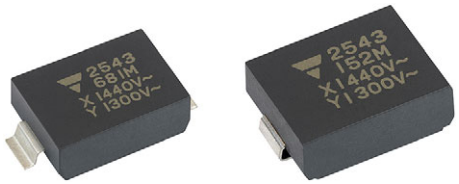
EMI Suppression Safety Capacitor, Ceramic Disc, Class X1, 440 V_{AC}, Class Y1, 300 V_{AC}



LINKS TO ADDITIONAL RESOURCES

Related Documents | 3D Models | SPICE Models

QUICK REFERENCE DATA						
DESCRIPTION	VALUE					
Ceramic class	1		2			
Ceramic dielectric	U2J		Y5S		Y5U	
Voltage (V_{AC})	300	440	300	440	300	440
Min. capacitance (pF)	10					
Max. capacitance (pF)	1500					
Mounting	Surface-mount (reflow soldering)					

OPERATING TEMPERATURE RANGE

-55 °C to +125 °C

TEMPERATURE CHARACTERISTICS

U2J, Y5S, Y5U

SECTIONAL SPECIFICATIONS

Climatic category (according to EN 60058-1)
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
CQC 60384-14

FEATURES

- Complying with IEC 60384-14
- Singlelayer disc safety capacitors
- Mounting: surface-mount
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb e3 RoHS COMPLIANT HALOGEN FREE

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 / silver plated on both sides. Encapsulation is made of flame retardant epoxy resin in accordance with UL 94 V-0.

CAPACITANCE RANGE

10 pF to 1500 pF

RATED VOLTAGE U_R

IEC 60384-14:
(X1): 440 V_{AC}, 50 Hz
(Y1): 300 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

≥ 10 000 MΩ

CAPACITANCE TOLERANCE

± 10 % (code K)
± 20 % (code M)

DISSIPATION FACTOR

Class 1: max. 0.3 % (1 MHz)
Class 2: max. 2.5 % (1 kHz)

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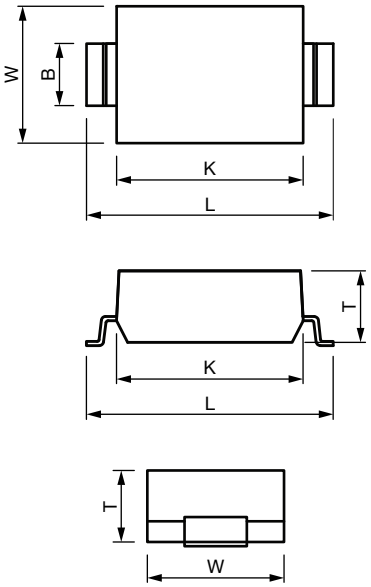
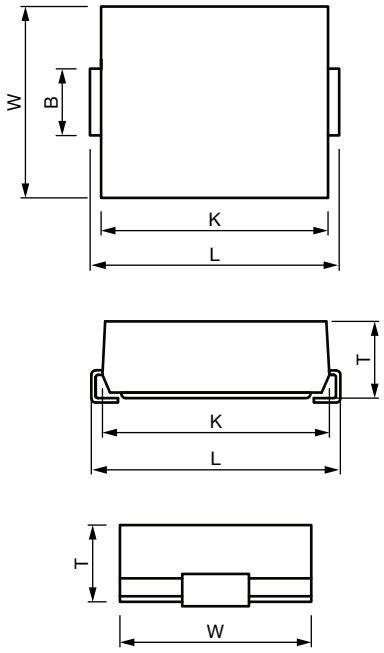
DIMENSIONS in millimeters

10 pF TO 680 pF



1000 pF TO 1500 pF



CAPACITANCE	W	L	T	B	K
10 pF to 680 pF	6.6 ± 0.5	11.9 ± 0.5	4.0 max.	3.0 ± 0.25	9.0 ± 0.25
1000 pF to 1500 pF	8.6 ± 0.5	11.2 ± 0.5	4.0 max.	3.0 ± 0.25	10.2 ± 0.25

Note

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

TECHNICAL DATA

CAPACITANCE (pF)	TOLERANCE (%)	SIZE CODE	PART NUMBER
			MISSING DIGITS SEE ORDERING CODE BELOW
10	± 10	A	SMDY1100KU2JARS
22		A	SMDY1220KU2JARS
33		A	SMDY1330KU2JARS
47		A	SMDY1470KY5SARS
100		A	SMDY1101KY5SARS
220		A	SMDY1221KY5SARS
330	± 20	A	SMDY1331MY5UARS
470		A	SMDY1471MY5UARS
680		A	SMDY1681MY5UARS
1000		B	SMDY1102MY5UBRS
1500		B	SMDY1152MY5UBRS

ORDERING CODE

Example	SMDY1	152	M	Y5U	B	R	S
	Series	Capacitance value	Tolerance code	Temperature coefficient	Size code	Packaging Tape and reel	Internal code

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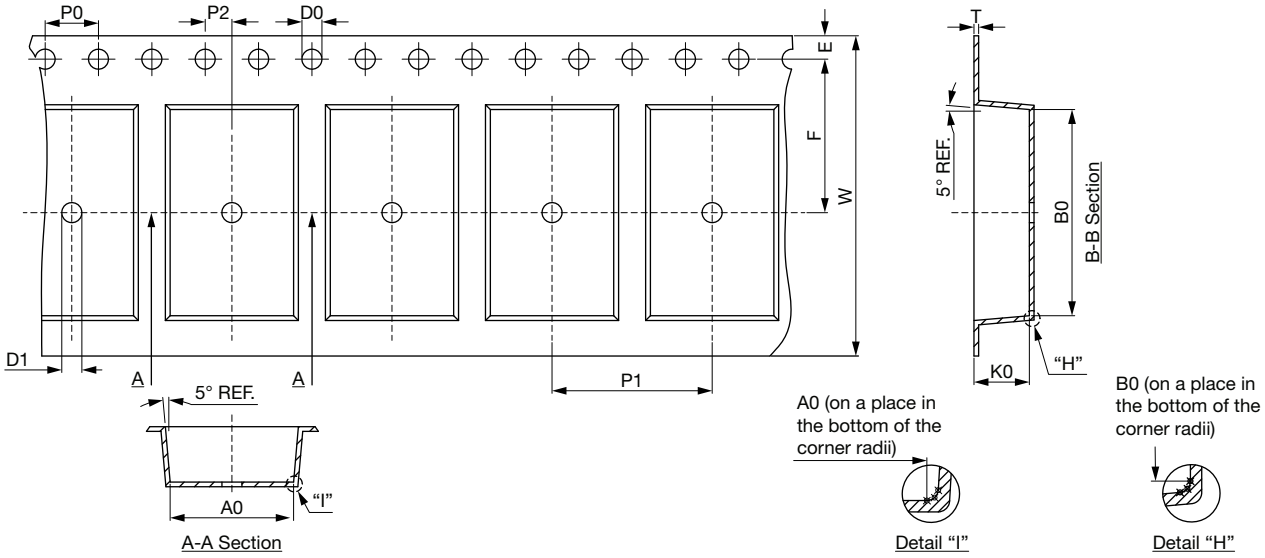
PACKAGING

CAPACITANCE	PACKAGING QUANTITIES (PCS)
10 pF to 680 pF	1000
1000 pF to 1500 pF	1000

CARRIER TAPE DIMENSIONS in millimeters



CAPACITANCE	W	A0	B0	K0	P1	P0	P2	T	E	F	D0	D1	10P0
10 pF to 680 pF	24.00 ± 0.30	7.25 ± 0.10	12.55 ± 0.10	4.10 ± 0.10	12.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.10	0.35 ± 0.05	1.75 ± 0.10	11.5 ± 0.10	1.55 ± 0.05	1.5 min.	40 ± 0.20
1000 pF to 1500 pF	24.00 ± 0.30	9.25 ± 0.10	11.85 ± 0.10	4.10 ± 0.10	12.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.10	0.35 ± 0.05	1.75 ± 0.10	11.5 ± 0.10	1.55 ± 0.05	1.5 min.	40 ± 0.20

APPROVALS

IEC 60384-14 - Safety tests
This approval together with CB test certificate substitutes all national approvals.

CB Certificate (www.vishay.com/doc?22274)

Y1-capacitor: CB test certificate:	DE1-69482	10 pF to 1.5 nF	300 V_{AC}
X1-capacitor: CB test certificate:	DE1-69482	10 pF to 1.5 nF	440 V_{AC}

VDE (www.vishay.com/doc?22276)

Y1-capacitor: VDE marks approval:	40059817	10 pF to 1.5 nF	300 V_{AC}
X1-capacitor: VDE marks approval:	40059817	10 pF to 1.5 nF	440 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?22275)

Y1-capacitor: CSA test certificate:	2575309	10 pF to 1.5 nF	300 V_{AC}
X1-capacitor: CSA test certificate:	2575309	10 pF to 1.5 nF	440 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?22273)

Y1-capacitor: CQC test certificate:	CQC25001476496	10 pF to 1.5 nF	300 V_{AC}
X1-capacitor: CQC test certificate:	CQC25001476496	10 pF to 1.5 nF	440 V_{AC}

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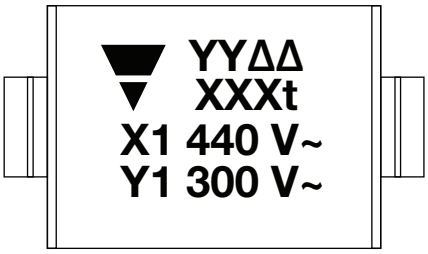
MARKING



YY: year, ΔΔ: 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 ± 3 °C; RH ≤ 75 %; 1.0 V_{RMS} ± 0.2 V_{RMS} at 1 MHz for class 1 1.0 V_{RMS} ± 0.2 V_{RMS} at 1 kHz for class 2	Capacitance within specified tolerance
Dissipation factor (DF)		Class 1: DF ≤ 0.3 %; Class 2: DF ≤ 2.5 %
Insulation resistance (IR)	Measured with 60 s ± 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 °C ± 5 °C after fluxing	95 % of the terminations are to be soldered
Impulse voltage	3 pulses of 8 kV	No failure
Life test	125 °C; 1000 V_{AC} at 50 Hz; 1000 h 125 °C; 2550 V_{DC}; 1000 h	No visual damage
		ΔC/C < ± 15 %
		U2J: DF ≤ 0.5 %; Y5S / Y5U: DF ≤ 5 %
		IR ≥ 3000 MΩ
		Dielectric strength: no failure
Humidity test	500 h + 48 h / - 0 h; 40 °C ± 2 °C; 90 % to 95 % RH; 440 V_{AC} at 50 Hz	No visual damage
		U2J: ΔC/C < ± 10 %; Y5S / Y5U: ΔC/C < ± 15 %
		U2J: DF ≤ 0.5 %; Y5S / Y5U: DF ≤ 5 %
		IR ≥ 3000 MΩ
		Dielectric strength: no failure
	500 h + 48 h / - 0 h; 40 °C ± 2 °C; 90 % to 95 % RH; 1500 V_{DC}	No visual damage
		U2J: ΔC/C < ± 10 %; Y5S / Y5U: ΔC/C < ± 15 %
		U2J: DF ≤ 0.5 %; Y5S / Y5U: DF ≤ 5 %
		IR ≥ 3000 MΩ
		Dielectric strength: no failure
	500 h + 48 h / - 0 h; 40 °C ± 2 °C; 90 % to 95 % RH; 0 V loading	No visual damage
		U2J: ΔC/C < ± 10 %; Y5S / Y5U: ΔC/C < ± 15 %
		U2J: DF ≤ 0.5 %; Y5S / Y5U: DF ≤ 5 %
		IR ≥ 3000 MΩ
		Dielectric strength: no failure

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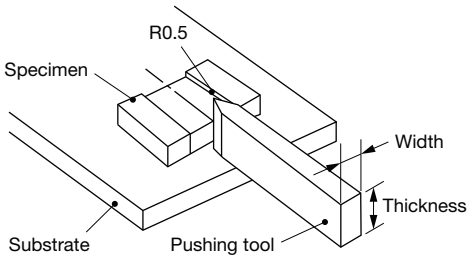
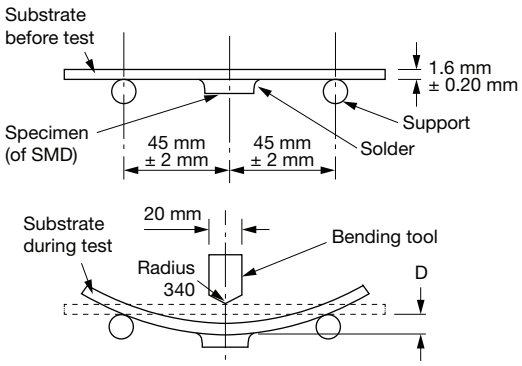
PERFORMANCE		
TEST	**TEST CONDITION**	**TEST LIMITS**
Robustness of termination	Shear test: 17.7 N for 10 s ± 1 s for soldered on PCB  Bending test: 1 mm bending constant for 5 s ± 1 s  	No damage to capacitor body and pin
Resistance to soldering heat (solder bath)	Reflow soldering: peak 260 °C + 0 °C / - 5 °C The area of soldering 230 °C min., 20 s to 40 s	No visual damage U2J: ΔC/C < ± 5 %; Y5S / Y5U: ΔC/C < ± 20 % U2J: DF ≤ 0.3 %; Y5S / Y5U: DF ≤ 2.5 % IR ≥ 3000 MΩ Dielectric strength: no failure
Temperature cycling	-55 °C to +125 °C; 5 cycles	No visual damage ΔC/C < ± 30 % U2J: DF ≤ 0.5 %; Y5S / Y5U: DF ≤ 5 % IR ≥ 3000 MΩ Dielectric strength: no failure
Electrical characterization	25 °C and -55 °C, +125 °C	Capacitance within specified tolerance Class 1: DF ≤ 0.3 %; Class 2: DF ≤ 2.5 % IR ≥ 10 000 MΩ

STORAGE AND OPERATION RECOMMENDATIONS

The molding resin of the molding type ceramic capacitor does not form a perfect seal, avoid corrosive gas and direct sunlight, and use (storage) in the condition without moisture condensation.
This series is declared to MSL 2a.
Solder the enclosed capacitors within 168 h after opening the moisture-proof package.
After opening, store it in the packing condition at the time of delivery or in a similar state.
Temperature: 10 °C to 30 °C
Humidity: 60 % max.
If it has been more than 4 weeks since opening, or if the 10 % display of the HIC (humidity indicator card) is pink, perform baking according to J-STD-033B0.1.

RELATED DOCUMENTS	
CB Test Certificate	www.vishay.com/doc?22274
VDE Marks Approval	www.vishay.com/doc?22276
UL Test Certificate	www.vishay.com/doc?22275
CQC Test Certificate	www.vishay.com/doc?22273
Soldering Recommendation	www.vishay.com/doc?28572

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