



Defense and Aerospace

KEMET
CHARGED.™

Ceramic High Voltage, High Temperature Capacitors

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High Voltage MIL-PRF-49467 (Equivalent)	HV	15-17
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High Voltage Disc	D30/40/50/75/90/100/120	33-34
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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	+10%, +20%, +80% / -20%, +100% / -0%
X5U	+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

	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

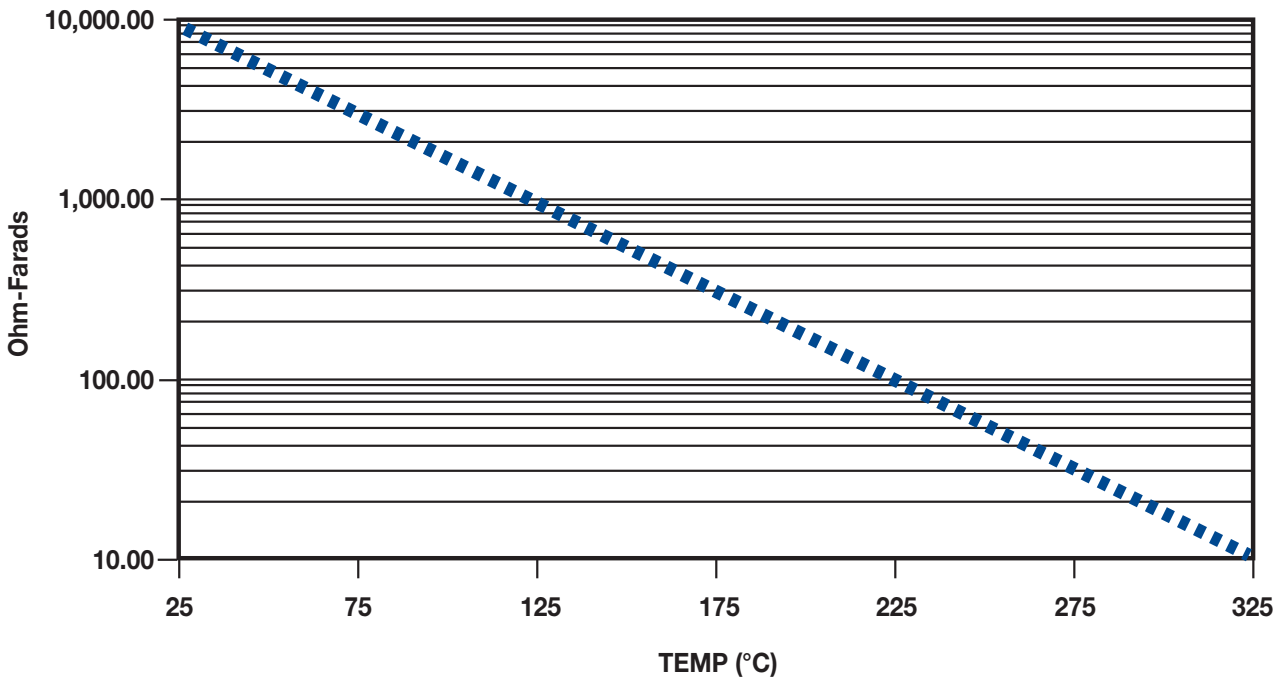
HIGH TEMPERATURE

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 (NPO)	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, NPO & X7R DIELECTRICS**



FEATURES

The HT/HP Series is used in robust applications

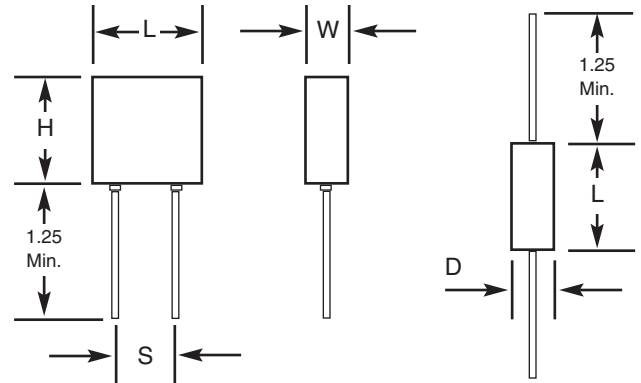
- Down Hole
- Industrial
- Harsh Environments

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

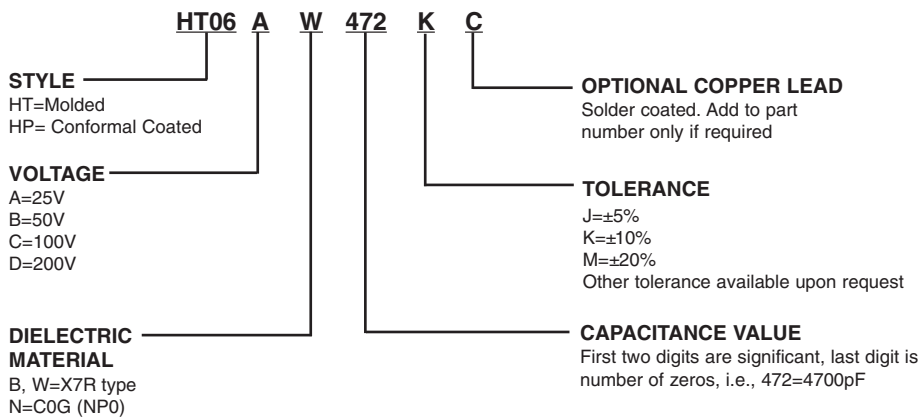
Molded (HT) and Conformal Coated (HP), Radial Lead Types

Style	Sizes in Inches (mm) max			Lead Spacing ±0.030 (S)
	Length (L)	Height (H)	Thickness (W)	
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.

COG & X7R DIELECTRIC

Radial COG							Radial X7R									
Series		HT/HP05	HT/HP55	HT/HP06	HT/HP08	HT/HP09	Series		HT/HP05	HT/HP55	HT/HP06	HT/HP08	HT/HP09			
Cap	W max	.200 (5.08)	.200 (5.08)	.300 (7.62)	.500 (12.70)	.700 (17.78)	Cap	W max	.200 (5.08)	.200 (5.08)	.300 (7.62)	.500 (12.70)	.700 (17.78)			
	H max	.200 (5.08)	.200 (5.08)	.300 (7.62)	.500 (12.70)	.400 (10.16)		H 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)		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)		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)		Lead Dia.	.025 (.635)	.025 (.635)	.025 (.635)	.025 (.635)	.025 (.635)	.025 (.635)		
Cap Code	Cap	WVDC			WVDC			WVDC			WVDC			WVDC		
		50	100	200	50	100	200	50	100	200	50	100	200	50	100	200
1.0pF	109															
1.2	129															
1.5	159															
1.8	189															
2.2	229															
2.7	279															
3.3	339															
3.9	399															
4.7	479															
5.6	569															
6.8	689															
8.2	829															
10	100															
12	120															
15	150															
18	180															
22	220															
27	270															
33	330															
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3900	392															
4700	472															
5600	562															
6800	682															
8200	822															
.010uF	103															
.012	123															
.015	153															
.018	183															
.022	223															
.027	273															
.033	333															
.039	393															
.047	473															
.056	563															
.068	683															
.082	823															
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.12	124															
.15	154															
.100uF	101															
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.068	683															
.082	823															
.10	104															
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.15	154															

FEATURES

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

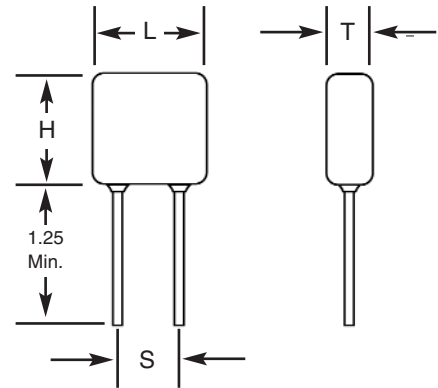
To be used in robust applications

- Down Hole
- Industrial
- Harsh Environments

NOTE:

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

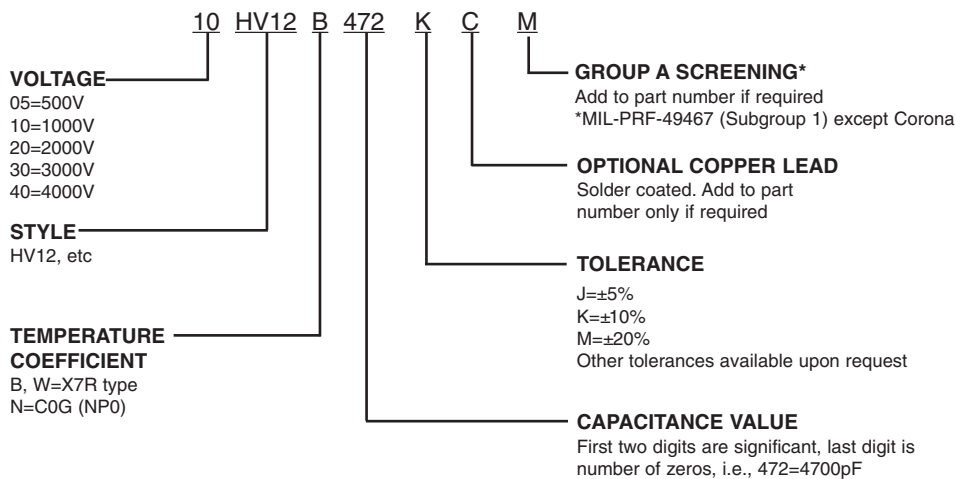
CAPACITOR OUTLINE DRAWING



DIMENSIONS

Style	Sizes in Inches (mm) max.			Lead Spacing ±0.030 (S)
	Length (L)	Height (H)	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

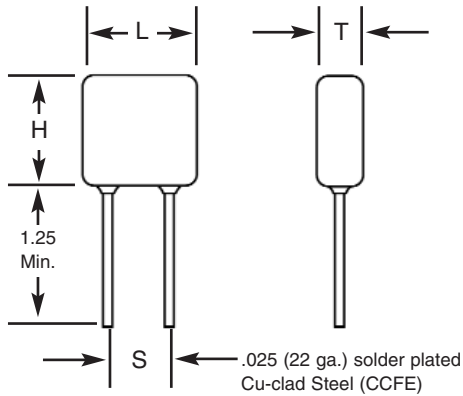
(HV10, HV11)
472M
KEC
Date Code

(All other sizes)
HV12B472M
1kV
KEC
Date Code

COG DIELECTRIC

STYLE COG		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)									
	H max	.220 (5.59)			.300 (7.62)			.400 (10.16)			.500 (12.70)			.500 (12.70)				.700 (17.78)				.700 (17.78)									
	W 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. +.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									
pF		500	1k	2k	500	1k	2k	3k	500	1k	2k	3k	500	1k	2k	3k	500	1k	2k	3k	4k	500	1k	2k	3k	4k	500	1k	2k	3k	4k
12pF	120																														
15	150																														
18	180																														
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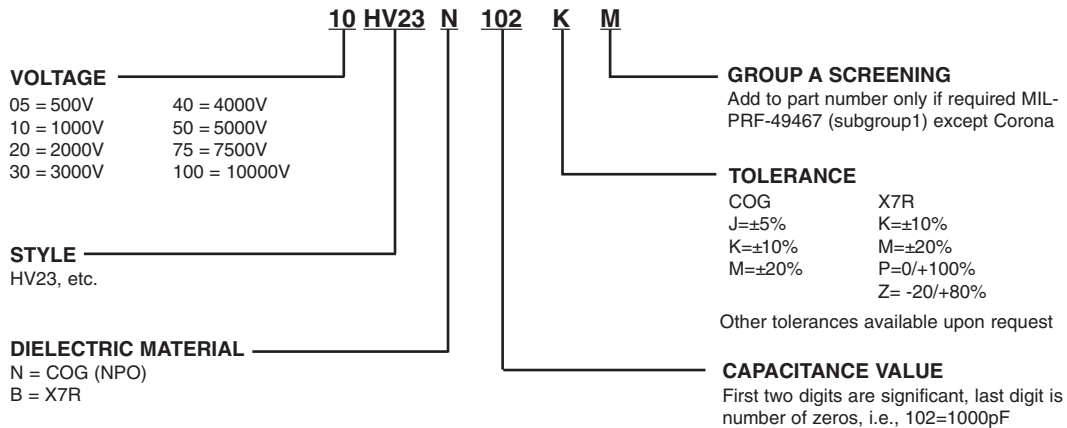
CAPACITOR OUTLINE DRAWING



DIMENSIONS

Style	Sizes in Inches (mm) max.			Lead Spacing ±0.030 (S)
	Length (L)	Height (H)	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

COG DIELECTRIC

STYLE	COG	HV30				HV31				HV33				HV34				HV35				HV36														
	W max	.450 (11.43)				.550 (13.97)				.850 (21.59)				1.050 (26.67)				1.250 (31.75)				1.450 (36.83)														
	L 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. +.004/-0.002	.025 (.635)				.025 (.635)				.025 (.635)				.025 (.635)				.025 (.635)				.025 (.635)														
	Cap Code	WVDC				WVDC				WVDC				WVDC				WVDC				WVDC														
Cap	pF	500	1k	2k	3k	4k	500	1k	2k	3k	4k	5k	500	1k	2k	3k	4k	5k	7k	10k	500	1k	2k	3k	4k	5k	7k	10k	500	1k	2k	3k	4k	5k	7k	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																																			
100	101																																			
120	121																																			
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180	181																																			
220	221																																			
270	271																																			
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3900	392																																			
4700	472																																			
5600	562																																			
6800	682																																			
8200	822																																			
.010uF	103																																			
.012	123																																			
.015	153																																			
.018	183																																			
.022	223																																			
.027	273																																			
.033	333																																			
.039	393																																			
.047	473																																			
.056	563																																			
.068	683																																			
.082	823																																			
.10	104																																			
.12	124																																			
.15	154																																			
.18	184																																			
.22	224																																			
.27	274																																			
.33	334																																			

X7R DIELECTRIC

STYLE X7R	HV20			HV21			HV22			HV23			HV24					HV25					HV26															
	W max	L max	T max	S ±.030	Lead Dia. +.004/-0.02	Cap Code	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	
Cap	PF																																					
270pF	271																																					
330	331																																					
390	391																																					
470	471																																					
560	561																																					
680	681																																					
820	821																																					
1000	102																																					
1200	122																																					
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2700	272																																					
3300	332																																					
3900	392																																					
4700	472																																					
5600	562																																					
6800	682																																					
8200	822																																					
.010uF	103																																					
.012	123																																					
.015	153																																					
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.027	273																																					
.033	333																																					
.039	393																																					
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.056	563																																					
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.39	394																																					
.47	474																																					
.56	564																																					
.68	684																																					
.82	824																																					
1.0	105																																					
1.2	125																																					
1.5	155																																					
1.8	185																																					
2.2	225																																					

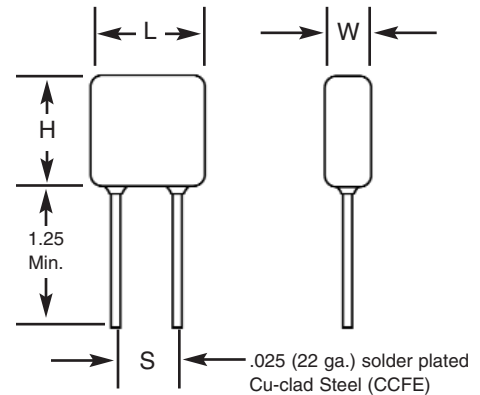
X7R DIELECTRIC

STYLE	X7R	HV30	HV31	HV33	HV34	HV35	HV36
W max		.450 (11.43)	.550 (13.97)	.850 (21.59)	1.050 (26.67)	1.250 (31.75)	1.450 (36.83)
L 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. +.004/-0.002		.025 (.635)	.025 (.635)	.025 (.635)	.025 (.635)	.025 (.635)	.025 (.635)
Cap Code		WVDC	WVDC	WVDC	WVDC	WVDC	WVDC
Cap	pF	50 1k 2k 3k 4k 500 1k 2k 3k 4k 5k 500 1k 2k 3k 4k 5k 7k 500 1k 2k 3k 4k 5k 7k 10k 500 1k 2k 3k 4k 5k 7k 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						
.010uF	103						
.012	123						
.015	153						
.018	183						
.022	223						
.027	273						
.033	333						
.039	393						
.047	473						
.056	563						
.068	683						
.082	823						
.10	104						
.12	124						
.15	154						
.18	184						
.22	224						
.27	274						
.33	334						
.39	394						
.47	474						
.56	564						
.68	684						
.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						

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. SLAM available by special order.

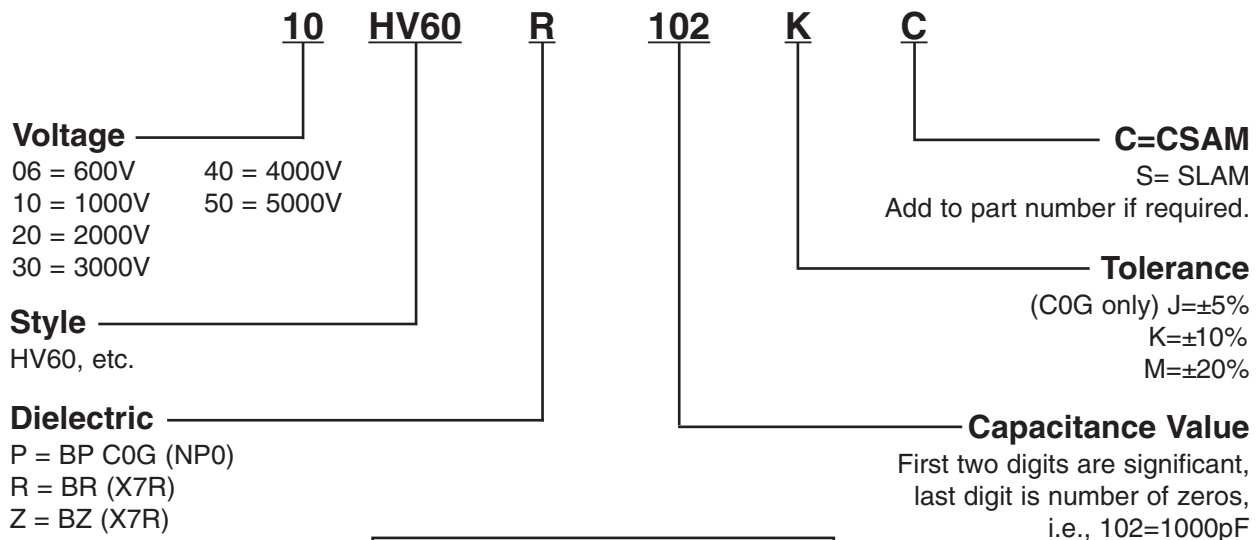
CAPACITOR OUTLINE DRAWING



DIMENSIONS

Style	Sizes in Inches (mm) max.			Lead Spacing ±0.030 (S)
	Length (L)	Height (H)	Thickness (W)	
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

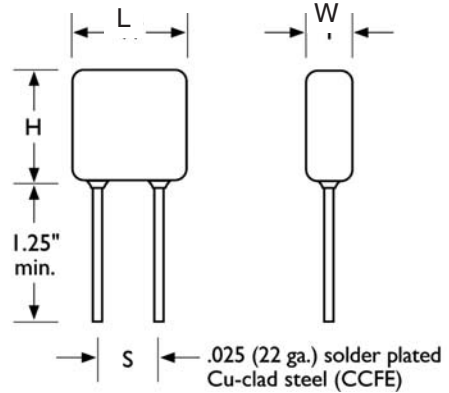
X7R DIELECTRIC

STYLE X7R	HV60			HV61			HV62			HV63				HV64				HV65			HV66				HV68			HV69												
	W max	L max	T max	S ± .030	Lead Dia. ±.004/-0.002	Cap Code	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		
Cap	270pF	330	390	470	560	680	820	1000	1200	1500	1800	2200	2700	3300	3900	4700	5600	6800	8200	.010uF	.012	.015	.018	.022	.027	.033	.039	.047	.056	.068	.082	.10	.12	.15	.18	.22	.27	.33	.39	.47
	271	331	391	471	561	681	821	102	122	152	182	222	272	332	392	472	562	682	822	103	123	153	183	223	273	333	393	473	563	683	823	104	124	154	184	224	274	334	394	474

FEATURES

1. Similar to NASA Spec. SSQ 21113 (1, 2 & 5kV).
2. Conforms to MIL-PRF-49467. (Group A Screening, Subgroup 1)
3. 100% Corona tested.
4. No IR degradation over life.
5. High density, low DF ceramic.
6. Conservative and proven design is recommended for non-repairable applications such as spacecraft.
7. CSAM inspections are available and is recommended for space applications. SLAM available by special order.
8. Burn-in in a non-contaminating inert fluid available.

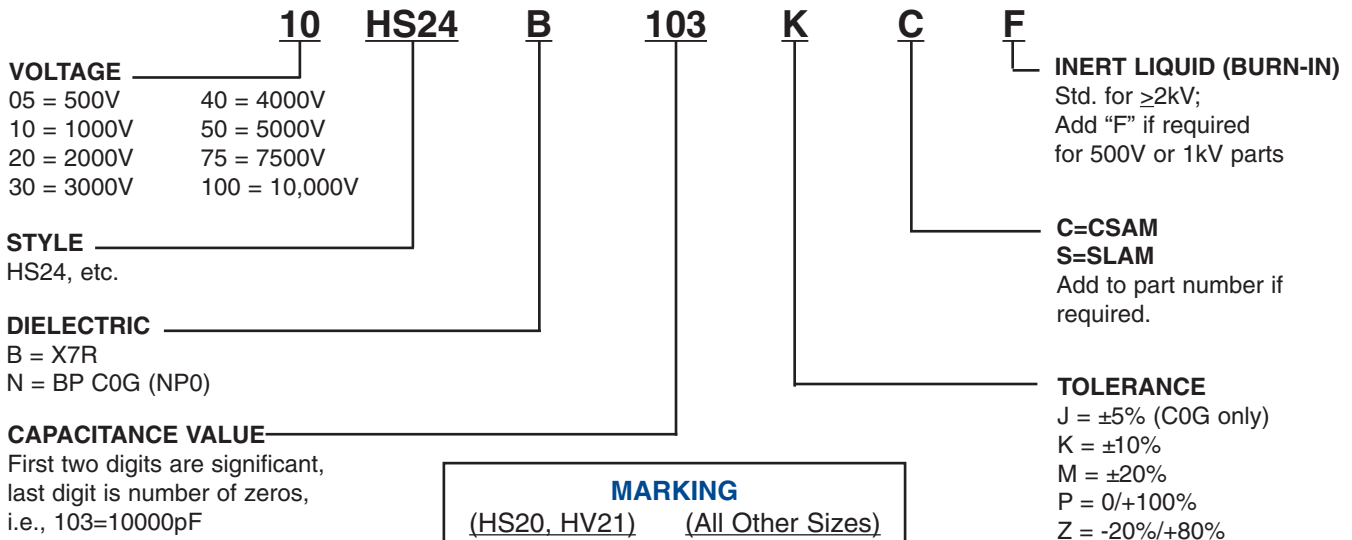
CAPACITOR OUTLINE DRAWING



DIMENSIONS

Style	Sizes in Inches (mm) max.			Lead Spacing ±0.030 (S)
	Length (L)	Height (H)	Thickness (W)	
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



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

COG DIELECTRIC

STYLE COG		HS20			HS21			HS22			HS23				HS24					HS25					HS26							
Cap	W max	.250 (6.35)			.320 (8.13)			.370(9.40)			.470 (11.94)				.570 (14.48)					.670 (17.02)					.770 (19.56)							
	L 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. +.004/-0.02	.025 (.635)			.025 (.635)			.025 (.635)			.025 (.635)				.025 (.635)					.025 (.635)					.025 (.635)							
Cap Code		WVDC			WVDC			WVDC			WVDC				WVDC					WVDC					WVDC							
pF		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
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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2700	272																															
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3900	392																															
4700	472																															
5600	562																															
6800	682																															
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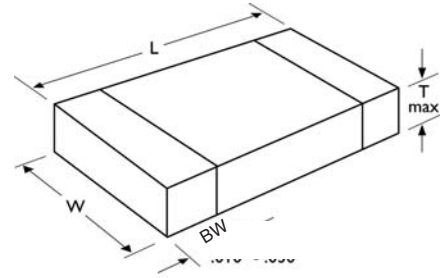
X7R DIELECTRIC

STYLE X7R		HS20			HS21			HS22			HS23				HS24					HS25					HS26						
Cap	W max	.250 (6.35)			.320 (8.13)			.370(9.40)			.470 (11.94)				.570 (14.48)					.670 (17.02)					.770 (19.56)						
	L 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. +.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						
	pF	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																														
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.68	684																														
.82	824																														
1.0	105																														

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, BR and BZ available as described in MIL-PRF-49467.
3. Group A and B screening per MIL-PRF-49467 available.
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, end band length dimensions may exceed the standard dimension listed.

CERAMIC CHIP OUTLINE DRAWING

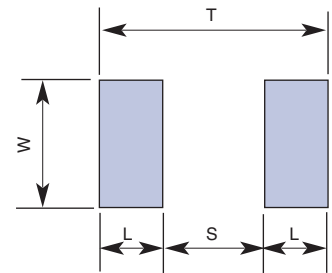


DIMENSIONS

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	5.90	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% COG (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.

COG DIELECTRIC

STYLE COG		4040					4540					5440					5550					6560						
		L					L					L					L					L						
	W	.400 ±.030(10,20±.76)					.450 ±.030(11,43±.76)					.540 ±.030(13,70±.76)					.550 ±.030(14,00±.76)					.650 ±.030(16,50±.76)						
	T max	.220 (5,59)					.220 (5,59)					.220 (5,59)					.220 (5,59)					.220 (5,59)						
	Band Width	.030 - .060"					.030 - .060"					.030 - .060"					.030 - .060"					.030 - .060"						
Cap	Cap Code pF	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
10pF	100																											
12	120																											
15	150																											
18	180																											
22	220																											
27	270																											
33	330																											
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X7R DIELECTRIC

STYLE X7R		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 ±.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 (3.55)				.200 (5.08)				.180 (3.55)				.220 (5.59)				.220 (5.59)					
	Band Width	.010 - .030"			.010 - .040"			.010 - .040"				.010 - .040"				.010 - .040"				.030 - .060"				.030 - .060"				.030 - .060"					
Cap Code	pF	WVDC			WVDC			WVDC				WVDC				WVDC				WVDC				WVDC				WVDC					
		500	1k	2k	500	1k	2k	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	
220pF	221																																
270	271																																
330	331																																
390	391																																
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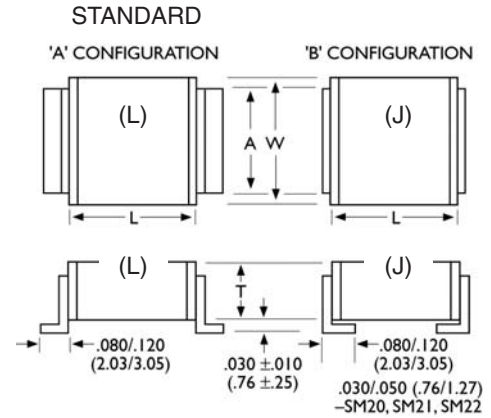
X7R DIELECTRIC

STYLE X7R		4040					4540					5440					5550					6560							
Cap	L	.400 ±.030(10,20±.76)					.450 ±.030(11,43±.76)					.540 ±.030(13,70±.76)					.550 ±.030(14,00±.76)					.650 ±.030(16,50±.76)							
	W	.400 ±.030(10,20±.76)					.400 ±.030(10,20±.76)					.400 ±.030(10,20±.76)					.500 ±.030(10,20±.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	.030 - .060*					.030 - .060*					.030 - .060*					.030 - .060*					.030 - .060*							
Cap Code	WVDC					WVDC					WVDC					WVDC					WVDC								
pF		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
220pF	221																												
270	271																												
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2.2	225																												

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'.

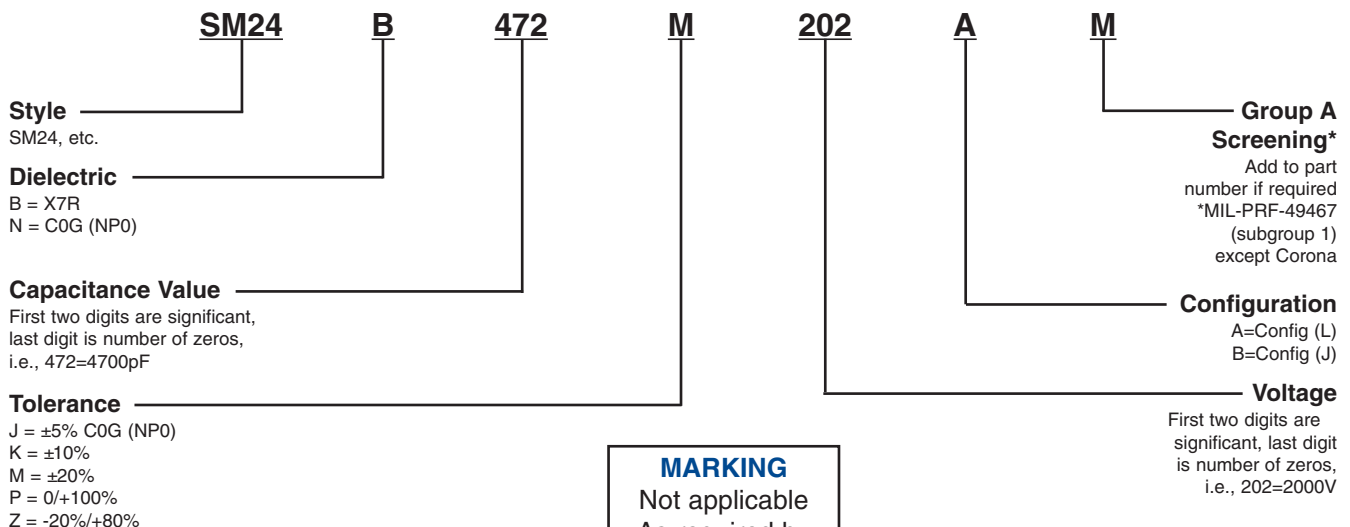
CAPACITOR OUTLINE DRAWING



DIMENSIONS

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

PART NUMBER AND ORDERING INFORMATION



MARKING
Not applicable
As required by customer only.

COG DIELECTRIC

STYLE COG		SM20				SM21				SM22				SM23					SM24					SM25					SM26									
Cap	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												
pF	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																																					
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X7R DIELECTRIC

STYLE	X7R	SM20			SM21			SM22			SM23			SM24			SM25			SM26									
Cap	L	.150±.015 (3.81±.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 (3.81±.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												
pF		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
270pF	271																												
330	331																												
390	391																												
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1.8	185																												
2.2	225																												
2.7	275																												



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)

Факс: 8 (812) 320-02-42

Электронная почта: org@eplast1.ru

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.