

High Temperature and High Voltage Ceramic Capacitors Selection Guide

Index

Test Requirements	4
High Voltage/High Temperature Series	5
High Temperature Ceramic Cases Series (C3)	6
High Voltage Series	7
High Voltage Ceramic Surface Mount Chip	8
High Voltage Disc Ceramic Series	9
Competitor Cross Reference	10

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The KEMET website (www.kemet.com) should be consulted for the very latest information on design characteristics, specifications, applications, and newly-released products, since previously-issued printed information may not be current.

Any capacitors misapplied may fail and thereby damage other circuit components. Please refer to application notes and recommendations in the catalog F3106 for a complete description of capacitor characteristics.

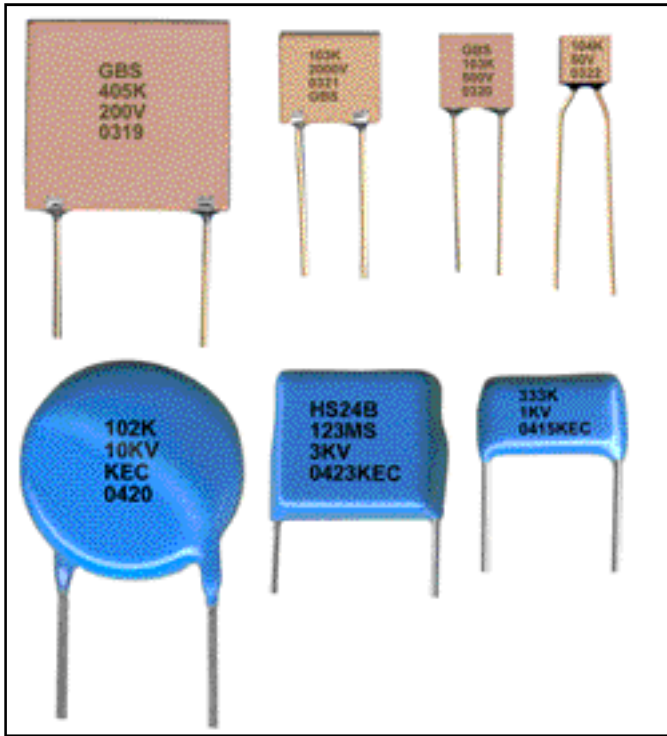
KEMET's Sierra-KD product line features High Voltage, High Temperature, and combined High Voltage/High Temperature Ceramic Leaded and Chip Capacitors.

Product Series	Description	Capacitance Range	Testing
High Temperature (HT/HP Series)	Conformally Coated (HP) Molded Case (HT) Temperature: +200°C Voltage range: 100 Vdc - 200 Vdc Radial or Axial Configuration	C0G: 16 pF - .10 µF X7R: 1000 pF - 1.0µF	KEMET Standard Customer Drawing
High Temperature, High Voltage (HV Series)	Conformally Coated Temperature: +200°C Voltage range: 500 Vdc to 4000 Vdc Radial Configuration	C0G: 390 pF - .015 µF X7R: 1400 pF - .27 µF	KEMET Standard MIL-PRF-49467, except Corona Customer Drawing
High Temperature Ceramic Cased Capacitors (C3)			
SCR/SCA/SRR/SRA Series	Temperature: +125°C Voltage range: 50 Vdc, 100 Vdc, 200 Vdc Radial or Axial Configuration	C0G: 1.0 pF - .12 µF X7R: 100 pF - 6.8 µF	KEMET Standard MIL-PRF-20 (C0G) MIL-PRF-39014 (X7R) Customer Drawing
ACR/ACA/ARR/ARA Series	Temperature: +200°C Voltage range: 100 Vdc, 200 Vdc Radial or Axial Configuration	C0G: 1.0 pF - .12 µF X7R: 100 pF - 3.3 µF	
TCR/TCA/TRR/TRA Series	Temperature: +260°C Voltage range: 100 Vdc, 200 Vdc Radial or Axial Configuration	C0G: 1.0 pF - .12 µF X7R: 100 pF - 3.3 µF	
VCR/VRR Series	Temperature: +200°C Voltage range: 500 Vdc to 5000 Vdc Radial or Axial Configuration	C0G: 1.0 pF - .056 µF X7R: 330 pF - 1.2 µF	
High Voltage (HV Series, HV20 thru HV36)	Temperature: C0G & X7R -55° – +125°C Voltage range: 500 Vdc to 10k Vdc Radial configuration	C0G: 10 pF - .33 µF X7R: 150 pF - 5.6 µF	KEMET Standard MIL-PRF-49467, except Corona Customer Drawing
High Voltage (HV Series, HV60 thru HV69)	Temperature: +125°C Voltage range: 600 Vdc to 5k Vdc Radial Configuration	C0G: 12 pF - .68 µF X7R: 27 pF - .47 µF	MIL-PRF-49467 (Equivalent) CSAM available SLAM available on special order
High Voltage (HS Series, Space Quality)	Temperature: +125°C Voltage range: 500 Vdc to 10k Vdc Radial Configuration	C0G: 10 pF - .18 µF X7R: 270 pF - 2.2 µF	
High Voltage Ceramic Chip	Temperature: +125°C Voltage range: 500 Vdc to 10k Vdc Chip Configuration Terminal Material: PdAg, Ag, Ag/Ni/SnPb plate, Ag/Ni/Sn Plate	C0G: 12 pF - .10 µF X7R: 270 pF - 2.2 µF	MIL-PRF-49467, except Corona Customer Drawing
High Voltage Ceramic Chip (Commercial Series)	Temperature: +125°C Voltage range: 500 Vdc to 3k Vdc Chip Configuration Terminal Material: Ag/Ni/Sn Plate	C0G: 1.0 pF - .01 µF X7R: 10 pF - .22 µF	KEMET Standard
High Voltage Ceramic Chip (SM Series)	Temperature : +125°C Voltage range: 500 Vdc to 10k Vdc Chip Surface Mount Lead Configuration Ag placed copper alloy lead characteristics	C0G: 10 pF - .33 µF X7R: 150 pF - 5.6 µF	KEMET Standard MIL-PRF-49467, except Corona Customer Drawing
High Voltage Disc Ceramic (D Series)	Temperature: 125°C Voltage range: 3k Vdc to 50k Vdc Leaded or non-leaded Circular Disc	C0G: 1.2 pF to 236 pF X7R: 10 pF - 7400 pF X5U: 80 pF - 17300 pF	
High Voltage Disc Multiplier Stacks	Temperature: 125°C Voltage range: 5k Vdc to 20k Vdc Multiple Stacked Leaded Circular Disc Customer designs available upon request	C0G: 1.2 pF - 141 pF X7R: 37 pF - 4400 pF X5U: 80 pF - 10400 pF	KEMET Standard Customer Drawing

High Voltage/High Temperature Series



Features



HT/HP Series

- Used in robust applications such as downhole, industrial and harsh environments.
- Radial/Axial coated/cased capacitor withstands 200°C temperatures

HV10 – HV16 Series

- Offers high temperature 200°C
- Offers high voltage, 500 Vdc to 4000 Vdc

High Temperature & High Voltage Applications

Military & Aerospace	Medical	Power Supply	Industrial	Other
Avionics	X-Ray Generator	HV Power Supply	Oil Rigging	Electric Ballast for CFL
Radar Systems			Down Hole	Electric Ballast for Fluorescent Lamp
			Mining	Measurement Equipment
				Microwave/Convection Oven

Product Information

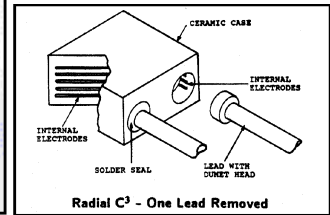
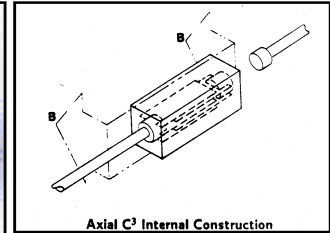
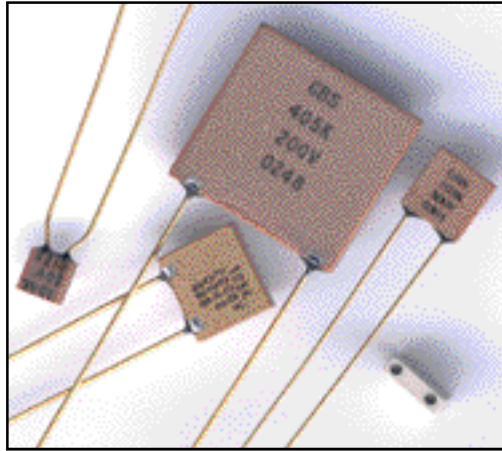
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High Temperature (HT/HP Series)	Conformally Coated (HP) Molded Case (HT) Temperature: +200°C Voltage range: 100 Vdc - 200 Vdc Radial or Axial Configuration	C0G: 16 pF - .10 μF X7R: 1000 pF - 1.0μF	KEMET Standard Customer Drawing
High Temperature, High Voltage (HV Series)	Conformally Coated Temperature: +200°C Voltage range: 500 Vdc to 4000 Vdc Radial or Axial Configuration	C0G: 390 pF - .015 μF X7R: 1400 pF - .27 μF	KEMET Standard MIL-PRF-49467, except Corona Customer Drawing

Features

Ceramic Cased Capacitors (C³) are capable of withstanding temperatures up to 260°C.

Advantages of C³ Construction are:

- Uniform coefficient of linear expansion
- No “pull-away” of epoxy potting
- Resistant to moisture penetration
- Superior volumetric efficiency
- Patent #4,931,899



High Temperature Applications

Military & Aerospace	Medical	Power Supply	Semiconductor	Industrial	Other
Avionics	X-Ray Generator	HV Power Supply	Semiconductor Manufacturing	Oil Rigging	Electric Ballast for CFL
Radar Systems		Inverter Power Supply - AC		Down Hole	Electric Ballast for Fluorescent Lamp
Control Systems				Mining	Measurement Equipment
					Microwave/ Convection Oven

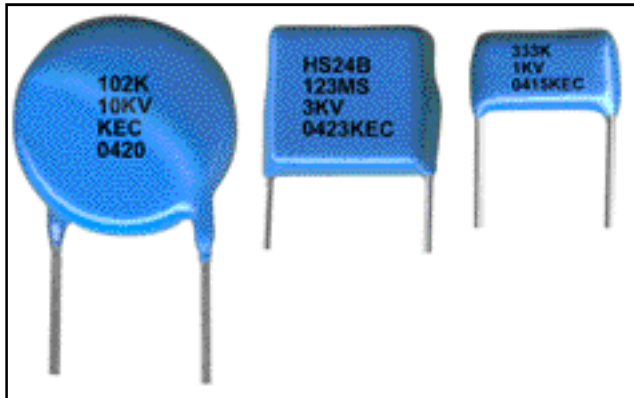
High Voltage Applications

Military & Aerospace	Medical	Power Supply	Industrial	Other
Avionics	X-Ray Generator	HV Power Supply	Oil Rigging	Electric Ballast for CFL
Radar Systems			Down Hole	Electric Ballast for Fluorescent Lamp
			Mining	Measurement Equipment
				Microwave/ Convection Oven

Product Information

Product Series	Description	Capacitance Range	Testing
SCR/SCA/SRR/SRA Series	Temperature: +125°C Voltage range: 50 Vdc, 100 Vdc, 200 Vdc Radial or Axial Configuration	C0G: 1.0 pF - .12 μF X7R: 100 pF - 6.8 μF	KEMET Standard MIL-PRF-20 (C0G) MIL-PRF-39014 (X7R) Customer Drawing
ACR/ACA/ARR/ARA Series	Temperature: +200°C Voltage range: 100 Vdc, 200 Vdc Radial or Axial Configuration	C0G: 1.0 pF - .12 μF X7R: 100 pF - 3.3 μF	KEMET Standard MIL-PRF-20 (C0G) MIL-PRF-39014 (X7R) Customer Drawing
TCR/TCA/TRR/TRA Series	Temperature: +260°C Voltage range: 100 Vdc, 200 Vdc Radial or Axial Configuration	C0G: 1.0 pF - .12 μF X7R: 100 pF - 3.3 μF	KEMET Standard MIL-PRF-20 (C0G) MIL-PRF-39014 (X7R) Customer Drawing
VCR/VRR Series	Temperature: +200°C Voltage range: 500 Vdc to 5000 Vdc Radial Configuration	C0G: 1.0 pF - .056 μF X7R: 330 pF - 1.2 μF	KEMET Standard MIL-PRF-20 (C0G) MIL-PRF-39014 (X7R) Customer Drawing

Features



HV20 – HV36 Series

- Group A & B Screening per MIL-PRF-49467 available. Note temperature range
- CSAM and Partial Discharge (Corona) available
- Designed for typical high voltage circuit application

HV60 – HV69 Series

- Electrical characteristics and environmental information may be obtained by referring to MIL-PRF-49467
- Parts are screened per MIL-PRF-49467, Group A, includes 100% Partial Discharge testing
- No IR degradation over life
- 100% non-destructive CSAM inspection available

HS20 – HS36 Series

- Similar to NASA Spec. SSQ21113 (1, 2, & 5kV)
- Conforms to MIL-PRF-49467, Group A Screening, Subgroup 1
- 100% Partial Discharge Testing
- No IR degradation over life
- Recommended for non-repairable applications (spacecraft)
- CSAM available and recommended for space applications
- Burn-in in a non-contaminating inert fluid available

High Voltage Applications

Military & Aerospace	Medical	Power Supply	Semiconductor	Telecom	Modem	Other
Avionics	.5 to 1.5 Tesla MR1	Power Station Equipment	RF Tuning Networks	Base Station Power AMPS	DAA Modem	LCD Backlight Inverter
Telemetry Data Tx/Rx	NM1 Tuning Coils	Power supply for AC, Washing Mach.	RF Power Supplies	Broadcasting Equipment	xDSL Modem	
Space Applications (HS Series)	1 to 3 Tesla MR1 Gradient				LAN, Router, HUB, Switches	
	Coils & Magnetic Rings				RF Power Amplifiers	
	CT Scanner & Medical MRI					

Product Information

Product Series	Description	Capacitance Range	Testing
High Voltage (HV Series, HV20 thru HV36)	Temperature: C0G & X7R -55° – +125°C Voltage range: 500 Vdc to 10k Vdc Radial configuration	C0G: 10 pF - .33 µF X7R: 150 pF - 5.6 µF	KEMET Standard MIL-PRF-49467, except Corona Customer Drawing
High Voltage (HV Series, HV60 thru HV69)	Temperature: +125°C Voltage range: 600 Vdc to 5k Vdc Radial Configuration	C0G: 12 pF - .68 µF X7R: 27 pF - .047 µF	MIL-PRF-49467 (equivalent) CSAM available SLAM available (special order)
High Voltage (HS Series, Space Quality)	Temperature: +125°C Voltage range: 500 Vdc to 10k Vdc Radial Configuration	C0G: 10 pF - .18 µF X7R: 270 pF - 2.2 µF	MIL-PRF-49467 (equivalent) CSAM available SLAM available (special order)

Features

High Voltage Ceramic Chip

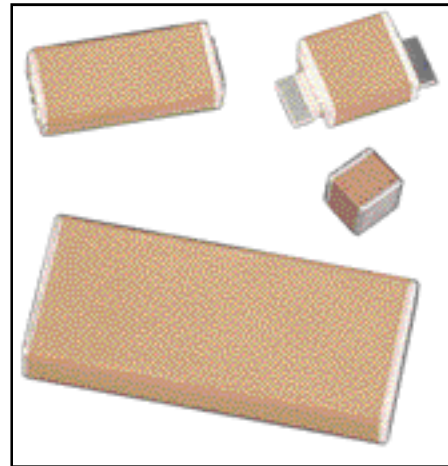
- Group A & B Screening per MIL-PRF-49467 available. Note temperature range
- Infrared or vapor phase soldering recommended to prevent thermal shock damage during installation
- Types BP, BR and BZ available per MII-PRF-49467 descriptions
- Higher voltages available upon request

High Voltage Ceramic Chip (Commercial)

- Offers high capacitance with low leakage current low ESR at high frequency
- Pure tin (Sn) plated external electrodes for good solderability
- X7R dielectrics are not designed for AC line filtering applications
- An insulating coating may be required to prevent surface arcing
- These components are RoHS compliant

High Voltage SM Capacitor (J or L Lead Configuration)

- Silver plated copper alloy terminal for easy soldering
- Lead configuration used to minimize differences in coefficient of thermal expansion between capacitor and mounting surface
- High density, low DF ceramic; offers low ESR
- High current discharge capability
- Group A & B screening per MIL-PRF-49467 available



High Voltage Applications

Military & Aerospace	Medical	Power Supply	Semiconductor	Telecom	Modem	Other
Avionics	.5 to 1.5 Tesla MR1	Power Station Equipment	RF Tuning Networks	Base Station Power AMPS	DAA Modem	LCD Backlight Inverter
Telemetry Data Tx/Rx	NM1 Tuning Coils	Power supply for AC, Washing Mach.	RF Power Supplies	Broadcasting Equipment	xDSL Modem	
Space Applications (HS Series)	1 to 3 Tesla MR1 Gradient				LAN, Router, HUB, Switches	
	Coils & Magnetic Rings				RF Power Amplifiers	
	CT Scanner & Medical MRI					

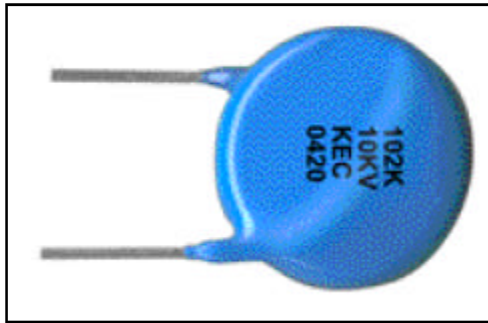
Product Information

Product Series	Description	Capacitance Range	Testing
High Voltage Ceramic Chip	Temperature: +125°C Voltage range: 500 Vdc to 10k Vdc Chip Configuration Terminal Material: PdAg, Ag, Ag/Ni/SnPb plate, Ag/Ni/Sn Plate	C0G: 12 pF - .10 µF X7R: 270 pF - 2.56 µF	MIL-PRF-49467, except Corona Customer Drawing
High Voltage Ceramic Chip (Commercial Series)	Temperature: +125°C Voltage range: 500 Vdc to 3k Vdc Chip Configuration Terminal Material: Ag/Ni/Sn Plate	C0G: 1.0 pF - .01 µF X7R: 10 pF - .22 µF	KEMET Standard
High Voltage Ceramic Chip (SM Series)	Temperature : +125°C Voltage range: 500 Vdc to 10k Vdc Chip Surface Mount J or L Lead Configuration Ag plated copper alloy lead characteristics Low DF, High discharge capability	C0G: 10 pF - .33 µF X7R: 150 pF - 5.6 µF	KEMET Standard MIL-PRF-49467, except Corona Customer Drawing

High Voltage Disc Ceramic Series



Features



- Disc ceramic capacitors made under strict quality control conditions, are reliable components
- Special attention to the ceramic pressing operation to assure high and uniform ceramic density
- Disc components can be ordered with or without leads
- Group A screening per MIL-PRF-49467 available

High Voltage Applications

Military & Aerospace	Medical	Power Supply	Semiconductor	Telecom	Modem	Other
Avionics	.5 to 1.5 Tesla MR1	Power Station Equipment	RF Tuning Networks	Base Station Power AMPS	DAA Modem	LCD Backlight Inverter
Telemetry Data Tx/Rx	NM1 Tuning Coils	Power supply for AC, Washing Mach.	RF Power Supplies	Broadcasting Equipment	xDSL Modem	
Space Applications (HS Series)	1 to 3 Tesla MR1 Gradient				LAN, Router, HUB, Switches	
	Coils & Magnetic Rings				RF Power Amplifiers	
	CT Scanner & Medical MRI					

Product Information

Product Series	Description	Capacitance Range	Testing
High Voltage Disc Ceramic (D Series)	Temperature: 125°C Voltage range: 3k Vdc to 50k Vdc Leaded or non-leaded Circular Disc	C0G: 1.2 pF to 236 pF X7R: 10 pF - 7400 pF X5U: 80 pF - 17300 pF	KEMET Standard MIL-PRF-49467, except Corona Customer Drawing
High Voltage Disc Multiplier Stacks	Temperature: 125°C Voltage range: 5k Vdc to 20k Vdc Multiple Stacked Leaded Circular Disc Customer designs available upon request	C0G: 1.2 pF - 141 pF X7R: 37 pF - 4400 pF X5U: 80 pF - 10400 pF	KEMET Standard Customer Drawing

High Temperature Leaded MLCC Cross Reference							
Series	Military Equivalent Testing			Dielectric Offering		Maximum Voltage	Maximum Operating Temperature
	MIL-PRF-20	MIL-PRF-39014	MIL-PRF-49467	C0G	X7R		
KEMET "HT/HP"				0	0	200VDC	+200°C
KEMET "HV"			0	0	0	4,000VDC	+200°C
KEMET "SCR/SRR/SCA/SRA"	0	0		0	0	200VDC	+125°C
KEMET "ACR/ARR/ACA/ARA"		0		0	0	100VDC	+200°C
KEMET "TCR/TRR/TCA/TRA"	0			0	0	100VDC	+260°C
KEMET "VCR/VRR"	0			0	0	5,000VDC	+200°C
AVX (US Microtech) "C27-C38"				0		100VDC	+200°C
AVX (US Microtech) "X27-X38"					0	100VDC	+200°C
Johanson (AMC)			0	0	0	4,000VDC	+200°C
Novacap "High Rel"		0	0	0	0	4,000VDC	+200°C
Wright Capacitor "HT"				0	0	500VDC	+200°C

High Voltage Leaded MLCC Cross Reference						
Series	Properties		Dielectric Offering			Maximum Voltage
	High Temp	Space Quality	C0G	X7R	KDA	
KEMET "HV"	0		0	0	0	10,000VDC
KEMET "HS"		0	0	0		10,000VDC
KEMET "VCR/VRR"	0		0	0		5,000VDC
AVX (US Microtech) "SV"			0	0		5,000VDC
AVX (US Microtech) "CV"		0	0	0		5,000VDC
Calramic "HV"			0	0		10,000VDC
Calramic "HS"		0	0	0		10,000VDC
Johanson "H"			0	0		15,000VDC
Johanson "T"	0		0	0		4,000VDC
MuRata "HPP"			0			7,200VDC
Novacap "HV" Leaded			0	0		10,000VDC
Novacap "HT" Leaded	0		0	0		4,000VDC
Presidio "RL"			0	0	0	5,000VDC
Syfer "81- -"			0	0		5,000VDC
TEMEX "H"		0	0	0		10,000VDC
TEMEX "SPACE"		0	0	0		5,000VDC
Wright "HV" Leaded			0	0		10,000VDC
Eurofarad "TCF"			0	0		5,000VDC
Eurofarad "TCK"		0	0	0		10,000VDC

High Voltage SMD MLCC Cross Reference						
Series	Military Equivalent Testing		Dielectric Offering			Maximum Voltage
	MIL-PRF-123	MIL-PRF-49467	C0G	X7R	KDA	
KEMET Commercial			0	0	0	5,000VDC
KEMET "Mil Equivalent"	0	0	0	0		10,000VDC
AVX (US Microtech)			0	0		5,000VDC
Johanson (AMC)			0	0		5,000VDC
MuRata "GRM"			0	0		2,000VDC
Novacap "High Rel"	0	0	0	0		10,000VDC
Yageo (Phycomp)			0	0		4,000VDC
Presidio	0	0	0	0		4,000VDC
Spectrum Control			0	0		5,000VDC
Syfer			0	0		5,000VDC
Tecate "CMC (HV)"			0	0		5,000VDC
TEMEX			0	0		5,000VDC
TDK "C"			0	0		3,000VDC
Venkel			0	0		5,000VDC
Vishay "VJ"			0	0		3,000VDC
Wright Capacitor			0	0		10,000VDC
Eurofarad "C"		0	0	0		10,000VDC



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