

⚡ Ceramic Capacitors

Up to 8 kV

HIGH VOLTAGE
SMD CAPACITORS

COG (NPO) and X7R Dielectrics

SMD SAFETY-CERTIFIED
CAPACITORS

High Voltage Up to 50 kV_{DC}

715C

Up to 7.2 kV

HIFREQ

X1 / Y1 and X1 / Y2,
Up to 20 nF, for
Industrial Applications

VY1, VY1 COMPACT,
VY2, SMDY1, AND 440L

AEC-Q200 Qualified

GA...31G, GA...34G,
GA...31M, GA...EDG,
VJ...X1A, VJ...X2A

X1 / Y1 and X1 / Y2,
Automotive Applications,
AEC-Q200 Qualified

SMDY1...A, AY1 AND AY2

Leaded High Voltage
10 kV, 15 kV, and 20 kV

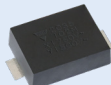
HVCC



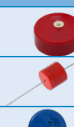
CERAMIC CAPACITORS

Focus Products

Ceramic Safety Capacitors

	Series	Voltage			Capacitance	Tolerance	Temperature Characteristics	
		Y Rating	X Rating	Rated DC Voltage				
	SMDY1 Series	500 V _{AC}	760 V _{AC}	1500 V _{DC}	470 pF to 4.7 nF	± 20 %	Y5U	
	EMI suppression safety capacitor; class X1: 760 V _{AC} ; class Y1: 500 V _{AC} ; SMD component reflow solderable							
	SMDY1...A Series	500 V _{AC}	760 V _{AC}	1500 V _{DC}	470 pF to 4.7 nF	± 20 %	Y5U	
	Automotive EMI suppression safety capacitor, class X1: 760 V _{AC} ; class Y1: 500 V _{AC}							
	SMDY1...S Series	300 V _{AC}	440 V _{AC}	1500 V _{DC}	10 pF to 1.5 nF	± 10 % / ± 20 %	U2J / Y5S / Y5U	
	EMI suppression safety capacitor, class X1: 440 V _{AC} ; class Y1: 300 V _{AC}							
	VY1 Series	500 V _{AC}	760 V _{AC}	1500 V _{DC}	10 pF to 4.7 nF	± 10 % / ± 20 %	U2J / Y5S / Y5U / Y5V	
	EMI suppression safety capacitor; class X1: 760 V _{AC} ; class Y1: 500 V _{AC} ; this series includes mini sized VY1...Y5V							
	VY1 Compact Series	500 V _{AC}	760 V _{AC}	1500 V _{DC}	470 pF to 4.7 nF	± 20 %	Y5U	
	EMI suppression safety capacitor; compact size and high pulse strength; class X1: 760 V _{AC} ; class Y1: 500 V _{AC}							
	VY2 Series	300 V _{AC}	440 V _{AC}	1000 V _{DC}	10 pF to 10 nF	± 10 % / ± 20 %	U2J / Y5S / Y5U / Y5V	
	EMI suppression safety capacitor; class X1: 440 V _{AC} ; class Y2: 300 V _{AC} ; this series includes mini sized VY2...Y5V							
	AY1 Series	500 V _{AC}	760 V _{AC}	1500 V _{DC}	15 pF to 4.7 nF	± 10 % / ± 20 %	U2J / Y5S / Y5T / Y5U	
	Automotive Grade EMI suppression safety capacitor, class X1: 760 V _{AC} ; class Y1: 500 V _{AC}							
	AY2 Series	300 V _{AC}	440 V _{AC}	1000 V _{DC}	10 pF to 10 nF	± 10 % / ± 20 %	U2J / Y5S / Y5U / Y5V	
	EMI suppression safety capacitor for automotive applications; class X1: 440 V _{AC} ; class Y2: 300 V _{AC}							
		WKP Series	500 V _{AC}	760 V _{AC}		33 pF to 4.7 nF	± 10 % / ± 20 %	U2J / Y5S / Y5T / Y5U
		EMI suppression safety capacitor; class X1: 760 V _{AC} ; class Y1: 500 V _{AC}						
WYO Series		250 V _{AC}	440 V _{AC}		1.0 nF to 12 nF	± 20 %	Y5U	
	EMI suppression safety capacitor; class X1: 440 V _{AC} ; class Y2: 250 V _{AC}							
	440L Series	500 V _{AC}	760 V _{AC}		10 pF to 20 nF	± 10 % / ± 20 %	C0G / U2J / P3K / R3L / X7R / Y5U	
	EMI suppression safety capacitor; class X1: 760 V _{AC} ; class Y1: 500 V _{AC}							

High Voltage Ceramic Capacitors

	Series	Voltage	Capacitance	Tolerance	Temperature Characteristics	Dissipation Factor	Terminal
	715C Series (Class 1, Class 2)	10 kV _{DC} to 50 kV _{DC}	100 pF to 20 nF	± 20 % / +80 %, -20 %	N4700 / Y5U	0.2 % (class 1) / 2.0 % (class 2)	Screw
	High voltage class 1 and class 2 ceramic DC disc capacitors; screw terminal mounting; 15 kV _{DC} to 50 kV _{DC}						
	660R Series	10 kV _{DC} to 30 kV _{DC}	100 pF to 10 nF	± 20 % / +80 %, -20 %	N4700 / X7R / Z5U	0.2 % (class 1) / 2.0 % (class 2)	Axial leaded
	High voltage ceramic DC disc capacitors with axial leads; 10 kV _{DC} to 30 kV _{DC}						
	HVCC Series	10 kV _{DC} to 20 kV _{DC}	100 pF to 2.0 nF	± 10 % / ± 20 %	Y6P	< 1.5 %	Radial leaded
	High voltage ceramic DC disc capacitors with radial leads; 10 kV _{DC} to 20 kV _{DC}						
	HVCC Class 1 Series	15 kV _{DC}	100 pF to 1.0 nF	± 10 %	T3M	Max. 1.0 % at 1 kHz, 1.5 % at 100 kHz	Radial leaded
	High voltage ceramic DC disc capacitors with radial leads; 15 kV _{DC}						
	615R Series	10 kV _{DC} to 20 kV _{DC}	100 pF to 3.3 nF	± 20 % / +80 %, -20 %	T3M / X5F / Y5R / Y5U / Z5U	0.2 % (class 1) / 2.0 % (class 2)	Radial leaded
	High voltage ceramic DC disc capacitors with radial leads; 10 kV _{DC} to 20 kV _{DC}						

Leaded MLCCs for Automotive Applications

Series	Voltage	Capacitance	Tolerance	Temperature Characteristics	Terminal		
	A...P Series	50 V _{DC} to 200 V _{DC}	100 pF to 1.0 µF	± 5 % / ± 10 % / ± 20 %	C0G / X7R	Axial leaded	
	Axial leaded multilayer ceramic capacitors for automotive applications; class 1 and class 2; 50 V _{DC} , 100 V _{DC} , 200 V _{DC} ; 160 °C						
		K...G Series	50 V _{DC} to 200 V _{DC}	100 pF to 1.0 µF	± 5 % / ± 10 % / ± 20 %	C0G / X7R	Radial leaded
Radial leaded multilayer ceramic capacitors for automotive applications; class 1 and class 2; 50 V _{DC} , 100 V _{DC} , 200 V _{DC} ; 160 °C							
K...H Series		50 V _{DC} to 200 V _{DC}	100 pF to 1.0 µF	± 5 % / ± 10 % / ± 20 %	C0G / X0U	Radial leaded	
	Radial leaded multilayer ceramic capacitors for automotive applications; class 1 and class 2; 50 V _{DC} , 100 V _{DC} , 200 V _{DC} ; 175 °C; 200 °C for max. 500 h						
		MDSA Series	50 V _{DC} to 200 V _{DC}	10 pF to 1.0 µF	± 5 % / ± 10 % / ± 20 %	C0G / X7R	Axial leaded
		Axial leaded multilayer ceramic capacitors for automotive applications class 1 and class 2; 50 V _{DC} , 100 V _{DC} , 200 V _{DC}					
		MDSK Series	50 V _{DC} to 200 V _{DC}	10 pF to 1.0 µF	± 5 % / ± 10 % / ± 20 %	C0G / X7R	Radial leaded
	Radial leaded multilayer ceramic capacitors for automotive applications class 1 and class 2; 50 V _{DC} , 100 V _{DC} , 200 V _{DC}						

Ceramic SMD Capacitors for General Applications

Series		Capacitance	Voltage	Sizes	Dielectric	Process
	VJ Commercial Series	1 pF to 6.8 µF	16 V to 1000 V	0402, 0603, 0805, 1206, 1210, 1808, 1812, 1825, 2220, 2225, 3640	C0G (NP0), X7R	Wet build, noble metal electrode
	Excellent ESD performance; robust design due to wet build process; polymer (flexible) termination available					
	VJ...W1BC Basic Commodity	0.5 pF to 100 µF	10 V to 100 V	0201, 0402, 0603, 0805, 1206, 1210	C0G (NP0), X5R, X7R, Y5V	Dry sheet, base metal electrode
	High capacitance values: ultra small 0201 size					



CERAMIC CAPACITORS

Focus Products

Ceramic SMD Capacitors for Special Applications

Series		Capacitance	Voltage	Sizes	Dielectric	Process	
	GA...31G, GA...34G Automotive Series	1 pF to 1 μF	16 V to 3000 V	0402, 0603, 0805, 1206, 1210, 1812	C0G (NP0), X7R, X8R	- Wet build - Noble metal electrode	
	Ag / Pd termination for epoxy bonding; polymer (flexible) termination available; robust design due to wet build process						
	GA...31G Automotive Extended Bending MLCC	100 pF to 470 nF	16 V to 630 V	0603, 0805, 1206, 1210	C0G (NP0), X7R		
	Flexible termination with typically more than 5 mm bending; robust design due to wet build process						
	GA...31M / GA...34G HIFREQ Automotive Series	0.1 pF to 5.1 nF	25 V to 1500 V	0402, 0603, 0805, 0505, 1111, 1206	Q: > 2000 (at 1 MHz)		
	Highest Q factor; HIFREQ dielectric (D) with TCC characteristic of C0G (NP0); Vishay Green						
	GA...EDG Automotive ESD MLCC	1 nF to 1 μF	25 V to 200 V	0603, 0805, 1206	C0G (NP0), X7R		
	Excellent ESD performance; robust design due to wet build process						
		VJ...X1A and VJ...X2A Automotive Safety Certified Capacitors	10 pF to 12 nF	250 V _{AC}	2008, 2220		C0G (NP0), X7R
Acc. AEC-Q200; VDE; CSA; cCSAus; X1 / Y2 and X2 class; IEC 60384-14; CAN / CSA - E60384-14:09; ANSI / UL 60384-14-2009							
	VJ X8R	330 pF to 220 nF	25 V to 100 V	0402, 0603, 0805, 1206, 1210	X8R	- Wet build - Noble metal electrode	
	High temperature dielectric with TCC of ± 15 % up to +150 °C						
	VJ BX Series	510 pF to 100 nF	50 V	0505, 1111	BX		
	Low equivalent series resistance, TCC of ± 15 %, -25 % from -55 °C to +125 °C with 100 % rated V _{DC} applied						
		VJ...32 Lead Bearing Termination Series	1 pF to 1 μF	16 V to 630 V	0402, 0603, 0805, 1206, 1210		C0G (NP0), X7R
		Tin / lead (Pb) termination finish min. 4 % lead; AEC-Q200 qualified; tin whisker mitigation, low orbit satellite applications					
	Non-magnetic Series for IR Reflow Soldering	1 pF to 6.8 nF	6.3 V to 3000 V	0402, 0603, 0805, 1206, 1210, 1808, 1812, 1825, 2220, 2225, 3640, 0505, 1111, 2525, 3838	C0G (NP0), X5R, X7R		
	Non-magnetic safety screened; copper barrier termination; also see HIFREQ series						

Ceramic SMD Capacitors for Military and High Reliability Applications

	Series	Capacitance	Voltage	Sizes	Dielectric	Process	
	Hi-Rel Series	1 pF to 6.8 µF	6.3 V to 600 V	0402, 0603, 0805, 1206, 1210, 1808, 1812, 1825, 2220, 2225, 3640	C0G (NP0), X5R, X7R	- Wet build - Noble metal electrode	
	MIL-PRF-55681 group testing (A only, full A and C); several life test and voltage conditioning options; customer-specific requirements						
	CDR	1 pF to 470 nF	6.3 V to 100 V	CDR01 (0805), CDR02 (1805), CDR03 (1808), CDR04 (1812), CDR06 (2225), CDR31 (0805), CDR32 (1206), CDR33 (1210), CDR34 (1812), CDR35 (1825), CDR36 (0603), CDR37 (0402)	BP, BR, BX		
	Several failure rate options; high reliability tested per MIL-PRF-55681; cage code 2770A						
	DSCC 03028 / 03029 / 05006 / 05007	1 pF to 470 nF	6.3 V to 200 V	0402, 0603, 0805, 1206	BP, BR, BX		
	Full group "C"; several life test and voltage conditioning options; cage code 2770A						
	DSCC 05001 / 05002 / 05003	1 pF to 100 pF	50 V to 250 V	0402, 0603, 0805	High Q		
	High Q for high frequency operation with full group "C"; several life test and voltage conditioning options; CAGE CODE 2770A						
	MIL-PRF-123	1 pF to 470 nF	50 V to 100 V	CKS51 (0805), CKS55 (1206), CKS52 (1210), CKS53 (1808), CKS56 (1812), CKS57 (1825), CKS54 (2225)	BP, BX		
	Space-level reliability tested per MIL-PRF-123; nickel barrier with tin / lead (Pb) finish for solder assembly; silver palladium for conductive epoxy assembly						

RF - High Frequency SMD Capacitors

Series		Capacitance	Voltage	Sizes	Dielectric / DF	Process
	HiFREQ Series	0.1 pF to 12 nF	25 V to 7200 V	0402, 0603, 0805, 0505, 1111, 2525, 3838	Q: > 2000 (at 1 MHz)	• Wet build • Noble metal electrode
Highest Q factor; Vishay Green available; terminations for soldering: Ni barrier with 100 % matte tin (Sn) or tin / lead (SnPb), non-magnetic Cu barrier with Sn; for conductive attach: AgPd						
	Hi Temperature HT Series	0.1 pF to 3.3 nF	25 V to 500 V	0402, 0603, 0805, 0505, 1111	Q: > 2000 (at 1 MHz)	• Dry sheet
Operating temperature up to 200 °C (first in industry)						
	VJ...W1BC High Q	0.5 pF to 3.3 nF	16 V to 100 V	0402, 0603	Q: > 1000	
High Q; stable dielectric						
	VJ...W1BC Ultra High Q / Low ESR	0.1 pF to 100 pF	10 V to 250 V	0201, 0402, 0603, 0805	Q: > 1400	
High Q; low ESR; stable dielectric; ultra small 0201 size; BME electrode system						

High Voltage and Safety-Certified Ceramic SMD Capacitors

Series		Capacitance	Voltage	Sizes	Dielectric	Process
	HVArc Guard® Series	10 pF to 270 nF	250 V to 2500 V	0805, 1206, 1210, 1808, 1812, 2220, 2225	C0G (NP0), X7R	• Wet build • Noble metal electrode
Prevents arcing over; polymer (flexible) termination available for X7R						
	Open Mode Design Series	10 pF to 1.8 µF	16 V to 3000 V	0805, 1206, 1210, 1808, 1812, 1825, 2220, 2225	C0G (NP0), X7R	
Reduces risk of short circuit due to bending crack; polymer (flexible) termination available						
	Safety-Certified Capacitors C0G (NP0), X7R	10 pF to 12 nF	250 V _{AC}	2008, 2220	C0G (NP0), X7R	
VDE; CSA; cCSAus; X1 / Y2 and X2 class; IEC 60384-14; CAN / CSA-E60384-14:14; ANSI / UL 60384-14-2014						
	Source Energy Capacitor	4.7 nF to 560 nF	1000 V, 1500 V	1812, 1825, 2225, 3040, 3640, 4044	X7R (Y5P)	
Low electrostrictive ceramic for charge and discharge cycles						
	HV High Voltage Series	10 pF to 560 nF	500 V to 8000 V	1206, 1210, 1808, 1812, 1825, 2220, 2225, 3040, 3640, 4044	C0G (NP0), X7R	
High reliability serial design; low electrostrictive ceramic for charge and discharge cycles						

Wide Range of **Ceramic Capacitors** (SMD and Leaded) With **Stable** **Characteristics** for Various Applications

Advantages of Vishay Ceramic Capacitors

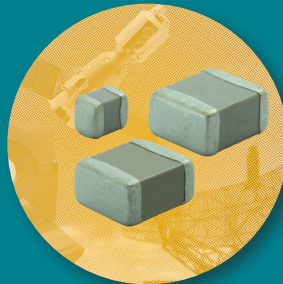
- Wide range of sizes and voltages
- Several termination options
- Robust and reliable design with high stability
- Customized options available

For the Following **Applications**

- High voltage generation and AC mains filtering
- High frequency and high voltage / power
- High reliability, medical, military, and space
- Automotive



AEC-Q200 qualified SMDY1...A, AY1 and AY2 safety capacitors for AC line filtering in onboard chargers



Vishay's HIFREQ series MLCCs offer high voltages and high Q for RF applications



Useful **Links**

- Ceramic MLCC SMD Capacitors Gateway Page
www.vishay.com/capacitors/ceramic/ceramic-multilayer-smd/
- Ceramic Singlelayer Capacitors Gateway Page
www.vishay.com/capacitors/ceramic/ceramic-singlelayer/
- Ceramic Leaded MLCC Capacitors Gateway Page
www.vishay.com/capacitors/ceramic/ceramic-multilayer-leaded/

ISO 9001 / IATF 16949 / OHSAS 18001 / ISO 14001
ISO 13485:2003
IEC 60384-14, CAN / CSA-E60384-14, ANSI / UL 60384-14
AEC-Q200 Qualified and MIL-PRF-55681 (CAGE CODE 2770A)
See specific datasheets if applicable

HALOGEN
FREE

The DNA of tech.®