EMI Suppressors Metallized Polypropylene

R49+R EMI Capacitors Class X1, 330VAC with Internal Discharge Resistor

Construction

Metallized polypropylene film encapsulated with self-extinguishing resin in a box of material recognized to UL 94 V–0.

Benefits

- Approvals: ENEC, UL, cUL
- Rated voltage: 330VAC 50/60Hz
- Capacitance range: 0.33µ–6.8µF
- Pitch: 27.5 mm–37.5 mm
- Capacitance tolerance: ± 20% standard, ± 10% option, ± 5% on request
- Climatic category: 40/110/56, IEC 60068-1
- Tape and reel packaging in accordance with IEC 60286-2
- RoHS compliance and lead-free terminations
- Operating temperature range of -40˚C to +110˚C
- 100% screening factory test at 2200VDC/1500VAC

Applications

For worldwide use as an electromagnetic interference suppressor in all X1 and across-the-line applications.

Ordering Information

R49	A	R	3330	00	B1	M	x
Series	Rated Voltage	Pitch	Capacitance Code (pF)	Packing Option and Leadform	Internal Use	Capacitance Tolerance	Value of Discharge Resistor
X1, Metallized Polypropylene	A = 330VAC	R = 27.5 W = 37.5	Digits 2-4 indicate the first three digits of the capacitance value. First digit indicates the number of zeros to be added.	see Ordering Options Table		J = ±5% K = ±10% M = ±20%	470 kΩ = E 680 kΩ = F 1 MΩ = G 1.2 MΩ = L 1.5 MΩ = N 2.2 MΩ = P 3.3 MΩ = Q 4.7 MΩ = S 6.8 MΩ = T 10 MΩ = V

Ordering Options Table

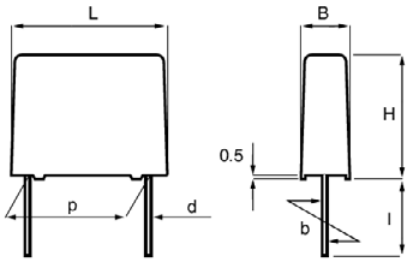
Standard Packaging Style	Lead Length	Taping Style			Ordering Code
	(mm)	P2	Fif.	Pitch	
		(mm)	(No)	(mm)	
Reel 500 mm		19.05	2	27.5	CK
Loose, short leads	4^{+2}				00
Loose, long leads	$25^{-1/+2}$				50
Loose, long leads	30^{+5}				40
Loose, insulated rigid leads	30^{+5}				51
Loose, insulated flexible leads	$150^{\pm5}$				52
Other options available on request					

Dimension Table

Lead Space	Outer Dimension		
	B	H	L
10.0	4.0	9.0	13.0
10.0	5.0	11.0	13.0
10.0	6.0	12.0	13.0
15.0	10.0	16.0	18.0
15.0	11.0	19.0	18.0
15.0	13.0	12.0	18.0
15.0	5.0	11.0	18.0
15.0	6.0	12.0	18.0
15.0	6.0	17.5	18.0
15.0	7.5	13.5	18.0
15.0	7.5	18.5	18.0
15.0	8.5	14.5	18.0
15.0	9.0	12.5	18.0
22.5	10.0	18.5	26.5
22.5	11.0	20.0	26.5
22.5	13.0	22.0	26.5
22.5	6.0	15.0	26.5
22.5	6.5	13.5	26.5
22.5	7.0	16.0	26.5
22.5	8.5	17.0	26.5
27.5	11.0	20.0	32.0
27.5	13.0	22.0	32.0
27.5	14.0	28.0	32.0
27.5	18.0	33.0	32.0
27.5	22.0	37.0	32.0
27.5	9.0	17.0	32.0
37.5	11.0	22.0	41.5
37.5	13.0	24.0	41.5
37.5	16.0	28.5	41.5
37.5	19.0	32.0	41.5
37.5	20.0	40.0	41.5
37.5	24.0	44.0	41.5

Leadspacing Table

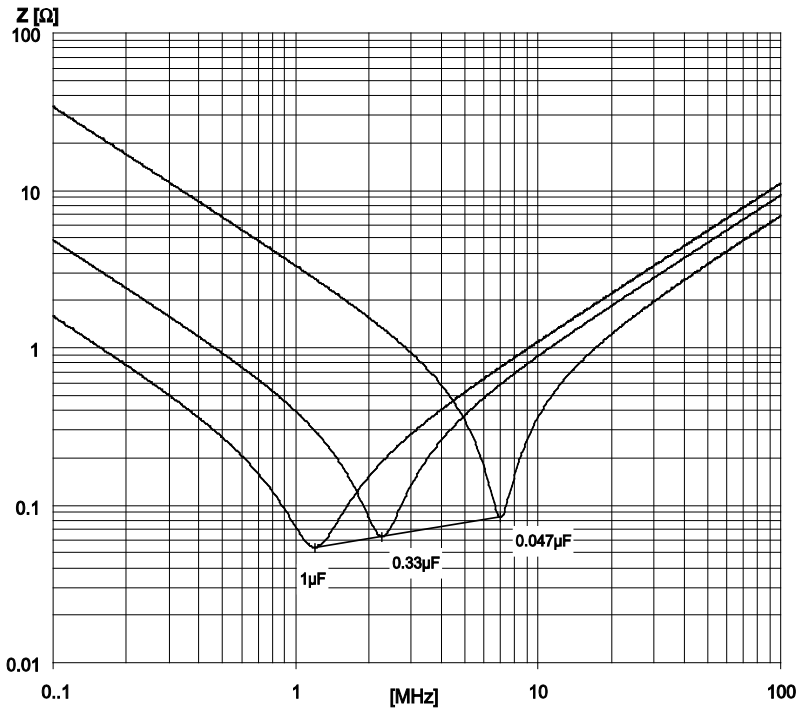
p	d	std l	max l	b
22.5 ± 0.4	0.8	4	30	± 0.4
27.5 ± 0.4	0.8	4	30	± 0.4
37.5 ± 0.4	1.0	4	30	± 0.7
Tolerance in Lead Length		< 30mm +2 / -0		
		30mm +5 / -0		



Technical Data

Rated Voltage	330VAC 50/60Hz	
Capacitance Range	0.33µF–6.8µF	
Capacitance Tolerance	± 20% standard, ± 10% option, ± 5% on request	
Temperature Range	-40 °C to +110°C	
Climatic Category	40/110/56	
Approvals	ENEC, UL, cUL	
Dissipation Factor	Maximum Values at +23°C	
	1 kHz	0.1%
Test Voltage Between Terminals	The 100% screening factory test is carried out at 2200VDC/1500VAC. The voltage level is selected to meet the requirements in applicable equipment standards. All electrical characteristics are checked after the test. It is not permitted to repeat this test as there is a risk to damage the capacitor. KEMET is not liable in such case for any failures.	
Insulation Resistance	C ≤ 0.33 µF: ≥ 10 000 MΩ	
	C > 0.33 µF : ≥ 30 000 s	
In DC applications	Recommended Voltage ≤ 800 VDC	

Impedance Graph



Environmental Test Data

Test	IEC Publication	Procedure
Endurance	IEC 60384-14	1.25 x UR VAC 50Hz, once every hour increase to 1000 VAC for 0.1 s, 1000 h at upper rated temperature
Vibration	IEC 60068–2–6 Test Fc	3 directions at 2 hours each 10 - 55 Hz at 0.75 mm or 98m/s^2
Bump	IEC 60068-2-29 Test Eb	1000 bumps at 390 m/s^2
Change of Temperature	IEC 60068-2-14 Test Na	Upper and lower rated temperature 5 cycles
Active Flammability	IEC 60384-14	UR + 20 surge pulses at 2.5 kV (pulse every 5 s)
Passive Flammability	IEC 60384-14	IEC 60384-1, IEC 60695-11-5 Needle-flame test
Damp Heat Steady State	IEC 60068-2-78 Test Cab	+40°C and 93% R.H., 56 days

Environmental Compliance

All KEMET EMI capacitors are RoHS compliant

RoHS Compliant

Approvals

Mark	Specification	File Number
	EN/IEC 60384-14	V4413
	UL 1283 (310VAC)	E85238
	CSA - C22.2 No.8 (310VAC)	E85238

Table 1 – Ratings & Part Number Reference

Lead Space	Cap Value (µF)	B (mm)	H (mm)	L (mm)	Ø d	dV/dt (V/µsec)	F Article Code	Part Number
27.5	0.33	9.0	17.0	32.0	0.8	200	49AR333000B1Mx	R49AR333000B1Mx
27.5	0.47	11.0	20.0	32.0	0.8	200	49AR347000B1Mx	R49AR347000B1Mx
27.5	0.68	13.0	22.0	32.0	0.8	200	49AR368000B1Mx	R49AR368000B1Mx
27.5	1.0	13.0	22.0	32.0	0.8	200	49AR410000B1Mx	R49AR410000B1Mx*
27.5	1.0	14.0	28.0	32.0	0.8	200	49AR410000B2Mx	R49AR410000B2Mx
27.5	1.5	18.0	33.0	32.0	0.8	200	49AR415000B1Mx	R49AR415000B1Mx*
27.5	1.5	14.0	28.0	32.0	0.8	200	49AR415000B2Mx	R49AR415000B2Mx
27.5	2.2	22.0	37.0	32.0	0.8	200	49AR422000B1Mx	R49AR422000B1Mx
37.5	0.68	11.0	22.0	41.5	1.0	100	49AW368000A1Mx	R49AW368000A1Mx
37.5	1.0	11.0	22.0	41.5	1.0	100	49AW410000B1Mx	R49AW410000B1Mx
37.5	1.5	13.0	24.0	41.5	1.0	100	49AW415000B1Mx	R49AW415000B1Mx
37.5	2.2	16.0	28.5	41.5	1.0	100	49AW422000B1Mx	R49AW422000B1Mx
37.5	3.3	19.0	32.0	41.5	1.0	100	49AW433000B1Mx	R49AW433000B1Mx
37.5	4.7	20.0	40.0	41.5	1.0	100	49AW447000B1Mx	R49AW447000B1Mx
37.5	6.8	30.0	45.0	41.5	1.0	100	49AW468000B1Mx	R49AW468000B1Mx
Lead Space	**Cap Value (µF)**	**B (mm)**	**H (mm)**	**L (mm)**	**Ø d**	**dV/dt (V/µsec)**	**F Article Code**	**Part Number**

Other part number options:

(1) Where the 14th character equal to, J (±5% tolerance), K (±10% tolerance) and M (±20% tolerance).

(2) Refer to Ordering Options Table for Ordering Code.

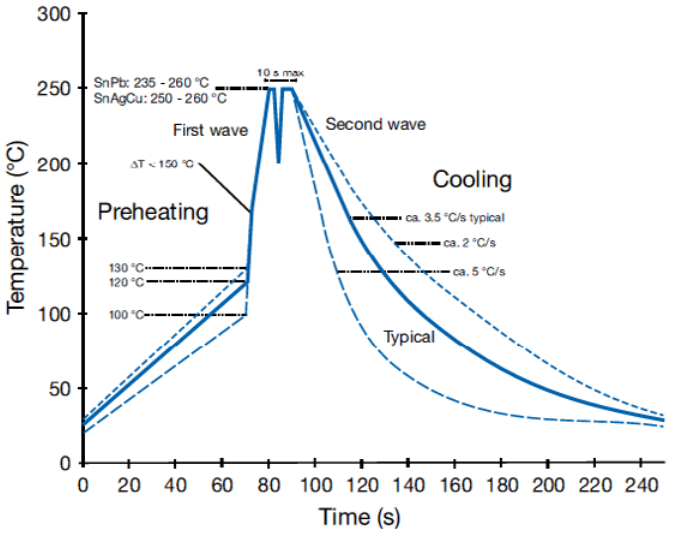
**Where the 10th character equal to M (±20% tolerance) is only available in M (±20% tolerance)*

x: Value of Discharge resistor.

Roll Over for Order Info.

Soldering Process

The implementation of RoHS Directive has forced to select SnAuCu (SAC) alloys or SnCu alloys as primary solder. This has increased the liquidus temperature from that of 183ºC for SnPb eutectic alloy to 217–221ºC for the new alloys. This means that the heat stress to components, even in wave soldering, has increased considerably due to higher pre-heat and wave temperatures. The Polypropylene Capacitors are especially sensitive to heat (melting point of Polypropylene is 160–170ºC). The wave soldering can be destructive especially for mechanically small Polypropylene Capacitors (lead spacings 5-10 mm), and great care has to be taken when soldering them. The recommended solder profiles from KEMET should be used. In case of doubt, KEMET should be consulted. In general the wave soldering curve from IEC Publication 61760-1 edition 2 gives a good guideline for successful soldering.



Marking

- Manufacturer's logo
- Article series
- Rated capacitance
- Capacitance tolerance
- Rated voltage
- Capacitor class
- Approval marks
- Manufacturing date code
- IEC climatic category
- Passive flammability class
- Manufacturing date code
- Manufacturing plant

Lead Taping and Packaging of Radial Components for Automatic Insertion Machines

Technical terms: IEC 60286-2

Pitch = 5 and 7.5 mm

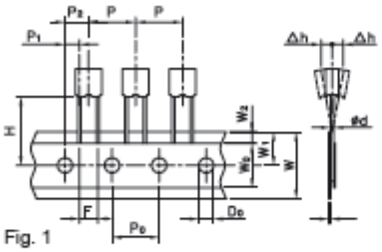


Fig. 1

Pitch = 7.5 mm

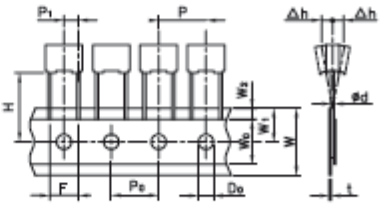
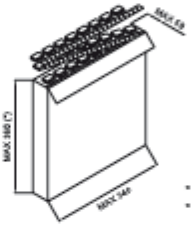


Fig. 2

Description	Symbol	Dimensions (mm)			
		Pitch			Tol.
		5 mm	7.5 mm	7.5 mm	
		Fig.1	Fig.1	Fig. 2	
Lead wire diameter	d	0.5 ... 0.6	0.5 ... 0.6	0.5 ... 0.6	±0.05
Taping pitch	P	12.7	12.7	12.7	±1
Feed hole pitch	P_0	12.7	12.7	12.7	±0.2*
Centering of the lead wire	P_1	3.85	2.6	3.75	±0.7
Centering of the body	P_2	6.35	6.35		±1.3
Lead spacing (pitch)	F	5	7.5	7.5	+0.6 -0.1
Component alignment	Δh	0	0	0	±2
Height of component from tape center	H**	18.5	18.5	18.5	±0.5
Carrier tape width	W	18	18	18	+1 -0.5
Hold down tape width	W_0	6	6	6	min.
Hole position	W_1	9	9	9	±0.5
Hold down tape position	W_2	3	3	3	max.
Feed hole diameter	D_0	4	4	4	±0.2
Tape thickness	t	0.7	0.7	0.7	±0.2

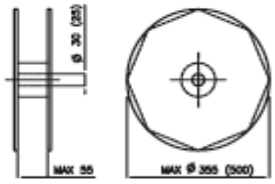
Packaging detail
Two different containers are available:
Fan-fold box (Ammo-pack)
Reel Ø 355 mm only.

Ammo-pack (dimensions in mm)



* Lower dimension available
* upon request (max. 295mm)

Reel (dimensions in mm)



Remarks

* Max 1mm on 20 pitches
** H = 16.5 mm is available upon request.
For orders of capacitors with pitch = 7.5 mm, please specify the requested version (fig.1 or fig.2).

NUMBER OF PIECES FOR PACKING UNIT

Box dimensions B (mm)	H (mm)	L (mm)	Pitch (mm)	Loose *short leads (pcs)	Loose **long leads (pcs)	Ammo (pcs)	Reel Ø355mm (pcs)
2.5	6.5	7.2	5.0	3000	4000	3500	2500
3.5	7.5	7.2	5.0	2000	3000	2500	1800
4.5	9.5	7.2	5.0	1500	2000	1900	1400
5.0	10.0	7.2	5.0	1000	1500	1700	1200
6.0	11.0	7.2	5.0	2000	1000	1400	1000
7.2	13.0	7.2	5.0	1500	750	1150	800

Box dimensions B (mm)	H (mm)	L (mm)	Pitch (mm)	Loose *short leads (pcs)	Loose **long leads (pcs)	Ammo (pcs)	Reel Ø355mm (pcs)
3.0	8.0	10.0	7.5	1500	1750	2800	2100
4.0	9.0	10.0	7.5	2000	1500	2100	1500
5.0	10.5	10.0	7.5	1500	1000	1600	1200
6.0	12.0	10.5	7.5	1000	800	1350	1000

* Short leads: lead length = $4^{+1.5}$ mm (pitch = 5mm); 4^{+2} mm (pitch = 7.5mm)
** Long leads: lead length = $17^{+1/-2}$ mm

Lead Taping and Packaging of Radial Components for Robot Insertion Machines

Technical terms: IEC 60286-2

Pitch = 10 mm

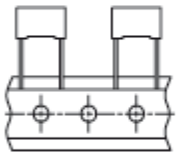


Fig. 1

Pitch = 15 mm

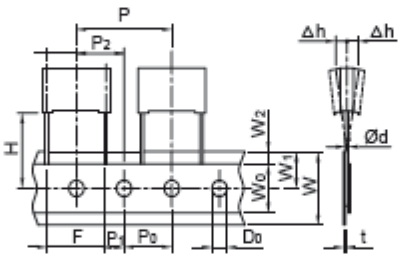


Fig. 2

Pitch = 22.5 mm
Pitch = 27.5 mm

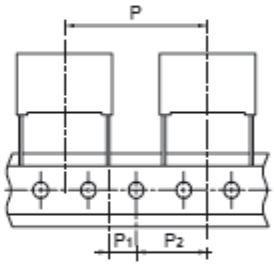


Fig. 3

Description	Symbol	Dimensions (mm)				
		Pitch				Tol.
		10 mm	15 mm	22.5mm	27.5mm	
		Fig.1	Fig.2	Fig.3	Fig.3	
Lead wire diameter	d	0.6	0.6/0.8	0.8	0.8	±0.05
Taping pitch	P	25.4	25.4	38.1	38.1	±1
Feed hole pitch*	P_0	12.7	12.7	12.7	12.7	±0.2**
Centering of the lead wire	P_1	7.7	5.2	7.8	5.3	±0.7
Centering of the body	P_2	12.7	12.7	19.05	19.05	±1.3
Lead spacing (pitch) ***	F	10	15	22.5	27.5	+ 0.6 - 0.1
Component alignment	Δh	0	0	0	0	±2
Height of component from tape center	H****	18.5	18.5	18.5	18.5	±0.5
Carrier tape width	W	18	18	18	18	+1-0. 5
Hold down tape width	W_0	9	10	10	10	min.
Hole position	W_1	9	9	9	9	±0.5
Hold down tape position	W_2	3	3	3	3	max.
Feed hole diameter	D_0	4	4	4	4	±0.2
Tape thickness	t	0.7	0.7	0.7	0.7	±0.2

Remarks

* Available also 15mm.

** Max 1mm on 20 pitches.

*** Pitches 15mm and 10mm taped to 7.5mm (crimped leads) available upon request.

**** H = 16.5 mm is available upon request.

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Shanghai, China
Tel: 86-21-6447-0707

Taipei, Taiwan
Tel: 886-2-27528585

Southeast Asia
Singapore
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Penang, Malaysia
Tel: 60-4-6430200

Bangalore, India
Tel: 91-806-53-76817

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Other KEMET Resources

Tools	
Resource	Location
Configure A Part: CapEdge	http://capacitoredge.kemet.com
SPICE & FIT Software	http://www.kemet.com/spice
Search Our FAQs: KnowledgeEdge	http://www.kemet.com/keask

Product Information	
Resource	Location
Products	http://www.kemet.com/products
Technical Resources (Including Soldering Techniques)	http://www.kemet.com/technicalpapers
RoHS Statement	http://www.kemet.com/rohs
Quality Documents	http://www.kemet.com/qualitydocuments

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Resource	Location
Sample Request	http://www.kemet.com/sample
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Although we design and manufacture our products to the most stringent quality and safety standards, given the current state of the art, isolated component failures may still occur. Accordingly, customer applications which require a high degree of reliability or safety should employ suitable designs or other safeguards (such as installation of protective circuitry or redundancies) in order to ensure that the failure of an electrical component does not result in a risk of personal injury or property damage.

Although all product-related warnings, cautions and notes must be observed, the customer should not assume that all safety measures are indicated or that other measures may not be required.