

Safety recognized ceramic capacitors



Features, applications & certificate

Features

1. Worldwide safety agency certificate: UL/CSA/VDE/ENEC/CQC.
2. Operating temperature range: 125°C(UL: 85°C).
3. Dielectric strength: AC2600V for KL type, AC4000V for WD type.
4. Complete Range of capacitance values.
5. Coated with flame-resistant epoxy resin (UL94V-0).
6. Cost-saving automatic insertion available.
7. Comply with RoHS .
8. Halogen-free available.

Applications

- Across-the-line
- Line by-pass
- Antenna coupling

Approval Standard and Certificate No






Country	Standard	Rated Voltage		Certificate No	
		KL(X1 Y2)	WD(X1 Y1)	KL(X1 Y2)	WD(X1 Y1)
 U.S.A. & Canada	UL 1414	250Vac		E104572	
 Canada	CAN/CSA-E384-14-95	250Vac		1413193 (LR66829)	
 Germany	EN 60384-14 IEC 60384-14	X1: 440/400Vac Y2: 300/250Vac	X1: 760/400Vac Y1: 500/250Vac	116772	115455
 (Table A)		X1: 440/400Vac Y2: 300/250Vac	X1: 760/400Vac Y1: 500/250Vac	40016156	40016157
 China	GB/T 14472-1998	X1: 400Vac Y2: 250Vac	X1: 400Vac Y1: 250Vac	CQC03001008380	CQC03001008379

Table A - ENEC Signatories (Please refer to http://www.eepca.org/affiche_cbgroup.php?typ=1&soc=4)

AENOR (Spain)	MEEI (Hungary)
ASTA BEAB (United kingdom)	NEMKO (Norway)
BSI (United kingdom)	SGS Belgium (Belgium)
CERTIF (Portugal)	SGS FIMKO (Finland)
ELECTROSUISSE (Switzerland)	SIQ (Slovenia)
ELOT (Greece)	SNCH (Luxembourg)
EZU (Czech Republic)	TRPS (Germany)
IMQ (Italy)	TUV SUD PS (Germany)
Intertek Semko (Sweden)	UL Int DEMKO (Demark)
KEMA (Netherlands)	VDE (Germany)
LCIE (France)	OVE (Austria)

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Marking and general specifications



Marking

Type code
WD: IEC 60384-14 Class X1 Y1
KL: IEC 60384-14 Class X1 Y2

Company logo

Temperature characteristic
C: COG; L: SL; B: Y5P
X: X7R; E: Y5U; F: Y5V

Monogram safety regulation body
VDE ENEC CSA CQC CUL

Nominal capacitance
WD472M

Capacitance Tolerance
C: ±0.25pF; D: ±0.5pF
J: ±5%; K: ±10%
M: ±20%; Z: +80/-20%

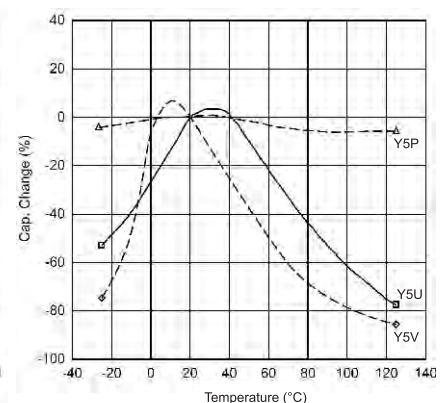
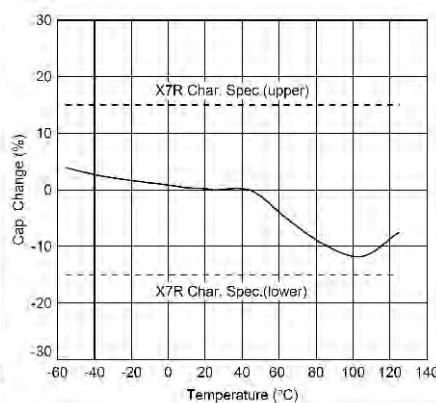
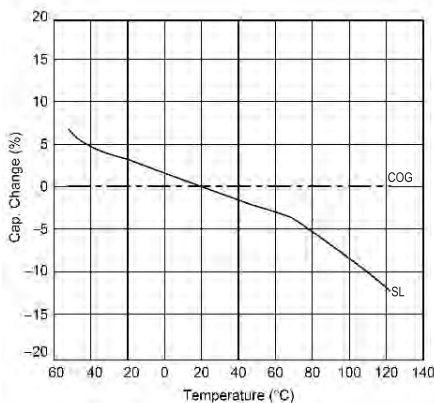
Sub-class of safety performance
WD type: X1 and Y1
KL type: X1 and Y2

Rated Voltage
X1 : 400V~
Y1 and Y2: 250V~

General Specifications

Characteristics	X1 Y1 (WD type)	X1 Y2 (KL type)
Capacitance Range	1pF to 0.01μF	1pF to 0.015μF
Rated Voltage (U _R)	X1: 760/400Vac Y1: 500/250Vac	X1: 440/400Vac Y2: 300/250Vac
Dielectric Strength	4000VAC(50Hz~60Hz, 50mA max.) for 1minute	2600VAC(50Hz~60Hz, 50mA max.) for 1minute
Capacitance (C _R)	Within the specified tolerance Y5P, Y5U, Y5V, X7R measured at 1KHz±20% COG, SL measured at 1MHz±20% Both are 1Vrms, 25°C	
Dissipation Factor (tan δ) or Q Value	SL and COG: C _R ≥ 30pF, Q ≥ 1000; C _R < 30pF, Q ≥ 400+20C _R Measured Condition see "Capacitance"	Y5P, Y5U, X7R: tan δ ≤ 0.025 Y5V: tan δ ≤ 0.050
Insulation Resistance (IR)	10000MΩ minimum at 500VDC for 1 minute	
Operating Temperature Range	-25°C to +125°C (-25°C to +85°C in case of the standard of UL/CSA) -55°C to +125°C for COG, SL and X7R	

Temperature Characteristic Curves



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Capacitance chart

Capacitance Chart

PREFERRED SIZES ARE SHADED

Class	X1 Y2 (KL type)						X1 Y1 (WD type)							
	C0G (C)	SL (L)	Y5P (B)	X7R (X)	Y5U (E)	Y5V (F)	C0G (C)	SL (L)	Y5P (B)	X7R (X)	Y5U (E)	Y5V (F)		
Capacitance (pF)	1.0	G	G	G			G	G	G					
	1.5	G	G	G			G	G	G					
	2.2	G	G	G			G	G	G					
	3.3	G	G	G			G	G	G					
4.7	G	G	G				J	J	I					
5.1	G	G	G	G			J	J	I	I				
6.8	J	J	I				K	K	J					
10	J	G	I	G			K	G	J	J				
12		G	I	G				G	J	J				
15		G	I	G				G	J	J				
18		G	I	G				G	J	J				
20		G	I	G				G	J	J				
22		G	I	G				G	J	J				
27		J	I	G				G	J	K				
30		J	I	G				G	J	K				
33		J	I	G				G	K	K				
36		J	I	G				G	K	K				
39		J	I	G				G	K	K				
47		K	I	G				L	K	K				
56		K	K	G				L	K	K				
68		K	K	G				L	K	K				
82		K	K	G				L	K	K				
100			G	G					K	K	G			
120			G	G					K	K	G			
150			G	G					K	K	G			
180			G	G					K	K	G			
220			G	G					K	K	G			
270			G	G					K	K	G			
330			G	G	E				K	K	G			
390			J	I	E				K	K	G			
470			J	I	E	E			K	K	G	G		
560			J	I	E	E			K	K	G	G		
680			J	I	E	E			K	L	G	G		
820			J	J	E	E			L	L	G	G		
860			J	J	E	E			L	L	G	G		
1000			L	J	G	G			N	N	I	I		
1200			L	M	G	G			N	N	I	I		
1500			N	M	I	I			O	O	K	K		
1800			N		I	I			R	R	K	K		
2000			O		J	J			R	R	L	L		
2200			O		J	J			R		L	L		
2700					L	L					M	M		
2800					L	L					M	M		
3000					L	L					O	O		
3200					L	L					O	O		
3300					L	L					O	O		
3600					M	M					O	O		
3900					M	M					Q	Q		
4000					M	O					Q	Q		
4700					O	O					Q	Q		
5000					O	O					S	S		
5500					O	O					S	S		
5600					O	O					S	S		
6000					Q	Q					S	S		
6800					Q	Q					S	S		
8000					Q	Q					S	S		
8200					Q	R					T	T		
8600					Q	R					T	T		
9000					T	T					T	T		
10000					T	T					T	T		
15000					U	T					T	T		
Lead Spacing (F) (±1.0mm)	5.0 & 7.5 & 10.0						7.5 & 10.0							
Thickness (T) max.	6.0mm						8.0mm							
Capacitance Tolerance	Below 10pF: ±0.25pF or ±0.50pF;						10pF~100pF: ±5% or ±10%;			Over 100pF: ±10% or ±20%				
Coating	Epoxy resin (UL94V-0)													
Body Color	Sky blue													
Code	E	G	I	J	K	L	M	N	O	Q	R	S	T	U
Diameter (D) max.	7mm	8mm	9mm	10mm	11mm	12mm	14mm	15mm	16mm	19mm	20mm	22mm	25mm	28mm

