

Overview

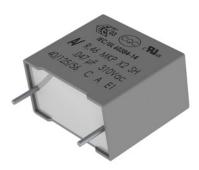
The R46 series is constructed of metallized polypropylene film encapsulated with self-extinguishing resin in a box of material that meets the requirements of UL 94 V-0.

Applications

For worldwide use in electromagnetic interference (EMI) suppression in across-the-line applications that require X2 safety classification. Intended for use in situations in which capacitor failure would not result in exposure to electric shock. Not for use in "series with mains" type applications.

Benefits

- Approvals: ENEC, UL, cUL, CQC
- X2 CLASS (IEC 60384-14)
- Rated voltage: 310 VAC 50/60 Hz
- Capacitance range: 0.01 15 μF
- Lead spacing: 10.0 37.5 mm
- Capacitance tolerance: ±20%, ±10%
- Climatic category 40/125/56, IEC 60068-1
- Tape & Reel in accordance with IEC 60286-2
- · RoHS compliant and lead-free terminations
- Operating temperature range of -40°C to +125°C
- 100% screening factory test at 2,200 VDC/1,500 VAC
- Self healing properties



Part Number System

R46	3	N	3220	00	H1	Μ
Series	Rated Voltage (VAC)	Lead Spacing (mm)	Capacitance Code (pF)	Packaging	Internal Use	Capacitance Tolerance
X2, Metallized Polypropylene	3 = 310	F = 10.0 I = 15.0 N = 22.5 R = 27.5 W = 37.5	The last three digits represent significant figures. The first digit specifies number of zeros to be added.	See Ordering Options Table	H = High Temperature H1 H2 H3 H4 H7	K = ±10% M = ±20%



Ordering Options Table

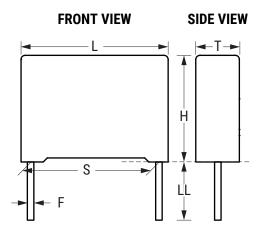
Lead Spacing Nominal (mm)	Type of Leads and Packaging	Lead Length (mm)	Lead and Packaging Code	
	Standard Lead and Packaging Options			
	Bulk (Bag) – Short Leads	4+2/-0	00	
	Ammo Pack	H ₀ = 18.5 ±0.5	DQ ¹	
	Other Lead and Packaging Options			
	Tape & Reel (Large Reel)	H ₀ = 18.5 ±0.5	СК	
10	Tape & Reel (Standard Reel)	H ₀ = 18.5 ±0.5	GY ¹	
15	Bulk (Bag)² – Short Leads	2.7 +0.5/-0	JA	
22.5	Bulk (Bag)² – Short Leads	3.5 +0.5/-0	JB	
	Bulk (Bag)² – Short Leads	4.0 +0.5/-0	JE	
	Bulk (Bag)² – Short Leads	3.2 +0.3/-0.2	JH	
	Bulk (Bag) – Long Leads	18 ±1	JM	
	Bulk (Bag) – Long Leads	30 +5/-0	40	
	Bulk (Bag) – Long Leads	25 +2/-1	50	
	Standard Lead and Packaging Options			
	Bulk (Bag) – Short Leads	4+2/-0	00	
	Tape & Reel (Large Reel)	H ₀ = 18.5 ±0.5	CK ¹	
	Other Lead and Packaging Options			
	Bulk (Tray) – Short Leads	2.7 +0.5/-0	JA	
27.5	Bulk (Tray) – Short Leads	3.5 +0.5/-0	JB	
	Bulk (Tray) – Short Leads	4.0 +0.5/-0	JE	
	Bulk (Tray)- Short Leads	3.2 +0.3/-0.2	JH	
	Bulk (Tray) – Long Leads	18 ±1	JM	
	Bulk (Tray) – Long Leads	30 +5/-0	40	
	Bulk (Tray) – Long Leads	25 +2/-1	50	
	Standard Lead and Packaging Options	4.01.0	0.0	
	Bulk (Bag) – Short Leads	4+2/-0	00	
	Other Lead and Packaging Options			
	Bulk (Tray) – Short Leads	2.7 +0.5/-0	JA	
37.5	Bulk (Tray) – Short Leads	3.5 +0.5/-0	JB	
	Bulk (Tray) – Short Leads	4.0 +0.5/-0	JE	
	Bulk (Tray)– Short Leads	3.2 +0.3/-0.2	JH	
	Bulk (Tray) – Long Leads	18 ±1	JM	
	Bulk (Tray) – Long Leads	30 +5/-0	40	
	Bulk (Tray) – Long Leads	25 +2/-1	50	

¹ Not for all sizes, see "Packaging Quantities" table.

 2 For lead spacing 22.5 case sizes \geq 8.5*17*26.5 the parts are packed in a Pizza box 335*320*34 mm



Dimensions – Millimeters



S T H L				l	F						
Nominal	Tolerance	Nominal	Tolerance	Nominal	Tolerance	Nominal	Tolerance	Nominal	Tolerance		
10.0	±0.4	4.0	+0.2/-0.5	9.0	+0.1/-0.5	13.0	+0.2/-0.5	0.6	±0.05		
10.0	±0.4	5.0	+0.2/-0.5	11.0	+0.1/-0.5	13.0	+0.2/-0.5	0.6	±0.05		
10.0	±0.4	6.0	+0.2/-0.5	12.0	+0.1/-0.5	13.0	+0.2/-0.5	0.6	±0.05		
15.0	±0.4	5.0	+0.2/-0.5	11.0	+0.1/-0.5	18.0	+0.3/-0.5	0.6	±0.05		
15.0	±0.4	6.0	+0.2/-0.5	12.0	+0.1/-0.5	18.0	+0.3/-0.5	0.6	±0.05		
15.0	±0.4	6.0	+0.2/-0.5	17.5	+0.1/-0.5	18.0	+0.3/-0.5	0.6	±0.05		
15.0	±0.4	7.5	+0.2/-0.5	13.5	+0.1/-0.5	18.0	+0.5/-0.5	0.6	±0.05		
15.0	±0.4	7.5	+0.2/-0.5	18.5	+0.1/-0.5	18.0	+0.5/-0.5	0.8	±0.05		
15.0	±0.4	8.5	+0.2/-0.5	14.5	+0.1/-0.5	18.0	+0.5/-0.5	0.6	±0.05		
15.0	±0.4	9.0	+0.2/-0.5	12.5	+0.1/-0.5	18.0	+0.5/-0.5	0.6	±0.05		
15.0	±0.4	10.0	+0.2/-0.5	16.0	+0.1/-0.5	18.0	+0.5/-0.5	0.8	±0.05		
15.0	±0.4	11.0	+0.2/-0.5	19.0	+0.1/-0.5	18.0	+0.5/-0.5	0.8	±0.05		
15.0	±0.4	13.0	+0.2/-0.5	12.0	+0.1/-0.5	18.0	+0.5/-0.5	0.8	±0.05		
22.5	±0.4	6.0	+0.2/-0.5	15.0	+0.1/-0.5	26.5	+0.3/-0.5	0.8	±0.05		
22.5	±0.4	7.0	+0.2/-0.5	16.0	+0.1/-0.5	26.5	+0.3/-0.5	0.8	±0.05		
22.5	±0.4	10.0	+0.2/-0.5	18.5	+0.1/-0.5	26.5	+0.3/-0.5	0.8	±0.05		
22.5	±0.4	11.0	+0.2/-0.5	20.0	+0.1/-0.5	26.5	+0.3/-0.5	0.8	±0.05		
22.5	±0.4	13.0	+0.2/-0.5	22.0	+0.1/-0.5	26.5	+0.3/-0.5	0.8	±0.05		
27.5	±0.4	9.0	+0.2/-0.7	17.0	+0.1/-0.7	32.0	+0.3/-0.7	0.8	±0.05		
27.5	±0.4	11.0	+0.2/-0.7	20.0	+0.1/-0.7	32.0	+0.3/-0.7	0.8	±0.05		
27.5	±0.4	13.0	+0.2/-0.7	22.0	+0.1/-0.7	32.0	+0.3/-0.7	0.8	±0.05		
27.5	±0.4	13.0	+0.2/-0.7	25.0	+0.1/-0.7	32.0	+0.3/-0.7	0.8	±0.05		
27.5	±0.4	14.0	+0.2/-0.7	28.0	+0.1/-0.7	32.0	+0.3/-0.7	0.8	±0.05		
27.5	±0.4	18.0	+0.2/-0.7	33.0	+0.1/-0.7	32.0	+0.3/-0.7	0.8	±0.05		
27.5	±0.4	22.0	+0.2/-0.7	37.0	+0.1/-0.7	32.0	+0.3/-0.7	0.8	±0.05		
37.5	±0.4	11.0	+0.3/-0.7	22.0	+0.1/-0.7	41.5	+0.3/-0.7	1.0	±0.05		
37.5	±0.4	13.0	+0.3/-0.7	24.0	+0.1/-0.7	41.5	+0.3/-0.7	1.0	±0.05		
37.5	±0.4	16.0	+0.3/-0.7	28.5	+0.1/-0.7	41.5	+0.3/-0.7	1.0	±0.05		
37.5	±0.4	19.0	+0.3/-0.7	32.0	+0.1/-0.7	41.5	+0.3/-0.7	1.0	±0.05		
37.5	±0.4	20.0	+0.3/-0.7	40.0	+0.1/-0.7	41.5	+0.3/-0.7	1.0	±0.05		
37.5	±0.4	24.0	+0.3/-0.7	44.0	+0.1/-0.7	41.5	+0.3/-0.7	1.0	±0.05		
37.5	±0.4	30.0	+0.3/-0.7	45.0	+0.1/-0.7	41.5	+0.3/-0.7	1.0	±0.05		
	Note: See Ordering Options Table for lead length (LL/H ₀) options.										

3



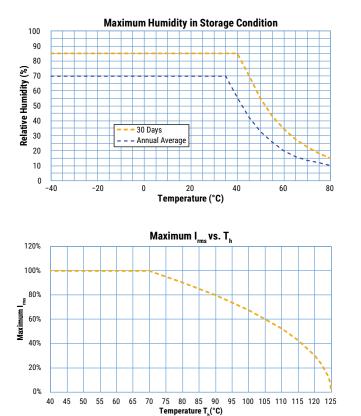
Performance Characteristics

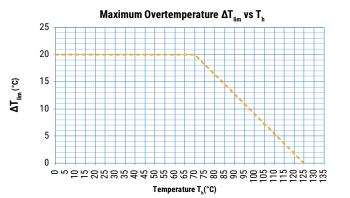
Dielectric	Polypropylene film	Polypropylene film								
Plates	Metal layer deposited by	Metal layer deposited by evaporation under vacuum								
Winding	Non-inductive type									
Leads	Tinned wire	Tinned wire								
Protection	Plastic case, thermosetting	g resin filled. Box material is s	olvent resistant and flame reta	ardant according to UL94.						
Related Documents	IEC 60384-14, EN 60384	-14								
Rated Voltage V _R	310 VAC (50/60 Hz)									
Recommended DC Voltage	≤ 630 VDC									
Capacitance Range	0.010 – 15 µF									
Capacitance Values	E6 series (IEC 60063) me	easured at 1 kHz and +20 ±1	°C							
Capacitance Tolerance	±10%, ±20%									
Temperature Range	-40°C to +125°C									
Climatic Category	40/125/56 IEC 60068-1									
Reliability	Operational life 100,000 l	hours at 85°C; 2,000 hours a	at 125°C							
	Storage time: ≤ 24 months from the date marked on the label package									
	Average relative humidity per year ≤ 70%									
Storage Conditions	RH ≤ 85% for 30 days ran	domly distributed througho	ut the year							
	Dew is absent									
	Temperature: -40 to 80°0	C (see "Maximum Humidity	in Storage Conditions" grap	h below)						
Approvals	ENEC, UL, cUL, CQC									
		Maximum Va	lues at +23°C							
Dissipation Factor (tanδ)			C ≤ 0.1 µF	C > 0.1 µF						
	Frequenc	•	0.3%	0.2%						
Test Voltage Between Terminals	The 100% screening factory test is carried out at 2,200 VDC/1,500 VAC. The voltage level is selected to meet the requirements in applicable equipment standards. All electrical characteristics are checked after the test. This test cannot be repeated, as there is a risk of damaging the capacitor. KEMET is not liable in such cases for any failures.									
	Measured at +25°C ±5°C, according to IEC 60384-2									
		Minimum Values E	Between Terminals							
Insulation Resistance	Voltage Charge	Voltage Charge Time	C ≤ 0.33 µF	C > 0.33 µF						
	100 VDC	1 minute	≥ 1 • 10 ⁵ MΩ (≥ 5 • 10 ⁵ MΩ)*	≥ 30,000 MΩ • μF (≥ 150,000 MΩ • μF)*						

* Typical value

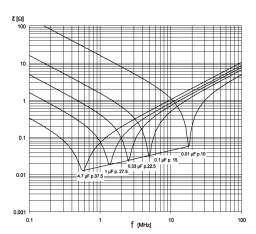


Performance Characteristics cont.



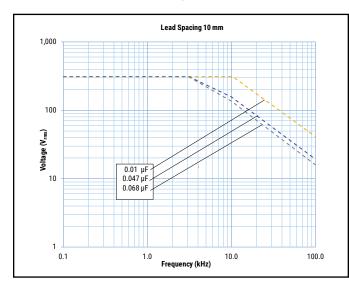


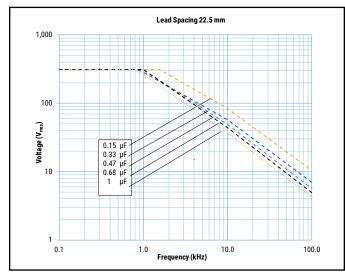
 T_h is the maximum ambient temperature surrounding the capacitor or hottest contact point (e.g. tracks), whichever is higher, in the worst operation conditions in °C.

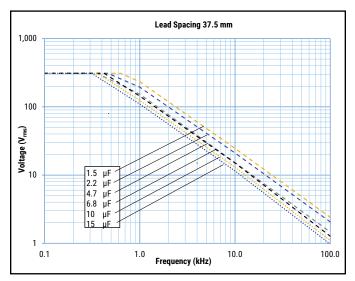


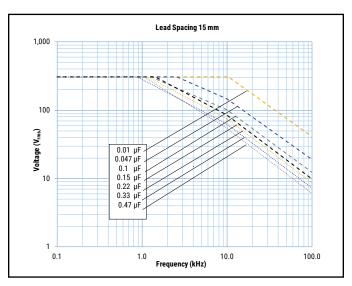
Impedance Graph

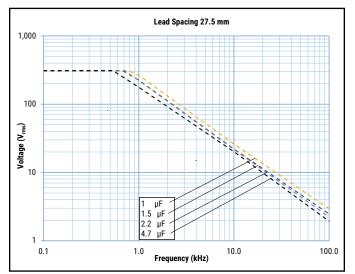
Maximum Voltage (V_{rms}) Versus Frequency (Sinusoidal Waveform/Th \leq 70°C)





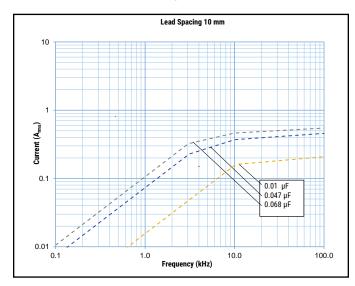


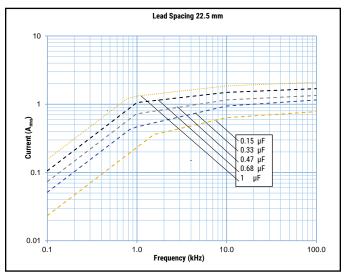


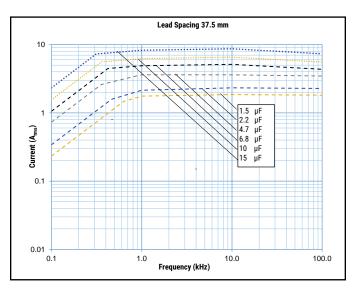


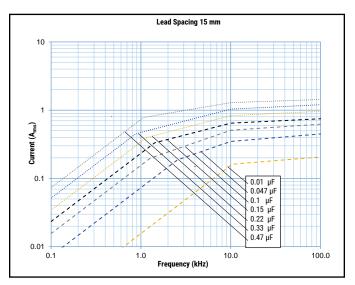


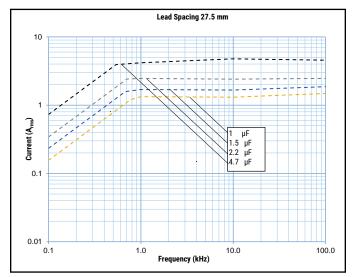
Maximum Current (I_{rms}) Versus Frequency (Sinusoidal Waveform/Th \leq 70°C)















Environmental Test Data

Test	IEC Publication	Procedure
Endurance	EN/IEC 60384-14	1.25 x V _R VAC 50 Hz, once every hour increase to 1,000 VAC for 0.1 second, 1,000 hours 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 98 m/s ²
Bump	IEC 60068-2-29 Test Eb	1,000 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	$V_{_{ m R}}$ + 20 surge pulses at 2.5 kV (pulse every 5 seconds)
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% RH, 56 days

Approvals

Certification Body	Mark	Specification	File Number
IMQ S-p.A.		EN/IEC 60384-14	CA08.00063
UL	c SN [®] us	UL 60384–14 and CAN/CSA E60384–14 (310 VAC)	E97797
CQC		IEC 60384-14	CQC15001128630 CQC15001128703 CQC15001128705

Environmental Compliance

All KEMET EMI capacitors are RoHS compliant.





Table 1 – Ratings & Part Number Reference

0.01 5.0 11.0 13.0 10.0 500 4462210(1)H1(2) RA 0.015 5.0 11.0 13.0 10.0 500 4462210(1)H1(2) RA 0.022 4.0 9.0 13.0 10.0 500 4467223(1)H1(2) RA 0.022 5.0 11.0 13.0 10.0 500 4467223(1)H1(2) RA 0.033 5.0 11.0 13.0 10.0 500 4467223(1)H1(2) RA 0.047 5.0 11.0 13.0 10.0 500 467247(1)H1(2) RA 0.047 5.0 11.0 18.0 15.0 400 4632150(1)H1(3) RA 0.015 5.0 11.0 18.0 15.0 400 4632150(1)H1(2) RA 0.010 5.0 11.0 18.0 15.0 400 4632150(1)H1(2) RA 0.033 5.0 11.0 18.0 15.0 400 4632120(1)H1(2) RA	Capacitance	Dime	ensions ir	n mm	Lead Spacing	dV/dt	KEMET	Legacy Part
0.01 5.0 11.0 13.0 10.0 500 44672100(1)+112) RA 0.015 5.0 11.0 13.0 10.0 500 44672230(1)+12) RA 0.022 4.0 9.0 13.0 10.0 500 44672230(1)+12) RA 0.022 5.0 11.0 13.0 10.0 500 44672230(1)+12) RA 0.033 5.0 11.0 13.0 10.0 500 4457230(1)+12) RA 0.047 5.0 11.0 13.0 10.0 500 44572470(1)+12) RA 0.047 5.0 11.0 18.0 15.0 400 4632150(1)+13) RA 0.015 5.0 11.0 18.0 15.0 400 4632150(1)+12) RA 0.033 5.0 11.0 18.0 15.0 400 4632150(1)+12) RA 0.043 5.0 1.0 18.0 15.0 400 4632120(1)+12) RA	Value (µF)	Т	Н	L	(S)	(V/µs)	Part Number	Number
0.015 4.0 9.0 13.0 10.0 500 46372150(1917) PR 0.022 4.0 9.0 13.0 10.0 500 4637230(1917) PR 0.022 5.0 11.0 13.0 10.0 500 4637230(1917) PR 0.033 5.0 11.0 13.0 10.0 500 4637230(1917) PR 0.047 6.0 12.0 13.0 10.0 500 46372470(1917) PR 0.066 6.0 12.0 13.0 10.0 500 46372460(1917) PR 0.010 5.0 11.0 18.0 15.0 400 46321200(1917) PR 0.022 5.0 11.0 18.0 15.0 400 4632220(1917) PR 0.033 5.0 11.0 18.0 15.0 400 4631240(1917) PR 0.047 5.0 11.0 18.0 15.0 400 4631300(1917) PR 0.05			9.0	13.0		500	463F2100(1)H7(2)	R463F2100(1)H7(2)
0.015 5.0 11.0 13.0 10.0 50.0 46872150(1)H(2) FR 0.022 5.0 11.0 13.0 10.0 50.0 4687220(1)H(2) FR 0.033 5.0 11.0 13.0 10.0 50.0 4687230(1)H(2) FR 0.047 5.0 11.0 13.0 10.0 50.0 46872470(1)H(2) FR 0.047 5.0 11.0 13.0 10.0 50.0 46972470(1)H(2) FR 0.068 6.0 12.0 13.0 10.0 50.0 46972470(1)H(2) FR 0.015 5.0 11.0 18.0 15.0 40.0 4637250(1)H(2) FR 0.022 5.0 11.0 18.0 15.0 40.0 4637250(1)H(2) FR 0.033 5.0 11.0 18.0 15.0 40.0 4637250(1)H(2) FR 0.046 5.0 11.0 18.0 15.0 40.0 46337250(1)H(2) FR							463F2100(1)H1(2)	R463F2100(1)H1(2)
0.022 4.0 9.0 13.0 10.0 50.0 4467220(1)41/2 PA 0.033 5.0 11.0 13.0 10.0 50.0 4467230(1)41/2 PA 0.047 6.0 12.0 13.0 10.0 50.0 44672470(1)41/2 PA 0.046 6.0 12.0 13.0 10.0 50.0 44672460(1)41/2 PA 0.047 6.0 12.0 13.0 10.0 50.0 4692490(1)41/2 PA 0.050 4692490(1)41/2 PA PA 4692190(1)41/2 PA 0.010 5.0 11.0 18.0 15.0 400 4632290(1)41/2 PA 0.022 5.0 11.0 18.0 15.0 400 4631290(1)41/2 PA 0.047 5.0 11.0 18.0 15.0 400 4631290(1)41/2 PA 0.15 6.0 17.5 18.0 15.0 400 4631390(1)41/2 PA 0.15 6.0	0.015		9.0	13.0			463F2150(1)H7(2)	R463F2150(1)H7(2)
0.022 5.0 11.0 13.0 10.0 500 445F2220()H1(2) FA 0.047 5.0 11.0 13.0 10.0 500 445F2470()H1(2) FA 0.047 5.0 11.0 13.0 10.0 500 445F2470()H1(2) FA 0.066 6.0 12.0 13.0 10.0 500 45F2470()H1(2) FA 0.016 5.0 11.0 18.0 15.0 400 445F260()H1(2) FR 0.022 5.0 11.0 18.0 15.0 400 443B250()H1(2) FR 0.033 5.0 11.0 18.0 15.0 400 443B230()H1(2) FR 0.048 5.0 11.0 18.0 15.0 400 443B190()H7(2) FR 0.15 6.0 17.5 18.0 15.0 400 443B190()H7(2) FR 0.15 6.0 17.5 18.0 15.0 400 443B190()H7(2) FR 0.							463F2150(1)H1(2)	R463F2150(1)H1(2)
0.033 5.0 11.0 13.0 10.0 500 445F2330()H12) R4 0.047 6.0 12.0 13.0 10.0 500 445F2470()H12) R4 0.066 6.0 12.0 13.0 10.0 500 445F2470()H12) R4 0.010 5.0 11.0 18.0 15.0 400 4431210()H12) R4 0.022 5.0 11.0 18.0 15.0 400 4431220()H12) R4 0.023 5.0 11.0 18.0 15.0 400 4431220()H12) R4 0.047 5.0 11.0 18.0 15.0 400 4431220()H12) R4 0.058 5.0 11.0 18.0 15.0 400 443130()H12) R4 0.15 6.0 12.0 18.0 15.0 400 443130()H12) R4 0.15 6.0 17.5 18.0 15.0 400 443130()H12) R4 0.15	0.022		9.0	13.0	10.0		463F2220(1)H7(2)	R463F2220(1)H7(2)
0.047 5.0 11.0 13.0 10.0 500 445F2470()HP(2) R4 0.068 6.0 12.0 13.0 10.0 500 445F260()HP(2) R4 0.015 5.0 11.0 18.0 15.0 400 445F260()HP(2) R4 0.022 5.0 11.0 18.0 15.0 400 445H220()HP(2) R4 0.033 5.0 11.0 18.0 15.0 400 445H230()HP(2) R4 0.047 5.0 11.0 18.0 15.0 400 445H230()HP(2) R4 0.053 5.0 11.0 18.0 15.0 400 445H230()HP(2) R4 0.10 5.0 11.0 18.0 15.0 400 445H310()HP(2) R4 0.15 6.0 12.0 18.0 15.0 400 45H310()HP(2) R4 0.15 6.0 17.5 18.0 15.0 400 45H310()HP(2) R4 0.15 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>R463F2220(1)H1(2)</td>								R463F2220(1)H1(2)
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0.227.518.518.015.040046313220(1)H4(2)RA 0.33 8.514.518.015.04004631330(1)H7(2)RA 0.33 10.016.018.015.04004631330(1)H7(2)RA 0.33 7.518.518.015.040046313330(1)H7(3)RA 0.33 13.012.018.015.040046313330(1)H7(3)RA 0.47 10.016.018.015.040046313470(1)H7(3)RA 0.68 11.019.018.015.040046313470(1)H7(3)RA 0.68 15.026.522.5200463N3150(1)H1(2)RA 0.22 6.015.026.522.5200463N330(1)H7(2)RA 0.33 6.015.026.522.5200463N330(1)H7(2)RA 0.33 7.016.026.522.5200463N330(1)H7(2)RA 0.47 7.016.026.522.5200463N3470(1)H7(2)RA 0.47 7.016.026.522.5200463N340(1)H7(2)RA 0.47 10.018.526.522.5200463N340(1)H7(2)RA 0.47 10.018.526.522.5200463N340(1)H7(2)RA 0.47 10.018.526.522.5200463N340(1)H7(2)RA 0.68 11.020.026.522.5200							() ()	R463I3220(1)H2(3)
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		20.0	40.0	41.5	37.5	100	463W4680(1)H7(2)	R463W4680(1)H7(2)
15 30.0 45.0 41.5 37.5 100 463W5150(1)H7(3) R4		24.0	44.0	41.5	37.5		463W5100(1)H7(2)	R463W5100(1)H7(2)
	15	30.0	45.0	41.5	37.5	100	463W5150(1)H7(3)	R463W5150(1)H7(3)
		_ / .			Lead		KEMET	Legacy
	Capacitance Value (µF)	T (mm)	H (mm)	L (mm)		dV/dt (V/µs)		Part Number

(1) Insert lead and packaging code. See Ordering Options Table for available options.

(2) $M = \pm 20\%$, $K = \pm 10\%$

(3) $M = \pm 20\%$ (only available tolerance).

9



Soldering Process

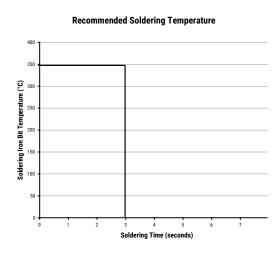
The implementation of the RoHS directive has resulted in the selection of SnAuCu (SAC) alloys or SnCu alloys as primary solder material. This has increased the liquidus temperature from 183°C for SnPb eutectic alloys to 217 - 221°C for the new alloys. As a result, the heat stress to the components, even in wave soldering, has increased considerably due to higher preheat and wave temperatures. Polypropylene capacitors are especially sensitive to heat (the melting point of polypropylene is 160 - 170°C). Wave soldering can be destructive, especially for mechanically small polypropylene capacitors (with lead spacing of 5 - 15 mm). Great care must be taken during soldering. The recommended solder profiles from KEMET should be used. Consult KEMET with any questions. In general, the wave soldering curve from IEC Publication 61760-1 Edition 2 serves as a solid guideline for successful soldering. See Figure 1.

Reflow soldering is not recommended for through-hole film capacitors. Exposing capacitors to a soldering profile in excess of the above-recommended limits may result to degradation of or permanent damage to the capacitors.

Do not place the polypropylene capacitor through an adhesive curing oven to cure resin for surface mount components. Insert through-hole parts after curing surface mount parts. Consult KEMET to discuss the actual temperature profile in the oven, if through-hole components must pass through the adhesive curing process. A maximum two soldering cycles is recommended. Allow time for the capacitor surface temperature to return to normal temperature before performing the second soldering cycle.

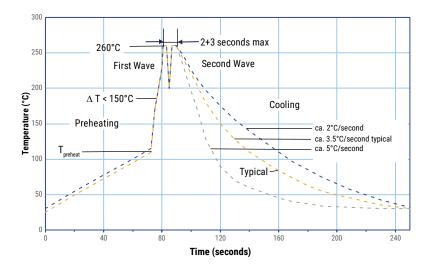
Manual Soldering Recommendations

Following is the recommendation for manual soldering with a soldering iron.



The soldering iron tip temperature should be set at 350°C (+10°C maximum), with the soldering duration not to exceed more than 3 seconds.

Wave Soldering Recommendations





Soldering Process cont.

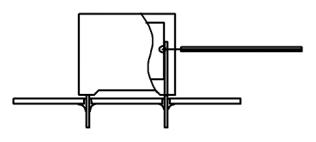
Wave Soldering Recommendations cont.

1. The table indicates the maximum set-up temperature of the soldering process.

Dielectric	Maxi Prel Tempe	heat	Maximum Peak Soldering Temperature			
Film Material	Capacitor Pitch ≤ 15 mm	Capacitor Pitch > 15 mm	Capacitor Pitch ≤ 15 mm	Capacitor Pitch > 15 mm		
Polyester	130°C	130°C	270°C	270°C		
Polypropylene	125°C	130°C	260°C	270°C		
Paper	130°C	140°C	270°C	270°C		
Polyphenylene Sulphide	150°C	160°C	270°C	270°C		

2. The maximum temperature measured inside the capacitor: set the temperature so that the maximum temperature inside the element is below the limit.

Dielectric Film Material	Maximum Temperature Measured Inside the Element
Polyester	160°C
Polypropylene	125°C
Paper	160°C
Polyphenylene Sulphide	160°C



Temperature monitored inside the capacitor.

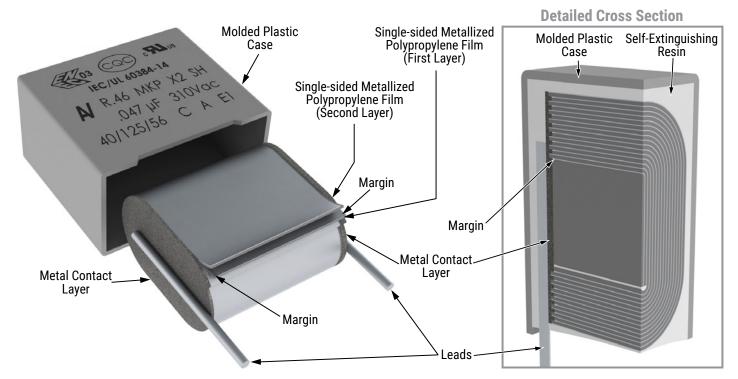
Selective Soldering Recommendations

Selective dip soldering is a variation of reflow soldering. In this method, the printed circuit board with through-hole components to be soldered is preheated and transported over the solder bath as it is in normal flow soldering, without touching the solder. When the board is over the bath, it is stopped. Pre-designed solder pots are lifted from the bath with molten solder, only at the places of the selected components, and pressed against the lower surface of the board to solder the components.

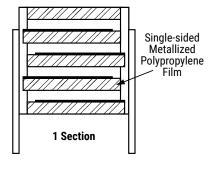
The temperature profile for selective soldering is similar to the double wave flow soldering outlined in this document. **However, instead of two baths, there is only one with a time from 3 – 10 seconds.** In selective soldering, the risk of overheating is greater than in double wave flow soldering, and great care must be taken so that the parts do not overheat.



Construction

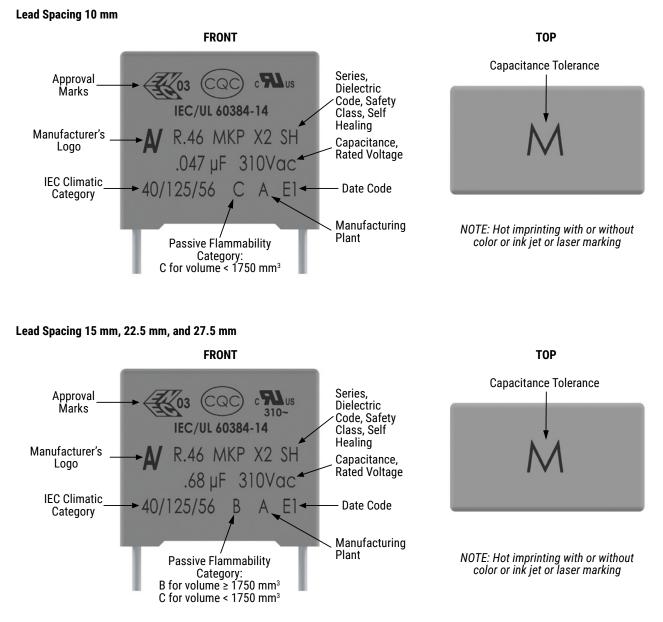


Winding Scheme





Marking

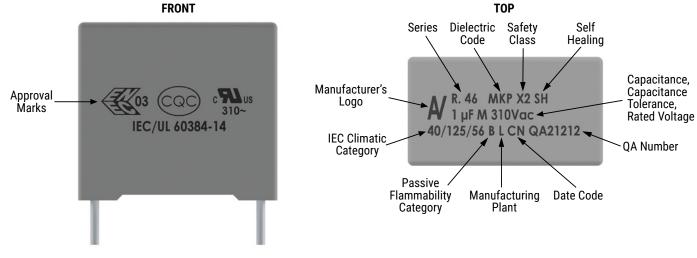


Slight change in the layout can be possible but this does not affect the content of the information of the current marking. This change will be achieved without impact to product form, fit or function, as the products are equivalent with respect to physical, mechanical, quality and reliability characteristics.



Marking cont.

Lead Spacing 22.5 and 27.5 mm (alternatives*) and 37.5 mm



*Differences are caused by technology (clichee, laser, or ink) and production line.

Slight change in the layout can be possible but this does not affect the content of the information of the current marking. This change will be achieved without impact to product form, fit or function, as the products are equivalent with respect to physical, mechanical, quality and reliability characteristics.

	Manufacturing Date Code (IEC 60062)											
Year	Code	Year	Code	Year	Code	Month	Code	Month	Code			
2020	М	2027	V	2034	E	January	1	July	7			
2021	N	2028	W	2035	F	February	2	August	8			
2022	Р	2029	Х	2036	Н	March	3	September	9			
2023	R	2030	A	2037	J	April	4	October	0			
2024	S	2031	В	2038	K	May	5	November	Ν			
2025	Т	2032	С	2039	L	June	6	December	D			
2026	U	2033	D	2040	М							



Packaging Quantities

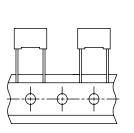
Lead Spacing (mm)	Thickness (mm)	Height (mm)	Length (mm)	Bulk Short Leads		ulk Leads	Standard Reel ø 355 mm	Large Reel ø 500 mm	Ammo Taped
Lead and Packaging Code:			00 - JA - JB JE - JH	JM	40 - 50	GY	СК	DQ	
	4	9	13	2,000	2,200	1,800	750	1,500	1,000
10	5	11	13	1,300	2,000	1,500	600	1,250	800
	6	12	13	1,000	1,800	1,200	500	1,000	680
	5	11	18	2,000	1,250	1,000	600	1,250	800
	6	11	18	1,750	1,250	900	500	1,230	680
	6	17.5	18	1,750	800	700	500	1,000	680
	7.5	17.5	18	1,000	800	700	350	800	500
	7.5	18.5	18	900	650	500		800	500
15	8.5	14.5	18	1,000	650	500	300	700	440
	<u> </u>	14.5	18	1,000	700	500	270	650	440
	10	12.5	18	750		520	270	600	380
	10	10	18	450	550 400	350		500	380
	13	19	18	750	520	490	200	480	280
	15	12	10	750	520	490	200	400	200
	6	15	26.5	805	450	500	-	700	464
	7	16	26.5	700	450	500	-	550	380
22.5	10	18.5	26.5	396	350	300	-	350	235
	11	20	26.5	360	200	250	-	350	217
	13	22	26.5	300	150	200	-	300	
		47		014	400	400		450	
	9	17	32	816	408	408	-	450	-
	11	20	32	560	336	336	-	350	-
27.5	13	22	32	480	288	288	-	300	-
	14	28	32	352	176	176	-	-	-
	18	33	32	256	128	128	-	-	-
	22	37	32	168	112	112	-	-	-
	11	22	41.5	420	252	252	-	-	-
	13	24	41.5	360	216	216	-	-	-
	16	28.5	41.5	216	108	108	-	-	-
37.5	19	32	41.5	192	96	96	-	-	-
0.10	20	40	41.5	126	84	84	-	-	-
	24	44	41.5	108	72	72	-	-	-
	30	45	41.5	90	60	60	-	-	-



Lead Taping & Packaging (IEC 60286-2)



Figure 2 Lead Spacing 15 mm



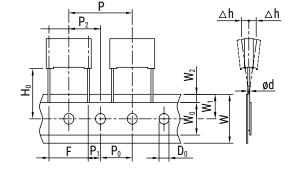
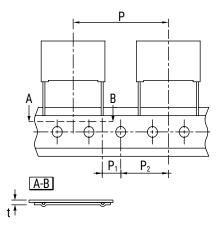


Figure 3 Lead Spacing 22.5 – 27.5 mm



Taping Specification

			Dim	ensions (r	nm)	
Description	Symbol					
Description	o y	10	15	22.5	27.5	Tol.
		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 lead space	Р	25.4	25.4	38.1	38.1	±1
Feed hole lead space *	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 ₀ ****	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	Minimum
Hole position	W ₁	9	9	9	9	±0.5
Hold down tape position	W ₂	3	3	3	3	Maximum
Feed hole diameter	D ₀	4	4	4	4	±0.2
Total tape thickness	t	0.7	0.7	0.7	0.7	±0.2

* 15 mm also available

** Maximum of 1 mm on 20 lead spaces

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

**** $H_0 = 16.5 \text{ mm}$ is available upon request



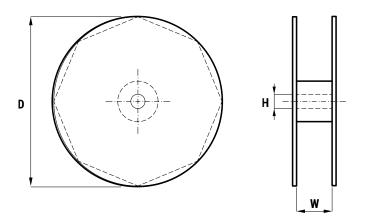
Ammo Specifications

Dimensions (mm)				
Н	W	т		
360	340	59		

H T W

Reel Specifications

Dimensions (mm)		
D	Н	W
355	30	55 Maximum
500	25	
	D 355	D H 355 30







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