

**Bell System
Standard
Components
Catalog**

X-75511



capacitors



**Bell Laboratories
Western Electric**



Bell System Standard Components - CAPACITORS

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**Issued by
Department 8257, Bell Laboratories
in cooperation with
Bell Laboratories and Western Electric Components Consultants**

ACKNOWLEDGMENTS

This catalog is a by-product of CODA, the Component Data system which provides engineering information on apparatus used in Bell System designed and manufactured products. It represents the joint efforts of Bell Laboratories and Western Electric personnel.

At Bell Laboratories, the following members of Department 8257 comprised the CODA team. Mr. T. J. O'Connor was the original leader - followed by Mr. A. G. Gross - and initiated production of this catalog. Mr. C. Weinberger acted as Data Base Administrator, assisted by Mrs. M. Perillo and later by Mrs. D. Coleman. Mrs. C. D. Perez and Messrs. D. H. Rucinski and J. H. Clary did the program development. Mrs. H. V. Carlson was Production Editor.

Several BTL and Western groups having engineering responsibility for capacitors provided data for the catalog and served as advisors. Specific persons who contributed in this way are listed in the Consultants section.

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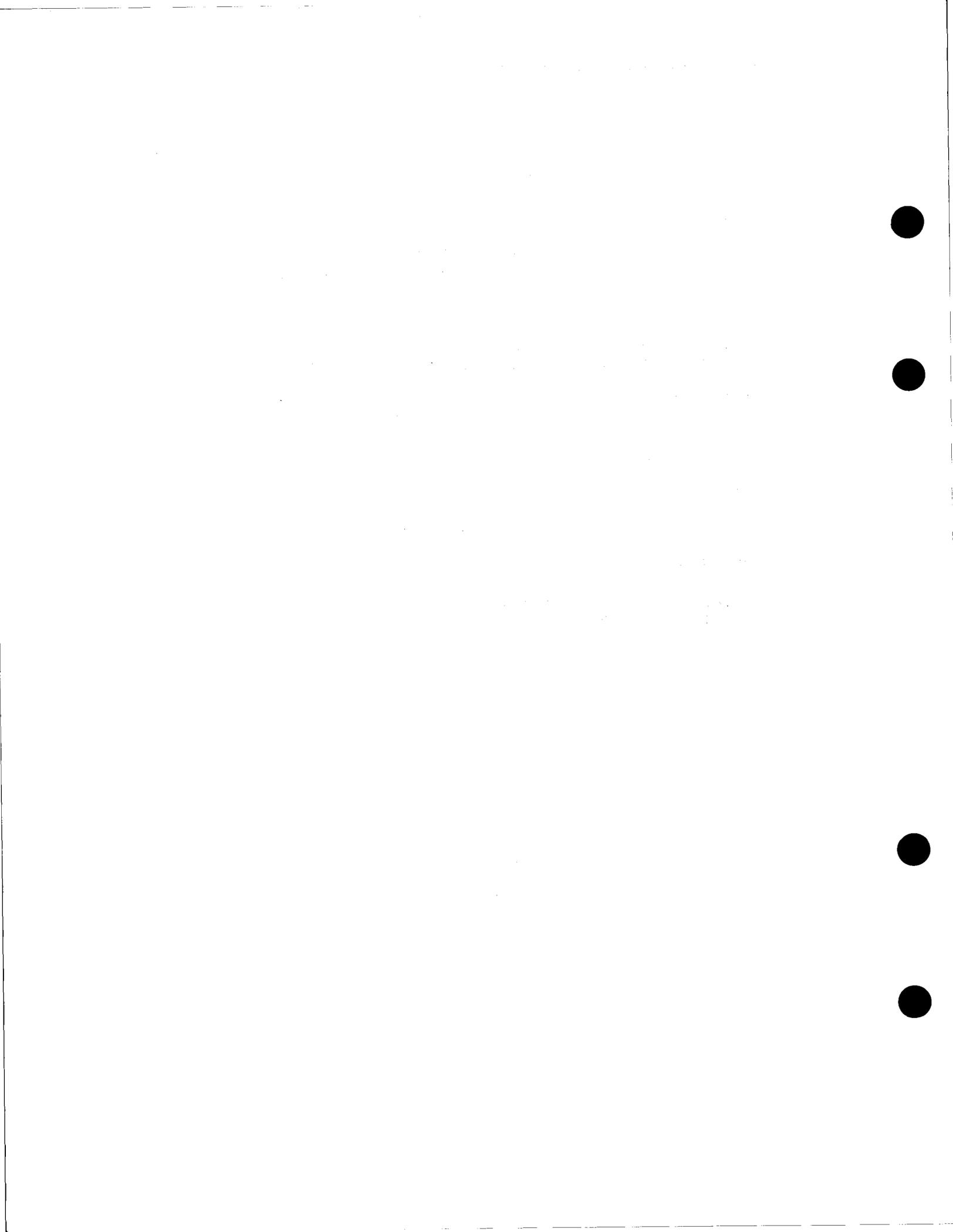
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INTRODUCTION
Purpose and Scope of Catalog

The primary purpose of this catalog is to aid in the selection of capacitors preferred for use in Bell System products. It will also provide limited assistance with other engineering functions related to the use of capacitors:

Evaluation - circuit analysis, cost, reliability

Procurement - ordering information

Layout and Mounting - physical outline, dimensions, layout of holes, printed wiring patterns

Interconnection - terminal, wiring data

Documentation - electrical parts lists, assembly stock lists

The catalog contains electrical, physical, and related data on various types of discrete capacitors that have been declared preferred by the cognizant capacitor specialists having engineering responsibility.

The catalog is formatted to provide the user with several alternative paths to the capacitor information he is seeking. In the GENERAL GUIDELINES section he will find guidelines to aid him in deciding on the type of capacitor (e.g., ceramic, electrolytic, etc) that can satisfy his requirements. In the sections covering each type, he can then find additional required data.

If only the KS Specification or Apparatus Code is known, the user can turn to the section headed KS SPECIFICATIONS or APPARATUS CODES and use the index there to locate the section where detailed information is given for the item in question. The index also lists the applicable tables which contain electrical and physical data.

Detailed information on nonpreferred capacitors is not included in this catalog. Nonpreferred KS-Specification capacitors are listed in the NONPREFERRED section. In some cases replacements are indicated. Prospective users of nonpreferred capacitors are urged to contact the appropriate consultant named in the CONSULTANTS section. The capacitor specialists listed there will be pleased to discuss applications problems by phone or in writing. A CAPACITOR

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CHECK LIST form is included in the CONSULTANTS section for guidance and use.

Supplementary information on capacitors (such as reliability) may be found in the documents referenced in the BIBLIOGRAPHY portion of this Introduction.

A LIST OF CATALOGS covering various discrete components is also included in the Introduction section.

Definitions of terms related to capacitors are included in the GLOSSARY section at the back of this catalog.

Arrangements have been made to provide catalog holders with the latest information on new or changed capacitor data. This will be done via the yellow CAPACITOR DATA BULLETIN (an example is the one transmitting this catalog to the holder). These bulletins will be issued between regular reissues of the catalog and should be filed in the catalog in the sections indicated.

Explanations of Illustrations and Tables

In this catalog, the characteristic curves shown in the capacitor-type sections are indicative of typical performance, except where maximum or minimum limits are specified.

The data shown in the machine-generated tables numbered 4.1 through 10.1 were originally gathered to populate a machine-sensible file which is intended to be used for several different applications. Consequently, certain machine needs were permitted to dictate how the data should be stored and presented. These considerations should not cause any difficulty in reading, understanding, or using the data.

The tables contain both electrical and physical data. In those cases where a KS Specification with a list number or an Apparatus Code identifies a single value or a range of values, and the physical dimensions are all the same, both the electrical and the physical data are shown in the same table (e.g., KS16048L07 in Table 4.1 in the Ceramic section). In those cases where the physical dimensions for a given list number vary with capacitance, a separate table

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showing the physical data is provided (e.g., KS16456L26 in Table 6.4 in the Mica section).

The dimensions given are nominal. Where conversions were made from fractions to decimals, the decimal is truncated to three places.

The dimensions shown for terminals are in inches except where a threaded terminal is indicated. In those cases, the whole number in the column headed TD is the number of threads per inch.

The table headings have the following meanings:

CAPACITANCE refers to nominal values in microfarads unless otherwise specified (the crossover is 9,999 picofarads). Where a range of values is available, the column is subheaded MIN and MAX. In the physical data tables the subheadings FROM and TO indicate the range of values for a given series of dimensions. For variable capacitors the limits are for the complete travel of the capacitor.

STD VALUE TABLE refers to the listing of standard values that should be specified for the given capacitor. See Standard Values section.

TOLERANCE is given in plus and minus percent. In certain cases where the percent tolerance does not apply for small values, the tolerance is given in picofarads (PF).

DCWV is the dc working voltage.

FIG. refers to the numbered drawings on the pages headed Physical Outlines. The drawings do not give all dimensional details, but serve to provide general outlines.

BODY SIZE gives the body dimensions, using the same designations (L, H, and D) as shown on the physical outline drawings. The L (length) dimension is the dimension that lies across a mounting surface. In the case of capacitors mounted by axial pigtail leads, the leads are assumed to emanate axially and project at right angles to the axis of the capacitor into a

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mounting surface. The H (height) dimension is the distance the item projects above the mounting surface. The D (depth) dimension is the depth of the unit. Where a capacitor is circular, a dimension may be repeated, depending on the orientation of the unit.

TERM. TYPE identifies the type of terminal. By referring to the description in this column, and the designations on the outline drawings, one can then obtain the applicable dimensions from the TERM. SIZE columns. For example, in the Paper capacitor section, in Table 7.1, 0.47 mF (KS20302L02), Fig. C31, two types of terminals are indicated, EXT THD and SOLDER. The outline drawing indicates a TL and TW for each terminal, and a TD for the solder terminal. The dimensions are as shown under those subheadings in Table 7.1.

TERM. SIZE gives terminal dimensions, using the designations (TL, TW, and TD) that appear on the physical outline drawings. Where applicable, TL refers to terminal length and TW to terminal width (if only these two dimensions are given, TW is usually a diameter). TD indicates terminal depth. In those cases where more than one terminal is available on a unit, e.g., solder and body, the outline drawings repeat the references to the TL, TW, and TD.

CODE is the KS-Specification or WECO Apparatus-Coded identification. KS numbers always appear with no space or dash. The list number is always two digits. Note that coded apparatus must be specified with the name, e.g., Capacitor 535AB. KS items and coded apparatus may require a value in addition to the part number.

In the Mica section a table is included which gives the characteristic of the capacitor by item identification code and value. The temperature coefficient and drift are expressed by the characteristic.

In the Electrolytic section the DF, ESR, and AC RIPPLE (see Glossary for definitions) are given where available.

In the Variable section the dielectric and the number of terminals are shown for each entry. The tolerance is given in picofarads.

INTRODUCTIONList of Bell System Standard Components Catalogs

(Engineering Reference Data Bulletins)

	<u>Spec No.</u>	<u>Issue Date</u>
Capacitors	X-75511	July 1973
Connectors	X-75500	June 1965
Cords	X-75517	Mar 1972
Frequency Generators - Power	X-75523	May 1958
Inductors	X-75527	June 1962
Power	X-75523	May 1958
Instruments, Electrical Indicating (Meters)	X-75504	Jan 1965
Jacks	X-75500	June 1965
Jack Mountings	X-75500	June 1965
Keys		
Numerically Coded	X-75507	June 1964
Universal Type for Switchboards	X-75506	Apr 1961
Knobs	X-75526	Feb 1962
Magnetic Amplifiers - Power	X-75523	May 1958
Mounting Plates	X-75505	June 1971
Networks, Transmission	X-75522	June 1961
Plugs	X-75500	June 1965
Relays		
280 Type	X-75305	Aug 1954
B and G Types	X-75508	Apr 1955
Meter Type	X-75504	Jan 1965
Multicontact - 286, 287, and 288 Types	X-75513	Apr 1963
Sealed Contact	X-75518	Apr 1964
Step-by-Step System - 221, 222, 223, 224, 225, 247, 248, 251 and 252 Types	X-75514	Dec 1960
Time Delay - Circuit Arrangements	X-75519	May 1961
U, UA, and Y Types	X-75375	June 1956
Wire Spring - AF, AG, AJ, and AK Types	X-75509	Dec 1967
Resistors	X-75525	Mar 1966
Terminals, Hermetically Sealed	X-75521	May 1961
Terminal Strips	X-75510	Apr 1962
Transformers - Power	X-75523	May 1958
Transmission	X-75512	Nov 1964
Voltage Regulators (AC) - Power	X-75523	May 1958



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Bibliography

Bell System Documentation

A Drawings (for specific capacitors); available from BTL Engineering Records.

Design Standards, Bell Telephone Laboratories Engineering Standards, Book 1, Vol 1; available from BTL Engineering Records.

KS Specifications (for specific capacitors); available from BTL Engineering Records.

Reliability Information (a handbook), BTL Center 655, February 1973.

External Publications

Brotherton, M., Capacitors, Their Use in Electronic Circuits, New York: D. Van Nostrand Co., Inc., 1946.

"Capacitors - A Comprehensive EDN Report," EDN Vol 11, No. 5, May 1966, pp 139-147.

Capacitors, Selection and Use of, MIL-STD-198C, December 10, 1971; available from BTL Engineering Records, Whippany.

Component Technology and Standardization (a manual), General Electric Company, Aerospace Electronic Systems, Utica, N. Y.

Dummer, G. W. A., Fixed Capacitors, Radio and Electronic Components, Vol 3, London: Sir Isaac Pitman & Sons, Ltd., 1964.







CONSULTANTS

<u>Capacitor Type</u>	<u>Consultant*</u>
CAPACITORS, GENERAL	Anderson, Primak, Gerondeau, Evenson
AIR, VARIABLE (See VARIABLE)	
CERAMIC (See also VARIABLE)	Checkaneck, Demchik
ELECTROLYTIC, ALUMINUM	Gerondeau, Gorman
ELECTROLYTIC, TANTALUM (Nonsolid)	Gerondeau, Gorman
ELECTROLYTIC, TANTALUM (Solid)	Durgin, McKnight
GLASS, VARIABLE (See VARIABLE)	
MICA	Primak, DeStefano
PAPER	Evenson, Scafidi, Anderson, Briedis
PAPER, METALIZED	Evenson, Scafidi
PLASTIC, POLYESTER, FOIL	Evenson, Scafidi, Anderson, Briedis
PLASTIC, POLYESTER, METALIZED	Evenson, Scafidi, Anderson, Briedis
PLASTIC, POLYPROPYLENE	Mellon, Scafidi Anderson, Briedis
PLASTIC, POLYSTYRENE	Mellon, Scafidi Anderson, Briedis
PLASTIC, CAP-PAKS	Mellon, Linsley, Scafidi
PORCELAIN (See CERAMIC)	
SILICON BASE, BEAM LEAD	Nacci
VARIABLE (AIR, CERAMIC, GLASS)	Anderson, Briedis

* See next page for complete names, addresses, phone numbers.

CONSULTANTS' ADDRESSES

Anderson, A. B. (Andy) Dept 53HT02458-WE-PPE*	8242-7341
Briedis, J. (John) Dept 53HT02458-WE-PPE*	8242-7282
Checkaneck, R. W. (Bob) Dept 53HT02458-WE-PPE*	8242-7123
Demchik, J. (John) Dept 53HT02458-WE-PPE*	8242-7022
DeStefano, R. J. (Rich) Dept 53HT02458-WE-PPE*	8242-7281
Durgin, D. E. (Mike) Dept 2242-BTL-AL	8235-6739
Evenson, R. K. (Dick) Dept 8211-WE-HW†	8354-3134
Gerondeau, P. J. (Pierre) Dept 53HT02458-WE-PPE*	8242-7350
Gorman, W. E. (Bill) Dept 53HT02458-WE-PPE*	8242-7349
Linsley, J. W. (John) Dept 8211-WE-HW†	8354-3134
McKnight, H. M. (Hugh) Dept 12WL314330-WE-NC‡	8574-2815
Mellon, J. J. (John) Dept 8211-WE-HW†	8354-5108
Nacci, J. M. (Joe) Dept 2134-BTL-AL	8235-7510
Primak, J. (John) Dept 53HT02458-WE-PPE*	8242-7124
Scafidi, A. M. (Tony) Dept 8211-WE-HW†	8354-3646

* WE, 50 Lawrence Road, Springfield, N. J. 07081

† WE, Hawthorne Station, Chicago, Ill. 60623

‡ WE, 3300 Lexington Road S. E., Winston-Salem, N. C. 27102

CONSULTANTS
Use of the Check List

This catalog is intended to provide the circuit designer with enough information to select a capacitor. Those capacitors listed are deemed by a group of qualified consultants to be most preferable for Bell System applications. The variety included should be sufficient to satisfy most requirements.

Should a need arise where it is difficult to make a satisfactory selection for the given application, the consultants stand ready to advise the circuit designer and aid him in choosing the best component for his application. The following check list is intended to provide a convenient method of organizing and listing the salient features which must be provided to the consultant so that he can properly advise the requestor.

This check list may be used informally

- for telephone inquiry when speed is important
- as a mailed inquiry so that the consultant can conduct a more thorough search
- as the data sheet attachment for an official request for appropriate action.

The check list is arranged as follows:

- Section 1 - Application
- Section 2 - Electrical requirements
- Section 3 - Environmental data
- Section 4 - Administrative information

Items calling for data considered not applicable and those requiring detailed information not readily available may be ignored.

It is suggested that the check list printed here be retained as a master copy, and that additional copies be reproduced by the users as required.



Date _____

To _____
(Capacitor Consultant)

(Address)

1. APPLICATION

1.1 Function in circuit (e.g., bypass, filtering, etc) _____

1.2 Where used: 1.2.1 Equipment _____ 1.2.2 Apparatus _____

1.3 Reliability

1.3.1 Unspecified _____ 1.3.2 General _____ 1.3.3 High Reliability _____

1.4 Cost considerations

1.4.1 Primary concern _____ 1.4.2 Unit cost limit if any _____

1.4.3 Quantity expected yearly _____

1.4.4 If cost is secondary, is it because of one of the following:

1.4.4.1 Reliability _____ 1.4.4.2 Size _____ 1.4.4.3 Special requirements _____
(See 2.5 below)

2. ELECTRICAL REQUIREMENTS

2.1 Initial nominal capacitance _____ 2.2 Tolerances _____

2.3 Voltage applied to component

2.3.1 Normal: dc _____ ac _____ frequency _____

2.3.2 Trouble: dc _____ ac _____ frequency _____

2.3.3 Waveforms _____ 2.3.4 Operating frequency range _____

2.3.5 Acceptable ripple _____ frequency _____

2.4 Current: 2.4.1 RMS value _____ 2.4.2 Waveform _____

2.5 Special requirements

2.5.1 Temperature coefficient _____ 2.5.2 Aging _____

2.5.3 Insulation resistance or leakage current _____

2.5.4 Power factor _____, Q _____, or equivalent series resistance _____

2.5.5 Internal inductance _____ 2.5.6 Maximum impedance _____

2.5.7 Other _____

3. ENVIRONMENTAL DATA

3.1 Temperature range _____ 3.2 Humidity _____

3.3 Vibration _____ 3.4 Shock _____

3.5 Size and/or shape _____

3.6 Terminal: 3.6.1 Type _____ 3.6.2 Orientation _____

3.7 Mounting means _____ 3.8 Case insulation _____

3.9 Other _____

4. ADMINISTRATIVE INFORMATION

4.1 Project _____ 4.2 Request No. _____ 4.3 SD No. _____

4.4 Check list prepared by _____

4.5 Location _____ 4.6 Phone No. _____







GENERAL GUIDELINES
Selection of a Capacitor Type

The capacitors in this catalog have been carefully selected with the expectation that they will meet most of the application requirements for the current technology level of Bell System products at a competitive cost. However, it is recognized that requirements will arise necessitating the use of special capacitors not on the preferred list. The consultants should be contacted for help with the selection of such capacitors. The Check List in the Consultants section provides guidance on the information the consultants will want to know about your circuit application.

Selection of a specific capacitor depends not only on how well it meets the circuit and physical layout and mounting requirements, but also on such factors as the environmental operating conditions, required reliability and life expectancy, Western Electric equipment assembly, wiring, and testing techniques, and the cost of the capacitor itself. Information included in this General Guidelines section is intended to assist the designer in making a first-level selection of the capacitor type most suitable for a given application.

One general factor to be considered in the selection of a capacitor (or any component) is that there may be a restricted list of capacitors that have been declared preferred for application on a particular project. Hopefully this list represents a subset of the Bell System preferred capacitors listed herein.

The capacitance value required is generally an initial consideration in capacitor selection. The chart in Figure 3-1 shows the ranges of available capacitance (and maximum dc working voltage) for the various types of preferred capacitors listed in the catalog. Obviously, if an application requires a capacitor with a value of more than a few microfarads, the electrolytics are candidates, provided other characteristics such as their polarity and wide tolerances are acceptable.

If a capacitor in the picofarad range is required for mounting on a printed circuit substrate, then the ceramic or silicon-base "chip" type of capacitor may be a candidate (see the basic data tables at the beginning of each capacitor-type section).

GENERAL GUIDELINES

Selection of a Capacitor Type

If the capacitors are to be used on printed wiring boards (PWB), and mechanized component insertion devices are planned for assembly of the boards, then it may be advisable to select axial pigtail capacitors that lend themselves to this assembly technique. When a number of similar capacitors are required on a PWB, the use of the CAP-PAK technique may be worth considering (see the Plastics section).

Along with capacitance ranges, Figure 3-1 also depicts the typical dc working voltage ranges for the various types of capacitors. Recommended voltage limits for specific capacitors are given in the appropriate capacitor-type section. The voltage rating of the capacitor selected should be sufficiently high to allow for reliability derating and voltage surges and transients likely to occur in the circuit. While certain capacitors are rated specifically for ac operation (e.g., the KS20588 paper types), the ac limitations of the capacitor in dc applications should be carefully considered. In any case, the peak value of the normally applied voltage should not exceed the dc rating. Corona should also be considered where ac or pulse conditions may occur in the use of high voltage capacitors (600 volts and up). For certain types of capacitors, corona start levels may occur as low as 250 peak volts.

Capacitors are subject to some degradation due to heat. Heat sources such as the soldering operation during assembly, nearby dissipative devices, internal heating of the capacitor itself, should all be considered so that the maximum temperature rating of the capacitor is not exceeded. Figure 3-2 depicts typical recommended temperature ranges for the various capacitor types. Specific temperature limits are given in the appropriate capacitor-type sections.

Figures 3-3, 3-4, and 3-5 combine curves for several capacitor types to show their relative changes in capacitance with temperature. Individual curves showing capacitance versus temperature are included in the capacitor-type sections.

Table 3-1 shows the most common failure modes for the various capacitor types. For a more comprehensive discussion of factors to be considered in the selection and application of capacitors and the impact on reliability,

GENERAL GUIDELINES
Selection of a Capacitor Type

users of this catalog are urged to refer to the BTL Reliability Information handbook (see the bibliography reference in the Introduction section of this catalog) - particularly the section on part selection and application.

Specifying Capacitors

Capacitor types are designated by their dielectric. Two types of Bell System identifying codes are used for capacitors listed: the Apparatus Code (App Code) which normally identifies a Western Electric manufactured capacitor; and the KS Specification (KS Spec) which normally identifies a capacitor purchased from an outside supplier. Complete engineering information on both App-Coded and KS-Spec capacitors is available from Bell Labs Engineering Records files. Selection of capacitors carrying either of these identifying codes provides assurance that the capacitors are in accord with Bell System standards.

Certain App Codes and KS Spec numbers identify a specific capacitor with single-valued characteristics. In such cases, the word "capacitor" plus the App Code or KS Spec number represents complete identification of a "unique" capacitor. For examples:

CAPACITOR	535NR
CAPACITOR	KS14571L1

Other App Codes and KS Spec numbers identify "family-type" capacitors in which the same identifying code or number covers a group of capacitors where all characteristics are single-valued except one - usually capacitance - which is available in a number of different values. These values should be selected from the standard value capacitance tables provided in the Standard Values section of this catalog.

In order to identify a specific capacitor of the family type, it is necessary to specify the capacitance value along with the word CAPACITOR and the App Code or KS Spec number. For examples:

CAPACITOR	719A	300 pF
CAPACITOR	KS16958L34	510 pF

GENERAL GUIDELINES

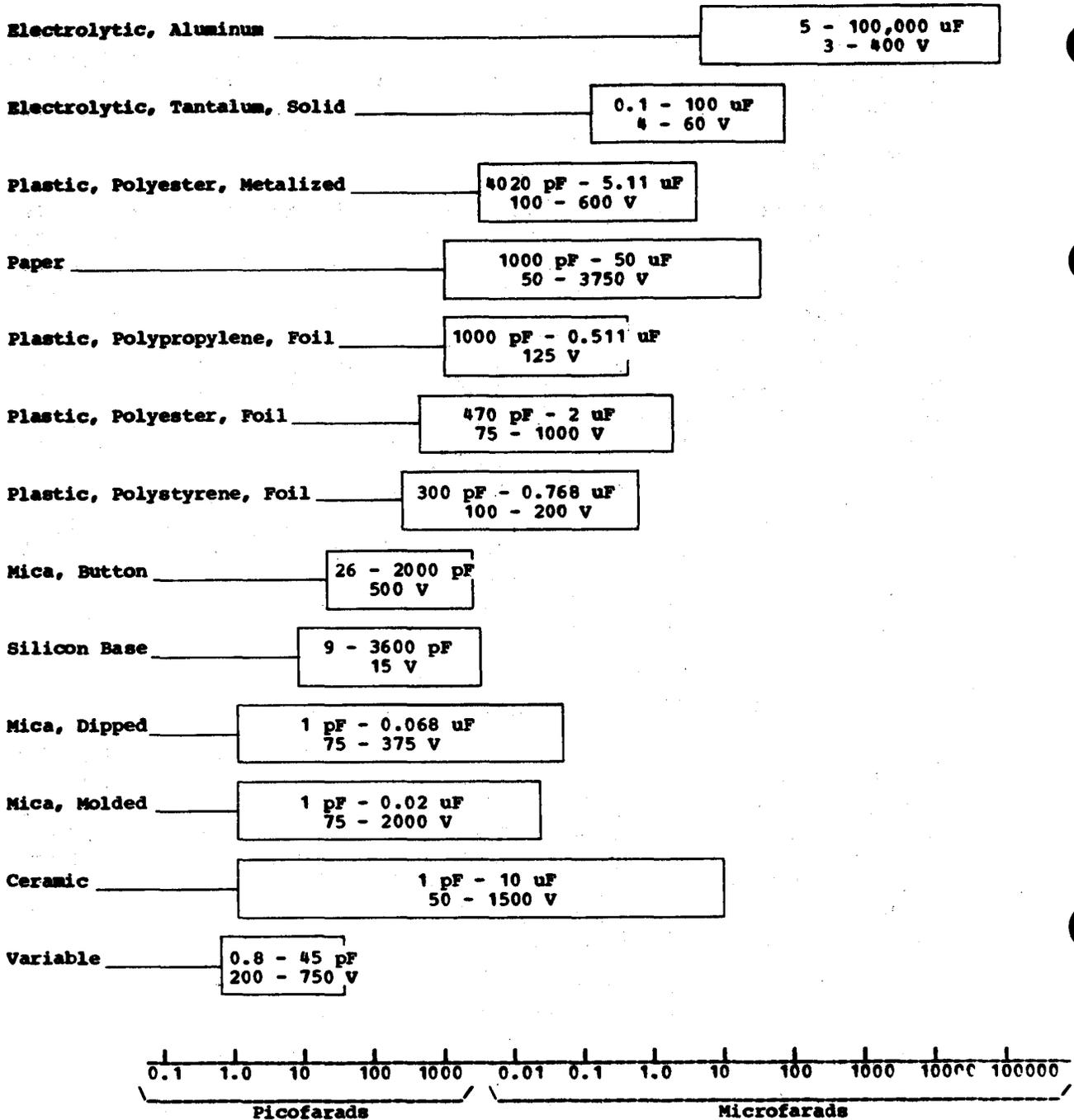


FIG. 3-1 AVAILABLE CAPACITANCE AND VOLTAGE RANGES

GENERAL GUIDELINES

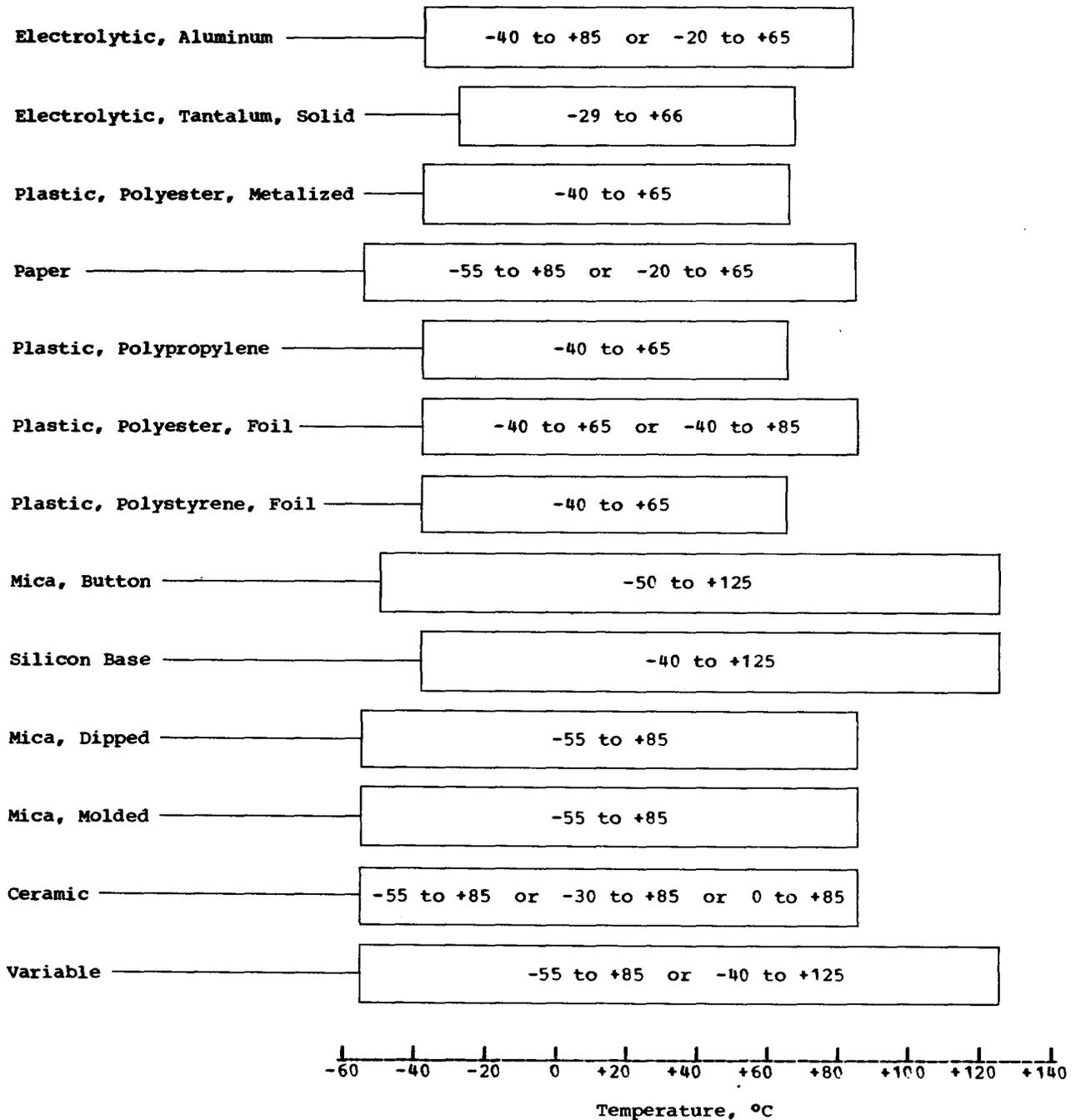


FIG. 3-2 AVAILABLE TEMPERATURE RANGES

GENERAL GUIDELINES

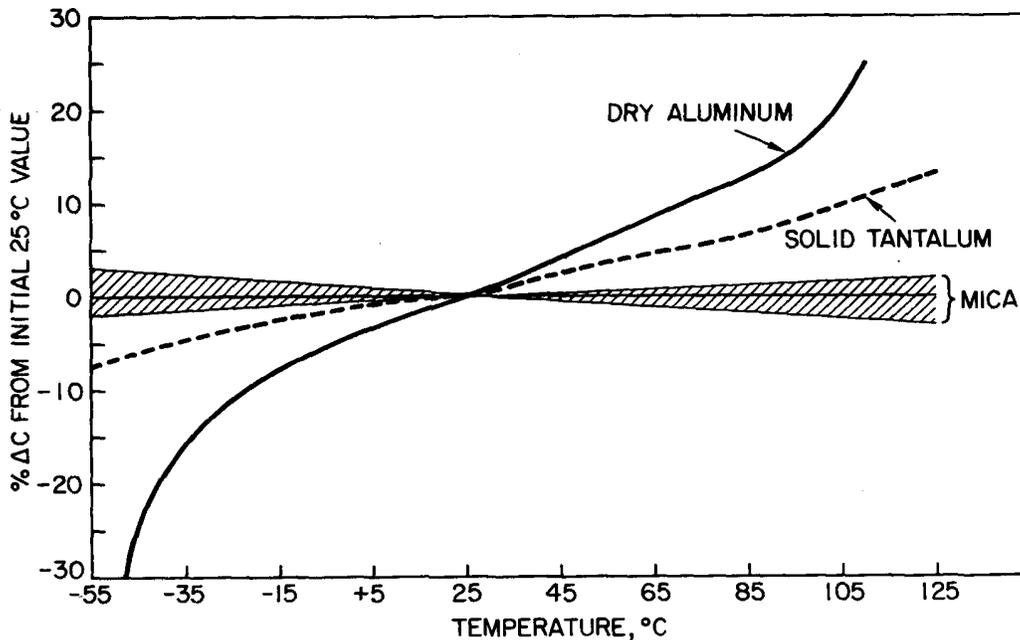


FIG. 3-3 CAPACITANCE CHANGE VS TEMPERATURE
TYPICAL FOR ELECTROLYTICS AND MICA

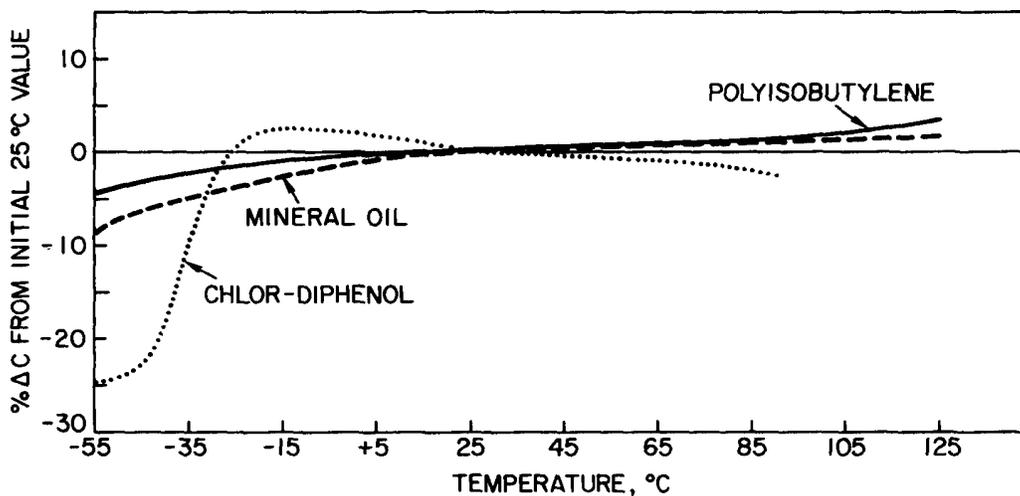


FIG. 3-4 CAPACITANCE CHANGE VS TEMPERATURE
TYPICAL FOR PAPER

GENERAL GUIDELINES

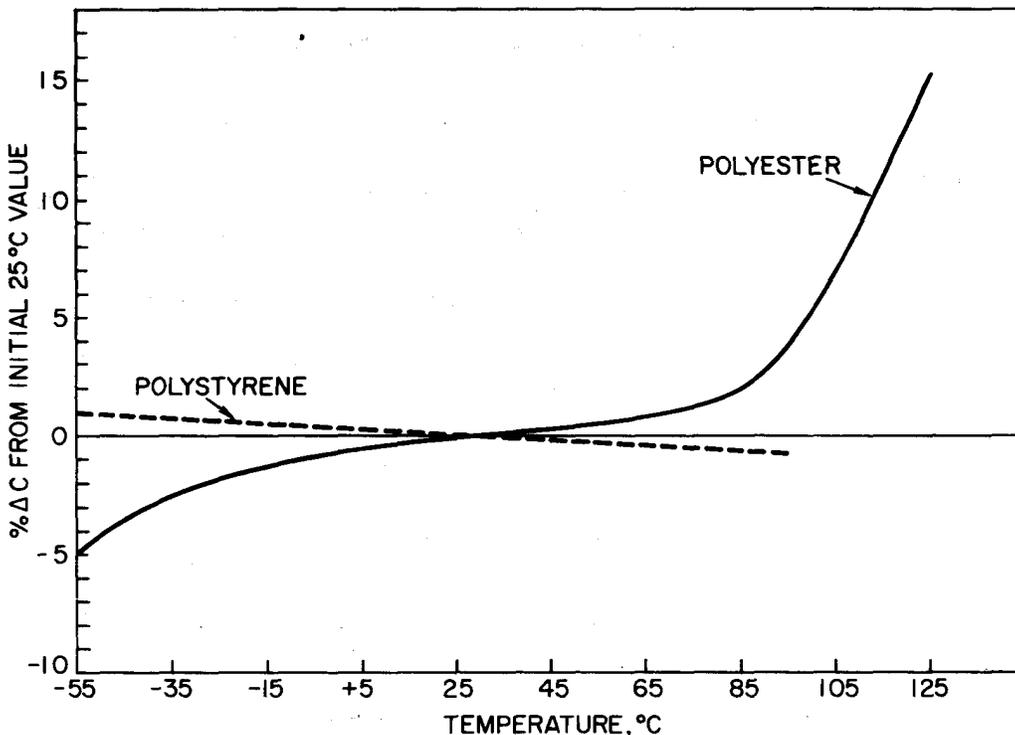


FIG. 3-5 CAPACITANCE CHANGE VS TEMPERATURE
TYPICAL FOR POLYESTER AND POLYSTYRENE PLASTICS

GENERAL GUIDELINES

TABLE 3-1

MOST COMMON CAPACITOR FAILURE MODES

Capacitor Type	When Subjected to				
	Normal Use	Excess Voltage	High Temperature	High Humidity	Severe Shock or Vibration
Ceramic	Open	Short	Short	High Leakage - Short	Open
Electrolytic, Aluminum	Open*	Short	Open*	†	Short
Electrolytic, Solid Tantalum	Short	Short	High Leakage - Short	†	Short
Mica	Short	Short	Short	High Leakage - Short	
Paper or Plastic, Foil	Short	Short	High Leakage - Short	†	Open
Plastic, Metalized	High Leakage	Noise	High Leakage	†	Open

* Actually an increase in series resistance. Appears open on ac.

† Hermetically sealed. Any effect is external.

Data source: Reliability Information, February 1973, courtesy BTL Center 655. See that handbook for further information.





CERAMIC
Basic Data

Basic Code	Type Code (Note)	Description	Capacitance Range		Tolerance %	DC Working Voltage	Oper Temp Range °C	
			From	To			From	To
CLASS 1								
KS19765	Family	Disc, Radial PT	2.2 pF	820 pF	2,5	200-1500	-55	+85
KS20505	Family	Chip	6.8 pF	0.015 uF	5,10	50	-55	+85
KS20609	Family	Chip	1 pF	510 pF	1	50	-55	+85
KS20676	Family	Flat, Radial PT Tubular, Axial PT	1.5 pF	0.024 uF	1,2,5,10	50	-55	+85
CLASS 2								
KS16048	Unique	Disc, Radial PT	1000 pF	0.01 uF	10,100	300	-30	+85
KS19774	Family	Flat, Radial PT Tubular, Axial PT	10 pF	2.2 uF	10,20	50-200	-55	+85
KS19953	Unique	Disc, Radial PT	4700 pF	0.1 uF	20,80	75	0	+85
KS20480	Unique	Flat, Radial PT Tubular, Axial PT	0.01 uF	0.05 uF	20	200	-55	+85
KS20506	Family	Chip	150 pF	1 uF	10,20	50	-55	+85
KS20688	Unique	Feed-through, Axial	1.4 uF	-	-	50	0	+85
KS20736	Family	Flat, Radial PT Tubular, Axial PT	0.01 uF	10 uF	20,80	50	0	+85
KS20787	Family	Chip	0.1 uF	4.7 uF	20,80	50	0	+85

Note: Unique - one value per code number. Family - range of values per code number.
See GENERAL GUIDELINES section for more information.



CERAMIC
Application GuideGeneral Description

Ceramic capacitors have an inorganic dielectric based on complex titanate compounds, sintered at high temperatures either in a single layer or in monolithic multiple layers. They are widely used because of good volumetric efficiency, wide range of characteristics, low cost, and excellent high-frequency capabilities. The ceramic capacitors listed in this catalog are available in disc, flat, tubular, or feed-through shapes with pigtail leads, and as chips for mounting on printed circuit substrates.

There are two dielectric classes of ceramic capacitors - Class 1 and Class 2.

Class 1, also known as temperature-compensating capacitors, use low dielectric constant ceramic dielectrics. Their capacitance varies relatively precisely and predictably over the operating range. Class 1 capacitors include NPO (negative, positive, zero) coefficient as well as other specific positive and negative temperature coefficient types. They are stable with time and voltage. NPO capacitors have a temperature coefficient of capacitance defined between +25 and +85°C as follows:

<u>Capacitance</u>	<u>TCC in ppm/°C</u>
> 10 pF	0 ± 30
4 - 10 pF	0 ± 60
2.1 - 3.9 pF	0 ± 120
< 2 pF	0 ± 250

Typical applications for Class 1 ceramic capacitors are for timing and frequency discrimination, and for temperature compensation.

Class 2, also known as general purpose or as high-K capacitors, use high dielectric constant ceramic dielectrics. Changes in capacitance are relatively large and nonlinear with respect to frequency, temperature, time, and voltage. Their main advantage is high volumetric efficiency. Class 2 capacitors are designated as X7R and Z5U with capacitance change characteristics as follows:

X7R: Capacitance change is less than ±15% over a temperature range of -55 to +125°C.

CERAMIC
Application Guide

Z5U: Capacitance change is less than +22%, -56%
over a temperature range of +10 to +85°C.

Typical applications for Class 2 capacitors are for
bypassing, blocking, and coupling.

Application Limitations for Ceramic Capacitors

Capacitors with NPO and X7R characteristics may be used
at dc voltages up to rated volts over a temperature range of
-55 to +85°C. Operation at temperatures up to +125°C is
permissible with reduced life expectancy or at a reduced
voltage.

Capacitors with Z5U characteristics may be used at dc
voltages up to rated volts over a temperature range of 0 to
+85°C. No harm will result from operation down to -55°C,
but the capacitance value will not be useful at these
temperatures (see characteristic curves).

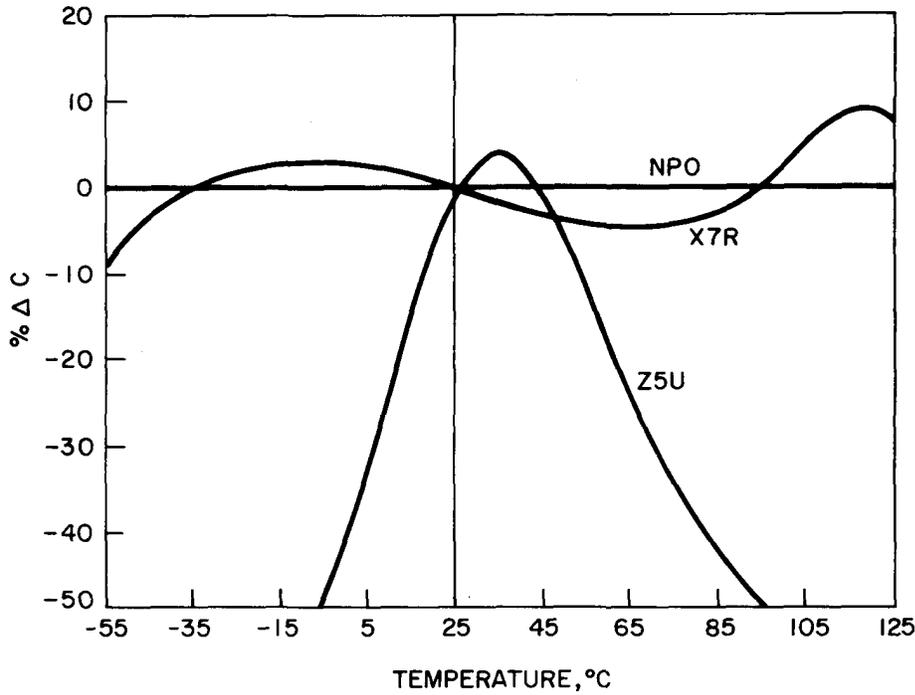
Designers are cautioned that transients which sometimes
occur in low impedance power distribution systems may be
harmful to ceramic capacitors. For example, it is not good
practice to use them as bypass capacitors directly across a
central office battery supply.

CERAMIC
Comparative Properties

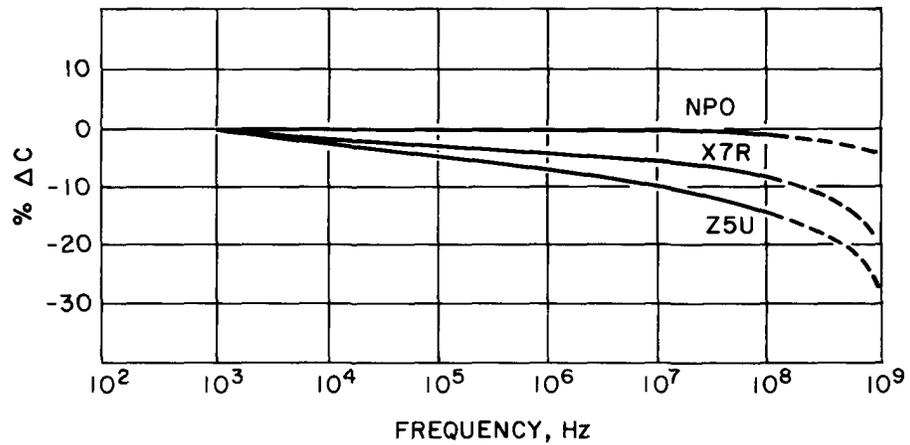
Type	Dissip Factor %	Temp Coeff	Capacitance Range			Relative Cost
			Time	Freq	Voltage	
Class 1						
NPO	< 0.1	Linear 0, +, -	Low	Low	Low	4-8
Class 2						
Z5U	< 4	Nonlinear	High	High	High	1
X7R	< 3	Nonlinear	High	High	High	2



CERAMIC
Characteristic Curves

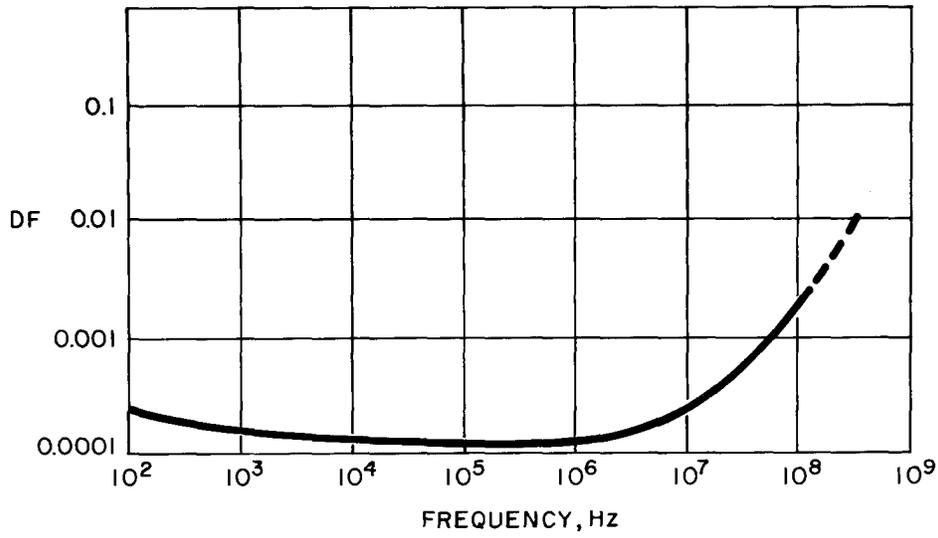


CAPACITANCE CHANGE VS TEMPERATURE

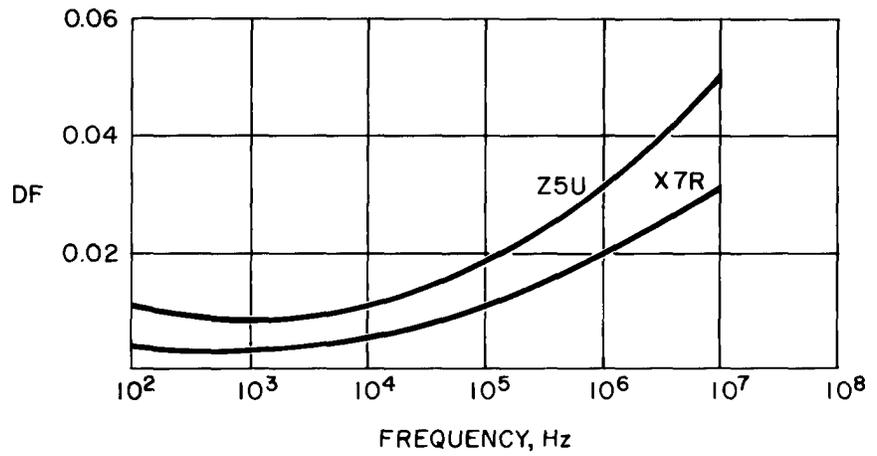


CAPACITANCE CHANGE VS FREQUENCY

CERAMIC
Characteristic Curves

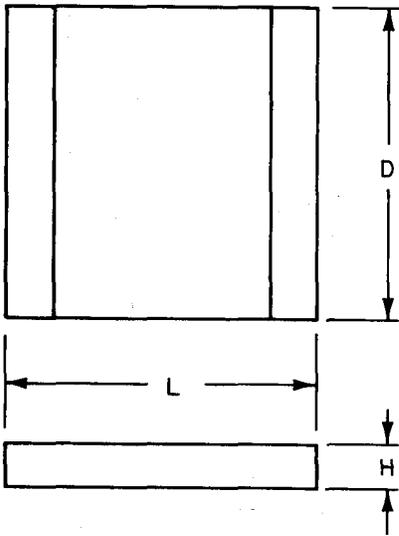


DISSIPATION FACTOR VS FREQUENCY
TYPICAL FOR NPO CLASS 1



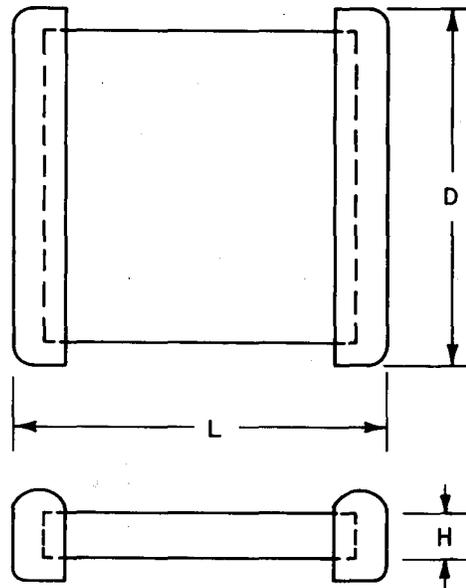
DISSIPATION FACTOR VS FREQUENCY
TYPICAL FOR CLASS 2

CERAMIC
Physical Outlines



TERMINATION DIMENSIONS ARE NOMINALLY THE OVERALL DIMENSIONS OF THE CHIP.

FIG. C01



TERMINATION DIMENSIONS INCLUDE NOMINAL DEPOSIT OF SOLDER ON CHIP.

FIG. C02

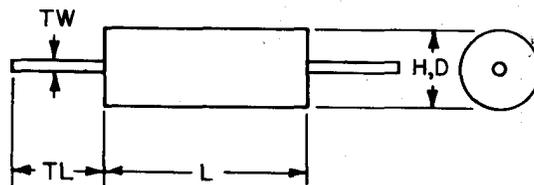
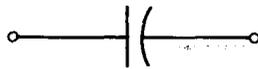


FIG. C10

CERAMIC
Physical Outlines

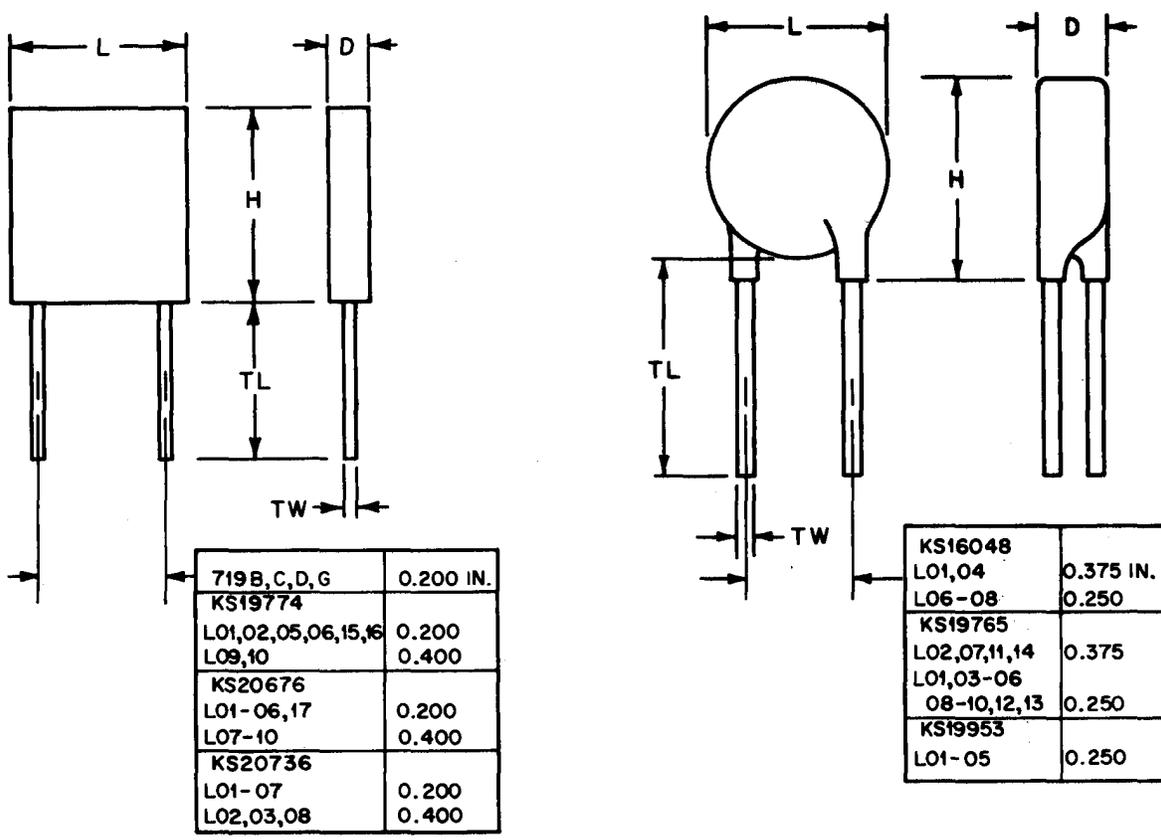


FIG. C12

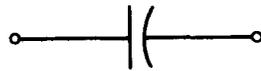


FIG. C41

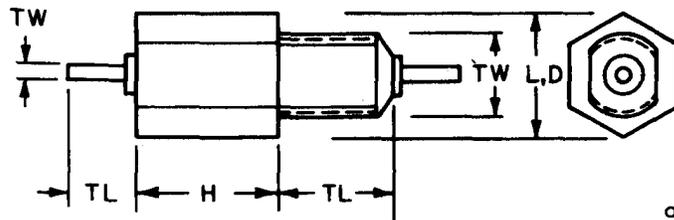
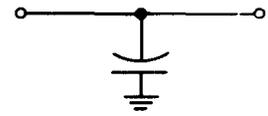


FIG. C16



BELL SYSTEM STANDARD COMPONENTS - CAPACITORS

CERAMIC
(UNIQUE CODES)
ELECTRICAL AND PHYSICAL DATA

TABLE 4.1

FOR KS20688, THE CAPACITANCE VALUE SHOWN IS A GUARANTEED MINIMUM VALUE. (NO TOLERANCE IS SPECIFIED ON THE UPPER LIMIT.)

CAPACITANCE	TDLERANCE		DCHV	FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)			CODE
	+Z	-Z			L	H	D		TL	TW	TD	
1000 PF	25	10	300	C41	0.44	0.44	0.156	RAD PT	1.25	0.032		KS16048L07
2200 PF	10	10	300	C41	0.595	0.595	0.156	RAD PT	2	0.032		KS16048L01
4700 PF	80	20	75	C41	0.275	0.375	0.125	RAD PT	1.25	0.025		KS19953L01
5100 PF	25	10	300	C41	0.595	0.595	0.156	RAD PT	1.25	0.032		KS16048L06
5100 PF	25	10	300	C41	0.595	0.595	0.156	RAD PT	0.219	0.032		KS16048L08
0.01	100	0	300	C41	0.595	0.595	0.156	RAD PT	1.25	0.032		KS16048L04
0.01	80	20	75	C41	0.344	0.46	0.125	RAD PT	1.25	0.025		KS19953L02
0.01	20	20	200	C12	0.29	0.29	0.09	RAD PT	1.25	0.025		KS20480L01
0.022	80	20	75	C41	0.475	0.585	0.125	RAD PT	1.25	0.025		KS19953L03
0.047	80	20	75	C41	0.675	0.765	0.125	RAD PT	1.25	0.025		KS19953L04
0.05	20	20	200	C10	0.5	0.19	0.19	AXIAL PT	1.25	0.025		KS20480L02
0.1	80	20	75	C41	0.72	0.845	0.187	RAD PT	1.25	0.025		KS19953L05
1.4			50	C16	0.315	0.378	0.25	SOLDER	0.2	0.04		KS20688L01
								EXT THD	0.312	0.216	32	KS20688L01
1.4			50	C16	0.315	0.378	0.25	SOLDER	0.15	0.04		KS20688L02
								EXT THD	0.19	0.216	32	KS20688L02
1.4			50	C16	0.315	0.378	0.25	SOLDER	0.2	0.04		KS20688L03
								EXT THD	0.19	0.216	32	KS20688L03
1.4			50	C16	0.315	0.378	0.25	SOLDER	0.15	0.04		KS20688L04
								EXT THD	0.312	0.216	32	KS20688L04

TABLE 4.2

WHEN TOLERANCE IS SHOWN IN BOTH % AND PF, THE LARGEST TOLERANCE VARIATION APPLIES

CAPACITANCE		STD VALUE TABLE	TOLERANCE				DCWV	FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)			CODE
MIN	MAX		+%	-%	+PF	-PF			L	H	D		TL	TW	TD	
1 PF	510 PF	CEIA05	1	1	1	1	50	C02	0.18	0.05	0.08	SOLDER	0.22	0.055	0.105	KS20609L01
1 PF	510 PF	CEIA05	1	1	1	1	50	C01	0.18	0.047	0.08	BONDED	0.18	0.047	0.08	KS20609L21
1.5 PF	9.88 PF	C00000			0.2	0.2	50	C12	0.19	0.19	0.09	RAD PT	1.25	0.025		KS20676L17
2.2 PF	51 PF	CEIA05	5	5	0.5	0.5	500	C41	0.3	0.425	0.156	RAD PT	1.5	0.025		KS19765L08
4.3 PF	120 PF	CEIA05	5	5	0.5	0.5	500	C41	0.29	0.415	0.156	RAO PT	1.5	0.025		KS19765L01
6.8 PF	220 PF	CEIA05	10	10	2	2	50	C01	0.08	0.04	0.05	BONDED	0.08	0.04	0.05	KS20505L22
6.8 PF	220 PF	CEIA05	5	5	1	1	50	C02	0.08	0.04	0.05	SOLDER	0.125	0.055	0.075	KS20505L01
6.8 PF	220 PF	CEIA05	10	10	2	2	50	C02	0.08	0.04	0.05	SOLDER	0.125	0.055	0.075	KS20505L02
6.8 PF	220 PF	CEIA05	5	5	1	1	50	C01	0.08	0.04	0.05	BONDED	0.08	0.04	0.05	KS20505L21
6.8 PF	1500 PF	CEIA05	5	5	1	1	50	C01	0.18	0.047	0.08	BONDED	0.18	0.047	0.08	KS20505L25
6.8 PF	1500 PF	CEIA05	10	10	2	2	50	C01	0.18	0.047	0.08	BONDED	0.18	0.047	0.08	KS20505L26
6.8 PF	1500 PF	CEIA05	5	5	1	1	50	C02	0.18	0.05	0.08	SOLDER	0.22	0.055	0.105	KS20505L05
6.8 PF	1500 PF	CEIA05	10	10	2	2	50	C02	0.18	0.05	0.08	SOLDER	0.22	0.055	0.105	KS20505L06
10 PF	820 PF	CEIA05	5	5	1	1	50	C10	0.25	0.095	0.095	AXIAL PT	1.25	0.015		KS20676L11
10 PF	820 PF	CEIA10	10	10	2	2	50	C10	0.25	0.095	0.095	AXIAL PT	1.25	0.015		KS20676L12
10 PF	2200 PF	CEIA05	5	5	1	1	50	C12	0.19	0.19	0.09	RAD PT	1.25	0.025		KS20676L01
10 PF	2200 PF	CEIA10	10	10	2	2	50	C12	0.19	0.19	0.09	RAD PT	1.25	0.025		KS20676L02
10 PF	3300 PF	C00000	1	1	0.25	0.25	50	C10	0.385	0.14	0.14	AXIAL PT	1.25	0.025		KS20676L13
10 PF	3300 PF	C00000	2	2	0.5	0.5	50	C10	0.385	0.14	0.14	AXIAL PT	1.25	0.025		KS20676L14
10 PF	7500 PF	C00000	1	1	0.25	0.25	50	C12	0.29	0.29	0.09	RAD PT	1.25	0.025		KS20676L03
10 PF	7500 PF	C00000	2	2	0.5	0.5	50	C12	0.29	0.29	0.09	RAD PT	1.25	0.025		KS20676L04
10 PF	0.01	CEIA10	10	10			100	C12	0.19	0.19	0.09	RAD PT	1.25	0.025		KS19774L01
10 PF	0.01	CEIA10	20	20			100	C12	0.19	0.19	0.09	RAD PT	1.25	0.025		KS19774L02
10 PF	0.022	CEIA10	10	10			100	C10	0.25	0.095	0.095	AXIAL PT	1.25	0.015		KS19774L07
10 PF	0.022	CEIA10	20	20			100	C10	0.25	0.095	0.095	AXIAL PT	1.25	0.015		KS19774L08
15 PF	510 PF	CEIA05	5	5	1	1	50	C02	0.18	0.04	0.05	SOLDER	0.22	0.055	0.08	KS20505L03
15 PF	510 PF	CEIA05	10	10	2	2	50	C02	0.18	0.04	0.05	SOLDER	0.22	0.055	0.08	KS20505L04
18 PF	47 PF	CEIA05	5	5			1500	C41	0.49	0.615	0.187	RAD PT	1.5	0.025		KS19765L05
30 PF	100 PF	CEIA05	5	5			750	C41	0.437	0.562	0.156	RAD PT	1.5	0.025		KS19765L04
43 PF	100 PF	CEIA05	5	5			500	C41	0.437	0.562	0.156	RAD PT	1.5	0.025		KS19765L06
56 PF	120 PF	CEIA05	5	5			500	C41	0.437	0.562	0.156	RAD PT	1.5	0.025		KS19765L09
81 PF	110 PF	CEIA05	2	2			200	C41	0.475	0.6	0.125	RAD PT	1.5	0.025		KS19765L15
110 PF	180 PF	CEIA05	5	5			750	C41	0.675	0.8	0.187	RAD PT	1.5	0.025		KS19765L03
110 PF	220 PF	CEIA05	5	5			500	C41	0.593	0.718	0.156	RAD PT	1.5	0.025		KS19765L07
111 PF	230 PF	CEIA05	2	2			200	C41	0.575	0.7	0.125	RAD PT	1.5	0.025		KS19765L16
130 PF	160 PF	CEIA05	5	5			500	C41	0.49	0.615	0.156	RAD PT	1.5	0.025		KS19765L10
130 PF	220 PF	CEIA05	5	5			500	C41	0.36	0.485	0.156	RAD PT	1.5	0.025		KS19765L12
150 PF	0.01	CEIA10	10	10			50	C01	0.08	0.04	0.05	BONDED	0.08	0.04	0.05	KS20506L21

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 CERAMIC
 (FAMILY CODES)
 ELECTRICAL & PHYSICAL DATA

BELL SYSTEM STANDARD COMPONENTS - CAPACITORS

TABLE 4.2
(CONT'D)

WHEN TOLERANCE IS SHOWN IN BOTH X AND PF, THE LARGEST TOLERANCE VARIATION APPLIES

CAPACITANCE		STD VALUE TABLE	TOLERANCE				DCWV	FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)			CODE
MIN	MAX		+X	-X	+PF	-PF			L	H	D		TL	TW	TD	
150 PF	0.01	CEIA10	20	20			50	C01	0.08	0.04	0.05	BONDED	0.08	0.04	0.05	KS20506L22
150 PF	0.01	CEIA10	10	10			50	C02	0.08	0.04	0.05	SOLDER	0.125	0.055	0.075	KS20506L01
150 PF	0.01	CEIA10	20	20			50	C02	0.08	0.04	0.05	SOLDER	0.125	0.055	0.075	KS20506L02
150 PF	0.1	CEIA10	10	10			50	C02	0.18	0.05	0.08	SOLDER	0.22	0.055	0.105	KS20506L05
150 PF	0.1	CEIA10	20	20			50	C02	0.18	0.05	0.08	SOLDER	0.22	0.055	0.105	KS20506L06
150 PF	0.1	CEIA10	10	10			50	C01	0.18	0.047	0.08	BONDED	0.18	0.047	0.08	KS20506L25
150 PF	0.1	CEIA10	20	20			50	C01	0.18	0.047	0.08	BONDED	0.18	0.047	0.08	KS20506L26
200 PF	270 PF	CEIA05	5	5			750	C41	0.75	0.875	0.187	RAD PT	1.5	0.025		KS19765L02
240 PF	300 PF	CEIA05	5	5			500	C41	0.437	0.562	0.156	RAD PT	1.5	0.025		KS19765L13
330 PF	0.022	CEIA10	10	10			50	C02	0.18	0.04	0.05	SOLDER	0.22	0.055	0.08	KS20506L03
330 PF	0.022	CEIA10	20	20			50	C02	0.18	0.04	0.05	SOLDER	0.22	0.055	0.08	KS20506L04
470 PF	470 PF	C	5	5			500	C41	0.937	1.062	0.156	RAD PT	1.5	0.025		KS19765L14
470 PF	820 PF	CEIA05	5	5			500	C41	0.8	0.925	0.156	RAD PT	1.5	0.025		KS19765L11
910 PF	3300 PF	CEIA05	5	5			50	C10	0.385	0.14	0.14	AXIAL PT	1.25	0.025		KS20676L15
910 PF	3300 PF	CEIA10	10	10			50	C10	0.385	0.14	0.14	AXIAL PT	1.25	0.025		KS20676L16
1600 PF	5100 PF	CEIA05	5	5			50	C02	0.18	0.05	0.25	SOLDER	0.22	0.055	0.28	KS20505L07
1600 PF	5100 PF	CEIA05	10	10			50	C02	0.18	0.05	0.25	SOLDER	0.22	0.055	0.28	KS20505L08
2400 PF	7500 PF	CEIA10	10	10			50	C12	0.29	0.29	0.09	RAD PT	1.25	0.025		KS20676L06
2400 PF	7500 PF	CEIA05	5	5			50	C12	0.29	0.29	0.09	RAD PT	1.25	0.025		KS20676L05
4700 PF	0.033	CEIA10	10	10			200	C12	0.29	0.29	0.09	RAD PT	1.25	0.025		KS19774L15
4700 PF	0.033	CEIA10	20	20			200	C12	0.29	0.29	0.09	RAD PT	1.25	0.025		KS19774L16
5600 PF	0.015	CEIA05	5	5			50	C02	0.32	0.05	0.5	SOLDER	0.385	0.055	0.545	KS20505L09
5600 PF	0.015	CEIA05	10	10			50	C02	0.32	0.05	0.5	SOLDER	0.385	0.055	0.545	KS20505L10
7510 PF	0.024	C00000	1	1			50	C12	0.49	0.49	0.14	RAD PT	1.25	0.025		KS20676L07
7510 PF	0.024	CEIA10	10	10			50	C12	0.49	0.49	0.14	RAD PT	1.25	0.025		KS20676L10
7510 PF	0.024	C00000	2	2			50	C12	0.49	0.49	0.14	RAD PT	1.25	0.025		KS20676L08
7510 PF	0.024	CEIA05	5	5			50	C12	0.49	0.49	0.14	RAD PT	1.25	0.025		KS20676L09
0.01	0.1	C00004	80	20			50	C10	0.25	0.095	0.095	AXIAL PT	1.25	0.015		KS20736L04
0.012	0.47	CEIA10	10	10			50	C12	0.29	0.29	0.09	RAD PT	1.25	0.025		KS19774L05
0.012	0.47	CEIA10	20	20			50	C12	0.29	0.29	0.09	RAD PT	1.25	0.025		KS19774L06
0.027	0.047	CEIA10	20	20			50	C10	0.25	0.095	0.095	AXIAL PT	1.25	0.015		KS19774L12
0.027	0.047	CEIA10	10	10			50	C10	0.25	0.095	0.095	AXIAL PT	1.25	0.015		KS19774L11
0.056	0.27	CEIA10	10	10			50	C10	0.385	0.14	0.14	AXIAL PT	1.25	0.025		KS19774L13
0.056	0.27	CEIA10	20	20			50	C10	0.385	0.14	0.14	AXIAL PT	1.25	0.025		KS19774L14
0.1	0.22	C00001	80	20			50	C01	0.18	0.047	0.08	BONDED	0.18	0.047	0.08	KS20787L21
0.1	0.22	C00001	80	20			50	C02	0.18	0.047	0.08	SOLDER	0.22	0.07	0.105	KS20787L01
0.1	1	C00004	80	20			50	C12	0.29	0.29	0.095	RAD PT	1.25	0.025		KS20736L01

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BELL SYSTEM STANDARD COMPONENTS - CAPACITORS

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TABLE 4.2
(CONT'D)

WHEN TOLERANCE IS SHOWN IN BOTH % AND PF, THE LARGEST TOLERANCE VARIATION APPLIES

CAPACITANCE		STD VALUE TABLE	TOLERANCE				DCMV	FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)			CODE
MIN	MAX		+%	-%	+PF	-PF			L	H	D		TL	TW	TD	
0.1	4.7	CEIA20	20	20			50	C12	0.49	0.49	0.14	RAD PT	1.25	0.025		KS20736L08
0.12	0.27	CEIA10	20	20			50	C02	0.18	0.05	0.25	SOLDER	0.22	0.055	0.28	KS20506L08
0.12	0.27	CEIA10	10	10			50	C02	0.18	0.05	0.25	SOLDER	0.22	0.055	0.28	KS20506L07
0.22	0.47	C00003	80	20			50	C10	0.385	0.14	0.14	AXIAL PT	1.25	0.025		KS20736L05
0.33	1	CEIA10	10	10			50	C02	0.32	0.05	0.5	SOLDER	0.385	0.055	0.545	KS20506L09
0.33	1	CEIA10	20	20			50	C02	0.32	0.05	0.5	SOLDER	0.385	0.055	0.545	KS20506L10
0.47	1	C00002	80	20			50	C02	0.18	0.05	0.25	SOLDER	0.22	0.055	0.28	KS20787L02
0.56	2.2	CEIA10	10	10			50	C12	0.49	0.49	0.14	RAD PT	1.25	0.025		KS19774L09
0.56	2.2	CEIA10	20	20			50	C12	0.49	0.49	0.14	RAD PT	1.25	0.025		KS19774L10
1	2.2	C00001	80	20			50	C10	0.5	0.25	0.25	AXIAL PT	1.25	0.025		KS20736L06
2.2	2.2	C	80	20			50	C12	0.29	0.29	0.185	RAD PT	1.25	0.025		KS20736L07
2.2	4.7	C00003	80	20			50	C02	0.32	0.05	0.5	SOLDER	0.385	0.055	0.545	KS20787L03
2.2	4.7	C00003	80	20			50	C12	0.49	0.49	0.14	RAD PT	1.25	0.025		KS20736L02
10	10	C	80	20			50	C12	0.49	0.49	0.24	RAD PT	1.25	0.025		KS20736L03

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ELECTROLYTIC
Basic Data

Basic Code	Type Code (Note)	Description	Capacitance Range		Tolerance %	DC Working Voltage	Oper Temp Range °C	
			From	To			From	To
DRY ALUMINUM								
KS16390*	Unique	Tubular, Axial PT	5 uF	500 uF	10,50	3-150	-20	+65
KS19524*	Unique	Cyl Can, Axial PT, Single Ended	8 uF	250 uF	5,15,20,25,33,50	15-150	-20	+65
KS19658*	Unique	Tubular, Axial PT	8 uF	4500 uF	10,20,50,75	5-400	-20	+65
KS20133*#	Unique	Cyl Can, Threaded, Single Ended	700 uF	100000 uF	10,50	7.5-400	-20	+65
KS20423†	Unique	Tubular, Axial PT	22 uF	210 uF	10,50	30-60	-40	+85
KS20443†	Unique	Cyl Can, Threaded, Single Ended	600 uF	6000 uF	10,50	30-200	-40	+85
KS20446†	Unique	Tubular, Axial PT	95 uF	6900 uF	10,50	7.5-300	-40	+85
SOLID TANTALUM								
600	Unique	Tubular, Axial PT	1 uF	5 uF	20	8-60	-29	+66
601	Unique	Tubular, Axial PT	5 uF	30 uF	10,20	8-35	-29	+66
602	Unique	Tubular, Axial PT	15 uF	100 uF	10,20	8-35	-29	+66
603	Unique	Tubular, Axial PT	4 uF	16 uF	20	4-20	-29	+66
604	Unique	Tubular, Axial PT	10 uF	50 uF	10,20	8-35	-29	+66
605	Unique	Tubular, Axial PT	0.68 uF	3.3 uF	10,20	35-60	-29	+66
606	Unique	Tubular, Axial PT	3.3 uF	10 uF	10,20	60	-29	+66
607	Unique	Tubular, Axial PT	0.1 uF	1 uF	20	20-60	-29	+66
608	Unique	Tubular, Axial PT	22 uF	39 uF	10,20	35-60	-29	+66
609	Unique	Tubular, Axial PT	1 uF	3.3 uF	10,20	35-60	-29	+66
610	Unique	Tubular, Axial PT	4.7 uF	10 uF	10,20	60	-29	+66
611	Unique	Tubular, Axial PT	3.9 uF	3.9 uF	10	8	-29	+66
612	Unique	Tubular, Axial PT	100 uF	100 uF	10,20	8-20	-29	+66

* Borate

† DMF

Computer grade

Note: Unique - one value per code number. Family - range of values per code number. See GENERAL GUIDELINES section for more information.



ELECTROLYTIC
Application Guide

General Description

Electrolytic capacitors are the type in which the dielectric has been formed by electrolytic action. This type of capacitor usually consists of a base metal (anode) on which an oxide dielectric is anodically formed, supplemented with an electrolyte which provides contact between the dielectric and the metallic cathode.

Electrolytic capacitors have a high volumetric efficiency, providing the lowest volume, mass, and cost per microfarad of any type of capacitor. Their main disadvantage lies in their polarity - their limited ability to withstand reverse voltages.

There are four principal types of electrolytic capacitors:

- (1) Dry Aluminum, combining aluminum foil, aluminum oxide dielectric, paper separator impregnated with electrolyte, and aluminum foil.
- (2) Tantalum Foil, combining tantalum foil, tantalum oxide dielectric, paper separator impregnated with electrolyte, and tantalum foil.
- (3) Wet Slug Tantalum, combining porous tantalum pellets, tantalum oxide dielectric, sulfuric acid gelled electrolyte, and silver cathode.
- (4) Solid Tantalum, combining porous tantalum pellets, tantalum oxide dielectric, manganese dioxide solid electrolyte, silver and solder cathode.

The tantalum foil and wet slug types are not preferred, and so data on them are not included in this catalog.

The preferred dry aluminum electrolytic capacitors described herein are tubular with axial pigtail leads and cylindrical cans with pigtail leads, or internally or externally threaded stud-terminals. The preferred solid tantalum electrolytics included are tubular with pigtail leads.

ELECTROLYTIC
Application Guide

Features

Dry Aluminum Types

These capacitors provide large capacitance at low cost. They may be used for low-frequency filtering, bypassing, and coupling. They are not recommended for timing circuits.

Temperature is the principal aging factor; reliable operating life is achievable only within the recommended temperature ratings.

Voltage reversal should be avoided, and peak voltage should not exceed the rated voltage. Ripple voltage (or current) should not exceed recommended rating, or excessive internal heating will result.

Capacitance decreases with increasing frequency (self-resonant frequency = 10 - 100 kHz, depending on capacitance value and construction). Capacitance decreases also with decreasing temperature and with time, but is independent of applied voltage.

Equivalent Series Resistance (ESR) is a function of frequency, decreasing with an increase in frequency, increasing with decreasing temperature and with time.

The dry aluminum electrolytic capacitors have the limitations of being polar, have relatively high losses, and are relatively unstable with respect to frequency, temperature, and time.

Field experience and accelerated test data indicate a failure rate of 0.1 to less than 0.01% per 1000 hours for usages within the recommended ratings of temperature and voltage.

Solid Tantalum Types

The use of the solid and dry electrolyte in these capacitors provides a more stable capacitance with variations in time and temperature than in the other electrolytics (a maximum capacitance variation of less than 10% over -55 to +125°C).

ELECTROLYTIC
Application Guide

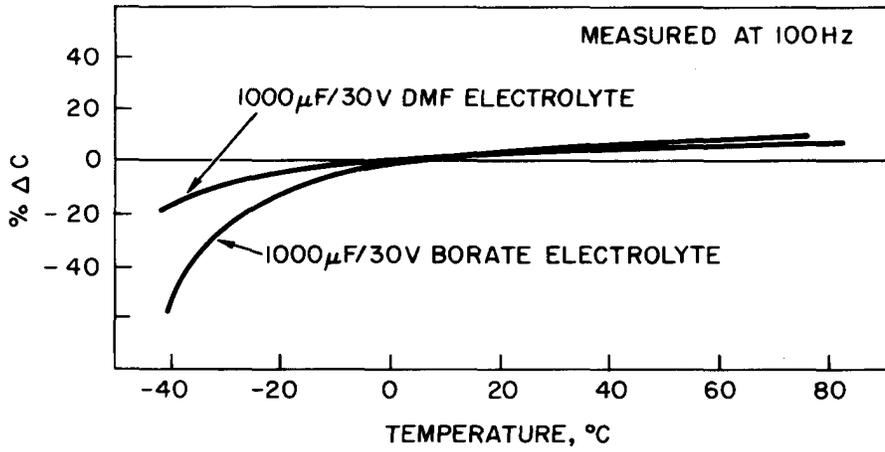
The solid tantalum types are generally used where low frequency pulsating dc components are to be bypassed or filtered out, where large capacitance values are required, where space is limited, and where shock and vibration may exist. They may be used for low dc voltage applications where stability, size, weight, and shelf life are important.

As with other electrolytics, the solid tantalums have limitations because of their relatively high leakage current and their polarity.

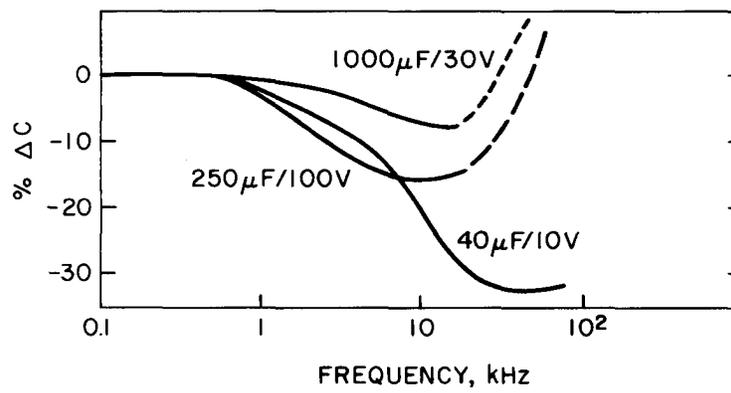


ELECTROLYTIC
Characteristic Curves

Dry Aluminum



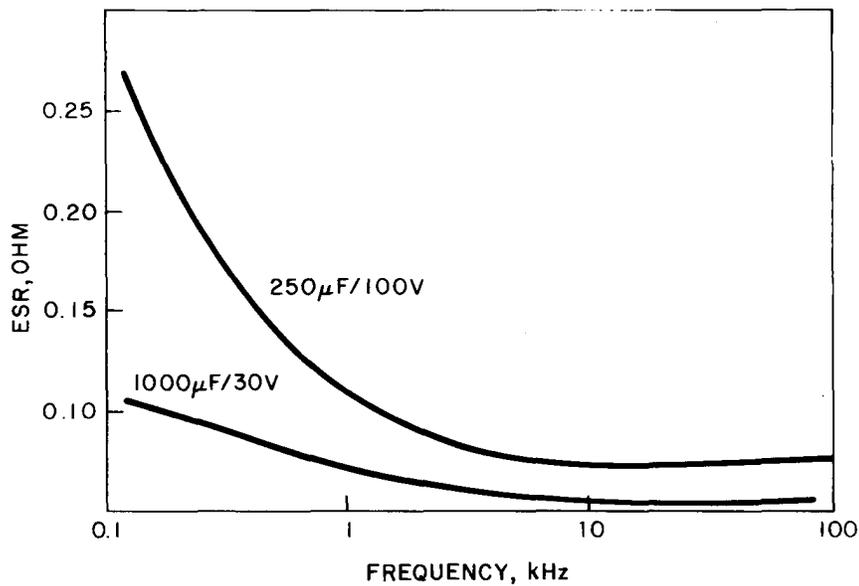
CAPACITANCE CHANGE VS TEMPERATURE



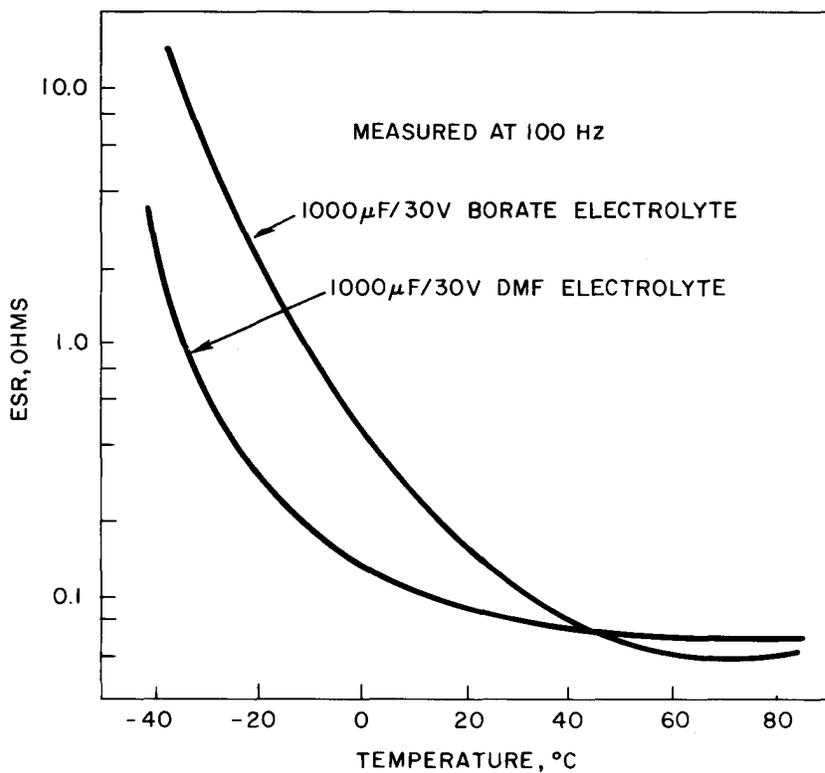
CAPACITANCE CHANGE VS FREQUENCY

ELECTROLYTIC
Characteristic Curves

Dry Aluminum



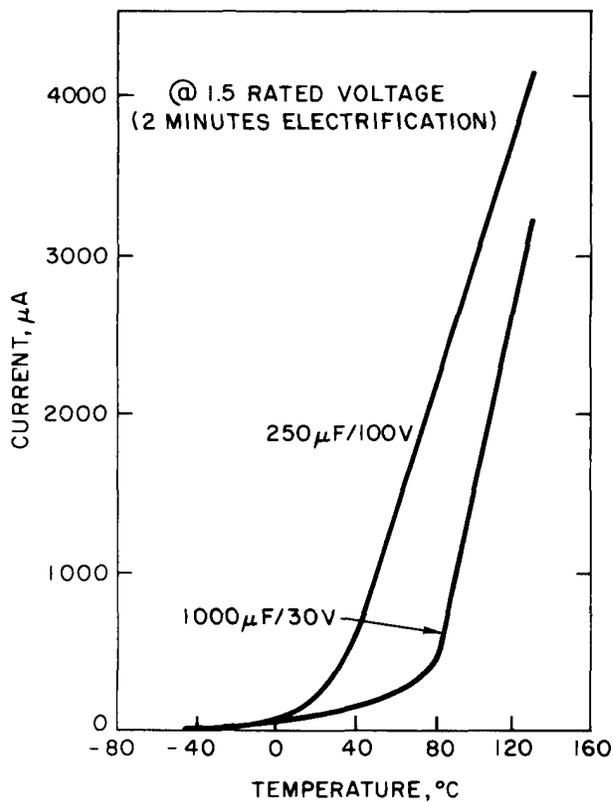
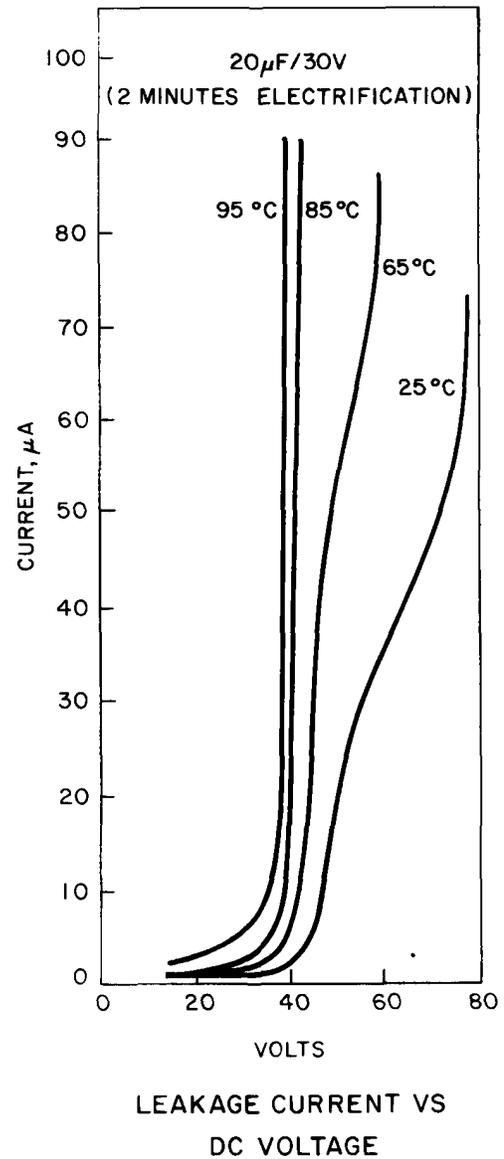
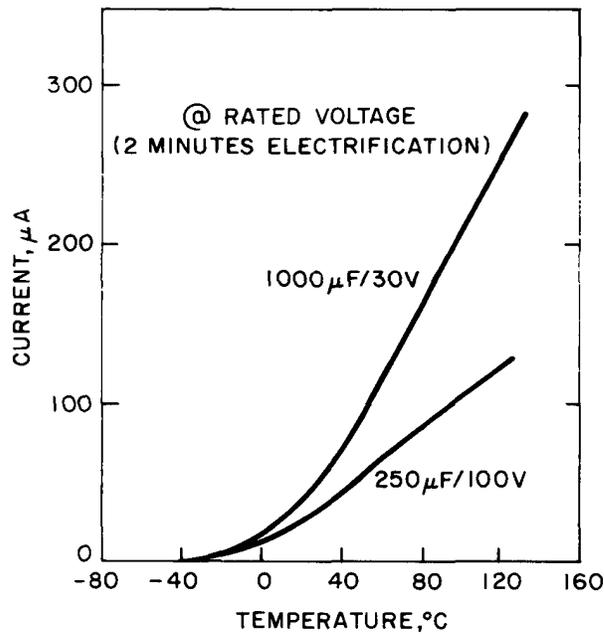
EQUIVALENT SERIES RESISTANCE VS FREQUENCY



EQUIVALENT SERIES RESISTANCE VS TEMPERATURE

ELECTROLYTIC
Characteristic Curves

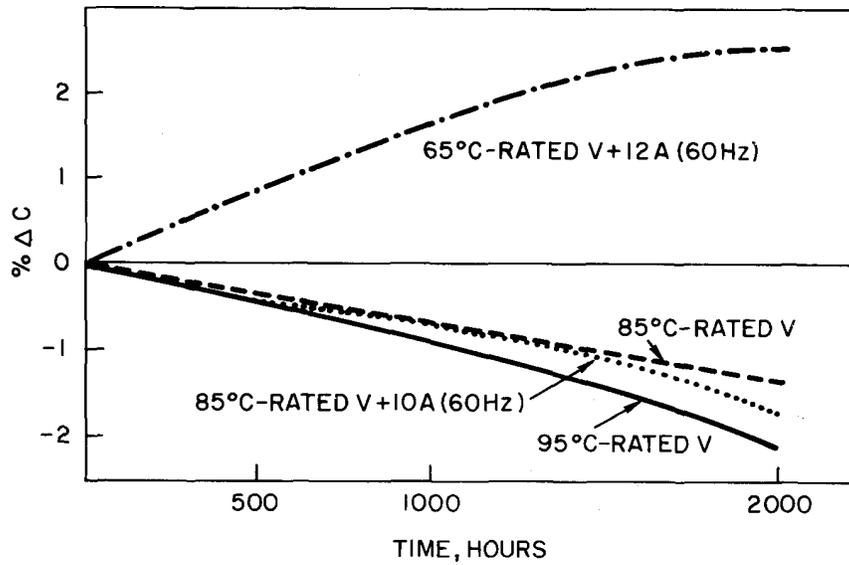
Dry Aluminum



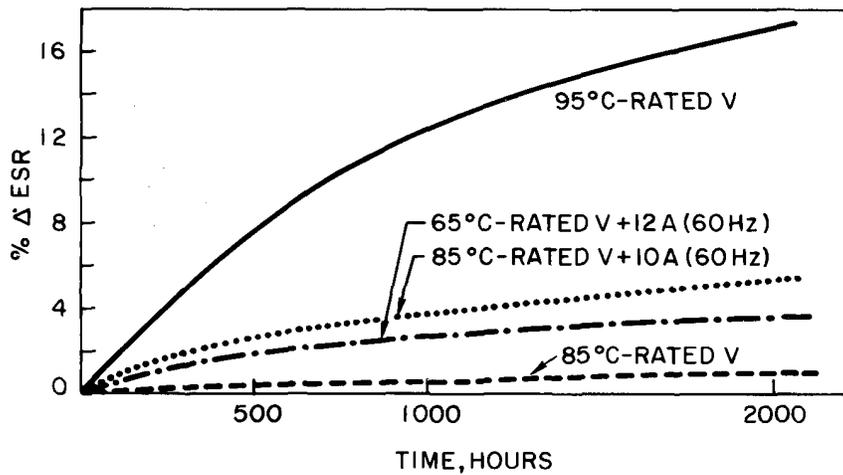
LEAKAGE CURRENT VS TEMPERATURE

ELECTROLYTIC
Characteristic Curves

Dry Aluminum



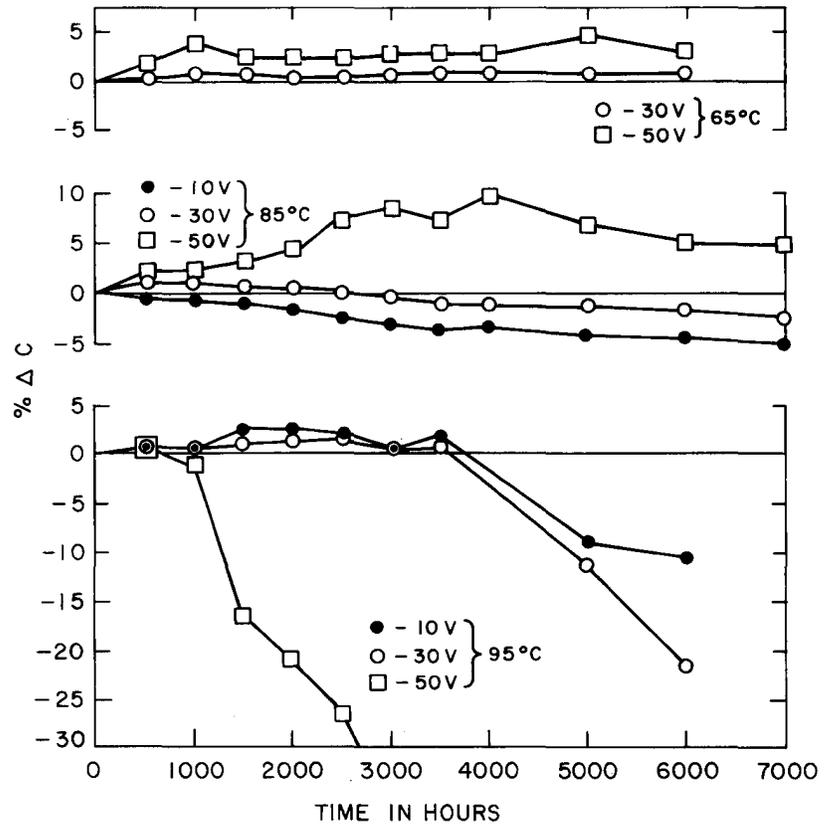
CAPACITANCE CHANGE VS TIME
FOR COMPUTER GRADE TYPE
(3" DIA x 5-3/8" LENGTH)



EQUIVALENT SERIES RESISTANCE CHANGE VS TIME
FOR COMPUTER GRADE TYPE
(3" DIA x 5-3/8" LENGTH)

ELECTROLYTIC
Characteristic Curves

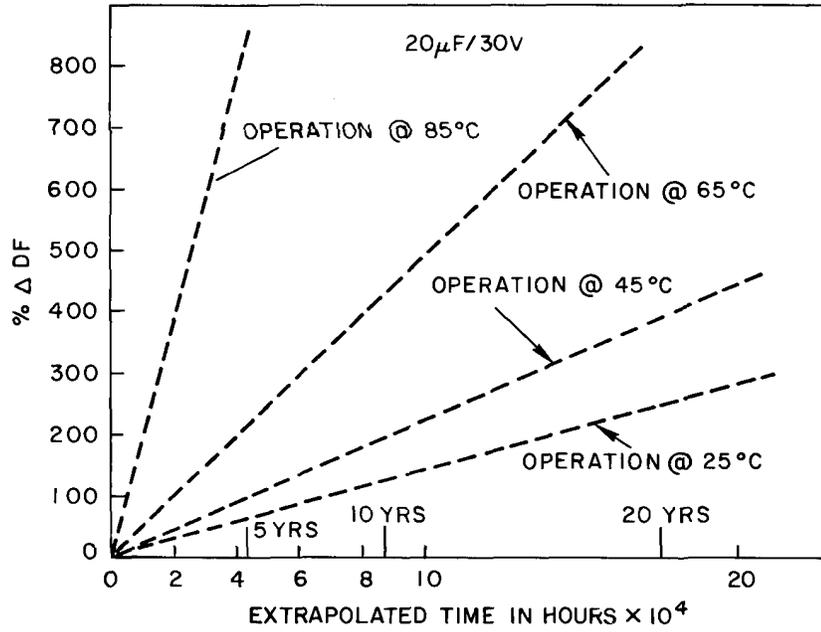
Dry Aluminum



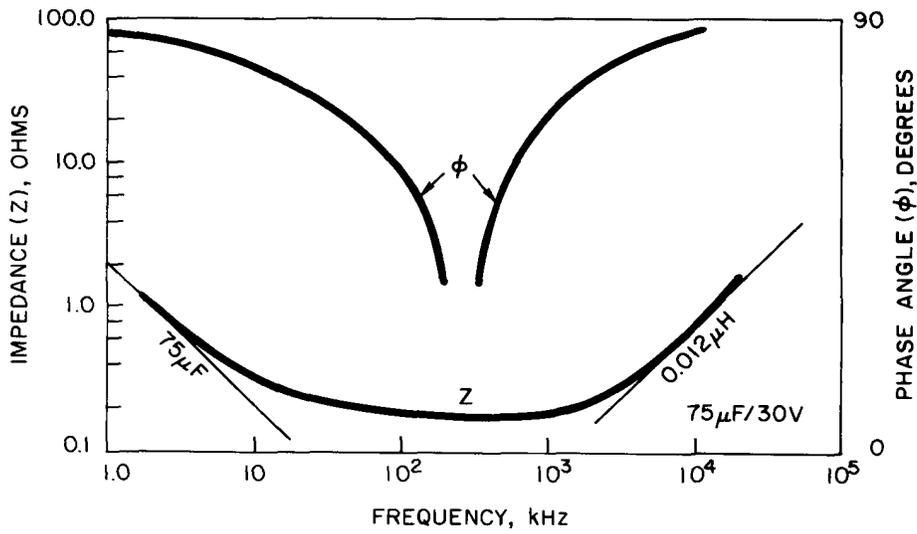
CAPACITANCE CHANGE VS TIME
MEASURED AT 120 Hz

ELECTROLYTIC
Characteristic Curves

Dry Aluminum



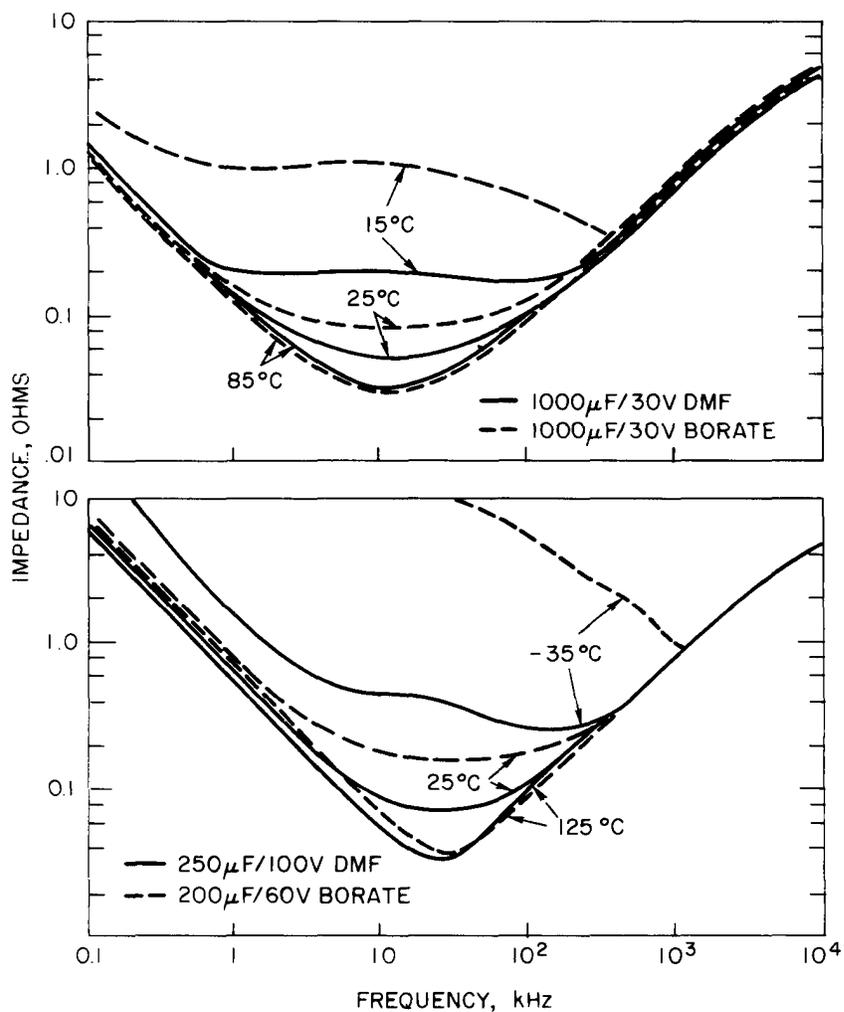
DISSIPATION FACTOR CHANGE VS TIME



IMPEDANCE AND PHASE ANGLE VS FREQUENCY

ELECTROLYTIC
Characteristic Curves

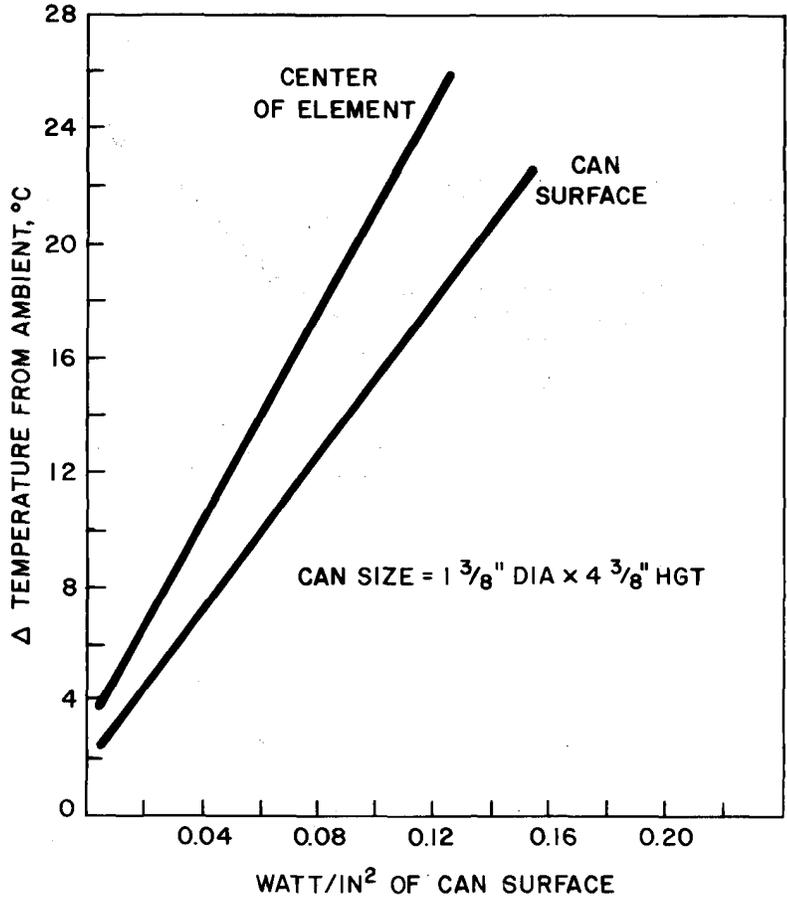
Dry Aluminum



IMPEDANCE VS FREQUENCY

ELECTROLYTIC
Characteristic Curves

Dry Aluminum



TEMPERATURE RISE VS POWER INPUT
(SIMULATING RIPPLE CURRENT)

ELECTROLYTIC
Physical Outlines

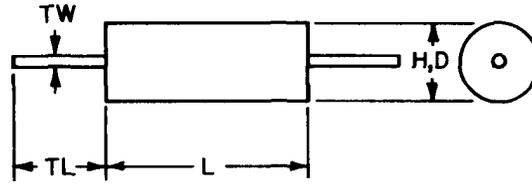
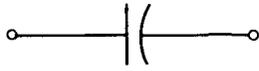


FIG. C10

For 600 series only:



For others:

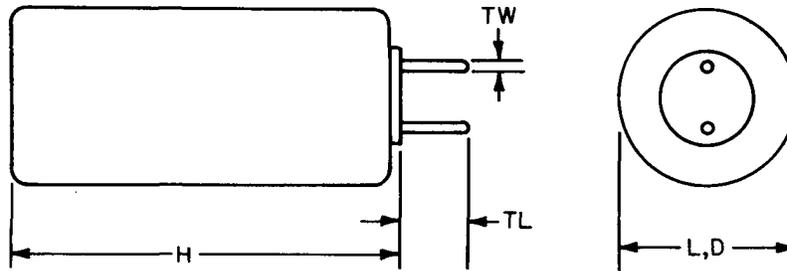
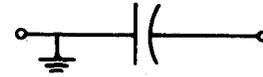
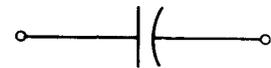


FIG. C42



ELECTROLYTIC
Physical Outlines

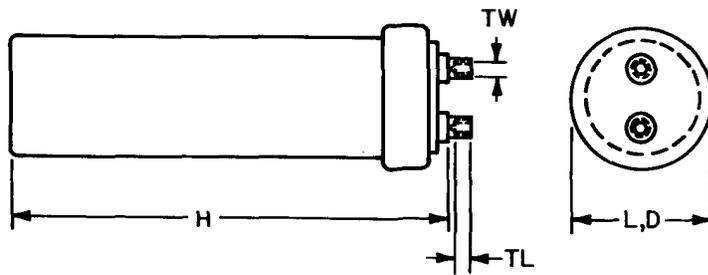
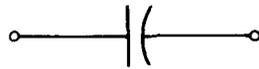
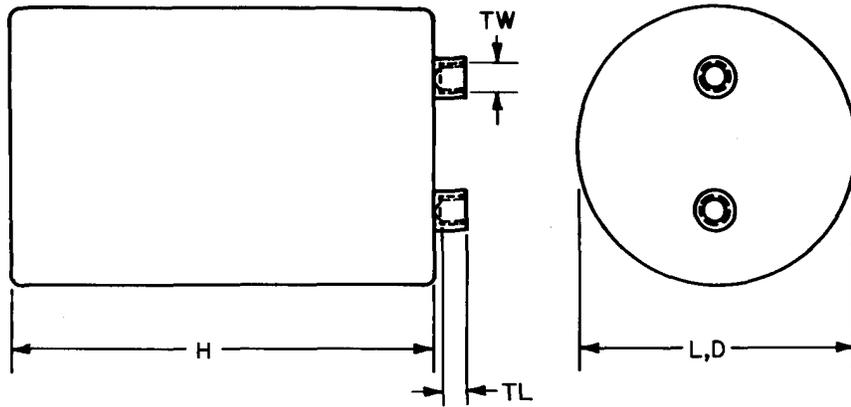


TABLE 5.1

CAPACITANCE	TOLERANCE		DCWV	DF (% @ 120 HZ)	ESR (OHMS @ 120HZ)	AC RIPPLE (VOLTS @ 120HZ)	FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)			CODE
	+X	-X						L	H	D		TL	TW	TD	
0.1	20	20	60				C10	0.25	0.125	0.125	AXIAL PT	1.5	0.02		607A
0.22	20	20	60				C10	0.25	0.125	0.125	AXIAL PT	1.5	0.02		607B
0.33	20	20	60				C10	0.25	0.125	0.125	AXIAL PT	1.5	0.02		607C
0.47	20	20	60				C10	0.25	0.125	0.125	AXIAL PT	1.5	0.02		607D
0.68	20	20	60				C10	0.438	0.175	0.175	AXIAL PT	1.5	0.02		605A
0.68	20	20	35				C10	0.25	0.125	0.125	AXIAL PT	1.5	0.02		607E
1	20	20	35				C10	0.38	0.2	0.2	AXIAL PT	1.5	0.032		600A
1	20	20	60				C10	0.38	0.2	0.2	AXIAL PT	1.5	0.032		600D
1	20	20	60				C10	0.438	0.175	0.175	AXIAL PT	1.5	0.02		605B
1	20	20	20				C10	0.25	0.125	0.125	AXIAL PT	1.5	0.02		607F
1	20	20	60				C10	0.474	0.185	0.185	AXIAL PT	1.5	0.02		609A
1.5	20	20	60				C10	0.438	0.175	0.175	AXIAL PT	1.5	0.02		605C
2.2	20	20	60				C10	0.438	0.175	0.175	AXIAL PT	1.5	0.02		605D
2.2	10	10	60				C10	0.438	0.175	0.175	AXIAL PT	1.5	0.02		605G
2.2	20	20	60				C10	0.474	0.185	0.185	AXIAL PT	1.5	0.02		609B
3.3	20	20	35				C10	0.438	0.175	0.175	AXIAL PT	1.5	0.02		605E
3.3	10	10	35				C10	0.438	0.175	0.175	AXIAL PT	1.5	0.02		605F
3.3	20	20	60				C10	0.65	0.279	0.279	AXIAL PT	1.5	0.025		606A
3.3	10	10	60				C10	0.65	0.279	0.279	AXIAL PT	1.5	0.025		606D
3.3	10	10	35				C10	0.474	0.185	0.185	AXIAL PT	1.5	0.02		609C
3.9	10	10	8				C10	0.286	0.135	0.135	AXIAL PT	1.5	0.02		611A
4	20	20	20				C10	0.505	0.2	0.2	AXIAL PT	1.5	0.032		603A
4	20	20	20				C10	0.505	0.2	0.2	AXIAL PT	1.5	0.032		603C
4.7	20	20	60				C10	0.65	0.279	0.279	AXIAL PT	1.5	0.025		606B
4.7	10	10	60				C10	0.65	0.279	0.279	AXIAL PT	1.5	0.025		606E
4.7	20	20	60				C10	0.686	0.289	0.289	AXIAL PT	1.5	0.025		610A
5	50	10	100	15			C10	0.937	0.43	0.43	AXIAL PT	2	0.032		KS16390L15
5	20	20	8				C10	0.38	0.2	0.2	AXIAL PT	1.5	0.032		600B
5	20	20	35				C10	0.555	0.3	0.3	AXIAL PT	1.5	0.032		601A
5	10	10	35				C10	0.555	0.3	0.3	AXIAL PT	1.5	0.032		601F
7	20	20	25				C10	0.555	0.3	0.3	AXIAL PT	1.5	0.032		601E
8	50	10	60	12			C10	0.812	0.43	0.43	AXIAL PT	2	0.032		KS16390L02
8	25	15	60	12			C42	1.125	0.5	0.5	AXIAL PT	0.188	0.032		KS19524L03
8	50	10	400	09			C10	1.625	0.667	0.667	AXIAL PT	2.5	0.032		KS19658L56
10	50	10	100	15			C10	1.375	0.43	0.43	AXIAL PT	2	0.032		KS16390L03
10	50	10	150	15			C10	1.625	0.43	0.43	AXIAL PT	2	0.032		KS16390L10
10	20	20	20				C10	0.555	0.3	0.3	AXIAL PT	1.5	0.032		601B
10	20	20	8				C10	0.505	0.2	0.2	AXIAL PT	1.5	0.032		603E
10	20	20	35				C10	0.605	0.355	0.355	AXIAL PT	1.5	0.032		604A
10	10	10	35				C10	0.605	0.355	0.355	AXIAL PT	1.5	0.032		604C
10	20	20	60				C10	0.65	0.279	0.279	AXIAL PT	1.5	0.025		606C

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BELL SYSTEM STANDARD COMPONENTS - CAPACITORS

ELECTROLYTIC
ELECTRICAL & PHYSICAL DATA

SHEET 1 OF 6

TABLE 5.1
(CONT'D)

CAPACITANCE	TOLERANCE		DCWV	DF (% @ 120 HZ)	ESR (OHMS @ 120HZ)	AC RIPPLE (VOLTS @ 120HZ)	FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)			CODE
	+%	-%						L	H	D		TL	TW	TD	
10	10	10	60				C10	0.686	0.289	0.289	AXIAL PT	1.5	0.025	610B	
12	50	10	60	12			C10	0.937	0.43	0.43	AXIAL PT	2	0.032	KS16390L14	
12	50	10	150	15			C42	1.125	0.525	0.5	AXIAL PT	2.25	0.032	KS19524L05	
12	50	10	150	09			C10	1.125	0.667	0.667	AXIAL PT	2.5	0.032	KS19658L11	
15	50	10	100	15			C42	1.125	0.5	0.5	AXIAL PT	0.188	0.032	KS19524L04	
15	50	10	350	09			C10	2.125	0.718	0.718	AXIAL PT	2.5	0.032	KS19658L51	
15	10	10	35				C10	0.805	0.355	0.355	AXIAL PT	1.5	0.032	602F	
16	20	20	4				C10	0.505	0.2	0.2	AXIAL PT	1.5	0.032	603B	
20	50	10	30	18			C10	0.937	0.43	0.43	AXIAL PT	2	0.032	KS16390L04	
20	20	20	35				C10	0.805	0.355	0.355	AXIAL PT	1.5	0.032	602C	
20	10	10	35				C10	0.805	0.355	0.355	AXIAL PT	1.5	0.032	602G	
22	50	10	50	10		4.3	C10	1	0.327	0.327	AXIAL PT	2	0.032	KS20423L03	
22	20	20	60				C10	0.75	0.341	0.341	AXIAL PT	1.5	0.025	608A	
22	10	10	60				C10	0.75	0.341	0.341	AXIAL PT	1.5	0.025	608C	
25	50	10	60	12			C10	1.375	0.43	0.43	AXIAL PT	2	0.032	KS16390L01	
25	50	10	60	12			C42	1.125	0.5	0.5	AXIAL PT	0.188	0.032	KS19524L01	
25	50	10	60	12			C42	1.125	0.52	0.52	AXIAL PT	0.188	0.032	KS19524L08	
25	50	10	250	10			C10	1.625	0.917	0.917	AXIAL PT	2.5	0.04	KS19658L10	
25	20	20	8				C10	0.555	0.3	0.3	AXIAL PT	1.5	0.032	601C	
30	20	20	8				C10	0.555	0.3	0.3	AXIAL PT	1.5	0.032	601G	
30	10	10	8				C10	0.555	0.3	0.3	AXIAL PT	1.5	0.032	601H	
35	50	10	20	18			C10	0.937	0.43	0.43	AXIAL PT	2	0.032	KS16390L16	
39	10	10	35				C10	0.75	0.341	0.341	AXIAL PT	1.5	0.025	608B	
40	50	10	60	12			C10	1.625	0.43	0.43	AXIAL PT	2	0.032	KS16390L08	
40	50	10	60	12			C10	1.625	0.43	0.43	AXIAL PT	2	0.032	KS16390L20	
40	50	10	60	12			C42	1.375	0.5	0.5	AXIAL PT	0.188	0.032	KS19524L02	
40	50	10	60	12			C42	1.375	0.52	0.52	AXIAL PT	0.188	0.032	KS19524L13	
40	50	10	40	15			C10	1.125	0.593	0.593	AXIAL PT	2.5	0.032	KS19658L46	
40	50	10	100	09			C10	1.625	0.667	0.667	AXIAL PT	2.5	0.032	KS19658L57	
40	20	20	20				C10	0.805	0.355	0.355	AXIAL PT	1.5	0.032	602A	
40	10	10	20				C10	0.805	0.355	0.355	AXIAL PT	1.5	0.032	602J	
50	50	10	20	19			C10	1.125	0.542	0.542	AXIAL PT	2.5	0.032	KS19658L19	
50	50	10	300	07			C10	2.125	0.917	0.917	AXIAL PT	2.5	0.04	KS19658L38	
50	50	10	75	12			C10	1.625	0.667	0.667	AXIAL PT	2.5	0.032	KS19658L42	
50	20	20	8				C10	0.605	0.355	0.355	AXIAL PT	1.5	0.032	604B	
55	50	10	30	18			C10	1.375	0.43	0.43	AXIAL PT	2	0.032	KS16390L17	
60	50	10	10	20			C10	0.937	0.43	0.43	AXIAL PT	2	0.032	KS16390L05	
60	33	10	25	12			C42	1.125	0.525	0.5	AXIAL PT	1.15	0.032	KS19524L09	
60	50	10	300	07			C10	2.125	0.885	0.885	AXIAL PT	2.5	0.04	KS19658L61	
68	20	5	15	12			C42	1.125	0.5	0.5	AXIAL PT	0.188	0.032	KS19524L06	

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TABLE 5.1
(CONT'D)

CAPACITANCE	TOLERANCE		DCWV	DF (% @ 120 HZ)	ESR (OHMS @ 120HZ)	AC RIPPLE (VOLTS @ 120HZ)	FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)			CODE
	+%	-%						L	H	D		TL	TW	TD	
68	30	10	60	12			C42	1.375	0.5	0.5	AXIAL PT	0.188	0.032	KS19524L11	
70	50	10	150	09			C10	1.625	0.917	0.917	AXIAL PT	2.5	0.04	KS19658L32	
75	50	10	30	14			C10	1.625	0.43	0.43	AXIAL PT	2	0.032	KS16390L12	
75	50	10	30	12			C42	1.125	0.52	0.52	AXIAL PT	0.188	0.032	KS19524L10	
75	50	10	15	22			C10	1.125	0.542	0.542	AXIAL PT	2.5	0.032	KS19658L20	
80	50	10	60	10		3.4	C10	1.687	0.421	0.421	AXIAL PT	2	0.032	KS20423L02	
90	20	10	60	12			C42	1.375	0.52	0.52	AXIAL PT	0.188	0.032	KS19524L14	
95	50	10	150		1.600	5.5	C10	2.312	0.843	0.843	AXIAL PT	2.5	0.04	KS20446L17	
100	50	10	20	18			C10	1.625	0.43	0.43	AXIAL PT	2	0.032	KS16390L06	
100	50	10	5	24			C10	0.937	0.43	0.43	AXIAL PT	2	0.032	KS16390L09	
100	50	10	60	13			C10	1.625	0.625	0.625	AXIAL PT	2.5	0.032	KS19658L06	
100	50	10	40	15			C10	1.625	0.667	0.667	AXIAL PT	2.5	0.032	KS19658L21	
100	50	10	20	19			C10	1.625	0.542	0.542	AXIAL PT	2.5	0.032	KS19658L22	
100	50	10	100	11			C10	2.625	0.917	0.917	AXIAL PT	2.5	0.04	KS19658L36	
100	50	10	60	13			C10	1.625	0.667	0.667	AXIAL PT	2.5	0.032	KS19658L43	
100	50	10	15	22			C10	1.125	0.593	0.593	AXIAL PT	2.5	0.032	KS19658L45	
100	50	10	75			4.5	C10	1.25	0.937	0.937	AXIAL PT	2.5	0.04	KS20446L26	
100	20	20	8				C10	0.805	0.355	0.355	AXIAL PT	1.5	0.032	602B	
100	10	10	8				C10	0.805	0.355	0.355	AXIAL PT	1.5	0.032	602H	
100	20	20	20				C10	0.786	0.351	0.351	AXIAL PT	1.5	0.025	612A	
100	20	20	8				C10	0.786	0.351	0.351	AXIAL PT	1.5	0.025	612B	
100	10	10	8				C10	0.786	0.351	0.351	AXIAL PT	1.5	0.025	612C	
125	50	10	20	19			C10	1.125	0.667	0.667	AXIAL PT	2.5	0.032	KS19658L04	
125	50	10	50	14			C10	1.125	0.875	0.875	AXIAL PT	2.5	0.04	KS19658L18	
125	50	10	60	13			C10	2.125	0.792	0.792	AXIAL PT	2.5	0.04	KS19658L41	
150	50	10	10	20			C10	1.375	0.43	0.43	AXIAL PT	2	0.032	KS16390L18	
150	20	20	15	12			C42	1.125	0.5	0.5	AXIAL PT	0.188	0.032	KS19524L07	
150	50	10	30	17			C10	1.625	0.625	0.625	AXIAL PT	2.5	0.032	KS19658L03	
150	50	10	15	22			C10	1.625	0.542	0.542	AXIAL PT	2.5	0.032	KS19658L23	
150	50	10	100	11			C10	2.125	0.917	0.917	AXIAL PT	2.5	0.04	KS19658L33	
150	50	10	30	17			C10	1.625	0.667	0.667	AXIAL PT	2.5	0.032	KS19658L50	
150	50	10	30	10		2.2	C10	1.437	0.421	0.421	AXIAL PT	2	0.032	KS20423L01	
150	50	10	300			9.3	C10	3.75	1.062	1.062	AXIAL PT	2.5	0.04	KS20446L25	
200	50	10	10	20			C10	1.625	0.43	0.43	AXIAL PT	2	0.032	KS16390L07	
200	50	10	15	12			C42	1.375	0.52	0.52	AXIAL PT	0.188	0.032	KS19524L15	
200	50	10	60	13			C10	2.625	0.625	0.625	AXIAL PT	2.5	0.032	KS19658L05	
200	50	10	20	19			C10	1.625	0.542	0.542	AXIAL PT	2.5	0.032	KS19658L24	
200	50	10	60	13			C10	2.625	0.667	0.667	AXIAL PT	2.5	0.032	KS19658L62	
210	50	10	40	10		2.4	C10	2.249	0.421	0.421	AXIAL PT	2	0.032	KS20423L04	
250	50	10	10	12			C42	1.125	0.52	0.52	AXIAL PT	0.188	0.032	KS19524L12	

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TABLE 5.1
(CONT'D)

CAPACITANCE	TOLERANCE		DCHV	DF (% @ 120 HZ)	ESR (OHMS @ 120HZ)	AC RIPPLE (VOLTS @ 120HZ)	FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)			CODE
	+%	-%						L	H	D		TL	TW	TD	
250	50	10	30	17			C10	1.625	0.625	0.625	AXIAL PT	2.5	0.032		KS19658L02
250	50	10	30	17			C10	1.625	0.667	0.667	AXIAL PT	2.5	0.032		KS19658L40
250	50	10	60		0.680	3.5	C10	3.312	0.718	0.718	AXIAL PT	2.5	0.032		KS20446L21
290	50	10	20		1.200	1.4	C10	1.312	0.718	0.718	AXIAL PT	2.5	0.032		KS20446L15
300	50	10	25	17			C10	1.625	0.792	0.792	AXIAL PT	2.5	0.04		KS19658L13
300	50	10	15	22			C10	1.625	0.667	0.667	AXIAL PT	2.5	0.032		KS19658L25
300	50	10	40	37			C10	2.625	0.667	0.667	AXIAL PT	2.5	0.032		KS19658L31
325	50	10	5	24			C10	1.625	0.43	0.43	AXIAL PT	2	0.032		KS16390L11
360	50	10	150		0.400	3.9	C10	3.812	1.093	1.093	AXIAL PT	2.5	0.04		KS20446L04
400	50	10	60	13			C10	2.125	0.875	0.875	AXIAL PT	2.5	0.04		KS19658L07
400	20	10	25	17			C10	2.125	0.792	0.792	AXIAL PT	2.5	0.04		KS19658L14
400	50	10	25	17			C10	2.125	0.792	0.792	AXIAL PT	2.5	0.04		KS19658L15
400	50	10	60	13			C10	2.161	0.885	0.885	AXIAL PT	2.5	0.04		KS19658L58
450	50	10	25	17			C10	1.625	0.75	0.75	AXIAL PT	2.5	0.04		KS19658L12
500	50	10	3	25			C10	1.625	0.43	0.43	AXIAL PT	2	0.032		KS16390L13
500	50	10	30	17			C10	1.625	0.875	0.875	AXIAL PT	2.5	0.04		KS19658L01
500	50	10	60	13			C10	2.625	0.875	0.875	AXIAL PT	2.5	0.04		KS19658L08
500	50	10	30	17			C10	1.625	0.917	0.917	AXIAL PT	2.5	0.04		KS19658L16
500	50	10	40	15			C10	1.625	1.042	1.042	AXIAL PT	2.5	0.04		KS19658L17
500	50	10	15	22			C10	1.625	0.667	0.667	AXIAL PT	2.5	0.032		KS19658L35
500	50	10	60	13			C10	2.625	0.917	0.917	AXIAL PT	2.5	0.04		KS19658L37
500	50	10	60	13			C10	2.625	0.968	0.968	AXIAL PT	2.5	0.04		KS19658L60
500	50	10	75		0.300	3.1	C10	2.812	1.093	1.093	AXIAL PT	2.5	0.04		KS20446L01
600	50	10	200		0.200	3.8	C44	1.47	4.345	1.47	INT THD	0.44	0.19	32	KS20443L05
680	50	10	60		0.220	2.4	C10	2.692	0.917	0.917	AXIAL PT	2.5	0.04		KS20446L10
700	50	10	350		0.280	13.11	C43	5.825	2.063	2.063	INT THD	0.44	0.19	32	KS20133L31
750	50	10	400		0.270	4.27	C43	5.325	2.563	2.563	INT THD	0.44	0.19	32	KS20133L24
800	50	10	15	22			C10	1.625	0.792	0.792	AXIAL PT	2.5	0.04		KS19658L28
800	50	10	10		0.450	1.1	C10	1.312	1.093	1.093	AXIAL PT	2.5	0.04		KS20446L07
800	50	10	75		0.190	2.8	C10	3.812	1.093	1.093	AXIAL PT	2.5	0.04		KS20446L16
880	50	10	30		0.300	1.3	C10	1.692	0.917	0.917	AXIAL PT	2.5	0.04		KS20446L11
900	50	10	30	17			C10	2.125	0.917	0.917	AXIAL PT	2.5	0.04		KS19658L47
1000	50	10	30	09			C10	2.625	0.917	0.917	AXIAL PT	2.5	0.04		KS19658L09
1000	50	10	30	17			C10	2.625	0.968	0.968	AXIAL PT	2.5	0.04		KS19658L27
1000	50	10	50	13			C10	3.125	1.042	1.042	AXIAL PT	2.5	0.04		KS19658L29
1000	50	10	20	19			C10	2.625	0.843	0.843	AXIAL PT	2.5	0.04		KS19658L54
1000	50	10	10	22			C10	1.625	0.843	0.843	AXIAL PT	2.5	0.04		KS19658L55
1000	50	10	30		0.300	1.4	C10	3.812	0.718	0.718	AXIAL PT	2.5	0.032		KS20446L02
1000	50	10	7.5		0.500	0.7	C10	1.312	0.843	0.843	AXIAL PT	2.5	0.04		KS20446L24
1200	50	10	20	19			C10	1.625	1.042	1.042	AXIAL PT	2.5	0.04		KS19658L49

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TABLE 5.1
(CONT'D)

CAPACITANCE	TOLERANCE		DCWV	DF (% @ 120 HZ)	ESR (OHMS @ 120HZ)	AC RIPPLE (VOLTS @ 120HZ)	FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)			CODE
	+%	-%						L	H	D		TL	TW	TD	
1300	50	10	15		0.300	0.8	C10	1.812	0.843	0.843	AXIAL PT	2.5	0.04		KS20446L23
1400	50	10	5	22			C10	2.125	0.718	0.718	AXIAL PT	2.5	0.032		KS19658L53
1400	50	10	100		0.090	2.8	C44	1.47	4.97	1.47	INT THD	0.44	0.19	32	KS20443L02
1500	50	10	30		0.200	1.2	C10	2.692	0.917	0.917	AXIAL PT	2.5	0.04		KS20446L08
1600	50	10	75		0.140	2.1	C43	5.825	1.475	1.475	INT THD	0.44	0.19	32	KS20133L35
1600	50	10	60		0.080	2.1	C44	1.47	3.22	1.47	INT THD	0.44	0.19	32	KS20443L03
1800	50	10	10		0.200	0.8	C10	2.812	0.718	0.718	AXIAL PT	2.5	0.032		KS20446L12
2000	50	10	15	22			C10	2.625	0.917	0.917	AXIAL PT	2.5	0.04		KS19658L26
2000	50	10	30	37			C10	2.625	1.093	1.093	AXIAL PT	2.5	0.04		KS19658L30
2000	50	10	60		0.200	1.39	C43	3.825	2.1	2.1	INT THD	0.44	0.19	32	KS20133L05
2300	50	10	5	30			C10	2.125	0.843	0.843	AXIAL PT	2.5	0.04		KS19658L52
2300	50	10	40		0.150	1.1	C10	3.812	1.093	1.093	AXIAL PT	2.5	0.04		KS20446L03
2300	50	10	5		0.240	0.5	C10	2.312	0.718	0.718	AXIAL PT	2.5	0.032		KS20446L13
2500	50	10	30	17			C10	3.625	1.042	1.042	AXIAL PT	2.5	0.04		KS19658L48
2700	50	10	15		0.130	0.7	C10	2.125	0.875	0.875	AXIAL PT	2.5	0.04		KS20446L18
2700	50	10	30		0.100	1.1	C10	3.312	1.093	1.093	AXIAL PT	2.5	0.04		KS20446L20
2800	50	10	60		0.070	1.6	C44	1.47	4.97	1.47	INT THD	0.44	0.19	32	KS20443L06
3500	50	10	40		0.100	0.84	C43	4.192	1.475	1.475	INT THD	0.44	0.19	32	KS20133L33
3700	50	10	75		0.055	1.8	C43	5.671	2.026	2.026	INT THD	0.44	0.19	32	KS20133L23
4000	50	10	7.5	30			C10	2.625	0.917	0.917	AXIAL PT	2.5	0.04		KS19658L39
4000	50	10	10	34			C10	3.161	0.885	0.885	AXIAL PT	2.5	0.04		KS19658L59
4200	50	10	15		0.080	0.7	C10	3.312	0.968	0.968	AXIAL PT	2.5	0.04		KS20446L09
4500	75	10	5	37			C10	2.625	0.917	0.917	AXIAL PT	2.5	0.04		KS19658L44
4600	50	10	40		0.045	1.2	C44	1.47	4.97	1.47	INT THD	0.44	0.19	32	KS20443L04
5000	50	10	15	22			C10	3.625	1.093	1.093	AXIAL PT	2.5	0.04		KS19658L34
5000	50	10	200		0.045	1.39	C43	5.825	3.063	3.063	INT THD	0.44	0.19	32	KS20133L29
5200	50	10	75		0.050	1.46	C43	4.825	2.563	2.563	INT THD	0.44	0.19	32	KS20133L27
5400	50	10	30		0.092	0.73	C43	4.825	1.475	1.475	INT THD	0.44	0.19	32	KS20133L08
5500	50	10	10		0.070	0.6	C10	3.312	0.968	0.968	AXIAL PT	2.5	0.04		KS20446L19
5800	50	10	50		0.050	1.1	C43	4.192	2.1	2.1	INT THD	0.44	0.19	32	KS20133L37
6000	50	10	30		0.035	1.1	C44	1.47	4.97	1.47	INT THD	0.44	0.19	32	KS20443L01
6100	50	10	5		0.090	0.4	C10	2.812	0.968	0.968	AXIAL PT	2.5	0.04		KS20446L14
6700	50	10	5		0.090	0.4	C10	3.812	0.843	0.843	AXIAL PT	2.5	0.04		KS20446L22
6900	50	10	30		0.072	0.68	C43	5.825	1.475	1.475	INT THD	0.44	0.19	32	KS20133L04
6900	50	10	15		0.050	0.64	C10	3.812	1.093	1.093	AXIAL PT	2.5	0.04		KS20446L06
8300	50	10	75		0.038	1.14	C43	5.325	3.1	3.1	INT THD	0.44	0.19	32	KS20133L15
9800	50	10	60		0.040	0.96	C43	5.325	3.1	3.1	INT THD	0.44	0.19	32	KS20133L03
10000	50	10	30		0.050	0.6	C43	4.192	2.032	2.032	INT THD	0.44	0.19	32	KS20133L06
10000	50	10	30		0.050	0.69	C43	4.325	2.532	2.532	INT THD	0.44	0.19	32	KS20133L16
10000	50	10	20		0.060	0.5	C43	5.325	1.475	1.475	INT THD	0.44	0.19	32	KS20133L36

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BELL SYSTEM STANDARD COMPONENTS - CAPACITORS

SHEET 5 OF 6
ELECTROLYTIC
ELECTRICAL & PHYSICAL DATA

TABLE 5.1
(CONT'D)

CAPACITANCE	TOLERANCE		DCVW	DF (% @ 120 HZ)	ESR (OHMS @ 120HZ)	AC RIPPLE (VOLTS @ 120HZ)	FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)			CODE
	+%	-%						L	H	D		TL	TW	TD	
11000	50	10	40		0.036	0.59	C43	5.825	2.1	2.1	INT THD	0.44	0.19	32	KS20133L12
11000	50	10	30		0.048	0.55	C43	3.325	2.563	2.563	INT THD	0.44	0.19	32	KS20133L26
11000	50	10	75		0.041	0.69	C43	5.325	2.563	2.563	INT THD	0.44	0.19	32	KS20133L30
12000	50	10	75		0.018	0.72	C43	5.825	1.475	1.475	INT THD	0.44	0.19	32	KS20133L20
14000	50	10	10		0.076	0.3	C43	4.825	1.475	1.475	INT THD	0.44	0.19	32	KS20133L10
15000	50	10	30		0.032	0.57	C43	4.325	2.6	2.6	INT THD	0.44	0.19	32	KS20133L02
16000	50	10	60		0.028	0.7	C43	5.325	3.1	3.1	INT THD	0.44	0.19	32	KS20133L09
17000	50	10	60		0.028	0.68	C43	5.825	3.1	3.1	INT THD	0.44	0.19	32	KS20133L34
23000	50	10	30		0.027	0.45	C43	5.325	2.563	2.563	INT THD	0.44	0.19	32	KS20133L25
24000	50	10	30		0.027	0.49	C43	5.825	3.1	3.1	INT THD	0.44	0.19	32	KS20133L01
25000	50	10	40		0.022	0.51	C43	5.325	3.1	3.1	INT THD	0.44	0.19	32	KS20133L21
26000	50	10	20		0.030	0.34	C43	4.325	2.6	2.6	INT THD	0.44	0.19	32	KS20133L17
26000	50	10	30		0.027	0.26	C43	5.825	2.6	2.6	INT THD	0.44	0.19	32	KS20133L18
30000	50	10	40		0.020	0.44	C43	5.825	3.1	3.1	INT THD	0.44	0.19	32	KS20133L32
34000	50	10	7.5		0.040	0.2	C43	4.325	2.063	2.063	INT THD	0.44	0.19	32	KS20133L28
39000	50	10	30		0.020	0.35	C43	5.825	3.1	3.1	INT THD	0.44	0.19	32	KS20133L14
42000	50	10	10		0.028	0.22	C43	5.825	2.1	2.1	INT THD	0.44	0.19	32	KS20133L07
42000	50	10	10		0.028	0.22	C43	5.825	2.1	2.1	INT THD	0.44	0.19	32	KS20133L11
51000	50	10	7.5		0.026	0.19	C43	5.825	2.1	2.1	INT THD	0.44	0.19	32	KS20133L13
58000	50	10	20		0.018	0.26	C43	5.825	3.1	3.1	INT THD	0.44	0.19	32	KS20133L22
100000	50	10	10		0.018	0.14	C43	5.825	3.1	3.1	INT THD	0.44	0.19	32	KS20133L19

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MICA
Basic Data

Basic Code	Type Code (Note)	Description	Capacitance Range		Tolerance %	DC Working Voltage	Oper Temp Range °C	
			From	To			From	To
BUTTON								
KS16509	Unique	Button, Feed-thru, Stand-off, Solder	26 pF	2000 pF	2.94-20	500	-50	+125
DIPPED								
KS16456*	Family	Dipped, Radial PT	0.015 uF	0.068 uF	0.5,1,5	225-375	-55	+85
KS16591†	Family	Dipped, Radial PT	2000 pF	0.03 uF	0.5,1,5	225-375	-55	+85
KS16742#	Family	Dipped, Radial PT	150 pF	0.012 uF	0.5,1,5	225-375	-55	+85
KS16958**	Family	Dipped, Radial PT	1 pF	825 pF	0.5,1,5	225-375	-55	+85
KS20299††	Family	Dipped, Radial PT	1 pF	400 pF	0.5,1,2,5,10	75,225,375	-55	+85
MOLDED								
KS13365	Family	Flat, Axial PT	1 pF	5100 pF	0.5,1,5	225-375	-55	+85
KS13367	Family	Flat, Axial PT	470 pF	0.012 uF	0.5,1,5	225-375	-55	+85
KS13368	Family	Flat, Axial PT	470 pF	0.02 uF	0.5,1,5	225-375	-55	+85
KS14056	Family	Flat, Axial PT	1 pF	620 pF	0.5,1,5	225-375	-55	+85
KS14057	Family	Flat, Axial PT	1 pF	1500 pF	0.5,1,2,5	750-2000	-55	+85
KS14058	Family	Flat, Axial PT	5 pF	3000 pF	0.5,1,5	750	-55	+85
KS14228	Family	Flat, Axial PT	1500 pF	5700 pF	0.5,1,5	750	-55	+85
KS20813	Family	Tubular, Axial PT	1 pF	510 pF	0.5,1,2,5,10	75,225,375	-55	+85

EAI Designations:

- * RDM42
- † RDM30
- # RDM20
- ** RDM15
- †† RDM10

Note: Unique - one value per code number. Family - range of values per code number. See GENERAL GUIDELINES section for more information.



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General Description

Mica capacitors use natural delaminated mica sheets as the dielectric. Silver electrodes are fired on the mica sheets, which are then stacked with interconnecting metal foil.

These capacitors are widely used because of their unique combination of high dielectric strength, low dielectric loss over the range of audio and radio frequencies, resistance to high temperatures, and stability with respect to time and frequency. However, because of the stacked construction, their volumetric efficiency is low.

The mica capacitors listed in this catalog are available in button, dipped, or molded form.

Button mica capacitors are special feed-through and stand-off types that are built in cylindrical stacks encased in a metal housing. The housing forms one terminal of the capacitor while the other terminal is insulated from the housing by a glass seal. A variety of methods for mounting and terminal configurations are available.

The dipped and molded mica capacitors use the same type of mica stacks but are encapsulated differently, as the names imply. Although both types are used extensively, the dipped mica capacitors currently appear to be slightly more reliable in performance. However, recent changes in the molding process may eliminate this difference.

Features

Mica capacitors may be used advantageously in circuits where precise high-frequency filtering, bypassing, and coupling are required. They are used where close impedance limits are essential when subjected to environmental variations in temperature and moisture, and with circuits of wide frequency bandwidths. Mica capacitors are stable with time. They are useful as padders in tuned circuits, as secondary capacitance standards, and as fixed-tuning capacitors at high frequencies.

Dipped mica capacitors, when used to their design and Bell System voltage ratings, are the most stable (along with NPO ceramics) and most reliable of all types of capacitors.

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Application Guide

The aging of dipped mica capacitors is from -0.1 to -0.3% in 20 years. (Aging at one year is about the same, since most of the change occurs early in life.) Shelf aging at room temperature and humidity averages about 0.02% for a 0.01-uF capacitor and about 0.035% for a 1000-pF capacitor.

Characteristics

Mica capacitors are rated for capacitance change with change in temperature. A portion of the capacitance change may be permanent, in which case it is termed "capacitance drift." The table below indicates the temperature coefficient of capacitance and the temperature drift.

Characteristic	Temperature Coefficient ppm/°C	Capacitance Drift %	Availability of Characteristic
B	Not specified	Not specified	All values
C	-200 to +200	±0.5	All values
D	-100 to +100	±0.3	All values
E	-20 to +100	±(0.1% + 0.1 pF)	Above 20 pF
F	0 to +70	±(0.05% + 0.1 pF)	Above 50 pF

The table that follows (Table 6.0) gives the characteristic code for each mica capacitor.

TABLE 6.0
CHARACTERISTICS

CODE	CAPACITANCE		CHAR.
	FROM	TO	
KS13365L26	1 PF	110 PF	C
KS13365L26	111 PF	200 PF	E
KS13365L26	203 PF	5050 PF	F
KS13365L27	1 PF	110 PF	C
KS13365L27	111 PF	200 PF	E
KS13365L27	203 PF	5050 PF	F
KS13365L29	1 PF	110 PF	C
KS13365L29	115 PF	196 PF	E
KS13365L29	205 PF	4870 PF	F
KS13365L31	1 PF	110 PF	C
KS13365L31	111 PF	200 PF	E
KS13365L31	203 PF	3570 PF	F
KS13365L32	1 PF	110 PF	C
KS13365L32	111 PF	200 PF	E
KS13365L32	203 PF	3570 PF	F
KS13365L34	1 PF	110 PF	C
KS13365L34	115 PF	196 PF	E
KS13365L34	205 PF	3480 PF	F
KS13367L26			F
KS13367L27			F
KS13367L29			F
KS13367L31			F
KS13367L32			F
KS13367L34			F
KS13368L26			F
KS13368L27			F
KS13368L29			F
KS13368L31			F
KS13368L32			F
KS13368L34			F
KS14056L26	1 PF	27.7 PF	C
KS14056L26	28 PF	50.5 PF	E
KS14056L26	51.1 PF	619 PF	F
KS14056L27	1 PF	27.7 PF	C
KS14056L27	28 PF	50.5 PF	E
KS14056L27	51.1 PF	619 PF	F
KS14056L29	21.5 PF	27.4 PF	C
KS14056L29	28.7 PF	48.7 PF	E
KS14056L29	53.6 PF	619 PF	F
KS14056L31	1 PF	27.7 PF	C
KS14056L31	28 PF	50.5 PF	E
KS14056L31	511 PF	505 PF	F
KS14056L32	1 PF	27.7 PF	C
KS14056L32	28 PF	50.5 PF	E
KS14056L32	51.1 PF	505 PF	F
KS14056L34	21.5 PF	27.4 PF	C
KS14056L34	28.7 PF	48.7 PF	E
KS14056L34	51 PF	487 PF	F
KS14057L15			E
KS14057L21	1 PF	110 PF	C
KS14057L21	111 PF	200 PF	E
KS14057L21	203 PF	1500 PF	F
KS14057L22	1 PF	110 PF	C
KS14057L22	111 PF	200 PF	E
KS14057L22	203 PF	1500 PF	F
KS14057L24	1 PF	110 PF	C
KS14057L24	115 PF	196 PF	E
KS14057L24	205 PF	1470 PF	F
KS14058L21	5.05 PF	110 PF	C
KS14058L21	111 PF	200 PF	E
KS14058L21	203 PF	2980 PF	F

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Application Guide

TABLE 6.0
(CONT'D)
CHARACTERISTICS

CODE	CAPACITANCE		CHAR.
	FROM	TO	
KS14058L22	5.05 PF	110 PF	C
KS14058L22	111 PF	200 PF	E
KS14058L22	203 PF	2870 PF	F
KS14058L24	4.87 PF	110 PF	C
KS14058L24	115 PF	196 PF	E
KS14058L24	205 PF	2870 PF	F
KS14228L21			F
KS14228L22			F
KS14228L24			F
KS16456L26			F
KS16456L27			F
KS16456L29			F
KS16456L31			F
KS16456L32			F
KS16456L34			F
KS16509L01			E
KS16509L02			E
KS16509L03			E
KS16509L06			C
KS16509L07			C
KS16509L17			C
KS16509L19			E
KS16509L20			E
KS16509L27			C
KS16509L28			E
KS16509L29			E
KS16509L30			E
KS16509L31			E
KS16509L32			E
KS16509L33			E
KS16509L34			E
KS16591L26			F
KS16591L27			F
KS16591L29			F
KS16591L31			F
KS16591L32			F
KS16591L34			F
KS16742L26	150 PF	180 PF	C
KS16742L26	182 PF	556 PF	E
KS16742L26	562 PF	0.012	F
KS16742L27	150 PF	180 PF	C
KS16742L27	182 PF	556 PF	E
KS16742L27	562 PF	0.012	F
KS16742L29	154 PF	178 PF	C
KS16742L29	187 PF	536 PF	E
KS16742L29	562 PF	0.0115	F
KS16742L31	150 PF	180 PF	C
KS16742L31	182 PF	556 PF	E
KS16742L31	562 PF	0.01	F
KS16742L32	150 PF	180 PF	C
KS16742L32	182 PF	556 PF	E
KS16742L32	562 PF	0.01	F
KS16742L34	154 PF	178 PF	C
KS16742L34	187 PF	536 PF	E
KS16742L34	562 PF	0.01	F
KS16958L26	1 PF	27.1 PF	C
KS16958L26	28 PF	120 PF	E
KS16958L26	121 PF	825 PF	F
KS16958L27	1 PF	27.1 PF	C

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Application Guide

TABLE 6.0
(CONT'D)
CHARACTERISTICS

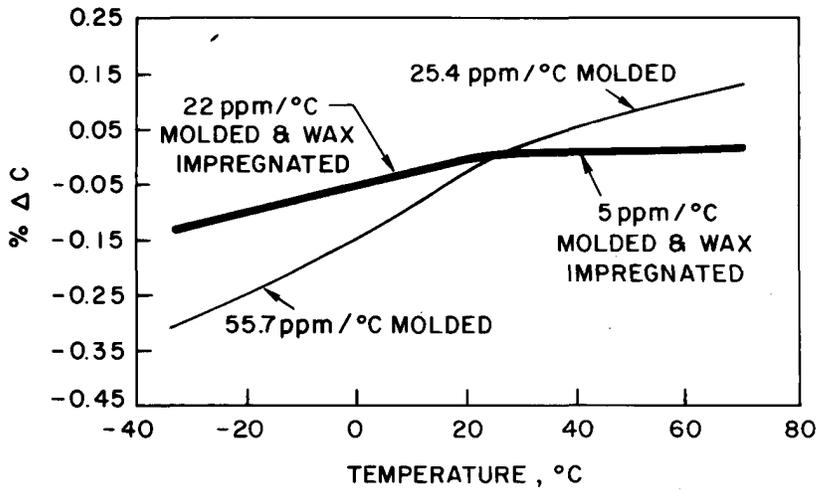
CODE	CAPACITANCE		CHAR.
	FROM	TO	
KS16958L27	28 PF	120 PF	E
KS16958L27	121 PF	825 PF	F
KS16958L29	1 PF	27.4 PF	C
KS16958L29	27.4 PF	115 PF	E
KS16958L29	121 PF	825 PF	F
KS16958L31	1 PF	27.1 PF	C
KS16958L31	28 PF	120 PF	E
KS16958L31	121 PF	511 PF	F
KS16958L32	1 PF	27.1 PF	C
KS16958L32	28 PF	120 PF	E
KS16958L32	121 PF	511 PF	F
KS16958L34	1 PF	27.4 PF	C
KS16958L34	28.7 PF	115 PF	E
KS16958L34	121 PF	511 PF	F
KS20299L01	1 PF	27.1 PF	C
KS20299L01	28 PF	90.9 PF	E
KS20299L01	92 PF	397 PF	F
KS20299L02	1 PF	27.1 PF	C
KS20299L02	28 PF	90.9 PF	E
KS20299L02	92 PF	397 PF	F
KS20299L03	51 PF	90.9 PF	E
KS20299L03	93.1 PF	392 PF	F
KS20299L04	21 PF	27.4 PF	C
KS20299L04	28.7 PF	90.9 PF	E
KS20299L04	95.3 PF	383 PF	F
KS20299L05	11 PF	26.1 PF	C
KS20299L05	28.7 PF	90.9 PF	E
KS20299L05	100 PF	383 PF	F
KS20299L06	1 PF	27.7 PF	C
KS20299L06	28 PF	90.9 PF	E
KS20299L06	92 PF	298 PF	F
KS20299L07	1 PF	27.1 PF	C
KS20299L07	28 PF	90.9 PF	E
KS20299L07	92 PF	298 PF	F
KS20299L08	51.1 PF	90.9 PF	E
KS20299L08	93.1 PF	294 PF	F
KS20299L09	21.5 PF	27.4 PF	C
KS20299L09	28.7 PF	90.9 PF	E
KS20299L09	95.3 PF	287 PF	F
KS20299L10	11 PF	26.1 PF	C
KS20299L10	28.7 PF	90.9 PF	E
KS20299L10	100 PF	287 PF	F
KS20299L11	1 PF	27.7 PF	C
KS20299L11	28 PF	90.9 PF	E
KS20299L11	92 PF	249 PF	F
KS20299L12	1 PF	27.7 PF	C
KS20299L12	28 PF	90.9 PF	E
KS20299L12	92 PF	249 PF	F
KS20299L13	51.1 PF	90.9 PF	E
KS20299L13	93.1 PF	249 PF	F
KS20299L14	21.5 PF	27.4 PF	C
KS20299L14	28.7 PF	90.9 PF	E
KS20299L14	95.3 PF	249 PF	F
KS20299L15	11 PF	26.1 PF	C
KS20299L15	28.7 PF	90.9 PF	E
KS20299L15	100 PF	237 PF	F
KS20813L01	1 PF	4.71 PF	B
KS20813L01	5.05 PF	24.9 PF	C
KS20813L01	25.2 PF	82.5 PF	E

MICA
Application Guide

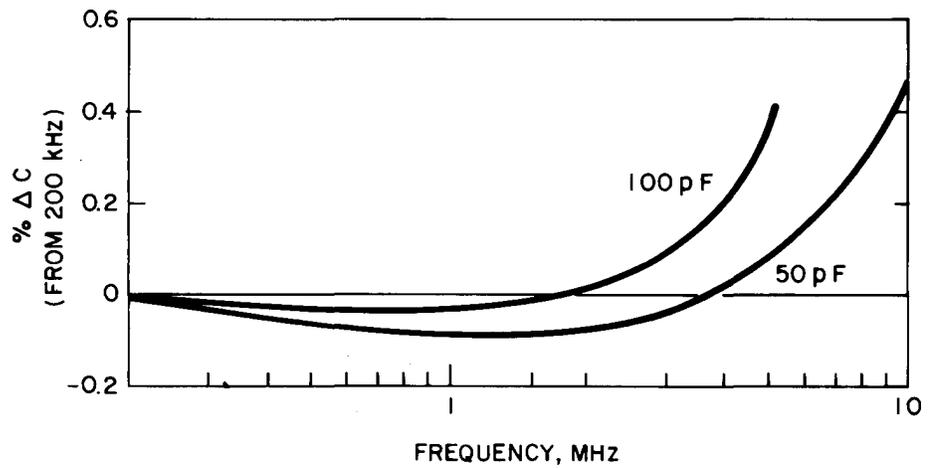
TABLE 6.0
(CONT'D)
CHARACTERISTICS

CODE	CAPACITANCE		CHAR.
	FROM	TO	
KS20813L01	83.5 PF	499 PF	F
KS20813L02	1 PF	4.99 PF	B
KS20813L02	5.05 PF	24.9 PF	C
KS20813L02	25.2 PF	82.5 PF	E
KS20813L02	83.5 PF	499 PF	F
KS20813L03	51.1 PF	82.5 PF	F
KS20813L03	84.5 PF	499 PF	F
KS20813L04	21.5 PF	24.9 PF	C
KS20813L04	26.1 PF	82.5 PF	E
KS20813L04	86.6 PF	487 PF	F
KS20813L05	11 PF	23.7 PF	C
KS20813L05	26.1 PF	82.5 PF	F
KS20813L05	90.9 PF	464 PF	F
KS20813L06	1 PF	4.99 PF	B
KS20813L06	5.05 PF	24.9 PF	C
KS20813L06	25.2 PF	82.5 PF	E
KS20813L06	83.5 PF	388 PF	F
KS20813L07	1 PF	4.99 PF	B
KS20813L07	5.05 PF	24.9 PF	C
KS20813L07	25.2 PF	82.5 PF	F
KS20813L07	83.5 PF	388 PF	F
KS20813L08	51.1 PF	80.6 PF	F
KS20813L08	82.5 PF	383 PF	F
KS20813L09	21.5 PF	24.9 PF	C
KS20813L09	26.1 PF	82.5 PF	E
KS20813L09	86.6 PF	383 PF	F
KS20813L10	11 PF	23.7 PF	C
KS20813L10	26.1 PF	82.5 PF	E
KS20813L10	90.9 PF	383 PF	F
KS20813L11	1 PF	4.99 PF	B
KS20813L11	5.05 PF	24.9 PF	C
KS20813L11	25.2 PF	82.5 PF	E
KS20813L11	83.5 PF	240 PF	F
KS20813L12	1 PF	4.99 PF	B
KS20813L12	5.05 PF	24.9 PF	C
KS20813L12	25.2 PF	82.5 PF	E
KS20813L12	83.5 PF	240 PF	F
KS20813L13	51.1 PF	82.5 PF	E
KS20813L13	84.5 PF	237 PF	F
KS20813L14	21.5 PF	24.9 PF	C
KS20813L14	26.1 PF	78.7 PF	E
KS20813L14	82.5 PF	237 PF	F
KS20813L15	11 PF	23.7 PF	C
KS20813L15	26.1 PF	82.5 PF	E
KS20813L15	90.9 PF	237 PF	F

MICA
Characteristic Curves

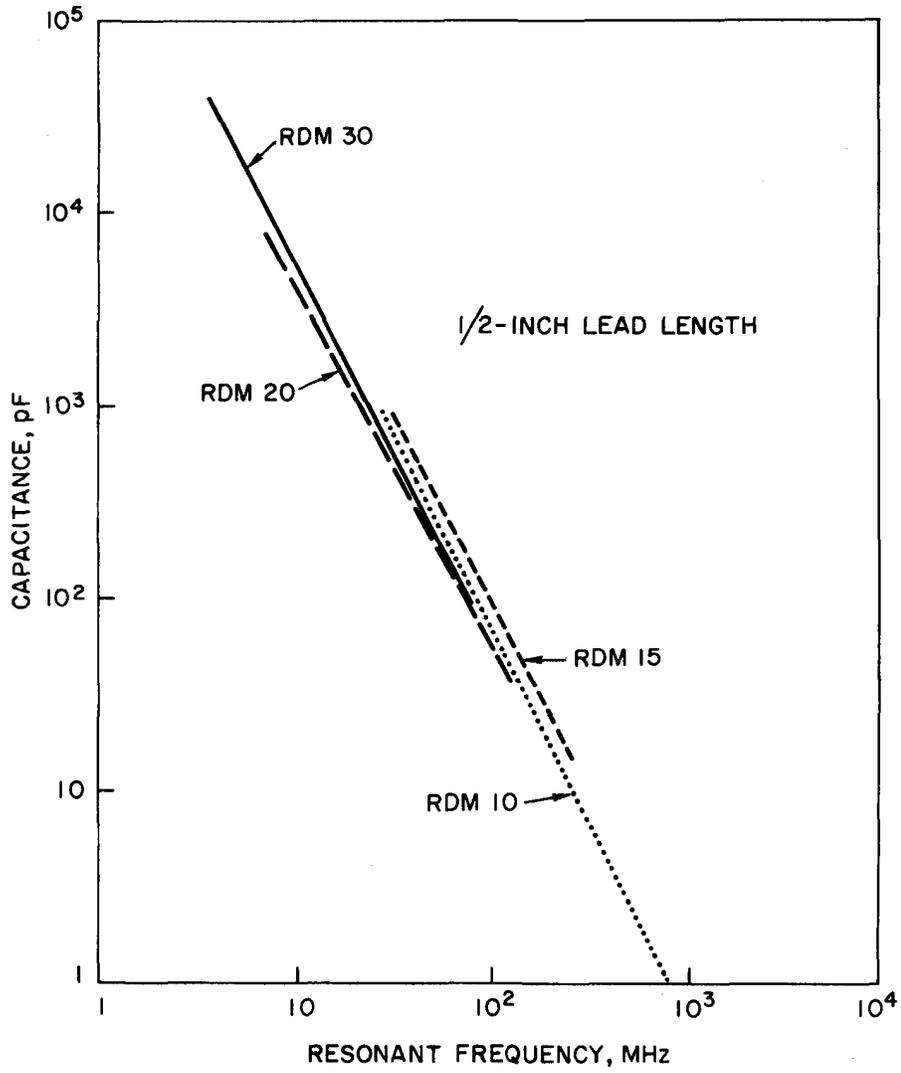


CAPACITANCE CHANGE VS TEMPERATURE



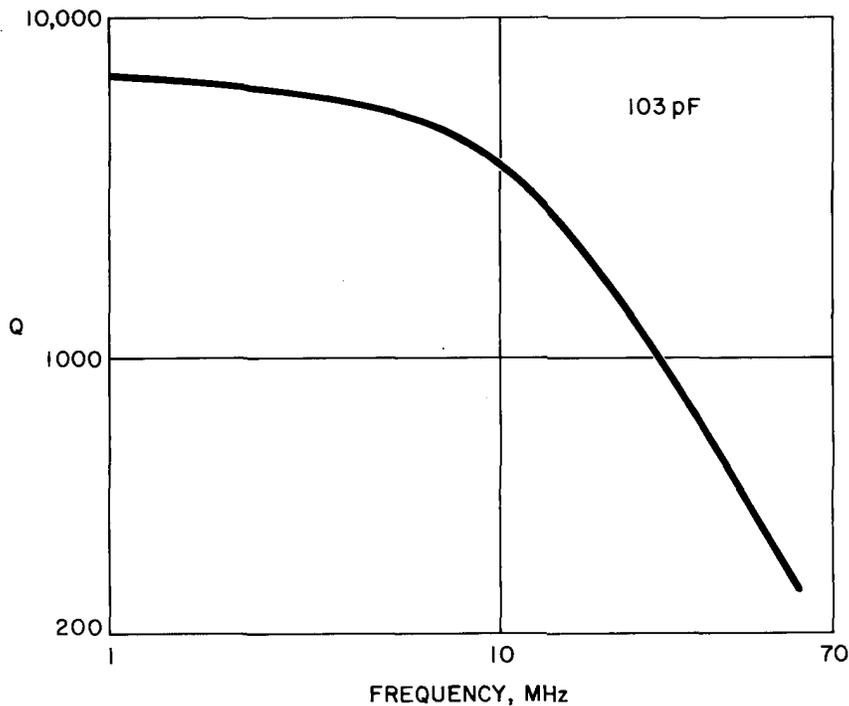
CAPACITANCE CHANGE VS FREQUENCY
TYPICAL FOR MOLDED MICA CAPACITORS

MICA
Characteristic Curves

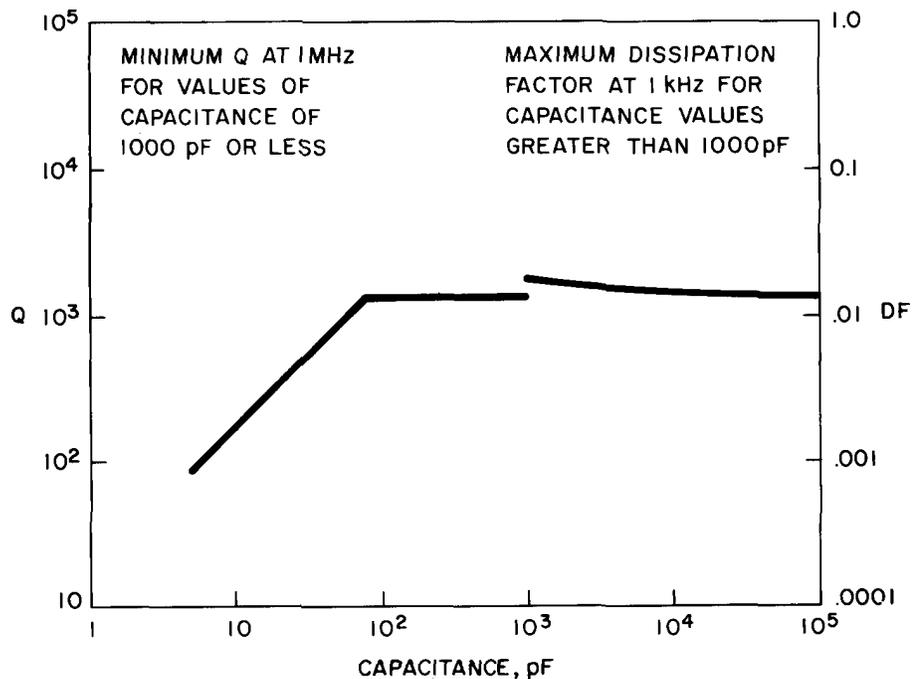


CAPACITANCE VS RESONANT FREQUENCY
FOR DIPPED MICA CAPACITORS

MICA
Characteristic Curves

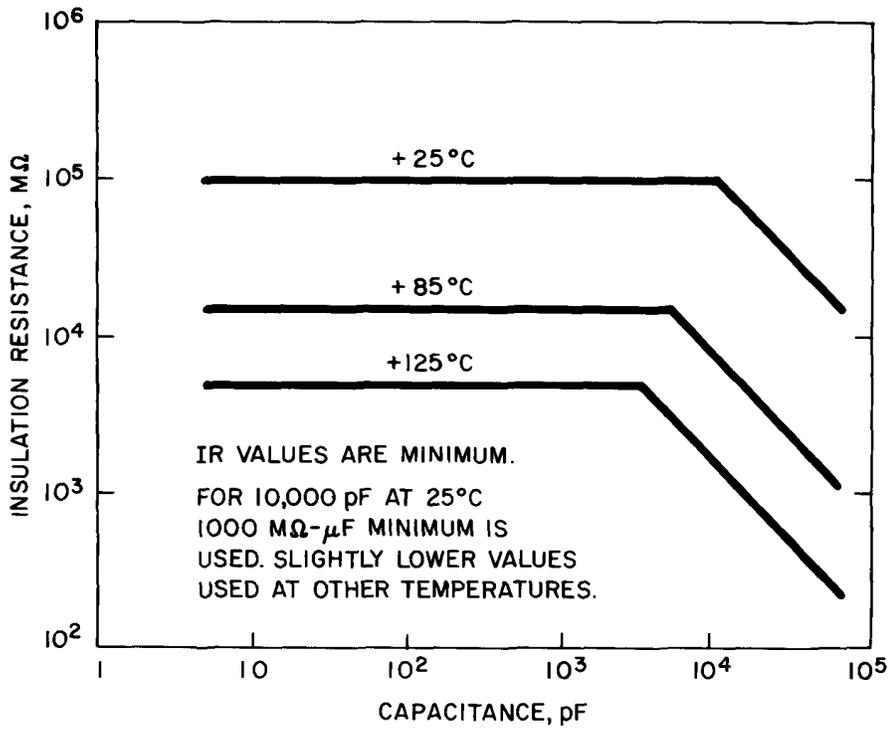


Q VERSUS FREQUENCY
TYPICAL FOR MOLDED MICA CAPACITORS



Q AND DISSIPATION FACTOR VS CAPACITANCE
FOR DIPPED AND MOLDED MICA CAPACITORS

MICA
Characteristic Curves



INSULATION RESISTANCE VS CAPACITANCE
FOR DIPPED AND MOLDED MICA CAPACITORS

MICA
Physical Outlines

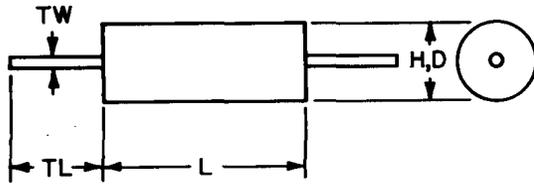
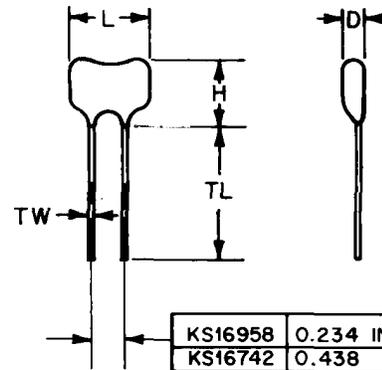
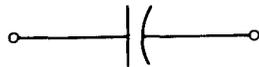


FIG. C10



KS16958	0.234 IN.
KS16742	0.438
KS16591	0.438
KS16456	1.062
KS20299	0.141

FIG. C11



KS13365	1/16 IN.
KS14056	
KS14057	
KS13367	5/64 IN.
KS13368	
KS14228	
KS14058	

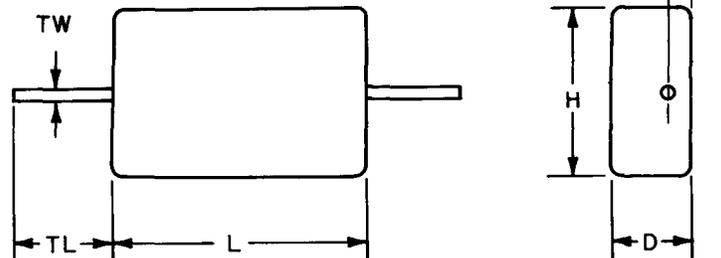


FIG. C13

MICA
Physical Outlines

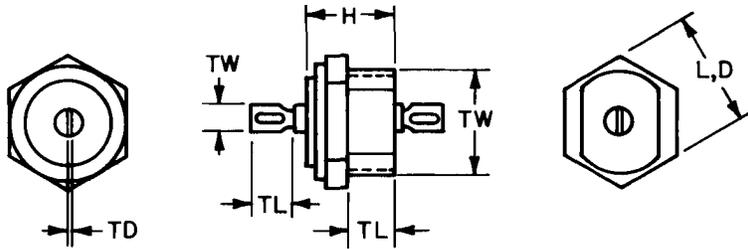


FIG. C34

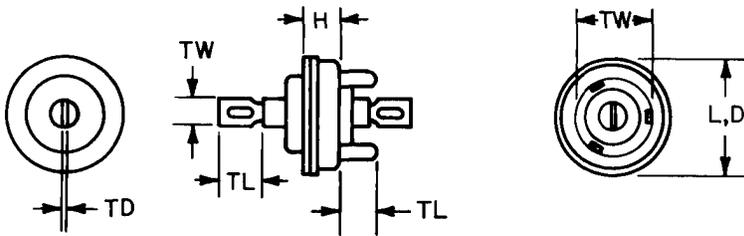
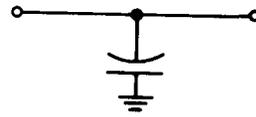


FIG. C35

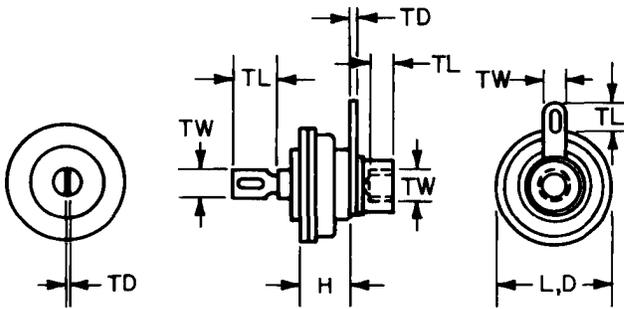
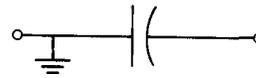


FIG. C36



MICA
Physical Outlines

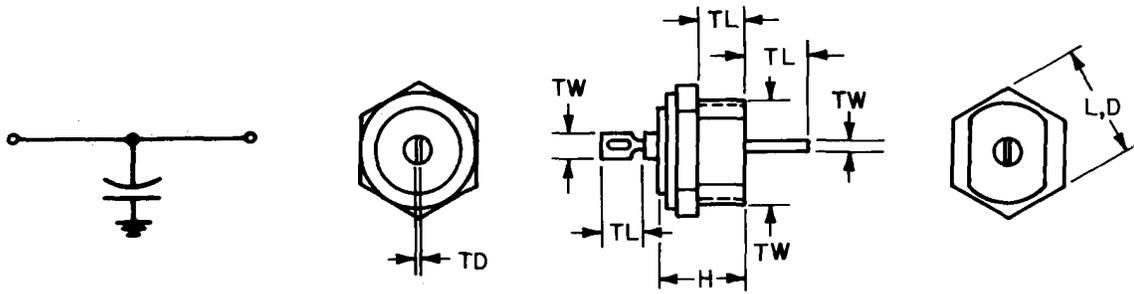


FIG. C37

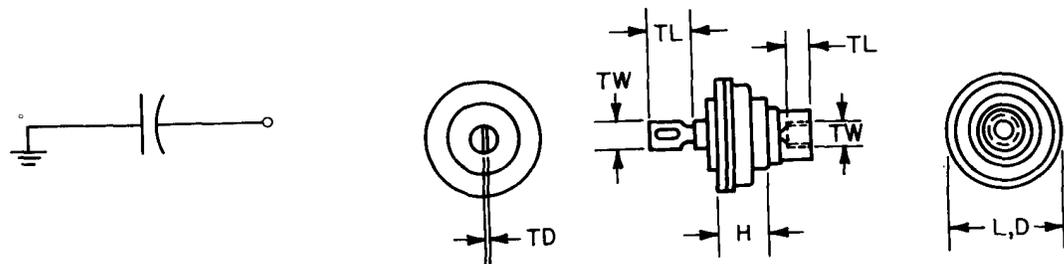


FIG. C38

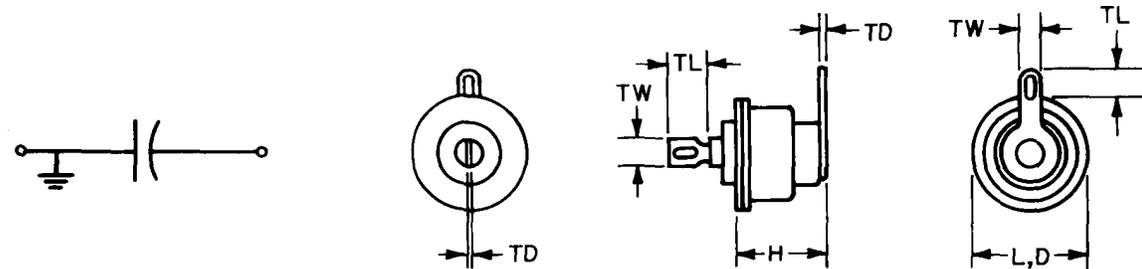


FIG. C39

MICA
Physical Outlines

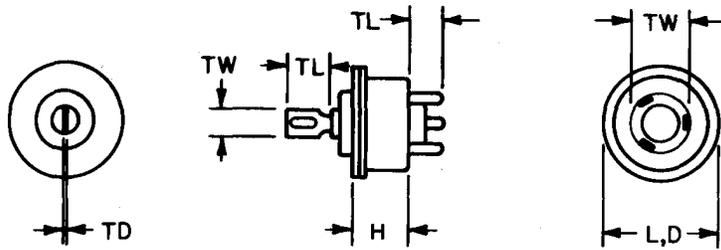


FIG. C40

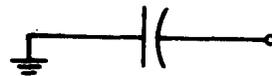


TABLE 6.1

WHEN TOLERANCE IS SHOWN IN BOTH % AND PF, THE LARGEST TOLERANCE VARIATION APPLIES

CAPACITANCE		STD VALUE TABLE	TOLERANCE				DCV	FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)		CODE
MIN	MAX		+%	-%	+PF	-PF			L	H	D		TL	TW	
1 PF	240 PF	CBSP01	0.5	0.5	0.5	0.5	375	C10	0.35	0.197	0.197	AXIAL PT	1.125	0.025	KS20813L11
1 PF	240 PF	CBSP01	1	1	1	1	375	C10	0.35	0.197	0.197	AXIAL PT	1.125	0.025	KS20813L12
1 PF	390 PF	CBSP01	0.5	0.5	0.5	0.5	225	C10	0.35	0.197	0.197	AXIAL PT	1.125	0.025	KS20813L06
1 PF	390 PF	CBSP01	1	1	1	1	225	C10	0.35	0.197	0.197	AXIAL PT	1.125	0.025	KS20813L07
1 PF	510 PF	CBSP01	0.5	0.5	0.5	0.5	75	C10	0.35	0.197	0.197	AXIAL PT	1.125	0.025	KS20813L01
1 PF	510 PF	CBSP01	1	1	1	1	75	C10	0.35	0.197	0.197	AXIAL PT	1.125	0.025	KS20813L02
1 PF	510 PF	CBSP01	0.5	0.5	0.5	0.5	375	C13	0.531	0.312	0.218	AXIAL PT	1.125	0.025	KS14056L31
1 PF	510 PF	CBSP01	1	1	1	1	375	C13	0.531	0.312	0.218	AXIAL PT	1.125	0.025	KS14056L32
1 PF	510 PF	CBSP05	5	5			375	C13	0.531	0.312	0.218	AXIAL PT	1.125	0.025	KS14056L34
1 PF	620 PF	CBSP01	0.5	0.5	0.5	0.5	225	C13	0.531	0.312	0.218	AXIAL PT	1.125	0.025	KS14056L26
1 PF	620 PF	CBSP01	1	1	1	1	225	C13	0.531	0.312	0.218	AXIAL PT	1.125	0.025	KS14056L27
1 PF	620 PF	CBSP05	5	5			225	C13	0.531	0.312	0.218	AXIAL PT	1.125	0.025	KS14056L29
1 PF	1500 PF	CBSP01	0.5	0.5	0.5	0.5	750	C13	0.796	0.468	0.218	AXIAL PT	1.125	0.032	KS14057L21
1 PF	1500 PF	CBSP01	1	1	1	1	750	C13	0.796	0.468	0.218	AXIAL PT	1.125	0.032	KS14057L22
1 PF	1500 PF	CBSP05	5	5			750	C13	0.796	0.468	0.218	AXIAL PT	1.125	0.032	KS14057L24
1 PF	3600 PF	CBSP01	0.5	0.5	0.5	0.5	375	C13	0.796	0.468	0.218	AXIAL PT	1.125	0.032	KS13365L31
1 PF	3600 PF	CBSP01	1	1	1	1	375	C13	0.796	0.468	0.218	AXIAL PT	1.125	0.032	KS13365L32
1 PF	3600 PF	CBSP05	5	5			375	C13	0.796	0.468	0.218	AXIAL PT	1.125	0.032	KS13365L34
1 PF	5100 PF	CBSP01	1	1	1	1	225	C13	0.796	0.468	0.218	AXIAL PT	1.125	0.032	KS13365L27
1 PF	5100 PF	CBSP05	5	5			225	C13	0.796	0.468	0.218	AXIAL PT	1.125	0.032	KS13365L29
1 PF	5100 PF	CBSP01	0.5	0.5	0.5	0.5	225	C13	0.796	0.468	0.218	AXIAL PT	1.125	0.032	KS13365L26
5 PF	3000 PF	CBSP01	0.5	0.5	0.5	0.5	750	C13	0.828	0.828	0.281	AXIAL PT	1.125	0.04	KS14058L21
5 PF	3000 PF	CBSP01	1	1	1	1	750	C13	0.828	0.828	0.281	AXIAL PT	1.125	0.04	KS14058L22
5 PF	3000 PF	CBSP05	5	5			750	C13	0.828	0.828	0.281	AXIAL PT	1.125	0.04	KS14058L24
11 PF	240 PF	CBSP10	10	10			375	C10	0.35	0.197	0.197	AXIAL PT	1.125	0.025	KS20813L15
11 PF	390 PF	CBSP10	10	10			225	C10	0.35	0.197	0.197	AXIAL PT	1.125	0.025	KS20813L10
11 PF	510 PF	CBSP10	10	10			75	C10	0.35	0.197	0.197	AXIAL PT	1.125	0.025	KS20813L05
21 PF	240 PF	CBSP05	5	5			375	C10	0.35	0.197	0.197	AXIAL PT	1.125	0.025	KS20813L14
21 PF	390 PF	CBSP05	5	5			225	C10	0.35	0.197	0.197	AXIAL PT	1.125	0.025	KS20813L09
21 PF	510 PF	CBSP05	5	5			75	C10	0.35	0.197	0.197	AXIAL PT	1.125	0.025	KS20813L04
51 PF	240 PF	CBSP02	2	2			375	C10	0.35	0.197	0.197	AXIAL PT	1.125	0.025	KS20813L13
51 PF	390 PF	CBSP02	2	2			225	C10	0.35	0.197	0.197	AXIAL PT	1.125	0.025	KS20813L08
51 PF	510 PF	CBSP02	2	2			75	C10	0.35	0.197	0.197	AXIAL PT	1.125	0.025	KS20813L03
200 PF	200 PF	CBSP02	2	2			2000	C13	0.796	0.468	0.218	AXIAL PT	1.125	0.032	KS14057L15
470 PF	7500 PF	CBSP01	0.5	0.5			375	C13	0.828	0.828	0.281	AXIAL PT	1.125	0.04	KS13367L31
470 PF	7500 PF	CBSP01	1	1			375	C13	0.828	0.828	0.281	AXIAL PT	1.125	0.04	KS13367L32
470 PF	7500 PF	CBSP05	5	5			375	C13	0.828	0.828	0.281	AXIAL PT	1.125	0.04	KS13367L34
470 PF	0.011	CBSP01	0.5	0.5			375	C13	0.828	0.828	0.343	AXIAL PT	1.125	0.04	KS13368L31

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BELL SYSTEM STANDARD COMPONENTS - CAPACITORS

SHEET 1 OF 2
MICA, MOLEDED
(FAMILY CODES)
ELECTRICAL & PHYSICAL DATA

TABLE 6.1
(CONT'D)

WHEN TOLERANCE IS SHOWN IN BOTH % AND PF, THE LARGEST TOLERANCE VARIATION APPLIES

CAPACITANCE		STD VALUE TABLE	TOLERANCE				DCWV	FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)		CODE
MIN	MAX		+%	-%	+PF	-PF			L	H	D		TL	TW	
470 PF	0.011	CBSP01	1	1			375	C13	0.828	0.828	0.343	AXIAL PT	1.125	0.04	KS13368L32
470 PF	0.011	CBSP05	5	5			375	C13	0.828	0.828	0.343	AXIAL PT	1.125	0.04	KS13368L34
470 PF	0.012	CBSP01	0.5	0.5			225	C13	0.828	0.828	0.281	AXIAL PT	1.125	0.04	KS13367L26
470 PF	0.012	CBSP01	1	1			225	C13	0.828	0.828	0.281	AXIAL PT	1.125	0.04	KS13367L27
470 PF	0.012	CBSP05	5	5			225	C13	0.828	0.828	0.281	AXIAL PT	1.125	0.04	KS13367L29
470 PF	0.02	CBSP01	1	1			225	C13	0.828	0.828	0.343	AXIAL PT	1.125	0.04	KS13368L27
470 PF	0.02	CBSP05	5	5			225	C13	0.828	0.828	0.343	AXIAL PT	1.125	0.04	KS13368L29
470 PF	0.02	CBSP01	0.5	0.5			225	C13	0.828	0.828	0.343	AXIAL PT	1.125	0.04	KS13368L26
1500 PF	5700 PF	CBSP01	0.5	0.5			750	C13	0.828	0.828	0.343	AXIAL PT	1.375	0.04	KS14228L21
1500 PF	5700 PF	CBSP01	1	1			750	C13	0.828	0.828	0.343	AXIAL PT	1.375	0.04	KS14228L22
1500 PF	5700 PF	CBSP05	5	5			750	C13	0.828	0.828	0.343	AXIAL PT	1.375	0.04	KS14228L24

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BELL SYSTEM STANDARD COMPONENTS - CAPACITORS

MICA,BUTTON
(UNIQUE CODES)
ELECTRICAL & PHYSICAL DATA

TABLE 6.2

CAPACITANCE	TOLERANCE		DCWV	FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)			CODE
	+%	-%			L	H	C		TL	TW	TD	
26 PF	3.84	3.84	500	C37	0.5	0.34	0.5	EXT THD	0.19	0.437	20	KS16509L27
								AXIAL PT	0.419	0.032		KS16509L27
28 PF	3.68	3.68	500	C37	0.5	0.34	0.5	SOLDER	0.15	0.115	0.025	KS16509L27
								EXT THD	0.19	0.437	20	KS16509L17
30 PF	3.3	3.3	500	C37	0.5	0.34	0.5	AXIAL PT	0.419	0.032		KS16509L17
								SOLDER	0.15	0.115	0.025	KS16509L17
34 PF	2.94	2.94	500	C37	0.5	0.34	0.5	EXT THD	0.19	0.437	20	KS16509L06
								AXIAL PT	0.419	0.032		KS16509L06
500 PF	10	10	500	C36	0.5	0.2	0.5	SOLDER	0.15	0.115	0.025	KS16509L06
								EXT THD	0.19	0.437	20	KS16509L07
500 PF	10	10	500	C39	0.5	0.214	0.5	AXIAL PT	0.419	0.032		KS16509L06
								SOLDER	0.15	0.115	0.025	KS16509L06
500 PF	10	10	500	C35	0.5	0.13	0.5	EXT THD	0.19	0.437	20	KS16509L07
								AXIAL PT	0.419	0.032		KS16509L07
1000 PF	20	20	500	C34	0.5	0.34	0.5	SOLDER	0.15	0.115	0.025	KS16509L07
								EXT THD	0.19	0.437	20	KS16509L20
1000 PF	20	20	500	C35	0.5	0.155	0.5	AXIAL PT	0.419	0.032		KS16509L07
								SOLDER	0.15	0.115	0.025	KS16509L20
1000 PF	20	20	500	C36	0.5	0.225	0.5	EXT THD	0.19	0.437	20	KS16509L20
								AXIAL PT	0.419	0.032		KS16509L20
1000 PF	20	20	500	C38	0.5	0.225	0.5	SOLDER	0.15	0.115	0.025	KS16509L20
								EXT THD	0.19	0.437	20	KS16509L28
1000 PF	5	5	500	C39	0.5	0.24	0.5	AXIAL PT	0.419	0.032		KS16509L28
								SOLDER	0.15	0.115	0.025	KS16509L28
1000 PF	20	20	500	C35	0.5	0.155	0.5	EXT THD	0.19	0.437	20	KS16509L33
								AXIAL PT	0.419	0.032		KS16509L33
1000 PF	20	20	500	C40	0.5	0.155	0.5	SOLDER	0.15	0.115	0.025	KS16509L33
								EXT THD	0.19	0.437	20	KS16509L01
1000 PF	10	10	500	C38	0.5	0.225	0.5	AXIAL PT	0.419	0.032		KS16509L01
								SOLDER	0.15	0.115	0.025	KS16509L01
2000 PF	10	10	500	C39	0.5	0.318	0.5	EXT THD	0.19	0.437	20	KS16509L02
								AXIAL PT	0.419	0.032		KS16509L02
								EXT THD	0.19	0.437	20	KS16509L02
								SOLDER	0.15	0.115	0.025	KS16509L02
								EXT THD	0.19	0.437	20	KS16509L03
								AXIAL PT	0.419	0.032		KS16509L03
								SOLDER	0.15	0.115	0.025	KS16509L03
								EXT THD	0.19	0.437	20	KS16509L03
								AXIAL PT	0.419	0.032		KS16509L19
								SOLDER	0.15	0.115	0.025	KS16509L19
								EXT THD	0.19	0.437	20	KS16509L19
								AXIAL PT	0.419	0.032		KS16509L19
								SOLDER	0.15	0.115	0.025	KS16509L29
								EXT THD	0.19	0.437	20	KS16509L29
								AXIAL PT	0.419	0.032		KS16509L29
								SOLDER	0.15	0.115	0.025	KS16509L31
								EXT THD	0.19	0.437	20	KS16509L31
								AXIAL PT	0.419	0.032		KS16509L31
								SOLDER	0.15	0.115	0.025	KS16509L31
								EXT THD	0.19	0.437	20	KS16509L32
								AXIAL PT	0.419	0.032		KS16509L32
								SOLDER	0.15	0.115	0.025	KS16509L32
								EXT THD	0.19	0.437	20	KS16509L32
								AXIAL PT	0.419	0.032		KS16509L34
								SOLDER	0.15	0.115	0.025	KS16509L34
								EXT THD	0.19	0.437	20	KS16509L34
								AXIAL PT	0.419	0.032		KS16509L34
								SOLDER	0.15	0.115	0.025	KS16509L34
								EXT THD	0.19	0.437	20	KS16509L30
								AXIAL PT	0.419	0.032		KS16509L30
								SOLDER	0.15	0.115	0.025	KS16509L30

BELL SYSTEM STANDARD COMPONENTS - CAPACITORS

MICA, DIPPED
(FAMILY CODES)
ELECTRICAL DATA

TABLE 6.3

FOR PHYSICAL DATA, SEE TABLES 6.4 THRU 6.14.

CAPACITANCE		STD VALUE TABLE	TOLERANCE				DCWV	CODE
MIN	MAX		+%	-%	+PF	-PF		
1 PF	250 PF	CBSP01	0.5	0.5	0.5	0.5	375	KS20299L11
1 PF	250 PF	CBSP01	1	1	1	1	375	KS20299L12
1 PF	300 PF	CBSP01	0.5	0.5	0.5	0.5	225	KS20299L06
1 PF	300 PF	CBSP01	1	1	1	1	225	KS20299L07
1 PF	400 PF	CBSP01	0.5	0.5	0.5	0.5	75	KS20299L01
1 PF	400 PF	CBSP01	1	1	1	1	75	KS20299L02
1 PF	511 PF	CBSP05	5	5			375	KS16958L34
1 PF	511 PF	CBSP01	0.5	0.5	0.5	0.5	375	KS16958L31
1 PF	511 PF	CBSP01	1	1	1	1	375	KS16958L32
1 PF	825 PF	CBSP01	1	1	1	1	225	KS16958L27
1 PF	825 PF	CBSP05	5	5			225	KS16958L29
1 PF	825 PF	CBSP01	0.5	0.5	0.5	0.5	225	KS16958L26
11 PF	250 PF	CBSP10	10	10			375	KS20299L15
11 PF	300 PF	CBSP10	10	10			225	KS20299L10
11 PF	400 PF	CBSP10	10	10			75	KS20299L05
21 PF	250 PF	CBSP05	5	5			375	KS20299L14
21 PF	300 PF	CBSP05	5	5			225	KS20299L09
21 PF	400 PF	CBSP05	5	5			75	KS20299L04
51 PF	250 PF	CBSP02	2	2			375	KS20299L13
51 PF	300 PF	CBSP02	2	2			225	KS20299L08
51 PF	400 PF	CBSP02	2	2			75	KS20299L03
150 PF	0.01	CBSP01	0.5	0.5			375	KS16742L31
150 PF	0.01	CBSP01	1	1			375	KS16742L32
150 PF	0.01	CBSP05	5	5			375	KS16742L34
150 PF	0.012	CBSP01	0.5	0.5			225	KS16742L26
150 PF	0.012	CBSP01	1	1			225	KS16742L27
150 PF	0.012	CBSP05	5	5			225	KS16742L29
2000 PF	0.022	CBSP05	5	5			375	KS16591L34
2000 PF	0.022	CBSP01	0.5	0.5			375	KS16591L31
2000 PF	0.022	CBSP01	1	1			375	KS16591L32
2000 PF	0.03	CBSP01	1	1			225	KS16591L27
2000 PF	0.03	CBSP05	5	5			225	KS16591L29
2000 PF	0.03	CBSP01	0.5	0.5			225	KS16591L26
0.015	0.051	CBSP01	0.5	0.5			375	KS16456L31
0.015	0.051	CBSP01	1	1			375	KS16456L32
0.015	0.051	CBSP05	5	5			375	KS16456L34
0.015	0.068	CBSP01	0.5	0.5			225	KS16456L26
0.015	0.068	CBSP01	1	1			225	KS16456L27
0.015	0.068	CBSP05	5	5			225	KS16456L29

BELL SYSTEM STANDARD COMPONENTS - CAPACITORS

MICA, DIPPED
(FAMILY CODES)
PHYSICAL DATA

TABLE 6.4
(DATA FOR KS16456L26, L27, L29)

CAPACITANCE		FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)	
FROM	TO		L	H	D		TL	TW
0.015	0.016	C11	1.41	0.87	0.28	RAD PT	1.25	0.04
0.016001	0.018	C11	1.41	0.87	0.29	RAD PT	1.25	0.04
0.018001	0.02	C11	1.42	0.87	0.3	RAD PT	1.25	0.04
0.020001	0.022	C11	1.42	0.87	0.29	RAD PT	1.25	0.04
0.022001	0.024	C11	1.42	0.87	0.3	RAD PT	1.25	0.04
0.024001	0.027	C11	1.42	0.88	0.31	RAD PT	1.25	0.04
0.027001	0.03	C11	1.43	0.88	0.32	RAD PT	1.25	0.04
0.030001	0.033	C11	1.43	0.88	0.34	RAD PT	1.25	0.04
0.033001	0.036	C11	1.44	0.89	0.35	RAD PT	1.25	0.04
0.036001	0.039	C11	1.44	0.89	0.36	RAD PT	1.25	0.04
0.039001	0.043	C11	1.45	0.9	0.37	RAD PT	1.25	0.04
0.043001	0.047	C11	1.45	0.9	0.39	RAD PT	1.25	0.04
0.047001	0.051	C11	1.46	0.9	0.4	RAD PT	1.25	0.04
0.051001	0.056	C11	1.46	0.91	0.42	RAD PT	1.25	0.04
0.056001	0.062	C11	1.47	0.92	0.45	RAD PT	1.25	0.04
0.062001	0.068	C11	1.48	0.92	0.47	RAD PT	1.25	0.04

TABLE 6.5
(DATA FOR KS16456L31, L32, L34)

CAPACITANCE		FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)	
FROM	TO		L	H	D		TL	TW
0.015	0.016	C11	1.41	0.87	0.28	RAD PT	1.25	0.04
0.016001	0.018	C11	1.41	0.87	0.29	RAD PT	1.25	0.04
0.018001	0.02	C11	1.42	0.87	0.3	RAD PT	1.25	0.04
0.020001	0.022	C11	1.42	0.88	0.31	RAD PT	1.25	0.04
0.022001	0.024	C11	1.43	0.88	0.32	RAD PT	1.25	0.04
0.024001	0.027	C11	1.43	0.88	0.33	RAD PT	1.25	0.04
0.027001	0.03	C11	1.44	0.89	0.35	RAD PT	1.25	0.04
0.030001	0.033	C11	1.44	0.89	0.36	RAD PT	1.25	0.04
0.033001	0.036	C11	1.45	0.9	0.38	RAD PT	1.25	0.04
0.036001	0.039	C11	1.45	0.9	0.4	RAD PT	1.25	0.04
0.039001	0.043	C11	1.46	0.91	0.42	RAD PT	1.25	0.04
0.043001	0.047	C11	1.47	0.91	0.45	RAD PT	1.25	0.04
0.047001	0.051	C11	1.48	0.92	0.47	RAD PT	1.25	0.04

BELL SYSTEM STANDARD COMPONENTS - CAPACITORS

MICA, DIPPED
(FAMILY CODES)
PHYSICAL DATA

TABLE 6.6
(DATA FOR KS16591L26, L27, L29)

CAPACITANCE		FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)	
FROM	TO		L	H	D		TL	TW
2000 PF	2700 PF	C11	0.77	0.85	0.25	RAD PT	1.25	0.04
2701 PF	3000 PF	C11	0.77	0.86	0.25	RAD PT	1.25	0.04
3001 PF	3900 PF	C11	0.77	0.86	0.26	RAD PT	1.25	0.04
3901 PF	4700 PF	C11	0.78	0.86	0.27	RAD PT	1.25	0.04
4701 PF	5100 PF	C11	0.78	0.86	0.28	RAD PT	1.25	0.04
5101 PF	6200 PF	C11	0.78	0.87	0.29	RAD PT	1.25	0.04
6201 PF	6800 PF	C11	0.78	0.87	0.3	RAD PT	1.25	0.04
6801 PF	7500 PF	C11	0.78	0.86	0.27	RAD PT	1.25	0.04
7501 PF	8200 PF	C11	0.78	0.86	0.28	RAD PT	1.25	0.04
8201 PF	9100 PF	C11	0.78	0.87	0.28	RAD PT	1.25	0.04
9101 PF	0.01	C11	0.78	0.87	0.29	RAD PT	1.25	0.04
0.010001	0.011	C11	0.78	0.87	0.3	RAD PT	1.25	0.04
0.011001	0.013	C11	0.79	0.88	0.31	RAD PT	1.25	0.04
0.013001	0.015	C11	0.79	0.88	0.33	RAD PT	1.25	0.04
0.015001	0.016	C11	0.8	0.89	0.34	RAD PT	1.25	0.04
0.016001	0.018	C11	0.8	0.89	0.36	RAD PT	1.25	0.04
0.018001	0.02	C11	0.81	0.89	0.37	RAD PT	1.25	0.04
0.020001	0.022	C11	0.81	0.9	0.39	RAD PT	1.25	0.04
0.022001	0.024	C11	0.82	0.9	0.41	RAD PT	1.25	0.04
0.024001	0.027	C11	0.82	0.91	0.43	RAD PT	1.25	0.04
0.027001	0.03	C11	0.83	0.92	0.46	RAD PT	1.25	0.04

TABLE 6.7
(DATA FOR KS16591L31, L32, L34)

CAPACITANCE		FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)	
FROM	TO		L	H	D		TL	TW
2000 PF	2700 PF	C11	0.77	0.85	0.25	RAD PT	1.25	0.04
2701 PF	3000 PF	C11	0.77	0.86	0.25	RAD PT	1.25	0.04
3001 PF	3900 PF	C11	0.77	0.86	0.26	RAD PT	1.25	0.04
3901 PF	4700 PF	C11	0.78	0.86	0.27	RAD PT	1.25	0.04
4701 PF	5100 PF	C11	0.78	0.86	0.28	RAD PT	1.25	0.04
5101 PF	6200 PF	C11	0.78	0.87	0.29	RAD PT	1.25	0.04
6201 PF	6800 PF	C11	0.78	0.87	0.3	RAD PT	1.25	0.04
6801 PF	7500 PF	C11	0.79	0.88	0.31	RAD PT	1.25	0.04
7501 PF	8200 PF	C11	0.79	0.88	0.32	RAD PT	1.25	0.04
8201 PF	9100 PF	C11	0.79	0.88	0.33	RAD PT	1.25	0.04
9101 PF	0.01	C11	0.8	0.89	0.34	RAD PT	1.25	0.04
0.010001	0.011	C11	0.8	0.89	0.35	RAD PT	1.25	0.04
0.011001	0.012	C11	0.8	0.89	0.36	RAD PT	1.25	0.04
0.012001	0.013	C11	0.81	0.89	0.37	RAD PT	1.25	0.04
0.013001	0.015	C11	0.81	0.9	0.39	RAD PT	1.25	0.04
0.015001	0.016	C11	0.82	0.9	0.41	RAD PT	1.25	0.04
0.016001	0.018	C11	0.82	0.91	0.43	RAD PT	1.25	0.04
0.018001	0.02	C11	0.83	0.92	0.45	RAD PT	1.25	0.04
0.020001	0.022	C11	0.84	0.93	0.48	RAD PT	1.25	0.04

BELL SYSTEM STANDARD COMPONENTS - CAPACITORS

MICA, DIPPED
(FAMILY CODES)
PHYSICAL DATA

TABLE 6.8
(DATA FOR KS16742L26, L27, L29)

CAPACITANCE		FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)	
FROM	TO		L	H	D		TL	TW
150 PF	620 PF	C11	0.75	0.5	0.19	RAD PT	1.25	0.032
621 PF	1200 PF	C11	0.75	0.51	0.2	RAD PT	1.25	0.032
1201 PF	1500 PF	C11	0.75	0.51	0.21	RAD PT	1.25	0.032
1501 PF	1600 PF	C11	0.76	0.51	0.21	RAD PT	1.25	0.032
1601 PF	2200 PF	C11	0.76	0.52	0.22	RAD PT	1.25	0.032
2201 PF	2400 PF	C11	0.77	0.53	0.25	RAD PT	1.25	0.032
2401 PF	2700 PF	C11	0.77	0.54	0.26	RAD PT	1.25	0.032
2701 PF	3000 PF	C11	0.77	0.54	0.27	RAD PT	1.25	0.032
3001 PF	3300 PF	C11	0.78	0.55	0.28	RAD PT	1.25	0.032
3301 PF	3600 PF	C11	0.78	0.55	0.29	RAD PT	1.25	0.032
3601 PF	3900 PF	C11	0.78	0.56	0.3	RAD PT	1.25	0.032
3901 PF	4700 PF	C11	0.77	0.54	0.27	RAD PT	1.25	0.032
4701 PF	5100 PF	C11	0.78	0.55	0.28	RAD PT	1.25	0.032
5101 PF	5600 PF	C11	0.78	0.55	0.29	RAD PT	1.25	0.032
5601 PF	6200 PF	C11	0.78	0.56	0.3	RAD PT	1.25	0.032
6201 PF	6800 PF	C11	0.79	0.56	0.32	RAD PT	1.25	0.032
6801 PF	7500 PF	C11	0.79	0.57	0.33	RAD PT	1.25	0.032
7501 PF	8200 PF	C11	0.79	0.57	0.34	RAD PT	1.25	0.032
8201 PF	9100 PF	C11	0.8	0.58	0.36	RAD PT	1.25	0.032
9101 PF	0.01	C11	0.8	0.59	0.37	RAD PT	1.25	0.032
0.010001	0.011	C11	0.8	0.59	0.38	RAD PT	1.25	0.032
0.011001	0.012	C11	0.81	0.6	0.4	RAD PT	1.25	0.032

TABLE 6.9
(DATA FOR KS16742L31, L32, L34)

CAPACITANCE		FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)	
FROM	TO		L	H	D		TL	TW
150 PF	620 PF	C11	0.75	0.5	0.19	RAD PT	1.25	0.032
621 PF	1200 PF	C11	0.75	0.51	0.2	RAD PT	1.25	0.032
1201 PF	1500 PF	C11	0.75	0.51	0.21	RAD PT	1.25	0.032
1501 PF	1600 PF	C11	0.76	0.51	0.21	RAD PT	1.25	0.032
1601 PF	2200 PF	C11	0.76	0.52	0.22	RAD PT	1.25	0.032
2201 PF	2400 PF	C11	0.77	0.53	0.25	RAD PT	1.25	0.032
2401 PF	2700 PF	C11	0.77	0.54	0.26	RAD PT	1.25	0.032
2701 PF	3000 PF	C11	0.77	0.54	0.27	RAD PT	1.25	0.032
3001 PF	3300 PF	C11	0.78	0.55	0.28	RAD PT	1.25	0.032
3301 PF	3600 PF	C11	0.78	0.55	0.29	RAD PT	1.25	0.032
3601 PF	3900 PF	C11	0.78	0.56	0.3	RAD PT	1.25	0.032
3901 PF	4300 PF	C11	0.78	0.56	0.31	RAD PT	1.25	0.032
4301 PF	4700 PF	C11	0.79	0.56	0.32	RAD PT	1.25	0.032
4701 PF	5100 PF	C11	0.79	0.57	0.33	RAD PT	1.25	0.032
5101 PF	5600 PF	C11	0.79	0.57	0.34	RAD PT	1.25	0.032
5601 PF	6200 PF	C11	0.79	0.58	0.35	RAD PT	1.25	0.032
6201 PF	6800 PF	C11	0.8	0.59	0.37	RAD PT	1.25	0.032
6801 PF	7500 PF	C11	0.8	0.6	0.39	RAD PT	1.25	0.032
7501 PF	8200 PF	C11	0.81	0.61	0.41	RAD PT	1.25	0.032
8201 PF	9100 PF	C11	0.81	0.62	0.43	RAD PT	1.25	0.032
9101 PF	0.01	C11	0.82	0.63	0.45	RAD PT	1.25	0.032

BELL SYSTEM STANDARD COMPONENTS - CAPACITORS

MICA, DIPPED
(FAMILY CODES)
PHYSICAL DATA

TABLE 6.10
(DATA FOR KS16958L26, L27, L29)

CAPACITANCE		FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)	
FROM	TO		L	H	D		TL	TW
1 PF	62 PF	C11	0.45	0.36	0.17	RAD PT	1.25	0.025
63 PF	82 PF	C11	0.45	0.36	0.18	RAD PT	1.25	0.025
83 PF	100 PF	C11	0.46	0.36	0.18	RAD PT	1.25	0.025
101 PF	130 PF	C11	0.46	0.37	0.18	RAD PT	1.25	0.025
131 PF	180 PF	C11	0.46	0.37	0.19	RAD PT	1.25	0.025
181 PF	200 PF	C11	0.46	0.38	0.19	RAD PT	1.25	0.025
201 PF	240 PF	C11	0.46	0.38	0.2	RAD PT	1.25	0.025
241 PF	330 PF	C11	0.47	0.39	0.21	RAD PT	1.25	0.025
331 PF	390 PF	C11	0.47	0.4	0.22	RAD PT	1.25	0.025
391 PF	470 PF	C11	0.46	0.38	0.2	RAD PT	1.25	0.025
471 PF	510 PF	C11	0.47	0.38	0.2	RAD PT	1.25	0.025
511 PF	680 PF	C11	0.47	0.39	0.21	RAD PT	1.25	0.025
681 PF	750 PF	C11	0.47	0.4	0.22	RAD PT	1.25	0.025
751 PF	825 PF	C11	0.47	0.4	0.23	RAD PT	1.25	0.025

TABLE 6.11
(DATA FOR KS16958L31, L32, L34)

CAPACITANCE		FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)	
FROM	TO		L	H	D		TL	TW
1 PF	62 PF	C11	0.45	0.36	0.17	RAD PT	1.25	0.025
63 PF	82 PF	C11	0.45	0.36	0.18	RAD PT	1.25	0.025
83 PF	100 PF	C11	0.46	0.36	0.18	RAD PT	1.25	0.025
101 PF	130 PF	C11	0.46	0.37	0.18	RAD PT	1.25	0.025
131 PF	180 PF	C11	0.46	0.37	0.19	RAD PT	1.25	0.025
181 PF	200 PF	C11	0.46	0.38	0.19	RAD PT	1.25	0.025
201 PF	240 PF	C11	0.46	0.38	0.2	RAD PT	1.25	0.025
241 PF	330 PF	C11	0.47	0.39	0.21	RAD PT	1.25	0.025
331 PF	390 PF	C11	0.47	0.4	0.22	RAD PT	1.25	0.025
391 PF	430 PF	C11	0.48	0.4	0.23	RAD PT	1.25	0.025
431 PF	470 PF	C11	0.48	0.41	0.23	RAD PT	1.25	0.025
471 PF	511 PF	C11	0.49	0.42	0.24	RAD PT	1.25	0.025

BELL SYSTEM STANDARD COMPONENTS - CAPACITORS

MICA, DIPPED
(FAMILY CODES)
PHYSICAL DATA

TABLE 6.12
(DATA FOR KS20299L1-L5)

CAPACITANCE		FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)	
FROM	TO		L	H	D		TL	TW
1 PF	24 PF	C11	0.36	0.33	0.19	RAD PT	1.25	0.015
25 PF	27 PF	C11	0.37	0.33	0.19	RAD PT	1.25	0.015
28 PF	36 PF	C11	0.37	0.34	0.19	RAD PT	1.25	0.015
37 PF	39 PF	C11	0.36	0.33	0.19	RAD PT	1.25	0.015
40 PF	43 PF	C11	0.37	0.33	0.19	RAD PT	1.25	0.015
44 PF	110 PF	C11	0.37	0.34	0.19	RAD PT	1.25	0.015
111 PF	120 PF	C11	0.37	0.35	0.2	RAD PT	1.25	0.015
121 PF	160 PF	C11	0.37	0.35	0.2	RAD PT	1.25	0.015
161 PF	200 PF	C11	0.38	0.35	0.2	RAD PT	1.25	0.015
201 PF	250 PF	C11	0.38	0.36	0.21	RAD PT	1.25	0.015
251 PF	270 PF	C11	0.38	0.37	0.21	RAD PT	1.25	0.015
271 PF	300 PF	C11	0.39	0.37	0.21	RAD PT	1.25	0.015
301 PF	330 PF	C11	0.39	0.37	0.22	RAD PT	1.25	0.015
331 PF	400 PF	C11	0.39	0.38	0.22	RAD PT	1.25	0.015

TABLE 6.13
(DATA FOR KS20299L6-L10)

CAPACITANCE		FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)	
FROM	TO		L	H	D		TL	TW
1 PF	24 PF	C11	0.36	0.33	0.19	RAD PT	1.25	0.015
25 PF	27 PF	C11	0.37	0.33	0.19	RAD PT	1.25	0.015
28 PF	82 PF	C11	0.37	0.34	0.19	RAD PT	1.25	0.015
83 PF	120 PF	C11	0.37	0.35	0.2	RAD PT	1.25	0.015
121 PF	150 PF	C11	0.38	0.35	0.2	RAD PT	1.25	0.015
151 PF	160 PF	C11	0.38	0.36	0.2	RAD PT	1.25	0.015
161 PF	200 PF	C11	0.38	0.36	0.21	RAD PT	1.25	0.015
201 PF	220 PF	C11	0.39	0.37	0.21	RAD PT	1.25	0.015
221 PF	250 PF	C11	0.39	0.37	0.22	RAD PT	1.25	0.015
251 PF	300 PF	C11	0.39	0.38	0.22	RAD PT	1.25	0.015

TABLE 6.14
(DATA FOR KS20299L11-L15)

CAPACITANCE		FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)	
FROM	TO		L	H	D		TL	TW
1 PF	24 PF	C11	0.36	0.33	0.19	RAD PT	1.25	0.015
25 PF	27 PF	C11	0.37	0.33	0.19	RAD PT	1.25	0.015
28 PF	68 PF	C11	0.37	0.34	0.19	RAD PT	1.25	0.015
69 PF	75 PF	C11	0.37	0.34	0.2	RAD PT	1.25	0.015
76 PF	100 PF	C11	0.37	0.35	0.2	RAD PT	1.25	0.015
101 PF	120 PF	C11	0.38	0.35	0.2	RAD PT	1.25	0.015
121 PF	130 PF	C11	0.38	0.36	0.2	RAD PT	1.25	0.015
131 PF	160 PF	C11	0.38	0.36	0.21	RAD PT	1.25	0.015
161 PF	180 PF	C11	0.39	0.37	0.21	RAD PT	1.25	0.015
181 PF	220 PF	C11	0.39	0.37	0.22	RAD PT	1.25	0.015
221 PF	250 PF	C11	0.39	0.38	0.22	RAD PT	1.25	0.015







PAPER
Basic Data

Basic Code	Type Code (Note)	Description	Capacitance Range		Tolerance %	DC Working Voltage	Oper Temp Range °C	
			From	To			From	To
KS13807	Unique	Tubular, Feed-thru, Axial PT, *	0.02 uF	0.02 uF	-10,+20	200	-55	+85
KS14570	Unique	Tubular, Axial Thread, PT, * †	0.33 uF	0.33 uF	10	50	-55	+85
KS14571	Unique	Tubular, Axial PT, * †	0.1 uF	1 uF	5,10	50	-55	+85
KS14658	Unique	Tubular, Feed-thru, Axial PT, *	0.02 uF	0.25 uF	10,20	100,300	-55	+85
KS14659	Unique	Tubular, Feed-thru, Axial PT, *	7500 pF	7500 pF	-10,+20	300	-55	+85
KS14660	Unique	Tubular and, Axial Solder and Single Ended, †	0.1 uF	0.1 uF	10	150	-55	+85
KS14733	Unique	Tubular, Axial Lug, PT, * †	1000 pF	1 uF	5,10,20	100-500	-55	+85
KS14755	Unique	Tubular, Can, Axial PT and Single Ended, * †	0.01 uF	1 uF	10	50-300	-55	+85
KS14980	Unique	Tubular, Axial Lug, PT, * †	1000 pF	1 uF	5,10,20	50-500	-55	+85
KS14981	Unique	Tubular, Axial PT, * †	0.68 uF	0.68 uF	20	50	-55	+85
KS19066	Family	Molded Tubular, Axial PT, ‡	1000 pF	0.82 uF	5,10,20	150	-55	+85
KS19067	Family	Molded Tubular, Axial PT, ‡	1000 pF	0.51 uF	5,10,20	300	-55	+85
KS19347	Unique	Tubular, Axial Stud and PT, †	0.01 uF	0.1 uF	10	1000-3750	-55	+85
KS20302	Unique	Tubular, Feed-thru, Axial Lug, * †	0.1 uF	1 uF	20	50	-55	+85
KS20588	Unique	Oval, Rectangular Can, Solder, **	3 uF	50 uF	6,10	--	-20	+65

Impregnants:

- * Mineral Oil
- † Polyisobutylene
- ‡ Synthetic organic resin
- ** Chlor-diphenol

Note: Unique - one value per code number. Family - range of values per code number. See GENERAL GUIDELINES section for more information.



PAPER
Application Guide

General Description

A paper capacitor consists of a rolled construction with two metal electrodes separated by two or more sheets of impregnated kraft paper. The various impregnants available offer a wide range of characteristics with temperature.

Normally paper capacitor designed for dc applications can be used in circuits where a relatively small amount of ac voltage is present. Where paper capacitors are to be used principally with ac, the circuit designer should consider the following special features.

Features

For the preferred paper capacitors listed herein, the available capacitance ranges from 1000 picofarads to 50 microfarads, and the voltage ranges from 50 to 3750 volts.

The paper dielectric is adversely affected by humidity and therefore requires moisture protection. The ratings specified have been based on a capacitor which has been carefully dried, impregnated, and sealed.

Paper capacitors are used as power supply filters, power harmonic suppression filters, blocking capacitors, voltage regulator capacitors, and for bypassing and timing.

The physical size of paper capacitors is relatively large for a given capacitance. Where size is a factor, other capacitor types should be considered.

Paper capacitors do not have as low a dissipation factor or as stable a temperature characteristic as mica, polystyrene, and Class 1 ceramics, but they are better than electrolytics in these respects.

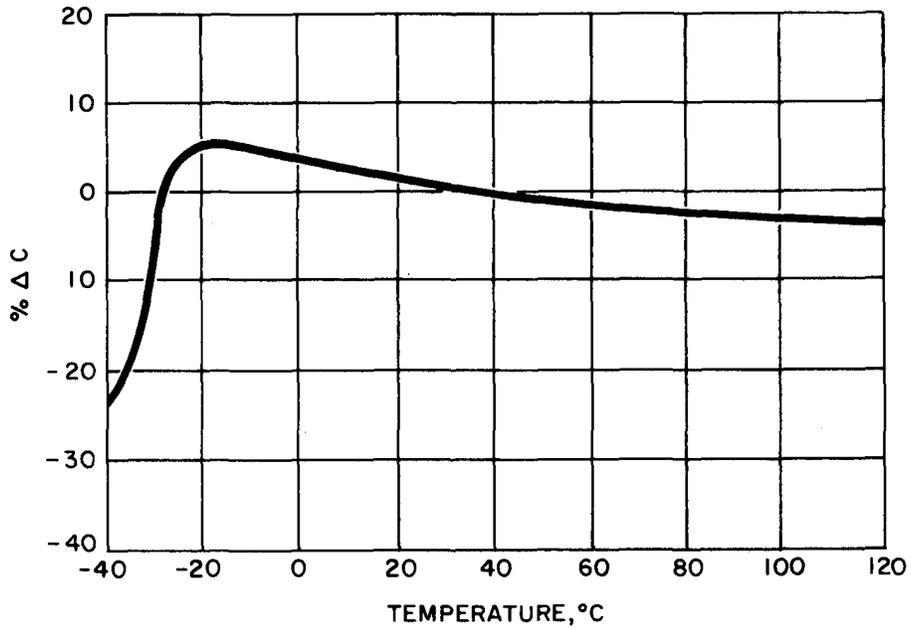
Paper and polyester are comparable in terms of dissipation factor.

In terms of insulation resistance, paper is better than electrolytics, but not as good as polyester.

Dielectric absorption is higher in paper than in polyester capacitors.

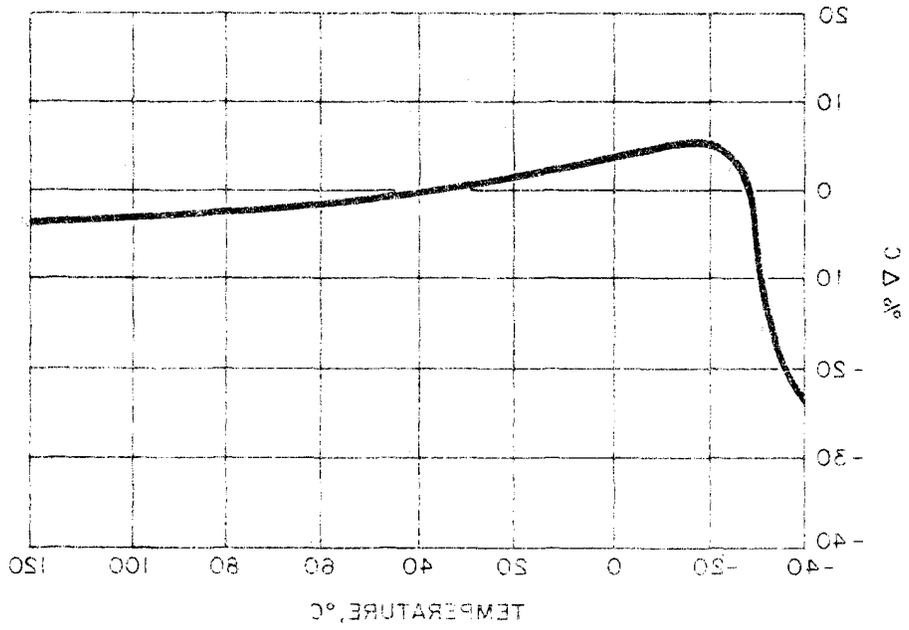


PAPER
Characteristic Curves



CAPACITANCE CHANGE VS TEMPERATURE

PAPER
Characteristic Curves



CAPACITANCE CHANGE VS TEMPERATURE

PAPER
Physical Outlines

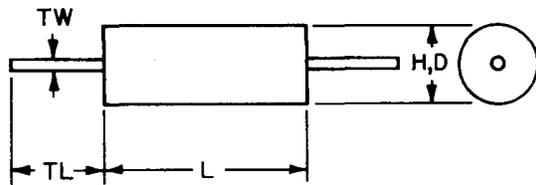
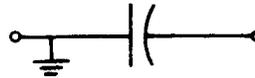


FIG. C10

For KS14755L12, L13, L15, L16
and KS14980L03, L24:



For others:

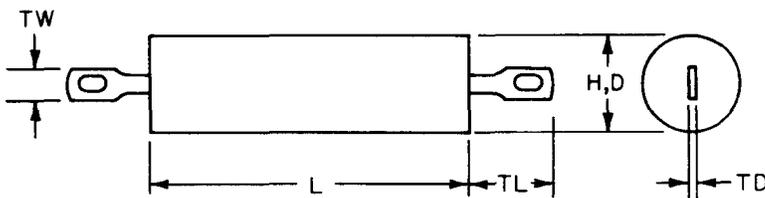
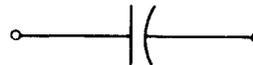


FIG. C21

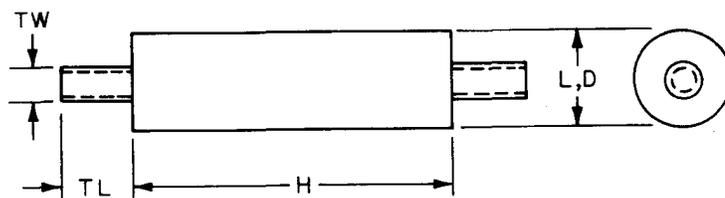
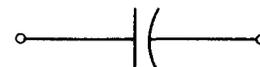


FIG. C22

PAPER
Physical Outlines

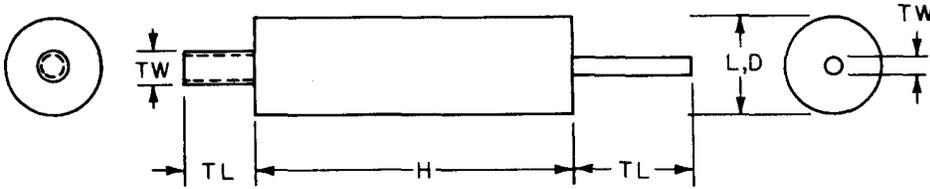


FIG. C23

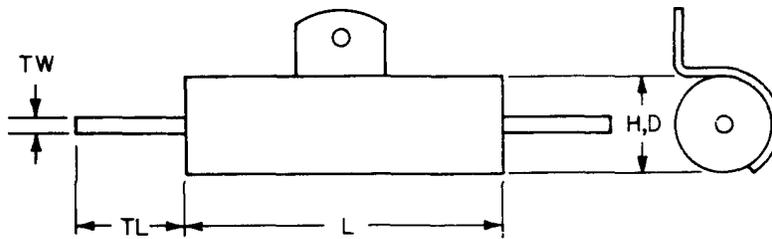
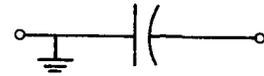
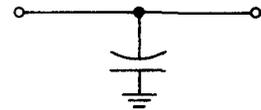


FIG. C24

For KS13807:



For others:

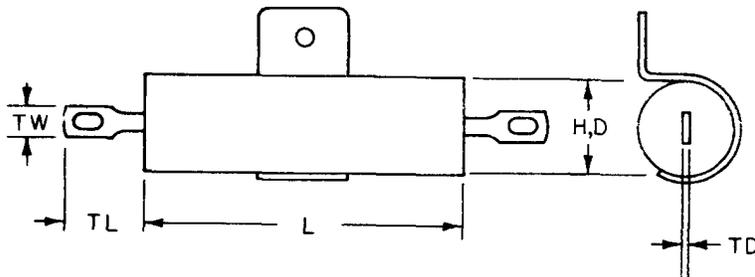
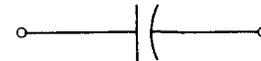
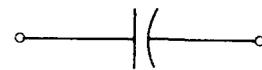
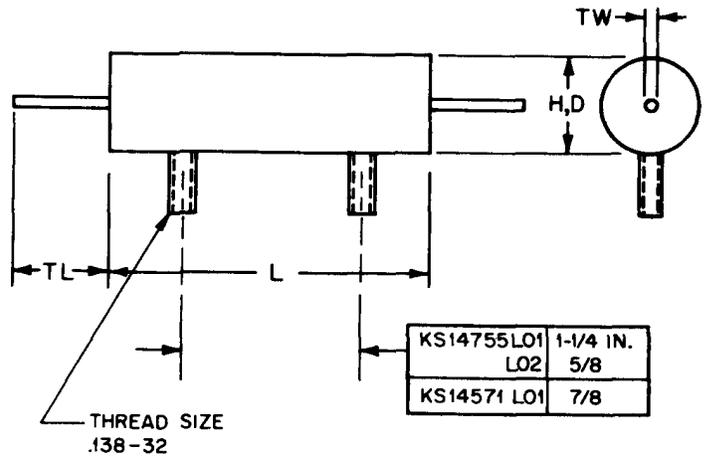


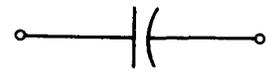
FIG. C25



PAPER
Physical Outlines



For KS14571L01:



For others:

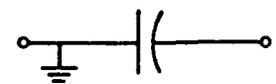


FIG. C26

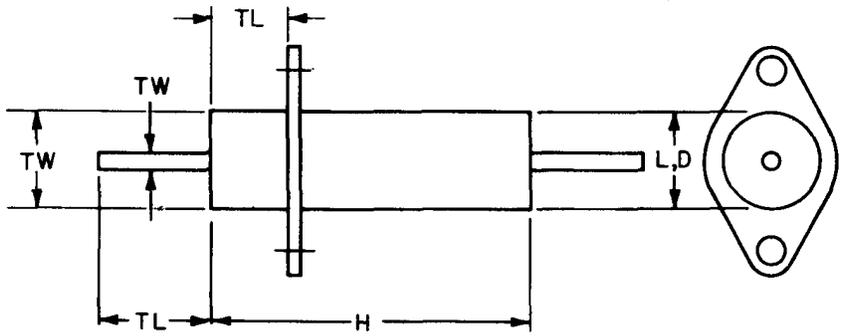


FIG. C27

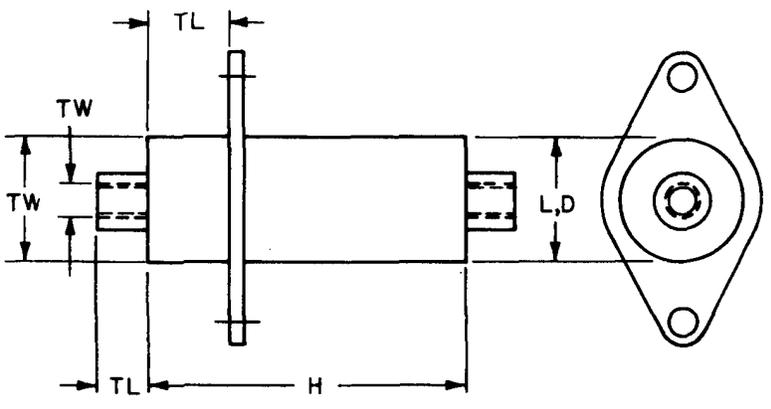
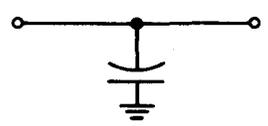


FIG. C28

PAPER
Physical Outlines

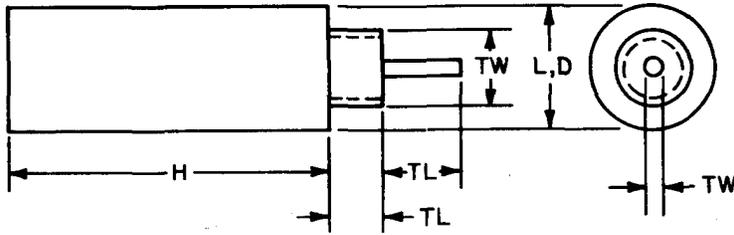


FIG. C29

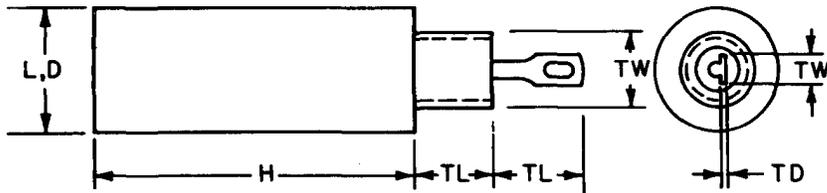
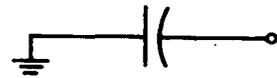


FIG. C30

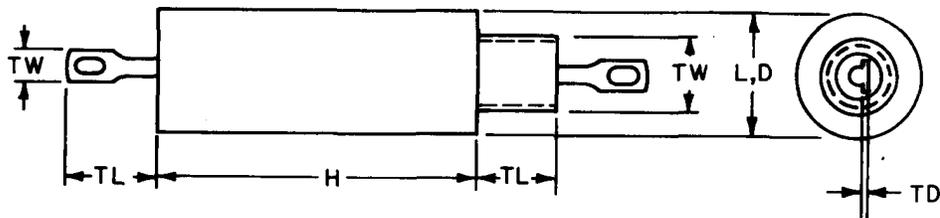
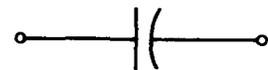


FIG. C31



PAPER
Physical Outlines

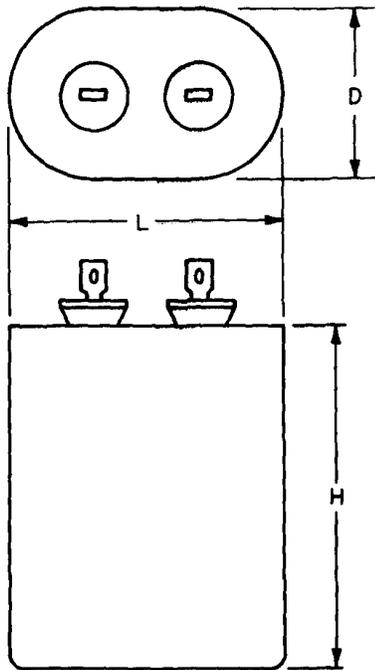


FIG. C32

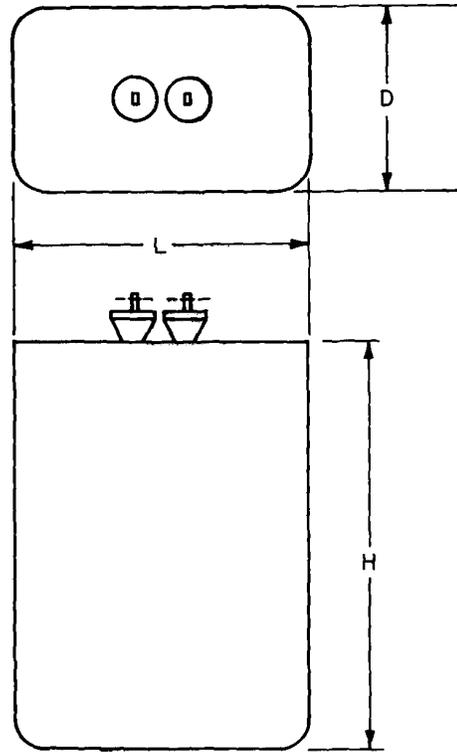


FIG. C33

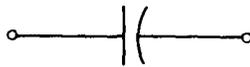




TABLE 7.1

CAPACITANCE	TOLERANCE		DCWV	FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)			CODE
	+X	-X			L	H	D		TL	TW	TD	
1000 PF	10	10	100	C10	0.938	0.329	0.329	AXIAL PT	1.625	0.025		KS14733L10
1000 PF	10	10	500	C10	1	0.494	0.494	AXIAL PT	1.625	0.032		KS14980L03
1000 PF	10	10	100	C10	0.937	0.329	0.329	AXIAL PT	1.625	0.025		KS14980L05
4700 PF	10	10	100	C10	0.937	0.329	0.329	AXIAL PT	1.625	0.025		KS14980L06
5100 PF	5	5	300	C10	1.026	0.406	0.406	AXIAL PT	1.625	0.025		KS14980L13
7500 PF	20	10	300	C27	0.251	1	0.251	AXIAL PT	1.625	0.025		KS14659
								BODY	0.25	0.25		KS14659
0.01	10	10	100	C10	0.781	0.251	0.251	AXIAL PT	1.625	0.025		KS14733L02
0.01	10	10	150	C10	0.781	0.251	0.251	AXIAL PT	1.625	0.025		KS14733L03
0.01	10	10	100	C10	0.938	0.329	0.329	AXIAL PT	1.625	0.025		KS14733L11
0.01	10	10	150	C29	0.4	1.687	0.4	AXIAL PT	1.625	0.032		KS14755L03
								EXT THD	0.312	0.312	24	KS14755L03
0.01	10	10	300	C10	1.026	0.406	0.406	AXIAL PT	1.625	0.025		KS14980L07
0.01	10	10	1500	C10	1.562	0.531	0.531	AXIAL PT	1.5	0.032		KS19347L02
0.01	10	10	1000	C10	1.187	0.532	0.532	AXIAL PT	1.5	0.032		KS19347L06
0.01	10	10	2000	C22	1.562	0.625	0.625	EXT THD	0.375	0.164	32	KS19347L07
0.01	10	10	3750	C22	2.25	0.75	0.75	EXT THD	0.375	0.164	32	KS19347L08
0.012	10	10	50	C10	0.781	0.251	0.251	AXIAL PT	1.625	0.025		KS14980L01
0.02	20	10	200	C24	1.5	0.437	0.437	AXIAL PT	2.25	0.05		KS13807
0.02	20	10	300	C27	0.437	1.5	0.437	AXIAL PT	1.5	0.05		KS14658L01
0.02	10	10	1000	C10	1.562	0.531	0.531	AXIAL PT	1.5	0.032		KS19347L03
0.02	10	10	3750	C22	2.75	1.031	1.031	EXT THD	0.375	0.164	32	KS19347L04
0.02	10	10	2000	C22	1.75	0.75	0.75	EXT THD	0.375	0.164	32	KS19347L05
0.022	10	10	100	C10	0.938	0.329	0.329	AXIAL PT	1.625	0.025		KS14733L14
0.022	10	10	500	C10	1.312	0.494	0.494	AXIAL PT	1.625	0.032		KS14733L22
0.022	5	5	300	C10	1.062	0.494	0.494	AXIAL PT	1.625	0.032		KS14980L10
0.027	10	10	50	C10	0.906	0.328	0.328	AXIAL PT	1.625	0.025		KS14980L02
0.03	5	5	200	C10	1.062	0.494	0.494	AXIAL PT	1.625	0.032		KS14980L18
0.033	5	5	300	C10	1.312	0.494	0.494	AXIAL PT	1.625	0.032		KS14980L11
0.047	10	10	150	C10	1.062	0.406	0.406	AXIAL PT	1.625	0.025		KS14733L21
0.047	20	20	500	C10	1.312	0.656	0.656	AXIAL PT	1.625	0.032		KS14733L25
0.047	5	5	150	C10	1.062	0.494	0.494	AXIAL PT	1.625	0.032		KS14980L14
0.05	10	10	3750	C22	2.75	1.344	1.344	EXT THD	0.375	0.164	32	KS19347L01
0.05	10	10	2500	C22	2.25	0.875	0.875	EXT THD	0.375	0.164	32	KS19347L10
0.051	5	5	200	C10	1.312	0.494	0.494	AXIAL PT	1.625	0.032		KS14980L19
0.056	5	5	150	C10	1.062	0.494	0.494	AXIAL PT	1.625	0.032		KS14980L12
0.062	5	5	150	C10	1.312	0.494	0.494	AXIAL PT	1.625	0.032		KS14980L15
0.091	5	5	500	C10	1.656	0.686	0.686	AXIAL PT	1.625	0.032		KS14980L22
0.1	5	5	50	C10	1.062	0.494	0.494	AXIAL PT	1.625	0.032		KS14571L03
0.1	20	20	300	C28	0.687	1.812	0.687	INT THD	0.218	0.19	32	KS14658L03
0.1	10	10	150	C30	0.4	1.312	0.4	EXT THD	0.312	0.312	24	KS14660
								SOLDER	0.296	0.125	0.015	KS14660
0.1	10	10	150	C10	1.156	0.416	0.416	AXIAL PT	1.625	0.032		KS14733L04
0.1	10	10	100	C10	1.062	0.494	0.494	AXIAL PT	1.625	0.032		KS14733L12
0.1	5	5	150	C10	1.312	0.494	0.494	AXIAL PT	1.625	0.032		KS14733L15
0.1	10	10	200	C10	1.562	0.494	0.494	AXIAL PT	1.625	0.032		KS14733L16
0.1	10	10	150	C10	1.312	0.494	0.494	AXIAL PT	1.625	0.032		KS14733L20
0.1	10	10	500	C10	1.656	0.578	0.578	AXIAL PT	1.625	0.032		KS14733L23
0.1	10	10	500	C25	1.656	0.578	0.578	SOLDER	0.156	0.125	0.02	KS14733L24
0.1	10	10	150	C26	1.062	0.4	0.4	AXIAL PT	1.625	0.032		KS14755L02
0.1	10	10	300	C29	0.562	1.062	0.562	AXIAL PT	1.625	0.032		KS14755L04
								EXT THD	0.312	0.312	24	KS14755L04
0.1	10	10	100	C29	0.4	0.812	0.4	AXIAL PT	1.625	0.032		KS14755L06
								EXT THD	0.312	0.312	24	KS14755L06
0.1	10	10	150	C29	0.4	1.062	0.4	AXIAL PT	1.625	0.032		KS14755L07
								EXT THD	0.312	0.312	24	KS14755L07
0.1	20	20	500	C24	1.656	0.686	0.686	AXIAL PT	1.625	0.032		KS14980L20
0.1	20	20	300	C10	1.5	0.656	0.656	AXIAL PT	1.625	0.032		KS14980L24
0.1	10	10	1000	C22	2.25	0.75	0.75	EXT THD	0.375	0.164	32	KS19347L09
0.1	10	10	2500	C22	2.75	1.031	1.031	EXT THD	0.375	0.164	32	KS19347L11
0.1	10	10	2000	C22	2.75	1.031	1.031	EXT THD	0.375	0.164	32	KS19347L12
0.1	20	20	50	C31	0.4	0.875	0.4	EXT THD	0.312	0.312	24	KS20302L01

TABLE 7.1
(CONT'D)

CAPACITANCE	TOLERANCE		DCWV	FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)			CODE
	+%	-%			L	H	D		TL	TW	TD	
0.16	5	5	50	C10	1.406	0.416	0.416	SOLDER	0.281	0.125	0.02	KS20302L01
0.22	10	10	200	C10	1.562	0.656	0.656	AXIAL PT	1.625	0.032		KS14571L02
0.22	10	10	150	C10	1.312	0.656	0.656	AXIAL PT	1.625	0.032		KS14733L01
0.22	10	10	100	C10	1.312	0.4	0.4	AXIAL PT	1.625	0.032		KS14733L19
0.22	10	10	200	C10	1.312	0.562	0.562	AXIAL PT	1.625	0.032		KS14755L15
0.22	10	10	500	C24	2.156	0.766	0.766	AXIAL PT	1.625	0.032		KS14755L16
0.22	10	10	500	C21	2.156	0.766	0.766	SOLDER	0.188	0.125	0.02	KS14980L04
0.22	10	10	500	C25	2.156	0.766	0.766	SOLDER	0.188	0.125	0.02	KS14980L16
0.25	20	10	100	C28	0.75	1.812	0.75	INT THD	0.218	0.19	32	KS14658L02
0.27	5	5	150	C24	1.406	0.578	0.578	AXIAL PT	1.625	0.032		KS14733L06
0.27	10	10	100	C10	1.156	0.578	0.578	AXIAL PT	1.625	0.032		KS14733L07
0.27	10	10	150	C10	1.406	0.578	0.578	AXIAL PT	1.625	0.032		KS14733L08
0.27	10	10	100	C29	0.562	1.062	0.562	AXIAL PT	1.625	0.032		KS14755L09
0.27	10	10	150	C29	0.562	1.312	0.562	EXT THD	0.312	0.312	24	KS14755L09
0.27	10	10	100	C10	1.562	0.656	0.656	AXIAL PT	1.625	0.032		KS14755L10
0.3	10	10	500	C10	2.312	1.093	1.093	AXIAL PT	1.625	0.032		KS14980L08
0.33	10	10	50	C23	1.093	0.578	0.578	AXIAL PT	1.625	0.032		KS14980L23
0.47	10	10	150	C24	1.906	0.578	0.578	EXT THD	0.355	0.138	32	KS14570L01
0.47	10	10	200	C29	0.67	1.812	0.67	AXIAL PT	1.625	0.032		KS14733L09
0.47	10	10	150	C29	0.562	1.812	0.562	AXIAL PT	1.625	0.032		KS14755L05
0.47	10	10	300	C29	0.75	2.062	0.75	EXT THD	0.312	0.312	24	KS14755L05
0.47	10	10	300	C10	2.562	0.844	0.844	AXIAL PT	1.625	0.032		KS14755L11
0.47	20	20	50	C31	0.562	1.375	0.562	EXT THD	0.312	0.312	24	KS14755L14
0.56	10	10	200	C24	2.156	0.766	0.766	AXIAL PT	1.625	0.032		KS14755L14
0.56	10	10	150	C10	1.812	0.67	0.67	AXIAL PT	1.625	0.032		KS14755L11
0.68	20	20	50	C10	1.406	0.578	0.578	AXIAL PT	1.625	0.032		KS14755L11
1	10	10	50	C26	1.656	0.686	0.686	AXIAL PT	1.625	0.032		KS14981L01
1	10	10	150	C24	2.156	0.766	0.766	AXIAL PT	1.625	0.032		KS14571L01
1	10	10	100	C10	2.062	0.764	0.764	AXIAL PT	1.625	0.032		KS14733L05
1	10	10	200	C24	1.906	1.016	1.016	AXIAL PT	1.625	0.032		KS14733L13
1	10	10	150	C26	2.062	0.75	0.75	AXIAL PT	1.625	0.032		KS14733L17
1	10	10	50	C29	0.562	1.812	0.562	AXIAL PT	1.625	0.032		KS14755L01
1	10	10	200	C10	1.812	1	1	EXT THD	0.312	0.312	24	KS14755L08
1	5	5	100	C10	2.312	0.844	0.844	AXIAL PT	1.625	0.032		KS14755L08
1	10	10	100	C10	2.156	0.766	0.766	AXIAL PT	1.625	0.032		KS14980L09
1	20	20	50	C31	0.67	1.875	0.67	EXT THD	0.312	0.312	24	KS14980L21
3	10	10		C32	2.81	2.16	1.31	SOLDER	0.281	0.125	0.02	KS20302L03
5	6	6		C32	3.5	2.69	1.56	SOLDER				KS20588L08
6	6	6		C32	4.25	2.69	1.56	SOLDER				KS20588L10
10	6	6		C32	3.5	2.91	1.91	SOLDER				KS20588L09
10	10	10		C32	5.75	2.91	1.91	SOLDER				KS20588L03
12.5	6	6		C32	2.88	2.91	1.91	SOLDER				KS20588L07
15	6	6		C32	5.25	2.91	1.91	SOLDER				KS20588L02
25	6	6		C32	6.75	3.66	1.97	SOLDER				KS20588L01
45	6	6		C33	6.75	4.56	2.84	SOLDER				KS20588L05
50	6	6		C33	6.75	4.56	2.84	SOLDER				KS20588L04

BELL SYSTEM STANDARD COMPONENTS - CAPACITORS

PAPER
(FAMILY CODES)
ELECTRICAL AND PHYSICAL DATA

TABLE 7.2

FOR PHYSICAL DATA, SEE TABLES 7.3 AND 7.4.

CAPACITANCE		STD VALUE TABLE	TOLERANCE		DCV	CODE
MIN	MAX		+%	-%		
1000 PF	0.47	CBSP20	20	20	300	KS19067L01
1000 PF	0.47	CBSP10	10	10	300	KS19067L02
1000 PF	0.51	CBSP05	5	5	300	KS19067L03
1000 PF	0.68	CBSP20	20	20	150	KS19066L01
1000 PF	0.82	CBSP10	10	10	150	KS19066L02
1000 PF	0.82	CBSP05	5	5	150	KS19066L03

TABLE 7.3
(DATA FOR KS19066L1,L2,L3)

CAPACITANCE		FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)	
FROM	TO		L	H	D		TL	TW
1000 PF	0.01	C10	1	0.313	0.313	AXIAL PT	1.75	0.032
0.015	0.033	C10	1.25	0.375	0.375	AXIAL PT	1.75	0.032
0.047	0.068	C10	1.25	0.438	0.438	AXIAL PT	1.75	0.032
0.1	0.15	C10	1.5	0.5	0.5	AXIAL PT	1.75	0.032
0.22	0.33	C10	1.875	0.625	0.625	AXIAL PT	1.75	0.04
0.47	0.68	C10	2.25	0.75	0.75	AXIAL PT	1.75	0.04

TABLE 7.4
(DATA FOR KS19067L1,L2,L3)

CAPACITANCE		FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)	
FROM	TO		L	H	D		TL	TW
1000 PF	6800 PF	C10	1	0.313	0.313	AXIAL PT	1.75	0.032
0.01	0.022	C10	1.25	0.375	0.375	AXIAL PT	1.75	0.032
0.033	0.047	C10	1.25	0.438	0.438	AXIAL PT	1.75	0.032
0.068	0.1	C10	1.5	0.5	0.5	AXIAL PT	1.75	0.032
0.15	0.22	C10	1.875	0.625	0.625	AXIAL PT	1.75	0.04
0.33	0.47	C10	2.25	0.75	0.75	AXIAL PT	1.75	0.04







PLASTIC
Basic Data

Basic Code	Type Code (Note)	Description	Capacitance Range		Tolerance %	DC Working Voltage	Oper Temp Range °C	
			From	To			From	To
POLYESTER, METALIZED								
535	Unique	Flat, Axial PT	4020 pF	4.32 uF	1,2,3,5	200,250,350	-40	+65
542	Unique	Flat, Axial PT	4020 pF	4 uF	5-20	200,250,350,500	-40	+65
579	Unique	Flat, Axial PT	0.0215 uF	4 uF	6,10,20	200,250,350	-40	+65
580	Unique	Flat, Axial PT, Matched Pair	1.125 uF	2.25 uF	0-25	200	-40	+65
596	Family	Flat, Axial PT	0.464 uF	2.61 uF	5,10	150	-40	+65
701	Family	Tubular, Axial PT	0.464 uF	2.37 uF	5	100	-40	+65
702	Family	Tubular, Axial PT	0.1 uF	1.1 uF	5,10,20	200	-40	+65
705	Family	Flat, Axial PT	2.15 uF	5.11 uF	10,20	100	-40	+65
715	Unique	Tubular, Axial PT	0.05 uF	0.147 uF	10	400,600	-40	+65
POLYESTER, FOIL								
594	Family	Tubular, Axial PT	1000 pF	0.511 uF	5,10	125	-40	+65
722	Unique	Tubular, Axial PT	0.1 uF	0.1 uF	5,10,20	125	-40	+65
KS13814	Unique	Flat, Axial PT	0.01 uF	0.5 uF	10-50	150,200	-40	+65
KS13815	Unique	Flat, Axial PT	0.25 uF	1 uF	10-30	150,200	-40	+65
KS14081	Unique	Tubular, Axial PT	0.01 uF	2 uF	5,10,20	75,150,200	-40	+65
KS14289	Unique	Flat, Axial PT	5000 pF	0.02 uF	10,15	400	-40	+65
KS14290	Unique	Tubular, Axial PT	3000 pF	0.05 uF	10,15,20	1000	-40	+65
KS14420	Unique	Flat, Axial PT	0.15 uF	0.15 uF	15	200	-40	+65
KS16862	Family	Tubular, Axial PT	1000 pF	0.01 uF	5,10,20	150	-40	+65
KS19090	Unique	Tubular, Axial PT	0.01 uF	0.01 uF	20	300	-40	+65
KS20300	Family	Tubular, Axial PT	470 pF	0.33 uF	5,10,20	100,150,300	-40	+85
KS20977	Family	Tubular, Axial PT	1000 pF	10.051 uF	5,10,20	100,150,300,450	-40	+85

(Cont)

Note: Unique - one value per code number. Family - range of values per code number. See GENERAL GUIDELINES section for more information.

PLASTIC
Basic Data

Basic Code	Type Code	Description	Capacitance Range		Tolerance %	DC Working Voltage	Oper Temp Range °C	
			From	To			From	To
POLYPROPYLENE, FOIL								
727	Family	Tubular, Axial PT	1000 pF	0.511 uF	5	125	-40	+65
POLYSTYRENE, FOIL								
570	Unique	Tubular, Axial PT	383 pF	0.38 uF	1,2,3,5,20	200	-40	+65
577	Family	Tubular Paired, Radial PT	7150 pF	0.768 uF	0.5,1	200	-40	+65
578	Family	Tubular Paired, Radial PT	7150 pF	0.768 uF	0.5,1	200	-40	+65
719	Family	Rectangular Can, Radial PT	300 pF	0.02 uF	0.5,1,2,5,10	200	-40	+65
725	Family	Tubular, Axial PT	383 pF	0.383 uF	5	100	-40	+65
CAP-PAKs								
No specific code data.								

PLASTIC
Application Guide

General Description

Plastic capacitors use a wound, or rolled, thin plastic sheet as the dielectric (polyester, polypropylene, and polystyrene are listed in this catalog). The electrode may be a thin metal layer deposited on the plastic, or separate metal foils. The majority of the plastic capacitors shown are tubular or flattened in shape, with pigtail leads. One type (the 719) is encased in an aluminum can and sealed with epoxy. Multiple plastic capacitor packages, known as CAP-PAKS, are also available, as described in this catalog.

Plastic capacitors are available in a wide range of physical and electrical properties. Since the films are not hygroscopic (unlike the paper types), impregnation is not as essential for moisture protection, although some are impregnated to reduce corona and improve voltage breakdown characteristics.

Features

Polystyrene capacitors are useful in applications where it is required that the capacitor give up its charge completely in a very short time. Polystyrene and polypropylene are preferred for applications where capacitance-frequency stability is important.

The metalized film plastic capacitors have electrical properties similar to their foil counterparts but are smaller physically. The size advantage is most significant for low voltage ratings, so metalized types are not generally available with ratings over 600 volts. These capacitors have the additional advantage of being self-healing when a dielectric breakdown occurs, as when there is an over-voltage condition. The self-healing operation creates a momentary transient. In digital or other types of circuits with severe noise requirements, if metalized types are used, special attention should be given to see that the voltage rating is never exceeded.

The very thin electrodes of metalized capacitors are also limited in their ability to pass high transient and steady state currents. Therefore, operating conditions and circuit requirements should be carefully considered in the application of metalized plastic capacitors.

PLASTIC
Application Guide

Plastic capacitors in general are used in practically all types of applications including coupling, bypassing, filtering, timing, noise suppression, and power factor correction. They may be used over frequency ranges to 10 megahertz or greater, depending on capacitance value and construction.

PLASTIC
CAP-PAKSCAP-PAK - The Multiple Capacitor Package

Combinations of wound plastic film dielectric capacitors are now available from WE-Hawthorne in prepackaged form called CAP-PAKS. While detailed information is not provided in this catalog, some of the general features of CAP-PAKS are given. Contact the CAP-PAK consultant for further information on currently available and new CAP-PAK codes.

CAP-PAK is a single modular unit composed of individual capacitors potted with epoxy resin in molded housings.

CAP-PAKS are designed for use in printed circuit board applications.

CAP-PAKS when used in printed circuit board applications can reduce total costs by as much as 30%, compared with the use of identical capacitors in the tape-wrapped and end-filled individual state.

CAP-PAKS are versatile and will be tailored to almost any capacitor requirement such as filtering, bypass coupling, and pulse forming.

CAP-PAKS currently consist of 15 Hawthorne-controlled codes. These codes incorporate various combinations of

- capacitance values
- tolerances
- number of capacitors per PAK (3 to 10)
- wound plastic film dielectrics such as polyester foil, metalized polyester, polystyrene foil, and polypropylene foil.

CAP-PAKS' Main Advantages

Reduced cost
Easier handling
Compactness
Versatility
Flexibility

PLASTIC
CAP-PAKs

Effective moisture barrier
Avoidance of insertion errors
Minimal inventory problems

Potential Savings

Capacitor Costs - CAP-PAK costs are lower, capacitor for capacitor, than those for individual units because the multiple packaging concept permits elimination of the cost of tape-wrapping and end-filling each capacitor.

Insertion Time - CAP-PAKs enable an assembler to mount simultaneously up to ten capacitors into a printed circuit board in less time than required to assemble two individual capacitors.

Avoidance of Insertion Errors - The orientation tab that extends from the bottom of each CAP-PAK prevents improper mounting. Never again will errors result from look-alike capacitors being inserted in the wrong mounting location.

Size - CAP-PAK will normally occupy less area on a printed circuit board than the equivalent set of individual tape-wrapped and end-filled capacitors.

Reliability - Preproduction testing experience indicates that factors inherent in CAP-PAK design will improve their capability to withstand rough handling and resistance to in-use failures resulting from vibration. The solid epoxy in which the capacitors are imbedded also creates an effective moisture barrier.

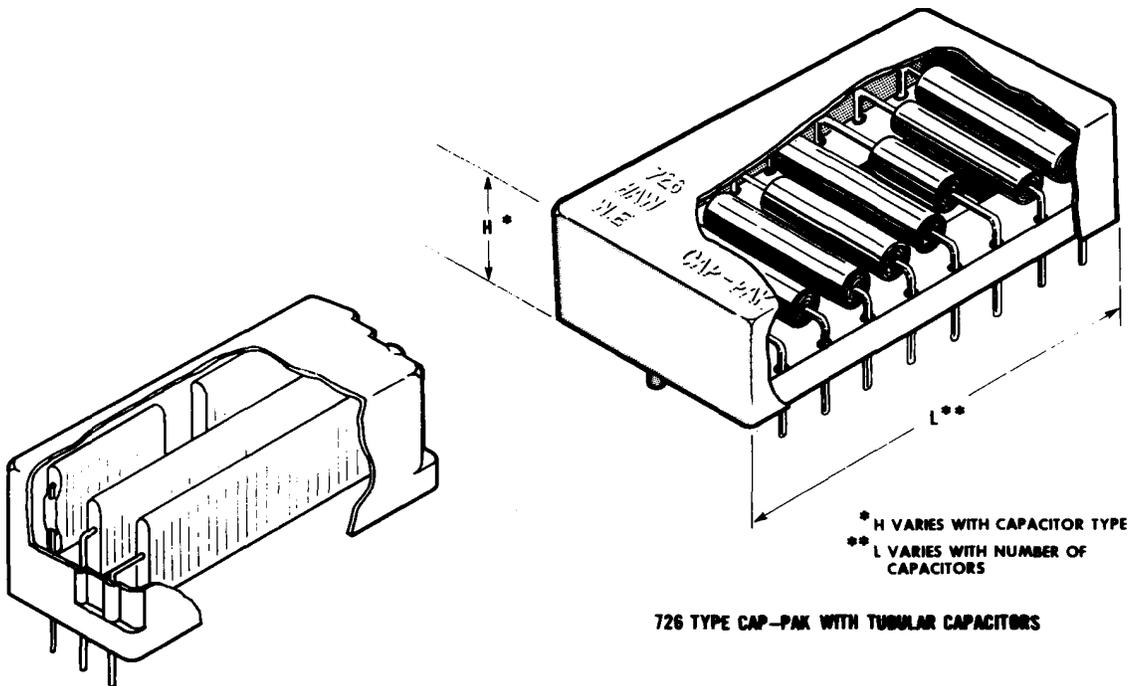
Recommended Production

To achieve maximum savings, first consideration should always be directed toward the possibility of utilizing Hawthorne's present CAP-PAK facilities (such as shell, frame, sequencer, inserter, and epoxy dispenser). Production levels for these applications should total either 50,000 CAP-PAKs or 100,000 capacitors per year.

PLASTIC
CAP-PAKS

CAP-PAKs Initial Users

<u>Location</u>	<u>Application</u>	<u>Predicted 5-Yr Avg Bulletin Savings</u>
Merrimack Valley	D1, D1, and D3 Digital Transmission Systems	\$1,086,000
Indianapolis	Rotary Dial and Push-button Telephones	1,080,000
Kansas City	E-6 Repeater	378,000
Lisle	ESS No. 1	1,000,000
Oklahoma City	ANI Frame Equipment	150,000



735 TYPE CAP-PAK WITH FLAT CAPACITORS

726 TYPE CAP-PAK WITH TUBULAR CAPACITORS

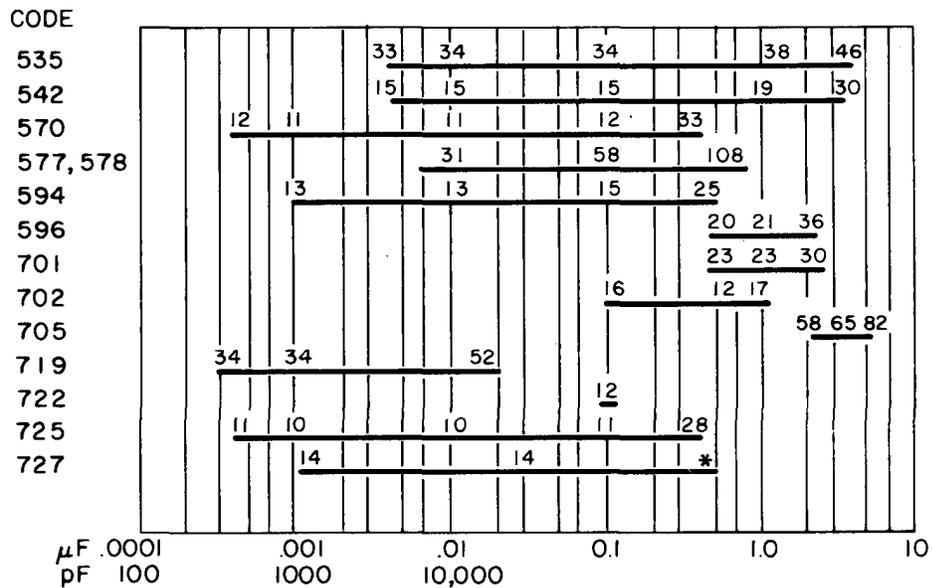


PLASTIC
Comparative Properties
and
Cost Data

Comparative Properties

Type	Dissip Factor	Temperature Coefficient	Capacitance Change		Insulation Resistance	Dielec Absorptn
			Time	Frequency		
Polyester, Metalized	Moderate	Nonlinear	Moderate	Moderate	High	Low
Polyester, Foil	Moderate	Nonlinear	Moderate	Moderate	High	Low
Polypropylene, Foil	Very Low	Linear - neg	Low	Negligible	Very high	Very low
Polystyrene, Foil	Very Low	Linear - neg	Low	Negligible	Very high	Very low

APPROXIMATE RELATIVE COST

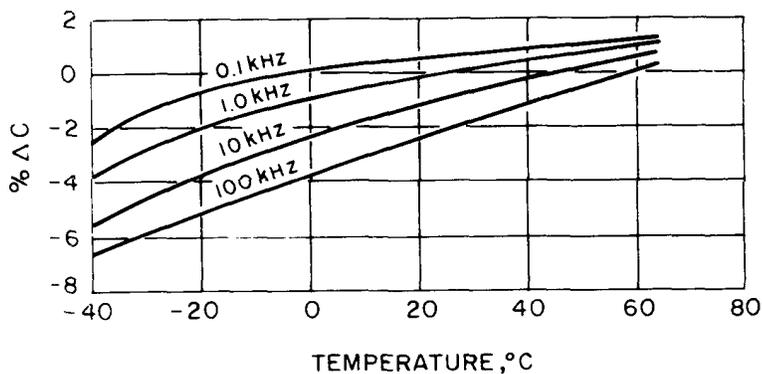


* NOT ESTABLISHED

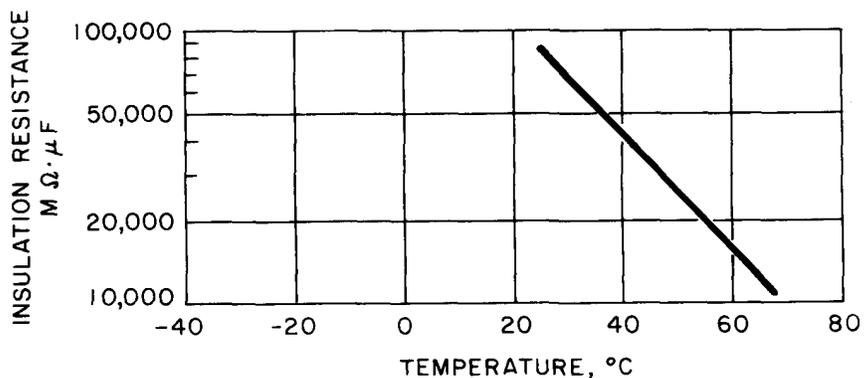


PLASTIC
Characteristic Curves

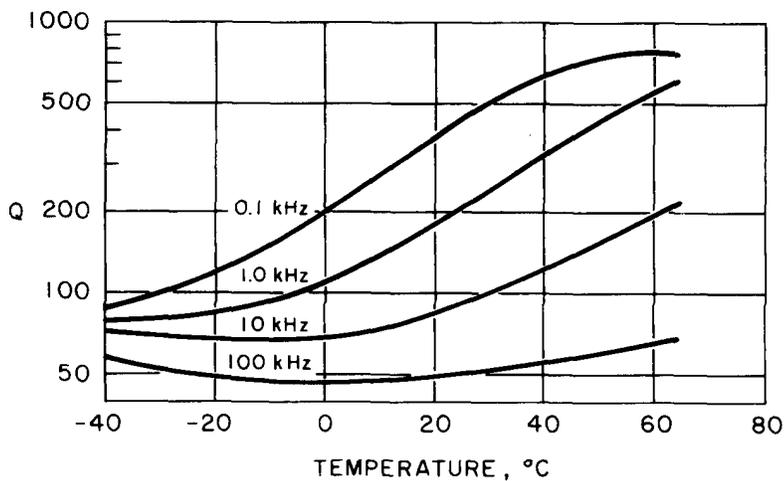
Polyester, Metalized



CAPACITANCE CHANGE VS TEMPERATURE
AT DIFFERENT FREQUENCIES



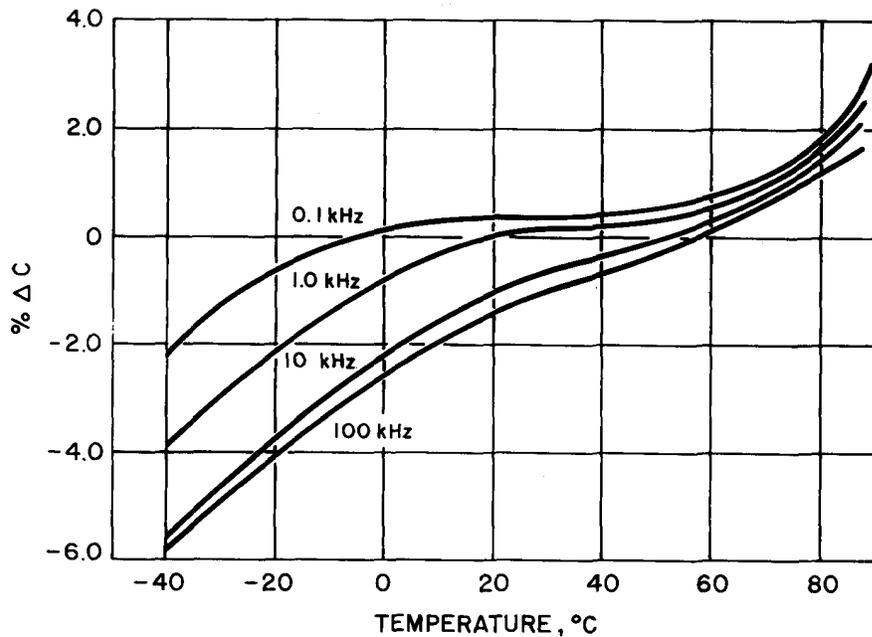
INSULATION RESISTANCE VS TEMPERATURE



Q VS TEMPERATURE
AT DIFFERENT FREQUENCIES

PLASTIC
Characteristic Curves

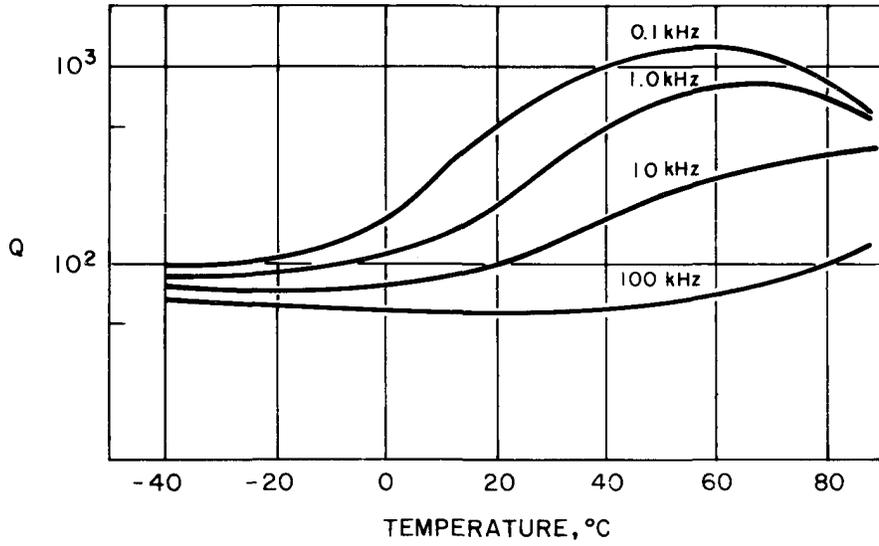
Polyester, Foil



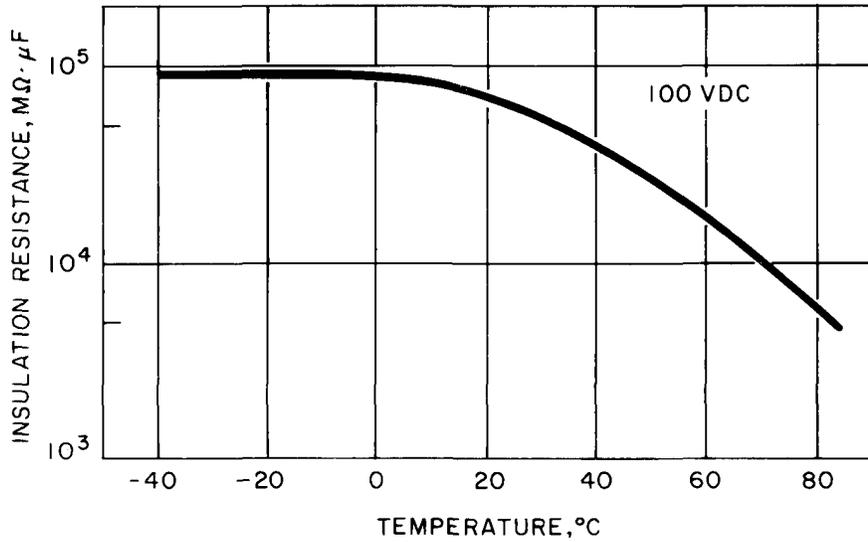
CAPACITANCE CHANGE VS TEMPERATURE
AT DIFFERENT FREQUENCIES
TYPICAL FOR 594, 722 TYPES

PLASTIC
Characteristic Curves

Polyester, Foil



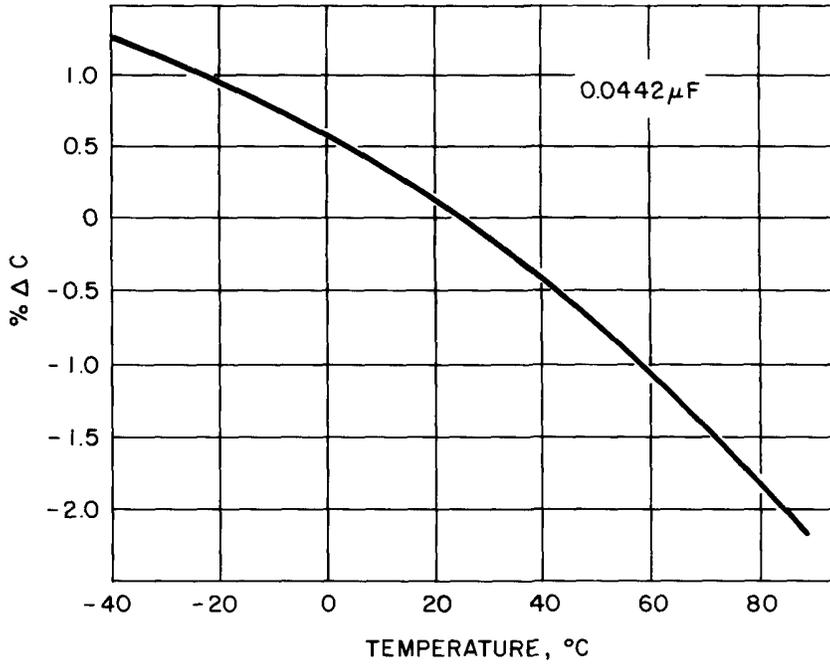
Q VS TEMPERATURE
AT DIFFERENT FREQUENCIES
TYPICAL FOR 594,722 TYPES



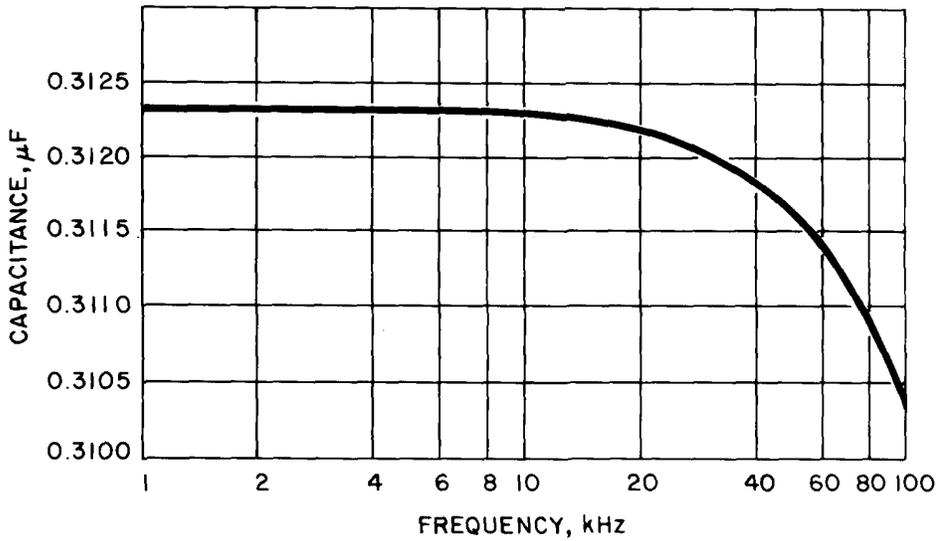
INSULATION RESISTANCE VS TEMPERATURE
TYPICAL FOR 594, 722 TYPES

PLASTIC
Characteristic Curves

Polypropylene, Foil



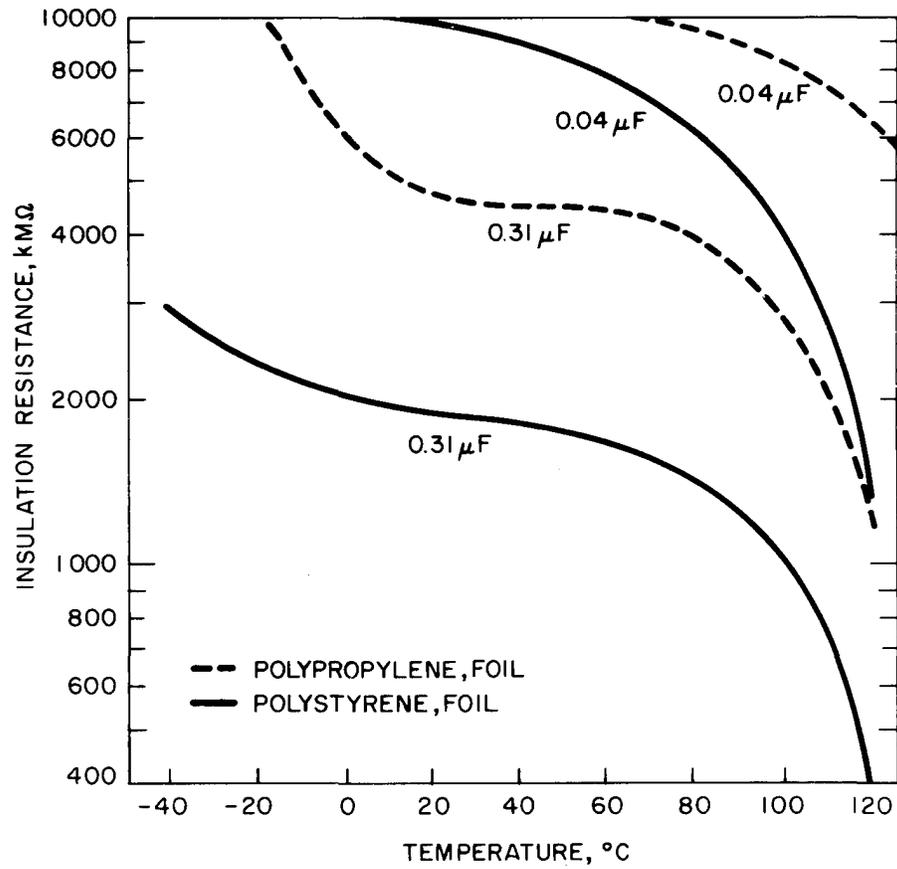
CAPACITANCE CHANGE VS TEMPERATURE



CAPACITANCE VS FREQUENCY

PLASTIC
Characteristic Curves

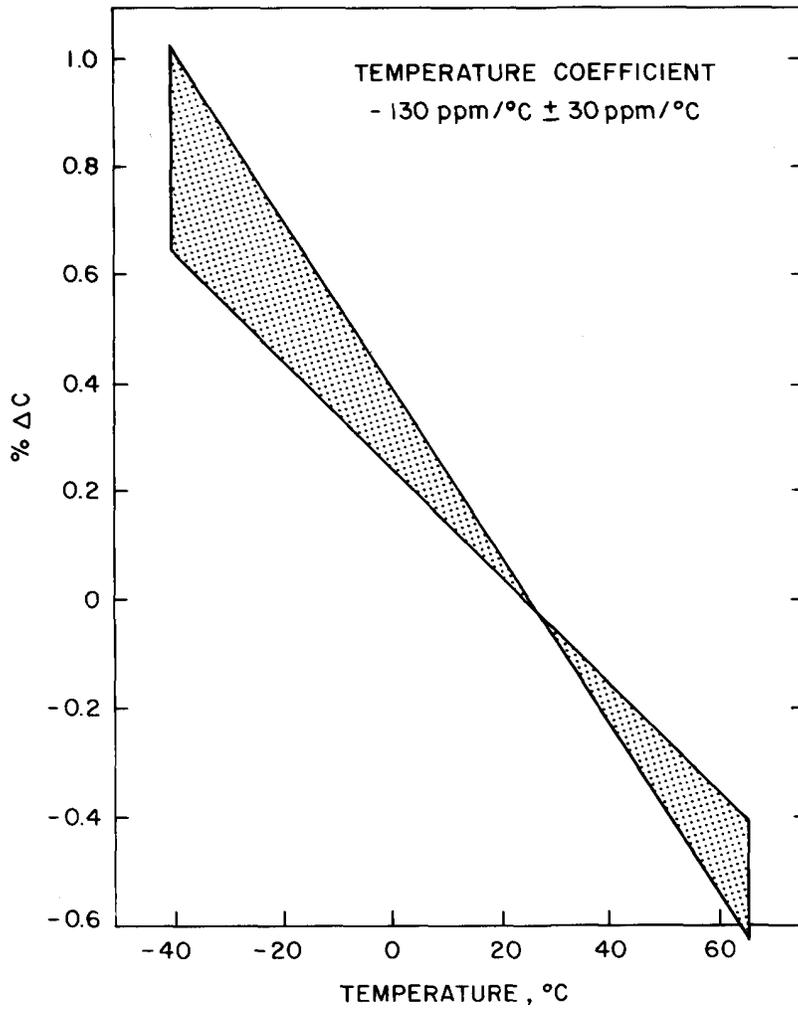
Polypropylene, Foil
and
Polystyrene, Foil



INSULATION RESISTANCE VS TEMPERATURE

PLASTIC
Characteristic Curves

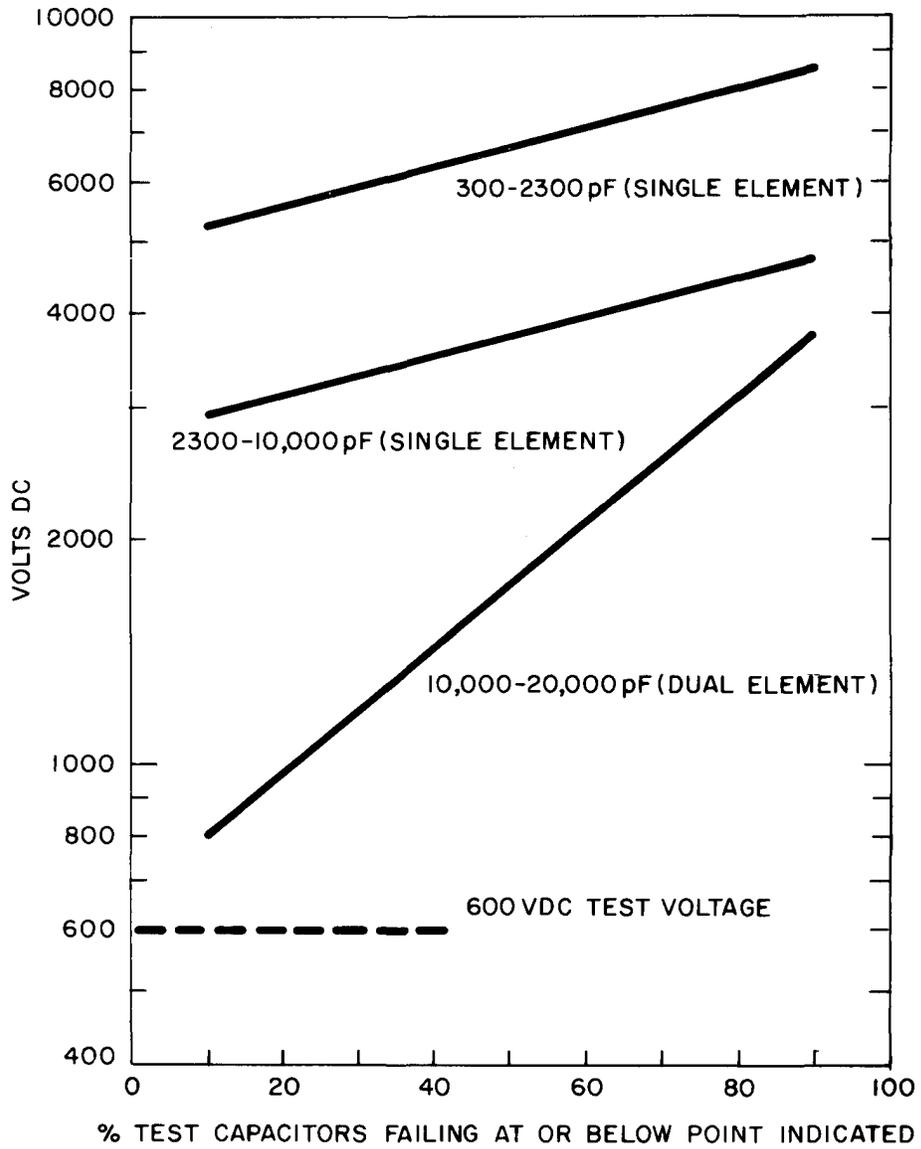
Polystyrene, Foil



CAPACITANCE CHANGE VS TEMPERATURE

PLASTIC
Characteristic Curves

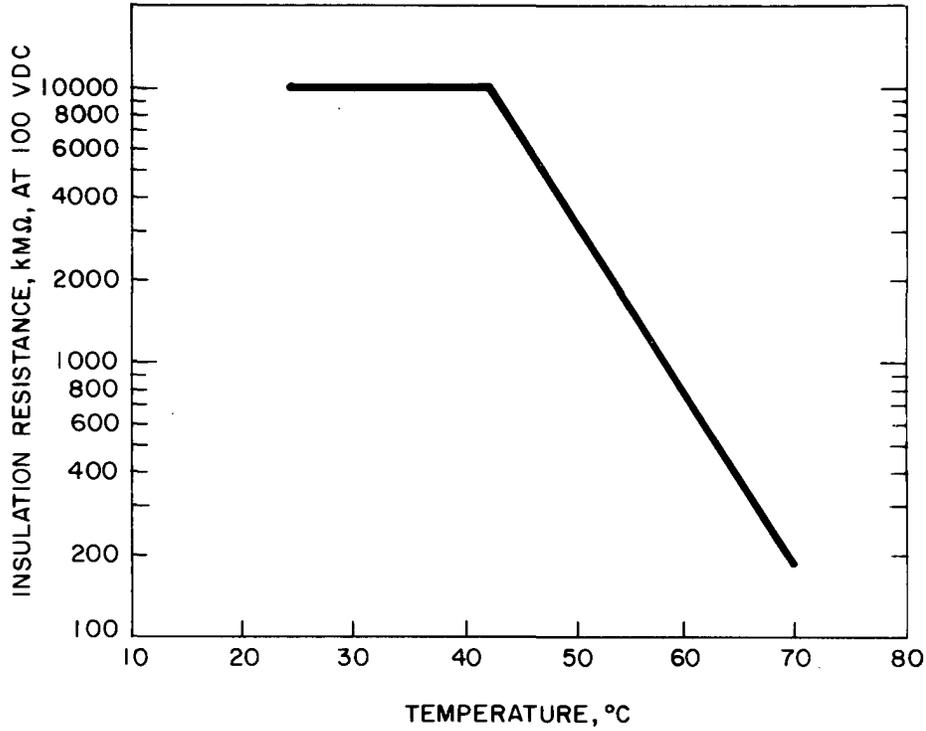
Polystyrene, Foil



ULTIMATE ELECTRICAL BREAKDOWN CHARACTERISTICS
FOR 719 TYPE

PLASTIC
Characteristic Curves

Polystyrene, Foil



INSULATION RESISTANCE VS TEMPERATURE
FOR 719 TYPE

PLASTIC
Physical Outlines

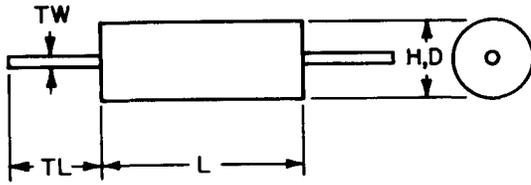
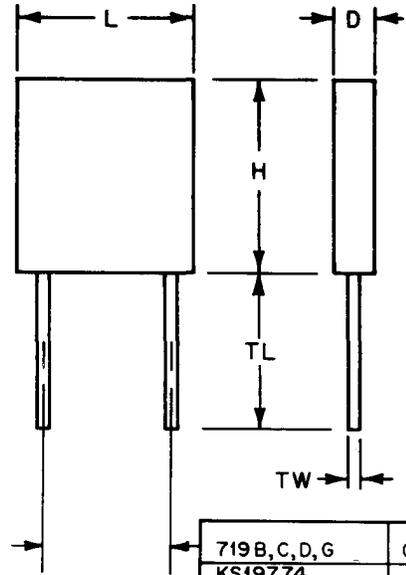
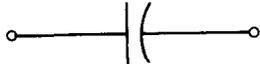


FIG. C10



719B, C, D, G	0.200 IN.
KS19774	
L01,02,05,06,15,16	0.200
L09,10	0.400
KS20676	
L01-06,17	0.200
L07-10	0.400
KS20736	
L01-07	0.200
L02,03,08	0.400

FIG. C12

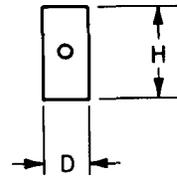
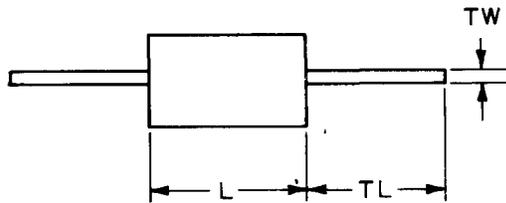


FIG. C14

PLASTIC
Physical Outlines

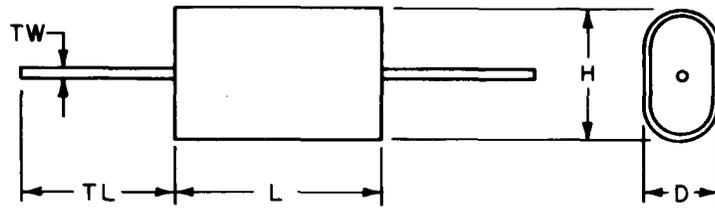


FIG. C15

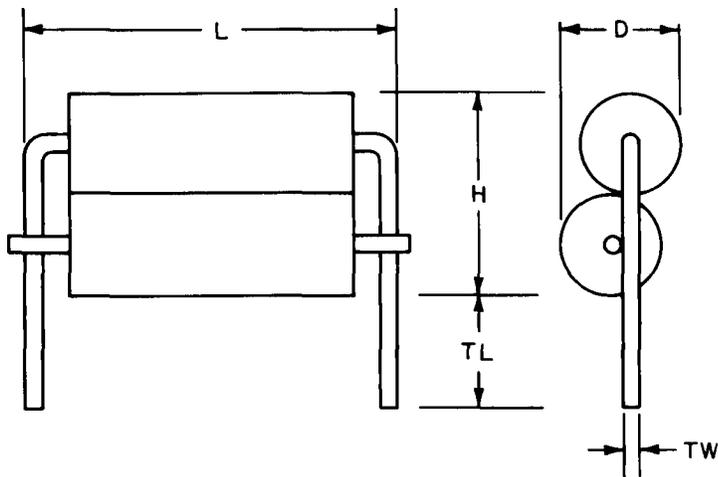
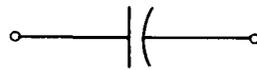


FIG. C18

PLASTIC
Physical Outlines

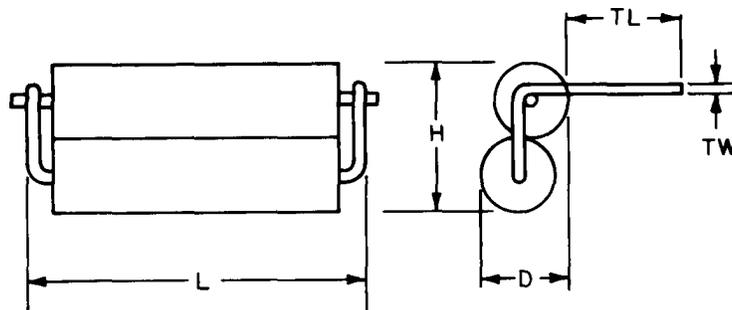


FIG. C19

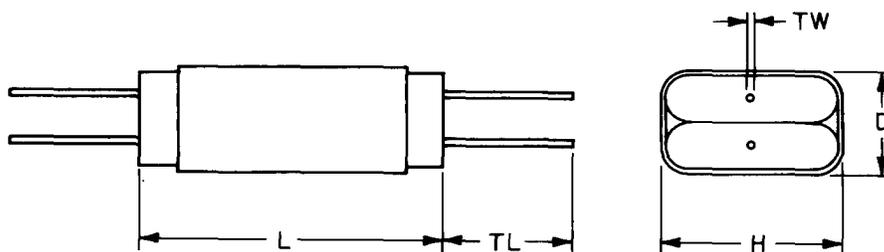
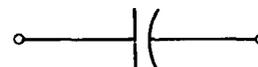


FIG. C20

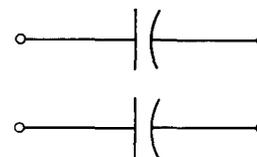




TABLE 8.1

CAPACITANCE	TOLERANCE		DCWV	FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)		CODE
	+%	-%			L	H	D		TL	TW	
4020 PF	5	5	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535AW
4020 PF	5	5	350	C15	1	0.6	0.165	AXIAL PT	1.5	0.032	535KH
4020 PF	10	10	500	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	542R
6980 PF	2	2	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535AU
7500 PF	2	2	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535EB
8060 PF	2	2	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535BC
8250 PF	10	10	500	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	542AK
0.01	5	5	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535CC
0.01	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535HP
0.01	10	10	500	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	542S
0.0104	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535MN
0.0105	5	5	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535FC
0.0109	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535NP
0.0114	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535FF
0.0118	2	2	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535BD
0.0121	10	10	500	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	542T
0.0129	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535MG
0.013	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535AT
0.0143	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535KB
0.0144	2	2	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535EU
0.0147	2	2	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535CN
0.016	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535GM
0.0162	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535KC
0.0164	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535KP
0.0169	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535GU
0.0174	2	2	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535CP
0.0178	5	5	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535FD
0.018	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535KR
0.0187	5	5	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535EC
0.0191	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535KD
0.0196	5	5	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535ED
0.02	2	2	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535CR
0.0205	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535BN
0.0215	5	5	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535FJ
0.0215	10	10	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	542AA
0.0215	10	10	350	C15	1	0.6	0.165	AXIAL PT	1.5	0.032	579F
0.0223	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535CS
0.0232	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535LM
0.0237	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535FA
0.0252	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535AS
0.0255	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535CT
0.0274	5	5	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535CD
0.0274	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535GW
0.0287	2	2	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535BE
0.0287	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535BU
0.0294	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535KE
0.0305	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535KL
0.0316	2	2	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535EJ
0.0316	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535JT
0.032	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535GN
0.0332	2	2	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535EY
0.034	3	3	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535EK
0.034	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535GY
0.0344	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535BP
0.0348	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535KF
0.0352	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535HA
0.0365	2	2	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535CU
0.0365	5	5	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535EE
0.0379	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535KS
0.0383	10	10	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	542U
0.0388	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535BR
0.0402	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535BM

POLYESTER, METALIZED
(UNIQUE CODES)
ELECTRICAL & PHYSICAL DATA

TABLE 8.1
(CONT'D)

CAPACITANCE	TOLERANCE		DCWV	FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)		CODE
	+%	-%			L	H	D		TL	TW	
0.0402	2	2	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535EF
0.0417	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535CG
0.0422	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535HF
0.0437	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535BW
0.0442	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535BS
0.0448	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535KT
0.0464	2	2	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535CW
0.0464	10	10	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	542AB
0.0475	2	2	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535FE
0.0487	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535AR
0.0493	1	1	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535KK
0.0499	2	2	350	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535EG
0.0499	1	1	350	C15	1	0.6	0.165	AXIAL PT	1.5	0.032	535JP
0.05	10	10	600	C10	1	0.45	0.45	AXIAL PT	1.96	0.032	715A
0.0511	1	1	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535GE
0.0511	10	10	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	542W
0.0517	1	1	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535HB
0.0536	1	1	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535CH
0.0566	1	1	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535FY
0.059	1	1	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535CY
0.06	1	1	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535AP
0.0604	2	2	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535BF
0.0604	3	3	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535EL
0.0619	2	2	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535DA
0.0619	3	3	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535EM
0.0649	2	2	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535KU
0.0657	1	1	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535BY
0.0665	2	2	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535AE
0.0673	1	1	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535DT
0.0681	10	10	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	542AC
0.0698	3	3	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535EN
0.0698	1	1	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535HG
0.0715	2	2	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535BG
0.0732	3	3	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535P
0.074	1	1	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535CA
0.075	2	2	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535MD
0.0816	1	1	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535DB
0.0835	1	1	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535BT
0.0886	2	2	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535AF
0.0887	2	2	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535AA
0.0887	1	1	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535DU
0.0898	1	1	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535KW
0.0909	2	2	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535AG
0.0931	2	2	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535BH
0.0931	1	1	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535HS
0.0953	1	1	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535HH
0.0965	1	1	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535FB
0.0976	1	1	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535DW
0.0976	3	3	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535EP
0.1	3	3	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535AB
0.1	1	1	250	C15	1	0.6	0.165	AXIAL PT	1.5	0.032	535JU
0.1	10	10	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	542AD
0.1	5	5	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	542L
0.1	10	10	600	C10	1	0.57	0.57	AXIAL PT	1.96	0.032	715C
0.101	1	1	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535MU
0.102	1	1	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535DY
0.105	2	2	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535DC
0.105	3	3	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535ER
0.107	2	2	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535BJ
0.107	3	3	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535ES

TABLE 8.1
 (CONT'D)

CAPACITANCE	TOLERANCE		DCHV	FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)		CODE
	+%	-%			L	H	D		TL	TW	
0.11	1	1	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535FT
0.111	1	1	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	5350D
0.113	2	2	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535AH
0.118	2	2	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535FR
0.12	1	1	250	C15	1	0.65	0.25	AXIAL PT	1.5	0.032	535GF
0.121	2	2	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535EH
0.124	2	2	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535AJ
0.126	1	1	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535MW
0.13	1	1	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535KY
0.13	2	2	250	C15	1	0.65	0.25	AXIAL PT	1.5	0.032	535ME
0.133	2	2	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535BK
0.14	1	1	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535DE
0.143	1	1	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535MY
0.145	1	1	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535DM
0.147	2	2	250	C15	1	0.65	0.25	AXIAL PT	1.5	0.032	535MF
0.147	10	10	250	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	542AH
0.147	20	20	250	C15	1	0.5	0.245	AXIAL PT	1.5	0.032	579E
0.147	10	10	400	C10	1	0.5	0.5	AXIAL PT	1.96	0.032	715B
0.15	2	2	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	5350F
0.152	1	1	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535NA
0.158	2	2	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535FP
0.162	10	10	250	C15	1	0.7	0.3	AXIAL PT	1.5	0.032	542Y
0.164	1	1	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535HD
0.165	2	2	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535LA
0.169	3	3	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535ET
0.176	1	1	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535A
0.178	1	1	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535HT
0.178	2	2	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535LB
0.18	1	1	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535HE
0.182	1	1	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535NB
0.183	2	2	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535FN
0.187	2	2	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535DN
0.193	1	1	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535CL
0.198	1	1	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535DG
0.2	10	10	200	C15	1	0.61	0.21	AXIAL PT	1.5	0.032	542B
0.203	1	1	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535B
0.21	2	2	200	C15	1	0.6	0.2	AXIAL PT	1.5	0.032	535LC
0.212	2	2	200	C15	1	0.61	0.21	AXIAL PT	1.5	0.032	535N
0.226	3	3	200	C15	1	0.62	0.22	AXIAL PT	1.5	0.032	535R
0.235	1	1	200	C15	1	0.62	0.22	AXIAL PT	1.5	0.032	535C
0.237	1	1	200	C15	1	0.65	0.25	AXIAL PT	1.5	0.032	535CF
0.24	1	1	200	C15	1	0.65	0.25	AXIAL PT	1.5	0.032	535NC
0.246	1	1	200	C15	1	0.65	0.25	AXIAL PT	1.5	0.032	535ND
0.249	1	1	200	C15	1	0.6	0.165	AXIAL PT	1.5	0.032	535JR
0.249	3	3	200	C15	1	0.63	0.23	AXIAL PT	1.5	0.032	535S
0.25	20	20	200	C15	1	0.65	0.25	AXIAL PT	1.5	0.032	542C
0.254	1	1	200	C15	1	0.63	0.23	AXIAL PT	1.5	0.032	535D
0.258	2	2	200	C15	1	0.63	0.23	AXIAL PT	1.5	0.032	535AK
0.261	2	2	200	C15	1	0.65	0.25	AXIAL PT	1.5	0.032	535FM
0.267	3	3	200	C15	1	0.63	0.23	AXIAL PT	1.5	0.032	535T
0.271	1	1	200	C15	1	0.65	0.25	AXIAL PT	1.5	0.032	535HU
0.28	1	1	200	C15	1	0.65	0.25	AXIAL PT	1.5	0.032	535NE
0.284	1	1	200	C15	1	0.65	0.25	AXIAL PT	1.5	0.032	535NF
0.287	1	1	200	C15	1	0.65	0.25	AXIAL PT	1.5	0.032	535DP
0.294	1	1	200	C15	1	0.64	0.24	AXIAL PT	1.5	0.032	535AC
0.3	10	10	250	C15	1	0.75	0.35	AXIAL PT	1.5	0.032	542AM
0.301	1	1	200	C15	1	0.65	0.25	AXIAL PT	1.5	0.032	535DR
0.305	1	1	200	C15	1	0.65	0.25	AXIAL PT	1.5	0.032	535KG
0.305	1	1	200	C15	1	0.65	0.25	AXIAL PT	1.5	0.032	535LD
0.309	1	1	200	C15	1	0.65	0.25	AXIAL PT	1.5	0.032	535MR

POLYESTER, METALIZED
(UNIQUE CODES)
ELECTRICAL & PHYSICAL DATA

TABLE 8.1
(CONT'D)

CAPACITANCE	TOLERANCE		DCWV	FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)		CODE
	+%	-%			L	H	D		TL	TW	
0.326	1	1	200	C15	1	0.65	0.25	AXIAL PT	1.5	0.032	535E
0.332	3	3	200	C15	1	0.66	0.26	AXIAL PT	1.5	0.032	535U
0.336	1	1	200	C15	1	0.7	0.3	AXIAL PT	1.5	0.032	535DH
0.34	1	1	200	C15	1	0.66	0.26	AXIAL PT	1.5	0.032	535AD
0.344	1	1	200	C15	1	0.7	0.3	AXIAL PT	1.5	0.032	535NG
0.348	1	1	200	C15	1	0.7	0.3	AXIAL PT	1.5	0.032	535HM
0.352	2	2	200	C15	1	0.67	0.27	AXIAL PT	1.5	0.032	535AL
0.352	1	1	200	C15	1	0.67	0.27	AXIAL PT	1.5	0.032	535AY
0.357	1	1	200	C15	1	0.7	0.3	AXIAL PT	1.5	0.032	535LE
0.357	3	3	200	C15	1	0.67	0.27	AXIAL PT	1.5	0.032	535W
0.37	1	1	200	C15	1	0.7	0.3	AXIAL PT	1.5	0.032	535NN
0.374	1	1	200	C15	1	0.7	0.3	AXIAL PT	1.5	0.032	535HN
0.383	2	2	200	C15	1	0.7	0.3	AXIAL PT	1.5	0.032	535FL
0.383	1	1	200	C15	1	0.7	0.3	AXIAL PT	1.5	0.032	535LF
0.388	1	1	200	C15	1	0.7	0.3	AXIAL PT	1.5	0.032	535NH
0.398	1	1	200	C15	1	0.68	0.28	AXIAL PT	1.5	0.032	535K
0.402	1	1	200	C15	1	0.7	0.3	AXIAL PT	1.5	0.032	535LG
0.402	1	1	350	C15	1.8	1.1	0.35	AXIAL PT	1.5	0.032	535LN
0.407	2	2	200	C15	1	0.69	0.29	AXIAL PT	1.5	0.032	535AM
0.412	1	1	200	C15	1	0.7	0.3	AXIAL PT	1.5	0.032	535LR
0.412	3	3	200	C15	1	0.69	0.29	AXIAL PT	1.5	0.032	535Y
0.416	1	1	200	C15	1	0.69	0.29	AXIAL PT	1.5	0.032	535L
0.417	1	1	200	C15	1	0.7	0.3	AXIAL PT	1.5	0.032	535HW
0.422	10	10	200	C15	1	0.7	0.3	AXIAL PT	1.5	0.032	542AE
0.427	1	1	200	C15	1	0.7	0.3	AXIAL PT	1.5	0.032	535KM
0.442	1	1	200	C15	1	0.7	0.3	AXIAL PT	1.5	0.032	535DS
0.448	2	2	200	C15	1	0.7	0.3	AXIAL PT	1.5	0.032	535AN
0.459	1	1	200	C15	1	0.7	0.3	AXIAL PT	1.5	0.032	535GP
0.464	20	20	250	C15	1	0.865	0.4	AXIAL PT	1.5	0.032	579D
0.465	10	10	250	C15	1	0.9	0.5	AXIAL PT	1.5	0.032	542K
0.47	1	1	200	C15	1	0.71	0.31	AXIAL PT	1.5	0.032	535F
0.475	1	1	200	C15	1	0.75	0.35	AXIAL PT	1.5	0.032	535MH
0.487	1	1	200	C15	1	0.75	0.35	AXIAL PT	1.5	0.032	535DJ
0.499	1	1	200	C15	1	1	0.165	AXIAL PT	1.5	0.032	535JS
0.499	1	1	200	C15	1	0.75	0.35	AXIAL PT	1.5	0.032	535KN
0.5	20	20	200	C15	1	0.75	0.35	AXIAL PT	1.5	0.032	542A
0.5	20	20	200	C15	1	0.68	0.35	AXIAL PT	1.5	0.032	579C
0.505	1	1	200	C15	1	0.75	0.35	AXIAL PT	1.5	0.032	535HY
0.511	5	5	250	C15	1	0.9	0.5	AXIAL PT	1.5	0.032	535CE
0.517	1	1	200	C15	1	0.75	0.35	AXIAL PT	1.5	0.032	535JA
0.523	1	1	200	C15	1	0.75	0.35	AXIAL PT	1.5	0.032	535MJ
0.53	1	1	200	C15	1	0.73	0.33	AXIAL PT	1.5	0.032	535M
0.542	1	1	200	C15	1	0.75	0.35	AXIAL PT	1.5	0.032	535ML
0.55	5	5	200	C15	1	0.75	0.35	AXIAL PT	1.5	0.032	542M
0.554	1	1	200	C15	1	0.74	0.34	AXIAL PT	1.5	0.032	535G
0.562	1	1	200	C15	1	0.85	0.45	AXIAL PT	1.5	0.032	535LH
0.576	1	1	200	C15	1	0.75	0.35	AXIAL PT	1.5	0.032	535JB
0.5895	1	1	200	C15	1	0.75	0.35	AXIAL PT	1.5	0.032	535JC
0.597	1	1	200	C15	1	0.75	0.35	AXIAL PT	1.5	0.032	535JD
0.604	1	1	200	C15	1	0.75	0.35	AXIAL PT	1.5	0.032	535GC
0.612	1	1	200	C15	1	0.8	0.4	AXIAL PT	1.5	0.032	535CB
0.619	10	10	200	C15	1	0.8	0.4	AXIAL PT	1.5	0.032	542AF
0.626	1	1	200	C15	1	0.8	0.4	AXIAL PT	1.5	0.032	535JE
0.642	1	1	200	C15	1	0.8	0.4	AXIAL PT	1.5	0.032	535GR
0.657	1	1	200	C15	1	0.8	0.4	AXIAL PT	1.5	0.032	535NM
0.679	1	1	200	C15	1	0.77	0.37	AXIAL PT	1.5	0.032	535H
0.698	1	1	200	C15	1	0.8	0.4	AXIAL PT	1.5	0.032	535JF
0.706	1	1	200	C15	1.8	0.65	0.25	AXIAL PT	1.5	0.032	535BA
0.706	1	1	200	C15	1	0.8	0.4	AXIAL PT	1.5	0.032	535JN
0.715	1	1	200	C15	1	0.8	0.4	AXIAL PT	1.5	0.032	535JG

TABLE 8.1
 (CONT'D)

CAPACITANCE	TOLERANCE		DCV	FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)		CODE
	+X	-X			L	H	D		TL	TW	
0.723	1	1	200	C15	1	0.8	0.4	AXIAL PT	1.5	0.032	535CM
0.75	1	1	200	C15	1	0.85	0.45	AXIAL PT	1.5	0.032	535HJ
0.75	2	2	200	C15	1	0.04	0.425	AXIAL PT	1.5	0.032	535LJ
0.777	1	1	200	C15	1	0.85	0.45	AXIAL PT	1.5	0.032	535JH
0.796	1	1	200	C15	1	0.85	0.45	AXIAL PT	1.5	0.032	535FG
0.8	10	10	200	C15	1.8	0.67	0.27	AXIAL PT	1.5	0.032	542J
0.806	2	2	200	C15	1	0.81	0.41	AXIAL PT	1.5	0.032	535BL
0.835	1	1	200	C15	1	0.85	0.45	AXIAL PT	1.5	0.032	535GS
0.856	1	1	200	C15	1.8	1	0.3	AXIAL PT	1.5	0.032	535LK
0.866	1	1	200	C15	1	0.85	0.45	AXIAL PT	1.5	0.032	535FU
0.898	1	1	200	C15	1	1	0.45	AXIAL PT	1.5	0.032	535LL
0.931	1	1	200	C15	1	1	0.45	AXIAL PT	1.5	0.032	535NJ
0.942	1	1	200	C15	1	0.9	0.5	AXIAL PT	1.5	0.032	535HR
0.953	1	1	200	C15	1	0.9	0.5	AXIAL PT	1.5	0.032	535MP
0.976	1	1	200	C15	1	0.9	0.5	AXIAL PT	1.5	0.032	535GK
0.988	1	1	200	C15	1	0.9	0.5	AXIAL PT	1.5	0.032	535JJ
1	3	3	200	C15	1	0.9	0.5	AXIAL PT	1.5	0.032	535CK
1	10	10	350	C15	1.8	1.3	0.55	AXIAL PT	1.5	0.032	542AL
1	10	10	200	C15	1.8	0.7	0.3	AXIAL PT	1.5	0.032	542D
1	20	10	200	C15	1	0.9	0.5	AXIAL PT	1.5	0.032	542N
1.06	1	1	200	C15	1.8	0.7	0.3	AXIAL PT	1.5	0.032	535BB
1.09	1	1	200	C15	1	0.9	0.5	AXIAL PT	1.5	0.032	535GB
1.11	1	1	200	C15	1.8	1.05	0.3	AXIAL PT	1.5	0.032	535GT
1.125	25	0	200	C20	1.8	1.05	0.3	AXIAL PT	1.5	0.032	580B *
1.14	1	1	200	C15	1.8	1.05	0.3	AXIAL PT	1.5	0.032	535LS
1.18	1	1	200	C15	1.8	1.05	0.3	AXIAL PT	1.5	0.032	535HK
1.2	1	1	200	C15	1.8	1.05	0.3	AXIAL PT	1.5	0.032	535LT
1.22	1	1	200	C15	1.8	1.05	0.3	AXIAL PT	1.5	0.032	535FS
1.24	1	1	200	C15	1.8	1.05	0.3	AXIAL PT	1.5	0.032	535JK
1.26	1	1	200	C15	1.8	1.05	0.3	AXIAL PT	1.5	0.032	535JY
1.27	2	2	200	C15	1.8	1.05	0.3	AXIAL PT	1.5	0.032	535GG
1.29	1	1	200	C15	1.8	1.05	0.3	AXIAL PT	1.5	0.032	535JK
1.33	1	1	200	C15	1.8	1.05	0.3	AXIAL PT	1.5	0.032	535MK
1.35	1	1	200	C15	1.8	1.05	0.3	AXIAL PT	1.5	0.032	535NL
1.38	1	1	200	C15	1.8	1.05	0.3	AXIAL PT	1.5	0.032	535DK
1.45	1	1	200	C15	1.8	1.1	0.35	AXIAL PT	1.5	0.032	535CJ
1.49	1	1	200	C15	1.8	1.1	0.35	AXIAL PT	1.5	0.032	535EA
1.5	20	20	200	C15	1.8	1.05	0.32	AXIAL PT	1.5	0.032	542E
1.5	10	10	200	C15	1.8	0.84	0.4	AXIAL PT	1.5	0.032	579B
1.56	1	1	200	C15	1.8	1.04	0.35	AXIAL PT	1.5	0.032	535NK
1.58	1	1	200	C15	1.8	1.1	0.35	AXIAL PT	1.5	0.032	535HL
1.62	1	1	200	C15	1.8	1.1	0.35	AXIAL PT	1.5	0.032	535DL
1.65	1	1	200	C15	1.8	1.1	0.35	AXIAL PT	1.5	0.032	535MM
1.76	1	1	200	C15	1.8	1.1	0.35	AXIAL PT	1.5	0.032	535LU
1.87	1	1	200	C15	1.8	1.1	0.35	AXIAL PT	1.5	0.032	535LW
1.91	1	1	200	C15	1.8	1.1	0.35	AXIAL PT	1.5	0.032	535GD
1.93	1	1	200	C15	1.8	1.1	0.35	AXIAL PT	1.5	0.032	535LY
2	20	20	250	C15	1.8	1.3	0.55	AXIAL PT	1.5	0.032	542AG
2	12.5	12.5	200	C15	1.8	1.1	0.37	AXIAL PT	1.5	0.032	542F
2	10	10	200	C15	1.8	0.84	0.4	AXIAL PT	1.5	0.032	579A
2	6	6	200	C15	1.8	1.1	0.37	AXIAL PT	1.5	0.032	579H
2.1	2	2	200	C15	1.8	1.06	0.35	AXIAL PT	1.5	0.032	535J
2.15	1	1	200	C15	1.8	1.15	0.4	AXIAL PT	1.5	0.032	535FW
2.15	10	10	250	C15	1.8	1.3	0.55	AXIAL PT	1.5	0.032	542AJ
2.25	25	0	200	C20	1.8	1.15	0.4	AXIAL PT	1.5	0.032	580A **
2.34	1	1	200	C15	1.8	1.15	0.4	AXIAL PT	1.5	0.032	535MA
2.4	1	1	200	C15	1.8	1.15	0.4	AXIAL PT	1.5	0.032	535FH
2.46	1	1	200	C15	1.8	1.15	0.4	AXIAL PT	1.5	0.032	535MB
2.49	1	1	200	C15	1.8	1.15	0.4	AXIAL PT	1.5	0.032	535KA
2.61	2	2	200	C15	1.8	1.2	0.45	AXIAL PT	1.5	0.032	535FK

* MATCHED PAIR TO WITHIN 0.055 UF

** MATCHED PAIR TO WITHIN 0.11 UF

POLYESTER, METALIZED
(UNIQUE CODES)
ELECTRICAL & PHYSICAL DATA

TABLE 8.1
(CONT'D)

CAPACITANCE	TOLERANCE		DCVW	FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)		CODE
	+X	-X			L	H	D		TL	TW	
2.64	1	1	200	C15	1.8	1.2	0.45	AXIAL PT	1.5	0.032	535MS
2.71	1	1	200	C15	1.8	1.2	0.45	AXIAL PT	1.5	0.032	535GJ
2.77	1	1	200	C15	1.8	1.2	0.45	AXIAL PT	1.5	0.032	535GL
2.87	1	1	200	C15	1.8	1.2	0.45	AXIAL PT	1.5	0.032	535JL
3.05	1	1	200	C15	1.8	1.2	0.45	AXIAL PT	1.5	0.032	535KJ
3.24	2	2	200	C15	1.8	1.25	0.5	AXIAL PT	1.5	0.032	535HC
3.32	1	1	200	C15	1.8	1.25	0.5	AXIAL PT	1.5	0.032	535MC
3.61	1	1	200	C15	1.8	1.25	0.5	AXIAL PT	1.5	0.032	535MT
3.83	1	1	200	C15	1.8	1.3	0.55	AXIAL PT	1.5	0.032	535JM
4	15	15	200	C15	1.8	1.25	0.55	AXIAL PT	1.5	0.032	542G
4	10	10	200	C15	1.8	1.025	0.425	AXIAL PT	1.5	0.032	579G
4.22	2	2	200	C15	1.8	1.3	0.55	AXIAL PT	1.5	0.032	535GA
4.32	1	1	200	C15	1.8	1.3	0.55	AXIAL PT	1.5	0.032	535GH
4.32	1	1	200	C15	1.8	1.5	0.45	AXIAL PT	1.5	0.032	535LP
4.32	1	1	200	C15	1.8	1	0.4	AXIAL PT	1.5	0.032	535NR

BELL SYSTEM STANDARD COMPONENTS - CAPACITORS

POLYESTER, METALIZED
(FAMILY CODES)
ELECTRICAL & PHYSICAL DATA

TABLE 8.2

FOR PHYSICAL DATA, SEE TABLES 8.3 THRU 8.6.

CAPACITANCE		STD VALUE TABLE	TOLERANCE		DCWV	CODE
MIN	MAX		+%	-%		
0.1	1	CBSP20	20	20	200	702H
0.1	1.1	CBSP10	10	10	200	702G
0.1	1.1	CBSP05	5	5	200	702C
0.464	2.37	CBSP05	5	5	100	701C
0.464	2.37	CBSP10	5	5	100	701G
0.464	2.61	CBSP05	5	5	150	596C
0.464	2.61	CBSP10	10	10	150	596G
2.15	4.64	CBSP20	20	20	100	705H
2.15	5.11	CBSP10	10	10	100	705G

TABLE 8.3
(DATA FOR 596C, 596G)

CAPACITANCE		FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)	
FROM	TO		L	H	D		TL	TW
0.464	0.487	C15	1	0.6	0.205	AXIAL PT	1.5	0.032
0.511	0.536	C15	1	0.61	0.205	AXIAL PT	1.5	0.032
0.562	0.59	C15	1	0.62	0.215	AXIAL PT	1.5	0.032
0.619	0.649	C15	1	0.65	0.215	AXIAL PT	1.5	0.032
0.681	0.715	C15	1	0.68	0.225	AXIAL PT	1.5	0.032
0.75	0.787	C15	1	0.69	0.225	AXIAL PT	1.5	0.032
0.825	0.866	C15	1	0.7	0.24	AXIAL PT	1.5	0.032
0.909	0.953	C15	1	0.72	0.24	AXIAL PT	1.5	0.032
1	1.05	C15	1	0.74	0.25	AXIAL PT	1.5	0.032
1.1	1.15	C15	1	0.75	0.265	AXIAL PT	1.5	0.032
1.21	1.27	C15	1	0.77	0.28	AXIAL PT	1.5	0.032
1.33	1.4	C15	1	0.78	0.3	AXIAL PT	1.5	0.032
1.47	1.54	C15	1	0.79	0.33	AXIAL PT	1.5	0.032
1.62	1.69	C15	1	0.8	0.35	AXIAL PT	1.5	0.032
1.78	1.87	C15	1	0.82	0.365	AXIAL PT	1.5	0.032
1.96	2.05	C15	1	0.85	0.385	AXIAL PT	1.5	0.032
2.15	2.26	C15	1	0.86	0.4	AXIAL PT	1.5	0.032
2.37	2.49	C15	1	0.89	0.435	AXIAL PT	1.5	0.032
2.61	2.61	C15	1	0.92	0.48	AXIAL PT	1.5	0.032

BELL SYSTEM STANDARD COMPONENTS - CAPACITORS

POLYESTER, METALIZED
(FAMILY CODES)
PHYSICAL DATA

TABLE 8.4
(DATA FOR 701C, 701G)

CAPACITANCE		FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)	
FROM	TO		L	H	D		TL	TW
0.464	0.487	C10	1	0.33	0.33	AXIAL PT	1.96	0.032
0.511	0.536	C10	1	0.34	0.34	AXIAL PT	1.96	0.032
0.562	0.562	C10	1	0.35	0.35	AXIAL PT	1.96	0.032
0.59	0.619	C10	1	0.36	0.36	AXIAL PT	1.96	0.032
0.649	0.681	C10	1	0.37	0.37	AXIAL PT	1.96	0.032
0.715	0.715	C10	1	0.38	0.38	AXIAL PT	1.96	0.032
0.75	0.787	C10	1	0.39	0.39	AXIAL PT	1.96	0.032
0.825	0.825	C10	1	0.4	0.4	AXIAL PT	1.96	0.032
0.866	0.909	C10	1	0.41	0.41	AXIAL PT	1.96	0.032
0.953	0.953	C10	1	0.42	0.42	AXIAL PT	1.96	0.032
1	1	C10	1	0.43	0.43	AXIAL PT	1.96	0.032
1.05	1.05	C10	1	0.44	0.44	AXIAL PT	1.96	0.032
1.1	1.15	C10	1	0.45	0.45	AXIAL PT	1.96	0.032
1.21	1.21	C10	1	0.46	0.46	AXIAL PT	1.96	0.032
1.27	1.27	C10	1	0.47	0.47	AXIAL PT	1.96	0.032
1.33	1.33	C10	1	0.48	0.48	AXIAL PT	1.96	0.032
1.4	1.4	C10	1	0.49	0.49	AXIAL PT	1.96	0.032
1.47	1.47	C10	1	0.5	0.5	AXIAL PT	1.96	0.032
1.54	1.54	C10	1	0.51	0.51	AXIAL PT	1.96	0.032
1.62	1.62	C10	1	0.52	0.52	AXIAL PT	1.96	0.032
1.69	1.69	C10	1	0.53	0.53	AXIAL PT	1.96	0.032
1.78	1.78	C10	1	0.55	0.55	AXIAL PT	1.96	0.032
1.87	1.87	C10	1	0.56	0.56	AXIAL PT	1.96	0.032
1.96	1.96	C10	1	0.57	0.57	AXIAL PT	1.96	0.032
2.05	2.05	C10	1	0.58	0.58	AXIAL PT	1.96	0.032
2.15	2.15	C10	1	0.59	0.59	AXIAL PT	1.96	0.032
2.26	2.26	C10	1	0.6	0.6	AXIAL PT	1.96	0.032
2.37	2.37	C10	1	0.61	0.61	AXIAL PT	1.96	0.032

BELL SYSTEM STANDARD COMPONENTS - CAPACITORS

POLYESTER, METALIZED
(FAMILY CODES)
PHYSICAL DATA

TABLE 8.5
(DATA FOR 702C, 702G, 702H)

CAPACITANCE		FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)	
FROM	TO		L	H	D		TL	TW
0.1	0.1	C10	1	0.29	0.29	AXIAL PT	1.5	0.04
0.105	0.121	C10	1	0.3	0.3	AXIAL PT	1.5	0.04
0.127	0.14	C10	1	0.31	0.31	AXIAL PT	1.5	0.04
0.147	0.162	C10	1	0.32	0.32	AXIAL PT	1.5	0.04
0.169	0.205	C10	1	0.33	0.33	AXIAL PT	1.5	0.04
0.215	0.261	C10	1	0.34	0.34	AXIAL PT	1.5	0.04
0.274	0.274	C10	1	0.35	0.35	AXIAL PT	1.5	0.04
0.287	0.301	C10	1	0.36	0.36	AXIAL PT	1.5	0.04
0.316	0.332	C10	1	0.37	0.37	AXIAL PT	1.5	0.04
0.348	0.365	C10	1	0.38	0.38	AXIAL PT	1.5	0.04
0.383	0.402	C10	1	0.39	0.39	AXIAL PT	1.5	0.04
0.422	0.442	C10	1	0.4	0.4	AXIAL PT	1.5	0.04
0.464	0.487	C10	1	0.41	0.41	AXIAL PT	1.5	0.04
0.511	0.511	C10	1	0.42	0.42	AXIAL PT	1.5	0.04
0.536	0.536	C10	1	0.43	0.43	AXIAL PT	1.5	0.04
0.562	0.59	C10	1	0.44	0.44	AXIAL PT	1.5	0.04
0.619	0.619	C10	1	0.45	0.45	AXIAL PT	1.5	0.04
0.649	0.649	C10	1	0.46	0.46	AXIAL PT	1.5	0.04
0.681	0.681	C10	1	0.47	0.47	AXIAL PT	1.5	0.04
0.715	0.715	C10	1	0.48	0.48	AXIAL PT	1.5	0.04
0.75	0.75	C10	1	0.49	0.49	AXIAL PT	1.5	0.04
0.787	0.787	C10	1	0.5	0.5	AXIAL PT	1.5	0.04
0.825	0.825	C10	1	0.51	0.51	AXIAL PT	1.5	0.04
0.866	0.866	C10	1	0.53	0.53	AXIAL PT	1.5	0.04
0.909	0.909	C10	1	0.54	0.54	AXIAL PT	1.5	0.04
0.953	0.953	C10	1	0.55	0.55	AXIAL PT	1.5	0.04
1	1	C10	1	0.56	0.56	AXIAL PT	1.5	0.04
1.05	1.05	C10	1	0.58	0.58	AXIAL PT	1.5	0.04
1.1	1.1	C10	1	0.59	0.59	AXIAL PT	1.5	0.04

TABLE 8.6
(DATA FOR 705G, 705H)

CAPACITANCE		FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)	
FROM	TO		L	H	D		TL	TW
2.15	2.15	C15	1.8	0.67	0.26	AXIAL PT	1.5	0.032
2.37	2.37	C15	1.8	0.69	0.28	AXIAL PT	1.5	0.032
2.61	2.61	C15	1.8	0.7	0.29	AXIAL PT	1.5	0.032
2.87	2.87	C15	1.8	0.72	0.31	AXIAL PT	1.5	0.032
3.16	3.16	C15	1.8	0.74	0.32	AXIAL PT	1.5	0.032
3.48	3.48	C15	1.8	0.76	0.34	AXIAL PT	1.5	0.032
3.83	3.83	C15	1.8	0.78	0.35	AXIAL PT	1.5	0.032
4.22	4.22	C15	1.8	0.8	0.37	AXIAL PT	1.5	0.032
4.64	4.64	C15	1.8	0.83	0.39	AXIAL PT	1.5	0.032
5.11	5.11	C15	1.8	0.85	0.41	AXIAL PT	1.5	0.032

BELL SYSTEM STANDARD COMPONENTS - CAPACITORS

POLYESTER, FOIL
(UNIQUE CODES)
ELECTRICAL & PHYSICAL DATA

TABLE 8.7

CAPACITANCE	TOLERANCE		DCMV	FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)		CODE
	+X	-X			L	H	D		TL	TW	
3000 PF	20	20	400	C10	0.718	0.205	0.205	AXIAL PT	1.875	0.025	KS14290L02
5000 PF	50	25	150	C14	0.75	0.218	0.343	AXIAL PT	1.875	0.025	KS13814L08
5000 PF	15	10	400	C14	0.75	0.218	0.406	AXIAL PT	1.875	0.025	KS14289L02
8000 PF	10	10	1000	C10	0.97	0.4	0.4	AXIAL PT	1.875	0.025	KS14290L03
0.01	10	10	150	C14	0.812	0.218	0.437	AXIAL PT	1.875	0.025	KS13814L02
0.01	10	10	150	C10	0.532	0.172	0.172	AXIAL PT	1.875	0.025	KS14081L04
0.01	15	10	400	C14	0.812	0.218	0.437	AXIAL PT	1.875	0.025	KS14289L03
0.01	20	20	300	C10	0.625	0.32	0.32	AXIAL PT	1.75	0.025	KS19090L01
0.02	20	20	150	C14	0.937	0.218	0.437	AXIAL PT	1.875	0.025	KS13814L03
0.02	10	10	150	C14	0.937	0.218	0.437	AXIAL PT	1.875	0.025	KS13814L07
0.02	15	10	400	C14	0.937	0.218	0.437	AXIAL PT	1.875	0.025	KS14289L04
0.022	10	10	150	C14	0.937	0.218	0.5	AXIAL PT	1.875	0.025	KS13814L11
0.04	10	10	150	C14	0.937	0.218	0.406	AXIAL PT	1.875	0.025	KS13814L13
0.05	30	10	150	C14	0.937	0.218	0.406	AXIAL PT	1.875	0.025	KS13814L01
0.05	10	10	150	C14	0.625	0.218	0.437	AXIAL PT	1.875	0.025	KS13814L14
0.05	15	10	400	C10	0.938	0.5	0.5	AXIAL PT	1.875	0.032	KS14290L01
0.06	10	10	150	C14	0.937	0.218	0.437	AXIAL PT	1.875	0.025	KS13814L15
0.075	20	20	150	C14	0.937	0.203	0.531	AXIAL PT	1.875	0.025	KS13814L05
0.1	20	20	150	C14	0.937	0.281	0.5	AXIAL PT	1.875	0.025	KS13814L04
0.1	10	10	150	C14	0.937	0.281	0.5	AXIAL PT	1.875	0.025	KS13814L09
0.1	10	10	200	C14	0.937	0.312	0.656	AXIAL PT	1.875	0.025	KS13814L10
0.1	20	20	125	C10	1	0.28	0.28	AXIAL PT	1.2	0.032	722A
0.1	10	10	125	C10	1	0.28	0.28	AXIAL PT	1.2	0.032	722B
0.1	5	5	125	C10	1	0.28	0.28	AXIAL PT	1.2	0.032	722C
0.15	20	20	150	C14	0.937	0.296	0.625	AXIAL PT	1.875	0.025	KS13814L06
0.15	15	15	200	C15	1.062	0.343	0.656	AXIAL PT	1.875	0.025	KS14420L01
0.25	20	20	200	C14	1.125	0.5	0.687	AXIAL PT	1.875	0.032	KS13815L02
0.25	10	10	150	C14	0.875	0.39	0.765	AXIAL PT	1.875	0.032	KS13815L04
0.36	10	10	150	C10	1.25	0.425	0.425	AXIAL PT	1.875	0.025	KS14081L05
0.5	30	10	150	C14	1.25	0.343	0.968	AXIAL PT	1.875	0.025	KS13814L12
0.5	10	10	150	C14	1.25	0.343	0.968	AXIAL PT	1.875	0.032	KS13815L05
0.5	20	20	150	C10	1.438	0.578	0.578	AXIAL PT	1.875	0.032	KS14081L01
1	30	10	150	C14	1.875	0.468	0.687	AXIAL PT	1.875	0.032	KS13815L01
1	30	10	150	C14	1.25	0.656	1.015	AXIAL PT	1.875	0.032	KS13815L03
1	10	10	150	C14	1.796	0.312	0.843	AXIAL PT	1.875	0.032	KS13815L06
1	20	20	200	C10	1.875	0.782	0.782	AXIAL PT	1.875	0.032	KS14081L02
1	20	20	150	C10	1.438	0.782	0.782	AXIAL PT	1.875	0.032	KS14081L03
2	5	5	75	C10	1.937	0.715	0.715	AXIAL PT	1.875	0.032	KS14081L06

BELL SYSTEM STANDARD COMPONENTS - CAPACITORS

POLYESTER, FOIL
(FAMILY CODES)
ELECTRICAL AND PHYSICAL DATA

TABLE 8.8

FOR PHYSICAL DATA, SEE TABLES 8.9 THRU 8.17.

CAPACITANCE		STD VALUE TABLE	TOLERANCE		DCWV	CODE
MIN	MAX		+%	-%		
470 PF	0.075	CEIA05	5	5	300	KS20300L07
470 PF	0.075	CEIA10	10	10	300	KS20300L08
470 PF	0.075	CEIA20	20	20	300	KS20300L09
470 PF	0.24	CEIA05	5	5	150	KS20300L04
470 PF	0.24	CEIA10	10	10	150	KS20300L05
470 PF	0.24	CEIA20	20	20	150	KS20300L06
1000 PF	5600 PF	CEIA05	5	5	450	KS20977L10
1000 PF	5600 PF	CEIA10	10	10	450	KS20977L11
1000 PF	5600 PF	CEIA20	20	20	450	KS20977L12
1000 PF	0.01	CEIA20	20	20	150	KS16862L01
1000 PF	0.01	CEIA10	10	10	150	KS16862L02
1000 PF	0.01	CEIA05	5	5	150	KS16862L03
1000 PF	0.01	CEIA05	5	5	300	KS20977L07
1000 PF	0.01	CEIA10	10	10	300	KS20977L08
1000 PF	0.01	CEIA20	20	20	300	KS20977L09
1000 PF	0.033	CEIA05	5	5	150	KS20977L04
1000 PF	0.033	CEIA10	10	10	150	KS20977L05
1000 PF	0.033	CEIA20	20	20	150	KS20977L06
1000 PF	0.051	CEIA05	5	5	100	KS20977L01
1000 PF	0.051	CEIA10	10	10	100	KS20977L02
1000 PF	0.051	CEIA20	20	20	100	KS20977L03
1000 PF	0.511	CBSP05	5	5	125	594C
1000 PF	0.511	CBSP10	10	10	125	594G
2200 PF	0.33	CEIA05	5	5	100	KS20300L01
2200 PF	0.33	CEIA10	10	10	100	KS20300L02
2200 PF	0.33	CEIA20	20	20	100	KS20300L03

TABLE 8.9
(DATA FOR 594C, 594G)

CAPACITANCE		FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)	
FROM	TO		L	H	D		TL	TW
1000 PF	0.0195	C10	0.797	0.2	0.2	AXIAL PT	1.2	0.032
0.0205	0.0348	C10	0.797	0.25	0.25	AXIAL PT	1.2	0.032
0.0365	0.0511	C10	0.797	0.3	0.3	AXIAL PT	1.2	0.032
0.0536	0.0715	C10	0.797	0.35	0.35	AXIAL PT	1.2	0.032
0.075	0.0909	C10	0.797	0.4	0.4	AXIAL PT	1.2	0.032
0.0953	0.147	C10	0.797	0.45	0.45	AXIAL PT	1.2	0.032
0.154	0.178	C10	1.312	0.3	0.3	AXIAL PT	1.2	0.032
0.187	0.261	C10	1.312	0.35	0.35	AXIAL PT	1.2	0.032
0.274	0.348	C10	1.312	0.4	0.4	AXIAL PT	1.2	0.032
0.365	0.464	C10	1.312	0.45	0.45	AXIAL PT	1.2	0.032
0.487	0.511	C10	1.312	0.5	0.5	AXIAL PT	1.2	0.032

BELL SYSTEM STANDARD COMPONENTS - CAPACITORS

POLYESTER FOIL
(FAMILY CODES)
PHYSICAL DATA

TABLE 8.10
(DATA FOR KS20300L1,L2,L3)

CAPACITANCE		FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)	
FROM	TO		L	H	D		TL	TW
2200 PF	3900 PF	C10	0.405	0.155	0.155	AXIAL PT	1.25	0.025
4300 PF	5100 PF	C10	0.405	0.19	0.19	AXIAL PT	1.25	0.025
5600 PF	8200 PF	C10	0.465	0.19	0.19	AXIAL PT	1.25	0.025
9100 PF	0.012	C10	0.53	0.19	0.19	AXIAL PT	1.25	0.025
0.013	0.016	C10	0.59	0.19	0.19	AXIAL PT	1.25	0.025
0.018	0.027	C10	0.53	0.23	0.23	AXIAL PT	1.25	0.032
0.03	0.036	C10	0.655	0.23	0.23	AXIAL PT	1.25	0.032
0.039	0.051	C10	0.65	0.25	0.25	AXIAL PT	1.25	0.032
0.056	0.075	C10	0.59	0.315	0.315	AXIAL PT	1.25	0.032
0.082	0.1	C10	0.715	0.315	0.315	AXIAL PT	1.25	0.032
0.11	0.15	C10	0.715	0.345	0.345	AXIAL PT	1.25	0.032
0.16	0.22	C10	0.965	0.345	0.345	AXIAL PT	1.25	0.032
0.24	0.33	C10	1.28	0.345	0.345	AXIAL PT	1.25	0.032

TABLE 8.11
(DATA FOR KS20300L4,L5,L6)

CAPACITANCE		FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)	
FROM	TO		L	H	D		TL	TW
470 PF	1600 PF	C10	0.405	0.155	0.155	AXIAL PT	1.25	0.025
1800 PF	3600 PF	C10	0.405	0.19	0.19	AXIAL PT	1.25	0.025
3900 PF	7500 PF	C10	0.53	0.19	0.19	AXIAL PT	1.25	0.032
8200 PF	0.011	C10	0.59	0.19	0.19	AXIAL PT	1.25	0.025
0.012	0.016	C10	0.53	0.23	0.23	AXIAL PT	1.25	0.032
0.018	0.024	C10	0.655	0.23	0.23	AXIAL PT	1.25	0.032
0.027	0.036	C10	0.655	0.25	0.25	AXIAL PT	1.25	0.032
0.039	0.051	C10	0.59	0.315	0.315	AXIAL PT	1.25	0.032
0.056	0.075	C10	0.715	0.315	0.315	AXIAL PT	1.25	0.032
0.082	0.11	C10	0.715	0.345	0.345	AXIAL PT	1.25	0.032
0.12	0.16	C10	0.965	0.345	0.345	AXIAL PT	1.25	0.032
0.18	0.24	C10	1.28	0.345	0.345	AXIAL PT	1.25	0.032

TABLE 8.12
(DATA FOR KS20300L7,L8,L9)

CAPACITANCE		FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)	
FROM	TO		L	H	D		TL	TW
470 PF	1600 PF	C10	0.465	0.19	0.19	AXIAL PT	1.25	0.025
1800 PF	2400 PF	C10	0.53	0.19	0.19	AXIAL PT	1.25	0.025
2700 PF	5100 PF	C10	0.53	0.23	0.23	AXIAL PT	1.25	0.032
5600 PF	0.011	C10	0.655	0.25	0.25	AXIAL PT	1.25	0.032
0.012	0.016	C10	0.59	0.315	0.315	AXIAL PT	1.25	0.032
0.018	0.024	C10	0.715	0.315	0.315	AXIAL PT	1.25	0.032
0.027	0.036	C10	0.715	0.345	0.345	AXIAL PT	1.25	0.032
0.039	0.039	C10	0.965	0.345	0.345	AXIAL PT	1.25	0.032
0.056	0.056	C10	1.28	0.345	0.345	AXIAL PT	1.25	0.032

BELL SYSTEM STANDARD COMPONENTS - CAPACITORS

POLYESTER, FOIL
(FAMILY CODES)
PHYSICAL DATA

TABLE 8.13
(DATA FOR KS20977L1,L2,L3)

CAPACITANCE		FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)	
FROM	TO		L	H	D		TL	TW
1000 PF	6800 PF	C10	0.4	0.175	0.175	AXIAL PT	1.25	0.025
7500 PF	0.015	C10	0.531	0.218	0.218	AXIAL PT	1.25	0.025
0.016	0.033	C10	0.625	0.25	0.25	AXIAL PT	1.25	0.032
0.036	0.051	C10	0.75	0.312	0.312	AXIAL PT	1.25	0.032

TABLE 8.14
(DATA FOR KS20977L4,L5,L6)

CAPACITANCE		FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)	
FROM	TO		L	H	D		TL	TW
1000 PF	2200 PF	C10	0.4	0.175	0.175	AXIAL PT	1.25	0.025
2400 PF	0.01	C10	0.531	0.218	0.218	AXIAL PT	1.25	0.025
0.011	0.012	C10	0.625	0.25	0.25	AXIAL PT	1.25	0.032
0.013	0.033	C10	0.75	0.312	0.312	AXIAL PT	1.25	0.032

TABLE 8.15
(DATA FOR KS20977L7,L8,L9)

CAPACITANCE		FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)	
FROM	TO		L	H	D		TL	TW
1000 PF	3300 PF	C10	0.531	0.218	0.218	AXIAL PT	1.25	0.025
3600 PF	3600 PF	C10	0.625	0.25	0.25	AXIAL PT	1.25	0.032
3900 PF	0.01	C10	0.75	0.312	0.312	AXIAL PT	1.25	0.032

TABLE 8.16
(DATA FOR KS20977L10,L11,L12)

CAPACITANCE		FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)	
FROM	TO		L	H	D		TL	TW
1000 PF	1500 PF	C10	0.531	0.218	0.218	AXIAL PT	1.25	0.025
1600 PF	2200 PF	C10	0.625	0.25	0.25	AXIAL PT	1.25	0.032
2400 PF	5600 PF	C10	0.75	0.312	0.312	AXIAL PT	1.25	0.032

TABLE 8.17
(DATA FOR KS16862L1,L2,L3)

CAPACITANCE		FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)	
FROM	TO		L	H	D		TL	TW
1000 PF	0.01	C10	0.625	0.195	0.195	AXIAL PT	1.75	0.02

BELL SYSTEM STANDARD COMPONENTS - CAPACITORS

POLYPROPYLENE FOIL
(FAMILY CODES)
ELECTRICAL & PHYSICAL DATA

TABLE 8.18

CAPACITANCE		STD VALUE TABLE	TOLERANCE		DCWV	CODE
MIN	MAX		+%	-%		
1000 PF	0.511	CBSP05	5	5	125	727

TABLE 8.19
(DATA FOR 727)

CAPACITANCE		FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)	
FROM	TO		L	H	D		TL	TW
1000 PF	0.01	C10	0.688	0.3	0.3	AXIAL PT	1.25	0.032
0.0105	0.0249	C10	1.031	0.281	0.281	AXIAL PT	1.25	0.032
0.0261	0.0348	C10	1.031	0.3	0.3	AXIAL PT	1.25	0.032
0.0365	0.0442	C10	1.031	0.315	0.315	AXIAL PT	1.25	0.032
0.0464	0.0536	C10	1.031	0.375	0.375	AXIAL PT	1.25	0.032
0.0562	0.0562	C10	1.031	0.391	0.391	AXIAL PT	1.25	0.032
0.059	0.0649	C10	1.031	0.422	0.422	AXIAL PT	1.25	0.032
0.0681	0.0715	C10	1.031	0.438	0.438	AXIAL PT	1.25	0.032
0.075	0.0866	C10	1.031	0.453	0.453	AXIAL PT	1.25	0.032
0.0909	0.0953	C10	1.031	0.48	0.48	AXIAL PT	1.25	0.032
0.1	0.105	C10	1.031	0.5	0.5	AXIAL PT	1.25	0.032
0.11	0.133	C10	1.031	0.531	0.531	AXIAL PT	1.25	0.032
0.14	0.147	C10	1.8	0.422	0.422	AXIAL PT	1.25	0.032
0.154	0.187	C10	1.8	0.453	0.453	AXIAL PT	1.25	0.032
0.196	0.226	C10	1.8	0.5	0.5	AXIAL PT	1.25	0.032
0.237	0.261	C10	1.8	0.531	0.531	AXIAL PT	1.25	0.032
0.274	0.301	C10	1.8	0.551	0.551	AXIAL PT	1.25	0.032
0.316	0.348	C10	1.8	0.57	0.57	AXIAL PT	1.25	0.032
0.365	0.402	C10	1.8	0.585	0.585	AXIAL PT	1.25	0.032
0.422	0.464	C10	1.8	0.6	0.6	AXIAL PT	1.25	0.032
0.487	0.511	C10	1.8	0.615	0.615	AXIAL PT	1.25	0.032

TABLE 8.20

CAPACITANCE	TOLERANCE		DCWV	FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)		CODE
	+%	-%			L	H	D		TL	TW	
383 PF	5	5	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570DK
681 PF	5	5	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570DF
681 PF	5	5	200	C10	0.688	0.225	0.225	AXIAL PT	1.5	0.032	570U
1000 PF	5	5	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570DL
1000 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570FJ
1000 PF	20	20	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570RK
1000 PF	20	20	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570RM *
1020 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570MH
1050 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570MJ
1070 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570MK
1100 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570ML
1130 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570MM
1150 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570FE
1180 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570LM
1210 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570FF
1210 PF	5	5	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570RH
1240 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570MN
1270 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570DA
1300 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570MP
1330 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570MR
1370 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570CY
1400 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570MS
1430 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570MT
1470 PF	5	5	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570DG
1470 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570EY
1470 PF	5	5	200	C10	0.688	0.225	0.225	AXIAL PT	1.5	0.032	570W
1500 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570MU
1540 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570MW
1580 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570MY
1620 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570KL
1650 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570NA
1690 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570KK
1740 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570KJ
1780 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570NB
1820 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570NC
1870 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570ND
1910 PF	5	5	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570BG
1910 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570KH
1960 PF	5	5	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570DM
1960 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570FG
2000 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570EW
2050 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570FH
2100 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570NE
2150 PF	5	5	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570BF
2150 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570CW
2210 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570KG
2260 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570NF
2320 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570CU
2370 PF	5	5	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570BE
2370 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570KF
2430 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570CT
2490 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570NG
2490 PF	5	5	200	C10	0.688	0.225	0.225	AXIAL PT	1.5	0.032	570Y
2550 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570CS
2610 PF	5	5	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570BD
2610 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570KE
2670 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570ME
2740 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570NH
2800 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570LL
2870 PF	5	5	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570BC
2870 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570EU
2870 PF	3	3	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570P

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POLYSTYRENE, FOIL
(UNIQUE CODES)
ELECTRICAL & PHYSICAL DATA

TABLE 8.20
(CONT'D)

CAPACITANCE	TOLERANCE		DCWV	FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)		CODE
	+%	-%			L	H	D		TL	TW	
2940 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570KD
3010 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570NJ
3090 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570ET
3160 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570NK
3240 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570NL
3320 PF	3	3	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570AA
3320 PF	5	5	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570BB
3320 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570NM
3320 PF	3	3	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570RN
3400 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570KC
3480 PF	5	5	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570DN
3480 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570NN
3570 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570NP
3650 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570ES
3740 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570KB
3830 PF	5	5	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570BA
3830 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570NR
3920 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570LK
4020 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570FK
4120 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570NS
4220 PF	5	5	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570AY
4220 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570LN
4320 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570KA
4420 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570JY
4530 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570JW
4640 PF	5	5	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570DH
4640 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570JU
4750 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570NT
4870 PF	5	5	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570AW
4870 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570NU
4990 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570FN
5110 PF	5	5	200	C10	0.688	0.225	0.225	AXIAL PT	1.5	0.032	570AB
5110 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570NW
5230 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570JT
5360 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570JS
5490 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570NY
5620 PF	5	5	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570AU
5620 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570JR
5760 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570JP
5760 PF	3	3	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570N
5900 PF	5	5	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570DP
5900 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570JN
6040 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570LJ
6190 PF	5	5	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570AT
6190 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570JM
6340 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570JL
6490 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570KW
6650 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570JK
6810 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570JJ
6980 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570PA
7150 PF	5	5	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570AS
7150 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570PB
7320 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570KY
7500 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570PC
7680 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570JH
7870 PF	5	5	200	C10	0.688	0.225	0.225	AXIAL PT	1.5	0.032	570AC
7870 PF	5	5	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570DJ
7870 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570FA
8060 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570FL
8250 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570CR

TABLE 8.20
(CONT'D)

CAPACITANCE	TOLERANCE		DCWV	FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)		CODE
	+%	-%			L	H	D		TL	TW	
8450 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570JG
8660 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570JF
8870 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570CP
8870 PF	3	3	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570M
9090 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570PD
9310 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570JE
9530 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570JD
9760 PF	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570ER
0.01	5	5	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570DR
0.01	2	2	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570LH
0.01	20	20	200	C10	0.688	0.3	0.3	AXIAL PT	1.5	0.032	570RL
0.0102	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570KU
0.0105	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570JC
0.0107	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570JB
0.011	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570EH
0.0113	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570JA
0.0115	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570HY
0.0118	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570LG
0.0121	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570B
0.0124	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570HW
0.0127	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570KT
0.013	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570HU
0.0133	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570MB
0.0137	3	3	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570CN
0.0137	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570HT
0.014	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570EP
0.0143	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570HS
0.0147	3	3	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570CM
0.0147	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570MA
0.015	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570FP
0.0154	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570HR
0.0158	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570EG
0.0162	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570FM
0.0165	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570HP
0.0169	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570HN
0.0174	3	3	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570CL
0.0174	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570FB
0.0178	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570PE
0.0182	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570EK
0.0187	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570LU
0.0191	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570KS
0.0196	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570HM
0.02	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570HL
0.0205	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570KR
0.021	3	3	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570CJ
0.021	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570CK
0.0215	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570HK
0.0215	3	3	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570L
0.0221	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570LY
0.0226	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570HJ
0.0232	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570PF
0.0237	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570LP
0.0243	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570LW
0.0249	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570T
0.0255	2	2	200	C10	1.031	0.281	0.281	AXIAL PT	1.5	0.032	570CH
0.0261	2	2	200	C10	1.031	0.312	0.312	AXIAL PT	1.5	0.032	570LF
0.0267	2	2	200	C10	1.031	0.312	0.312	AXIAL PT	1.5	0.032	570HH
0.0274	2	2	200	C10	1.031	0.312	0.312	AXIAL PT	1.5	0.032	570LT
0.028	2	2	200	C10	1.031	0.312	0.312	AXIAL PT	1.5	0.032	570HG
0.0287	2	2	200	C10	1.031	0.312	0.312	AXIAL PT	1.5	0.032	570PG

POLYSTYRENE, FOIL
(UNIQUE CODES)
ELECTRICAL & PHYSICAL DATA

TABLE 8.20
(CONT'D)

CAPACITANCE	TOLERANCE		DCMV	FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)		CODE
	+%	-%			L	H	D		TL	TW	
0.0294	2	2	200	C10	1.031	0.312	0.312	AXIAL PT	1.5	0.032	570CG
0.0301	2	2	200	C10	1.031	0.312	0.312	AXIAL PT	1.5	0.032	570HF
0.0309	2	2	200	C10	1.031	0.312	0.312	AXIAL PT	1.5	0.032	570KP
0.0316	2	2	200	C10	1.031	0.312	0.312	AXIAL PT	1.5	0.032	570CF
0.0324	2	2	200	C10	1.031	0.328	0.328	AXIAL PT	1.5	0.032	570HE
0.0332	5	5	200	C10	1.031	0.328	0.328	AXIAL PT	1.5	0.032	570C
0.0332	2	2	200	C10	1.031	0.328	0.328	AXIAL PT	1.5	0.032	570HD
0.034	2	2	200	C10	1.031	0.328	0.328	AXIAL PT	1.5	0.032	570HC
0.0348	2	2	200	C10	1.031	0.328	0.328	AXIAL PT	1.5	0.032	570LE
0.0357	3	3	200	C10	1.031	0.328	0.328	AXIAL PT	1.5	0.032	570CE
0.0357	2	2	200	C10	1.031	0.328	0.328	AXIAL PT	1.5	0.032	570HB
0.0365	2	2	200	C10	1.031	0.344	0.344	AXIAL PT	1.5	0.032	570HA
0.0374	2	2	200	C10	1.031	0.344	0.344	AXIAL PT	1.5	0.032	570GY
0.0383	2	2	200	C10	1.031	0.344	0.344	AXIAL PT	1.5	0.032	570GW
0.0388	2	2	200	C10	1.031	0.344	0.344	AXIAL PT	1.5	0.032	570DD
0.0392	2	2	200	C10	1.031	0.344	0.344	AXIAL PT	1.5	0.032	570GU
0.0392	3	3	200	C10	1.031	0.344	0.344	AXIAL PT	1.5	0.032	570K
0.0392	5	5	200	C10	1.031	0.344	0.344	AXIAL PT	1.5	0.032	570RJ
0.0402	2	2	200	C10	1.031	0.344	0.344	AXIAL PT	1.5	0.032	570EN
0.0412	2	2	200	C10	1.031	0.344	0.344	AXIAL PT	1.5	0.032	570GT
0.0422	2	2	200	C10	1.031	0.344	0.344	AXIAL PT	1.5	0.032	570GS
0.0432	2	2	200	C10	1.031	0.344	0.344	AXIAL PT	1.5	0.032	570KN
0.0442	3	3	200	C10	1.031	0.344	0.344	AXIAL PT	1.5	0.032	570CD
0.0442	5	5	200	C10	1.031	0.375	0.375	AXIAL PT	1.5	0.032	570EJ
0.0442	2	2	200	C10	1.031	0.344	0.344	AXIAL PT	1.5	0.032	570GR
0.0453	2	2	200	C10	1.031	0.344	0.344	AXIAL PT	1.5	0.032	570PH
0.0464	2	2	200	C10	1.031	0.344	0.344	AXIAL PT	1.5	0.032	570CC
0.0475	2	2	200	C10	1.031	0.344	0.344	AXIAL PT	1.5	0.032	570MC
0.0487	5	5	200	C10	1.031	0.344	0.344	AXIAL PT	1.5	0.032	570CB
0.0487	2	2	200	C10	1.031	0.344	0.344	AXIAL PT	1.5	0.032	570DU
0.0499	2	2	200	C10	1.031	0.344	0.344	AXIAL PT	1.5	0.032	570GP
0.0511	3	3	200	C10	1.031	0.375	0.375	AXIAL PT	1.5	0.032	570CA
0.0511	2	2	200	C10	1.031	0.375	0.375	AXIAL PT	1.5	0.032	570GN
0.0523	2	2	200	C10	1.031	0.375	0.375	AXIAL PT	1.5	0.032	570PJ
0.0536	2	2	200	C10	1.031	0.375	0.375	AXIAL PT	1.5	0.032	570BY
0.0549	2	2	200	C10	1.031	0.391	0.391	AXIAL PT	1.5	0.032	570PK
0.0562	5	5	200	C10	1.031	0.391	0.391	AXIAL PT	1.5	0.032	570D
0.0562	2	2	200	C10	1.031	0.391	0.391	AXIAL PT	1.5	0.032	570GM
0.0576	2	2	200	C10	1.031	0.422	0.422	AXIAL PT	1.5	0.032	570GL
0.059	2	2	200	C10	1.031	0.422	0.422	AXIAL PT	1.5	0.032	570BW
0.0604	2	2	200	C10	1.031	0.422	0.422	AXIAL PT	1.5	0.032	570PL
0.0619	2	2	200	C10	1.031	0.422	0.422	AXIAL PT	1.5	0.032	570GK
0.0634	2	2	200	C10	1.031	0.422	0.422	AXIAL PT	1.5	0.032	570BU
0.0649	2	2	200	C10	1.031	0.422	0.422	AXIAL PT	1.5	0.032	570BT
0.0657	2	2	200	C10	1.031	0.438	0.438	AXIAL PT	1.5	0.032	570DE
0.0665	2	2	200	C10	1.031	0.438	0.438	AXIAL PT	1.5	0.032	570GJ
0.0681	2	2	200	C10	1.031	0.438	0.438	AXIAL PT	1.5	0.032	570PM
0.0698	2	2	200	C10	1.031	0.438	0.438	AXIAL PT	1.5	0.032	570GH
0.0715	2	2	200	C10	1.031	0.438	0.438	AXIAL PT	1.5	0.032	570KM
0.0732	3	3	200	C10	1.031	0.438	0.438	AXIAL PT	1.5	0.032	570BS
0.0732	2	2	200	C10	1.031	0.438	0.438	AXIAL PT	1.5	0.032	570FC
0.075	2	2	200	C10	1.031	0.453	0.453	AXIAL PT	1.5	0.032	570MD
0.0768	3	3	200	C10	1.031	0.453	0.453	AXIAL PT	1.5	0.032	570J
0.0768	2	2	200	C10	1.031	0.453	0.453	AXIAL PT	1.5	0.032	570LD
0.0777	2	2	200	C10	1.031	0.453	0.453	AXIAL PT	1.5	0.032	570DB
0.0787	2	2	200	C10	1.031	0.453	0.453	AXIAL PT	1.5	0.032	570EM
0.0806	2	2	200	C10	1.031	0.453	0.453	AXIAL PT	1.5	0.032	570GG
0.0825	2	2	200	C10	1.031	0.453	0.453	AXIAL PT	1.5	0.032	570GF
0.0845	2	2	200	C10	1.031	0.453	0.453	AXIAL PT	1.5	0.032	570BR
0.0866	2	2	200	C10	1.031	0.453	0.453	AXIAL PT	1.5	0.032	570GE

TABLE 8.20
(CONT'D)

CAPACITANCE	TOLERANCE		DCHV	FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)		CODE
	+%	-%			L	H	D		TL	TW	
0.0887	2	2	200	C10	1.031	0.453	0.453	AXIAL PT	1.5	0.032	570EL
0.0909	2	2	200	C10	1.031	0.48	0.48	AXIAL PT	1.5	0.032	570DC
0.0931	2	2	200	C10	1.031	0.48	0.48	AXIAL PT	1.5	0.032	570BP
0.0953	2	2	200	C10	1.031	0.48	0.48	AXIAL PT	1.5	0.032	570FD
0.0976	2	2	200	C10	1.031	0.48	0.48	AXIAL PT	1.5	0.032	570GD
0.1	3	3	200	C10	1.031	0.5	0.5	AXIAL PT	1.5	0.032	570A
0.1	2	2	200	C10	1.031	0.5	0.5	AXIAL PT	1.5	0.032	570BN
0.102	2	2	200	C10	1.031	0.5	0.5	AXIAL PT	1.5	0.032	570LC
0.105	2	2	200	C10	1.031	0.5	0.5	AXIAL PT	1.5	0.032	570AR
0.107	2	2	200	C10	1.031	0.5	0.5	AXIAL PT	1.5	0.032	570BM
0.11	2	2	200	C10	1.031	0.531	0.531	AXIAL PT	1.5	0.032	570PN
0.113	2	2	200	C10	1.031	0.531	0.531	AXIAL PT	1.5	0.032	570GC
0.115	2	2	200	C10	1.031	0.531	0.531	AXIAL PT	1.5	0.032	570LR
0.118	2	2	200	C10	1.031	0.531	0.531	AXIAL PT	1.5	0.032	570AP
0.121	2	2	200	C10	1.031	0.531	0.531	AXIAL PT	1.5	0.032	570GB
0.124	2	2	200	C10	1.031	0.531	0.531	AXIAL PT	1.5	0.032	570GA
0.127	2	2	200	C10	1.031	0.531	0.531	AXIAL PT	1.5	0.032	570PP
0.13	2	2	200	C10	1.031	0.531	0.531	AXIAL PT	1.5	0.032	570AN
0.133	2	2	200	C10	1.031	0.531	0.531	AXIAL PT	1.5	0.032	570FY
0.137	2	2	200	C10	1.8	0.422	0.422	AXIAL PT	1.5	0.032	570FW
0.14	2	2	200	C10	1.8	0.422	0.422	AXIAL PT	1.5	0.032	570FU
0.143	2	2	200	C10	1.8	0.422	0.422	AXIAL PT	1.5	0.032	570AM
0.147	2	2	200	C10	1.8	0.422	0.422	AXIAL PT	1.5	0.032	570BL
0.15	3	3	200	C10	1.8	0.453	0.453	AXIAL PT	1.5	0.032	570BK
0.15	2	2	200	C10	1.8	0.453	0.453	AXIAL PT	1.5	0.032	570DW
0.154	2	2	200	C10	1.8	0.453	0.453	AXIAL PT	1.5	0.032	570FT
0.158	2	2	200	C10	1.8	0.453	0.453	AXIAL PT	1.5	0.032	570AL
0.158	3	3	200	C10	1.8	0.453	0.453	AXIAL PT	1.5	0.032	570H
0.162	2	2	200	C10	1.8	0.453	0.453	AXIAL PT	1.5	0.032	570FS
0.165	2	2	200	C10	1.8	0.453	0.453	AXIAL PT	1.5	0.032	570DY
0.169	2	2	200	C10	1.8	0.453	0.453	AXIAL PT	1.5	0.032	570PR
0.174	2	2	200	C10	1.8	0.453	0.453	AXIAL PT	1.5	0.032	570EA
0.178	2	2	200	C10	1.8	0.453	0.453	AXIAL PT	1.5	0.032	570PS
0.182	2	2	200	C10	1.8	0.453	0.453	AXIAL PT	1.5	0.032	570AK
0.187	2	2	200	C10	1.8	0.453	0.453	AXIAL PT	1.5	0.032	570PT
0.191	2	2	200	C10	1.8	0.453	0.453	AXIAL PT	1.5	0.032	570EB
0.196	2	2	200	C10	1.8	0.5	0.5	AXIAL PT	1.5	0.032	570MF
0.2	2	2	200	C10	1.8	0.5	0.5	AXIAL PT	1.5	0.032	570BJ
0.2	3	3	200	C10	1.8	0.5	0.5	AXIAL PT	1.5	0.032	570G
0.205	2	2	200	C10	1.8	0.5	0.5	AXIAL PT	1.5	0.032	570LS
0.21	2	2	200	C10	1.8	0.5	0.5	AXIAL PT	1.5	0.032	570AJ
0.215	2	2	200	C10	1.8	0.5	0.5	AXIAL PT	1.5	0.032	570PU
0.215	1	1	200	C10	1.8	0.5	0.5	AXIAL PT	1.5	0.032	570R
0.221	2	2	200	C10	1.8	0.5	0.5	AXIAL PT	1.5	0.032	570MG
0.226	2	2	200	C10	1.8	0.5	0.5	AXIAL PT	1.5	0.032	570F
0.231	2	2	200	C10	1.8	0.531	0.531	AXIAL PT	1.5	0.032	570LB
0.237	2	2	200	C10	1.8	0.531	0.531	AXIAL PT	1.5	0.032	570AH
0.243	2	2	200	C10	1.8	0.531	0.531	AXIAL PT	1.5	0.032	570EC
0.249	3	3	200	C10	1.8	0.531	0.531	AXIAL PT	1.5	0.032	570DT
0.249	2	2	200	C10	1.8	0.531	0.531	AXIAL PT	1.5	0.032	570LA
0.255	2	2	200	C10	1.8	0.531	0.531	AXIAL PT	1.5	0.032	570PW
0.261	2	2	200	C10	1.8	0.531	0.531	AXIAL PT	1.5	0.032	570AG
0.267	2	2	200	C10	1.8	0.551	0.551	AXIAL PT	1.5	0.032	570PY
0.274	2	2	200	C10	1.8	0.551	0.551	AXIAL PT	1.5	0.032	570RA
0.28	2	2	200	C10	1.8	0.551	0.551	AXIAL PT	1.5	0.032	570RB
0.287	2	2	200	C10	1.8	0.551	0.551	AXIAL PT	1.5	0.032	570ED
0.294	3	3	200	C10	1.8	0.551	0.551	AXIAL PT	1.5	0.032	570DS
0.294	2	2	200	C10	1.8	0.551	0.551	AXIAL PT	1.5	0.032	570EE
0.301	2	2	200	C10	1.8	0.551	0.551	AXIAL PT	1.5	0.032	570AF
0.309	2	2	200	C10	1.8	0.551	0.551	AXIAL PT	1.5	0.032	570EF

TABLE 8.20
 (CONT'D)

CAPACITANCE	TOLERANCE		DCV	FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)		CODE
	+%	-%			L	H	D		TL	TW	
0.316	2	2	200	C10	1.8	0.578	0.578	AXIAL PT	1.5	0.032	570BH
0.324	2	2	200	C10	1.8	0.578	0.578	AXIAL PT	1.5	0.032	570RC
0.332	2	2	200	C10	1.8	0.578	0.578	AXIAL PT	1.5	0.032	570RD
0.34	2	2	200	C10	1.8	0.578	0.578	AXIAL PT	1.5	0.032	570AE
0.348	2	2	200	C10	1.8	0.578	0.578	AXIAL PT	1.5	0.032	570FR
0.357	2	2	200	C10	1.8	0.6	0.6	AXIAL PT	1.5	0.032	570RE
0.365	2	2	200	C10	1.8	0.6	0.6	AXIAL PT	1.5	0.032	570RF
0.365	1	1	200	C10	1.8	0.6	0.6	AXIAL PT	1.5	0.032	570S
0.374	2	2	200	C10	1.8	0.615	0.615	AXIAL PT	1.5	0.032	570RG
0.383	2	2	200	C10	1.8	0.615	0.615	AXIAL PT	1.5	0.032	570AD
0.383	3	3	200	C10	1.8	0.615	0.615	AXIAL PT	1.5	0.032	570E

BELL SYSTEM STANDARD COMPONENTS - CAPACITORS

POLYSTYRENE, FOIL
(FAMILY CODES)
ELECTRICAL AND PHYSICAL DATA

TABLE 8.21

FOR PHYSICAL DATA, SEE TABLES 8.22 THRU 8.24.

CAPACITANCE		STD VALUE TABLE	TOLERANCE		DCWV	CODE
MIN	MAX		+%	-%		
300 PF	0.02	CBSP01	1	1	200	719A
300 PF	0.02	CBSP02	2	2	200	719B
300 PF	0.02	CBSP05	5	5	200	719C
300 PF	0.02	CBSP01	0.5	0.5	200	719D
300 PF	0.02	CBSP10	10	10	200	719G
383 PF	0.383	CBSP05	5	5	100	725C
7150 PF	0.768	CBSP01	1	1	200	577A
7150 PF	0.768	CBSP01	0.5	0.5	200	577D
7150 PF	0.768	CBSP01	1	1	200	578A
7150 PF	0.768	CBSP01	0.5	0.5	200	578D

TABLE 8.22
(DATA FOR 719A,B,C,D,G)

CAPACITANCE		FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)	
FROM	TO		L	H	D		TL	TW
300 PF	9880 PF	C12	0.5	0.4	0.3	RAD PT	0.2	0.02
0.01	0.02	C12	0.5	0.7	0.3	RAD PT	0.2	0.02

TABLE 8.23
(DATA FOR 725C)

CAPACITANCE		FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)	
FROM	TO		L	H	D		TL	TW
383 PF	0.01	C10	0.688	0.3	0.3	AXIAL PT	1.2	0.032
0.0102	0.0255	C10	1.031	0.281	0.281	AXIAL PT	1.2	0.032
0.0261	0.0316	C10	1.031	0.312	0.312	AXIAL PT	1.2	0.032
0.0324	0.0357	C10	1.031	0.328	0.328	AXIAL PT	1.2	0.032
0.0365	0.0499	C10	1.031	0.344	0.344	AXIAL PT	1.2	0.032
0.0511	0.0536	C10	1.031	0.375	0.375	AXIAL PT	1.2	0.032
0.0549	0.0562	C10	1.031	0.391	0.391	AXIAL PT	1.2	0.032
0.0576	0.0649	C10	1.031	0.422	0.422	AXIAL PT	1.2	0.032
0.0657	0.0732	C10	1.031	0.438	0.438	AXIAL PT	1.2	0.032
0.075	0.0887	C10	1.031	0.453	0.453	AXIAL PT	1.2	0.032
0.0909	0.0976	C10	1.031	0.48	0.48	AXIAL PT	1.2	0.032
0.1	0.107	C10	1.031	0.5	0.5	AXIAL PT	1.2	0.032
0.11	0.133	C10	1.031	0.531	0.531	AXIAL PT	1.2	0.032
0.137	0.147	C10	1.8	0.422	0.422	AXIAL PT	1.2	0.032
0.15	0.191	C10	1.8	0.453	0.453	AXIAL PT	1.2	0.032
0.196	0.226	C10	1.8	0.5	0.5	AXIAL PT	1.2	0.032
0.231	0.261	C10	1.8	0.531	0.531	AXIAL PT	1.2	0.032
0.267	0.309	C10	1.8	0.551	0.551	AXIAL PT	1.2	0.032
0.316	0.348	C10	1.8	0.578	0.578	AXIAL PT	1.2	0.032
0.357	0.365	C10	1.8	0.6	0.6	AXIAL PT	1.2	0.032
0.374	0.383	C10	1.8	0.615	0.615	AXIAL PT	1.2	0.032

BELL SYSTEM STANDARD COMPONENTS - CAPACITORS

POLYSTYRENE, FOIL
(FAMILY CODES)
PHYSICAL DATA

TABLE 8.24
(DATA FOR 577A, 577D, 578A, 578D)

CAPACITANCE		FIG.	BODY SIZE (IN.)			TERM. TYPE	TERM. SIZE (IN.)	
FROM	TO		L	H	D		TL	TW
7150 PF	0.02	C18	0.9	0.72	0.411	RAD PT	0.2	0.032
0.0203	0.0988	C18	1.25	0.808	0.455	RAD PT	0.2	0.032
0.1	0.193	C18	1.25	1.08	0.591	RAD PT	0.25	0.032
0.196	0.264	C18	1.25	1.182	0.642	RAD PT	0.25	0.032
0.267	0.379	C18	2	1.026	0.564	RAD PT	0.25	0.04
0.383	0.517	C18	2	1.182	0.642	RAD PT	0.25	0.04
0.523	0.69	C18	2	1.267	0.689	RAD PT	0.25	0.04
0.698	0.768	C18	2	1.35	0.726	RAD PT	0.25	0.04





SILICON
Basic Data

SILICON BASE, TANTALUM, THIN FILM, BEAM LEADS, POLARIZED

Code	Capacitance Range		DC Working Voltage Max	Leakage Current Max nA	Equivalent Series Resistance at Frequency Max	Dimensions	
	From pF	To				Length microns	Width microns
800A	1620	2300	15	100	2 ohms at 100 kHz	2340	1990
801A	2700	3600	15	100	2 ohms at 100 kHz	2700	2910
802A	9	11	15	100	10 ohms at 10 MHz	980	600
802B	13.5	16.5	15	100	10 ohms at 10 MHz	1220	900
803A	80	120*	15	100	4 ohms at 10 MHz	1220	900
803B	190	210	15	100	4 ohms at 10 MHz	1220	900
804A	475	645*	15	100	4 ohms at 10 MHz	1700	1390
804B	370	410	15	100	4 ohms at 10 MHz	1700	1390
805A	850	1150	15	100	4 ohms at 100 MHz	1940	1690

* Devices are matched in cells to within 5%.



SILICON
Application GuideGeneral Description

The 800-type capacitor is a beam-lead, thin-film tantalum, silicon-base device, which is compatible with integrated circuit assembly techniques. The device is polarized. Leakage current, voltage rating, and reliability require the silicon to be biased positive with respect to the field plate. Maximum ratings are defined as the limiting conditions that the user can apply to the device under all variations of circuit and environmental conditions. If any rating is exceeded, permanent damage may result. Bonding or soldering of the external leads of these capacitors can be performed safely at temperatures up to 300°C.

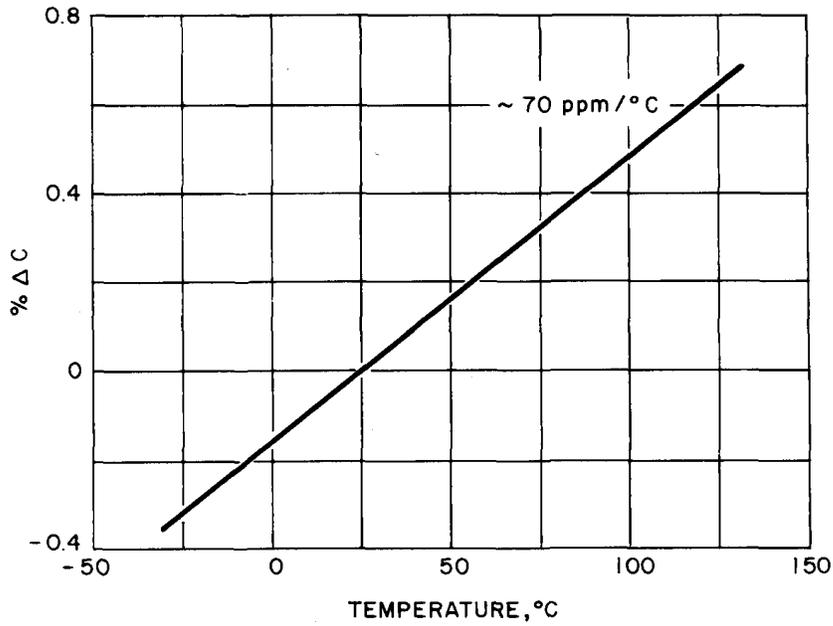
Features

The silicon-base capacitors feature low series resistance and high temperature capability. Extrapolations from short-term accelerated life tests on the 800A capacitor indicate that temperature-dependent failure rates less than 0.001% per 1000 hours may be assumed for these devices at average junction temperatures below 125°C. Curve data included in this catalog apply to the 800A capacitor.

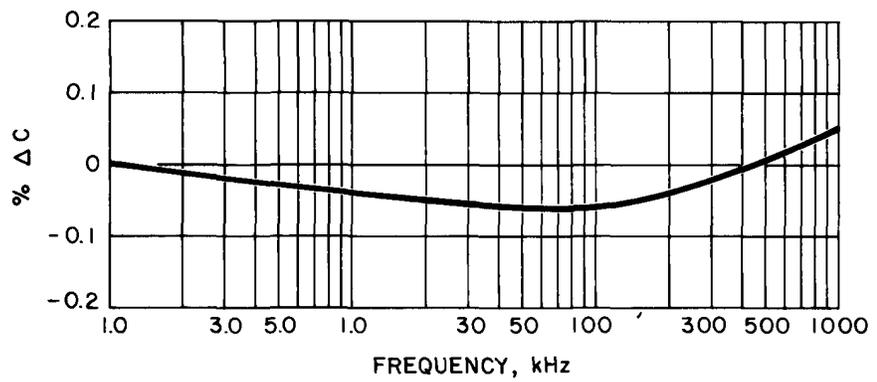


SILICON
Characteristic Curves

Typical for 800A Capacitors



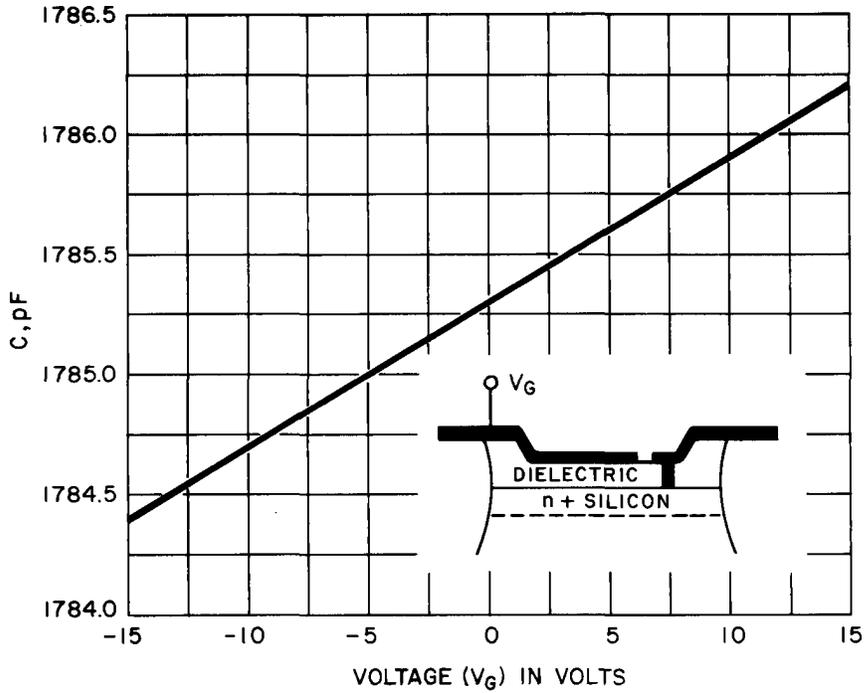
CAPACITANCE CHANGE VS TEMPERATURE



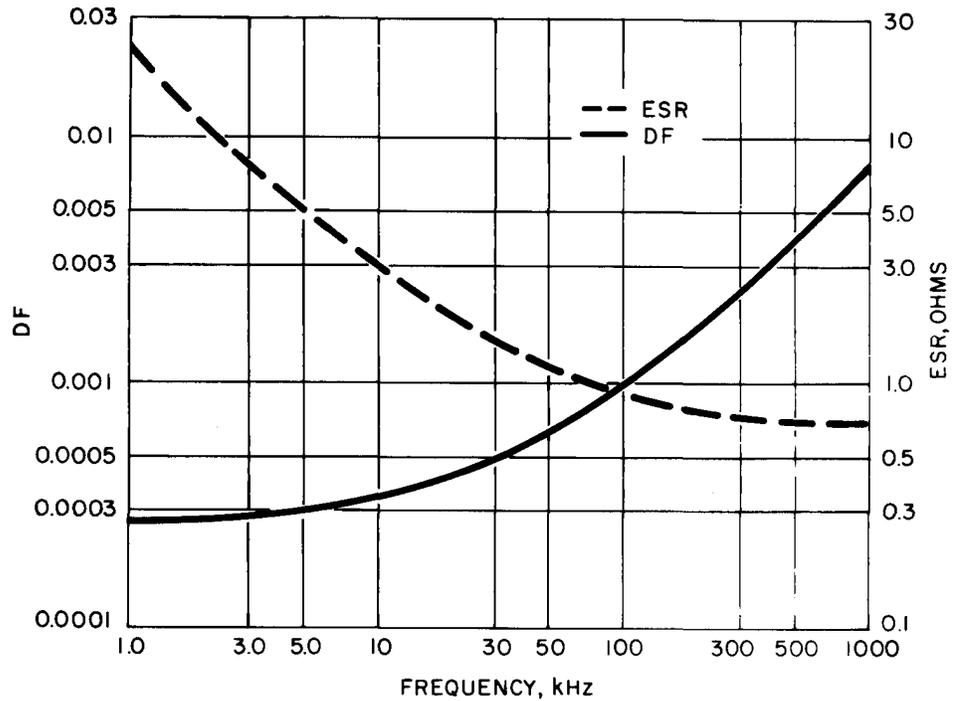
CAPACITANCE CHANGE VS FREQUENCY

SILICON
Characteristic Curves

Typical for 800A Capacitors



CAPACITANCE VS VOLTAGE



DISSIPATION FACTOR AND EQUIVALENT
 SERIES RESISTANCE VS FREQUENCY





VARIABLE
Basic Data

Basic Code	Type Code (Note)	Description	Capacitance Range		Max DC Working Voltage	Oper Temp Range °C	
			From	To		From	To
KS14195	Unique	Ceramic, Plate	1.5 pF	45 pF	500	-55	+85
KS16401	Unique	Glass, Piston	0.5 pF	12 pF	750	-55	+85
KS16698	Unique	Glass, Piston	0.8 pF	30 pF	500	-55	+85
KS19141	Unique	Ceramic, Plate	2.0 pF	35 pF	200	-55	+85
KS19374	Unique	Air, Plate	1.3 pF	30.6 pF	250	--	--
KS19772	Unique	Air, Piston	0.5 pF	30 pF	250	-40	+125

Note: Unique - one value per code number.
See GENERAL GUIDELINES section for more information.



VARIABLE
Application GuideGeneral Description

A variable capacitor is a unit whose capacitance value may be adjusted while it is installed in a circuit assembly. It is used for final tuning or trimming of the capacitance constants of the circuitry. Adjustment is generally made by a knob, screwdriver, or special adjustment tool acting on a rotatable shaft or adjustment screw. The change in capacitance is achieved by altering the amount of overlap between two electrode surfaces, by changing the spacing between the two surfaces, or by altering the amount of dielectric between the two surfaces.

Variable capacitors are available with a variety of dielectrics such as air, ceramic, glass, mica, quartz, Teflon, and a vacuum (those listed herein use air, ceramic, and glass).

Variable capacitors have two basic types of construction: open plate and piston (tubular). The plate variable generally covers its entire capacitance range by a single turn (or less) of its rotor shaft. The piston variable usually requires several rotations of its adjustment screw.

Features - Air Versus Ceramic

Air dielectric is used where linearity of capacitance and dissipation factor is required over a wide frequency range. Ceramic dielectric may be used where higher values of capacitance are desired and linearity over the frequency range is not as important.

Glass or quartz is generally used where higher voltage breakdown characteristics are desired.



VARIABLE
Physical Outlines

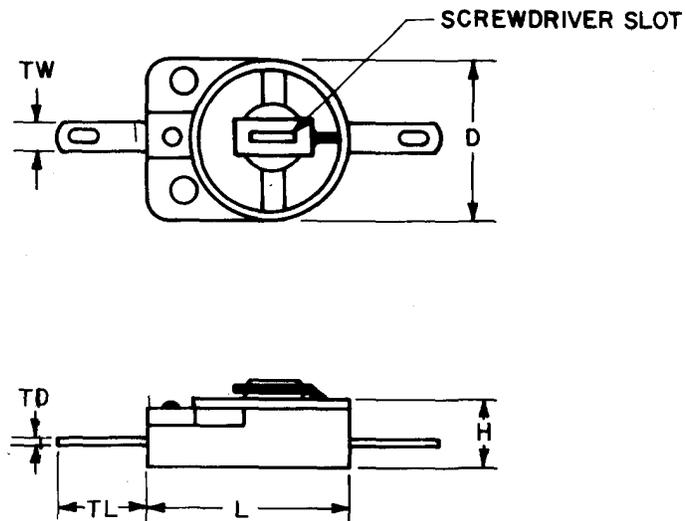


FIG. V01

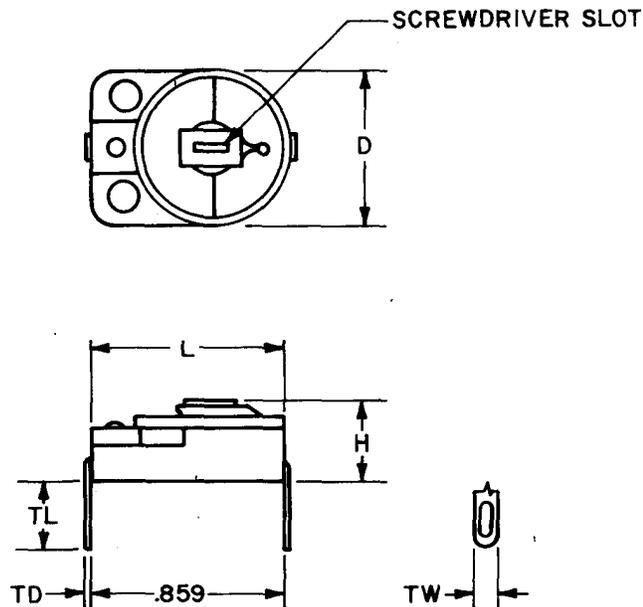


FIG. V02

VARIABLE
Physical Outlines

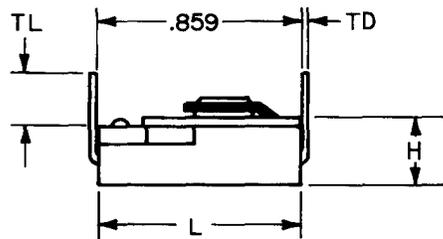
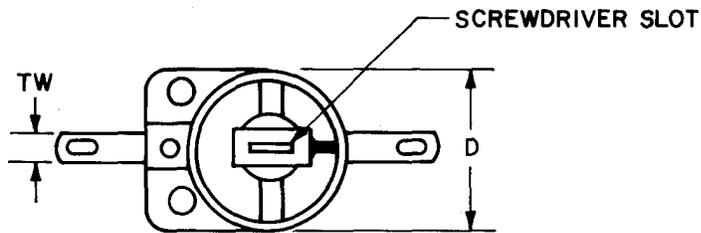


FIG. V03

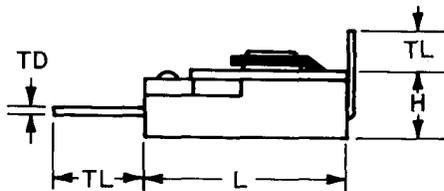
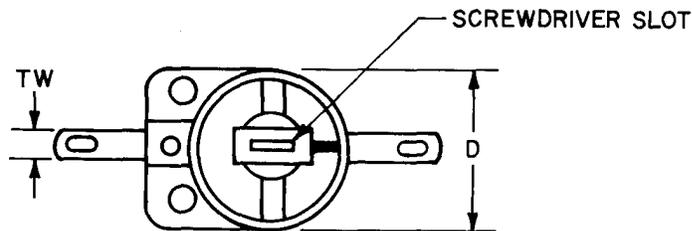
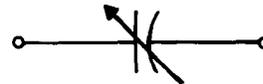


FIG. V04

VARIABLE
Physical Outlines

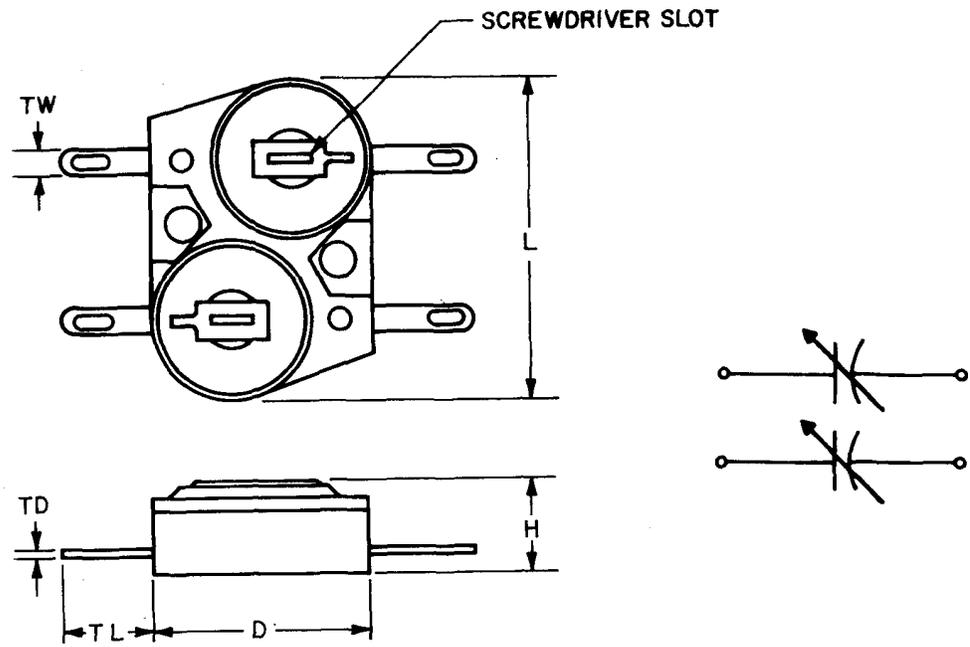


FIG. V05

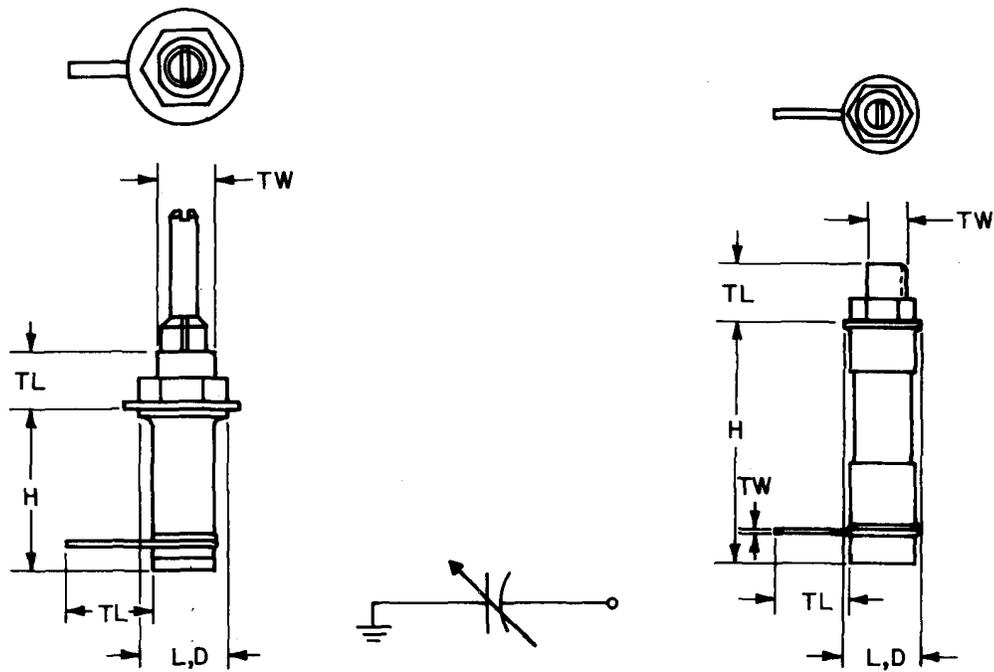
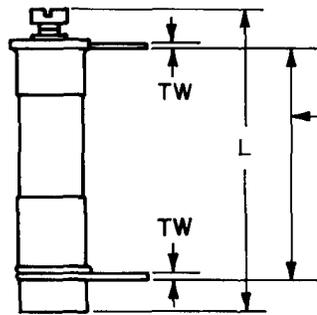
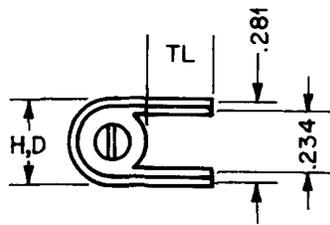


FIG. V06

FIG. V08

VARIABLE
Physical Outlines



KS19772 L02	.625
06	.250
07	.875
08	1.325
10	.438



FIG. V09

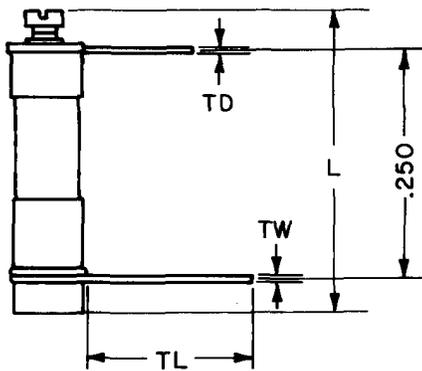
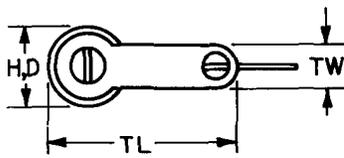


FIG. V10

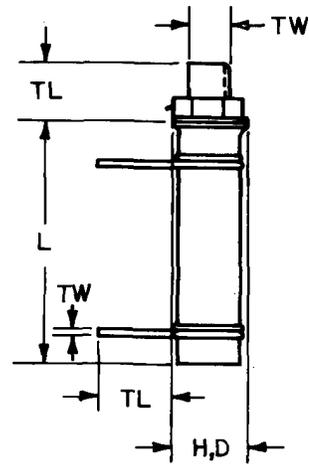


FIG. V11



VARIABLE
Physical Outlines

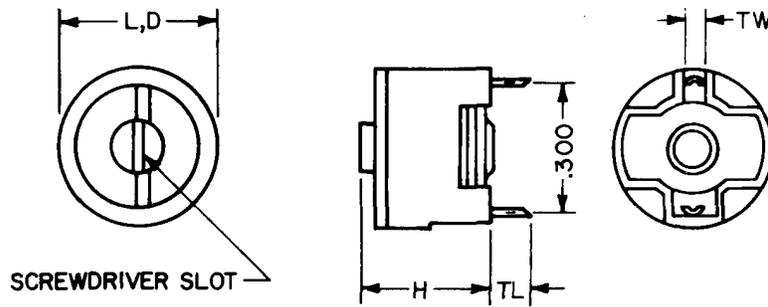


FIG. V12

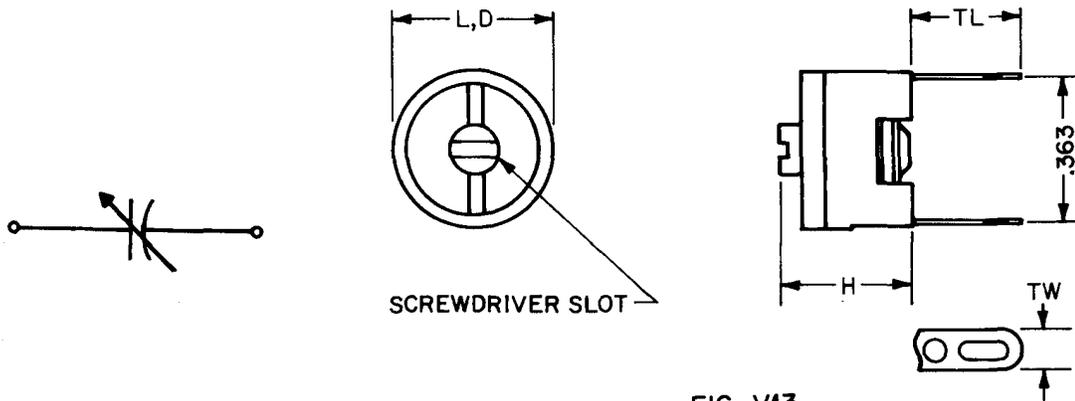


FIG. V13

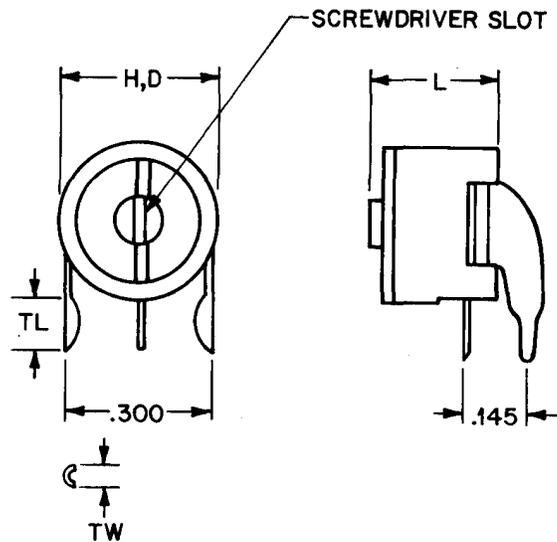


FIG. V14

VARIABLE
Physical Outlines

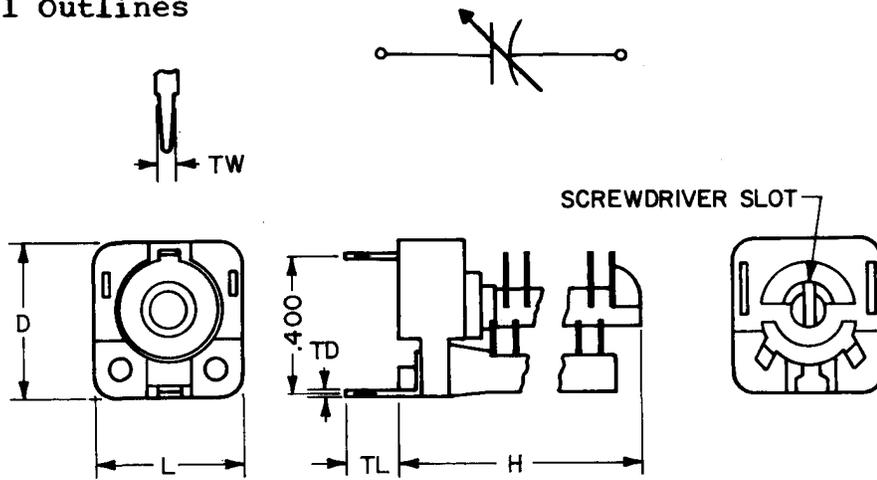


FIG. V15

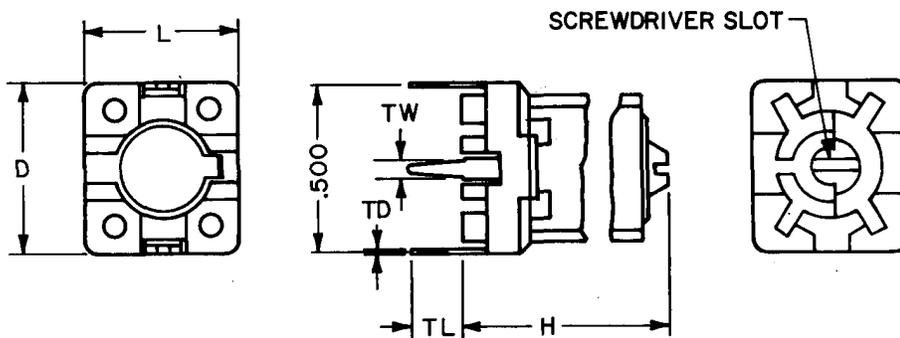


FIG. V16

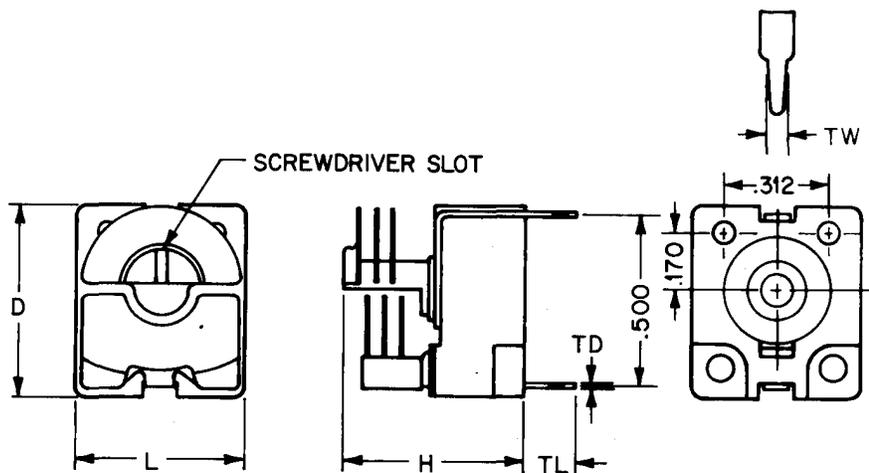


FIG. V17

VARIABLE
Physical Outlines

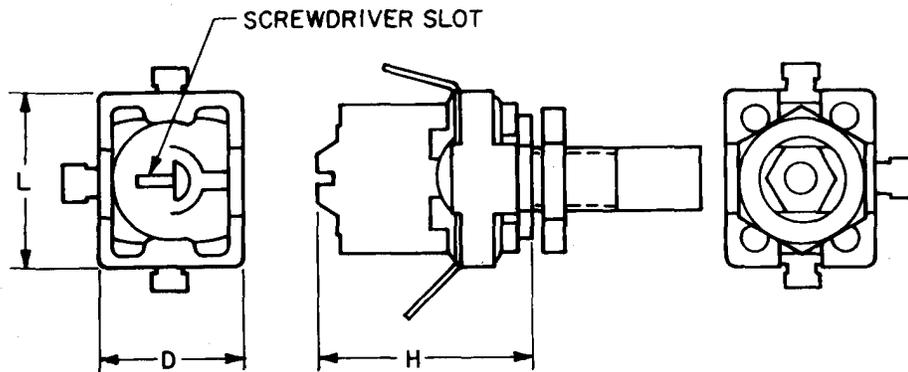


FIG. V18

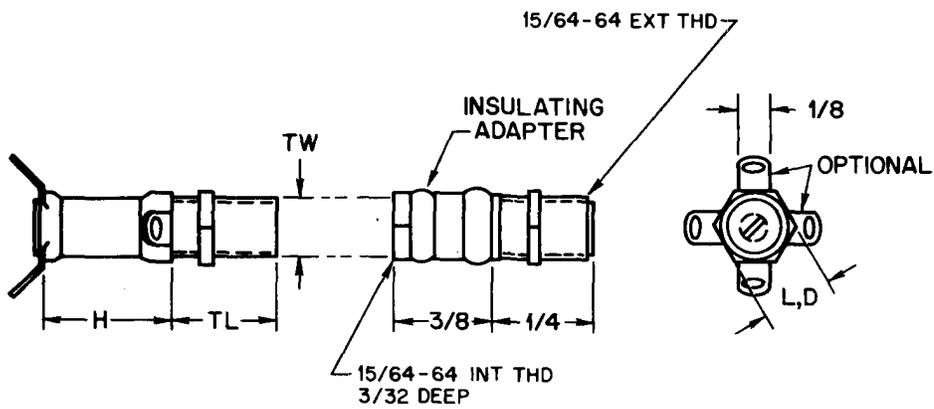


FIG. V19

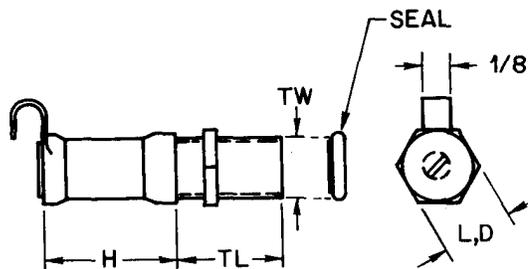


FIG. V20

VARIABLE
Physical Outlines

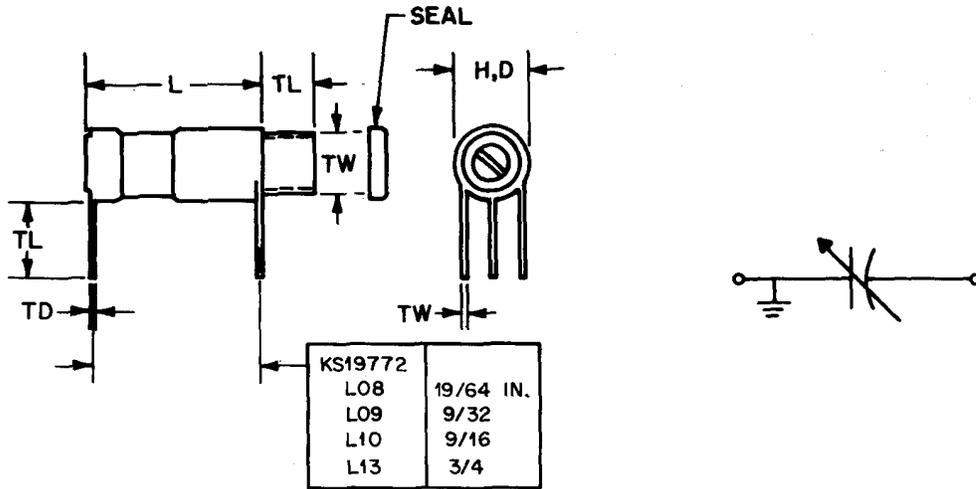


FIG. V21

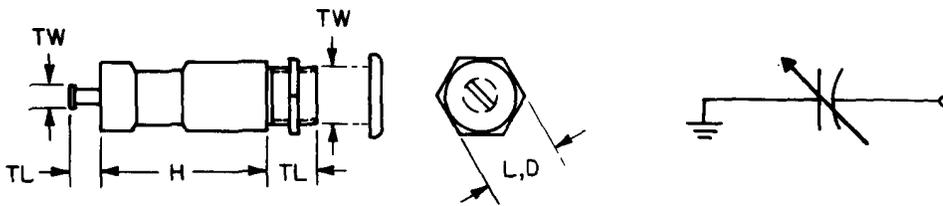


FIG. V22

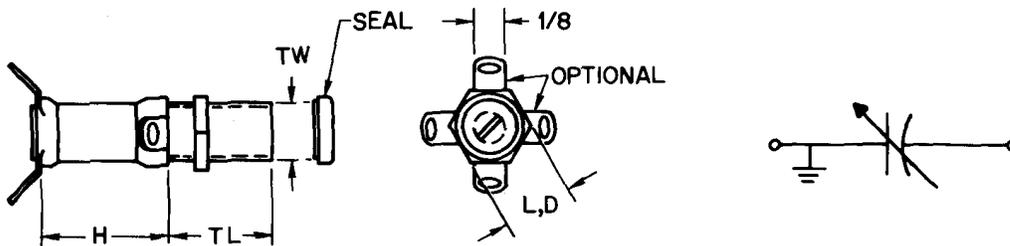


FIG. V23

VARIABLE
Physical Outlines

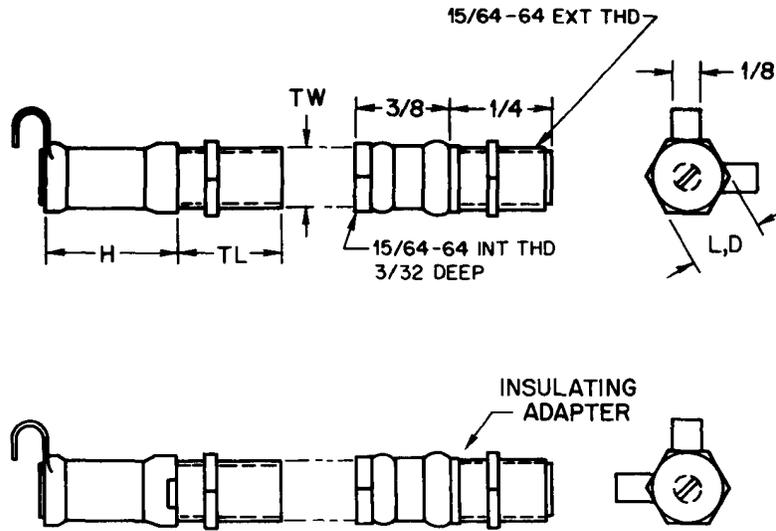


FIG. V24

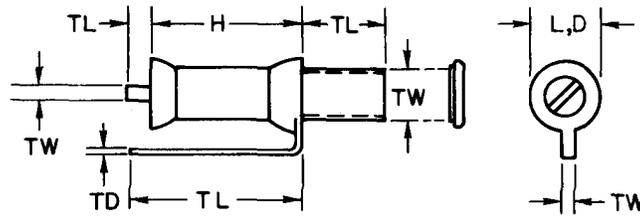


FIG. V25



TABLE 10.1

CAPACITANCE		DCWV	DIELECTRIC	FIG.	BODY SIZE (IN.)			TERM. TYPE	NO. OF TERMS.	TERM. SIZE (IN.)			CODE
MIN	MAX				L	H	D			TL	TW	TD	
0.5 PF	5 PF	250	AIR	V25	0.145	0.5	0.145	SOLDER	2	0.109	0.032		KS19772L15
								STUD	1	0.781	0.02	0.01	KS19772L15
0.5 PF	12 PF	750	GLASS	V06	0.375	1.016	0.375	RAD PT	1	2	0.025		KS16401L02
								EXT THD	1	0.25	0.25	28	KS16401L02
0.7 PF	9 PF	750	GLASS	V06	0.375	0.656	0.375	RAD PT	1	2	0.025		KS16401L01
								EXT THD	1	0.25	0.25	28	KS16401L01
0.8 PF	10 PF	250	AIR	V21	0.312	0.484	0.281	EXT THD	1	0.132	0.234	64	KS19772L08
								SOLDER	3	0.172	0.03	0.015	KS19772L08
0.8 PF	10 PF	250	AIR	V22	0.281	0.281	0.281	SOLDER	1	0.109	0.093		KS19772L11
								EXT THD	1	0.281	0.234	64	KS19772L11
0.8 PF	18 PF	500	GLASS	V08	0.312	1	0.312	EXT THD	1	0.25	0.19	32	KS16698L05
								RAD PT	1	2	0.025		KS16698L05
1 PF	14 PF	250	AIR	V20	0.281	0.281	0.281	SOLDER	1				KS19772L06
								EXT THD	1	0.149	0.234	64	KS19772L06
1 PF	14 PF	250	AIR	V24	0.281	0.296	0.281	SOLDER	2				KS19772L07
								EXT THD	1	0.132	0.234	64	KS19772L07
1 PF	14 PF	250	AIR	V21	0.312	0.468	0.312	EXT THD	1	0.132	0.234	64	KS19772L09
								SOLDER	3	0.172	0.03	0.015	KS19772L09
1 PF	14 PF	250	AIR	V22	0.281	0.281	0.281	SOLDER	1	0.109	0.093		KS19772L12
								EXT THD	1	0.281	0.218	0.281	KS19772L12
1 PF	20 PF	250	AIR	V21	0.312	0.75	0.312	EXT THD	1	0.132	0.234	64	KS19772L10
								SOLDER	3	0.172	0.03	0.015	KS19772L10
1 PF	20 PF	250	AIR	V22	0.281	0.5	0.281	SOLDER	1	0.109	0.093		KS19772L14
								EXT THD	1	0.21	0.234	64	KS19772L14
1 PF	30 PF	250	AIR	V23	0.281	0.515	0.281	SOLDER	2				KS19772L01
								EXT THD	1	0.368	0.234	64	KS19772L01
1 PF	30 PF	250	AIR	V19	0.281	0.515	0.281	SOLDER	2				KS19772L02
								EXT THD	1	0.368	0.234	64	KS19772L02
1 PF	30 PF	250	AIR	V23	0.281	0.515	0.281	SOLDER	4				KS19772L03
								EXT THD	1	0.368	0.234	64	KS19772L03
1 PF	30 PF	250	AIR	V19	0.281	0.515	0.281	SOLDER	4				KS19772L04
								EXT THD	1	0.368	0.234	64	KS19772L04
1 PF	30 PF	250	AIR	V24	0.281	0.515	0.281	EXT THD	1	0.368	0.234	64	KS19772L05
								SOLDER	1	0.368	0.234	64	KS19772L05
1 PF	30 PF	250	AIR	V21	0.937	0.281	0.281	EXT THD	1	0.132	0.234	64	KS19772L13
								SOLDER	3	0.172	0.03	0.015	KS19772L13
1.1 PF	4.5 PF	500	GLASS	V09	0.478	0.312	0.312	SOLDER	2	0.688	0.03		KS16698L06
								RAD PT	2	0.688	0.025		KS16698L06
1.1 PF	4.5 PF	500	GLASS	V10	0.448	0.21	0.21	RAD PT	1	1.5	0.025		KS16698L09
								SOLDER	1	0.688	0.14	0.02	KS16698L09
1.1 PF	8.5 PF	500	GLASS	V08	0.312	0.563	0.312	RAD PT	1	2	0.025		KS16698L03
								EXT THD	1	0.25	0.19	32	KS16698L03

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BELL SYSTEM STANDARD COMPONENTS - CAPACITORS

SHEET 1 OF 3
VARIABLE
(UNIQUE CODES)
ELECTRICAL & PHYSICAL DATA

TABLE 10.1
(CONT'D)

CAPACITANCE		DCWV	DIELECTRIC	FIG.	BODY SIZE (IN.)			TERM. TYPE	NO. OF TERMS.	TERM. SIZE (IN.)			CODE
MIN	MAX				L	H	D			TL	TW	TD	
1.1 PF	8.5 PF	500	GLASS	V11	0.312	0.563	0.312	RAD PT	2	2	0.025		KS16698L04
1.1 PF	8.5 PF	500	GLASS	V09	0.683	0.312	0.312	EXT THD	1	0.25	0.19	32	KS16698L04
1.1 PF	8.5 PF	500	GLASS	V09	0.683	0.312	0.312	SOLDER	2	1.5	0.025		KS16698L10
1.1 PF	12 PF	500	GLASS	V08	0.312	0.766	0.312	RAD PT	2	0.688	0.03		KS16698L10
1.1 PF	12 PF	500	GLASS	V08	0.312	0.766	0.312	RAD PT	1	2	0.025		KS16698L01
1.1 PF	12 PF	500	GLASS	V09	0.91	0.312	0.312	EXT THD	1	0.25	0.19	32	KS16698L01
1.1 PF	12 PF	500	GLASS	V09	0.91	0.312	0.312	SOLDER	2	0.688	0.03		KS16698L02
1.1 PF	18 PF	500	GLASS	V09	1.151	0.312	0.312	RAD PT	2	0.688	0.025		KS16698L02
1.1 PF	18 PF	500	GLASS	V09	1.151	0.312	0.312	RAD PT	2	0.688	0.025		KS16698L07
1.1 PF	30 PF	500	GLASS	V09	1.745	0.312	0.312	SOLDER	2	0.688	0.03		KS16698L07
1.1 PF	30 PF	500	GLASS	V09	1.745	0.312	0.312	SOLDER	2	0.688	0.03		KS16698L08
1.1 PF	30 PF	500	GLASS	V09	1.745	0.312	0.312	RAD PT	2	0.688	0.025		KS16698L08
1.3 PF	3.25 PF	250	AIR	V15	0.433	0.438	0.453	SOLDER	2	0.156	0.047	0.016	KS19374L01
1.4 PF	5.15 PF	250	AIR	V15	0.433	0.484	0.453	SOLDER	2	0.156	0.047	0.016	KS19374L02
1.5 PF	7 PF	500	CERAMIC	V02	0.854	0.375	0.656	SOLDER	2	0.219	0.1	0.016	KS14195L04
1.5 PF	7 PF	500	CERAMIC	V01	0.854	0.375	0.656	SOLDER	2	0.219	0.1	0.016	KS14195L09
1.54 PF	6.2 PF	250	AIR	V15	0.433	0.532	0.453	SOLDER	2	0.156	0.047	0.016	KS19374L03
1.65 PF	8.7 PF	250	AIR	V15	0.433	0.579	0.453	SOLDER	2	0.156	0.047	0.016	KS19374L04
1.74 PF	4.5 PF	250	AIR	V16	0.433	0.481	0.512	SOLDER	3				KS19374L18
1.74 PF	11.7 PF	250	AIR	V17	0.5	0.581	0.563	SOLDER	2	0.156	0.056	0.016	KS19374L10
1.76 PF	8.7 PF	250	AIR	V16	0.433	0.578	0.512	SOLDER	3				KS19374L07
1.85 PF	10.5 PF	250	AIR	V15	0.433	0.625	0.453	SOLDER	2	0.156	0.047	0.016	KS19374L05
1.85 PF	14.8 PF	250	AIR	V17	0.5	0.632	0.563	SOLDER	2	0.156	0.056	0.016	KS19374L11
1.98 PF	12.4 PF	250	AIR	V15	0.433	0.688	0.453	SOLDER	2	0.156	0.047	0.016	KS19374L06
2 PF	8 PF	200	CERAMIC	V13	0.375	0.31	0.375	SOLDER	2	0.275	0.093	0.012	KS19141L09
2 PF	8 PF	200	CERAMIC	V12	0.375	0.31	0.375	SOLDER	2	0.1	0.041		KS19141L15
2 PF	8 PF	200	CERAMIC	V14	0.375	0.31	0.375	SOLDER	3	0.125	0.041		KS19141L18
2.07 PF	4.77 PF	250	AIR	V18	0.512	0.532	0.433	SOLDER	3				KS19374L17
2.07 PF	18 PF	250	AIR	V17	0.5	0.683	0.563	SOLDER	2	0.156	0.056	0.016	KS19374L12
2.18 PF	20.1 PF	250	AIR	V17	0.5	0.734	0.563	SOLDER	2	0.156	0.056	0.016	KS19374L13
2.2 PF	13.5 PF	250	AIR	V15	0.433	0.734	0.453	SOLDER	2	0.156	0.047	0.016	KS19374L08
2.4 PF	15.3 PF	250	AIR	V15	0.433	0.781	0.453	SOLDER	2	0.156	0.047	0.016	KS19374L09
2.4 PF	24 PF	250	AIR	V17	0.5	0.785	0.563	SOLDER	2	0.156	0.056	0.016	KS19374L14
2.5 PF	11 PF	200	CERAMIC	V13	0.375	0.31	0.375	SOLDER	2	0.275	0.093	0.012	KS19141L03
2.5 PF	11 PF	200	CERAMIC	V14	0.375	0.31	0.375	SOLDER	3	0.125	0.041		KS19141L05
2.5 PF	11 PF	200	CERAMIC	V12	0.375	0.31	0.375	SOLDER	2	0.1	0.041		KS19141L07
2.5 PF	11 PF	200	CERAMIC	V13	0.375	0.31	0.375	SOLDER	2	0.275	0.093	0.012	KS19141L10
2.5 PF	11 PF	200	CERAMIC	V14	0.375	0.31	0.375	SOLDER	3	0.125	0.041		KS19141L12
2.51 PF	27.5 PF	250	AIR	V17	0.5	0.836	0.563	SOLDER	2	0.156	0.056	0.016	KS19374L15
2.62 PF	30.6 PF	250	AIR	V17	0.5	0.887	0.563	SOLDER	2	0.156	0.056	0.016	KS19374L16

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TABLE 10.1
(CONT'D)

CAPACITANCE		DCWV	DIELECTRIC	FIG.	BODY SIZE (IN.)			TERM. TYPE	NO. OF TERMS.	TERM. SIZE (IN.)			CODE
MIN	MAX				L	H	D			TL	TW	TD	
3 PF	12 PF	500	CERAMIC	V01	0.854	0.375	0.656	SOLDER	2	0.219	0.1	0.016	KS14195L02
3 PF	13 PF	500	CERAMIC	V01	0.854	0.375	0.656	SOLDER	2	0.219	0.1	0.016	KS14195L10
4 PF	30 PF	500	CERAMIC	V01	0.854	0.375	0.656	SOLDER	2	0.219	0.1	0.016	KS14195L11
5 PF	20 PF	500	CERAMIC	V01	0.854	0.375	0.656	SOLDER	2	0.219	0.1	0.016	KS14195L03
5 PF	20 PF	500	CERAMIC	V02	0.854	0.375	0.656	SOLDER	2	0.219	0.1	0.016	KS14195L06
5 PF	20 PF	500	CERAMIC	V01	0.854	0.375	0.656	SOLDER	2	0.219	0.1	0.016	KS14195L12
5.5 PF	18 PF	200	CERAMIC	V12	0.375	0.31	0.375	SOLDER	2	0.1	0.041		KS19141L04
5.5 PF	18 PF	200	CERAMIC	V14	0.375	0.31	0.375	SOLDER	3	0.125	0.041		KS19141L06
5.5 PF	18 PF	200	CERAMIC	V13	0.375	0.31	0.375	SOLDER	2	0.275	0.093	0.012	KS19141L08
5.5 PF	18 PF	200	CERAMIC	V12	0.375	0.31	0.375	SOLDER	2	0.1	0.041		KS19141L11
7 PF	25 PF	200	CERAMIC	V13	0.375	0.31	0.375	SOLDER	2	0.275	0.093	0.012	KS19141L01
7 PF	25 PF	200	CERAMIC	V12	0.375	0.31	0.375	SOLDER	2	0.1	0.041		KS19141L16
7 PF	25 PF	200	CERAMIC	V14	0.375	0.31	0.375	SOLDER	3	0.125	0.041		KS19141L17
7 PF	45 PF	500	CERAMIC	V03	0.854	0.375	0.656	SOLDER	2	0.344	0.1	0.016	KS14195L01
7 PF	45 PF	500	CERAMIC	V02	0.854	0.375	0.656	SOLDER	2	0.219	0.1	0.016	KS14195L05
7 PF	45 PF	500	CERAMIC	V04	0.854	0.375	0.656	SOLDER	2	0.219	0.1	0.016	KS14195L07
7 PF	45 PF	500	CERAMIC	V02	0.854	0.375	0.656	SOLDER	2	0.219	0.1	0.016	KS14195L08
7 PF	45 PF	500	CERAMIC	V01	0.854	0.375	0.656	SOLDER	2	0.219	0.1	0.016	KS14195L13
9 PF	35 PF	200	CERAMIC	V13	0.375	0.31	0.375	SOLDER	2	0.275	0.093	0.012	KS19141L02
9 PF	35 PF	200	CERAMIC	V14	0.375	0.31	0.375	SOLDER	3	0.125	0.041		KS19141L13
9 PF	35 PF	200	CERAMIC	V12	0.375	0.31	0.375	SOLDER	2	0.1	0.041		KS19141L14

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BELL SYSTEM STANDARD COMPONENTS - CAPACITORS

SHEET 3 OF 3
VARIABLE
(UNIQUE CODES)
ELECTRICAL & PHYSICAL DATA







APPARATUS CODES
Index

This index lists the preferred Apparatus-Coded capacitors. It indicates the name of the catalog section, and the numbers of the electrical and physical data tables within the section, where detailed information about a specific capacitor may be found.

<u>App Code</u>	<u>Section</u>	<u>Table(s)</u>
535	PLASTIC	8.1
542		8.1
570		8.20
577		8.21, 8.24
578		8.21, 8.24
579		8.1
580		8.1
594		8.8, 8.9
596		8.2, 8.3
600	ELECTROLYTIC	5.1
601		
602		
603		
604		
605		
606		
607		
608		
609		
610		
611		
612		
701	PLASTIC	8.2, 8.4
702		8.2, 8.5, 8.6
705		8.2, 8.6
715		8.1
719		8.21, 8.22
722		8.7
725		8.21, 8.23
727		8.18, 8.19
800	SILICON	No
801		electrical
802		and
803		physical data
804		tables
805		available







KS SPECIFICATIONS
Index

This index lists the preferred KS-Specification capacitors. It indicates the name of the catalog section, and the numbers of the electrical and physical data tables within the section, where detailed information about a specific capacitor may be found.

<u>KS Spec</u>	<u>Section</u>	<u>Table(s)</u>
13365	MICA	6.1
13367	MICA	6.1
13368	MICA	6.1
13807	PAPER	7.1
13814	PLASTIC	8.7
13815	PLASTIC	8.7
14056	MICA	6.1
14057	MICA	6.1
14058	MICA	6.1
14081	PLASTIC	8.7
14195	VARIABLE	10.1
14228	MICA	6.1
14289	PLASTIC	8.7
14290	PLASTIC	8.7
14420	PLASTIC	8.7
14570	PAPER	7.1
14571	PAPER	7.1
14658	PAPER	7.1
14659	PAPER	7.1
14660	PAPER	7.1
14733	PAPER	7.1
14755	PAPER	7.1
14980	PAPER	7.1
14981	PAPER	7.1
16048	CERAMIC	4.1
16390	ELECTROLYTIC	5.1
16401	VARIABLE	10.1
16456	MICA	6.3, 6.4, 6.5
16509	MICA	6.2
16591	MICA	6.3, 6.6, 6.7
16698	VARIABLE	10.1
16742	MICA	6.3, 6.8, 6.9
16862	PLASTIC	8.8, 8.17
16958	MICA	6.3, 6.10, 6.11

KS SPECIFICATIONS
Index

<u>KS Spec</u>	<u>Section</u>	<u>Table(s)</u>
19066	PAPER	7.2, 7.3
19067	PAPER	7.2, 7.4
19090	PLASTIC	8.7
19141	VARIABLE	10.1
19347	PAPER	7.1
19374	VARIABLE	10.1
19524	ELECTROLYTIC	5.1
19658	ELECTROLYTIC	5.1
19765	CERAMIC	4.2
19772	VARIABLE	10.1
19953	CERAMIC	4.1
19774	CERAMIC	4.2
20133	ELECTROLYTIC	5.1
20299	MICA	6.3, 6.12 - 6.14
20300	PLASTIC	8.8, 8.10 - 8.12
20302	PAPER	7.1
20423	ELECTROLYTIC	5.1
20443	ELECTROLYTIC	5.1
20446	ELECTROLYTIC	5.1
20480	CERAMIC	4.1
20505	CERAMIC	4.2
20506	CERAMIC	4.2
20588	PAPER	7.1
20609	CERAMIC	4.2
20676	CERAMIC	4.2
20688	CERAMIC	4.1
20736	CERAMIC	4.2
20787	CERAMIC	4.2
20813	MICA	6.1
20977	PLASTIC	8.8, 8.13 - 8.16





NONPREFERRED

The following is a partial list of capacitors which are considered nonpreferred by the engineering consultants listed in the Consultants section of this manual. In some cases there are replacements recommended for new design. If a question arises concerning the use of items in this list, it is suggested that the check list (also in the Consultants section) be used to aid in referring the problems to the responsible consultant.

CODE	SECTION	REPLACED BY	CODE	SECTION	REPLACED BY
KS01310	VARIABLE	NO REPL	KS0867A	ELECT ALUM	MD NO REPL
KS01359	VARIABLE	NO REPL	KS08679	ELECT ALUM	MD NO REPL
KS01375	VARIABLE	NO REPL	KS08892	PAPER	NO REPL
KS02905	VARIABLE	NO REPL	KS08951	CERAMIC	NO REPL
KS02906	VARIABLE	NO REPL	KS08983	PAPER	NO REPL
KS02907	VARIABLE	NO REPL	KS09053	CERAMIC	NO REPL
KS02929	VARIABLE	NO REPL	KS09349	ELECT ALUM	MD NO REPL
KS03085	VARIABLE	NO REPL	KS09485	MICA	NO REPL
KS06016	VARIABLE	NO REPL	KS0956A	CERAMIC	NO REPL
KS06026	VARIABLE	NO REPL	KS0958A	VARIABLE	KS14195
KS06027	VARIABLE	NO REPL	KS09679	PAPER	NO REPL
KS0602A	VARIABLE	NO REPL	KS09A18	PAPER	NO REPL
KS06061	VARIABLE	NO REPL	KS09A50	PAPER	NO REPL
KS06456	VARIABLE	NO REPL	KS09A89	PAPER	NO REPL
KS06847	ELECT ALUM	MD NO REPL	KS09943	MICA	NO REPL
KS07151	MICA	NO REPL	KS09968	ELECT ALUM	MD NO REPL
KS07480	ELECT ALUM	MD NO REPL	KS10135	VARIABLE	NO REPL
KS07481	ELECT ALUM	MD NO REPL	KS13010	ELECT ALUM	MD NO REPL
KS07550	VARIABLE	NO REPL	KS13013	ELECT ALUM	MD NO REPL
KS07599	VARIABLE	NO REPL	KS13014	ELECT ALUM	MD NO REPL
KS07611	VARIABLE	NO REPL	KS13016	ELECT ALUM	MD NO REPL
KS07757	VARIABLE	NO REPL	KS13074	PAPER	NO REPL
KS07763	ELECT ALUM	NO REPL	KS13140	ELECT ALUM	MD NO REPL
KS07868	ELECT ALUM	KS19658L19	KS13178	ELECT ALUM	MD NO REPL
KS08036	ELECT ALUM	MD NO REPL	KS13221	ELECT ALUM	MD NO REPL
KS08045	ELECT ALUM	MD NO REPL	KS13222	ELECT ALUM	MD NO REPL
KS08062	VARIABLE	NO REPL	KS13309	ELECT ALUM	NO REPL
KS08063	VARIABLE	NO REPL	KS13321	ELECT ALUM	NO REPL
KS08066	VARIABLE	NO REPL	KS13337	ELECT ALUM	MD NO REPL
KS08067	VARIABLE	NO REPL	KS13338	ELECT ALUM	MD NO REPL
KS08073	VARIABLE	NO REPL	KS13348	PAPER	NO REPL
KS08074	VARIABLE	NO REPL	KS13457	PAPER	NO REPL
KS08075	CERAMIC	NO REPL	KS13460	PAPER	NO REPL
KS08137	VARIABLE	NO REPL	KS13461	PAPER	NO REPL
KS08159	VARIABLE	NO REPL	KS13477	CERAMIC	NO REPL
KS08221	VARIABLE	NO REPL	KS13479	CERAMIC	NO REPL
KS08222	VARIABLE	NO REPL	KS13480	CERAMIC	NO REPL
KS08276	VARIABLE	NO REPL	KS13481	CERAMIC	NO REPL
KS08339	VARIABLE	NO REPL	KS13482	MICA	NO REPL
KS08364	VARIABLE	NO REPL	KS13552	PAPER	NO REPL
KS08431	VARIABLE	NO REPL	KS13555	PAPER	NO REPL
KS08432	VARIABLE	NO REPL	KS13614L01	PAPER	KS14290L02
KS08534	VARIABLE	NO REPL	KS13614L02	PAPER	KS20300L09
KS08545	PAPER	NO REPL	KS13614L03	PAPER	KS20300L09
KS08622	PAPER	NO REPL	KS13614L04	PAPER	KS20300L06
KS08669	ELECT ALUM	MD NO REPL	KS13614L05	PAPER	KS20300L09
KS08671	ELECT ALUM	MD NO REPL	KS13614L06	PAPER	KS20300L03
KS08673	ELECT ALUM	MD NO REPL	KS13616	PAPER	NO REPL
KS08676	ELECT ALUM	MD NO REPL	KS13617	PAPER	NO REPL
KS08677	ELECT ALUM	MD NO REPL	KS13664	PAPER	NO REPL

NONPREFERRED

CODE	SECTION	REPLACED BY	CODE	SECTION	REPLACED BY
KS13669	PLASTIC	NO REPL	KS1604AL05	CERAMIC	NO REPL
KS13672	ELECT ALUM	NO REPL	KS16057	ELECT TANT	NO REPL
KS13764	CERAMIC	NO REPL	KS16154L01	MICA	KS14056L31
KS13824	ELECT ALUM	NO REPL	KS16172L01	MICA	KS13365L32
KS13A25	ELECT ALUM	NO REPL	KS16177L01	MICA	KS13367L32
KS13A26	ELECT ALUM	NO REPL	KS16181L01	MICA	KS13365L31
KS13A49L01	PAPER	KS20300L02	KS16181L02	MICA	KS13365L31
KS13A49L02	PAPER	KS13814L10	KS16262	PAPER	KS20300
KS13A49L03	PAPER	KS20300L08	KS16263	PAPER	KS20300
KS13A49L04	PAPER	KS14290L03	KS16264	PAPER	KS20300
KS13A49L05	PAPER	KS13814L10	KS16391	PAPER	NO REPL
KS14050	CERAMIC	NO REPL	KS16448	CERAMIC	NO REPL
KS14052	CERAMIC	NO REPL	KS16449	CERAMIC	NO REPL
KS14054	CERAMIC	NO REPL	KS16480L01	MICA	KS13367L32
KS14055	CERAMIC	NO REPL	KS16509L04	MICA	NO REPL
KS14061	CERAMIC	NO REPL	KS16509L05	MICA	NO REPL
KS14062	CERAMIC	NO REPL	KS16509L08	MICA	NO REPL
KS14063	CERAMIC	NO REPL	KS16509L09	MICA	NO REPL
KS14064	CERAMIC	NO REPL	KS16509L10	MICA	NO REPL
KS14070	CERAMIC	NO REPL	KS16509L11	MICA	NO REPL
KS14092	ELECT ALUM	NO REPL	KS16509L12	MICA	NO REPL
KS14120	CERAMIC	NO REPL	KS16509L13	MICA	NO REPL
KS14138	PAPER	KS20300	KS16509L14	MICA	NO REPL
KS14139	PAPER	KS20300	KS16509L15	MICA	NO REPL
KS14140	PAPER	KS20300	KS16509L16	MICA	NO REPL
KS14141	PAPER	KS20300	KS16509L18	MICA	NO REPL
KS14142	PAPER	KS20300	KS16509L21	MICA	NO REPL
KS14143	PAPER	KS20300	KS16509L22	MICA	NO REPL
KS14144	PAPER	KS20300	KS16509L23	MICA	NO REPL
KS1414AL01	CERAMIC	KS16048L01	KS16509L24	MICA	NO REPL
KS1414AL02	CERAMIC	KS16048L06	KS16509L25	MICA	NO REPL
KS1414AL03	CERAMIC	KS16048L06	KS16509L26	MICA	NO REPL
KS1414AL04	CERAMIC	KS16048L04	KS16514	CERAMIC	NO REPL
KS14149L02	CERAMIC	KS16048L04	KS16630	CERAMIC	NO REPL
KS14337	ELECT TANT	NO REPL	KS16777	MICA	NO REPL
KS14412	CERAMIC	NO REPL	KS16A02L01	CERAMIC	KS16048L06
KS14477	ELECT TANT	NO REPL	KS16A02L02	CERAMIC	KS16048L07
KS14504	ELECT TANT	NO REPL	KS16A02L03	CERAMIC	NO REPL
KS14526	CERAMIC	NO REPL	KS19204L01	CERAMIC	NO REPL
KS14544	CERAMIC	NO REPL	KS19204L02	CERAMIC	NO REPL
KS14612	CERAMIC	NO REPL	KS19204L03	CERAMIC	KS19765L06
KS14620	VARIABLE	NO NO REPL	KS19204L04	CERAMIC	NO REPL
KS14623	CERAMIC	NO REPL	KS19204L05	CERAMIC	NO REPL
KS14987L12	MICA	KS14056	KS19204L07	CERAMIC	KS19765L07
KS14987L04	MICA	KS14056	KS19204L08	CERAMIC	KS19765L08
KS14987L07	MICA	KS14056	KS19204L09	CERAMIC	KS19765L09
KS14987L11	MICA	KS14056	KS19204L10	CERAMIC	KS19765L10
KS14988L07	MICA	KS13365	KS19204L11	CERAMIC	KS19765L11
KS14988L11	MICA	KS13365	KS19204L12	CERAMIC	KS19765L12
KS14988L12	MICA	KS13365	KS19204L13	CERAMIC	KS19765L13
KS14989L07	MICA	KS13368	KS1945A	ELECT TANT	NO REPL
KS14989L11	MICA	KS13368	KS19484	CERAMIC	NO REPL
KS14989L12	MICA	KS13368	KS19766L03	PAPER	NO REPL
KS15114L01	CERAMIC	NO REPL	KS19774L03	CERAMIC	KS19774L01
KS15114L02	CERAMIC	NO REPL	KS19774L04	CERAMIC	KS19774L02
KS16041	ELECT TANT	NO REPL	KS19A27	ELECT ALUM	NO REPL
KS1604AL02	CERAMIC	KS16048L06	KS20362	ELECT TANT	NO REPL
KS1604AL03	CERAMIC	KS16048L06			





STANDARD VALUES

In order to keep the number of purchase orders for odd values of capacitors to a minimum and to facilitate manufacture, stocking, and maintenance, certain specific values have been chosen as preferred. It is recommended that only those values shown in the standard value table below be selected. Only the first three significant figures are listed. Any decimal point should be placed where required and/or zeros added, as necessary. The codes shown below (CBSP01, etc) are referenced in the tables of electrical and physical data in the capacitor-type sections.

Bell System Preferred Values

CBSP01 ($\pm 1/2\%$ or $\pm 1\%$)				CBSP02 ($\pm 2\%$)	
100	182	332	604	100	332
101	184	336	612	102	340
102	187	340	619	105	348
104	189	344	626	107	357
105	191	348	634	110	365
106	193	352	642	113	374
107	196	357	649	115	383
109	198	361	657	118	392
110	200	365	665	121	402
111	203	370	673	124	412
113	205	374	681	127	422
114	208	379	690	130	432
115	210	383	698	133	442
117	213	388	706	137	453
118	215	392	715	140	464
120	218	397	723	143	475
121	221	402	732	147	487
123	223	407	741	150	499
124	226	412	750	154	511
126	229	417	759	158	523
127	232	422	768	162	536
129	234	427	777	165	549
130	237	432	787	169	562
132	240	437	796	174	576
133	243	442	806	178	590
135	246	448	816	182	604
137	249	453	825	187	619
138	252	459	835	191	634
140	255	464	845	196	649
142	258	470	856	200	665
143	261	475	866	205	681
145	264	481	876	210	698
147	267	487	887	215	715
149	271	493	898	221	732
150	274	499	909	226	750
152	277	505	920	232	768
154	280	511	931	237	787
156	284	517	942	243	806
158	287	523	953	249	825
160	291	530	965	255	845
162	294	536	976	261	866
164	298	542	988	267	887
165	301	549		274	909
167	305	556		280	931
169	309	562		287	953
172	312	569		294	976
174	316	576		301	
176	320	583		309	
178	324	590		316	
180	328	597		324	

STANDARD VALUES

<u>CBSPO5 (+5%)</u>		<u>CBSPI0 (+10%)</u>	<u>CBSPP0 (+20%)</u>
100	316	100	100
105	332	110	121
110	348	121	147
115	365	133	178
121	383	147	215
127	402	162	261
133	422	178	316
140	442	196	383
147	464	215	464
154	487	237	562
162	511	261	681
169	536	287	825
178	562	316	
187	590	348	
196	619	383	
205	649	422	
215	681	464	
226	715	511	
237	750	562	
249	787	619	
261	825	681	
274	866	750	
287	909	825	
301	953	909	

EAI Preferred Values

<u>CEIA05 (+5%)</u>		<u>CEIA10 (+10%)</u>	<u>CEIA20 (+20%)</u>
100	330	100	100
110	360	120	150
120	390	150	220
130	430	180	330
150	470	220	470
160	510	270	680
180	560	330	
200	620	390	
220	680	470	
240	750	560	
270	820	680	
300	910	820	

Miscellaneous Codes

C00000 - This code indicates capacitance values may be ordered to any three significant figures.

<u>C00001</u>	<u>C00002</u>	<u>C00003</u>	<u>C00004</u>
100	100	220	100
220	470	470	220
			470





GLOSSARY
Definitions of Terms

Admittance - Reciprocal of impedance (see formula).

Anode - Positive electrode of an electrolytic capacitor.

Anodic Film - Insulating oxide film formed electrochemically on the surface of a metal, which serves as an anode.

Applied Capacitor - Discrete capacitor attached to integrated circuit or printed wiring board. One without leads may be called a chip.

Axial Lead - A lead which extends out of a capacitor along a lengthwise axis of symmetry.

Borate Electrolyte - The most commonly used electrolyte, with temperature capability ranging from -20 to +65°C (although commercially rated to +85°C).

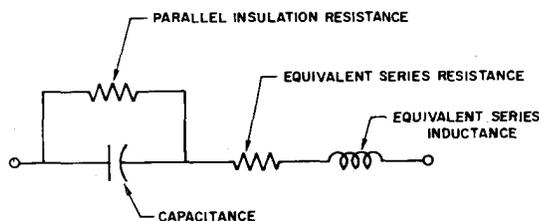
Capacitance (C) - A measure of the ability of a capacitor to store an electrical charge or energy when a given voltage (dc) is applied [e.g., a capacitor having a capacitance of 1 farad (F) can store 1 coulomb of charge or 1/2 watt-second of energy for 1 volt under standard ambient conditions]. In this catalog, capacitance values are expressed in units as follows:

Picofarads (pF): 0 F to 1×10^{-8} F (0 through 9,999 pF)

Microfarads (uF): 1×10^{-6} F to 1×10^{-4} F
(0.01 through 9,999 uF)

Capacitance values are specified for initial manufacture and test conditions at 25°C.

Capacitor, Equivalent Circuit - Internal circuit elements in a capacitor that cause it to deviate from a pure capacitive element in a circuit.



GLOSSARY

Definitions of Terms

Cathode - Negative electrode of an electrolytic capacitor.

Chip - See Appliqued Capacitor.

Computer Grade - Type of capacitor designed to be used with computers, where there is need for high reliability.

Conductance - Inverse of resistance; real part of admittance (see formula).

Corona - Electrical discharge resulting from ionization of gas within or on the surface of a capacitor.

Dielectric - The insulating material (e.g., paper, air, mica, etc) between the electrodes of a capacitor.

Dielectric Absorption - Property of a dielectric whereby a capacitor does not completely discharge when temporarily short-circuited; upon removal of a short circuit, a voltage gradually reappears between the capacitor electrodes.

Dielectric Breakdown - A disruptive discharge through insulation under electrical stress.

Dielectric Constant - Ratio of the capacitance of a capacitor with a given dielectric to the capacitance of a vacuum capacitor with the same electrode geometry.

Dielectric Loss - Energy dissipated in a dielectric subjected to a changing electric field or a steady state field.

Dimethyl Formamide (DMF) - An organic low resistivity electrolyte with temperature capability ranging from -55 to +85°C. (With adequate sealing, can be used in an ambient temperature of 125°C.)

Dipole - Two electric charges of equal magnitude but opposite polarity separated by a fixed distance. In dielectric materials, dipoles are separated by distances of molecular proportions.

Disc Capacitor - Capacitor made in disc shape. Principal application is single layer ceramics.

GLOSSARY
Definitions of Terms

Dissipation Factor (DF) - A method of expressing how far a capacitor deviates from being a pure capacitive element in a circuit. [See Quality Factor (Q) and Power Factor (PF) for alternative methods. See also Capacitor, Equivalent Circuit.] A measure of the ac loss of a capacitor; the ratio of the conductance to the susceptance.

$$DF = \frac{\text{equivalent series resistance}}{\text{capacitive reactance}} = \frac{1}{Q} \approx PF$$

Distributed Network - Network in which capacitance, resistance, and/or inductance are incorporated as an infinite number of incremented elements.

Dry Electrolytic - A type of aluminum foil capacitor in which a paper separator, impregnated with the electrolyte, acts as the connection between the oxide dielectric and the cathode foil.

Electrode - Capacitor electrodes are the conductors separated by the dielectric.

Electrolyte - In an electrolytic capacitor, the ionically conducting solution that provides low-resistance contact between the oxide dielectric and the metallic cathode.

Electrolytic Capacitor - Capacitor in which the dielectric is an insulating oxide formed by electrolytic oxidation (anodization) of such metals as aluminum or tantalum.

Equivalent Series Resistance (ESR) - Expression of the loss of a capacitor as the equivalent lumped resistance which appears in series with the capacitance.

Extended Foil Construction - Wound capacitor structure in which the electrode foil edges extend beyond the edge of the dielectric so that terminals can be attached to all turns without the use of tabs. (Compare with Inserted Tab Construction.)

Feed-Through Capacitor - Three-terminal capacitor in which two terminals are inserted in the line and the third one is connected to ground; the capacitance is between the line and ground.

GLOSSARY

Definitions of Terms

Ferroelectric - Dielectric material in which domains polarize spontaneously in a manner analogous to magnetic domains in ferromagnetic material.

High-K Ceramic - Capacitor in which the ceramic dielectric of high dielectric constant is a ferroelectric material.

Impedance - Opposition to the flow of ac current (see formula).

Impregnant - Liquid or solid dielectric material used to fill the voids and interstices in paper or other porous dielectrics in order to improve dielectric breakdown strength and stability, and increase capacitance.

Inserted Tab Construction - Capacitor construction in which flat metal strips, laid against the wound electrodes, are used to make connections to them. (Compare with Extended Foil Construction.)

Insulation Resistance (IR) - Measure of both volume and surface resistance of a material. In capacitors, dc resistance between terminals.

Insulator - Material that essentially does not conduct the flow of electricity. Materials having a resistivity greater than 10^9 ohm-cm are commonly considered to be insulators.

Integrated Capacitor - Capacitor structurally integral with other elements in a circuit.

Leakage Current - Direct current passed by the capacitor.

Life Test - A test usually performed at accelerated conditions of temperature and voltage to obtain a measure of the duration of serviceability of the capacitor.

Margin - The insulating band beyond the edge of electrodes of a capacitor.

Metalized Dielectric - A dielectric which bears an electrode that is formed by the deposition of a thin adherent film of metal.

GLOSSARY
Definitions of Terms

Monolithic - A construction for ceramic capacitors in which alternate layers of ceramic and electrodes are fired to form an integral structure.

Nonpolar - A capacitor in which dc voltage may be applied in either direction. Nonpolar electrolytics comprise two electrolytic capacitors connected cathode to cathode. Electrolytics may be made nonpolar by this method of connection.

Parallel Measurement - A measurement of capacitance and loss in which the unknown is represented by a capacitance and conductance connected in parallel.

Parasitics - Capacitance, inductance, and resistance which occur unintentionally in circuitry. Parasitics are very difficult to predict and usually must be determined experimentally.

Pigtail (PT) - An extended lead of solid or stranded wire. Used in combination with the term Axial or Radial.

Polar Capacitor - Electrolytic capacitor whose terminals are distinguishable as anode and cathode. When dc voltage is applied to such a capacitor, the anode must always be positive with respect to the cathode.

Polarization - Rearrangement, under the influence of an electric field, of the charges that comprise a dielectric material. Because of this rearrangement, all dielectric materials have a dielectric constant greater than unity.

Power Factor (PF) - A method of expressing how far a capacitor deviates from being a pure capacitive element in a circuit. [See Dissipation Factor (DF) and Quality Factor (Q) for alternative methods. See also Capacitor, Equivalent Circuit.] The ratio of real power to reactive power (see reference formula).

$$PF = \frac{\text{equivalent series resistance}}{\text{impedance of equivalent circuit}} \approx DF, \frac{1}{Q}$$

Quality Factor (Q) - A method of expressing how close a capacitor comes to being a pure capacitive element in a circuit. [See Dissipation Factor (DF) and Power Factor (PF)

GLOSSARY

Definitions of Terms

for alternative methods. See also Capacitor, Equivalent Circuit.]

$$Q = \frac{\text{capacitive reactance}}{\text{equivalent series resistance}} = \frac{1}{DF} \approx \frac{1}{PF}$$

Radial Lead - A lead which extends perpendicularly to the lengthwise axis of the capacitor body.

Reactance - Opposition offered to the flow of alternating current by capacitance or inductance.

Residual Charge - That portion of the charge which cannot be removed by temporarily short-circuiting a charged capacitor (see Dielectric Absorption).

Resonant Frequency (Self) - The frequency at which the sum of the capacitive reactance of the capacitor and its inductive reactance (parasitic) is zero.

Reverse Voltage - Voltage applied to a polar capacitor such that the anode is negative with respect to the cathode. This is likely to destroy the capacitor.

Ripple - The ac component of the unidirectional output from a dc power supply. Large electrolytic capacitors are usually used to suppress ripple.

Self-Healing - A process in metalized capacitors whereby an electrical defect in the dielectric is isolated by removal of the thin metal conductor around it, thus eliminating the short circuit. This action is accomplished by an electrical discharge of suitable magnitude.

Series Measurement - A measurement of capacitance and loss in which the unknown is represented by a capacitance and resistance connected in series.

Shelf Life - Duration of time when a part retains its operating parameters while stored without voltage; principally applicable to nonsolid electrolytics.

Solid Electrolytic - Electrolytic capacitor that has a solid conducting material, for example manganese dioxide, as a cathode, instead of a liquid or gel.

GLOSSARY
Definitions of Terms

Stacked Construction - A type of capacitor construction in which sheets of metal-coated dielectric, for example silvered mica, are placed one on top of the other with metal foils interleaved to make contact with the electrodes for terminating purposes.

Surge Voltage Rating - A voltage rating, for momentary or transient voltage surges, substantially higher than the rated dc working voltage.

Susceptance - The reciprocal of reactance.

Tangent δ - Tangent of the loss angle; same as dissipation factor.

Temperature Coefficient of Capacitance (TCC) - Rate of capacitance change with respect to temperature, usually expressed in parts per million per degree Celsius (ppm/°C).

Temperature Compensating Capacitor - Capacitor having a TCC of equal magnitude and opposite sign to the temperature coefficient of other circuit elements, thus canceling out the effect of temperature.

Time Constant - The rise time for a voltage on a capacitor in series with a resistor, being charged by a constant voltage source, to read $1-1/e$ of its first value ($1-1/e = 0.632$; see formula).

Thin Film Capacitor - Tantalum electrolytic capacitor formed on a substrate such as glass or ceramic.

Thick Film Capacitor - Capacitor, formed on a substrate, in which the dielectric is a fired-on layer of ceramic/glass or other fusible insulating film.

Variable Capacitor - Capacitor whose capacitance can be varied throughout a selected range, usually employed for circuit tuning.

Wet Electrolytic Capacitor - Capacitor that contains a liquid or gel electrolyte.

Working Voltage (WVDC) - The maximum continuous voltage at which a capacitor can be expected to function reliably.



GLOSSARY
Reference Formulas

$$C = \frac{q}{V}$$

$$C = 0.08854(10)^{-12} \frac{KA}{d} \quad (\text{parallel plate capacitor})$$

$$X = 2\pi fL - \frac{1}{2\pi fC} \quad (\text{capacitor and inductor in series})$$

$$B = 2\pi fC - \frac{1}{2\pi fL} \quad (\text{capacitor and inductor in parallel})$$

$$Z = R + jX \quad (\text{resistance and reactance in series})$$

$$Y = G + jB \quad (\text{conductance and susceptance in parallel})$$

$$DF = \frac{1}{Q} = 2\pi fC_s R = \frac{G}{2\pi fC_p} = \frac{PF}{\sqrt{1 - (PF)^2}}$$

$$PF = \frac{R}{|Z|} = \frac{DF}{\sqrt{1 + (DF)^2}} = \frac{P}{VI}$$

$$C_s = C_p \left(1 + \frac{1}{Q^2}\right)$$

$$R = \frac{1}{G} \left(\frac{1}{1+Q^2}\right)$$

$$C_p = C_s \frac{Q^2}{1+Q^2}$$

$$G = \frac{1}{R} \left(\frac{1}{1+Q^2}\right)$$

$$C_T = C_a + C_b + C_c + \dots \quad (\text{capacitors in parallel})$$

GLOSSARY

Reference Formulas

$$\frac{1}{C_T} = \frac{1}{C_a} + \frac{1}{C_b} + \frac{1}{C_c} + \dots \quad (\text{capacitors in series})$$

$$C_T = \frac{C_a C_b}{C_a + C_b} \quad (\text{two capacitors in series})$$

$$W = \frac{1}{2} C v^2 = \frac{1}{2} q v$$

$$P = i^2 R$$

$$f_o = \frac{1}{2\pi\sqrt{CL}}$$

$$TCC = \frac{C_1 - C_2}{C_1(T_1 - T_2)} (10)^6$$

Charging series C and R (for $v = 0$ at $t = 0$)

$$v = E(1 - e^{-t/T})$$

$$i = \frac{E}{R} e^{-t/T}$$

where $T = RC$

Discharging series C and R (for $v = V_o$ at $t = 0$)

$$v = V_o e^{-t/T}$$

$$i = \frac{V_o}{R} e^{-t/T}$$

where $T = RC$

GLOSSARY
Reference Formulas

Series C, L, and R (for $i = 0$ and $v = 0$ at $t = 0$)

When $\frac{R^2}{4L^2} > \frac{1}{LC}$ (overdamped)

$$i = \frac{E}{\sqrt{2L \left(\frac{R^2}{4L^2} - \frac{1}{LC} \right)}} (e^{mt} - e^{nt})$$

$$\text{where } m = -\frac{R}{2L} + \sqrt{\frac{R^2}{4L^2} - \frac{1}{LC}}$$

$$\text{and } n = \frac{R}{2L} - \sqrt{\frac{R^2}{4L^2} - \frac{1}{LC}}$$

When $\frac{R^2}{4L^2} = \frac{1}{LC}$ (critically damped)

$$i = \frac{E}{L} t e^{-\frac{R}{2L} t}$$

When $\frac{R^2}{4L^2} < \frac{1}{LC}$ (underdamped)

$$i = \frac{E}{\omega L} e^{-\alpha t} \sin \omega t$$

where $\alpha = R/2L$

$$\text{and } \omega = \sqrt{\frac{1}{LC} - \frac{R^2}{4L^2}}$$

GLOSSARY

Reference Formulas

Symbols Used in Formulas

- A - area of electrodes (cm^2)
- B - susceptance (siemens)
- C - capacitance (farads)
- C_a, C_b, C_c - individual capacitances connected in parallel or series
- C_p - capacitance in parallel with conductance
- C_s - capacitance in series with resistance
- C_T - total equivalent capacitance
- C_1, C_2 - capacitance at temperatures T_1 and T_2 , respectively; T_1 is reference condition
- d - distance between electrodes (cm)
- DF - dissipation factor
- E - voltage of source in series with capacitor (volts)
- f - frequency (Hz)
- f_o - resonant frequency (Hz)
- G - conductance (siemens)
- i - instantaneous or transient current through capacitor (amperes)
- I - steady state current through capacitor (amperes)
- K - dielectric constant (relative to vacuum)
- L - inductance (henries)
- P - power dissipated in capacitor (watts)
- PF - power factor
- q - charge stored by capacitor (coulombs)

GLOSSARY
Reference Formulas

- Q - quality factor of capacitor
- R - resistance (ohms)
- t - time (seconds)
- T - time constant (seconds)
- T_1, T_2 - temperature ($^{\circ}\text{C}$)
- TCC - temperature coefficient of capacitance
(parts per million per $^{\circ}\text{C}$)
- v - instantaneous or transient voltage across capacitor (volts)
- V - steady state voltage across capacitor (volts)
- V_0 - initial voltage across capacitor (volts)
- W - energy stored in capacitor (joules)
- X - reactance (ohms)
- Y - admittance (siemens)
- Z - impedance (ohms)