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Vishay BCcomponents

EMI Suppression Safety Capacitor, Ceramic Disc, Class X1, 760 V_{AC}, Class Y1, 500 V_{AC}





LINKS TO ADDITIONAL RESOURCES









QUICK REFERENCE DATA			
DESCRIPTION	VALUE		
Ceramic class	2		
Ceramic dielectric	Y5U		
Voltage (V _{AC})	500 760		
Min. capacitance (pF)	470		
Max. capacitance (pF)	4700		
Mounting	Surface-mount (reflow soldering)		

OPERATING TEMPERATURE RANGE

-55 °C to +125 °C

TEMPERATURE CHARACTERISTICS

Y5U

SECTIONAL SPECIFICATIONS

Climatic category (according to EN 60058-1) Class 2: 55 / 125 / 21

MOLDING

According to UL 94 V-0
Epoxy resin, isolating, flame retardant
Halogen-free
Reinforced insulation
Moisture sensitivity level: MSL 2a

APPROVALS

IEC 60384-14 UL 60384-14 DIN EN 60384-14 CSA E60384-1:14, CSA E60384-14:14 CQC11-471112-2015

FEATURES

- AEC-Q200 qualification planned for Q1/2025
- Complying with IEC 60384-14
- · Humidity class IIB annex I achieved
- Singlelayer AC disc safety capacitors
- Mounting: surface-mount
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Ph



ROHS
COMPLIANT
HALOGEN

APPLICATIONS

- X1, Y1 according to IEC 60384-14
- Line-to-line filtering (Class X)
- Line-to-ground filtering (Class Y)
- Primary and secondary coupling (SMPS)
- Industrial and consumer
- EMI / RFI suppression and filtering

DESIGN

The capacitor consists of a ceramic disc which is copper plated on both sides. Encapsulation is made of flame retardant epoxy resin in accordance with UL 94 V-0.

CAPACITANCE RANGE

470 pF to 4700 pF

RATED VOLTAGE UR

IEC 60384-14: (X1): 760 V_{AC}, 50 Hz (Y1): 500 V_{AC}, 50 Hz

Annex H: 1500 V_{DC}

TEST VOLTAGE

Component test (100 %): 4000 V_{AC}, 50 Hz, 2 s

Random sampling test (destructive test):

4000 V_{AC}, 50 Hz, 60 s

Voltage proof of molding (destructive test):

4000 V_{AC}, 50 Hz, 60 s

INSULATION RESISTANCE

 \geq 10 000 M Ω

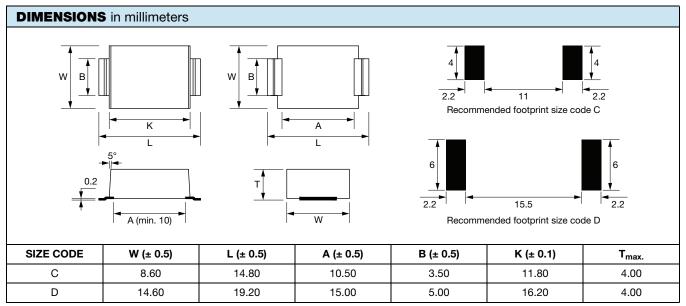
CAPACITANCE TOLERANCE

± 20 % (code M)

DISSIPATION FACTOR

Class 2: max. 2.5 % (1 kHz)





Note

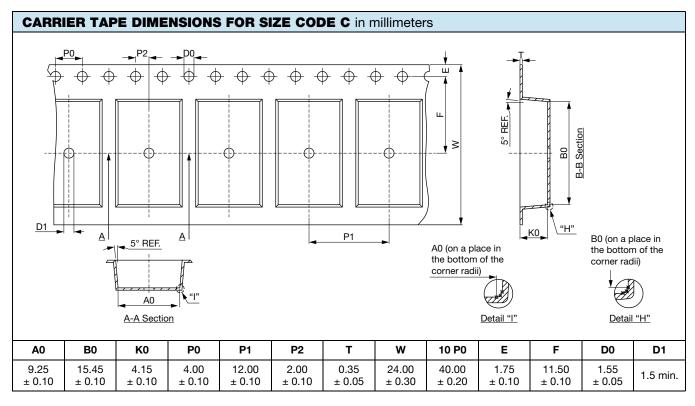
• For soldering recommendation please see www.vishay.com/doc?28572

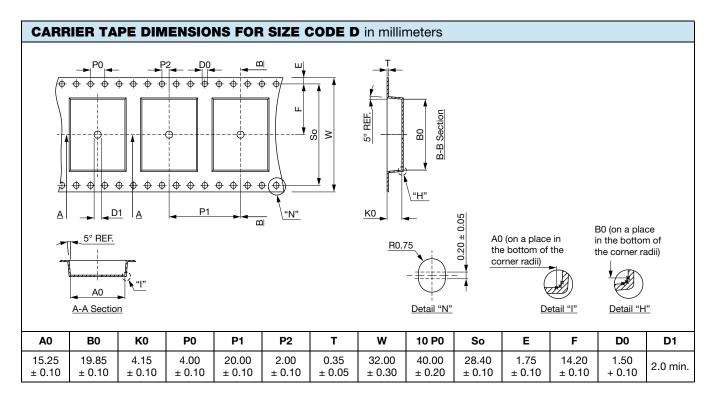
TECHNICAL DATA			
CAPACITANCE	TOLERANCE	SIZE CODE	PART NUMBER
(pF)	(%)		MISSING DIGITS SEE ORDERING CODE BELOW
Y5U			
470		С	SMDY1471MY5UC#
680	± 20	С	SMDY1681MY5UC#
1000		С	SMDY1102MY5UC#
1500		С	SMDY1152MY5UC#
2200		D	SMDY1222MY5UD#
3300		D	SMDY1332MY5UD#
3900		D	SMDY1392MY5UD#
4700		D	SMDY1472MY5UD#

ORDERII	NG CODE					
Example	SMDY1	472	М	Y5U	D	В
	Series	Capacitance value	Tolerance code	Temperature coefficient	Size code	Packaging code B = bulk R = tape and reel

PACKAGING			
SIZE CODE	PACKAGING QUANTITIES		
	BULK	REEL	
С	1000	1000	
D	500	500	









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APPROVALS

IEC 60384-14 - Safety tests

This approval together with CB test certificate substitutes all national approvals.

CB Certificate (www.vishay.com/doc?22268)

Y1-capacitor: CB test certificate: DE1-63889/A2 470 pF to 4.7 nF 500 V_{AC} X1-capacitor: CB test certificate: DE1-63889/A2 470 pF to 4.7 nF 760 V_{AC}



VDE (www.vishay.com/doc?22269)

Y1-capacitor: VDE marks approval: 40052244 470 pF to 4.7 nF 500 V_{AC} X1-capacitor: VDE marks approval: 40052244 470 pF to 4.7 nF 760 V_{AC}



DIN EN 60384-14 (VDE 0565-1-1):2014-04; EN 60384-14:2013-08

DIN EN 60384-14/A1 (VDE 0565-1-1/A1):2017-04; EN 60384-14:2013/A1:2016

Underwriters Laboratories Inc. / Canadian Standards Association (www.vishay.com/doc?22271)

Y1-capacitor: CSA test certificate: E183844 470 pF to 4.7 nF 500 V_{AC} X1-capacitor: CSA test certificate: E183844 470 pF to 4.7 nF 760 V_{AC}



UL 60384-14, CSA E60384-1:14, CSA E60384-14:14

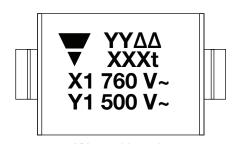
Fixed capacitors for electromagnetic interference suppression and connection to the supply mains.

CQC (www.vishay.com/doc?22270)

Y1-capacitor: CQC test certificate: CQC20001274917 470 pF to 4.7 nF 500 V_{AC} X1-capacitor: CQC test certificate: CQC20001274917 470 pF to 4.7 nF 760 V_{AC}



MARKING



YY: year, $\Delta\Delta$: week, XXX: capacitance value, t: tolerance code ⁽¹⁾



Note

(1) Identify "XXX" and "t" by the ordering code

PERFORMANCE			
TEST	TEST CONDITION	TEST LIMITS	
Visual and mechanical inspection	Optical inspection, dimensions measured with caliper	No visual damage, marking legible	
Capacitance (C)	25 °C \pm 3 °C; RH \leq 75 %; 1.0 $V_{RMS} \pm$ 0.2 V_{RMS} at 1 kHz	Capacitance within specified tolerance	
Dissipation factor (DF)	25 C ± 5 C, NH ≤ 75 %, 1.0 V _{RMS} ± 0.2 V _{RMS} at 1 KHZ	DF ≤ 2.5 %	
Insulation resistance (IR)	Measured with 60 s \pm 5 s after charging at 500 V_{DC}	Min. 10 000 MΩ	
Dielectric strength	4000 V _{AC} at 50 Hz / 60 Hz for 1 min 50 mA max.	No failure	
Solderability of termination	Immerse in solder bath for 2 s with 255 $^{\circ}$ C \pm 5 $^{\circ}$ C after fluxing	95 % of the terminations are to be soldered	
Impulse voltage	3 pulses of 8 kV	No failure	

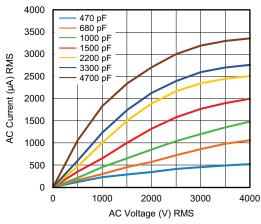


PERFORMANCE		
TEST	TEST CONDITION	TEST LIMITS
		No visual damage
Life test		ΔC/C < ± 15 %
	125 °C; 1.5 kV _{AC} at 50 Hz; 1000 h	DF ≤ 5 %
	125 °C; 2250 V _{DC} ; 1000 h	IR ≥ 3000 MΩ
		Dielectric strength: no failure
		No visual damage
	500 h +48 h / -0 h; 40 °C ± 2 °C; 90 % to 95 % RH;	ΔC/C < ± 15 %
	760 V _{AC} at 50 Hz 500 h +48 h / -0 h; 40 °C ± 2 °C; 90 % to 95 % RH;	DF ≤ 5 %
	1500 V _{DC}	IR ≥ 3000 MΩ
	1000 vDC	Dielectric strength: no failure
		No visual damage
		ΔC/C < ± 15 %
Humidity test	500 h +48 h / -0 h; 40 °C ± 2 °C / 90 % to 95 % RH;	DF ≤ 5 %
	0 V loading	IR ≥ 3000 MΩ
		Dielectric strength: no failure
		No visual damage
	500 h +48 h / -0 h; 85 °C ± 3 °C / 85 % RH;	ΔC/C < ± 15 %
	760 V _{AC} at 50 Hz	DF ≤ 5 %
	500 h +48 h / -0 h; 85 °C ± 3 °C / 85 % RH;	IR ≥ 3000 MΩ
	1500 V _{DC}	Dielectric strength: no failure
	Shear test: 17.7 N for 10 s ± 1 s for soldered on PCB	Ziolegani di Silgani ilo Ignato
Robustness of termination	Substrate Bending test: 1 mm bending constant for 5 s ± 1 s Substrate before test Specimen (of SMD) Substrate during test 20 mm ± 2 mm 45 mm ± 2 mm Support Solder Bending tool Radius 340 D D	No damage to capacitor body and pin
Resistance to soldering heat (solder bath)		No visual damage
	20 mm/s dipping speed; dwell 10 s at 2 mm dipping;	ΔC/C < ± 10 %
	260 °C ± 5 °C	DF ≤ 5 %
		IR \geq 3000 MΩ
		Dielectric strength: no failure
		No visual damage
		ΔC/C < ± 30 %
Temperature cycling	-55 °C to +125 °C; 5 cycles	DF ≤ 5 %
		$IR \ge 3000 \text{ M}\Omega$
		Dielectric strength: no failure

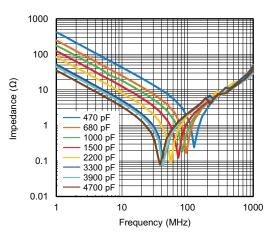


PERFORMANCE			
TEST	ST TEST CONDITION		
Electrical characterization	25 °C and -40 °C, +125 °C	Capacitance within specified tolerance	
		DF ≤ 2.5 %	
		Min. 10 000 MΩ	
Mechanical shock	Half-sine; 100 g/s; 6 ms; 3 shocks each of 6 orientation	No visual damage	
		ΔC/C < ± 10 %	
		DF ≤ 5 %	
		$IR \ge 10~000~M\Omega$	
Vibration	5 g/s; 1.5 mm amplitude; 20 min; 12 cycles each of orientation; 10 Hz to 2000 Hz	No visual damage	
		ΔC/C < ± 10 %	
		DF ≤ 5 %	
		IR ≥ 10 000 MΩ	

AC CURRENT VS. VOLTAGE (Typical)



IMPEDANCE VS. FREQUENCY (Typical)



Note

• Unless stated otherwise all electrical values apply at an ambient temperature of 25 °C ± 3 °C, at normal atmospheric conditions

RELATED DOCUMENTS		
CB Test Certificate	www.vishay.com/doc?22268	
VDE Marks Approval	www.vishay.com/doc?22269	
UL Test Certificate	www.vishay.com/doc?22271	
CQC Test Certificate	www.vishay.com/doc?22270	
Soldering Recommendation	www.vishay.com/doc?28572	



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