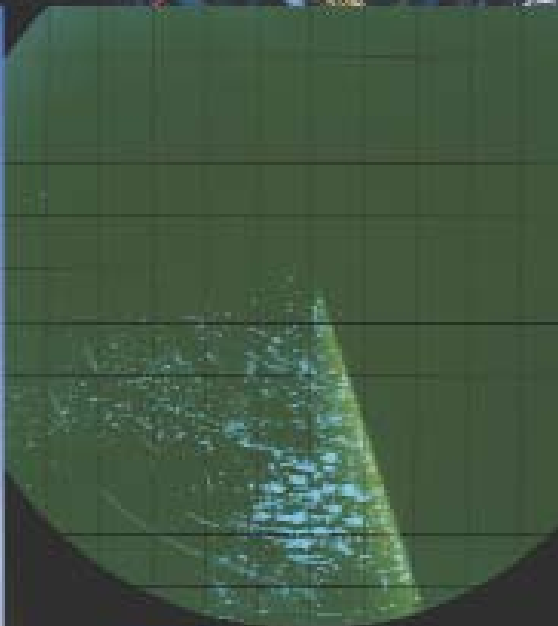
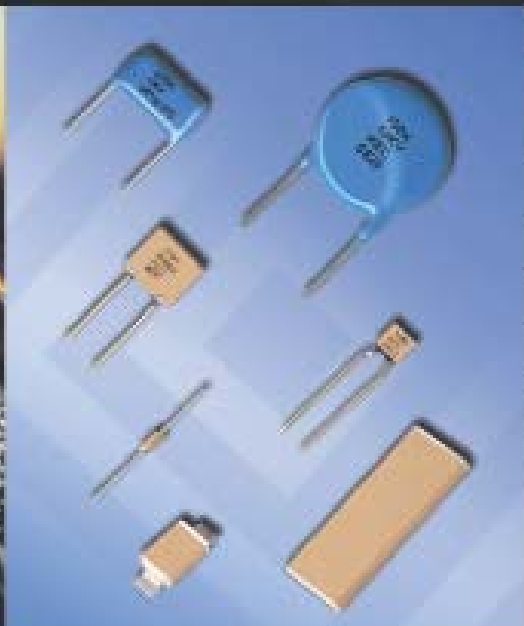
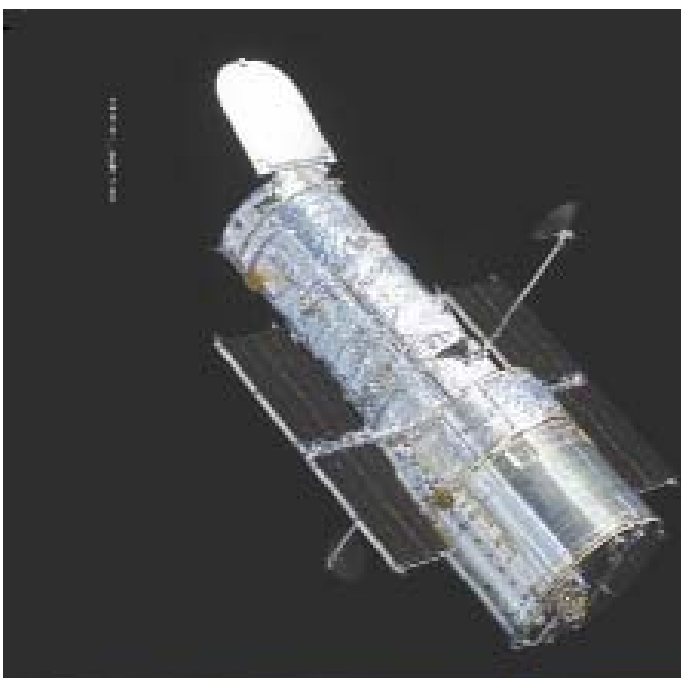




High Temperature High Voltage Ceramic Capacitors

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F-3106G 3/10

The Capacitance Company
KEMET
CHARGED.™

General Performance Characteristics	3-6
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HIGH TEMPERATURE CERAMIC CAPACITORS

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High Temperature, High Voltage Performance Characteristics

GENERAL SPECIFICATIONS

Working Voltage:

C0G	50, 100, 200, 500, 1k, 2k, 3k, 4k, 5k, 7.5k, 10k, 15k, 20k
X7R	50, 100, 200, 500, 1k, 2k, 3k, 4k, 5k, 7.5k, 10k, 15k, 20k, 30k, 40k, 50k
X5U	3k, 4k, 5k, 7.5k, 10k, 15k, 20k

Temperature Characteristics:

C0G	0 + 30 PPM / °C from -55°C to +125°C (1)
X7R	+15% from -55°C to +125°C
X5U	+22%, -56% from -55°C to +85°C

Capacitance Tolerance:

C0G	+0.5pF, +1%, +2%, +5%, +10%
X7R	±5%, ±10%, ±20%, +80% / -20%, +100% / -0%
X5U	±5%, ±10%, ±20%, +80% / -20%, +100% / -0%

Construction:

- Epoxy encapsulated - meets flame test requirements of UL Standard 94V-0.
- High-temperature solder - meets EIA RS-198, Method 302, Condition B (260°C for 10 seconds)

Termination Material:

- Check individual Series: Part Number and Ordering Information for Termination Materials offered in each series.

Solderability:

- MIL-STD 202, Method 208
- (Test Method: ANSI/J-STD-002)
- Test A for through-hole mount and surface mount leaded.
- Test B for surface mount leadless components.

Terminal Strength:

- MIL-STD 202, Method 208, Condition A (2.3kg or 5 lbs)

Resistance to Solvents:

- MIL-STD 202, Method 215

Resistance to Soldering Heat:

- MIL-STD 202, Method 210, Test Condition C

ELECTRICAL

Capacitance @ 25°C:

- Within specified tolerance and following test conditions per MIL-STD 202, Method 305.
- C0G, X7R & X5U
- > 100pF with 1.0 vrms @ 1 kHz with 1.0 vrms
- < 100pF with 1.0 vrms @ 1 MHz with 1.0 vrms

Dissipation Factor @ 25°C:

- Same test conditions as capacitance.
- C0G - 0.15% maximum
- X7R - 2.5% maximum
- X5U - 2.5% maximum

Insulation Resistance @25°C:

- MIL-STD 202, Method 302
- C0G & X7R:
100 gigohm or 1 gigohm x uF, whichever is less.
<500V test @ rated voltage, >1kV test @ 500V.
- X5U:
10 gigohm or 100 megohm x uF, whichever is less.
<500V test @ rated voltage, >1kV test @ 500V.

Dielectric Withstanding Voltage:

- MIL-STD 202, Method 301
- <200V test @ 250% of rated voltage
- 500V to 1250V test @ 150% of rated voltage
- >1251V test @ 120% of rated voltage

ENVIRONMENTAL

Vibration:

- MIL-STD 202, Method 204, Condition D (20g)

Shock:

- MIL-STD 202, Method 213, Condition I (100g)

Life Test:

- MIL-STD 202, Method 108

<200V

- C0G - 200% rated voltage @ +125°C
- X7R - 200% rated voltage @ +125°C

>500V

- C0G - rated voltage @ +125°C
- X7R - rated voltage @ +125°C
- X5U - rated voltage @ +85°C

Post Test Limits @ 25°C are:

Capacitance Change:

- C0G (< 200V) - +3% or 0.25pF, whichever is greater.
- C0G (> 500V) - +3% or 0.50pF, whichever is greater.
- X7R - +20% of initial value (2)

Dissipation Factor:

- C0G - 0.25% maximum
- X7R & X5U - 3.0% maximum

Insulation Resistance:

- C0G & X7R:
100 gigohm or 1 gigohm x uF, whichever is less.
<500V test @ rated voltage, >1kV test @ 500V.

X5U:

- 10 gigohm or 100 megohm x uF, whichever is less.
<500V test @ rated voltage, >1kV test @ 500V.

Moisture Resistance:

- MIL-STD 202, Method 106

Post Test Limits @ 25°C are:

Capacitance Change:

- C0G (< 200V) - +3% or 0.25pF, whichever is greater.
- C0G (> 500V) - +3% or 0.50pF, whichever is greater.
- X7R - +20% of initial value (2)

Dissipation Factor:

- C0G - 0.25% maximum
- X7R & X5U - 3.0% maximum

Insulation Resistance:

- C0G & X7R:
100 gigohm or 1 gigohm x uF, whichever is less.
<500V test @ rated voltage, >1kV test @ 500V.

X5U:

- 10 gigohm or 100 megohm x uF, whichever is less.
<500V test @ rated voltage, >1kV test @ 500V.

Thermal Shock:

- MIL-STD 202, Method 107, Condition A
- C0G & X7R: -55°C to 125°C
- X5U: -55°C to 85°C

- (1) +53 PPM -30 PPM/ °C from +25°C to -55°C, +60 PPM below 10pF.
- (2) X7R & X5U dielectrics exhibit aging characteristics; therefore, it is highly recommended that capacitors be deaged for 2 hours at 150°C and stabilized at room temperature for 48 hours before capacitance measurements are made.

	HIGH TEMPERATURE	HIGH VOLTAGE
MILITARY & AEROSPACE		
Avionics	X	X
Radar Systems	X	X
Telemetry, Data Tx/Rx		X
Control Systems	X	
MEDICAL		
.5 to 1.5 Tesla MR1 &		X
NM1 Tuning Coils		X
1 to 3 Tesla MR1 Gradient		X
Coils & Magnetic Rings		X
CT-Scanner		X
Medical MRI		X
X-Ray Generator	X	X
SEMICONDUCTOR		
RF Tuning Networks		X
RF Power Supplies		X
Semiconductor Manufacturing	X	
SECURITY		
Handheld Scanners		X
Intruder Detection Systems		X
Luggage Scanners		X
Metal/Explosive Detector		X
OTHER		
LCD Backlight Inverter		X
Electric Ballast for CFL	X	X
Electric Ballast for Fluorescent Lamp	X	X
Measurement Equipment	X	X
Microwave/Convection Ovens	X	X
POWER SUPPLY		
HV Power Supply	X	X
Power Station Equipment		X
Power Supply for Air Conditioner, Washing Machine		X
Inverter Power Supply-AC	X	
TELECOM		
Base Station Power amps		X
Broadcasting Equipment		X
MODEM		
DAA Modem		X
xDSL Modem		X
LAN, Router, HUB, Switches		X
RF Power Amplifiers		X
INDUSTRIAL		
Oil Rigging, Down Hole, Mining	X	X

KEMET High Voltage Technical Summary

	ELECTRICAL			ENVIRONMENTAL	MECHANICAL
	Voltage Range	Capacitance Range	Dissipation Factor	Operating Temperature Range	Configuration

HIGH VOLTAGE

Radial Conformally Coated					
Std	C0G/X7R: 500 to 10k VDC	C0G:12 pF - .330µF X7R: 220 pF - 5.6 µF	C0G: 0.15% max X7R: 2.5% max	C0G: -55°C to + 125°C X7R: -55°C to + 125°C	Radial
Mil-PRF-49467 Equivalent	C0G/X7R: 600 to 5k VDC	C0G: 12 pF - .68 µF X7R: 27 pF - .47 µF	C0G: 0.15% max X7R: 2.5% max	C0G/X7R: -55°C to + 125°C	Radial
Space Quality	C0G/X7R: 500 to 10k VDC	C0G/X7R: 560 pF - 2.20µF	C0G: 0.15% max X7R: 2.5% max	C0G/X7R: -55°C to + 125°C	Radial
Ceramic Surface Mount Chip					
Military	C0G/X7R: 500 to 5k VDC	C0G: 12 pF- .10 µF X7R: 270 pF -2.50 µF	C0G: 0.15% max X7R: 2.5% max	C0G/X7R: -55°C to + 125°C	Chip
Leaded Chips J or L lead	C0G/X7R: 500 to 10k VDC	C0G: 12 pF-.330 µF X7R: 220 pF-5.6 µF	C0G: 0.15% max X7R: 2.5% max	C0G/X7R: -55°C to + 125°C	Leaded Chip J or L Lead
Disc	C0G/X5U: 3k to 20k VDC, X7R:3k to 50k VDC	C0G: 1.2 pF-236 pF X7R: 10 p -7400 pF X5U: 80 pF-17300 pF	C0G: 0.15% max X7R: 2.5% max X5U: 2.5% max	C0G/X7R: -55°C to + 125°C X5U: -55°C to + 85°C	Disc
Disc Stack	C0G/X7R/X5U: 5k to 20k VDC	C0G: 1.2 pF-141 pF X7R: 37 pF-4400 pF X5U: 80 pF-10400 pF	C0G: 0.15% max X7R: 2.5% max X5U: 2.5% max	C0G/X7R: -55°C to + 125°C X5U: -55°C to + 85°C	Disc Stack

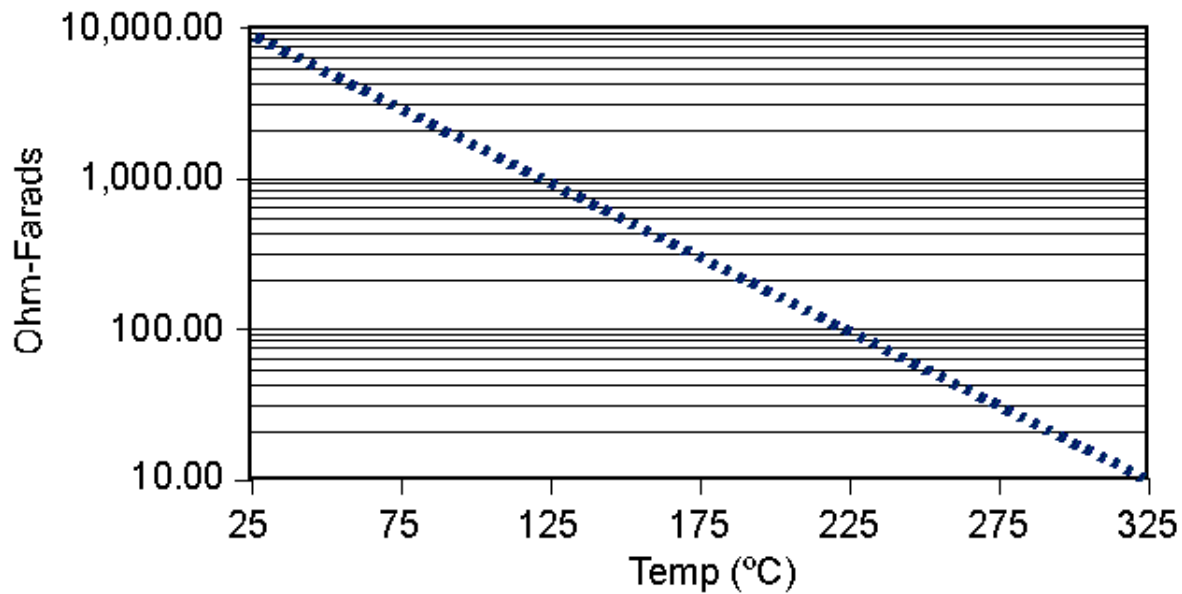
HIGH TEMPERATURE

Hi Temp (HT/HP)	100 to 200 VDC	-C0G: 22 pF-.100 µF X7R:1000 pF-1.0µF	C0G 0.15% X7R Type 2.0% X7R 2.50%	-55°C to + 200°C	Axial/Radial
Hi Temp Hi Volt (HV)	500 to 4000 VDC	C0G: 390 pF-.015 µF X7R:1400 pF- .270 µF	C0G 0.15% X7R Type 2.0% X7R 2.50%	-55°C to + 200°C	Radial
Ceramic Cased Capacitor					
Std 125°C (SCR/SRR/SCA/SRA)	50 to 200 VDC	C0G: 1.0 pF- .12 µF X7R:100 pF- 6.8 µF	C0G 0.15% X7R 2.50%	-55°C to + 125°C	Axial/Radial
200°C (ACR/ARR/ACA/ARA)	50 to 100 VDC	C0G: 1.0 pF- .12 µF X7R:100 pF- 3.3 µF	C0G 0.15% X7R 2.50%	-55°C to + 200°C	Axial/Radial
260°C (TCR/TRR/TCA/TRA)	50 to 100 VDC	C0G: 1.0 pF- .12 µF X7R:100 pF- 3.3 µF	C0G 0.15% X7R 2.50%	-55°C to + 260°C	Axial/Radial
Hi Temp Hi Volt (VCR/VRR)	500 to 5000 VDC	C0G: 10 pF-.056 µF X7R:330 pF-1.2µF	C0G 0.15% X7R 2.50%	-55°C to + 200°C	Radial

DIELECTRIC COMPARISONS

Features	Ultra Stable	Semi-Stable High Voltage	Semi-Stable Hi-Temp	Temp/Volt Dependent
Dielectric Type	C0G (NP0)	X7R	X7R type	X5U
Temperature Coefficient	0 ±30ppm/°C	±15%	+15/-40%	+22-56%
Operating Temp. Range	-55 to +200°C	-55 to +125°C	-55 to +200°C	-55 to +125°C
Dissipation Factor	0.1% max.	2.5% max.	2.0% max.	2.5% max.
Aging Rate	None	-2.0% max/dec. hour	-2.0% max/dec. hour	-2.0% max/dec. hour
Voltage Range	25 to 20k VDC	50 to 50k VDC	25 to 4k VDC	Up to 20K VDC
Standard Tolerance	J, K, M	K, M, P, Z	K, M, P, Z	M, P, Z
Coefficient of Thermal Expansion @ 25°C	9 X 10-6 IN/IN °C	11 X 10-6 IN/IN °C	11 X 10-6 IN/IN °C	11 X 10-6 IN/IN °C

**TYPICAL INSULATION RESISTANCE VS. TEMP (°C)
FOR C0G, NP0 & X7R DIELECTRICS**



High Temperature (+200°C) Axial and Radial Ceramic Capacitors

HT/HP Series

FEATURES

The HT/HP Series is used in robust applications

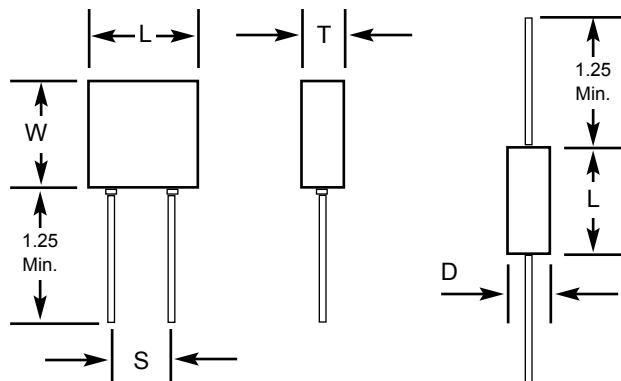
- Down Hole
- Industrial
- Harsh Environments

Where a Radial/Axial coated capacitor can withstand high temperatures (200°C).

NOTE:

Other tolerances, higher capacitance values, voltages, or special package configurations are available upon request.

CAPACITOR OUTLINE DRAWING



DIMENSIONS

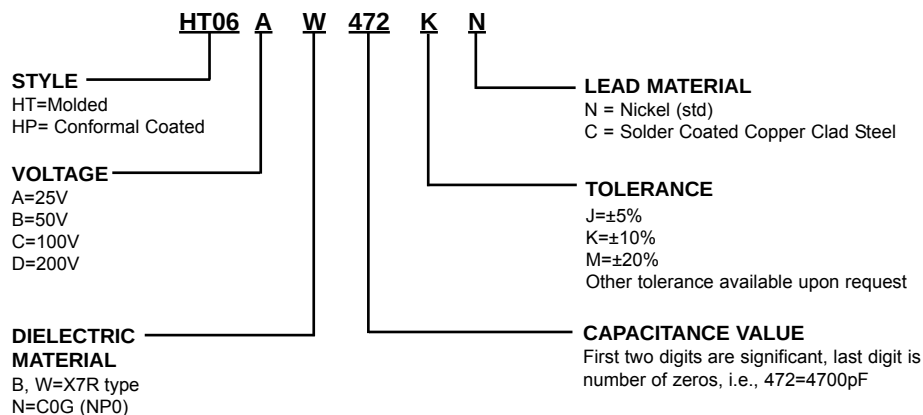
Molded (HT) and Conformal Coated (HP), Radial Lead Types

Style	Sizes in Inches (mm) max			Lead Spacing ±0.030 (S)
	Length (L)	Width (W)	Thickness (T)	
HT05	.200 (5.08)	.200 (5.08)	.100 (2.54)	.100 (2.54)
HT55	.200 (5.08)	.200 (5.08)	.100 (2.54)	.200 (5.08)
HT06	.300 (7.62)	.300 (7.62)	.150 (3.81)	.200 (5.08)
HT08	.500 (12.70)	.500 (12.70)	.250 (6.35)	.400 (10.16)
HT09	.700 (17.78)	.400 (10.16)	.200 (5.08)	.500 (12.70)

Tubular Case, Axial Lead Types

Style	Sizes in Inches (mm) max	
	Length (L)	Diameter (D)
HT11	.170 (4.32)	.100 (2.54)
HT13	.260 (6.60)	.135 (3.43)
HT14	.400 (10.16)	.155 (3.94)
HT15	.500 (12.70)	.200 (5.08)
HT16	.750 (19.05)	.375 (9.52)

PART NUMBER AND ORDERING INFORMATION



MARKING

(HT05, HT55, HT11)
472K
KEC

(All other sizes)
HT06AW472K
KEC
Date Code

For CONFORMAL COATED types, change style number to HPXX. HP dimensions will be reduced slightly.

C0G & X7R DIELECTRIC

C0G RADIAL																		
STYLE		HT/HP 05			HT/HP 55			HT/HP 06			HT/HP 08			HT/HP 09				
Cap	L MAX	.200 (5.08)			.200 (5.08)			.300 (7.62)			.500 (12.70)			.700 (17.78)				
	W MAX	.200 (5.08)			.200 (5.08)			.300 (7.62)			.500 (12.70)			.400 (10.16)				
	T MAX	.100 (2.54)			.100 (2.54)			.150 (3.81)			.250 (6.35)			.200 (5.08)				
	S± .030	.100 (2.54)			.200 (5.08)			.200 (5.08)			.400 (10.16)			.500 (12.70)				
	Lead Dia.	.025 (.635)			.025 (.635)			.025 (.635)			.025 (.635)			.025 (.635)				
	Cap Code	WVDC			WVDC			WVDC			WVDC			WVDC				
		50	100	200	50	100	200	50	100	200	50	100	200	50	100	200		
22pF	220																	
27	270																	
33	330																	
39	390																	
47	470																	
56	560																	
68	680																	
82	820																	
100	101																	
120	121																	
150	151																	
180	181																	
220	221																	
270	271																	
330	331																	
390	391																	
470	471																	
560	561																	
680	681																	
820	821																	
1000	102																	
1200	122																	
1500	152																	
1800	182																	
2200	222																	
2700	272																	
3300	332																	
3900	392																	
4700	472																	
5600	562																	
6800	682																	
8200	822																	
.010 uF	103																	
0.012	123																	
0.015	153																	
0.018	183																	
0.022	223																	
0.027	273																	
0.033	333																	
0.039	393																	
0.047	473																	
0.056	563																	
0.068	683																	
0.082	823																	
0.10	104																	
0.12	124																	

X7R RADIAL																		
STYLE		HT/HP 05			HT/HP 55			HT/HP 06			HT/HP 08			HT/HP 09				
	L MAX	.200 (5.08)			.200 (5.08)			.300 (7.62)			.500 (12.70)			.700 (17.78)				
	W MAX	.200 (5.08)			.200 (5.08)			.300 (7.62)			.500 (12.70)			.400 (10.16)				
	T MAX	.100 (2.54)			.100 (2.54)			.150 (3.81)			.250 (6.35)			.200 (5.08)				
	S± .030	.100 (2.54)			.200 (5.08)			.200 (5.08)			.400 (10.16)			.500 (12.70)				
	Lead Dia.	.025 (.635)			.025 (.635)			.025 (.635)			.025 (.635)			.025 (.635)				
	Cap Code	WVDC			WVDC			WVDC			WVDC			WVDC				
Cap		50	100	200	50	100	200	50	100	200	50	100	200	50	100	200		
1000pF	102																	
1200	122																	
1500	152																	
1800	182																	
2200	222																	
2700	272																	
3300	332																	
3900	392																	
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0.056	563																	
0.068	683																	
0.082	823																	
0.10	104																	
0.12	124																	
0.15	154																	
0.18	184																	
0.22	224																	
0.27	274																	
0.33	334																	
0.39	394																	
0.47	474																	
0.56	564																	
0.68	684																	
0.82	824																	
1.0	105																	
1.2	125																	
1.5	155																	
1.8	185																	
2.2	225																	
2.7	275																	
3.3	335																	
3.9	395																	
4.7	475																	
5.6	565																	

High Temperature (+200°C) Axial and Radial Ceramic Capacitors HT/HP Series

C0G & X7R DIELECTRIC

COG AXIAL																
STYLE		HT/HP 11			HT/HP 13			HT/HP 14			HT/HP 15			HT/HP 16		
Cap	L MAX	.170 (4.32)			.260 (6.60)			.400 (10.16)			.500 (12.70)			.750 (19.05)		
	D MAX	.100 (2.54)			.135 (3.43)			.155 (3.94)			.200 (5.08)			.375 (9.52)		
	Lead Dia.	.025 (.635)			.025 (.635)			.025 (.635)			.025 (.635)			.025 (.635)		
	Cap Code	WVDC			WVDC			WVDC			WVDC			WVDC		
		50	100	200	50	100	200	50	100	200	50	100	200	50	100	200
5.6pF	569															
6.8	689															
8.2	829															
10	100															
12	120															
15	150															
18	180															
22	220															
27	270															
33	330															
39	390															
47	470															
56	560															
68	680															
82	820															
100	101															
120	121															
150	151															
180	181															
220	221															
270	271															
330	331															
390	391															
470	471															
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1000	102															
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3900	392															
4700	472															
5600	562															
6800	682															
8200	822															
.010 uF	103															
0.012	123															
0.015	153															
0.018	183															
0.022	223															
0.027	273															
0.033	333															
0.039	393															
0.047	473															
0.056	563															
0.068	683															
0.082	823															
0.10	104															

X7R AXIAL																
STYLE		HT/HP 11			HT/HP 13			HT/HP 14			HT/HP 15			HT/HP 16		
Cap	L MAX	.170 (4.32)			.260 (6.60)			.400 (10.16)			.500 (12.70)			.750 (19.05)		
	D MAX	.100 (2.54)			.135 (3.43)			.155 (3.94)			.200 (5.08)			.375 (9.52)		
	Lead Dia.	.025 (.635)			.025 (.635)			.025 (.635)			.025 (.635)			.025 (.635)		
	Cap Code	WVDC			WVDC			WVDC			WVDC			WVDC		
		50	100	200	50	100	200	50	100	200	50	100	200	50	100	200
100pF	101															
120	121															
150	151															
180	181															
220	221															
270	271															
330	331															
390	391															
470	471															
560	561															
680	681															
820	821															
1000	102															
1200	122															
1500	152															
1800	182															
2200	222															
2700	272															
3300	332															
3900	392															
4700	472															
5600	562															
6800	682															
8200	822															
.010uF	103															
0.012	123															
0.015	153															
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0.022	223															
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0.033	333															
0.039	393															
0.047	473															
0.056	563															
0.068	683															
0.082	823															
0.1	104															
0.12	124															
0.15	154															
0.18	184															
0.22	224															
0.27	274															
0.33	334															
0.39	394															
0.47	474															
0.56	564															
0.68	684															
0.82	824															
1.0	105															
1.2	125															
1.5	155															
1.8	185															
2.2	225															
2.7	275															

FEATURES

The HV series not only withstands high temperatures (200°C) , but also offers high voltage (500-4000 VDC)

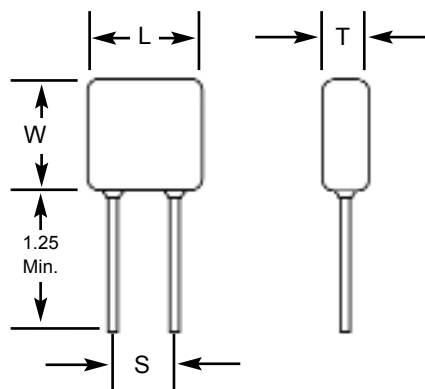
To be used in robust applications

- Down Hole
- Industrial
- Harsh Environments

NOTE:

Other tolerances, higher capacitance values, voltages, or special package configurations are available upon request.

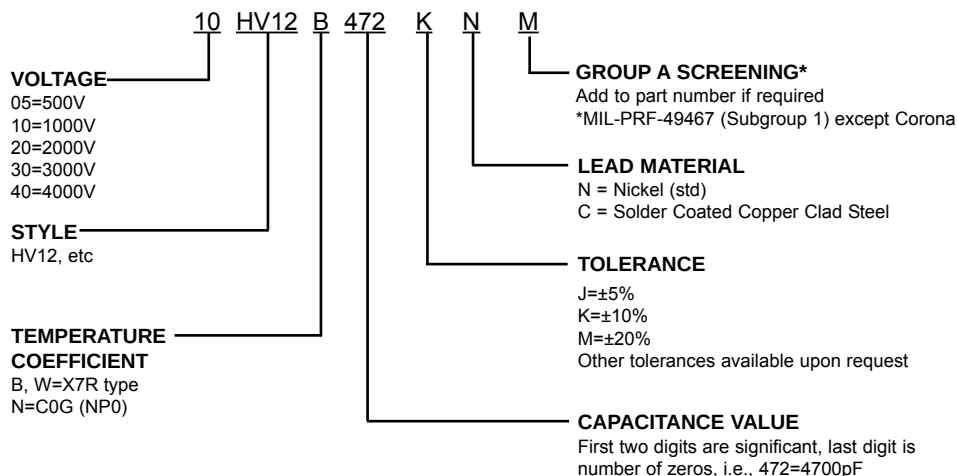
CAPACITOR OUTLINE DRAWING



DIMENSIONS

Style	Sizes in Inches (mm) max.			Lead Spacing ±0.030 (S)
	Length (L)	Width (W)	Thickness (T)	
HV10	.250 (6.35)	.220 (5.59)	.150 (3.81)	.170 (4.32)
HV11	.320 (8.13)	.300 (7.62)	.250 (6.35)	.200 (5.08)
HV12	.420 (10.67)	.400 (10.16)	.250 (6.35)	.300 (7.62)
HV13	.520 (13.21)	.500 (12.70)	.300 (7.62)	.400 (10.16)
HV14	.620 (15.75)	.500 (12.70)	.300 (7.62)	.500 (12.70)
HV15	.720 (18.29)	.700 (17.78)	.300 (7.62)	.600 (15.24)
HV16	.820 (20.83)	.700 (17.78)	.350 (8.89)	.700 (17.78)

PART NUMBER AND ORDERING INFORMATION



MARKING

(HV10, HV11)

472M

KEC

Date Code

(All other sizes)

HV12B472M

1kV

KEC

Date Code

HV Series

[illegible]

X7R DIELECTRIC

STYLE		HV10			HV11			HV12			HV13				HV14					HV15					HV16				
Cap	L MAX	.250 (6.35)			.320 (8.13)			.420 (10.67)			.520 (13.21)				.620 (15.75)					.720 (18.29)					.820 (20.83)				
	W MAX	.220 (5.59)			.300 (7.62)			.400 (10.16)			.500 (12.70)				.500 (12.70)					.700 (17.78)					.700 (17.78)				
	T MAX	.150 (3.81)			.250 (6.35)			.250 (6.35)			.300 (7.62)				.300 (7.62)					.300 (7.62)					.350 (8.89)				
	S± .030	.170 (4.32)			.200 (5.08)			.300 (7.62)			.400 (10.16)				.500 (12.70)					.600 (15.24)					.700 (17.78)				
	Lead Dia. +0.004/- .002	.025 (.635)			.025 (.635)			.025 (.635)			.025 (.635)				.025 (.635)					.025 (.635)					.025 (.635)				
	Cap Code	WVDC			WVDC			WVDC			WVDC				WVDC					WVDC					WVDC				
		500	1k	2k	500	1k	2k	500	1k	2k	500	1k	2k	3k	500	1k	2k	3k	4k	500	1k	2k	3k	4k	500	1k	2k	3k	4k
270pF	271																												
330	331																												
390	391																												
470	471																												
560	561																												
680	681																												
820	821																												
1000	102																												
1200	122																												
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0.01uF	103																												
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0.22	224																												
0.27	274																												
0.33	334																												
0.39	394																												
0.47	474																												

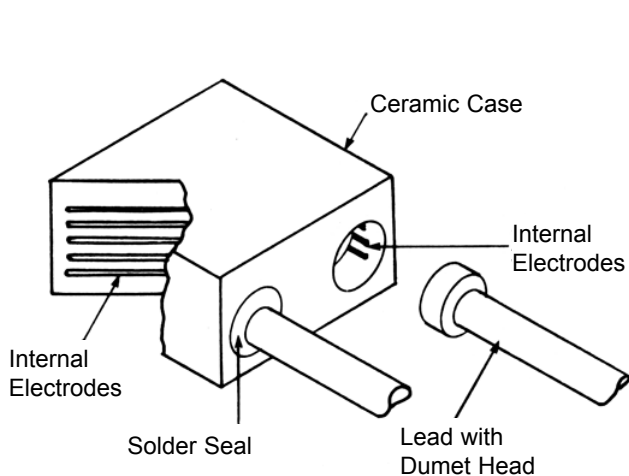
High Temperature Ceramic Cased Capacitors C³

C3 GENERAL INFORMATION

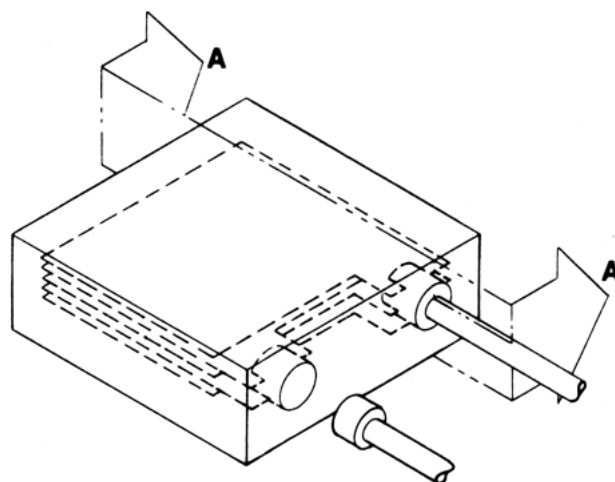
Monolithic ceramic capacitors are capable of withstanding and operating at temperatures up to +260°C when properly designed and manufactured for this application. A design has been developed which is ideal for operation at these high temperatures. This design is a Ceramic Cased Capacitor (C³) as described in PATENT #4,931,899.

The advantages of the C³ construction at 125°C, 200°C and 260°C are:

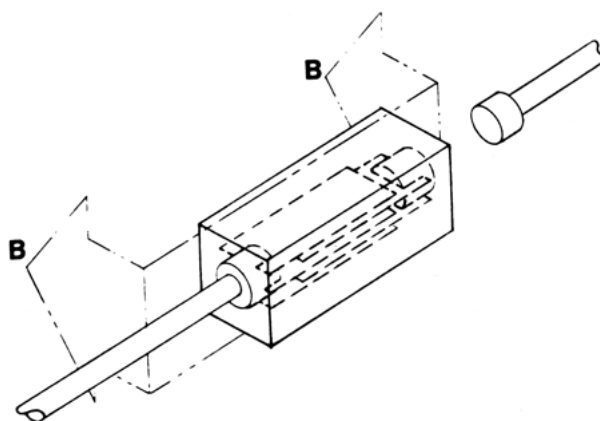
- Uniform coefficient of linear expansion eliminates chip cracking during thermal shock.
- No "pull-away" of epoxy potting from epoxy case at elevated temperatures.
- Resistant to moisture penetration.
- Superior volumetric efficiency



Radial C³ - One Lead Removed



Radial C³ - Capacitor Internal Construction



Axial C³ - One Lead Removed

C0G

C0G (NP0) capacitors which exhibit little change in capacitance with variations in temperature, are used in RF oscillators, precision timing circuits, wave filters and other circuits requiring a predictable linear temperature coefficient.

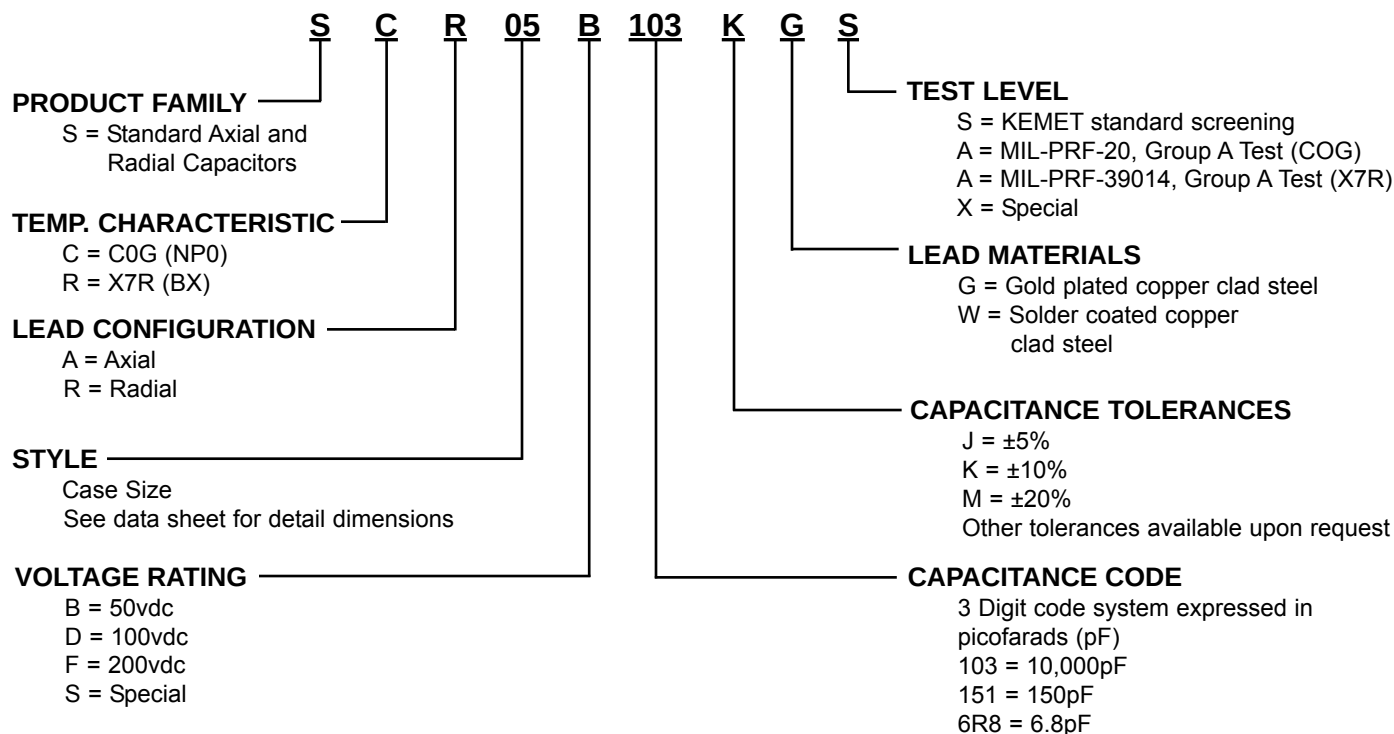
X7R

BX and X7R capacitors are used in coupling circuits (IF and RF); for bypassing and decoupling in computers and stereo systems; power supply line filtering and frequency discrimination.

INSTALLATION:

Parts should be soldered using a heat sink between the soldering point and the part using a soldering iron rated between 18-30 watts. Soldering temperature should not exceed +300°C. For wave soldering, the parts should be slowly heated to +150°C and, after soldering, be allowed to cool down slowly to +90°C to preclude thermal shocking of the parts.

PART NUMBER AND ORDERING INFORMATION



MARKING

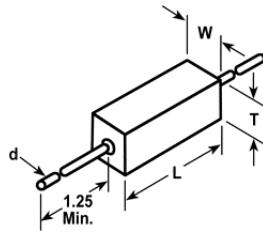
Manufacturer's ID	KEC
Capacitance	106J
Voltage	50V
Date Code	123

Note: Solderability testing is not required for gold leaded parts.

High Temperature Standard (+125°C) Axial and Radial Ceramic Cased Capacitors (C³) SCR/SCA Series

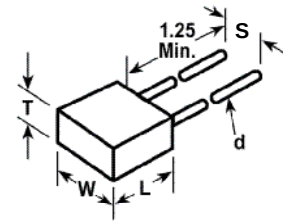
AXIAL

All Dimensions
in Inches (mm)



RADIAL

All Dimensions
in Inches (mm)

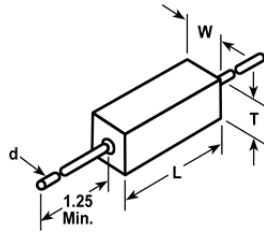


C0G DIELECTRIC

AXIAL														RADIAL																			
STYLE		16			25			39			50			69			05			06			07			08			09				
Cap	L MAX	.170 (4.32)			.270 (6.86)			.400 (10.16)			.520 (13.21)			.720 (18.29)			.200 (5.08)			.300 (7.62)			.300 (7.62)			.500 (12.70)			.500 (12.70)				
	W MAX	.080 (2.03)			.100 (2.54)			.150 (3.81)			.265 (6.73)			.370 (9.40)			.200 (5.08)			.300 (7.62)			.300 (7.62)			.500 (12.70)			.500 (12.70)				
	T MAX	.080 (2.03)			.100 (2.54)			.150 (3.81)			.160 (4.06)			.160 (4.06)			.100 (2.54)			.100 (2.54)			.150 (3.81)			.100 (2.54)			.150 (3.81)				
	S	---			---			---			---			---			.200 ± .030 (5.08 ± .76)			.200 ± .030 (5.08 ± .76)			.200 ± .030 (5.08 ± .76)			.400 ± .030 (10.16 ± .76)			.400 ± .030 (10.16 ± .76)				
	d	.020 ± .002 (.508 ± .051)			.020 ± .002 (.508 ± .051)			.025 ± .002 (.635 ± .051)			.025 ± .002 (.635 ± .051)			.025 ± .002 (.635 ± .051)			.020 ± .002 (.508 ± .051)			.020 ± .002 (.508 ± .051)			.020 ± .002 (.508 ± .051)			.025 ± .002 (.635 ± .051)			.025 ± .002 (.635 ± .051)				
	Cap Code	WVDC			WVDC			WVDC			WVDC			WVDC			WVDC			WVDC			WVDC			WVDC			WVDC			WVDC	
	50	100	200	50	100	200	50	100	200	50	100	200	50	100	200	50	100	200	50	100	200	50	100	200	50	100	200	50	100	200			
5.6pF	569																																
6.8	689																																
8.2	829																																
10	100																																
12	120																																
15	150																																
18	180																																
22	220																																
27	270																																
33	330																																
39	390																																
47	470																																
56	560																																
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150	151																																
180	181																																
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270	271																																
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680	681																																
820	821																																
1000	102																																
1200	122																																
1500	152																																
1800	182																																
2200	222																																
2700	272																																

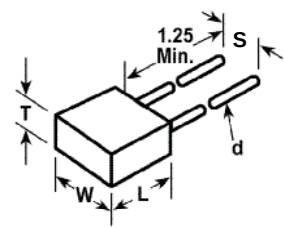
AXIAL

All Dimensions
in Inches (mm)



RADIAL

All Dimensions
in Inches (mm)



X7R DIELECTRIC

AXIAL																RADIAL																	
STYLE		16			25			39			50			69			05			06			07			08			09				
Cap	L MAX	.170 (4.32)			.270 (6.86)			.400 (10.16)			.520 (13.21)			.720 (18.29)			.200 (5.08)			.300 (7.62)			.300 (7.62)			.500 (12.70)			.500 (12.70)				
	W MAX	.080 (2.03)			.100 (2.54)			.150 (3.81)			.265 (6.73)			.370 (9.40)			.200 (5.08)			.300 (7.62)			.300 (7.62)			.500 (12.70)			.500 (12.70)				
	T MAX	.080 (2.03)			.100 (2.54)			.150 (3.81)			.160 (4.06)			.160 (4.06)			.100 (2.54)			.100 (2.54)			.150 (3.81)			.100 (2.54)			.150 (3.81)				
	S	---			---			---			---			---			.200 ± .030 (5.08 ± .76)			.200 ± .030 (5.08 ± .76)			.200 ± .030 (5.08 ± .76)			.400 ± .030 (10.16 ± .76)			.400 ± .030 (10.16 ± .76)				
	d	.020 ± .002 (.508 ± .051)			.020 ± .002 (.508 ± .051)			.025 ± .002 (.635 ± .051)			.025 ± .002 (.635 ± .051)			.025 ± .002 (.635 ± .051)			.020 ± .002 (.508 ± .051)			.020 ± .002 (.508 ± .051)			.020 ± .002 (.508 ± .051)			.025 ± .002 (.635 ± .051)			.025 ± .002 (.635 ± .051)				
	Cap Code	WVDC			WVDC			WVDC			WVDC			WVDC			WVDC			WVDC			WVDC			WVDC			WVDC			WVDC	
	50	100	200	50	100	200	50	100	200	50	100	200	50	100	200	50	100	200	50	100	200	50	100	200	50	100	200	50	100	200			
100pF	101																																
120	121																																
150	151																																
180	181																																
220	221																																
270	271																																
330	331																																
390	391																																
470	471																																
560	561																																
680	681																																
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1000	102																																
1200	122																																
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2200	222																																
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4700	472																																
5600	562																																
6800	682																																
8200	822																																
0.01 μF	103																																
0.012	123																																
0.015	153																																
0.018	183																																
0.022	223																																
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0.039	393																																
0.047	473																																
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0.56	564																																
0.68	684																																
0.82	824																																
1.0	105																																
1.2	125																																
1.5	155																																
1.8	185																																
2.2	225																																
2.7	275																																
3.3	335																																
3.9	395																																
4.7	475																																
5.6	565																																
6.8	685																																

High Temperature Standard (+200°C) Axial and Radial Ceramic Cased Capacitors (C³) ACR/ARR/ACA/ARA Series

High temperature ceramic cased capacitors, with a new, unique design concept, are ideally suited for continuous operation up to +200°C. Problems associated with epoxy cased/epoxy potted capacitors, such as material deterioration, cracks in cases and potted areas, are nonexistent, even at +200°C.

C0G

C0G (NPO) capacitors, which exhibit little change in capacitance with variations in temperature, are used in RF oscillators, precision timing circuits, wave filters, and other circuits requiring a predictable linear temperature coefficient.

X7R

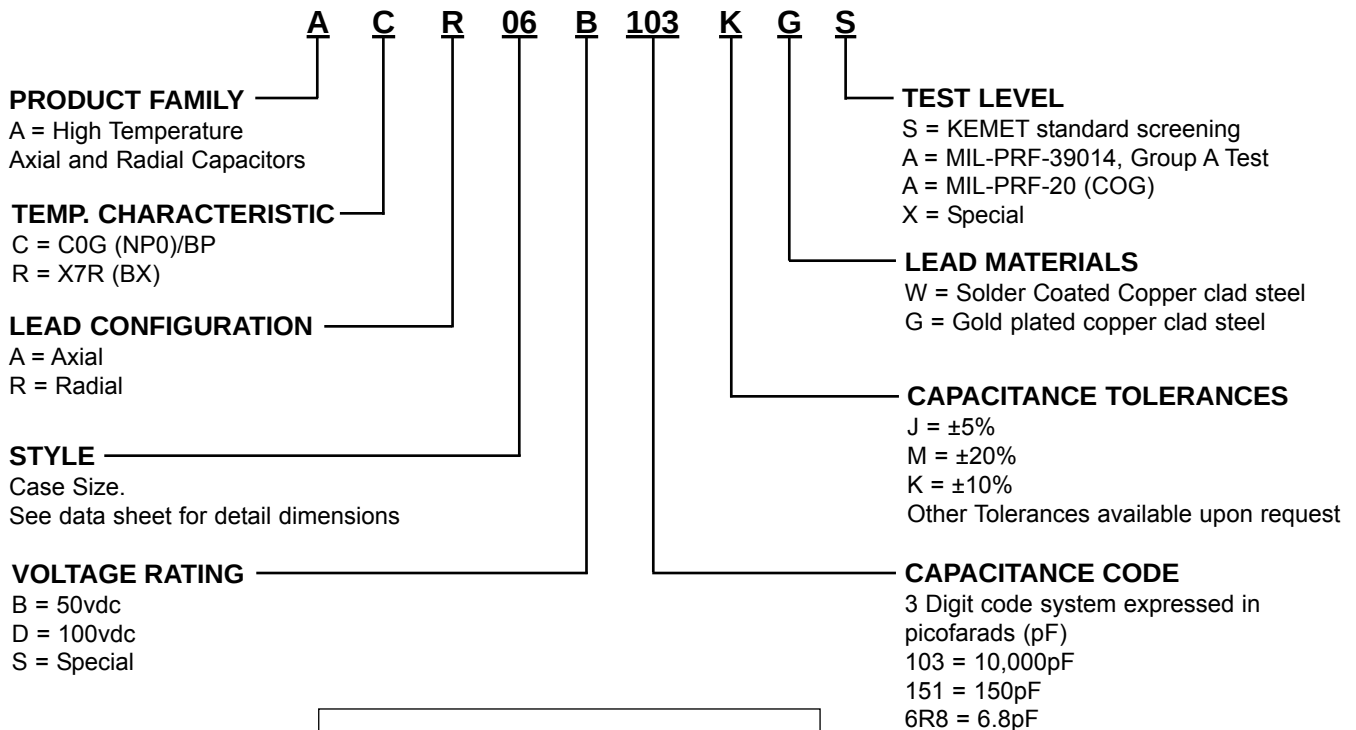
Specially formulated X7R ceramic materials result in a retention of 40% of the +25°C capacitance. Dissipation factor drops from 1.25% at +25°C to 0.1% at +200°C. At +120°C the ceramic undergoes a transformation (crystalline inversion) resulting in the material changing from ferroelectric to paraelectric - no piezoelectric behavior.

Typical applications include oil well logging (down hole), jet engine controls and geophysical pressure probes.

INSTALLATION:

Parts should be soldered using a heat sink between the soldering point and the part using a soldering iron rated between 18-30 watts. Soldering temperature should not exceed +300°C.

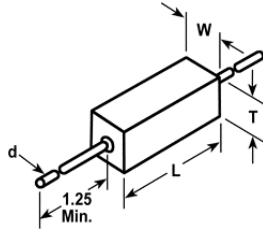
PART NUMBER AND ORDERING INFORMATION



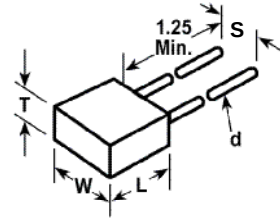
MARKING

Manufacturer's ID	KEC
Capacitance	106J
Voltage	50V
Date Code	123

AXIAL
All Dimensions
in Inches (mm)



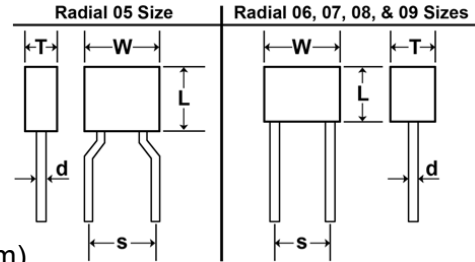
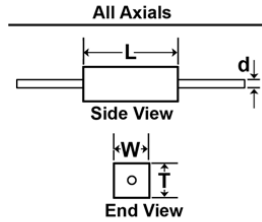
RADIAL
All Dimensions
in Inches (mm)



C0G DIELECTRIC

AXIAL											RADIAL									
STYLE	16	25	39	50	69	05	06	07	08	09										
L _{MAX}	.170 (4.32)	.270 (6.86)	.400 (10.16)	.520 (13.21)	.720 (18.29)	.200 (5.08)	.300 (7.62)	.300 (7.62)	.500 (12.70)	.500 (12.70)										
W _{MAX}	.080 (2.03)	.100 (2.54)	.150 (3.81)	.265 (6.73)	.370 (9.40)	.200 (5.08)	.300 (7.62)	.300 (7.62)	.500 (12.70)	.500 (12.70)										
T _{MAX}	.080 (2.03)	.100 (2.54)	.150 (3.81)	.160 (4.06)	.160 (4.06)	.100 (2.54)	.100 (2.54)	.150 (3.81)	.100 (2.54)	.150 (3.81)										
S	---	---	---	---	---	.200 ± .030 (5.08 ± .76)	.200 ± .030 (5.08 ± .76)	.200 ± .030 (5.08 ± .76)	.400 ± .030 (10.16 ± .76)	.400 ± .030 (10.16 ± .76)										
d	.020 ± .002 (.508 ± .051)	.020 ± .002 (.508 ± .051)	.025 ± .002 (.635 ± .051)	.025 ± .002 (.635 ± .051)	.025 ± .002 (.635 ± .051)	.020 ± .002 (.508 ± .051)	.020 ± .002 (.508 ± .051)	.020 ± .002 (.508 ± .051)	.025 ± .002 (.635 ± .051)	.025 ± .002 (.635 ± .051)										
Cap Code	WVDC		WVDC		WVDC		WVDC		WVDC		WVDC		WVDC		WVDC		WVDC		WVDC	
	50	100	50	100	50	100	50	100	50	100	50	100	50	100	50	100	50	100	50	100
5.6pF	569																			
6.8	689																			
8.2	829																			
10	100																			
12	120																			
15	150																			
18	180																			
22	220																			
27	270																			
33	330																			
39	390																			
47	470																			
56	560																			
68	680																			
82	820																			
100	101																			
120	121																			
150	151																			
180	181																			
220	221																			
270	271																			
330	331																			
390	391																			
470	471																			
560	561																			
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1000	102																			
1200	122																			
1500	152																			
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2200	222																			
2700	272																			
3300	332																			
3900	392																			
4700	472																			
5600	562																			
6800	682																			
8200	822																			
0.01 μF	103																			
0.012	123																			
0.015	153																			
0.018	183																			
0.022	223																			
0.027	273																			
0.033	333																			
0.039	393																			
0.047	473																			
0.056	563																			
0.068	683																			
0.082	823																			
0.10	104																			
0.12	124																			
0.15	154																			

High Temperature Standard (+200°C) Axial and Radial Ceramic Cased Capacitors (C³) ARR/ARA Series



X7R DIELECTRIC - All Dimensions in Inches (mm)

AXIAL											RADIAL									
STYLE	16	25	39	50	69	05	06	07	08	09										
L MAX	.170 (4.32)	.270 (6.86)	.400 (10.16)	.520 (13.21)	.720 (18.29)	.200 (5.08)	.300 (7.62)	.300 (7.62)	.500 (12.70)	.500 (12.70)										
W MAX	.080 (2.03)	.100 (2.54)	.150 (3.81)	.265 (6.73)	.370 (9.40)	.200 (5.08)	.300 (7.62)	.300 (7.62)	.500 (12.70)	.500 (12.70)										
T MAX	.080 (2.03)	.100 (2.54)	.150 (3.81)	.160 (4.06)	.160 (4.06)	.100 (2.54)	.100 (2.54)	.150 (3.81)	.100 (2.54)	.150 (3.81)										
s	---	---	---	---	---	.200 ± .030 (5.08 ± .76)	.200 ± .030 (5.08 ± .76)	.200 ± .030 (5.08 ± .76)	.400 ± .030 (10.16 ± .76)	.400 ± .030 (10.16 ± .76)										
d	.020 ± .002 (.508 ± .051)	.020 ± .002 (.508 ± .051)	.025 ± .002 (.635 ± .051)	.025 ± .002 (.635 ± .051)	.025 ± .002 (.635 ± .051)	.020 ± .002 (.508 ± .051)	.020 ± .002 (.508 ± .051)	.020 ± .002 (.508 ± .051)	.025 ± .002 (.635 ± .051)	.025 ± .002 (.635 ± .051)										
Cap	WVDC		WVDC		WVDC		WVDC		WVDC		WVDC		WVDC		WVDC		WVDC		WVDC	
	50	100	50	100	50	100	50	100	50	100	50	100	50	100	50	100	50	100	50	100
100pF	101																			
120	121																			
150	151																			
180	181																			
220	221																			
270	271																			
330	331																			
390	391																			
470	471																			
560	561																			
680	681																			
820	821																			
1000	102																			
1200	122																			
1500	152																			
1800	182																			
2200	222																			
2700	272																			
3300	332																			
3900	392																			
4700	472																			
5600	562																			
6800	682																			
8200	822																			
0.01 μF	103																			
0.012	123																			
0.015	153																			
0.018	183																			
0.022	223																			
0.027	273																			
0.033	333																			
0.039	393																			
0.047	473																			
0.056	563																			
0.068	683																			
0.082	823																			
0.10	104																			
0.12	124																			
0.15	154																			
0.18	184																			
0.22	224																			
0.27	274																			
0.33	334																			
0.39	394																			
0.47	474																			
0.56	564																			
0.68	684																			
0.82	824																			
1.0	105																			
1.2	125																			
1.5	155																			
1.8	185																			
2.2	225																			
2.7	275																			
3.3	335																			
3.9	395																			

High temperature ceramic cased capacitors, with a new, unique design concept, are ideally suited for continuous operation up to +260°C. Problems associated with epoxy cased/epoxy potted capacitors, such as material deterioration, cracks in cases and potted areas, are nonexistent, even at +260°C.

C0G

C0G (NP0) capacitors, which exhibit little change in capacitance with variations in temperature, are used in RF oscillators, precision timing circuits, wave filters, and other circuits requiring a predictable linear temperature coefficient.

X7R

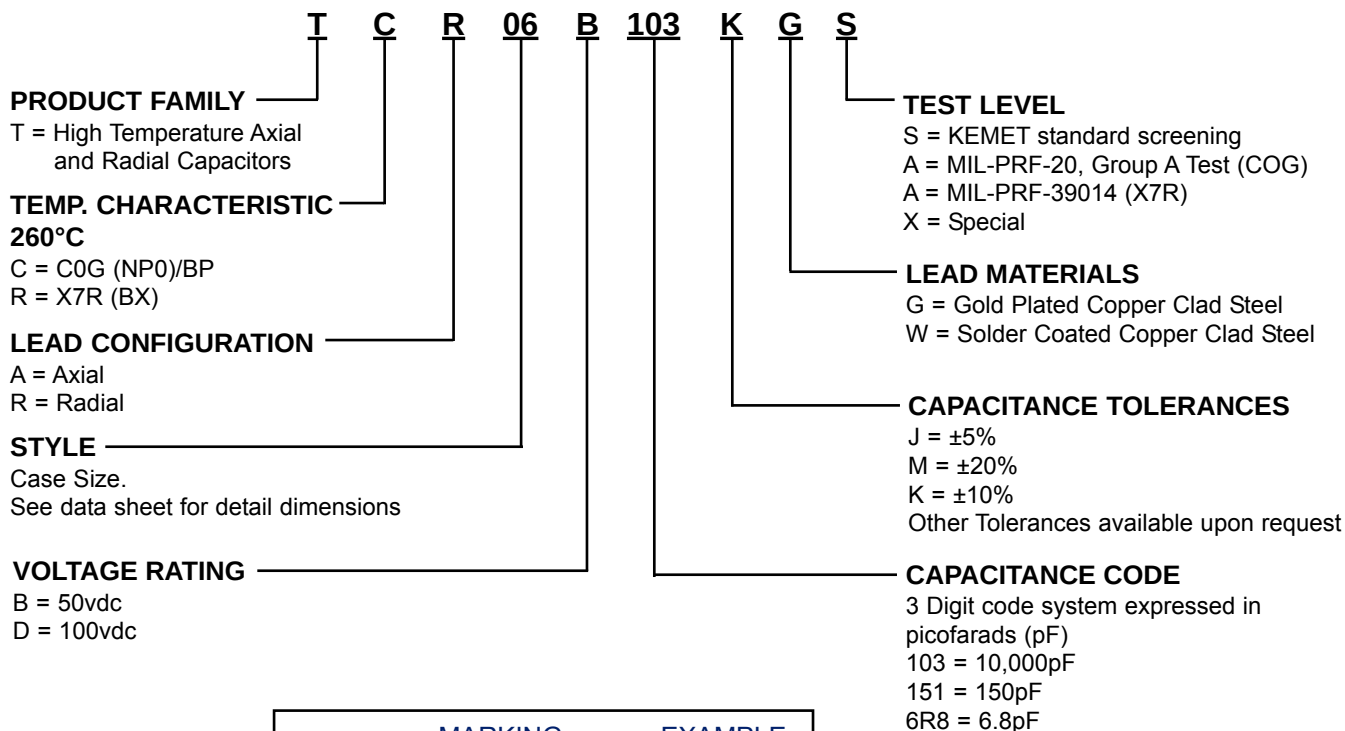
Conventional X7R materials lose up to 75% of the +25°C capacitance. Dissipation factor drops from 1.25% at +25°C to 0.2% at +260°C. At +120°C the ceramic undergoes a transformation (crystalline inversion) resulting in the material changing from ferroelectric to paraelectric - no piezoelectric behavior.

Typical applications include oil well logging (down hole), jet engine controls and geophysical pressure probes.

INSTALLATION:

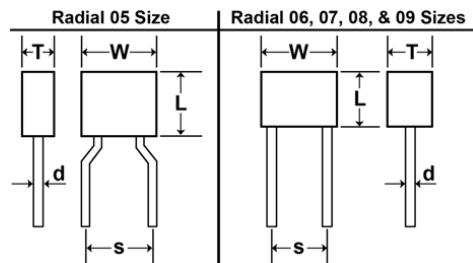
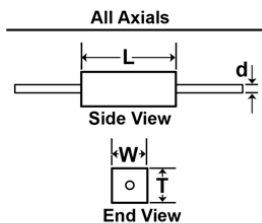
Parts should be soldered using a heat sink between the soldering point and the part using a soldering iron rated 18-30 watts. Remove all traces of flux or other contamination resulting from the soldering operation. An intermittent conducting path between the leads, at high voltage, could cause breakdown. Soldering temperature should not exceed +300°C.

PART NUMBER AND ORDERING INFORMATION



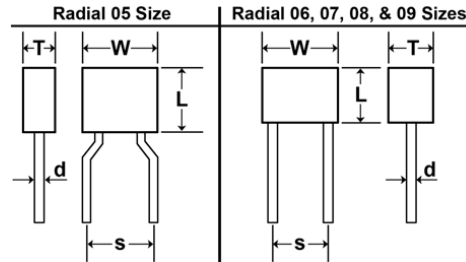
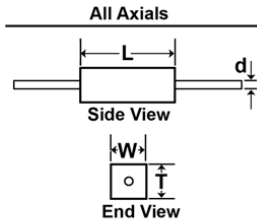
MARKING	EXAMPLE
Manufacturer's ID	KEC
Capacitance	106J
Voltage	50V
Date Code	123
Red dot = +260°C	•

High Temperature (+260°C) Axial and Radial Ceramic Cased Capacitors (C³) TCR/TCA Series



C0G DIELECTRIC

AXIAL												RADIAL											
STYLE		16		25		39		50		69		05		06		07		08		09			
Cap	L _{MAX}	.170 (4.32)		.270 (6.86)		.400 (10.16)		.520 (13.21)		.720 (18.29)		.200 (5.08)		.300 (7.62)		.300 (7.62)		.500 (12.70)		.500 (12.70)			
	W _{MAX}	.080 (2.03)		.100 (2.54)		.150 (3.81)		.265 (6.73)		.370 (9.40)		.200 (5.08)		.300 (7.62)		.300 (7.62)		.500 (12.70)		.500 (12.70)			
	T _{MAX}	.080 (2.03)		.100 (2.54)		.150 (3.81)		.160 (4.06)		.160 (4.06)		.100 (2.54)		.100 (2.54)		.150 (3.81)		.100 (2.54)		.150 (3.81)			
	s	---		---		---		---		---		.200 ± .030 (5.08 ± .76)		.200 ± .030 (5.08 ± .76)		.200 ± .030 (5.08 ± .76)		.400 ± .030 (10.16 ± .76)		.400 ± .030 (10.16 ± .76)			
	d	.020 ± .002 (.508 ± .051)		.020 ± .002 (.508 ± .051)		.025 ± .002 (.635 ± .051)		.025 ± .002 (.635 ± .051)		.025 ± .002 (.635 ± .051)		.020 ± .002 (.508 ± .051)		.020 ± .002 (.508 ± .051)		.020 ± .002 (.508 ± .051)		.025 ± .002 (.635 ± .051)		.025 ± .002 (.635 ± .051)			
	Cap Code	50 100		50 100		50 100		50 100		50 100		50 100		50 100		50 100		50 100		50 100			
	5.6pF	569																					
	6.8	689																					
	8.2	829																					
	10	100																					
12	120																						
15	150																						
18	180																						
22	220																						
27	270																						
33	330																						
39	390																						
47	470																						
56	560																						
68	680																						
82	820																						
100	101																						
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330	331																						
390	391																						
470	471																						
560	561																						
680	681																						
820	821																						
1000	102																						
1200	122																						
1500	152																						
1800	182																						
2200	222																						
2700	272																						
3300	332																						
3900	392																						
4700	472																						
5600	562																						
6800	682																						
8200	822																						
0.01 μF	103																						
0.012	123																						
0.015	153																						
0.018	183																						
0.022	223																						
0.027	273																						
0.033	333																						
0.039	393																						
0.047	473																						
0.056	563																						
0.068	683																						
0.082	823																						



X7R DIELECTRIC

[illegible]

High Temperature (+200°C), High Voltage Radial Ceramic Cased Capacitors (C³) VCR/VRR Series

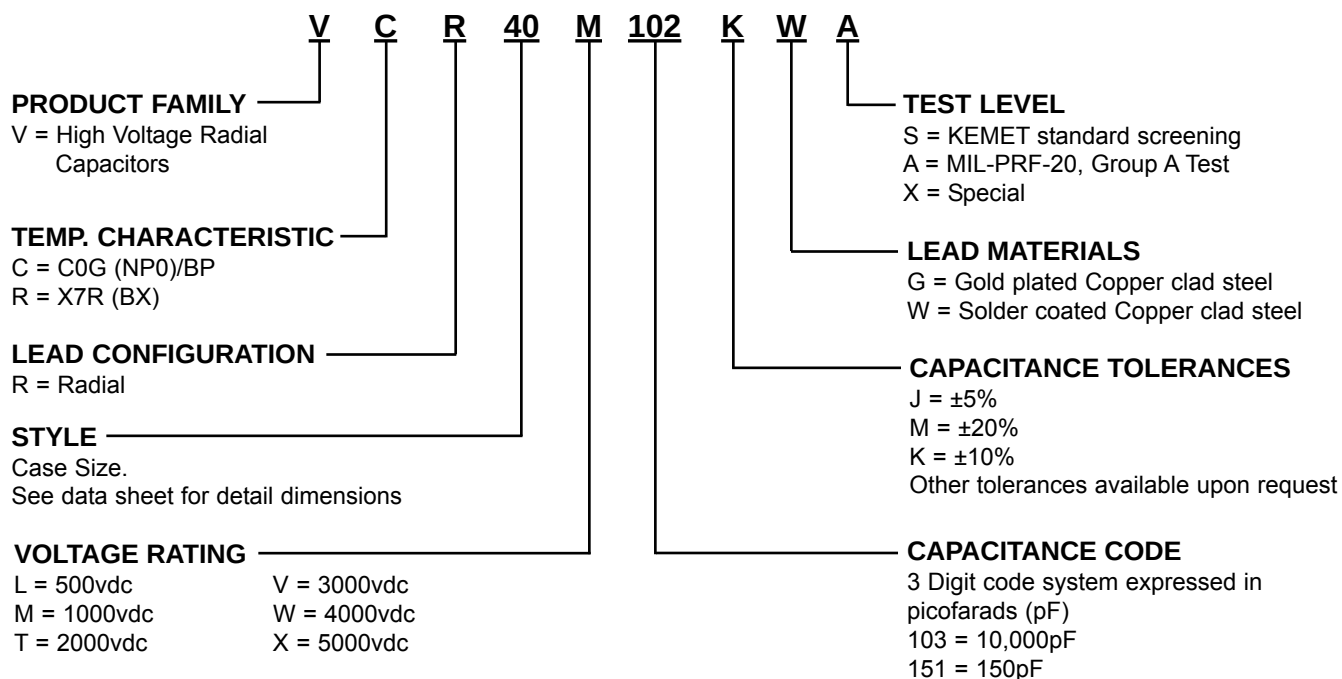
Ceramic cased capacitors, with a new, unique design concept which eliminates potential problems associated with conventional epoxy cased epoxy potted capacitors.

Major application is high voltage power supplies. High voltage capacitors are also utilized on high voltage meter multiplier and RF circuits.

INSTALLATION:

Parts should be soldered using a heat sink between the soldering point and the part using a soldering iron rated 18-30 watts. Remove all traces of flux or other contamination resulting from the soldering operation. An intermittent conducting path between the leads, at high voltage, could cause breakdown. Soldering temperature should not exceed +300°C.

PART NUMBER AND ORDERING INFORMATION



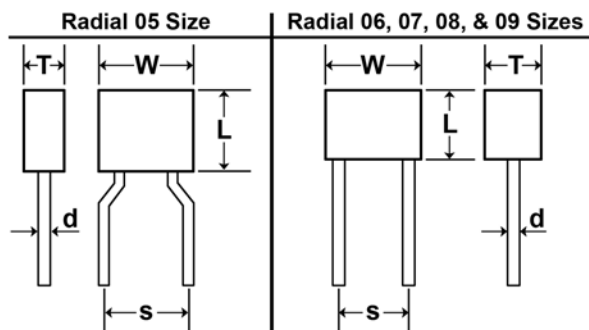
MARKING	EXAMPLE
Manufacturer's ID	KEC
Capacitance	106J
Voltage	500V
Date Code	123



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High Temperature (+200°C), High Voltage Axial and Radial Ceramic Cased Capacitors (C³)

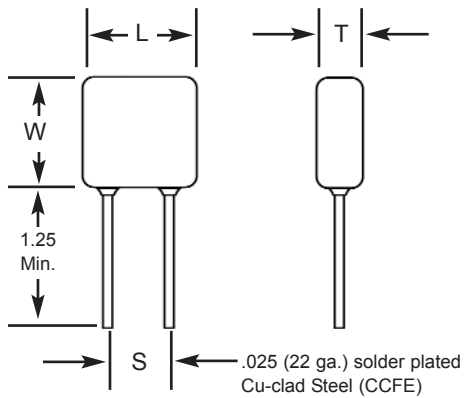
VRR Series



X7R DIELECTRIC

STYLE		07			40					50						60						70						80					
L _{MAX}		.300 (7.62)			.350 (8.89)					.520 (13.20')						.550 (13.97)						.650 (16.51)						.750 (19.05)					
W _{MAX}		.300 (7.62)			.400 (10.16)					.500 (12.70)						.600 (15.24)						.700 (17.78)						.800 (20.32)					
T _{MAX}		.150 (3.81)			.275 (6.98)					.300 (7.62)						.375 (9.52)						.375 (9.52)						.375 (9.52)					
S		.200 ± .030 (5.08 ± .76)			.250 ± .030 (6.35 ± .76)					.400 ± .030 (10.16 ± .76)						.400 ± .030 (10.16 ± .76)						.500 ± .030 (12.70 ± .76)						.600 ± .030 (15.24 ± .76)					
d		.025 ± .002 (.635 ± .051)			.025 ± .002 (.635 ± .051)					.025 ± .002 (.635 ± .051)						.032 ± .004 (.813 ± .102)						.032 ± .004 (.813 ± .102)						.032 ± .004 (.813 ± .102)					
Cap	Cap Code	WVDC			WVDC					WVDC						WVDC						WVDC						WVDC					
		500	1k	2k	500	1k	2k	3k	4k	500	1k	2k	3k	4k	5k	500	1k	2k	3k	4k	5k	500	1k	2k	3k	4k	5k	500	1k	2k	3k	4k	5k
330pF	331																																
390	391																																
470	471																																
560	561																																
680	681																																
820	821																																
1000	102																																
1200	122																																
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8200	822																																
0.01 μF	103																																
0.012	123																																
0.015	153																																
0.018	183																																
0.022	223																																
0.027	273																																
0.033	333																																
0.039	393																																
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0.056	563																																
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0.10	104																																
0.12	124																																
0.15	154																																
0.18	184																																
0.22	224																																
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0.33	334																																
0.39	394																																
0.47	474																																
0.56	564																																
0.68	684																																
0.82	824																																
1.0	105																																
1.2	125																																

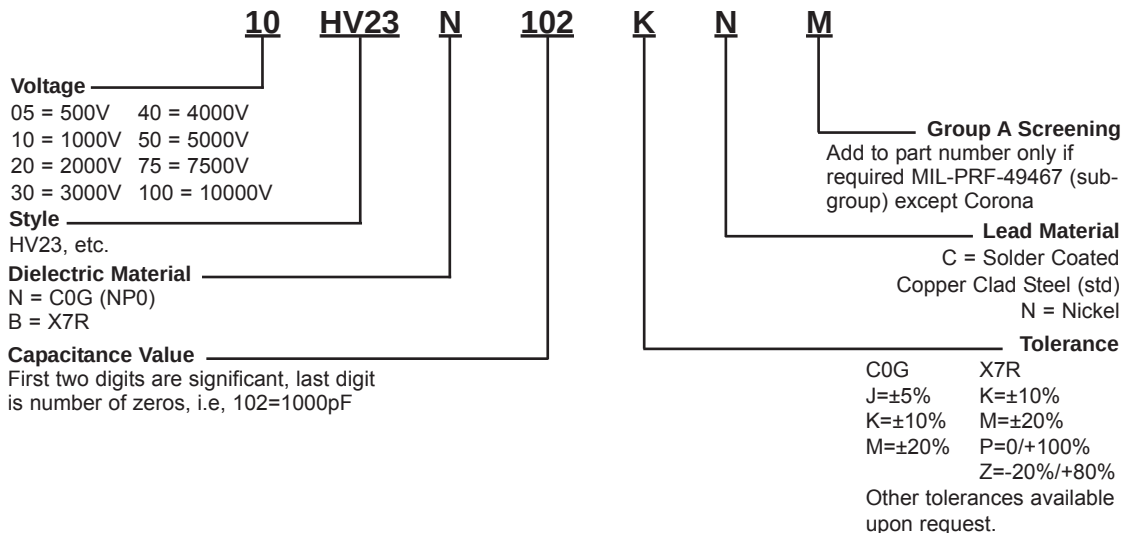
CAPACITOR OUTLINE DRAWING



DIMENSIONS

Style	Sizes in Inches (mm) max.			Lead Spacing ±0.030 (S)
	Length (L)	Width (W)	Thickness (T)	
HV20	.250 (6.35)	.220 (5.59)	.200 (5.08)	.170 (4.32)
HV21	.320 (8.13)	.280 (7.11)	.250 (6.35)	.220 (5.59)
HV22	.370 (9.40)	.300 (7.62)	.250 (6.35)	.275 (6.98)
HV23	.470 (11.94)	.400 (10.16)	.270 (6.89)	.375 (9.52)
HV24	.570 (14.48)	.500 (12.70)	.270 (6.89)	.475 (12.06)
HV25	.670 (17.02)	.600 (15.24)	.270 (6.89)	.575 (14.60)
HV26	.770 (19.56)	.720 (18.29)	.270 (6.89)	.675 (17.14)
HV30	.450 (11.43)	.220 (5.59)	.200 (5.08)	.300 (7.62)
HV31	.550 (13.97)	.280 (7.11)	.250 (6.35)	.400 (10.16)
HV33	.850 (21.59)	.400 (10.16)	.270 (6.89)	.700 (17.78)
HV34	1.050 (26.67)	.500 (12.70)	.270 (6.89)	.975 (24.76)
HV35	1.250 (31.75)	.600 (15.24)	.270 (6.89)	1.175 (29.84)
HV36	1.450 (36.83)	.720 (18.29)	.270 (6.89)	1.375 (34.92)

PART NUMBER AND ORDERING INFORMATION



MARKING

(HV20, HV21)	(All Other Sizes)
103K	HV24A103K
1 kV	1 kV
KEC	KEC
Date Code	Date Code

High Voltage Radial Conformally Coated Ceramic Capacitors HV Series

C0G DIELECTRIC

STYLE		HV20				HV21				HV22				HV23					HV24					HV25					HV26							
Cap	L MAX	.250 (6.35)				.320 (8.13)				.370 (9.40)				.470 (11.94)					.570 (14.48)					.670 (17.02)					.770 (19.56)							
	W MAX	.220 (5.59)				0.280 (7.11)				.300 (7.62)				.400 (10.16)					.500 (12.70)					.600 (15.24)					.720 (18.29)							
	T MAX	.200 (5.08)				.250 (6.35)				.250 (6.35)				.270 (6.86)					.270 (6.86)					.270 (6.86)					.270 (6.86)							
	S± .030	.170 (4.32)				.220 (5.59)				.275 (6.98)				.375 (9.52)					.475 (12.06)					.575 (14.60)					.675 (17.14)							
	Lead Dia. +0.004/-0.002	.025 (.635)				.025 (.635)				.025 (.635)				.025 (.635)					.025 (.635)					.025 (.635)					.025 (.635)							
	Cap Code	WVDC				WVDC				WVDC				WVDC					WVDC					WVDC					WVDC							
		500	1k	2k	3k	500	1k	2k	3k	500	1k	2k	3k	500	1k	2k	3k	4k	500	1k	2k	3k	4k	5k	500	1k	2k	3k	4k	5k	500	1k	2k	3k	4k	5k
12pF	120																																			
15	150																																			
18	180																																			
22	220																																			
27	270																																			
33	330																																			
39	390																																			
47	470																																			
56	560																																			
68	680																																			
82	820																																			
100	101																																			
120	121																																			
150	151																																			
180	181																																			
220	221																																			
270	271																																			
330	331																																			
390	391																																			
470	471																																			
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4700	472																																			
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8200	822																																			
0.01uF	103																																			
0.012	123																																			
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0.027	273																																			
0.033	333																																			
0.039	393																																			
0.047	473																																			
0.056	563																																			
0.068	683																																			
0.082	823																																			
0.10	104																																			

COG DIELECTRIC

[illegible]

X7R DIELECTRIC

29

X7R DIELECTRIC

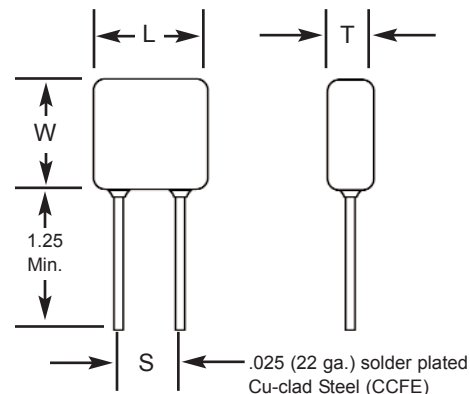
[illegible]

High Voltage MIL-PRF-49467 (Equivalent) HV Series

FEATURES

1. Electrical characteristics and environmental information on these parts may be obtained by referring to MIL-PRF-49467.
2. All parts are conformal coated multilayer ceramic.
3. Designed to provide excellent long-term reliability.
4. Parts are Group A screened per MIL-PRF-49467 which includes 100% Corona testing and meet all other specification requirements.
5. Designed for surface, sea and airborne military and commercial high-reliability applications.
6. No IR degradation over life.
7. BR (X7R) V/TC is -40% at rated voltage and BZ (X7R) V/TC is -40% at 60% rated voltage.
8. BX characteristic (-25%) on BR parts is approximately 52% rated voltage.
9. 100% Non-destructive test by means of CSAM inspection available.

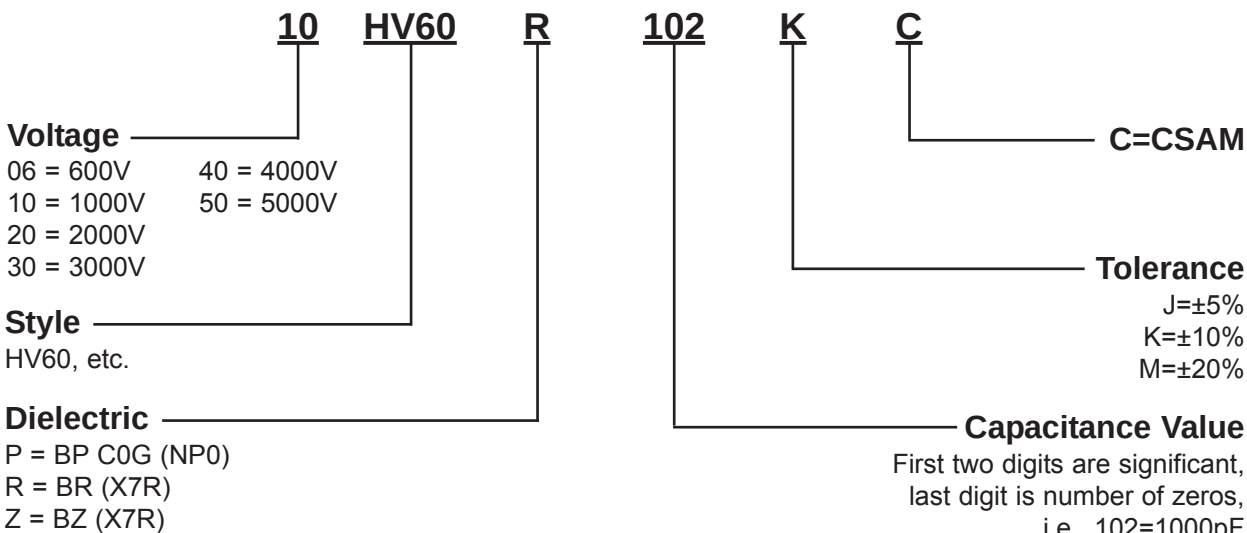
CAPACITOR OUTLINE DRAWING



DIMENSIONS

Style	Sizes in Inches (mm) max.			Lead Spacing ±0.030 (S)
	Length (L)	Width (W)	Thickness (T)	
HV60	.250 (6.35)	.220 (5.59)	.200 (5.08)	.170 (4.32)
HV61	.320 (8.13)	.280 (7.11)	.250 (6.35)	.220 (5.59)
HV62	.370 (9.40)	.300 (7.62)	.250 (6.35)	.275 (6.98)
HV63	.470 (11.94)	.400 (10.16)	.270 (6.86)	.375 (9.52)
HV64	.570 (14.48)	.500 (12.70)	.270 (6.86)	.475 (12.06)
HV65	.670 (17.02)	.600 (15.24)	.270 (6.86)	.575 (14.60)
HV66	.770 (19.56)	.720 (18.29)	.270 (6.86)	.675 (17.14)
HV68	1.300 (33.02)	.600 (15.24)	.270 (6.86)	1.175 (29.84)
HV69	1.500 (38.10)	.720 (18.29)	.270 (6.86)	1.375 (34.92)

PART NUMBER AND ORDERING INFORMATION



MARKING

(HV60, HV61)	(All Other Sizes)
102K	HV63R102K
1 kV	1 kV
KEC	KEC
Date Code	Date Code

COG DIELECTRIC

[illegible]

High Voltage MIL-PRF-49467 (Equivalent) HV Series

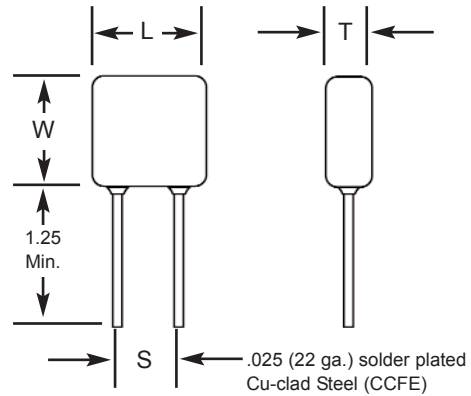
X7R DIELECTRIC

STYLE		HV60			HV61			HV62			HV63			HV64					HV65					HV66					HV 68			HV 69							
Cap	L MAX	.250 (6.35)			.320 (8.13)			.370 (9.40)			.470 (11.94)			.570 (14.48)					.670 (17.02)					.770 (19.56)					1.300 (33.02)			1.500 (38.10)							
	W MAX	.220 (5.59)			.280 (7.11)			.300 (7.62)			.400 (10.16)			.500 (12.70)					.600 (15.24)					.720 (18.29)					.600 (15.24)			.720 (18.29)							
	T MAX	.200 (5.08)			.250 (6.35)			.250 (6.35)			.270 (6.86)			.270 (6.86)					.270 (6.86)					.270 (6.86)					.270 (6.86)			.270 (6.86)							
	S± .030	.170 (4.32)			.220 (5.59)			.275 (6.98)			.375 (9.52)			.475 (12.06)					.575 (14.60)					.675 (17.14)					1.175 (29.84)			1.375 (34.92)							
	Lead Dia. +0.004/-0.002	.025 (.635)			.025 (.635)			.025 (.635)			.025 (.635)			.025 (.635)					.025 (.635)					.025 (.635)					0.025 (.635)			0.025 (.635)							
	Cap Code	WVDC			WVDC			WVDC			WVDC			WVDC					WVDC					WVDC					WVDC					WVDC			WVDC		
		600	1k	2k	600	1k	2k	3k	600	1k	2k	3k	600	1k	2k	3k	4k	600	1k	2k	3k	4k	5k	1k	2k	3k	4k	5k	1k	2k	3k	4k	5k	3k	4k	5k	3k	4k	5k
270pF	271																																						
330	331																																						
390	391																																						
470	471																																						
560	561																																						
680	681																																						
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0.047	473																																						
0.056	563																																						
0.068	683																																						
0.082	823																																						
0.10	104																																						

FEATURES

1. Conforms to MIL-PRF-49467. (Group A Screening, Subgroup 1)
2. 100% Corona tested.
3. No IR degradation over life.
4. High density, low DF ceramic.
5. Conservative and proven design is recommended for non-repairable applications such as spacecraft.
6. CSAM inspection is available and is recommended for space applications.
7. Burn-in in a non-contaminating inert fluid is standard for $\geq 2\text{KV}$; optional for 500V or 1 KV parts.

CAPACITOR OUTLINE DRAWING



DIMENSIONS

Style	Sizes in Inches (mm) max.			Lead Spacing ± 0.030 (S)
	Length (L)	Width (W)	Thickness (T)	
HS20	.250 (6.35)	.220 (5.59)	.200 (5.08)	.170 (4.32)
HS21	.320 (8.13)	.280 (7.11)	.250 (6.35)	.220 (5.59)
HS22	.370 (9.40)	.300 (7.62)	.250 (6.35)	.275 (6.98)
HS30	.450 (11.43)	.220 (5.59)	.200 (5.08)	.300 (7.62)
HS23	.470 (11.94)	.400 (10.16)	.270 (6.89)	.375 (9.52)
HS31	.550 (13.97)	.280 (7.11)	.250 (6.35)	.400 (10.16)
HS24	.570 (14.48)	.500 (12.70)	.270 (6.89)	.475 (12.06)
HS25	.670 (17.02)	.600 (15.24)	.270 (6.89)	.575 (14.60)
HS26	.770 (19.56)	.720 (18.29)	.270 (6.89)	.675 (17.14)
HS33	.850 (21.59)	.400 (10.16)	.270 (6.89)	.700 (17.78)
HS34	1.050 (26.67)	.500 (12.70)	.270 (6.89)	.975 (24.76)
HS35	1.250 (31.75)	.600 (15.24)	.270 (6.89)	1.175 (29.84)
HS36	1.450 (36.83)	.720 (18.29)	.270 (6.89)	1.375 (34.92)

PART NUMBER AND ORDERING INFORMATION

VOLTAGE

05 = 500V 40 = 4000V
 10 = 1000V 50 = 5000V
 20 = 2000V 75 = 7500V
 30 = 3000V 100 = 10,000V

STYLE

HS24, etc.

DIELECTRIC

B = X7R
 N = BP C0G (NP0)

CAPACITANCE VALUE

First two digits are significant, last digit is number of zeros, i.e., 103=10000pF

INERT LIQUID (BURN-IN)

Std. for $\geq 2\text{kV}$;
 Add "F" if required for 500V or 1kV parts

C=CSAM

TOLERANCE

J = $\pm 5\%$
 K = $\pm 10\%$
 M = $\pm 20\%$
 P = 0/+100%
 Z = -20%/+80%

MARKING

(HS20, HV21)	(All Other Sizes)
103K	HS24B103K
1 kV	1 kV
KEC	KEC
Date Code	Date Code

High Voltage Space Quality MLC (-55° to +125°C) HS Series

C0G DIELECTRIC

STYLE		HS 20			HS 21			HS 22			HS 23				HS 24					HS 25					HS 26							
Cap	L MAX	.250 (6.35)			.320 (8.13)			.370 (9.40)			.470 (11.94)				.570 (14.48)					.670 (17.02)					.770 (19.56)							
	W MAX	.220 (5.59)			.280 (7.11)			.300 (7.62)			.400 (10.16)				.500 (12.70)					.600 (15.24)					.720 (18.29)							
	T MAX	.200 (5.08)			.250 (6.35)			.250 (6.35)			.270 (6.86)				.270 (6.86)					.270 (6.86)					.270 (6.86)							
	S± .030	.170 (4.32)			.220 (5.59)			.275 (6.98)			.375 (9.52)				.475 (12.06)					.575 (14.60)					.675 (17.14)							
	Lead Dia. +0.004/-0.002	.025 (.635)			.025 (.635)			.025 (.635)			.025 (.635)				.025 (.635)					.025 (.635)					.025 (.635)							
		WVDC			WVDC			WVDC			WVDC				WVDC					WVDC					WVDC							
	Cap Code	500	1k	2k	500	1k	2k	500	1k	2k	500	1k	2k	3k	500	1k	2k	3k	4k	5k	500	1K	2k	3k	4k	5k	500	1K	2k	3k	4k	5k
12pF	120																															
15	150																															
18	180																															
22	220																															
27	270																															
33	330																															
39	390																															
47	470																															
56	560																															
68	680																															
82	820																															
100	101																															
120	121																															
150	151																															
180	181																															
220	221																															
270	271																															
330	331																															
390	391																															
470	471																															
560	561																															
680	681																															
820	821																															
1000	102																															
1200	122																															
1500	152																															
1800	182																															
2200	222																															
2700	272																															
3300	332																															
3900	392																															
4700	472																															
5600	562																															
6800	682																															
8200	822																															
0.010uF	103																															
0.012	123																															
0.015	153																															
0.018	183																															
0.022	223																															
0.027	273																															
0.033	333																															
0.039	393																															
0.047	473																															
0.056	563																															
0.068	683																															
0.082	823																															
0.10	104																															
0.12	124																															
0.15	154																															

COG DIELECTRIC

STYLE		HS 30					HS 31					HS 33					HS 34							HS 35							HS 36												
Cap	L MAX	.450 (11.43)					.550 (13.97)					.850 (21.59)					1.050 (26.67)							1.250 (31.75)							1.450 (36.83)												
	W MAX	.220 (5.59)					.280 (7.11)					.400 (10.16)					.500 (12.70)							.600 (15.24)							.720 (18.29)												
	T MAX	.200 (5.08)					.250 (6.35)					.270 (6.89)					.270 (6.89)							.270 (6.89)							.270 (6.89)												
	S± .030	.300 (7.62)					.400 (10.16)					.700 (17.78)					.975 (24.76)							1.175 (29.84)							1.375 (34.92)												
	Lead Dia. +0.004/-0.002	.025 (.635)					.025 (.635)					.025 (.635)					.025 (.635)							.025 (.635)							.025 (.635)												
Cap Code		WVDC				WVDC					WVDC					WVDC							WVDC							WVDC													
		500	1k	2k	3k	500	1k	2k	3k	4k	5k	500	1k	2k	3k	4k	5k	500	1k	2k	3k	4k	5k	7.5k	500	1k	2k	3k	4k	5k	7.5k	10k	500	1K	2k	3k	4k	5k	7.5k	10k			
10pF	100																																										
12	120																																										
15	150																																										
18	180																																										
22	220																																										
27	270																																										
33	330																																										
39	390																																										
47	470																																										
56	560																																										
68	680																																										
82	820																																										
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1000	102																																										
1200	122																																										
1500	152																																										
1800	182																																										
2200	222																																										
2700	272																																										
3300	332																														</												

High Voltage Space Quality MLC (-55° to +125°C) HS Series

X7R DIELECTRIC

STYLE		HS 20			HS 21			HS 22			HS 23				HS 24					HS 25					HS 26						
Cap	L MAX	.250 (6.35)			.320 (8.13)			.370 (9.40)			.470 (11.94)				.570 (14.48)					.670 (17.02)					.770 (19.56)						
	W MAX	.220 (5.59)			.280 (7.11)			.300 (7.62)			.400 (10.16)				.500 (12.70)					.600 (15.24)					.720 (18.29)						
	T MAX	.200 (5.08)			.250 (6.35)			.250 (6.35)			.270 (6.86)				.270 (6.86)					.270 (6.86)					.270 (6.86)						
	S± .030	.170 (4.32)			.220 (5.59)			.275 (6.98)			.375 (9.52)				.475 (12.06)					.575 (14.60)					.675 (17.14)						
	Lead Dia. +0.004/-0.002	.025 (.635)			.025 (.635)			.025 (.635)			.025 (.635)				.025 (.635)					.025 (.635)					.025 (.635)						
	Cap Code	WVDC			WVDC			WVDC			WVDC				WVDC					WVDC					WVDC						
		500	1k	2k	500	1k	2k	500	1k	2k	500	1k	2k	3k	500	1k	2k	3k	4k	500	1k	2k	3k	4k	5k	500	1k	2k	3k	4k	5k
270pF	271																														
330	331																														
390	391																														
470	471																														
560	561																														
680	681																														
820	821																														
1000	102																														
1200	122																														
1500	152																														
1800	182																														
2200	222																														
2700	272																														
3300	332																														
3900	392																														
4700	472																														
5600	562																														
6800	682																														
8200	822																														
0.010uF	103																														
0.012	123																														
0.015	153																														
0.018	183																														
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0.056	563																														
0.068	683																														
0.082	823																														
0.10	104																														
0.12	124																														
0.15	154																														
0.18	184																														
0.22	224																														
0.27	274																														
0.33	334																														
0.39	394																														
0.47	474																														
0.56	564																														
0.68	684																														
0.82	824																														
1.0	105																														
1.2	125																														
1.5	155																														
1.8	185																														
2.2	225																														
2.7	275																														

X7R DIELECTRIC

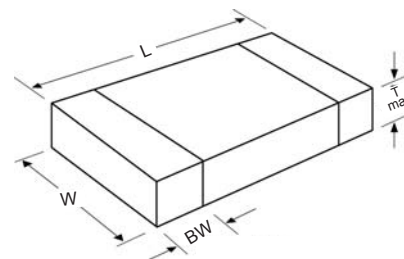
[illegible]

High Voltage Ceramic Chip (+125°C) Military Equivalent

FEATURES

1. The ceramic chip capacitors described in this section are the types used in our other high voltage ceramic multilayer product lines.
2. Types BP available as described in MIL-PRF-49467.
3. Group A and B screening per MIL-PRF-49467 available. - TCVC exceptions apply.
4. Ceramic chip capacitors are extremely sensitive to thermal shock damage during installation. Wherever possible, processes involving infrared or vapor phase soldering systems should be utilized.
5. Higher voltages available upon request.
6. Where nickel barrier termination is required, bandwidth dimensions may exceed the standard dimension listed.

CERAMIC CHIP OUTLINE DRAWING

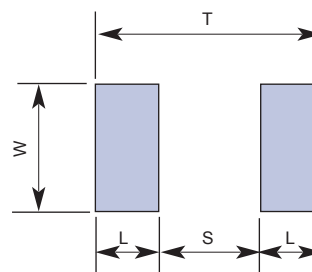


DIMENSIONS

Style	Length (L) Inches (mm)	Width (W) Inches (mm)	Thickness (T) max Inches (mm)	Bandwidth (BW) Inches
1515	.150 ±.015 (3.81 ±.38)	.150 ±.015 (3.81 ±.38)	.140 (3.55)	.010 - .030"
1812	.180 ±.020 (4.57 ±.51)	.120 ±.015 (3.05 ±.38)	.100 (2.54)	.010 - .040"
1825	.180 ±.020 (4.57 ±.51)	.250 ±.020 (6.35 ±.51)	.160 (4.07)	.010 - .040"
2020	.200 ±.020 (5.08 ±.51)	.200 ±.020 (5.08 ±.51)	.180 (3.55)	.010 - .040"
2225	.220 ±.020 (5.59 ±.51)	.250 ±.020 (6.35 ±.51)	.200 (5.08)	.010 - .040"
2520	.250 ±.020 (6.35 ±.51)	.200 ±.020 (5.08 ±.51)	.180 (4.57)	.030 - .060"
3333	.330 ±.030 (8.38 ±.76)	.330 ±.030 (8.38 ±.76)	.220 (5.59)	.030 - .060"
3530	.350 ±.030 (8.89 ±.76)	.300 ±.030 (7.62 ±.76)	.220 (5.59)	.030 - .060"
4040	.400 ±.030 (10.2 ±.76)	.400 ±.030 (10.2 ±.76)	.220 (5.59)	.030 - .060"
4540	.450 ±.030 (11.43 ±.76)	.400 ±.030 (10.2 ±.76)	.220 (5.59)	.030 - .060"
5440	.540 ±.030 (13.7 ±.76)	.400 ±.030 (10.2 ±.76)	.220 (5.59)	.030 - .060"
5550	.550 ±.030 (14.0 ±.76)	.500 ±.030 (12.7 ±.76)	.220 (5.59)	.030 - .060"
6560	.650 ±.030 (16.5 ±.76)	.600 ±.030 (15.2 ±.76)	.220 (5.59)	.030 - .060"

RECOMMENDED SOLDER PAD PATTERN DIMENSIONS

Chip Size	T (Total Length)		S (Separation)		W (Pad Width)		L (Pad Length)	
	mm	in.	mm	in.	mm	in.	mm	in.
1515	5.20	0.205	1.90	0.075	4.34	0.171	1.65	0.065
1812	5.390	0.232	2.30	0.091	3.70	0.146	1.80	0.071
1825	5.90	0.232	2.30	0.091	6.90	0.272	1.80	0.071
2020	6.50	0.256	2.80	0.110	5.62	0.221	1.85	0.073
2225	7.00	0.276	3.30	0.130	6.80	0.268	1.85	0.073
2520	8.68	0.342	4.98	0.196	5.62	0.221	1.85	0.073
3333	10.91	0.430	7.11	0.280	9.27	0.365	1.90	0.075
3530	11.51	0.453	7.61	0.300	8.51	0.335	1.95	0.077
4040	12.88	0.507	8.88	0.350	11.05	0.435	2.00	0.079
4540	14.21	0.559	10.15	0.400	11.05	0.435	2.03	0.080
5440	16.51	0.650	10.41	0.410	11.05	0.435	3.05	0.120
5550	18.92	0.745	12.82	0.505	13.59	0.535	3.05	0.120
6560	19.80	0.780	13.20	0.520	16.13	0.635	3.30	0.130



PART NUMBER AND ORDERING INFORMATION

4540 B 472 M 202 P M

Style
1515, 2020, etc.

Dielectric
B or R = X7R
N = C0G (NP0)

Capacitance Value
First two digits are significant,
last digit is number of zeros,
i.e., 472=4700pF

Tolerance
J = ±5% C0G (NP0)
K = ±10%
M = ±20%
P = 0/+100%
Z = -20%/+80%

Group A Screening*
Add to part number if required
*MIL-PRF-49467
(subgroup 1)
except Corona

Terminal Material
P = PdAg
S = Ag
E = Ag/Ni/SnPb Plate
C = Ag/Ni/Sn Plate

Voltage
First two digits are significant,
last digit is number of zeros,
i.e., 202=2000V

MARKING
Not applicable
As required by customer only.

C0G DIELECTRIC

STYLE		1515	1812	1825	2020	2225	2520	3333	3530
Cap	L	.150 ± .015 (3.81 ± .38)	.180 ± .020 (4.57 ± .51)	.180 ± .020 (4.57 ± .51)	.200 ± .020 (5.08 ± .51)	.220 ± 0.020 (5.59 ± .51)	.250 ± .020 (6.35 ± .51)	.330 ± .030 (8.38 ± .76)	.350 ± .030 (8.89 ± .76)
	W	.150 ± .015 (3.81 ± .38)	.120 ± .015 (3.05 ± .38)	.250 ± .020 (6.35 ± .51)	.200 ± .020 (5.08 ± .51)	.250 ± .020 (6.35 ± .51)	.200 ± .020 (5.08 ± .51)	.330 ± .030 (8.38 ± .76)	.300 ± .030 (7.62 ± .76)
	T MAX	.140 (3.55)	.100 (2.54)	.160 (4.07)	.180 (4.57)	.200 (5.08)	.180(4.57)	.220 (5.59)	.220 (5.59)
	Band Width	0.010-0.030	0.010-0.040	0.010-0.040	0.010-0.040	0.010-0.040	0.030-0.060	0.030-0.060	0.030-0.060
	Cap Code	WVDC				WVDC			
		500 1k 2k 3k	500 1k 2k 3k	500 1k 2k 3k	500 1k 2k 3k	500 1k 2k 3k	500 1k 2k 3k	500 1k 2k 3k 4k	500 1k 2k 3k 4k
12pF	120								
15	150								
18	180								
22	220								
27	270								
33	330								
39	390								
47	470								
56	560								
68	680								
82	820								
100	101								
120	121								
150	151								
180	181								
220	221								
270	271								
330	331								
390	391								
470	471								
560	561								
680	681								
820	821								
1000	102								
1200	122								
1500	152								
1800	182								
2200	222								
2700	272								
3300	332								
3900	392								
4700	472								
5600	562								
6800	682								
8200	822								
0.010uF	103								
0.012	123								
0.015	153								
0.018	183								
0.022	223								

COG DIELECTRIC

41

X7R DIELECTRIC

[illegible]

High Voltage Ceramic Chip (+125°C) Military Equivalent

X7R DIELECTRIC

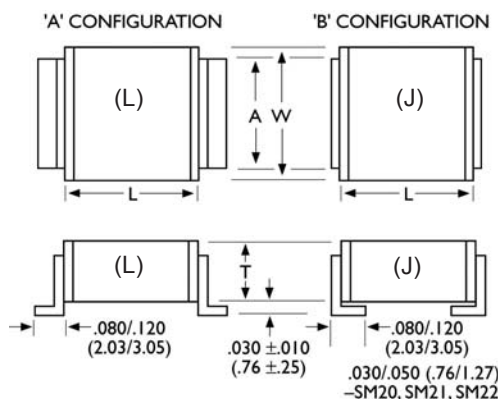
STYLE		4040					4540					5440					5550					6560							
Cap	L	.400 ± .030 (10.16 ± .76)					.450 ± .030 (11.43 ± .76)					.540 ± .030 (13.72 ± .76)					.550 ± .030 (13.97 ± .76)					.650 ± .030 (16.51 ± .76)							
	W	.400 ± .030 (10.16 ± .76)					.400 ± .030 (10.16 ± .76)					.400 ± .030 (10.16 ± .76)					.500 ± .030 (12.70 ± .76)					.600 ± .030 (15.20 ± .76)							
	T MAX	.220 (5.59)					.220 (5.59)					.220 (5.59)					.220 (5.59)					.220 (5.59)							
	Band Width	0.030 - 0.060					0.030 - 0.060					0.030 - 0.060					0.030 - 0.060					0.030 - 0.060							
	Cap Code	WVDC					WVDC					WVDC					WVDC					WVDC							
		500	1k	2k	3k	4k	500	1k	2k	3k	4k	5k	500	1k	2k	3k	4k	500	1k	2k	3k	4k	5k	500	1k	2k	3k	4k	5k
470pF	471																												
560	561																												
680	681																												
820	821																												
1000	102																												
1200	122																												
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0.056	563																												
0.068	683																												
0.082	823																												
0.10	104																												
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0.18	184																												
0.22	224																												
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0.33	334																												
0.39	394																												
0.47	474																												
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0.68	684																												
0.82	824																												
1.0	105																												
1.2	125																												
1.5	155																												
1.8	185																												
2.2	225																												
2.7	275																												

FEATURES

1. Silver plated copper alloy terminal for easy soldering.
2. Mounting tabs are designed to minimize the effect of thermal stress introduced by the differences in coefficient of thermal expansion between the capacitor and the mounting surface.
3. Low ESR.
4. High current discharge capability.
5. Group A and B screening per MIL-PRF-49467 available .
6. Standard lead configuration is 'B'.(J) If lead configuration is left out of part number the lead style is assumed to be 'B'.

CAPACITOR OUTLINE DRAWING

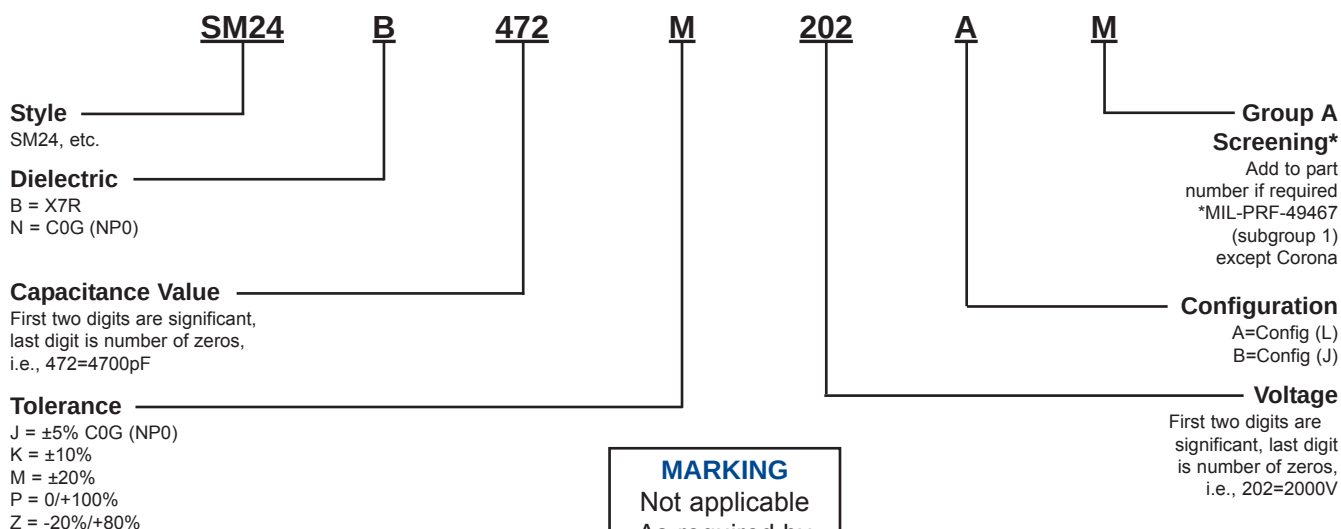
STANDARD



DIMENSIONS

Style	Length (L) Inches (mm)	Width (W) Inches (mm)	Thickness (T) max Inches (mm)	Tab (A) max Inches (mm)
SM20	.150 ± .015 (3.81 ± .38)	.150 ± .015 (3.81 ± .38)	.130 (3.30)	.100 (2.54)
SM21	.200 ± .020 (5.08 ± .51)	.200 ± .020 (5.08 ± .51)	.180 (4.57)	.100 (2.54)
SM22	.250 ± .020 (6.35 ± .51)	.200 ± .020 (5.08 ± .51)	.180 (4.57)	.100 (2.54)
SM23	.350 ± .030 (8.89 ± .76)	.300 ± .030 (7.62 ± .76)	.220 (5.59)	.200 (5.08)
SM24	.450 ± .030 (11.43 ± .76)	.400 ± .030 (10.20 ± .76)	.220 (5.59)	.300 (7.62)
SM25	.550 ± .030 (14.00 ± .76)	.500 ± .030 (12.70 ± .76)	.220 (5.59)	.400 (10.2)
SM26	.650 ± .030 (16.50 ± .76)	.600 ± .030 (15.20 ± .76)	.220 (5.59)	.500 (12.7)
SM30	.300 ± .030 (7.62 ± .76)	.150 ± .015 (3.81 ± .38)	.140 (3.55)	.100 (2.54)
SM31	.400 ± .030 (10.20 ± .76)	.200 ± .020 (5.08 ± .51)	.130 (3.30)	.100 (2.54)
SM33	.700 ± .030 (17.08 ± .76)	.300 ± .030 (7.62 ± .76)	.180 (4.57)	.200 (5.08)
SM34	.900 ± .030 (22.90 ± .76)	.400 ± .030 (10.20 ± .76)	.220 (5.59)	.300 (7.62)
SM35	1.100 ± .030 (27.90 ± .76)	.500 ± .030 (12.70 ± .76)	.220 (5.59)	.400 (10.2)
SM36	1.350 ± .030 (33.00 ± .76)	.600 ± .030 (15.20 ± .76)	.220 (5.59)	.500 (12.7)

PART NUMBER AND ORDERING INFORMATION



C0G DIELECTRIC

45

COG DIELECTRIC

[illegible]

High Voltage L and J Leaded Ceramic Capacitor SM Series

X7R DIELECTRIC

STYLE	SM20	SM21	SM22	SM23	SM24	SM25	SM26
L	.150 ± .015 (3.31 ± .38)	.200 ± .020 (5.08 ± .51)	.250 ± .020 (6.35 ± .51)	.350 ± .030 (8.89 ± .76)	.450 ± .030 (11.43 ± .76)	.550 ± .030 (14.00 ± .76)	.650 ± .030 (16.50 ± .76)
W	.150 ± .015 (3.31 ± .38)	.200 ± .020 (5.08 ± .51)	.200 ± .020 (5.08 ± .51)	.300 ± .030 (7.62 ± .76)	.400 ± .030 (10.20 ± .76)	.500 ± .030 (12.70 ± .76)	.600 ± .030 (15.20 ± .76)
T _{MAX}	.130 (3.30)	.180 (4.57)	.180 (4.57)	.220 (5.59)	.220 (5.59)	.220 (5.59)	.220 (5.59)
Tab A max	.100 (2.54)	.100 (2.54)	.100 (2.54)	.200 (5.08)	.300 (7.62)	.400 (10.20)	.500 (12.70)
Cap Code	WVDC	WVDC	WVDC	WVDC	WVDC	WVDC	WVDC
	500 1k 2k	500 1k 2k 3k	500 1k 2k 3k	500 1k 2k 3k 4k	500 1k 2k 3k 4k 5k	500 1k 2k 3k 4k 5k	500 1k 2k 3k 4k 5k
270pF	271						
330	331						
390	391						
470	471						
560	561						
680	681						
820	821						
1000	102						
1200	122						
1500	152						
1800	182						
2200	222						
2700	272						
3300	332						
3900	392						
4700	472						
5600	562						
6800	682						
8200	822						
0.01uF	103						
0.012	123						
0.015	153						
0.018	183						
0.022	223						
0.027	273						
0.033	333						
0.039	393						
0.047	473						
0.056	563						
0.068	683						
0.082	823						
0.10	104						
0.12	124						
0.15	154						
0.18	184						
0.22	224						
0.27	274						
0.33	334						
0.39	394						
0.47	474						
0.56	564						
0.68	684						
0.82	824						
1.0	105						
1.2	125						
1.5	155						
1.8	185						
2.2	225						
2.7	275						

X7R DIELECTRIC

STYLE	SM30	SM31	SM33	SM34	SM35	SM36
L	.300 ± .030 (7.62 ± .76)	.400 ± .030 (10.20 ± .76)	.700 ± .030 (17.08 ± .76)	.900 ± .030 (22.90 ± .76)	1.100 ± .030 (27.90 ± .76)	1.350 ± .030 (33.00 ± .76)
W	.150 ± .015 (3.31 ± .38)	.200 ± .020 (5.08 ± .51)	.300 ± .030 (10.20 ± .76)	.400 ± .030 (10.20 ± .76)	.500 ± .030 (12.70 ± .76)	.600 ± .030 (15.20 ± .76)
T _{MAX}	.140 (3.55)	.130 (3.30)	.180 (4.57)	.220 (5.59)	.220 (5.59)	.220 (5.59)
Tab A max	.100 (2.54)	.100 (2.54)	.200 (5.08)	.300 (7.62)	.400 (10.20)	.500 (12.70)
Cap Code	500 1k 2k 3k 4k	500 1k 2k 3k 4k 5k	500 1k 2k 3k 4k 5k 7.5k	500 1k 2k 3k 4k 5k 7.5k 10k	500 1k 2k 3k 4k 5k 7.5k 10k	500 1k 2k 3k 4k 5k 7.5k 10k
150pF	151					
180	181					
220	221					
270	271					
330	331					
390	391					
470	471					
560	561					
680	681					
820	821					
1000	102					
1200	122					
1500	152					
1800	182					
2200	222					
2700	272					
3300	332					
3900	392					
4700	472					
5600	562					
6800	682					
8200	822					
0.01uF	103					
0.012	123					
0.015	153					
0.018	183					
0.022	223					
0.027	273					
0.033	333					
0.039	393					
0.047	473					
0.056	563					
0.068	683					
0.082	823					
0.10	104					
0.12	124					
0.15	154					
0.18	184					
0.22	224					
0.27	274					
0.33	334					
0.39	394					
0.47	474					
0.56	564					
0.68	684					
0.82	824					
1.0	105					
1.2	125					
1.5	155					
1.8	185					
2.2	225					
2.7	275					
3.3	335					
3.9	395					
4.7	475					
5.6	565					

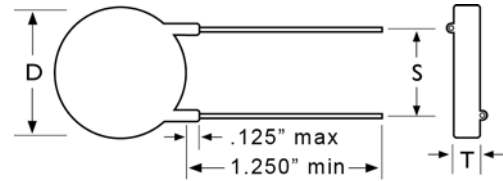
High Voltage Disc Ceramic Capacitor D Series

FEATURES

Disc ceramic capacitors made under strict quality control procedures are a reliable component. Special attention is given to the ceramic pressing operation to assure high and uniform ceramic density.

These parts are manufactured for the quality conscious customer. Parts are available screened to MIL-PRF-49467 established reliability specification.

CAPACITOR OUTLINE DRAWING



INSTALLATION

Higher-voltage parts may require further encapsulation to prevent surface breakdown. Parts should be cleaned and oven dried at 85°C before further encapsulation. Silicone rubbers or an epoxy may be used. De-airing of encapsulants is recommended. We recommend that a heat sink be attached to the lead between the soldering iron and the capacitor during installation soldering. Testing of higher-voltage parts before encapsulation may be done in a suitable dielectric fluid such as Freon.

DIELECTRIC COMPARISON

CERAMIC TYPE	C0G (NP0)	X7R	X5U
Dissipation Factor	0.1%	2.5%	2.5%
Temperature Coefficient	±30ppm/°C	±15%	+22% -56%
Voltage Coefficient	0	-20%	N/A
Dielectric Withstanding Voltage Test	3 to 15kV at 1.5x rated, 20 to 50kV at rated +10kV	3 to 15kV at 1.5x rated, 20 to 50kV at rated +10kV	3 to 15kV at 1.5x rated, 20 to 50kV at rated +10kV
Insulation Resistance (25°C)	100k megohms or 1k megohms-μF, whichever is less	100k megohms or 1k megohms-μF, whichever is less	10k megohms or 100 megohms-μF, whichever is less
Operating Temperature Range (rated voltage)	-55°C to +125°C	-55°C to +125°C	-55°C to +85°C

Thickness:
Inches (mm) max.

3kV = 0.15 (3.81)
5kV = 0.20 (5.08)
7.5kV = 0.28 (7.11)
10kV = 0.35 (8.89)
15kV = 0.45 (11.43)
20kV = 0.55 (13.97)
30kV = 0.95 (24.13)
40kV = 1.20 (30.48)
50kV = 1.50 (38.10)

Lead Type: Solder plated, copper-clad steel (CCFE)-
D30, D40: 0.025" (22GA)
D50 & Larger: 0.032" (20GA)

PART NUMBER AND ORDERING INFORMATION

30
Voltage
30 = 3000V
100 = 10,000V
etc.

D50
Style
D50, etc.

W
Dielectric
N = C0G (NP0)
W = X7R
Y = X5U

122
Capacitance Value
First two digits are significant, last digit is number of zeroes, i.e., 472=4700pF

M
Tolerance
J = ±5% C0G (NP0)
K = ±10%
M = ±20%
P = 0/+100%
Z = -20%/+80%

M
Group A Screening*
Add to part number if required
*MIL-PRF-49467 (subgroup 1) except Corona

Q
No Leads
Add to part number if required

MARKING

(D30)	(All Other Sizes)
301M	D50W122M
3kV	3kV
KEC	KEC
Date Code	Date Code

3K VDC

Disc Style	D Max.	S ±.030	C0G (NP0)		X7R		X5U	
			Min.	Max.	Min.	Max.	Min.	Max.
D30	.30	.250	7.8pF	9.6pF	250pF	300pF	520pF	700pF
D40	.40	.250	20pF	25pF	630pF	770pF	1300pF	1800pF
D50	.50	.375	36pF	44pF	1100pF	1400pF	2400pF	3200pF
D75	.75	.375	80pF	98pF	2500pF	3100pF	5300pF	7200pF
D90	.90	.500	123pF	150pF	3800pF	4700pF	8200pF	11000pF
D100	1.00	.500	145pF	178pF	4600pF	5600pF	9700pF	13000pF
D120	1.20	.500	193pF	236pF	6000pF	7400pF	12900pF	17300pF

5K VDC

D30	.30	.250	4.7pF	5.7pF	150pF	180pF	310pF	420pF
D40	.40	.250	12pF	15pF	380pF	460pF	810pF	1100pF
D50	.50	.375	21pF	26pF	670pF	820pF	1400pF	1900pF
D75	.75	.375	48pF	59pF	1500pF	1800pF	3200pF	4300pF
D90	.90	.500	74pF	90pF	2300pF	2800pF	4900pF	6600pF
D100	1.00	.500	87pF	107pF	2700pF	3300pF	5800pF	7800pF
D120	1.20	.500	116pF	141pF	3600pF	4400pF	7700pF	10400pF

7.5K VDC

D30	.30	.250	3.1pF	3.8pF	100pF	120pF	210pF	280pF
D40	.40	.250	8.1pF	9.9pF	250pF	310pF	540pF	720pF
D50	.50	.375	14pF	17pF	450pF	550pF	950pF	1300pF
D75	.75	.375	32pF	39pF	1000pF	1200pF	2100pF	2900pF
D90	.90	.500	49pF	60pF	1500pF	1900pF	3300pF	4400pF
D100	1.00	.500	58pF	71pF	1800pF	2200pF	3900pF	5200pF
D120	1.20	.500	77pF	94pF	2400pF	3000pF	5100pF	6900pF

10K VDC

D30	.30	.250	2.4pF	2.9pF	70pF	90pF	160pF	210pF
D40	.40	.250	6.1pF	7.4pF	190pF	230pF	400pF	540pF
D50	.50	.375	10.7pF	13.1pF	330pF	410pF	710pF	960pF
D75	.75	.375	24pF	29pF	750pF	920pF	1600pF	2200pF
D90	.90	.500	37pF	45pF	1200pF	1400pF	2500pF	3300pF
D100	1.00	.500	44pF	53pF	1400pF	1700pF	2900pF	3900pF
D120	1.20	.500	58pF	71pF	1800pF	2200pF	3900pF	5200pF

15K VDC

D30	.30	.250	1.6pF	1.9pF	50pF	60pF	100pF	140pF
D40	.40	.250	4.0pF	4.9pF	130pF	150pF	270pF	360pF
D50	.50	.375	7.1pF	8.7pF	220pF	270pF	480pF	640pF
D75	.75	.375	16pF	20pF	500pF	610pF	1100pF	1400pF
D90	.90	.500	25pF	30pF	770pF	940pF	1600pF	2200pF
D100	1.00	.500	29pF	36pF	910pF	1100pF	1900pF	2600pF
D120	1.20	.500	39pF	47pF	1200pF	1500pF	2600pF	3500pF

20K VDC

D30	.30	.250	1.2pF	1.4pF	37pF	45pF	80pF	110pF
D40	.40	.250	3.0pF	3.7pF	100pF	120pF	200pF	270pF
D50	.50	.375	5.3pF	6.5pF	170pF	200pF	360pF	480pF
D75	.75	.375	12pF	15pF	380pF	460pF	800pF	1100pF
D90	.90	.500	18pF	22pF	580pF	700pF	1200pF	1600pF
D100	1.00	.500	22pF	27pF	680pF	830pF	1500pF	2000pF
D120	1.20	.500	29pF	35pF	910pF	1100pF	1900pF	2600pF

30K, 40K & 50K VDC

Disc Style	D Max.	S ±.030	30kVDC		40kVDC		50kVDC	
			X7R		X7R		X7R	
			Min.	Max.	Min.	Max.	Min.	Max.
D30	.30	.250	20pF	30pF	18pF	22pF	10pF	20pF
D40	.40	.250	60pF	80pF	50pF	60pF	40pF	50pF
D50	.50	.375	110pF	140pF	80pF	100pF	70pF	80pF
D75	.75	.375	250pF	310pF	190pF	230pF	150pF	180pF
D90	.90	.500	380pF	470pF	290pF	350pF	230pF	280pF
D100	1.00	.500	460pF	560pF	340pF	420pF	270pF	330pF
D120	1.20	.500	600pF	740pF	450pF	550pF	360pF	440pF



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