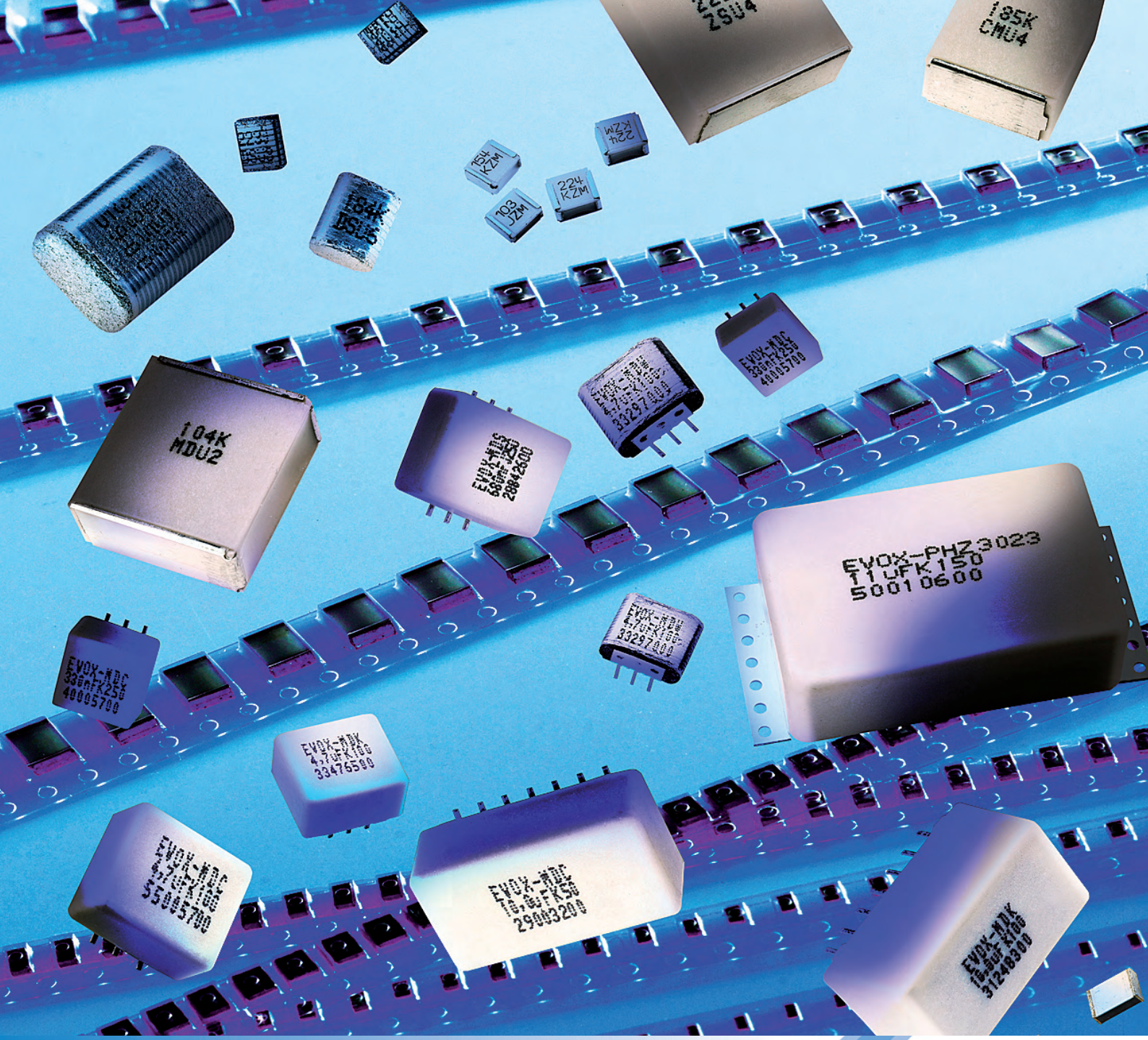

Evox Rifa SMD and DIL Film Capacitors

www.kemet.com
F3306 10/08

The Capacitance Company
KEMET
CHARGED.™

QUALITY POLICY

KEMET exceeds customer expectations through operational excellence and continuous improvement.

- Zero Defects
- 100% On-Time Delivery
- Technology Leader
- Lowest Total Cost of Ownership
- Six Sigma Process Capability
- World-Class Cycle Time Efficiencies

ENVIRONMENTAL POLICY

KEMET conducts its business in a manner designed to protect the health and safety of our employees, our customers, the public, and the environment.

Evox Rifa
SMD and DIL Film Capacitors

INDEX

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Specifications are subject to change without notice.

SMD Film Capacitors

	Metallized PET (MKT)		Metallized PEN (MKN)		Metallized PPS (MKI)		
							
TYPE:	**MMC**	**GMC**	**GMW**	**GPC**	**SPC**	**SMC**	**SMW**
International standard	IEC 60384-19	IEC 60384-23	IEC 60384-23	IEC 60384-23	IEC 60384-20	IEC 60384-20	IEC 60384-20
Capacitance range, µF	0.001-15	0.001-5.6	0.001-0.47	0.00047-1.0	0.00047-0.68	0.001-3.3	0.001-0.56
Capacitance tolerance, ±%	10, 5	10, 5	20, 10, 5	20, 10	20, 10, 5	5, 2.5, 2	10, 5, 2.5, 2
Rated voltage, VDC VAC	**50-400 30-200**	**50-630 30-300**	**63-630 40-220**	**63-1000 40-350**	**100-630 63-350**	**50-400 30-200**	**50-400 30-200**
Climatic Category according to IEC 60068	55/100/56	55/125/56	55/125/21	55/125/56	55/125/56	55/125/56	55/125/56
Pulse rise time, V/µs	5-50	5-50	20-50	100-2200	150-2000	2-40	8-20
Chip length, mm	5.7, 7.3, 10.2, 12.7, 16.5	5.7, 7.3, 10.2, 12.7, 16.5	5.7	7.3, 10.2, 12.7 16.5	7.3, 10.2, 12.7 16.5	5.7, 7.3, 10.2, 12.7, 16.5	5.7, 7.3
Features/Applications	Coupling / decoupling	Coupling / decoupling High temp.	Coupling / decoupling High temp.	Pulse High temp.	Pulse, High freq. High temp., High stability	High freq.,High temp High stability	High freq.,High temp High stability
Packing	Taped for automatic insertion, bulk in boxes	Taped for automatic insertion, bulk in boxes	Taped for automatic insertion, bulk in boxes	Taped for automatic insertion, bulk in boxes	Taped for automatic insertion, bulk in boxes	Taped for automatic insertion, bulk in boxes	Taped for automatic insertion, bulk in boxes
Page	21	26	30	33	43	36	40

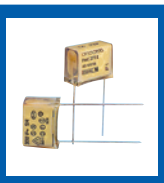
DIL CAPACITORS

	Metallized Polyester (MKT)		
			
TYPE:	**MDC**	**MDK**	**MDS**
International standard			
Capacitance range, µF	0.033-15	0.033-15	0.033-6.8
Capacitance tolerance, ±%	10, 5	10, 5	10, 5
Rated voltage, VDC VAC	**50-630 30-220**	**50-630 30-220**	**50-630 30-220**
Climatic Category according to IEC 60068	55/125/56	55/125/56	55/125/56
Lead spacing, mm	10.0, 15.0	10.0, 15.0	10.0, 15.0
Approvals/Remarks	SMD	Through-hole	SMD
Packing	In tube; taped on reels on request	In tube; taped on reels on request	In tube; taped on reels on request
Page	50	54	58

POWER CAPACITORS

	Metallized Polypropylene (MKP)	
		
TYPE:	**PHG491**	**PHG495**
Capacitance range, µF	0.15-10 0.22-6 0.5-4	13-25 9-18 5-10
Capacitance tolerance, ±%	5	5
Rated voltage, Us (V), non repetitive	**1500, 2000, 2500**	**1500, 2000, 2500**
U_{RMS} (VAC, 50 Hz)	550, 650, 750	
U_{DC} (V)	1200, 1600, 2000	1000, 1350, 1650
Climatic Category according to IEC 60068	40/085/56	40/085/56
Max RMS current, A	7-80	50-80
Pulse rise time, V/µs	500-750	25-55
Mounting/ terminations	Screw M6, M8 inner thread	Screw M6, M8 inner thread

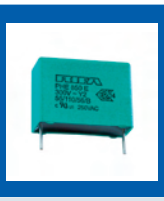
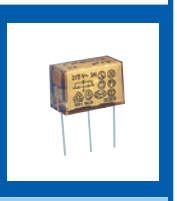
EMI SUPPRESSION CAPACITORS

	X1					X2	
	Metallized Paper (MP)		MKP			MP	
							
TYPE:	**PME271E**	**PME278**	**PHE841**	**PHE844**	**PHE845**	**PME271M**	**PME264**
International standard	EN/IEC 60384-14:2005 Across-the-line X1	EN/IEC 60384-14:2005 Across-the-line X1	EN/IEC 60384-14:2005 Across-the-line X1	EN/IEC 60384-14:2005 Across-the-line X1	EN/IEC 60384-14:2005 Across-the-line X1	EN/IEC 60384-14:2005 Across-the-line X2	EN/IEC 60384-14:2005 Across-the-line X2
Capacitance range, µF	0.01-0.22	0.001-0.15	0.01-2.2	0.1-2.2	0.01-1.0	0.001-0.6	0.001-0.1
Capacitance tolerance, ±%	20, 10	20	20, 10	20, 10	20, 10	20, 10	20
Rated voltage, VAC VDC	**300**	**440**	**330**	**440/480**	**760/600**	**275**	**660 1600**
Test voltage (factory test)	2150 VDC	2700 VDC	3000 VDC	3000 VDC	4250 VDC	2150 VDC	3000 VDC
Climatic Category according to IEC 60068	40/110/56/B	40/110/56/B	40/100/56/B	40/105/56/B	40/105/56/B	40/110/56/B	40/085/56/B
Pulse rise time, V/µs max. dU/dt in operation	400-1200	600-2000	100	100	100	400-1200	600-2000
Lead spacing, mm	15.2, 20.3, 22.5, 25.4	10.2, 15.2, 20.3, 22.5, 25.4	10, 15, 22.5 27.5, 37.5	22.5, 27.5, 37.5	22.5, 27.5, 37.5	10.2, 15.2, 20.3, 22.5, 25.4	15.2, 20.3, 25.4
Approvals/ Remarks	ENEC, UL	ENEC	ENEC, UL, cUL	ENEC, UL, cUL	ENEC, UL, cUL	ENEC, UL, CSA	ENEC, UL
Packing	Bulk in boxes, on tray or taped on reels	Bulk in boxes, on tray or taped on reels	Bulk in boxes, on tray or taped on reels	Bulk in boxes, on tray or taped on reels	Bulk in boxes, on tray or taped on reels	Bulk in boxes, on tray or taped on reels	Bulk in boxes, on tray or taped on reels

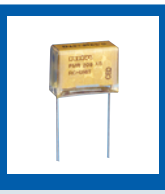
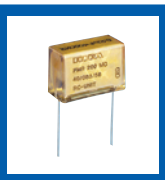
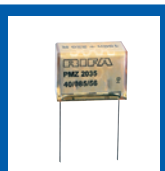
EMI SUPPRESSION CAPACITORS

	X2					
	Metallized Polyester (MKT)		Metallized Polypropylene (MKP)		MP	MKP
						
TYPE:	**PHE820M**	**PHE820E**	**PHE840E**	**PHE840M**	**PMZ2074**	**PHZ9004**
International standard	EN/IEC 60384-14:2005 Across-the-line X2	EN/IEC 60384-14:2005 Across-the-line X2	EN/IEC 60384-14:2005 Across-the-line X2	EN/IEC 60384-14:2005 Across-the-line X2	EN/IEC 60384-14:2005 Across-the-line X2	EN/IEC 60384-14:2005 Across-the-line X2
Capacitance range, µF	0.01-2.2	0.01-2.2	0.01-10.0	0.01-10.0	C1: 0.15-0.22 C2: 0.033-0.1	3 x 1.0
Capacitance tolerance, ±%	20, 10	20, 10	20, 10	20, 10, 5	20, 10, -5/+15	20
Rated voltage, VAC VDC	**275**	**300**	**300**	**275/280**	**275**	**300**
Test voltage (factory test)	2150 VDC	2150 VDC	2200 VDC	2200 VDC	2150 VDC	2200 VDC
Climatic Category according to IEC 60068	40/100/56/B	40/100/56/B	55/105/56/B	55/105/56/B	40/110/56/B	55/105/56
Pulse rise time, V/µs max. dU/dt in operation	100	100	100	100	C_1: 600 C_2: 1200	
Lead spacing, mm	15.0, 22.5, 27.5, 37.5	15.0, 22.5, 27.5, 37.5	10.0, 15.0, 22.5, 27.5, 37.5	7.5, 10.0, 15.0, 22.5 27.5, 37.5	20.3	27.5
Approvals/ Remarks	ENEC, UL, CSA	ENEC, UL, CSA	ENEC, UL, cUL	ENEC, UL, cUL	ENEC	
Packing	Bulk in boxes, on tray or taped on reels	Bulk in boxes, on tray or taped on reels	Bulk in boxes, on tray or taped on reels	Bulk in boxes, on tray or taped on reels	Bulk in boxes	Bulk in boxes

EMI SUPPRESSION CAPACITORS

	Y1	Y2			X2 + 2 x Y2
	Metallized Paper (MP)			MKP	Metallized Paper (MP)
					 
TYPE:	**PME295**	**PME271Y**	**PME271Y (A-E)**	**PHE850**	**SMP253**	**PZB300**
International standard	EN/IEC 60384-14:2005 Line-to-earth Y1	EN/IEC 60384-14:2005 Line-to-earth Y2	EN/IEC 60384-14:2005 Line-to-earth Y2	EN/IEC 60384-14:2005 Line-to-earth Y2	EN/IEC 60384-14:2005 Line-to-earth Y2	EN/IEC 60384-14:2005 X2+2Y2, Delta
Capacitance range, µF	0.47-4.7nF	0.001-0.1	0.001-0.15	0.001-1.0	0.001-0.0047	X2: 0.1, 0.15 Y2: 0.0022, 0.0033, 0.0047
Capacitance tolerance, ±%	20	20, 10	20, 10	20	20	20
Rated voltage, VAC VDC	**440/480**	**250**	**300**	**300/480**	**250**	**275**
Test voltage (factory test)	4000 VAC	3000 VDC	3000 VDC	5000 VDC 2500 VAC	3000 VDC	X2: 2150 VDC Y2: 3000 VDC
Climatic Category according to IEC 60068	40/115/56/B	40/100/56/B	40/115/56/B	55/110/56/B	40/100/56/B	40/100/56/B
Pulse rise time, V/µs max.dU/dt in operation	2000	400-2000	400-2000	100	2000	X2: 600 Y2: 1000
Lead spacing, mm	15.0	10.2, 15.2, 20.3 25.4	10.2, 15.2, 20.3 22.5, 25.4	10.0, 15.0, 22.5 27.5, 37.5	12.7 (Chip length)	20.0
Approvals/ Remarks	ENEC, UL, cUL	ENEC, UL, CSA	ENEC, UL, CSA	ENEC, UL, cUL	ENEC, UL, cUL	ENEC, UL, CSA
Packing	Bulk in boxes, on tray or taped on reels	Bulk in boxes, on tray or taped on reels	Bulk in boxes, on tray or taped on reels	Bulk in boxes, on tray or taped on reels	Taped for automatic insertion, bulk in boxes	Bulk in boxes

EMI SUPPRESSION CAPACITORS

	RC				General Purpose		
	Metallized Paper (MP)						
							
TYPE:	**PMR205**	**PMR209**	**PMR210**	**PMZ2035**	**PME261**		
International standard	–	EN/IEC 60384-14:2005 Across-the-line X2	EN/IEC 60384-14:2005 Line-to-earth X1	EN/IEC 60384-14:2005			
Capacitance range, µF	0.1-1.0 R: 22-680 Ω	0.047-0.47 R: 22-470 Ω	0.022-0.1 R: 100 Ω	0.1 R: 150 Ω	0.0082 -1.0	0.001 -0.15	0.001 -0.1
Capacitance tolerance, ±%	20 R: 30	20 R: 30	20 R: 30	20 R: 30	10, 5	20, 10	20, 10
Rated voltage, VAC VDC	**125 250**	**250 630**	**250**	**440**	**220 400**	**300 630**	**500 1000**
Test voltage (factory test)	375 VDC	1800 VDC	3000 VDC 2000 VAC	1800 VDC	800 VDC	1250 VDC	2000 VDC
Climatic Category according to IEC 60068	40/085/56/B	40/085/56/B	40/085/56/B	40/085/56/B	40/070/56		
Pulse rise time, V/µs max. dU/dt in operation					220-2000		
Lead spacing, mm	15.2, 20.3, 25.4	15.2, 20.3, 25.4	15.2, 20.3, 25.4	25.4	10.2, 15.2, 20.3, 25.4		
Approvals/ Remarks	Integrated resistor	ENEC, UL Integrated resistor	ENEC, UL Integrated resistor.	ENEC Integrated resistor			
Packing	Bulk in boxes, on tray or taped on reels	Bulk in boxes, on tray or taped on reels	Bulk in boxes, on tray or taped on reels	Bulk in boxes, on tray or taped on reels	Bulk in boxes, on tray or taped on reels		

PULSE AND HIGH FREQUENCY CAPACITORS

	Metallized Polypropylene (MKP)			Polypropylene Film/Foil	
				KP/MKP	KP
					
TYPE:	**PHE426**	**PHE429**	**PHE450**	**PHE448**	**PFR**
International standard	IEC 60384-16 Grade 1.1	IEC 60384-16 Grade 1.1	IEC 60384-17 Grade 1.1	IEC 60384-17 Grade 1.1	IEC 60384-13
Capacitance range, µF	0.001-27.0	0.047-0.47	0.00033-10	0.1-22 nF	0.0001-0.022
Capacitance tolerance, ±%	10, 5, 3.5, 2.5, 2	10, 5	10, 5, 3.5, 2.5, 2	10, 5, 3.5, 2.5, 2	10, 5, 2.5, 2, 1
Rated voltage, VDC **VAC**	**100-2000** **63-700**	**420-630** **220-275**	**250-3000** **180-1000**	**1600-2000** **650-700**	**63-1000** **40-250**
Climatic Category according to IEC 60068	55/105/56/B	55/110/56	55/105/56/B	55/105/56	55/100/56
Pulse rise time, V/µs	30-1500	150-250	200-2500	15000-25000	1000
Lead spacing, mm	5.0, 7.5, 10.0, 15.0, 22.5, 27.5, 37.5	15.0	7.5, 10.0, 15.0, 22.5, 27.5, 37.5	15.0	5.0
Packing	Bulk in boxes, on tray or taped on reels	Bulk in boxes, on tray or taped on reels	Bulk in boxes, on tray or taped on reels automatic insertion	Bulk in boxes Available taped for automatic insertion	Bulk in boxes Available taped for

COUPLING/DECOUPLING CAPACITORS — STABLE HIGH TEMP. CAPACITORS

	Polyester Metallized (MKT)	Metallized PPS (MKI)
		
TYPE:	**MMK**	**SMR**
International standard	CECC 30401-042 IEC 60384-2 DIN 44122	–
Capacitance range, µF	0.001-82	0.001-22
Capacitance tolerance, ±%	20, 10, 5	20, 10, 5, 2.5
Rated voltage, VDC **VAC**	**50-1000** **30-250**	**50-400** **30-200**
Climatic Category according to IEC 60068	55/100/56 (FME/DIN)	55/150/56 (FKD/DIN)
Pulse rise time, V/µs	2-100	2-40
Lead spacing, mm	5.0, 7.5, 10.0, 15.0, 22.5, 27.5, 37.5	5.0, 7.5, 10.0, 15.0, 22.5, 27.5
Approvals/Remarks	CECC 30401-042	Polyphenylene sulfide High temperature applications to +150°C
Packing	Bulk in boxes, on tray or taped on reels	Bulk in boxes, on tray or taped on reels

CUSTOMIZED SOLUTIONS

Evox Rifa has designed several engineered capacitor solutions based on specific customer requirements. Some examples of customised EMI suppression capacitors are presented on pages 77 to 83 in this catalogue.

Together with our customers, we have designed and developed for instance:

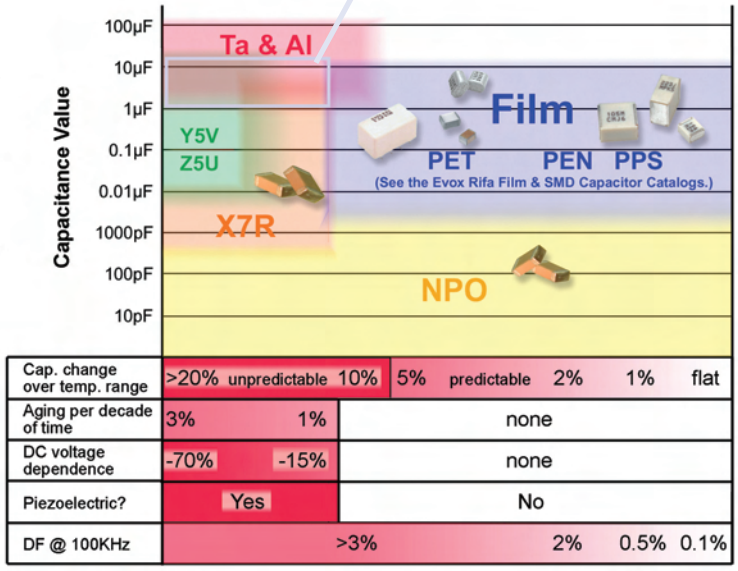
- Special capacitor designs
- Capacitors in customized housing
- Low profile capacitors
- Multiple capacitors in one unit
- Snubber capacitors
- Complete PCB supply

If you have any special requirements that are not covered in our standard product range, please do not hesitate to contact us. We will be happy to work with you to create new optimized solutions for your applications.

SELECTION GUIDELINES FOR SURFACE MOUNT CAPACITORS

Surface Mount Capacitor Application Chart
While variations do exist, the chart below provides a general guideline for selecting the correct surface mount capacitor. Begin at the left edge of the red stripes which denote the various electrical properties. Move to the right until all of the properties meet your design requirements. Then move upward to the capacitance value of interest.

Film capacitors are recommended for these applications if transients or surges may occur. "Self healing" metallized film capacitors are designed to recover from a transient over voltage.



TERMS AND DEFINITIONS

Rated capacitance (C_R)
The rated capacitance of a capacitor is the value which is indicated upon it. The capacitance is measured at 1 kHz and +23°C.

Rated voltage (U_R)
The rated voltage is the maximum direct voltage or the maximum RMS alternating voltage which may be applied continuously to the terminals of the capacitor at any temperature within the rated temperature range.

Rated temperature
The rated temperature is the maximum ambient temperature at which the rated voltage can be continuously applied.

Climatic category
The climatic category states the temperature range and the humidity class. For example 40/085/56 stands for –40°C to +85°C; 56 states that the steady state humidity test should take 56 days.

Tangent of the loss angle (Dissipation factor, tanδ)
The tangent of the loss angle is the power loss of the capacitor divided by the reactive power of the capacitor at a sinusoidal voltage of specified frequency. The tangent of loss angle is given in percent (Eg 0.01 tanδ=1%).
The dissipation factor is of interest especially when the capacitor is operated on AC. The dielectric loss causes heating of the capacitor which under unfavourable circumstances may lead to a destructive breakdown. This will not happen if the capacitor is used within specified limits. The ability to withstand short duration thermal and voltage overload is greater for small capacitors than for large ones.

Insulation resistance
The values given in the catalogue indicate the insulation resistance after one minute of electrification at +23°C with the following voltages: 100 VDC for capacitors rated at 100 to 500 VDC and 500 VDC for capacitors rated at 500 VDC. Insulation resistance is temperature dependent and is approximately halved for each 7 °C of temperature rise.
Multilayer construction provides insulation resistance higher than that of single-layer types.

Pulse operation
Capacitors loaded with pulses with fast rise or fall times (high dU/dt) will be exposed to high current pulses. In order not to overload the internal connections the current must be limited. The current limits for a specific type are dependent upon:
- Amplitude and form of the pulse
- Rated voltage of the capacitor
- Capacitance
- Geometrical configuration of the winding

$$dU/dt = U_R/(R \times C)$$

U_R = Rated voltage
R = Discharge resistor
C = Rated capacitance

At repeated pulse operation, self-heating, ambient temperature and cooling set the load limit.
Pulse current limits are commonly expressed in the form of maximum permitted dU/dt in volts per microsecond. The figures stated in the type specifications refer to an unlimited number of pulses charging or discharging from rated voltage U_R.

Passive flammability
The ability of a capacitor to burn with a flame as a consequence of the application of an external source of heat.

Resonance frequency
The resonance frequency of a capacitor is reached when

$$\omega L = 1/\omega C$$

$\omega = 2\pi f$ (f = frequency)
L = inductance caused by the winding and the length of the leads
C = the capacitance at f.

Dielectric absorption (DA)
Dielectric absorption describes the dielectric material's properties to "remember" the applied voltage. One method to define DA is:
The capacitor is to be charged for one hour at rated voltage DC (U_R) then discharged thr ough a resistor of 5 ohms for 10 seconds. The discharge resistor must then be disconnected and the recovery voltage U_r measured 15 minutes after disconnection. The dielectric absorption is defined by:
$DA = (U_r/U_R) \times 100\%$

HOW TO ORDER SMD CAPACITORS

The Evox Rifa article code includes all the information needed to specify the product characteristics and type of packing. This article code construction applies for the following products in this catalogue: **MMC, SMC, GMC, GPC, SPC, GMW, SMW, MDC** and **MDS**.

MMC **5.7** **273** **K** **50** **A31** **TR16**

Capacitor type

The first letter specifies the dielectric material:
M = Polyester (PET)
P = Polypropylene (PP)
G = Polyethylene naphthalate (PEN)
S = Polyphenylene sulphide (PPS)

The second letter indicates the electrode construction:
M = Metallized film
F = Metal foil

Chip length in mm

Rated capacitance

Expressed in picofarads. Three digit code where the first two digits indicate the two most significant digits of the capacitance value in pF. The third digit is the number of following zeroes.

103 = 10000 pF = 10 nF = 0.01 µF
104 = 100000 pF = 100 nF = 0.1 µF
106 =10000000 pF = 10000 nF = 10 µF

When three significant digits are needed to express the capacitance value, a four digit code is used. The last digit gives the amount of numbers after the two most significant digits. Example:

4582 = 4580 pF = 4.58 nF = 0.00458 µF
1464 = 146000 pF = 146 nF = 0.146 µF

Capacitance tolerance

M = ± 20 %
K = ± 10 %
J = ± 5 %
X = ± 3.5 %
H = ± 2.5 %
G = ± 2 %
F = ± 1 %

Rated voltage in DC Volts

Capacitor size code

See size codes on page 11.

Packaging

BULK [1]	Loose capacitors in a box
TUBE [1]	Tube packaging of DIL capacitors
TR12 [1]	Horizontally taped SMD capacitors, L*) = 5.7 and 7.3 mm
TR16 [1]	Horizontally taped SMD capacitors, L*) = 10.2 mm
TR24 [1]	Horizontally taped SMD capacitors, L*) = 12.7 and 16.5 mm
TV24 [2]	Vertically taped SMD capacitors, L*) = 10.2 and 12.7 mm
TV44 [2]	Vertically taped SMD capacitors, L*) = 16.5 mm

[1] Quantity/package according to article table
[2] Quantity per package according to table on page 11.
*) See figure on page 20.

THE MANUFACTURING CODE Y Z, ACCORDING TO IEC 60062

where Y = year, Z = month.

Year	Code	Year	Code	Year	Code	Month	Code	Month	Code
1991	B	2001	N	2011	B	Jan	1	July	7
1992	C	2002	P	2012	C	Febr	2	Aug	8
1993	D	2003	R	2013	D	March	3	Sept	9
1994	E	2004	S	2014	E	April	4	Oct	O
1995	F	2005	T	2015	F	May	5	Nov	N
1996	H	2006	U	2016	H	June	6	Dec	D
1997	J	2007	V	2017	J				
1998	K	2008	W	2018	K				
1999	L	2009	X	2019	L				
2000	M	2010	A	2020	M				

SIZE CODES OF SMD CAPACITORS

A size code has been added to the Evox Rifa SMD capacitors. The size code determines the size of the component and the packing quantities. The size codes are as follows:

Encapsulated SMD capacitors MMC, SMC, GMC, GPC, SPC

Size code in Article Code	Box dimensions in mm ±0.2				Quantity per package			Packaging code		
	B	H	L	p	Bulk	Reel	Reel, vertical taping	Bulk	Reel	Reel, vertical taping
A31	9.1	5.5	10.2	10.2	1000	800	500	BULK	TR16	TV24
B31	11.5	6.5	12.7	12.7	1000	600	400	BULK	TR24	TV24
C31	15.0	7.0	16.5	16.5	800	500	200	BULK	TR24	TV44
J31	5.0	2.5	5.7	5.7	2000	3100		BULK	TR12	
J33	5.0	3.0	5.7	5.7	2000	2400		BULK	TR12	
J35	5.0	4.0	5.7	5.7	2000	2100		BULK	TR12	
K31	6.0	2.5	7.3	7.3	2000	3100		BULK	TR12	
K33	6.0	3.0	7.3	7.3	2000	2500		BULK	TR12	
K35	6.0	3.5	7.3	7.3	2000	2300		BULK	TR12	
K37	6.0	4.5	7.3	7.3	1000	1700		BULK	TR12	

Naked SMD capacitors SMW, GMW

Size code in Article Code	Dimensions in mm				Quantity per package		Packaging code	
	B±0.4	H_{max}	L±0.4	p	Bulk	Reel	Bulk	Reel
J91	5.0	2.0	5.7	5.7	2000	3100	BULK	TR12
J93	5.0	3.0	5.7	5.7	2000	2400	BULK	TR12
J95	5.0	4.0	5.7	5.7	2000	2100	BULK	TR12
K91	6.0	2.0	7.3	7.3	2000	3100	BULK	TR12
K93	6.0	2.7	7.3	7.3	2000	2500	BULK	TR12
K95	6.0	3.2	7.3	7.3	2000	2300	BULK	TR12
K97	6.0	4.2	7.3	7.3	1000	1700	BULK	TR12

SIZE CODES OF DIL CAPACITORS

The size code in the article code determines the size of the component and the packing quantities.

Size code in Article Code	Box dimensions in mm ±0.2				Leads per side	Quantity per package		Packaging code	
	B	H	L	p		Tube	Reel	Tube	Reel
A52	12.2	6.05	11.0	10.0	3	43		TUBE	
A53	12.7	9.0	14.0	10.0	3 or 4	34	200	TUBE	TR32
A54	12.2	6.05	13.5	10.0	3 or 4	35		TUBE	
A55	12.2	6.05	16.5	10.0	3, 4 or 5	28		TUBE	
A57	12.7	9.0	23.0	10.0	7 or 8	21		TUBE	
A58	12.7	11.0	23.0	10.0	7 or 8	21		TUBE	
B53	16.5	6.05	11.0	15.0	3	43		TUBE	
B55	16.5	6.05	12.2	15.0	3 or 4	39		TUBE	

PROPERTIES OF DIELECTRICS

POLYESTER
(Polyethylene Terephthalate, PET)
Metallized and Film/foil
High dielectric constant and high dielectric strength provides good volumetric efficiency for metallized polyester film capacitors. Metallized polyester film has excellent self-healing properties.
Typical applications: Bypassing, coupling, filtering.

POLYESTER
(Polyethylene Naphthalate, PEN)
Metallized
High temperature Polyester. Relatively high dielectric constant and dielectric strength, and availability of thin films, provide good volymeric efficiency for metallized construction. High melting point allowes SMD constructions and service in high ambient temperatures. General purpose capacitor.

POLYPROPYLENE (PP) *)
Metallized and Film/foil
Very low losses, low dielectric absorption, high dielectric strength, very high insulation resistance, and negative temperature coefficient.
Typical applications: Stable oscillators and filters. Sample & hold circuits, pulse handling circuits, AC applications and mains filtering.

POLYCARBONATE (PC) **)
Metallized and Film/foil
Very low temperature dependency, wide operating temperature range, good long term stability, and low losses.
Typical applications: Timers and filters. Applications in high ambient temperatures.

POLYPHENYLENE SULPHIDE (PPS)
Metallized
Low losses, wide operating temperature range, low temperature coefficient, good stability.
Typical applications: Timers and filters. Automotive and other applications in high ambient temperatures. Available in SMD constructions.

PAPER
Metallized
High dielectric constant. Excellent self-healing properties and transient handling capability. High ionisation level due to impregnated dielectric material. Outstanding reliability in mains connected and other low frequency applications.

*) Polypropylene capacitors are not available as SMD, only for comparison.
**) Polycarbonate is no longer available. Replaced by polyphenylene sulfide.

NUMERICAL COMPARISON OF FILM MATERIALS

Material (Trade names)	Abbreviation	Min. film thickness (µm)	Dielectric constant at 1 kHz, +23°C	Operating temperature (°C)	Temperature coefficient (ppm/°C)	Dissipation factor at 1 kHz, +23°C	Insulation time constant (s) at +23°C	Dielectric absorption %
Polyester (Mylar, Lumirror, Hostaphan, Diafoil)	PET	0.9	3.3	–55 ... +100 (... +125)	+400 (±200)	0.5%	25 000	0.5
Polyethylene Naphthalate	PEN	1.4	3.0	–55 ... +125 (... +150)	+200 (±150)	0.4%	25 000	1.2
Polycarbonate **) (Makrofol)	PC	2.0	2.8	–55 ... +125	0 (±100) nonlinear	0.15%	25 000	0.06
Polypropylene *) (Torayfan, Trespaphan)	PP	3.5	2.2	–55 ... +105	–200 almost linear	0.03%	100 000 (–100, +50)	0.01
Polyphenylene sulfide (Torelina)	PPS	1.2	3.0	–55 ... +125 (... +150)	0 (–50) up to +100 °C	0.06%	25 000	0.05
Paper Impregnated	P	7.0	5.5	–40 ... +115	+1200 (±200)	0.8%	15 000	

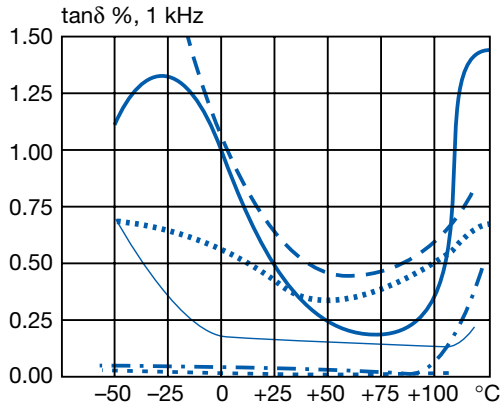
*) Polypropylene capacitors are not available as SMD, only for comparison.
**) Polycarbonate is no more available, only for comparison. Replaced by polyphenylene sulfide.

WARRANTY, PRODUCT LIABILITY

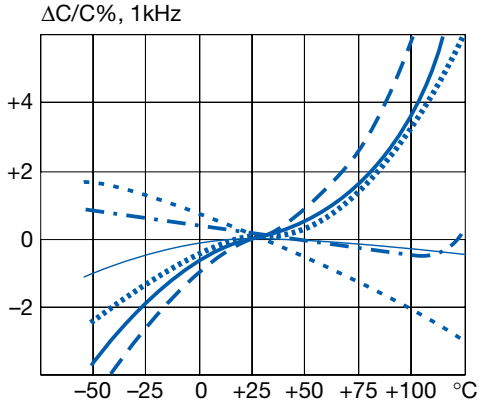
Evox Rifa warrants that the goods manufactured by Evox Rifa are free from defects in design, material and workmanship.
Evox Rifa's liability under this warranty shall be limited to replacement or repair free of charge, at one of Evox Rifa's factories selected by Evox Rifa, provided that notification of such failure or defect is given to Evox Rifa immediately upon the same becoming apparent and that on Evox Rifa's request and instruction the goods are promptly returned to Evox Rifa carriage paid by buyer.
In case the goods thus returned as defective, prove to be without fault or defect, Evox Rifa is entitled to charge buyer 100% of the value of the returned goods.

If the goods supplied or part thereof are not manufactured by or branded Evox Rifa, Evox Rifa will only extend to the buyer the benefit of the warranty granted by the manufacturer of the goods.
Evox Rifa's liability is further limited to a period of 12 months from the date of shipment to buyer.
Evox Rifa shall not be liable for any defect which is due to accident, fair wear and tear, negligent use, tampering, improper handling, improper use, improper operation or improper storage or any other default on the part of any person other than Evox Rifa.
Evox Rifa shall have no other liabilities in case of defective goods than those stated above and shall under no circumstances be liable for any consequential loss or damage arising from the use of goods sold by Evox Rifa. Liability under paragraph 823 BGB is expressly excluded.
The above limitations of Evox Rifa's liability for defective goods shall apply also with regard to product liability, and Evox Rifa shall have no responsibility for injury to persons or for damage to goods or property of any kind.
In case of product liability claims from third parties against Evox Rifa, not falling within Evox Rifa's liability in accordance with the above, buyer shall hold Evox Rifa harmless.

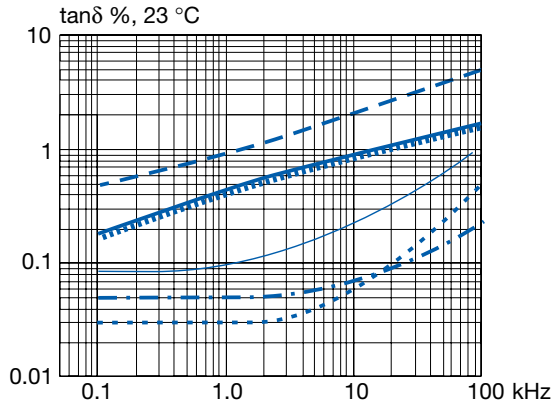
PROPERTIES OF DIELECTRICS



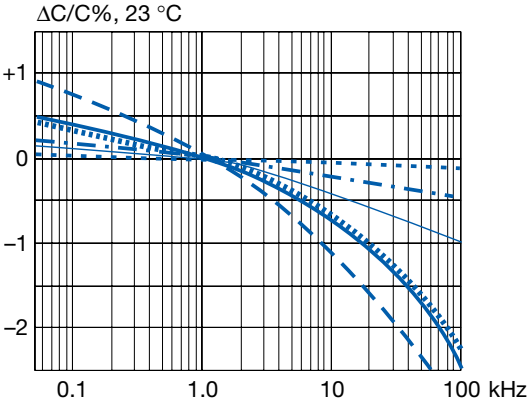
Typical dissipation factor vs. temperature



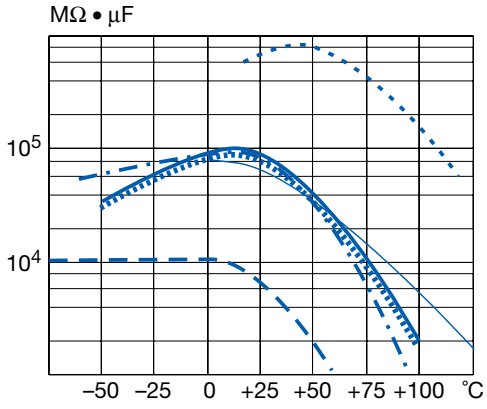
Typical capacitance vs. temperature



Typical dissipation factor vs. frequency



Typical capacitance vs. frequency

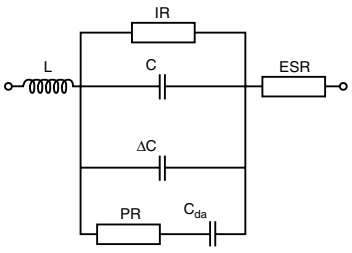


Typical insulation resistance vs. temperature

- Polyester PET
- Polyethylene Naphthalate PEN
- Polycarbonate PC *
- Polyphenylene sulfide PPS
- Polypropylene PP
- Paper

*) Please note: Polycarbonate is no longer available, only for comparison.

CAPACITOR EQUIVALENT DIAGRAM



C = nominal value of the capacitor
L = inductance (leads, metallization, winding)
ESR = equivalent series resistance (leads, metallization, metal spraying)
IR = insulation resistance (properties of the dielectric material)

ΔC = capacitance change (depending on changes in temperature, DC voltage and/or frequency)
PR = dielectric polarization resistance
C_{da} = dielectric absorption

RELIABILITY

The reliability of a capacitor is mainly a function of:
- The construction; dielectric material and its thickness
- The manufacturing process
- The application; electrical stress and temperature

The failure rate, λ, vs. voltage and temperature for the most common dielectric materials is shown in the diagrams below. U_R = rated voltage.

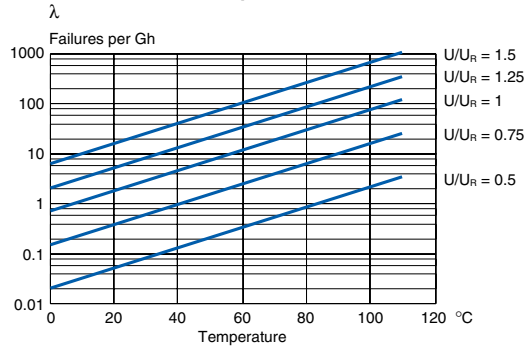
The operating life (L) can be calculated as:

$$L = \frac{1}{\lambda} \times \ln \frac{1}{1 - F}$$

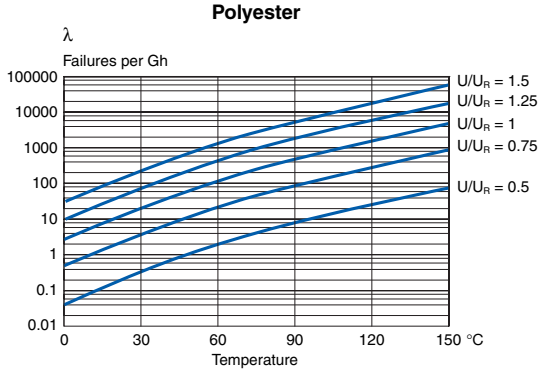
where F is the expected probability of failures.
Example: If $\lambda = 20 \times 10^{-9}$ it takes 6 years to have
F = 0.001 (0.1% failures)
and 300 years to have
F = 0.05 (5% failures)

MTBF (mean time between failures) = 1 / λ

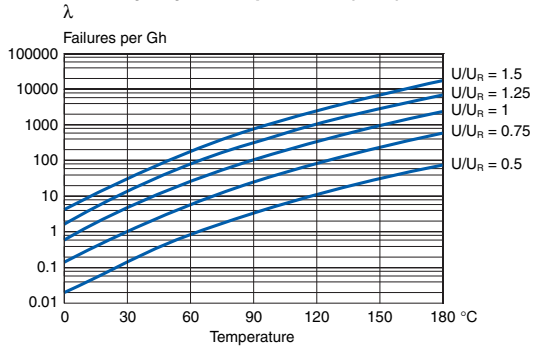
Failure rates vs. temperature and voltage
Paper



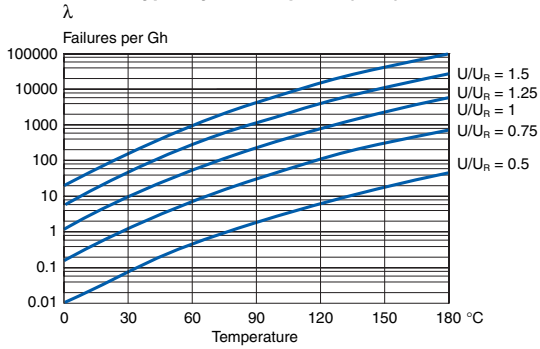
Failure rates vs. temperature and voltage
Polyester



Failure rates vs. temperature and voltage
Polyethylene Naphthalate (PEN)



Failure rates vs. temperature and voltage
Polyphenylene Sulphide (PPS)



EVOX RIFA QUALITY

The quality of Evox Rifa's products and services is based on a continuous strive towards excellency throughout the whole organization. Skilled and motivated personnel, technical know-how and modern equipment combined with extensive quality assurance make Evox Rifa the supplier of components of the highest quality.

The up-to date quality tools like Statistical Process Control (SPC) in various forms, Failure Mode and Effect Analysis (FMEA), Accelerated Reliability Testing and Zero Defect Acceptance concept in final testing are the corner stones of the every day quality work. Cross-functional teams are routinely used in Problem Solving (8D method) with effective Failure Analysis support.

As a visible evidence of our quality, all the manufacturing units world wide are certified according to ISO 9001. In addition to that, the relevant factories have the automotive industry's QS9000 certifications, which is in process to be upgraded to ISO TS 16949 during 2006. The Finnish factory has also IECQ approval. Our well known EMI suppression capacitors carry the important safety marks for world wide applications.

Evox Rifa companies have the following certificates:

ISO 14001
P.T. Evox Rifa, Batam, Indonesia
ISO 9001
BHC Components
Evox Rifa AB, Gränna, Sweden
Evox Rifa Oy, Suomussalmi, Finland
Nantong Evox Rifa Electrolytics, P.R. China
P.T. Evox Rifa, Batam, Indonesia
ISO TS 16949
Evox Rifa AB, Gränna, Sweden
Evox Rifa Oy, Suomussalmi, Finland
P.T. Evox Rifa, Batam, Indonesia
QS9000 (TS 16949 pending at the time of printing of this catalogue)
Nantong Evox Rifa Electrolytics, P.R. China
IECQ
Evox Rifa Oy, Suomussalmi Finland

Customer in Focus

The only real measure of our total quality performance is the acceptance of our customers.

Evox Rifa's quality work has always been focused on the customer. We have actively made quality agreements with ambitious goal settings with World-Class Companies – small and large.

This active quality cooperation has been most fruitful to Evox Rifa by bringing in most modern quality tools, but especially by providing us with reliable feedback on the performance quality of our products and services.

The cooperation has not only lead to continuous improvement of the quality of our products, but sometimes also helped our customers to spot some weaknesses in their designs. A visible sign of these close links between Evox Rifa and various customers is the numerous prestigious customer approvals and the performance awards addressed to Evox Rifa and BHC Components.

ENVIRONMENTAL COMMITMENT

The SMD capacitors don't contain any substances which have been listed in the restriction of hazardous substances Directive 2002/95/EC (RoHS).

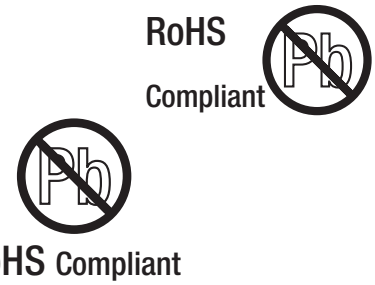
As an environmentally conscious company, Evox Rifa (including BHC Components) is working continuously with improvements concerning the environmental effects of both our capacitors and the production of them.

In Europe (RoHS Directive) and in some other geographical areas like China, legislation has been put on place to prevent the use of some hazardous materials, like Lead (Pb), in electronic equipment. All products in this catalogue are produced to help our customer's obligations to guarantee their products to fulfil these legislative requirements. The Evox Rifa SMD capacitors have always been designed without using any RoHS restricted materials.

Evox Rifa will follow closely any changes in legislation world wide, and makes any necessary changes in its products, whenever needed.

A symbol is used on the packaging labels for RoHS compatible capacitors. See pictures to the right.

Because of customer requirements there may appear additional markings like LF = Lead Free or LFW = Lead Free Wires on the label.



Examples of RoHS Compliance markings on packaging labels

PRODUCT SPECIFICATION

All descriptions, drawings and other particulars (including dimensions, materials and performance data) given by Evox Rifa are as accurate as possible but, being given for general information, are not binding on Evox Rifa unless specifically agreed in writing. All dimensions and materials are, unless otherwise stated, subject to reasonable variations resulting from the raw material available or arising in the ordinary course of manufacture. Any performance data are based upon Evox Rifa's experience and are such as Evox Rifa normally expects to achieve.

VACUUM PACKAGING

Some of the SMD and DIL capacitors are vacuum packaged. The reels are then packaged in vacuum, according to EIA 583 standard "Packaging Material Standards for Moisture Sensitive Items".
The vacuum package contains a desiccant, which can absorb 20% relative humidity (RH) at +20 °C. Therefore, the recommended maximum storage time is 12 months at the temperature lower than +40 °C RH less than 90 %.
When the package is opened, it should be used within 168 hours at the temperature lower than +30 °C RH less than 60 % according to JEDEC J-STD-020C (July 2004), Sensitivity level 3.
If the circumstances for storage and usage differ from these recommendations, please consult Evox Rifa.

WASHING AND DRYING

Evox Rifa recommends not to wash the naked SMD capacitors. If washing is requested, it should be made gently, according to the following instructions:

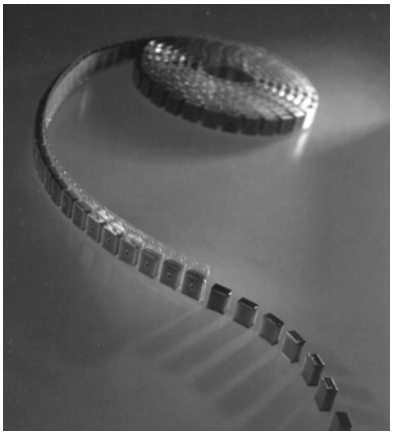
Statement on Washing of Naked Wound SMD Capacitors:

Because the "naked" wound SMD capacitors do not have any encapsulation and the protection of the active element is made with extra deactivated turns of the same dielectric film, which forms the capacitor, the components of flux and/or washing detergent left over on the element at the time of washing may be activated and invade inside the capacitor. This may cause adverse effects.

If washing is used, use flux and solder paste with halogen content of 0.1wt.% or less. The internal evaporated electrodes may deteriorate due to activated halogens, if the concentration is high.
The ultrasonic agitation is not recommended during washing, because it can cause the washing agents to penetrate the outer layers of the capacitor element.
When using a washing method , where water with detergent or the rinsing water is sprayed on to the substrate at high pressure, the protective film around the element surface may peel off slightly due to the water pressure. This is mainly a visual failure, and should not influence the performance of the capacitors.
The capacitors have to be dried after water washing so that no detergent is left over.
If drying is insufficient, and the detergent is left over on the element surface, the insulation resistance may be reduced.
The following solvents are suitable for washing of the "naked" SMD capacitors:

- Ethanol
- Isopropanol
- n-propanol

Even when suitable solvents are used, a reversible change of the electrical characteristics may occur in uncoated capacitors immediately after washing.
If testing of the boards with these capacitors is performed immediately after washing, it is recommended that the capacitors are dried (e.g. 4 hours at 70 °C) before being subjected to electrical testing.



Wound Technology SMD Film Capacitors

This section covers wound technology capacitors for Surface Mounting applications.

Type	Dielectric	Rated voltage VDC	Rated voltage VAC	Capacitance µF	Page
MMC 5.7 - 16.5	PET (MKT)	50 - 400	30 - 200	0.0010-15	**21**
GMC 5.7 - 16.5	PEN (MKN)	50 - 630	30 - 300	0.0010-5.6	**26**
GMW 5.7	PEN (MKN)	63 - 630	40 - 220	0.0010-0.47	**30**
GPC 7.3 - 16.5	PEN (MKN)	63 - 1000	40 - 350	0.00047-1.0	**33**
SMC 5.7 - 16.5	PPS (MKI)	50 - 400	30 - 200	0.0010-3.3	**36**
SMW 5.7 - 7.3	PPS (MKI)	50 - 400	30 - 200	0.0010-0.56	**40**
SPC 7.3 - 16.5	PPS (MKI)	100 - 630	63 - 350	0.00047-0.68	**43**
SMP253 12.7	MP		250	0.0010-0.0047	**45**

MARKING OF SMD CAPACITORS

The nominal **capacitance value** is given with 3 digits EIA-code,
Examples: 103 = 10000 pF = 10 nF = 0.01 µF

The **capacitance tolerance** is expressed with letter codes:

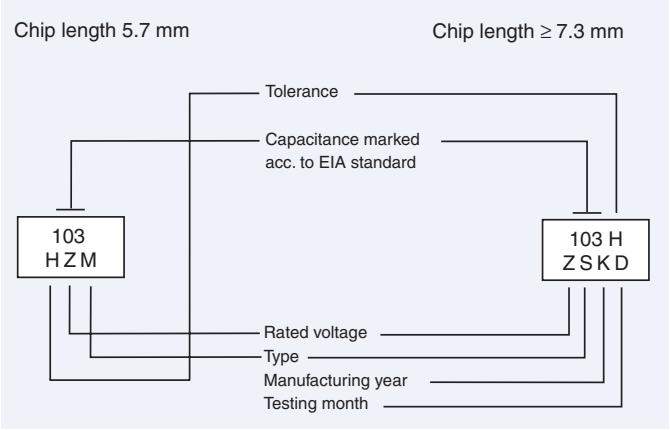
M	± 20 %	H	± 2.5 %
K	± 10 %	G	± 2 %
J	± 5 %	F	± 1 %

The **rated voltage** is expressed with letter codes:

Z	50 VDC	H	250 VDC
C	63 VDC	K	400 VDC
D	100 VDC	M	630 VDC
F	160 VDC	P	1000 VDC
W	12 00 VDC		

The **capacitor type** codes are as follows:

M	MMC	P	GPC
S	SMC, SMW	D	SPC
G	GMC, GMW		

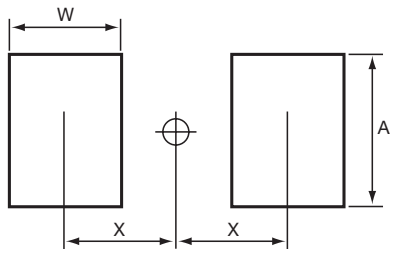


The **manufacturing year** and the **testing month** are expressed according to IEC 60062, see table on page 10.

SOLDERING OF WOUND SMD CAPACITORS

The recommended soldering land dimensions are:

L	Case size		W		Ah		Av		X	
mm	Horizontal	Vertical	mils	mm	mils	mm	mils	mm	mils	mm
5.7	2220 - J31, J91		60	1.5	200	5.1			118.58	3.0
5.7	2220 - J33, J93		60	1.5	200	5.1			118.58	3.0
5.7	2220 - J35, J95		60	1.5	200	5.1			118.58	3.0
7.3	2824 - K31, K91		60	1.5	240	6.1			148.11	3.8
7.3	2824 - K33, K93		60	1.5	240	6.1			148.11	3.8
7.3	2824 - K35, K95		60	1.5	240	6.1			148.11	3.8
7.3	2824 - K37, K97		60	1.5	240	6.1			148.11	3.8
10.2	4036 - A31	4022 - A31V	80	2.0	360	9.1	220	5.6	217.15	5.5
12.7	5045 - B31	5026 - B31V	100	2.5	455	11.6	260	6.6	276.4	7.0
16.5	6560 - C31	6528 - C31V	120	3.0	590	15.0	280	7.1	355.3	9.0



Ah = horizontal mounting
Av = vertical mounting

Land dimensions for PCB design are available in PADS format.
Please see our website www.evoxrifa.com

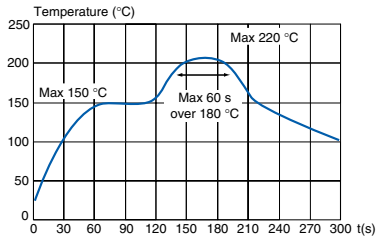
SOLDERING OF WOUND SMD CAPACITORS

Reflow soldering temperature shall be measured on the top body surface of the component.

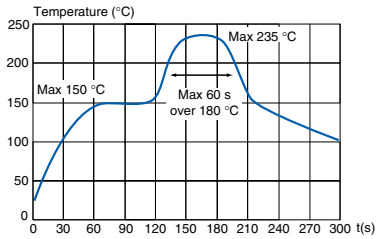
The profiles below are recommended soldering profiles for convection reflow ovens and IR reflow ovens. If vapour phase reflow oven is used, please consult Evox Rifa.

The recommended solder paste thickness for the **naked SMD** (SMW, GMW) parts is at least 0.25 mm (10 mils), for thicknesses below 0.25 mm (10 mils) please consult Evox Rifa.

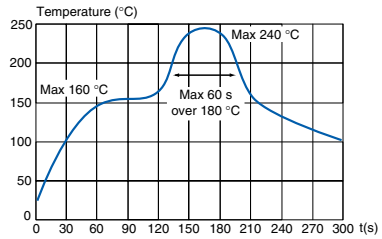
Soldering curves for Lead containing solder



Recommended reflow soldering profile for MMC

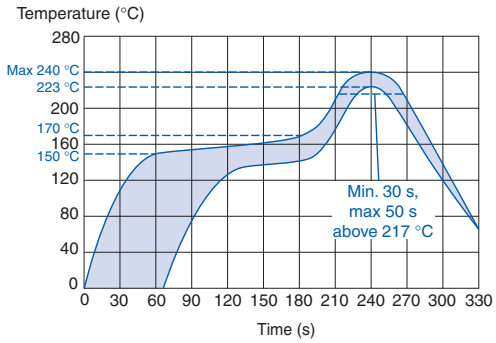


Recommended reflow soldering profile for GMC, GMW, GPC and SMW. For GMW, max T = 230 °C.

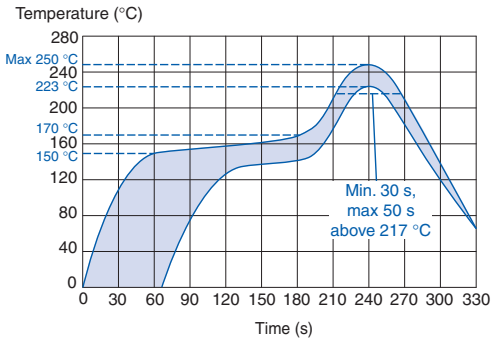


Recommended reflow soldering profile for SMC and SPC

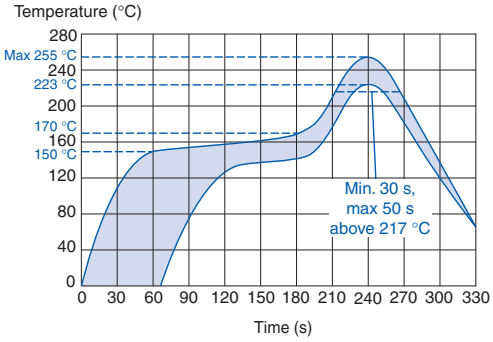
Soldering curves for Lead free solder



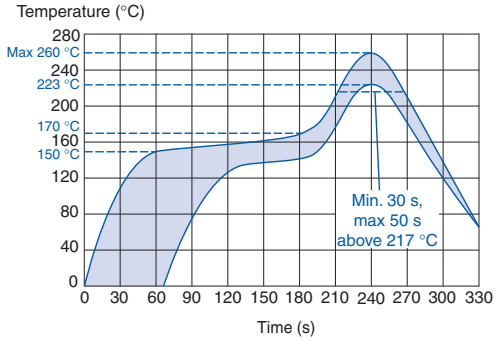
Recommended reflow soldering profile for GMW, MMC, MDC, MDS and SMW



Recommended reflow soldering profile for GMC, GPC, and SMP253



Recommended reflow soldering profile for SPC

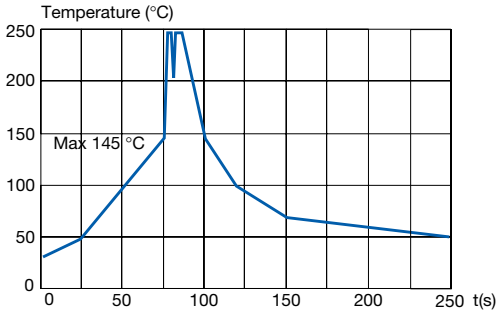


Recommended reflow soldering profile for SMC

These profiles are valid for products in this catalogue. Reflow recommendations for customised Evox Rifa products may deviate from the above profiles. Exceeding the manufacturer's process recommendations may harm the component and keep the manufacturer not liable for any defect caused by exceeding the recommendations.

According to international standards, the maximum temperature capability shall be measured on the top surface of a component. Any of the international standards do not define how the thermocouple should be fastened on the component. Our recommendation for attaching the thermocouple on the top surface of the component is glueing with high temperature resistant glue.

Soldering curves for Wave solder

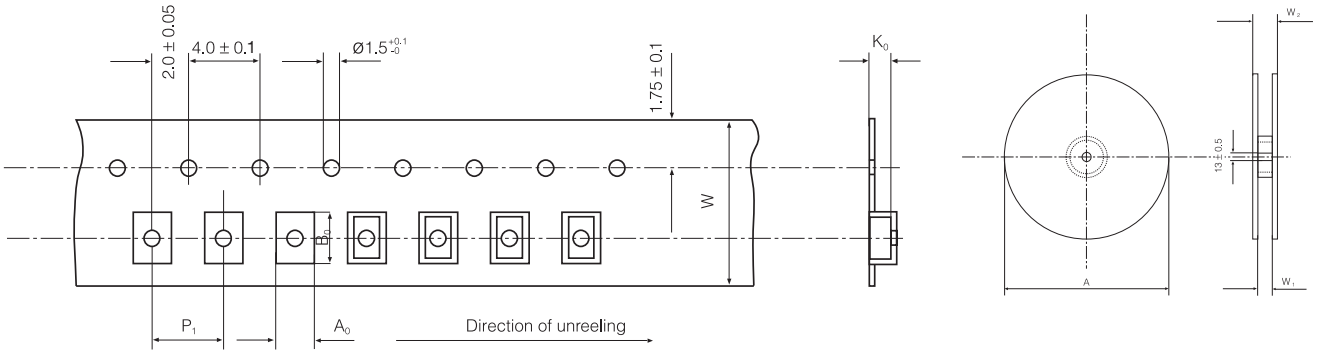


Recommended wave soldering profile for all Evox Rifa SMD capacitors suitable for wave soldering, total time in solder wave <5s.

TAPE PACKAGING OF WOUND SMD CAPACITORS

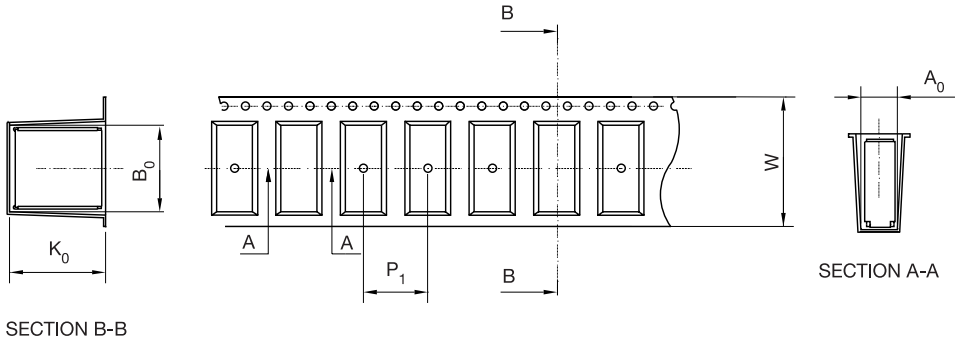
According to IEC 60286-3
Carrier Tape

Standard taping



EIA size code, horizontal mounting	Size of capacitor, mm L	B	H	W +0.3 −0.0	P_1 ± 0.1	A_0	B_0	K_0	A ± 2.0	W_1 +2 −0	W_2 max	Qty/pcs
2220	5.7	5.0	2.5	12.0	8.0	5.5	6.0	2.8	330	12.4	22.0	3100
2220	5.7	5.0	3.0	12.0	8.0	5.5	6.0	3.3	330	12.4	22.0	2400
2220	5.7	5.0	4.0	12.0	8.0	5.5	6.0	4.3	330	12.4	22.0	2100
2824	7.3	6.0	2.5	12.0	8.0	6.5	7.5	2.8	330	12.4	22.0	3100
2824	7.3	6.0	3.0	12.0	8.0	6.5	7.5	3.3	330	12.4	22.0	2500
2824	7.3	6.0	3.5	12.0	8.0	6.5	7.5	3.8	330	12.4	22.0	2300
2824	7.3	6.0	4.5	12.0	8.0	6.5	7.5	4.8	330	12.4	22.0	1700
4036	10.2	9.1	5.5	16.0	16.0	9.5	10.5	5.8	330	16.4	22.0	800
5045	12.7	11.5	6.5	24.0	16.0	11.9	13.1	6.8	330	24.4	30.0	600
6560	16.5	15.0	7.0	24.0	20.0	15.4	16.8	7.3	330	24.4	30.0	500

Vertical taping
Special option



EIA size code, vertical mounting	Size of capacitor, mm L	B*	H*	W +0.3 −0.0	P_1 ± 0.1	A_0	B_0	K_0	A ± 2.0	W_1 +2 −0	W_2 max	Qty/pcs
4022	10.2	5.5	9.1	24.0	16.0	6.0	10.5	9.3	330	24.4	30.0	500
5026	12.7	6.5	11.5	24.0	16.0	6.9	13.1	11.8	330	24.4	30.0	400
6528	16.5	7.0	15.0	44.0	20.0	7.5	17.0	15.3	330	44.5	49.5	200

* Dimensions B and H in vertical mounting correspond H and B in the standard mounting and in the article tables.

MMC

- **Metallized polyester (PET) SMD**
- **According to IEC 60384-19**

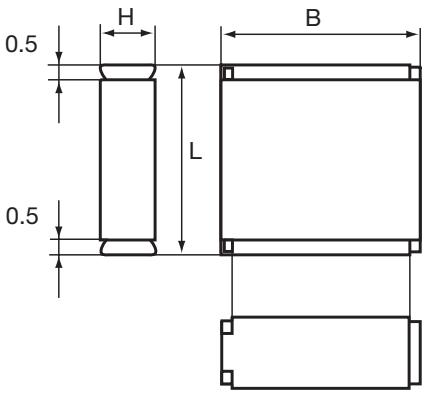
RoHS Compliant

TYPICAL APPLICATIONS

Bypassing, signal coupling. General purpose for highest reliability.

CONSTRUCTION

Polyester (PET) film capacitor for surface mounting. Encapsulation in self-extinguishing material meeting the requirements of UL 94V-0.



Components may be vertically mounted for decreased footprint. See page 20.

TECHNICAL DATA

Rated voltage U_R, VDC	50	63	100	250	400
Rated voltage U_R, VAC	30	40	63	160	200
Capacitance range, nF	1 - 15000	1 - 4700	1 - 3300	1 - 1000	1 - 470

Capacitance tolerance ± 10%, ±5%; other tolerances on request.

Category temperature range -55°C to +100°C

Rated temperature +85°C

Voltage derating The rated voltage is decreased with 1.25%/°C from +85°C.

Climatic category 55/100/56

Test voltage 1.6 x U_R, 60s

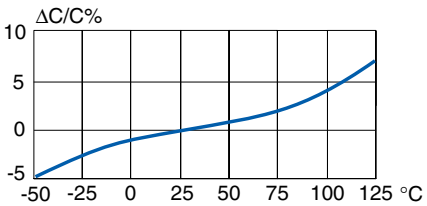
Insulation resistance Minimum value between terminals
Measured at +20°C according to IEC 60384-19

	C ≤ 0.33 µF	C > 0.33 µF
U_R ≤100 V	10 000 MΩ	3000 s
U_R >100 V	30 000 MΩ	10 000 s

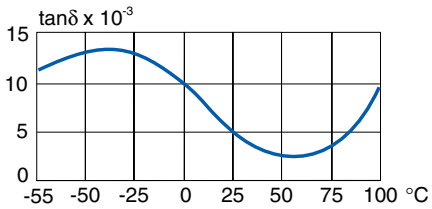
Dissipation factor Max values at +23°C

	C ≤ 100nF	100nF < C < 1µF	1µF≤ C ≤ 10µF	C > 10µF
1 kHz	0.8%	0.8%	0.8%	0.8%
10 kHz	1.2%	1.2%	1.5%	3.0%
100 kHz	2.5%	3.0%		

Pulse rise time The capacitors can withstand an unlimited number of pulses with a dU/dt according to article table. For voltages (U) lower than the rated voltage (U_R), the specified dU/dt can be multiplied by U_R/U.



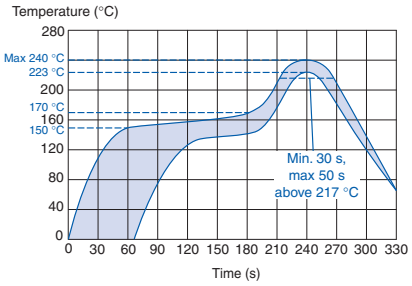
Typical capacitance vs temperature at 1 kHz



Typical dissipation factor vs temperature at 1 kHz

RECOMMENDED SOLDERING CONDITIONS

Reflow soldering temperature measured on the top body surface of the component
Preheating temperature should be less than 170°C. The time above 217°C should be less than 50 s. The peak temperature must not exceed 240°C.



MARKING

- Rated capacitance
- Capacitance tolerance code
- Rated voltage code
- Capacitor type M for MMC
- Manufacturing date code according to IEC 60062 (year, month)

See also page 18.

ORDERING INFORMATION

See article table and page 10 for options and article code construction.

ARTICLE TABLE

50 VDC/30 VAC

CHIP LENGTH 5.7 MM CODE 2220

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.0010	J31	5.0	2.5	40	MMC5.7 102K50J31 TR12
0.0012	J31	5.0	2.5	40	MMC5.7 122K50J31 TR12
0.0015	J31	5.0	2.5	40	MMC5.7 152K50J31 TR12
0.0018	J31	5.0	2.5	40	MMC5.7 182K50J31 TR12
0.0022	J31	5.0	2.5	40	MMC5.7 222K50J31 TR12
0.0027	J31	5.0	2.5	40	MMC5.7 272K50J31 TR12
0.0033	J31	5.0	2.5	40	MMC5.7 332K50J31 TR12
0.0039	J31	5.0	2.5	40	MMC5.7 392K50J31 TR12
0.0047	J31	5.0	2.5	40	MMC5.7 472K50J31 TR12
0.0056	J31	5.0	2.5	40	MMC5.7 562K50J31 TR12
0.0068	J31	5.0	2.5	40	MMC5.7 682K50J31 TR12
0.0082	J31	5.0	2.5	40	MMC5.7 822K50J31 TR12
0.010	J31	5.0	2.5	40	MMC5.7 103K50J31 TR12
0.012	J31	5.0	2.5	40	MMC5.7 123K50J31 TR12
0.015	J31	5.0	2.5	30	MMC5.7 153K50J31 TR12
0.018	J31	5.0	2.5	30	MMC5.7 183K50J31 TR12
0.022	J31	5.0	2.5	30	MMC5.7 223K50J31 TR12
0.027	J31	5.0	2.5	30	MMC5.7 273K50J31 TR12
0.033	J31	5.0	2.5	30	MMC5.7 333K50J31 TR12
0.039	J31	5.0	2.5	30	MMC5.7 393K50J31 TR12
0.047	J31	5.0	2.5	30	MMC5.7 473K50J31 TR12
0.056	J31	5.0	2.5	30	MMC5.7 563K50J31 TR12
0.068	J31	5.0	2.5	20	MMC5.7 683K50J31 TR12
0.082	J31	5.0	2.5	20	MMC5.7 823K50J31 TR12
0.10	J31	5.0	2.5	20	MMC5.7 104K50J31 TR12
0.12	J33	5.0	3.0	20	MMC5.7 124K50J33 TR12
0.15	J33	5.0	3.0	20	MMC5.7 154K50J33 TR12
0.18	J35	5.0	4.0	20	MMC5.7 184K50J35 TR12
0.22	J35	5.0	4.0	20	MMC5.7 224K50J35 TR12

CHIP LENGTH 7.3 MM CODE 2824

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.0010	K31	6.0	2.5	50	MMC7.3 102K50K31 TR12
0.0012	K31	6.0	2.5	50	MMC7.3 122K50K31 TR12
0.0015	K31	6.0	2.5	50	MMC7.3 152K50K31 TR12
0.0018	K31	6.0	2.5	50	MMC7.3 182K50K31 TR12
0.0022	K31	6.0	2.5	50	MMC7.3 222K50K31 TR12
0.0027	K31	6.0	2.5	50	MMC7.3 272K50K31 TR12
0.0033	K31	6.0	2.5	50	MMC7.3 332K50K31 TR12
0.0039	K31	6.0	2.5	50	MMC7.3 392K50K31 TR12
0.0047	K31	6.0	2.5	50	MMC7.3 472K50K31 TR12
0.0056	K31	6.0	2.5	50	MMC7.3 562K50K31 TR12
0.0068	K31	6.0	2.5	40	MMC7.3 682K50K31 TR12
0.0082	K31	6.0	2.5	40	MMC7.3 822K50K31 TR12
0.010	K31	6.0	2.5	40	MMC7.3 103K50K31 TR12
0.012	K31	6.0	2.5	40	MMC7.3 123K50K31 TR12
0.015	K31	6.0	2.5	40	MMC7.3 153K50K31 TR12
0.018	K31	6.0	2.5	40	MMC7.3 183K50K31 TR12
0.022	K31	6.0	2.5	30	MMC7.3 223K50K31 TR12
0.027	K31	6.0	2.5	30	MMC7.3 273K50K31 TR12
0.033	K31	6.0	2.5	30	MMC7.3 333K50K31 TR12
0.039	K31	6.0	2.5	30	MMC7.3 393K50K31 TR12
0.047	K31	6.0	2.5	30	MMC7.3 473K50K31 TR12
0.056	K31	6.0	2.5	30	MMC7.3 563K50K31 TR12
0.068	K31	6.0	2.5	30	MMC7.3 683K50K31 TR12
0.082	K31	6.0	2.5	30	MMC7.3 823K50K31 TR12
0.10	K31	6.0	2.5	30	MMC7.3 104K50K31 TR12
0.12	K31	6.0	2.5	30	MMC7.3 124K50K31 TR12
0.15	K31	6.0	2.5	25	MMC7.3 154K50K31 TR12
0.18	K33	6.0	3.0	25	MMC7.3 184K50K33 TR12
0.22	K33	6.0	3.0	25	MMC7.3 224K50K33 TR12
0.27	K35	6.0	3.5	25	MMC7.3 274K50K35 TR12

50 VDC/30 VAC

CHIP LENGTH 7.3 MM CODE 2824

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.33	K35	6.0	3.5	25	MMC7.3 334K50K35 TR12
0.39	K35	6.0	3.5	25	MMC7.3 394K50K35 TR12
0.47	K35	6.0	3.5	25	MMC7.3 474K50K35 TR12
0.56	K37	6.0	4.5	12	MMC7.3 564K50K37 TR12
0.68	K37	6.0	4.5	12	MMC7.3 684K50K37 TR12
0.82	K37	6.0	4.5	12	MMC7.3 824K50K37 TR12
1.0	K37	6.0	4.5	12	MMC7.3 105K50K37 TR12

CHIP LENGTH 10.2 MM CODE 4036

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.022	A31	9.1	5.5	40	MMC10.2 223K50A31 TR16
0.027	A31	9.1	5.5	40	MMC10.2 273K50A31 TR16
0.033	A31	9.1	5.5	40	MMC10.2 333K50A31 TR16
0.039	A31	9.1	5.5	40	MMC10.2 393K50A31 TR16
0.047	A31	9.1	5.5	40	MMC10.2 473K50A31 TR16
0.056	A31	9.1	5.5	40	MMC10.2 563K50A31 TR16
0.068	A31	9.1	5.5	40	MMC10.2 683K50A31 TR16
0.082	A31	9.1	5.5	40	MMC10.2 823K50A31 TR16
0.10	A31	9.1	5.5	30	MMC10.2 104K50A31 TR16
0.12	A31	9.1	5.5	30	MMC10.2 124K50A31 TR16
0.15	A31	9.1	5.5	30	MMC10.2 154K50A31 TR16
0.18	A31	9.1	5.5	20	MMC10.2 184K50A31 TR16
0.22	A31	9.1	5.5	20	MMC10.2 224K50A31 TR16
0.27	A31	9.1	5.5	20	MMC10.2 274K50A31 TR16
0.33	A31	9.1	5.5	20	MMC10.2 334K50A31 TR16
0.39	A31	9.1	5.5	20	MMC10.2 394K50A31 TR16
0.47	A31	9.1	5.5	20	MMC10.2 474K50A31 TR16
0.56	A31	9.1	5.5	12	MMC10.2 564K50A31 TR16
0.68	A31	9.1	5.5	12	MMC10.2 684K50A31 TR16
0.82	A31	9.1	5.5	12	MMC10.2 824K50A31 TR16
1.0	A31	9.1	5.5	12	MMC10.2 105K50A31 TR16
1.2	A31	9.1	5.5	12	MMC10.2 125K50A31 TR16
1.5	A31	9.1	5.5	12	MMC10.2 155K50A31 TR16
1.8	A31	9.1	5.5	12	MMC10.2 185K50A31 TR16
2.2	A31	9.1	5.5	12	MMC10.2 225K50A31 TR16

CHIP LENGTH 12.7 MM CODE 5045

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
2.7	B31	11.5	6.5	8	MMC12.7 275K50B31 TR24
3.3	B31	11.5	6.5	8	MMC12.7 335K50B31 TR24
3.9	B31	11.5	6.5	8	MMC12.7 395K50B31 TR24
4.7	B31	11.5	6.5	8	MMC12.7 475K50B31 TR24

CHIP LENGTH 16.5 MM CODE 6560

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
5.6	C31	15.0	7.0	5	MMC16.5 565K50C31 TR24
6.8	C31	15.0	7.0	5	MMC16.5 685K50C31 TR24
8.2	C31	15.0	7.0	5	MMC16.5 825K50C31 TR24
10.0	C31	15.0	7.0	5	MMC16.5 106K50C31 TR24
12.0	C31	15.0	7.0	5	MMC16.5 126K50C31 TR24
15.0	C31	15.0	7.0	5	MMC16.5 156K50C31 TR24

63 VDC/40 VAC

CHIP LENGTH 7.3 MM CODE 2824

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.0010	K31	6.0	2.5	50	MMC7.3 102K63K31 TR12
0.0012	K31	6.0	2.5	50	MMC7.3 122K63K31 TR12
0.0015	K31	6.0	2.5	50	MMC7.3 152K63K31 TR12
0.0018	K31	6.0	2.5	50	MMC7.3 182K63K31 TR12
0.0022	K31	6.0	2.5	50	MMC7.3 222K63K31 TR12
0.0027	K31	6.0	2.5	50	MMC7.3 272K63K31 TR12

ARTICLE TABLE

63 VDC/40 VAC

CHIP LENGTH 7.3 MM CODE 2824

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.0033	K31	6.0	2.5	50	MMC7.3 332K63K31 TR12
0.0039	K31	6.0	2.5	50	MMC7.3 392K63K31 TR12
0.0047	K31	6.0	2.5	50	MMC7.3 472K63K31 TR12
0.0056	K31	6.0	2.5	50	MMC7.3 562K63K31 TR12
0.0068	K31	6.0	2.5	40	MMC7.3 682K63K31 TR12
0.0082	K31	6.0	2.5	40	MMC7.3 822K63K31 TR12
0.010	K31	6.0	2.5	40	MMC7.3 103K63K31 TR12
0.012	K31	6.0	2.5	40	MMC7.3 123K63K31 TR12
0.015	K31	6.0	2.5	40	MMC7.3 153K63K31 TR12
0.018	K31	6.0	2.5	40	MMC7.3 183K63K31 TR12
0.022	K31	6.0	2.5	30	MMC7.3 223K63K31 TR12
0.027	K31	6.0	2.5	30	MMC7.3 273K63K31 TR12
0.033	K31	6.0	2.5	30	MMC7.3 333K63K31 TR12
0.039	K31	6.0	2.5	30	MMC7.3 393K63K31 TR12
0.047	K31	6.0	2.5	30	MMC7.3 473K63K31 TR12
0.056	K31	6.0	2.5	30	MMC7.3 563K63K31 TR12
0.068	K31	6.0	2.5	30	MMC7.3 683K63K31 TR12
0.082	K31	6.0	2.5	30	MMC7.3 823K63K31 TR12
0.10	K31	6.0	2.5	30	MMC7.3 104K63K31 TR12
0.12	K31	6.0	2.5	30	MMC7.3 124K63K31 TR12
0.15	K31	6.0	2.5	30	MMC7.3 154K63K31 TR12
0.18	K33	6.0	3.0	25	MMC7.3 184K63K33 TR12
0.22	K33	6.0	3.0	25	MMC7.3 224K63K33 TR12
0.27	K35	6.0	3.5	25	MMC7.3 274K63K35 TR12
0.33	K35	6.0	3.5	25	MMC7.3 334K63K35 TR12
0.39	K35	6.0	3.5	25	MMC7.3 394K63K35 TR12
0.47	K35	6.0	3.5	25	MMC7.3 474K63K35 TR12

CHIP LENGTH 10.2 MM CODE 4036

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.022	A31	9.1	5.5	40	MMC10.2 223K63A31 TR16
0.027	A31	9.1	5.5	40	MMC10.2 273K63A31 TR16
0.033	A31	9.1	5.5	40	MMC10.2 333K63A31 TR16
0.039	A31	9.1	5.5	40	MMC10.2 393K63A31 TR16
0.047	A31	9.1	5.5	40	MMC10.2 473K63A31 TR16
0.056	A31	9.1	5.5	40	MMC10.2 563K63A31 TR16
0.068	A31	9.1	5.5	40	MMC10.2 683K63A31 TR16
0.082	A31	9.1	5.5	40	MMC10.2 823K63A31 TR16
0.10	A31	9.1	5.5	30	MMC10.2 104K63A31 TR16
0.12	A31	9.1	5.5	30	MMC10.2 124K63A31 TR16
0.15	A31	9.1	5.5	30	MMC10.2 154K63A31 TR16
0.18	A31	9.1	5.5	20	MMC10.2 184K63A31 TR16
0.22	A31	9.1	5.5	20	MMC10.2 224K63A31 TR16
0.27	A31	9.1	5.5	20	MMC10.2 274K63A31 TR16
0.33	A31	9.1	5.5	20	MMC10.2 334K63A31 TR16
0.39	A31	9.1	5.5	20	MMC10.2 394K63A31 TR16
0.47	A31	9.1	5.5	20	MMC10.2 474K63A31 TR16
0.56	A31	9.1	5.5	12	MMC10.2 564K63A31 TR16
0.68	A31	9.1	5.5	12	MMC10.2 684K63A31 TR16
0.82	A31	9.1	5.5	12	MMC10.2 824K63A31 TR16
1.0	A31	9.1	5.5	12	MMC10.2 105K63A31 TR16
1.2	A31	9.1	5.5	12	MMC10.2 125K63A31 TR16
1.5	A31	9.1	5.5	12	MMC10.2 155K63A31 TR16

CHIP LENGTH 12.7 MM CODE 5045

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
1.8	B31	11.5	6.5	8	MMC12.7 185K63B31 TR24
2.2	B31	11.5	6.5	8	MMC12.7 225K63B31 TR24
2.7	B31	11.5	6.5	8	MMC12.7 275K63B31 TR24
3.3	B31	11.5	6.5	8	MMC12.7 335K63B31 TR24

63 VDC/40 VAC

CHIP LENGTH 16.5 MM CODE 6560

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
3.9	C31	15.0	7.0	5	MMC16.5 395K63C31 TR24
4.7	C31	15.0	7.0	5	MMC16.5 475K63C31 TR24

100 VDC/63 VAC

CHIP LENGTH 5.7 MM CODE 2220

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.0010	J31	5.0	2.5	40	MMC5.7 102K100J31 TR12
0.0012	J31	5.0	2.5	40	MMC5.7 122K100J31 TR12
0.0015	J31	5.0	2.5	40	MMC5.7 152K100J31 TR12
0.0018	J31	5.0	2.5	40	MMC5.7 182K100J31 TR12
0.0022	J31	5.0	2.5	40	MMC5.7 222K100J31 TR12
0.0027	J31	5.0	2.5	40	MMC5.7 272K100J31 TR12
0.0033	J31	5.0	2.5	40	MMC5.7 332K100J31 TR12
0.0039	J31	5.0	2.5	40	MMC5.7 392K100J31 TR12
0.0047	J31	5.0	2.5	40	MMC5.7 472K100J31 TR12
0.0056	J31	5.0	2.5	40	MMC5.7 562K100J31 TR12
0.0068	J31	5.0	2.5	40	MMC5.7 682K100J31 TR12
0.0082	J31	5.0	2.5	40	MMC5.7 822K100J31 TR12
0.010	J31	5.0	2.5	40	MMC5.7 103K100J31 TR12
0.012	J31	5.0	2.5	40	MMC5.7 123K100J31 TR12
0.015	J31	5.0	2.5	30	MMC5.7 153K100J31 TR12
0.018	J31	5.0	2.5	30	MMC5.7 183K100J31 TR12
0.022	J31	5.0	2.5	30	MMC5.7 223K100J31 TR12
0.027	J31	5.0	2.5	30	MMC5.7 273K100J31 TR12
0.033	J31	5.0	2.5	30	MMC5.7 333K100J31 TR12
0.039	J31	5.0	2.5	30	MMC5.7 393K100J31 TR12
0.047	J31	5.0	2.5	30	MMC5.7 473K100J31 TR12
0.056	J33	5.0	3.0	30	MMC5.7 563K100J33 TR12
0.068	J33	5.0	3.0	30	MMC5.7 683K100J33 TR12
0.082	J35	5.0	4.0	30	MMC5.7 823K100J35 TR12
0.10	J35	5.0	4.0	30	MMC5.7 104K100J35 TR12

CHIP LENGTH 7.3 MM CODE 2824

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.0010	K31	6.0	2.5	50	MMC7.3 102K100K31 TR12
0.0012	K31	6.0	2.5	50	MMC7.3 122K100K31 TR12
0.0015	K31	6.0	2.5	50	MMC7.3 152K100K31 TR12
0.0018	K31	6.0	2.5	50	MMC7.3 182K100K31 TR12
0.0022	K31	6.0	2.5	50	MMC7.3 222K100K31 TR12
0.0027	K31	6.0	2.5	50	MMC7.3 272K100K31 TR12
0.0033	K31	6.0	2.5	50	MMC7.3 332K100K31 TR12
0.0039	K31	6.0	2.5	50	MMC7.3 392K100K31 TR12
0.0047	K31	6.0	2.5	50	MMC7.3 472K100K31 TR12
0.0056	K31	6.0	2.5	50	MMC7.3 562K100K31 TR12
0.0068	K31	6.0	2.5	40	MMC7.3 682K100K31 TR12
0.0082	K31	6.0	2.5	40	MMC7.3 822K100K31 TR12
0.010	K31	6.0	2.5	40	MMC7.3 103K100K31 TR12
0.012	K31	6.0	2.5	40	MMC7.3 123K100K31 TR12
0.015	K31	6.0	2.5	40	MMC7.3 153K100K31 TR12
0.018	K31	6.0	2.5	40	MMC7.3 183K100K31 TR12
0.022	K31	6.0	2.5	30	MMC7.3 223K100K31 TR12
0.027	K31	6.0	2.5	30	MMC7.3 273K100K31 TR12
0.033	K31	6.0	2.5	30	MMC7.3 333K100K31 TR12
0.039	K31	6.0	2.5	30	MMC7.3 393K100K31 TR12
0.047	K31	6.0	2.5	30	MMC7.3 473K100K31 TR12
0.056	K31	6.0	2.5	30	MMC7.3 563K100K31 TR12
0.068	K31	6.0	2.5	30	MMC7.3 683K100K31 TR12
0.082	K31	6.0	2.5	30	MMC7.3 823K100K31 TR12
0.10	K31	6.0	2.5	30	MMC7.3 104K100K31 TR12
0.12	K33	6.0	3.0	30	MMC7.3 124K100K33 TR12
0.15	K35	6.0	3.5	30	MMC7.3 154K100K35 TR12

ARTICLE TABLE

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
100 VDC/63 VAC					
CHIP LENGTH 7.3 MM CODE 2824					
0.18	K35	6.0	3.5	30	MMC7.3 184K100K35 TR12
0.22	K35	6.0	4.5	30	MMC7.3 224K100K37 TR12
CHIP LENGTH 10.2 MM CODE 4036					
0.022	A31	9.1	5.5	40	MMC10.2 223K100A31 TR16
0.027	A31	9.1	5.5	40	MMC10.2 273K100A31 TR16
0.033	A31	9.1	5.5	40	MMC10.2 333K100A31 TR16
0.039	A31	9.1	5.5	40	MMC10.2 393K100A31 TR16
0.047	A31	9.1	5.5	40	MMC10.2 473K100A31 TR16
0.056	A31	9.1	5.5	40	MMC10.2 563K100A31 TR16
0.068	A31	9.1	5.5	40	MMC10.2 683K100A31 TR16
0.082	A31	9.1	5.5	40	MMC10.2 823K100A31 TR16
0.10	A31	9.1	5.5	30	MMC10.2 104K100A31 TR16
0.12	A31	9.1	5.5	30	MMC10.2 124K100A31 TR16
0.15	A31	9.1	5.5	30	MMC10.2 154K100A31 TR16
0.18	A31	9.1	5.5	20	MMC10.2 184K100A31 TR16
0.22	A31	9.1	5.5	20	MMC10.2 224K100A31 TR16
0.27	A31	9.1	5.5	20	MMC10.2 274K100A31 TR16
0.33	A31	9.1	5.5	20	MMC10.2 334K100A31 TR16
0.39	A31	9.1	5.5	20	MMC10.2 394K100A31 TR16
0.47	A31	9.1	5.5	20	MMC10.2 474K100A31 TR16
CHIP LENGTH 12.7 MM CODE 5045					
0.56	B31	11.5	6.5	12	MMC12.7 564K100B31 TR24
0.68	B31	11.5	6.5	12	MMC12.7 684K100B31 TR24
0.82	B31	11.5	6.5	12	MMC12.7 824K100B31 TR24
1.0	B31	11.5	6.5	12	MMC12.7 105K100B31 TR24
CHIP LENGTH 16.5 MM CODE 6560					
1.2	C31	15.0	7.0	8	MMC16.5 125K100C31 TR24
1.5	C31	15.0	7.0	8	MMC16.5 155K100C31 TR24
1.8	C31	15.0	7.0	8	MMC16.5 185K100C31 TR24
2.2	C31	15.0	7.0	8	MMC16.5 225K100C31 TR24
2.7	C31	15.0	7.0	8	MMC16.5 275K100C31 TR24
3.3	C31	15.0	7.0	8	MMC16.5 335K100C31 TR24
250 VDC/160 VAC					
CHIP LENGTH 5.7 MM CODE 2220					
0.0010	J31	5.0	2.5	40	MMC5.7 102K250J31 TR12
0.0012	J31	5.0	2.5	40	MMC5.7 122K250J31 TR12
0.0015	J31	5.0	2.5	40	MMC5.7 152K250J31 TR12
0.0018	J31	5.0	2.5	40	MMC5.7 182K250J31 TR12
0.0022	J31	5.0	2.5	40	MMC5.7 222K250J31 TR12
0.0027	J31	5.0	2.5	40	MMC5.7 272K250J31 TR12
0.0033	J31	5.0	2.5	40	MMC5.7 332K250J31 TR12
0.0039	J31	5.0	2.5	40	MMC5.7 392K250J31 TR12
0.0047	J31	5.0	2.5	40	MMC5.7 472K250J31 TR12
0.0056	J31	5.0	2.5	40	MMC5.7 562K250J31 TR12
0.0068	J31	5.0	2.5	40	MMC5.7 682K250J31 TR12
0.0082	J31	5.0	2.5	40	MMC5.7 822K250J31 TR12
0.010	J31	5.0	2.5	40	MMC5.7 103K250J31 TR12
0.012	J31	5.0	2.5	40	MMC5.7 123K250J31 TR12
0.015	J33	5.0	3.0	40	MMC5.7 153K250J33 TR12
0.018	J35	5.0	4.0	40	MMC5.7 183K250J35 TR12
0.022	J35	5.0	4.0	40	MMC5.7 223K250J35 TR12

NOTE: These products are not yet suitable for lead free soldering. For actual status, please contact manufacturer.

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
250 VDC/160 VAC					
CHIP LENGTH 7.3 MM CODE 2824					
0.0010	K31	6.0	2.5	50	MMC7.3 102K250K31 TR12
0.0012	K31	6.0	2.5	50	MMC7.3 122K250K31 TR12
0.0015	K31	6.0	2.5	50	MMC7.3 152K250K31 TR12
0.0018	K31	6.0	2.5	50	MMC7.3 182K250K31 TR12
0.0022	K31	6.0	2.5	50	MMC7.3 222K250K31 TR12
0.0027	K31	6.0	2.5	50	MMC7.3 272K250K31 TR12
0.0033	K31	6.0	2.5	50	MMC7.3 332K250K31 TR12
0.0039	K31	6.0	2.5	50	MMC7.3 392K250K31 TR12
0.0047	K31	6.0	2.5	50	MMC7.3 472K250K31 TR12
0.0056	K31	6.0	2.5	50	MMC7.3 562K250K31 TR12
0.0068	K31	6.0	2.5	40	MMC7.3 682K250K31 TR12
0.0082	K31	6.0	2.5	40	MMC7.3 822K250K31 TR12
0.010	K31	6.0	2.5	40	MMC7.3 103K250K31 TR12
0.012	K31	6.0	2.5	40	MMC7.3 123K250K31 TR12
0.015	K31	6.0	2.5	40	MMC7.3 153K250K31 TR12
0.018	K33	6.0	3.0	40	MMC7.3 183K250K33 TR12
0.022	K33	6.0	3.0	40	MMC7.3 223K250K33 TR12
0.027	K35	6.0	3.5	40	MMC7.3 273K250K35 TR12
0.033	K35	6.0	3.5	40	MMC7.3 333K250K35 TR12
0.039	K35	6.0	3.5	40	MMC7.3 393K250K35 TR12
0.047	K37	6.0	4.5	40	MMC7.3 473K250K37 TR12
CHIP LENGTH 10.2 MM CODE 4036					
0.022	A31	9.1	5.5	40	MMC10.2 223K250A31 TR16
0.027	A31	9.1	5.5	40	MMC10.2 273K250A31 TR16
0.033	A31	9.1	5.5	40	MMC10.2 333K250A31 TR16
0.039	A31	9.1	5.5	40	MMC10.2 393K250A31 TR16
0.047	A31	9.1	5.5	40	MMC10.2 473K250A31 TR16
0.056	A31	9.1	5.5	40	MMC10.2 563K250A31 TR16
0.068	A31	9.1	5.5	40	MMC10.2 683K250A31 TR16
0.082	A31	9.1	5.5	40	MMC10.2 823K250A31 TR16
0.10	A31	9.1	5.5	30	MMC10.2 104K250A31 TR16
0.12	A31	9.1	5.5	30	MMC10.2 124K250A31 TR16
0.15	A31	9.1	5.5	30	MMC10.2 154K250A31 TR16
CHIP LENGTH 12.7 MM CODE 5045					
0.18	B31	11.5	6.5	20	MMC12.7 184K250B31 TR24
0.22	B31	11.5	6.5	20	MMC12.7 224K250B31 TR24
0.27	B31	11.5	6.5	20	MMC12.7 274K250B31 TR24
0.33	B31	11.5	6.5	20	MMC12.7 334K250B31 TR24
0.39	B31	11.5	6.5	20	MMC12.7 394K250B31 TR24
0.47	B31	11.5	6.5	20	MMC12.7 474K250B31 TR24
CHIP LENGTH 16.5 MM CODE 6560					
0.56	C31	15.0	7.0	12	MMC16.5 564K250C31 TR24
0.68	C31	15.0	7.0	12	MMC16.5 684K250C31 TR24
0.82	C31	15.0	7.0	12	MMC16.5 824K250C31 TR24
1.0	C31	15.0	7.0	12	MMC16.5 105K250C31 TR24
400 VDC/200 VAC					
CHIP LENGTH 7.3 MM CODE 2824					
0.0010	K31	6.0	2.5	50	MMC7.3 102K400K31 TR12
0.0012	K31	6.0	2.5	50	MMC7.3 122K400K31 TR12
0.0015	K31	6.0	2.5	50	MMC7.3 152K400K31 TR12
0.0018	K31	6.0	2.5	50	MMC7.3 182K400K31 TR12

ARTICLE TABLE

400 VDC/200 VAC

CHIP LENGTH 7.3 MM CODE 2824

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.0022	K31	6.0	2.5	50	MMC7.3 222K400K31 TR12
0.0027	K31	6.0	2.5	50	MMC7.3 272K400K31 TR12
0.0033	K31	6.0	2.5	50	MMC7.3 332K400K31 TR12
0.0039	K31	6.0	2.5	50	MMC7.3 392K400K31 TR12
0.0047	K31	6.0	2.5	50	MMC7.3 472K400K31 TR12
0.0056	K33	6.0	3.0	50	MMC7.3 562K400K33 TR12
0.0068	K33	6.0	3.0	50	MMC7.3 682K400K33 TR12
0.0082	K33	6.0	3.0	50	MMC7.3 822K400K33 TR12
0.010	K35	6.0	3.5	50	MMC7.3 103K400K35 TR12
0.012	K35	6.0	3.5	50	MMC7.3 123K400K35 TR12
0.015	K37	6.0	4.5	50	MMC7.3 153K400K37 TR12

CHIP LENGTH 10.2 MM CODE 4036

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.022	A31	9.1	5.5	40	MMC10.2 223K400A31 TR16
0.027	A31	9.1	5.5	40	MMC10.2 273K400A31 TR16
0.033	A31	9.1	5.5	40	MMC10.2 333K400A31 TR16
0.039	A31	9.1	5.5	40	MMC10.2 393K400A31 TR16
0.047	A31	9.1	5.5	40	MMC10.2 473K400A31 TR16
0.056	A31	9.1	5.5	40	MMC10.2 563K400A31 TR16
0.068	A31	9.1	5.5	40	MMC10.2 683K400A31 TR16

400 VDC/200 VAC

CHIP LENGTH 12.7 MM CODE 5045

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.082	B31	11.5	6.5	30	MMC12.7 823K400B31 TR24
0.10	B31	11.5	6.5	30	MMC12.7 104K400B31 TR24
0.12	B31	11.5	6.5	30	MMC12.7 124K400B31 TR24
0.15	B31	11.5	6.5	30	MMC12.7 154K400B31 TR24

CHIP LENGTH 16.5 MM CODE 6560

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.18	C31	15.0	7.0	20	MMC16.5 184K400C31 TR24
0.22	C31	15.0	7.0	20	MMC16.5 224K400C31 TR24
0.27	C31	15.0	7.0	20	MMC16.5 274K400C31 TR24
0.33	C31	15.0	7.0	20	MMC16.5 334K400C31 TR24
0.39	C31	15.0	7.0	20	MMC16.5 394K400C31 TR24
0.47	C31	15.0	7.0	20	MMC16.5 474K400C31 TR24

GMC

- **Metallized polyethylene naphthalate (PEN) SMD**
- **According to IEC 60384-23**

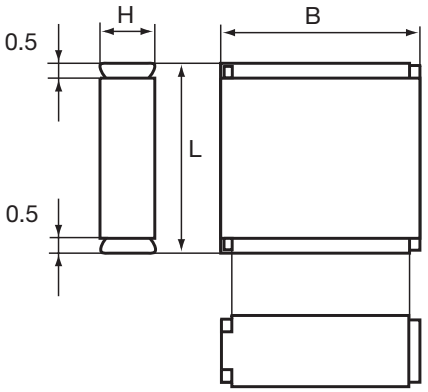
RoHS Compliant

TYPICAL APPLICATIONS

Bypassing, signal coupling. General purpose for highest reliability. High temperature service.

CONSTRUCTION

Polyethylene naphthalate (PEN) film capacitor for surface mounting. Encapsulation in self-extinguishing material meeting the requirements of UL 94V-0.



Components may be vertically mounted for decreased footprint. See page 20.

TECHNICAL DATA

Rated voltage U_R, VDC	50	63	100	250	400	630
Rated voltage U_R, VAC	30	40	63	160	200	300
Capacitance range, nF	1 - 5600	1 - 4700	1 - 2200	1 - 680	1 - 330	22 - 150

Capacitance tolerance
±10%, ±5%; other tolerances on request.

Category temperature range
-55°C to +125°C

Rated temperature
+100°C

Voltage derating
The rated voltage should be decreased with 1.25%/°C from +100°C to +125°C and 1.5%/°C from +125°C to 175 °C.

Climatic category
55/125/56

Voltage proof
1.6 x U_R, 60s

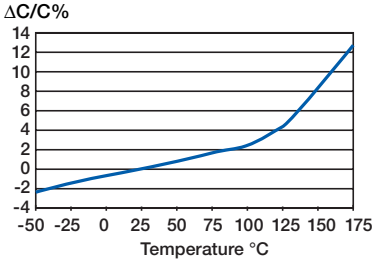
Insulation resistance
Minimum value between terminals
Measured at +20°C

	C ≤ 0.33 µF	C > 0.33 µF
$U_R \leq 100$ V	10 000 MΩ	3000 s
$U_R > 100$ V	30 000 MΩ	10 000 s

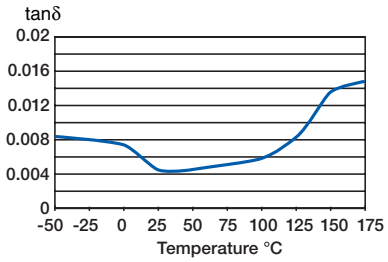
Dissipation factor
Max values at +23°C

	C ≤ 100 nF	100 nF < C ≤ 1µF	C > 1µF
1 kHz	0.6 %	0.6 %	0.6 %
10 kHz	1.0 %	1.0 %	1.0 %
100 kHz	2.0 %	2.5 %	

Pulse rise time
The capacitors can withstand an unlimited number of pulses with a dU/dt according to article table. For voltages (U) lower than the rated voltage (U_R), the specified dU/dt can be multiplied by U_R/U.



Typical capacitance vs temperature at 1 kHz



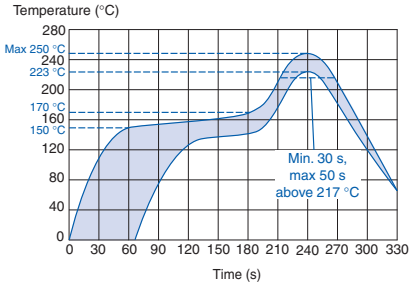
Typical dissipation factor vs temperature at 1 kHz

ORDERING INFORMATION

See article table and page 10 for options and article code construction.

RECOMMENDED SOLDERING CONDITIONS

Reflow soldering temperature measured on the top body surface of the component
Preheating temperature should be less than 170°C. The time above 217°C should be less than 50 s. The peak temperature must not exceed 250°C.



MARKING

- Rated capacitance
- Capacitance tolerance code
- Rated voltage code
- Capacitor type G for GMC
- Manufacturing date code according to IEC 60062 (year, month)

See also page 18.

ARTICLE TABLE

50 VDC/30 VAC

CHIP LENGTH 5.7 MM CODE 2220

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.0010	J31	5.0	2.5	40	GMC5.7 102K50J31 TR12
0.0012	J31	5.0	2.5	40	GMC5.7 122K50J31 TR12
0.0015	J31	5.0	2.5	40	GMC5.7 152K50J31 TR12
0.0018	J31	5.0	2.5	40	GMC5.7 182K50J31 TR12
0.0022	J31	5.0	2.5	40	GMC5.7 222K50J31 TR12
0.0027	J31	5.0	2.5	40	GMC5.7 272K50J31 TR12
0.0033	J31	5.0	2.5	40	GMC5.7 332K50J31 TR12
0.0039	J31	5.0	2.5	40	GMC5.7 392K50J31 TR12
0.0047	J31	5.0	2.5	40	GMC5.7 472K50J31 TR12
0.0056	J31	5.0	2.5	40	GMC5.7 562K50J31 TR12
0.0068	J31	5.0	2.5	40	GMC5.7 682K50J31 TR12
0.0082	J31	5.0	2.5	40	GMC5.7 822K50J31 TR12
0.010	J31	5.0	2.5	40	GMC5.7 103K50J31 TR12
0.012	J31	5.0	2.5	40	GMC5.7 123K50J31 TR12
0.015	J31	5.0	2.5	30	GMC5.7 153K50J31 TR12
0.018	J31	5.0	2.5	30	GMC5.7 183K50J31 TR12
0.022	J31	5.0	2.5	30	GMC5.7 223K50J31 TR12
0.027	J31	5.0	2.5	30	GMC5.7 273K50J31 TR12
0.033	J31	5.0	2.5	20	GMC5.7 333K50J31 TR12
0.039	J31	5.0	2.5	20	GMC5.7 393K50J31 TR12
0.047	J31	5.0	2.5	20	GMC5.7 473K50J31 TR12
0.056	J31	5.0	2.5	20	GMC5.7 563K50J31 TR12
0.068	J31	5.0	2.5	20	GMC5.7 683K50J31 TR12
0.082	J31	5.0	2.5	20	GMC5.7 823K50J31 TR12
0.10	J31	5.0	2.5	20	GMC5.7 104K50J31 TR12
0.12	J33	5.0	3.0	20	GMC5.7 124K50J33 TR12
0.15	J35	5.0	4.0	20	GMC5.7 154K50J35 TR12
0.18	J35	5.0	4.0	20	GMC5.7 184K50J35 TR12

CHIP LENGTH 10.2 MM CODE 4036

0.022	A31	9.1	5.5	40	GMC10.2 223K50A31 TR16
0.027	A31	9.1	5.5	40	GMC10.2 273K50A31 TR16
0.033	A31	9.1	5.5	40	GMC10.2 333K50A31 TR16
0.039	A31	9.1	5.5	40	GMC10.2 393K50A31 TR16
0.047	A31	9.1	5.5	30	GMC10.2 473K50A31 TR16
0.056	A31	9.1	5.5	30	GMC10.2 563K50A31 TR16
0.068	A31	9.1	5.5	30	GMC10.2 683K50A31 TR16
0.082	A31	9.1	5.5	30	GMC10.2 823K50A31 TR16
0.10	A31	9.1	5.5	30	GMC10.2 104K50A31 TR16
0.12	A31	9.1	5.5	30	GMC10.2 124K50A31 TR16
0.15	A31	9.1	5.5	20	GMC10.2 154K50A31 TR16
0.18	A31	9.1	5.5	20	GMC10.2 184K50A31 TR16
0.22	A31	9.1	5.5	20	GMC10.2 224K50A31 TR16
0.27	A31	9.1	5.5	20	GMC10.2 274K50A31 TR16
0.33	A31	9.1	5.5	20	GMC10.2 334K50A31 TR16
0.39	A31	9.1	5.5	10	GMC10.2 394K50A31 TR16
0.47	A31	9.1	5.5	10	GMC10.2 474K50A31 TR16
0.56	A31	9.1	5.5	10	GMC10.2 564K50A31 TR16
0.68	A31	9.1	5.5	10	GMC10.2 684K50A31 TR16
0.82	A31	9.1	5.5	10	GMC10.2 824K50A31 TR16
1.0	A31	9.1	5.5	10	GMC10.2 105K50A31 TR16
1.2	A31	9.1	5.5	10	GMC10.2 125K50A31 TR16

CHIP LENGTH 12.7 MM CODE 5045

1.5	B31	11.5	6.5	8	GMC12.7 155K50B31 TR24
1.8	B31	11.5	6.5	8	GMC12.7 185K50B31 TR24
2.2	B31	11.5	6.5	8	GMC12.7 225K50B31 TR24
2.7	B31	11.5	6.5	8	GMC12.7 275K50B31 TR24
3.0	B31	11.5	6.5	8	GMC12.7 305K50B31 TR24

50 VDC/30 VAC

CHIP LENGTH 16.5 MM CODE 6560

3.9	C31	15.0	7.0	5	GMC16.5 395K50C31 TR24
4.7	C31	15.0	7.0	5	GMC16.5 475K50C31 TR24
5.6	C31	15.0	7.0	5	GMC16.5 565K50C31 TR24

63 VDC/40 VAC

CHIP LENGTH 7.3 MM CODE 2824

0.0010	K31	6.0	2.5	50	GMC7.3 102K63K31 TR12
0.0012	K31	6.0	2.5	50	GMC7.3 122K63K31 TR12
0.0015	K31	6.0	2.5	50	GMC7.3 152K63K31 TR12
0.0018	K31	6.0	2.5	50	GMC7.3 182K63K31 TR12
0.0022	K31	6.0	2.5	50	GMC7.3 222K63K31 TR12
0.0027	K31	6.0	2.5	50	GMC7.3 272K63K31 TR12
0.0033	K31	6.0	2.5	50	GMC7.3 332K63K31 TR12
0.0039	K31	6.0	2.5	50	GMC7.3 392K63K31 TR12
0.0047	K31	6.0	2.5	50	GMC7.3 472K63K31 TR12
0.0056	K31	6.0	2.5	50	GMC7.3 562K63K31 TR12
0.0068	K31	6.0	2.5	40	GMC7.3 682K63K31 TR12
0.0082	K31	6.0	2.5	40	GMC7.3 822K63K31 TR12
0.010	K31	6.0	2.5	40	GMC7.3 103K63K31 TR12
0.012	K31	6.0	2.5	40	GMC7.3 123K63K31 TR12
0.015	K31	6.0	2.5	40	GMC7.3 153K63K31 TR12
0.018	K31	6.0	2.5	40	GMC7.3 183K63K31 TR12
0.022	K31	6.0	2.5	30	GMC7.3 223K63K31 TR12
0.027	K31	6.0	2.5	30	GMC7.3 273K63K31 TR12
0.033	K31	6.0	2.5	30	GMC7.3 333K63K31 TR12
0.039	K31	6.0	2.5	30	GMC7.3 393K63K31 TR12
0.047	K31	6.0	2.5	30	GMC7.3 473K63K31 TR12
0.056	K31	6.0	2.5	30	GMC7.3 563K63K31 TR12
0.068	K31	6.0	2.5	20	GMC7.3 683K63K31 TR12
0.082	K31	6.0	2.5	20	GMC7.3 823K63K31 TR12
0.10	K31	6.0	2.5	20	GMC7.3 104K63K31 TR12
0.12	K31	6.0	2.5	20	GMC7.3 124K63K31 TR12
0.15	K31	6.0	2.5	20	GMC7.3 154K63K31 TR12
0.18	K33	6.0	3.0	20	GMC7.3 184K63K33 TR12
0.22	K33	6.0	3.0	20	GMC7.3 224K63K33 TR12
0.27	K35	6.0	3.5	20	GMC7.3 274K63K35 TR12
0.33	K35	6.0	3.5	20	GMC7.3 334K63K35 TR12
0.39	K37	6.0	4.5	20	GMC7.3 394K63K37 TR12

CHIP LENGTH 10.2 MM CODE 4036

0.022	A31	9.1	5.5	40	GMC10.2 223K63A31 TR16
0.027	A31	9.1	5.5	40	GMC10.2 273K63A31 TR16
0.033	A31	9.1	5.5	40	GMC10.2 333K63A31 TR16
0.039	A31	9.1	5.5	40	GMC10.2 393K63A31 TR16
0.047	A31	9.1	5.5	30	GMC10.2 473K63A31 TR16
0.056	A31	9.1	5.5	30	GMC10.2 563K63A31 TR16
0.068	A31	9.1	5.5	30	GMC10.2 683K63A31 TR16
0.082	A31	9.1	5.5	30	GMC10.2 823K63A31 TR16
0.10	A31	9.1	5.5	30	GMC10.2 104K63A31 TR16
0.12	A31	9.1	5.5	30	GMC10.2 124K63A31 TR16
0.15	A31	9.1	5.5	20	GMC10.2 154K63A31 TR16
0.18	A31	9.1	5.5	20	GMC10.2 184K63A31 TR16
0.22	A31	9.1	5.5	20	GMC10.2 224K63A31 TR16
0.27	A31	9.1	5.5	20	GMC10.2 274K63A31 TR16
0.33	A31	9.1	5.5	20	GMC10.2 334K63A31 TR16
0.39	A31	9.1	5.5	10	GMC10.2 394K63A31 TR16
0.47	A31	9.1	5.5	10	GMC10.2 474K63A31 TR16
0.56	A31	9.1	5.5	10	GMC10.2 564K63A31 TR16

ARTICLE TABLE

63 VDC/40 VAC

CHIP LENGTH 10.2 MM CODE 4036

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.68	A31	9.1	5.5	10	GMC10.2 684K63A31 TR16
0.82	A31	9.1	5.5	10	GMC10.2 824K63A31 TR16

CHIP LENGTH 12.7 MM CODE 5045

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
1.0	B31	11.5	6.5	8	GMC12.7 105K63B31 TR24
1.2	B31	11.5	6.5	8	GMC12.7 125K63B31 TR24
1.5	B31	11.5	6.5	8	GMC12.7 155K63B31 TR24

CHIP LENGTH 16.5 MM CODE 6560

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
1.8	C31	15.0	7.0	5	GMC16.5 185K63C31 TR24
2.2	C31	15.0	7.0	5	GMC16.5 225K63C31 TR24
2.7	C31	15.0	7.0	5	GMC16.5 275K63C31 TR24
3.3	C31	15.0	7.0	5	GMC16.5 335K63C31 TR24
3.9	C31	15.0	7.0	5	GMC16.5 395K63C31 TR24
4.7	C31	15.0	7.0	5	GMC16.5 475K63C31 TR24

100 VDC/63 VAC

CHIP LENGTH 5.7 MM CODE 2220

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.0010	J31	5.0	2.5	40	GMC5.7 102K100J31 TR12
0.0012	J31	5.0	2.5	40	GMC5.7 122K100J31 TR12
0.0015	J31	5.0	2.5	40	GMC5.7 152K100J31 TR12
0.0018	J31	5.0	2.5	40	GMC5.7 182K100J31 TR12
0.0022	J31	5.0	2.5	40	GMC5.7 222K100J31 TR12
0.0027	J31	5.0	2.5	40	GMC5.7 272K100J31 TR12
0.0033	J31	5.0	2.5	40	GMC5.7 332K100J31 TR12
0.0039	J31	5.0	2.5	40	GMC5.7 392K100J31 TR12
0.0047	J31	5.0	2.5	40	GMC5.7 472K100J31 TR12
0.0056	J31	5.0	2.5	40	GMC5.7 562K100J31 TR12
0.0068	J31	5.0	2.5	40	GMC5.7 682K100J31 TR12
0.0082	J31	5.0	2.5	40	GMC5.7 822K100J31 TR12
0.010	J31	5.0	2.5	40	GMC5.7 103K100J31 TR12
0.012	J31	5.0	2.5	40	GMC5.7 123K100J31 TR12
0.015	J31	5.0	2.5	30	GMC5.7 153K100J31 TR12
0.018	J31	5.0	2.5	30	GMC5.7 183K100J31 TR12
0.022	J31	5.0	2.5	30	GMC5.7 223K100J31 TR12
0.027	J33	5.0	3.0	30	GMC5.7 273K100J33 TR12
0.033	J33	5.0	3.0	30	GMC5.7 333K100J33 TR12
0.039	J35	5.0	4.0	30	GMC5.7 393K100J35 TR12
0.047	J35	5.0	4.0	30	GMC5.7 473K100J35 TR12

CHIP LENGTH 7.3 MM CODE 2824

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.0010	K31	6.0	2.5	50	GMC7.3 102K100K31 TR12
0.0012	K31	6.0	2.5	50	GMC7.3 122K100K31 TR12
0.0015	K31	6.0	2.5	50	GMC7.3 152K100K31 TR12
0.0018	K31	6.0	2.5	50	GMC7.3 182K100K31 TR12
0.0022	K31	6.0	2.5	50	GMC7.3 222K100K31 TR12
0.0027	K31	6.0	2.5	50	GMC7.3 272K100K31 TR12
0.0033	K31	6.0	2.5	50	GMC7.3 332K100K31 TR12
0.0039	K31	6.0	2.5	50	GMC7.3 392K100K31 TR12
0.0047	K31	6.0	2.5	50	GMC7.3 472K100K31 TR12
0.0056	K31	6.0	2.5	50	GMC7.3 562K100K31 TR12
0.0068	K31	6.0	2.5	40	GMC7.3 682K100K31 TR12
0.0082	K31	6.0	2.5	40	GMC7.3 822K100K31 TR12
0.010	K31	6.0	2.5	40	GMC7.3 103K100K31 TR12
0.012	K31	6.0	2.5	40	GMC7.3 123K100K31 TR12
0.015	K31	6.0	2.5	40	GMC7.3 153K100K31 TR12
0.018	K31	6.0	2.5	40	GMC7.3 183K100K31 TR12

100 VDC/63 VAC

CHIP LENGTH 7.3 MM CODE 2824

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.022	K31	6.0	2.5	30	GMC7.3 223K100K31 TR12
0.027	K31	6.0	2.5	30	GMC7.3 273K100K31 TR12
0.033	K31	6.0	2.5	30	GMC7.3 333K100K31 TR12
0.039	K31	6.0	2.5	30	GMC7.3 393K100K31 TR12
0.047	K31	6.0	2.5	30	GMC7.3 473K100K31 TR12
0.056	K33	6.0	3.0	30	GMC7.3 563K100K33 TR12
0.068	K35	6.0	3.5	30	GMC7.3 683K100K35 TR12
0.082	K35	6.0	3.5	30	GMC7.3 823K100K35 TR12
0.10	K37	6.0	4.5	30	GMC7.3 104K100K37 TR12

CHIP LENGTH 10.2 MM CODE 4036

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.022	A31	9.1	5.5	40	GMC10.2 223K100A31 TR16
0.027	A31	9.1	5.5	40	GMC10.2 273K100A31 TR16
0.033	A31	9.1	5.5	40	GMC10.2 333K100A31 TR16
0.039	A31	9.1	5.5	40	GMC10.2 393K100A31 TR16
0.047	A31	9.1	5.5	30	GMC10.2 473K100A31 TR16
0.056	A31	9.1	5.5	30	GMC10.2 563K100A31 TR16
0.068	A31	9.1	5.5	30	GMC10.2 683K100A31 TR16
0.082	A31	9.1	5.5	30	GMC10.2 823K100A31 TR16
0.10	A31	9.1	5.5	30	GMC10.2 104K100A31 TR16
0.12	A31	9.1	5.5	30	GMC10.2 124K100A31 TR16
0.15	A31	9.1	5.5	20	GMC10.2 154K100A31 TR16
0.18	A31	9.1	5.5	20	GMC10.2 184K100A31 TR16
0.22	A31	9.1	5.5	20	GMC10.2 224K100A31 TR16
0.27	A31	9.1	5.5	20	GMC10.2 274K100A31 TR16
0.33	A31	9.1	5.5	20	GMC10.2 334K100A31 TR16

CHIP LENGTH 12.7 MM CODE 5045

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.39	B31	11.5	6.5	12	GMC12.7 394K100B31 TR24
0.47	B31	11.5	6.5	12	GMC12.7 474K100B31 TR24
0.56	B31	11.5	6.5	12	GMC12.7 564K100B31 TR24
0.68	B31	11.5	6.5	12	GMC12.7 684K100B31 TR24

CHIP LENGTH 16.5 MM CODE 6560

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.82	C31	15.0	7.0	8	GMC16.5 824K100C31 TR24
1.0	C31	15.0	7.0	8	GMC16.5 105K100C31 TR24
1.2	C31	15.0	7.0	8	GMC16.5 125K100C31 TR24
1.5	C31	15.0	7.0	8	GMC16.5 155K100C31 TR24
1.8	C31	15.0	7.0	8	GMC16.5 185K100C31 TR24
2.2	C31	15.0	7.0	8	GMC16.5 225K100C31 TR24

250 VDC/160 VAC

CHIP LENGTH 5.7 MM CODE 2220

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.0010	J31	5.0	2.5	40	GMC5.7 102K250J31 TR12
0.0012	J31	5.0	2.5	40	GMC5.7 122K250J31 TR12
0.0015	J31	5.0	2.5	40	GMC5.7 152K250J31 TR12
0.0018	J31	5.0	2.5	40	GMC5.7 182K250J31 TR12
0.0022	J31	5.0	2.5	40	GMC5.7 222K250J31 TR12
0.0027	J31	5.0	2.5	40	GMC5.7 272K250J31 TR12
0.0033	J31	5.0	2.5	40	GMC5.7 332K250J31 TR12
0.0039	J31	5.0	2.5	40	GMC5.7 392K250J31 TR12
0.0047	J31	5.0	2.5	40	GMC5.7 472K250J31 TR12
0.0056	J31	5.0	2.5	40	GMC5.7 562K250J31 TR12
0.0068	J31	5.0	2.5	40	GMC5.7 682K250J31 TR12

NOTE: These products are not yet suitable for lead free soldering. For actual status, please contact manufacturer.

ARTICLE TABLE

250 VDC/160 VAC

CHIP LENGTH 5.7 MM CODE 2220

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.0082	J31	5.0	2.5	40	GMC5.7 822K250J31 TR12
0.010	J31	5.0	2.5	40	GMC5.7 103K250J31 TR12
0.012	J33	5.0	3.0	40	GMC5.7 123K250J33 TR12
0.015	J33	5.0	3.0	40	GMC5.7 153K250J33 TR12
0.018	J33	5.0	3.0	40	GMC5.7 183K250J33 TR12
0.022	J35	5.0	4.0	40	GMC5.7 223K250J35 TR12

CHIP LENGTH 7.3 MM CODE 2824

0.0010	K31	6.0	2.5	50	GMC7.3 102K250K31 TR12
0.0012	K31	6.0	2.5	50	GMC7.3 122K250K31 TR12
0.0015	K31	6.0	2.5	50	GMC7.3 152K250K31 TR12
0.0018	K31	6.0	2.5	50	GMC7.3 182K250K31 TR12
0.0022	K31	6.0	2.5	50	GMC7.3 222K250K31 TR12
0.0027	K31	6.0	2.5	50	GMC7.3 272K250K31 TR12
0.0033	K31	6.0	2.5	50	GMC7.3 332K250K31 TR12
0.0039	K31	6.0	2.5	50	GMC7.3 392K250K31 TR12
0.0047	K31	6.0	2.5	50	GMC7.3 472K250K31 TR12
0.0056	K31	6.0	2.5	50	GMC7.3 562K250K31 TR12
0.0068	K31	6.0	2.5	40	GMC7.3 682K250K31 TR12
0.0082	K31	6.0	2.5	40	GMC7.3 822K250K31 TR12
0.010	K31	6.0	2.5	40	GMC7.3 103K250K31 TR12
0.012	K31	6.0	2.5	40	GMC7.3 123K250K31 TR12
0.015	K31	6.0	2.5	40	GMC7.3 153K250K31 TR12
0.018	K33	6.0	3.0	40	GMC7.3 183K250K33 TR12
0.022	K33	6.0	3.0	40	GMC7.3 223K250K33 TR12
0.027	K35	6.0	3.5	40	GMC7.3 273K250K35 TR12
0.033	K37	6.0	4.5	30	GMC7.3 333K250K37 TR12
0.039	K37	6.0	4.5	30	GMC7.3 393K250K37 TR12

CHIP LENGTH 10.2 MM CODE 4036

0.022	A31	9.1	5.5	40	GMC10.2 223K250A31 TR16
0.027	A31	9.1	5.5	40	GMC10.2 273K250A31 TR16
0.033	A31	9.1	5.5	40	GMC10.2 333K250A31 TR16
0.039	A31	9.1	5.5	40	GMC10.2 393K250A31 TR16
0.047	A31	9.1	5.5	30	GMC10.2 473K250A31 TR16
0.056	A31	9.1	5.5	30	GMC10.2 563K250A31 TR16
0.068	A31	9.1	5.5	30	GMC10.2 683K250A31 TR16
0.082	A31	9.1	5.5	30	GMC10.2 823K250A31 TR16
0.10	A31	9.1	5.5	30	GMC10.2 104K250A31 TR16
0.12	A31	9.1	5.5	30	GMC10.2 124K250A31 TR16
0.15	A31	9.1	5.5	30	GMC10.2 154K250A31 TR16

CHIP LENGTH 12.7 MM CODE 5045

0.18	B31	11.5	6.5	20	GMC12.7 184K250B31 TR24
0.22	B31	11.5	6.5	20	GMC12.7 224K250B31 TR24
0.27	B31	11.5	6.5	20	GMC12.7 274K250B31 TR24
0.33	B31	11.5	6.5	20	GMC12.7 334K250B31 TR24

CHIP LENGTH 16.5 MM CODE 6560

0.39	C31	15.0	7.0	12	GMC16.5 394K250C31 TR24
0.47	C31	15.0	7.0	12	GMC16.5 474K250C31 TR24
0.56	C31	15.0	7.0	12	GMC16.5 564K250C31 TR24
0.68	C31	15.0	7.0	12	GMC16.5 684K250C31 TR24

NOTE: These products are not yet suitable for lead free soldering. For actual status, please contact manufacturer.

400 VDC/200 VAC

CHIP LENGTH 7.3 MM CODE 2824

0.0010	K31	6.0	2.5	50	GMC7.3 102K400K31 TR12
0.0012	K31	6.0	2.5	50	GMC7.3 122K400K31 TR12
0.0015	K31	6.0	2.5	50	GMC7.3 152K400K31 TR12
0.0018	K31	6.0	2.5	50	GMC7.3 182K400K31 TR12
0.0022	K31	6.0	2.5	50	GMC7.3 222K400K31 TR12
0.0027	K31	6.0	2.5	50	GMC7.3 272K400K31 TR12
0.0033	K31	6.0	2.5	50	GMC7.3 332K400K31 TR12
0.0039	K31	6.0	2.5	50	GMC7.3 392K400K31 TR12
0.0047	K31	6.0	2.5	50	GMC7.3 472K400K31 TR12
0.0056	K31	6.0	2.5	50	GMC7.3 562K400K31 TR12
0.0068	K33	6.0	3.0	50	GMC7.3 682K400K33 TR12
0.0082	K35	6.0	3.5	50	GMC7.3 822K400K35 TR12
0.010	K35	6.0	3.5	50	GMC7.3 103K400K35 TR12
0.012	K35	6.0	3.5	50	GMC7.3 123K400K35 TR12
0.015	K37	6.0	4.5	50	GMC7.3 153K400K37 TR12

CHIP LENGTH 10.2 MM CODE 4036

0.022	A31	9.1	5.5	40	GMC10.2 223K400A31 TR16
0.027	A31	9.1	5.5	40	GMC10.2 273K400A31 TR16
0.033	A31	9.1	5.5	40	GMC10.2 333K400A31 TR16
0.039	A31	9.1	5.5	40	GMC10.2 393K400A31 TR16
0.047	A31	9.1	5.5	40	GMC10.2 473K400A31 TR16

CHIP LENGTH 12.7 MM CODE 5045

0.056	B31	11.5	6.5	30	GMC12.7 563K400B31 TR24
0.068	B31	11.5	6.5	30	GMC12.7 683K400B31 TR24
0.082	B31	11.5	6.5	30	GMC12.7 823K400B31 TR24
0.10	B31	11.5	6.5	30	GMC12.7 104K400B31 TR24

CHIP LENGTH 16.5 MM CODE 6560

0.12	C31	15.0	7.0	20	GMC16.5 124K400C31 TR24
0.15	C31	15.0	7.0	20	GMC16.5 154K400C31 TR24
0.18	C31	15.0	7.0	20	GMC16.5 184K400C31 TR24
0.22	C31	15.0	7.0	20	GMC16.5 224K400C31 TR24
0.27	C31	15.0	7.0	20	GMC16.5 274K400C31 TR24
0.33	C31	15.0	7.0	20	GMC16.5 334K400C31 TR24

630 VDC/300 VAC

CHIP LENGTH 10.2 MM CODE 4036

0.022	A31	9.1	5.5	40	GMC10.2 223K630A31 TR16
0.027	A31	9.1	5.5	40	GMC10.2 273K630A31 TR16

CHIP LENGTH 12.7 MM CODE 5045

0.033	B31	11.5	6.5	30	GMC12.7 333K630B31 TR24
0.039	B31	11.5	6.5	30	GMC12.7 393K630B31 TR24
0.047	B31	11.5	6.5	30	GMC12.7 473K630B31 TR24
0.056	B31	11.5	6.5	30	GMC12.7 563K630B31 TR24
0.068	B31	11.5	6.5	30	GMC12.7 683K630B31 TR24

CHIP LENGTH 16.5 MM CODE 6560

0.082	C31	15.0	7.0	20	GMC16.5 823K630C31 TR24
0.10	C31	15.0	7.0	20	GMC16.5 104K630C31 TR24
0.12	C31	15.0	7.0	20	GMC16.5 124K630C31 TR24
0.15	C31	15.0	7.0	20	GMC16.5 154K630C31 TR24

GMW

- Metallized polyethylene naphthalate (PEN) SMD
- Miniature size naked capacitor
- Low profile
- Wound construction
- According to IEC 60384-23

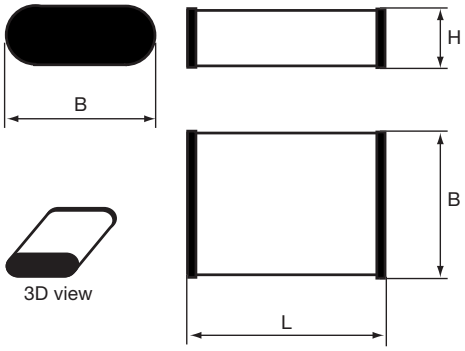
RoHS Compliant

TYPICAL APPLICATIONS

Bypassing, signal coupling. General purpose for highest reliability. High temperature service.

CONSTRUCTION

Polyethylene naphthalate (PEN) film capacitor for surface mounting.



TECHNICAL DATA

Rated voltage U_R, VDC	63	100	250	400	630
Rated voltage U_R, VAC	40	63	160	200	220
Capacitance range, nF	1 - 470	1 - 220	1 - 68	1 - 15	1 - 6.8

Capacitance tolerance
±20%, ±10% standard; ±5% on request.

Category temperature range
-55°C to +125°C

Rated temperature
+100°C

Voltage derating
The rated voltage should be decreased with 1.25%/°C from +100°C to +125°C and 1.5%/°C from +125°C to 175 °C.

Climatic category
55/125/21

Voltage proof
1.6 x U_R, 60s

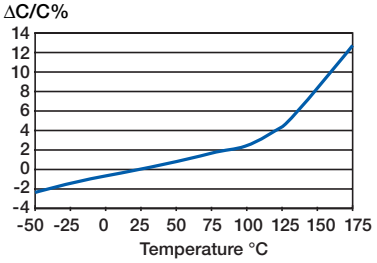
Insulation resistance
Minimum value between terminals
Measured at +20°C

	C ≤ 0.47 µF
U_R ≤ 100 V	10 000 MΩ
U_R > 100 V	30 000 MΩ

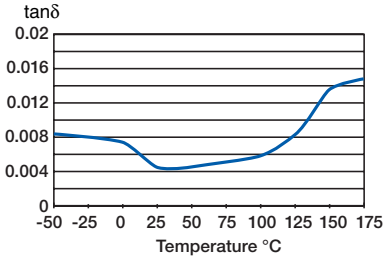
Dissipation factor
Max values at +23°C

	C ≤ 100 nF	100 nF < C ≤ 470 nF
1 kHz	0.6 %	0.6 %
10 kHz	1.0 %	1.0 %
100 kHz	2.0 %	2.5 %

Pulse rise time
The capacitors can withstand an unlimited number of pulses with a dU/dt according to article table. For voltages (U) lower than the rated voltage (U_R), the specified dU/dt can be multiplied by U_R/U.



Typical capacitance vs temperature at 1 kHz



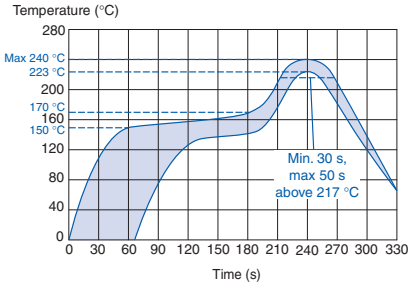
Typical dissipation factor vs temperature at 1 kHz

ORDERING INFORMATION

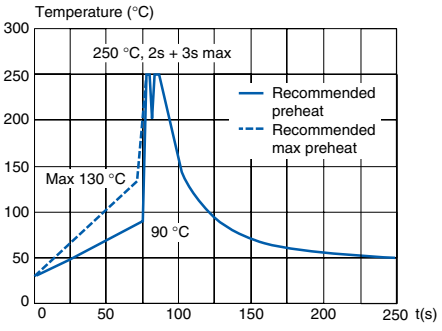
See article table and page 10 for options and article code construction.

RECOMMENDED SOLDERING CONDITIONS

Reflow soldering temperature measured on the top body surface of the component
Preheating temperature should be less than 170°C. The time above 217°C should be less than 50 s. The peak temperature must not exceed 240°C.
This series for Lead Free soldering process is partly under development. Please consult manufacturer.



Electrode temperature, Wave soldering
The recommended preheating temperature is 90 °C, max 130 °C. The peak temperature 250°C may be applied for 2 + 3 s max. Evox Rifa recommends wave soldering for GMW parts with up to H = 2 mm.



Recommended wave soldering profile

MARKING

- Rated capacitance
- Capacitance tolerance code
- Rated voltage code
- Capacitor type G for GMW
- Manufacturing date code according to IEC 60062 (year, month)

ARTICLE TABLE

63 VDC/40 VAC

CHIP LENGTH 5.7 MM CODE 2220

Capacitance µF	Size code	Dimensions in mm B ±0.4	H max	Max dU/dt V/µs	Article code
0.0010	J91	5.0	2.0	50	GMW5.7 102K63J91 TR12
0.0012	J91	5.0	2.0	50	GMW5.7 122K63J91 TR12
0.0015	J91	5.0	2.0	50	GMW5.7 152K63J91 TR12
0.0018	J91	5.0	2.0	50	GMW5.7 182K63J91 TR12
0.0022	J91	5.0	2.0	50	GMW5.7 222K63J91 TR12
0.0027	J91	5.0	2.0	50	GMW5.7 272K63J91 TR12
0.0033	J91	5.0	2.0	50	GMW5.7 332K63J91 TR12
0.0039	J91	5.0	2.0	50	GMW5.7 392K63J91 TR12
0.0047	J91	5.0	2.0	50	GMW5.7 472K63J91 TR12
0.0056	J91	5.0	2.0	50	GMW5.7 562K63J91 TR12
0.0068	J91	5.0	2.0	50	GMW5.7 682K63J91 TR12
0.0082	J91	5.0	2.0	40	GMW5.7 822K63J91 TR12
0.010	J91	5.0	2.0	40	GMW5.7 103K63J91 TR12
0.012	J91	5.0	2.0	40	GMW5.7 123K63J91 TR12
0.015	J91	5.0	2.0	40	GMW5.7 153K63J91 TR12
0.018	J91	5.0	2.0	40	GMW5.7 183K63J91 TR12
0.022	J91	5.0	2.0	40	GMW5.7 223K63J91 TR12
0.027	J91	5.0	2.0	40	GMW5.7 273K63J91 TR12
0.033	J91	5.0	2.0	40	GMW5.7 333K63J91 TR12
0.039	J91	5.0	2.0	30	GMW5.7 393K63J91 TR12
0.047	J91	5.0	2.0	30	GMW5.7 473K63J91 TR12
0.056	J91	5.0	2.0	30	GMW5.7 563K63J91 TR12
0.068	J91	5.0	2.0	30	GMW5.7 683K63J91 TR12
0.082	J91	5.0	2.0	30	GMW5.7 823K63J91 TR12
0.10	J91	5.0	2.0	30	GMW5.7 104K63J91 TR12
0.12	J91	5.0	2.0	20	GMW5.7 124K63J91 TR12
0.15	J91	5.0	2.0	20	GMW5.7 154K63J91 TR12
0.18	J91	5.0	2.0	20	GMW5.7 184K63J91 TR12
0.22	J91	5.0	2.0	20	GMW5.7 224K63J91 TR12
0.27	J91	5.0	2.0	20	GMW5.7 274K63J91 TR12
0.33	J93	5.0	3.0	20	GMW5.7 334K63J93 TR12
0.39	J93	5.0	3.0	20	GMW5.7 394K63J93 TR12
0.47	J95	5.0	4.0	20	GMW5.7 474K63J95 TR12

100 VDC/63 VAC

CHIP LENGTH 5.7 MM CODE 2220

Capacitance µF	Size code	Dimensions in mm B ±0.4	H max	Max dU/dt V/µs	Article code
0.0010	J91	5.0	2.0	50	GMW5.7 102K100J91 TR12
0.0012	J91	5.0	2.0	50	GMW5.7 122K100J91 TR12
0.0015	J91	5.0	2.0	50	GMW5.7 152K100J91 TR12
0.0018	J91	5.0	2.0	50	GMW5.7 182K100J91 TR12
0.0022	J91	5.0	2.0	50	GMW5.7 222K100J91 TR12
0.0027	J91	5.0	2.0	50	GMW5.7 272K100J91 TR12
0.0033	J91	5.0	2.0	50	GMW5.7 332K100J91 TR12
0.0039	J91	5.0	2.0	50	GMW5.7 392K100J91 TR12
0.0047	J91	5.0	2.0	50	GMW5.7 472K100J91 TR12
0.0056	J91	5.0	2.0	50	GMW5.7 562K100J91 TR12
0.0068	J91	5.0	2.0	50	GMW5.7 682K100J91 TR12
0.0082	J91	5.0	2.0	40	GMW5.7 822K100J91 TR12
0.010	J91	5.0	2.0	40	GMW5.7 103K100J91 TR12
0.012	J91	5.0	2.0	40	GMW5.7 123K100J91 TR12
0.015	J91	5.0	2.0	40	GMW5.7 153K100J91 TR12
0.018	J91	5.0	2.0	40	GMW5.7 183K100J91 TR12
0.022	J91	5.0	2.0	40	GMW5.7 223K100J91 TR12
0.027	J91	5.0	2.0	40	GMW5.7 273K100J91 TR12
0.033	J91	5.0	2.0	40	GMW5.7 333K100J91 TR12
0.039	J91	5.0	2.0	30	GMW5.7 393K100J91 TR12
0.047	J91	5.0	2.0	30	GMW5.7 473K100J91 TR12
0.056	J91	5.0	2.0	30	GMW5.7 563K100J91 TR12
0.068	J91	5.0	2.0	30	GMW5.7 683K100J91 TR12
0.082	J91	5.0	2.0	30	GMW5.7 823K100J91 TR12
0.10	J91	5.0	2.0	30	GMW5.7 104K100J91 TR12
0.12	J93	5.0	3.0	30	GMW5.7 124K100J93 TR12
0.15	J93	5.0	3.0	30	GMW5.7 154K100J93 TR12
0.18	J95	5.0	4.0	30	GMW5.7 184K100J95 TR12
0.22	J95	5.0	4.0	30	GMW5.7 224K100J95 TR12

250 VDC/160 VAC

CHIP LENGTH 5.7 MM CODE 2220

Capacitance µF	Size code	Dimensions in mm B ±0.4	H max	Max dU/dt V/µs	Article code
0.0010	J91	5.0	2.0	50	GMW5.7 102K250J91 TR12
0.0012	J91	5.0	2.0	50	GMW5.7 122K250J91 TR12
0.0015	J91	5.0	2.0	50	GMW5.7 152K250J91 TR12
0.0018	J91	5.0	2.0	50	GMW5.7 182K250J91 TR12
0.0022	J91	5.0	2.0	50	GMW5.7 222K250J91 TR12
0.0027	J91	5.0	2.0	50	GMW5.7 272K250J91 TR12
0.0033	J91	5.0	2.0	50	GMW5.7 332K250J91 TR12
0.0039	J91	5.0	2.0	50	GMW5.7 392K250J91 TR12
0.0047	J91	5.0	2.0	50	GMW5.7 472K250J91 TR12
0.0056	J91	5.0	2.0	50	GMW5.7 562K250J91 TR12
0.0068	J91	5.0	2.0	50	GMW5.7 682K250J91 TR12
0.0082	J91	5.0	2.0	40	GMW5.7 822K250J91 TR12
0.010	J91	5.0	2.0	40	GMW5.7 103K250J91 TR12
0.012	J91	5.0	2.0	40	GMW5.7 123K250J91 TR12
0.015	J91	5.0	2.0	40	GMW5.7 153K250J91 TR12
0.018	J91	5.0	2.0	40	GMW5.7 183K250J91 TR12
0.022	J91	5.0	2.0	40	GMW5.7 223K250J91 TR12
0.027	J91	5.0	2.0	40	GMW5.7 273K250J91 TR12
0.033	J91	5.0	2.0	40	GMW5.7 333K250J91 TR12
0.039	J93	5.0	3.0	40	GMW5.7 393K250J93 TR12
0.047	J93	5.0	3.0	40	GMW5.7 473K250J93 TR12
0.056	J93	5.0	3.0	40	GMW5.7 563K250J93 TR12
0.068	J95	5.0	4.0	40	GMW5.7 683K250J95 TR12

400 VDC/200 VAC

CHIP LENGTH 5.7 MM CODE 2220

Capacitance µF	Size code	Dimensions in mm B ±0.4	H max	Max dU/dt V/µs	Article code
0.0010	J91	5.0	2.0	50	GMW5.7 102K400J91 TR12
0.0012	J91	5.0	2.0	50	GMW5.7 122K400J91 TR12
0.0015	J91	5.0	2.0	50	GMW5.7 152K400J91 TR12
0.0018	J91	5.0	2.0	50	GMW5.7 182K400J91 TR12
0.0022	J91	5.0	2.0	50	GMW5.7 222K400J91 TR12
0.0027	J91	5.0	2.0	50	GMW5.7 272K400J91 TR12
0.0033	J91	5.0	2.0	50	GMW5.7 332K400J91 TR12
0.0039	J91	5.0	2.0	50	GMW5.7 392K400J91 TR12
0.0047	J91	5.0	2.0	50	GMW5.7 472K400J91 TR12
0.0056	J91	5.0	2.0	50	GMW5.7 562K400J91 TR12
0.0068	J91	5.0	2.0	50	GMW5.7 682K400J91 TR12
0.0082	J93	5.0	3.0	50	GMW5.7 822K400J93 TR12
0.010	J93	5.0	3.0	50	GMW5.7 103K400J93 TR12
0.012	J93	5.0	3.0	50	GMW5.7 123K400J93 TR12
0.015	J95	5.0	4.0	50	GMW5.7 153K400J95 TR12

ARTICLE TABLE

Capacitance µF	Size code	Dimensions in mm B ±0.4	H max	Max dU/dt V/µs	Article code
630 VDC/220 VAC					
CHIP LENGTH 5.7 MM CODE 2220					
0.0010	J91	5.0	2.0	50	GMW5.7 102K630J91 TR12
0.0012	J91	5.0	2.0	50	GMW5.7 122K630J91 TR12
0.0015	J91	5.0	2.0	50	GMW5.7 152K630J91 TR12
0.0018	J91	5.0	2.0	50	GMW5.7 182K630J91 TR12
0.0022	J91	5.0	2.0	50	GMW5.7 222K630J91 TR12
0.0027	J91	5.0	2.0	50	GMW5.7 272K630J91 TR12
0.0033	J93	5.0	3.0	50	GMW5.7 332K630J93 TR12
0.0039	J93	5.0	3.0	50	GMW5.7 392K630J93 TR12
0.0047	J95	5.0	4.0	50	GMW5.7 472K630J95 TR12
0.0056	J95	5.0	4.0	50	GMW5.7 562K630J95 TR12
0.0068	J95	5.0	4.0	50	GMW5.7 682K630J95 TR12

GPC

- **Double metallized polyethylene naphthalate (PEN) SMD**
- **According to IEC 60384-23**

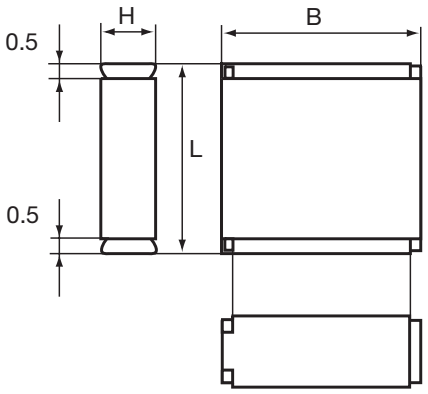
RoHS Compliant

TYPICAL APPLICATIONS

High frequency coupling and decoupling and in general high speed applications requiring high dU/dt, such as pulse operation in SMPS.

CONSTRUCTION

Film capacitor for surface mounting. Double sided metallized polyethylene naphthalate (PEN) as electrode. Clear PEN as dielectric. Rugged box encapsulation in self-extinguishing material meeting the requirements of UL 94V-0.



Components may be vertically mounted for decreased footprint. See page 20.

GENERAL DATA

Rated voltage U_R, VDC	63	100	160	250	400	630	1000
Rated voltage U_R, VAC	40	63	100	160	200	300	350
Capacitance range, nF	0.47–1000	0.47–1000	0.47–680	0.47–470	0.47–220	0.47–150	0.47–68

Capacitance values
In accordance with IEC E6 series. IEC E12 and other values on request.

Capacitance tolerance
±20%, ±10% standard; other tolerances on request.

Category temperature range
-55°C to +125°C

Rated temperature
+100°C

Voltage derating
The rated voltage should be decreased with 1.25%/°C from +100°C to +125°C and 1.5%/°C from +125°C to 175 °C.

Climatic category
55/125/56

Voltage proof
1.6 x U_R, 60s

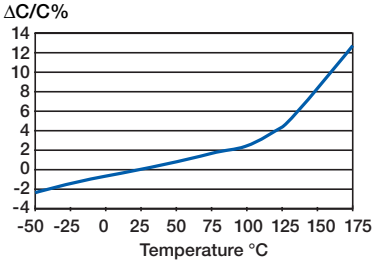
Insulation resistance
Minimum value between terminals
Measured at +20°C

	C ≤ 0.33 µF	C > 0.33 µF
U_R ≤ 100 V	10 000 MΩ	5000 s
U_R > 100 V	30 000 MΩ	10 000 s

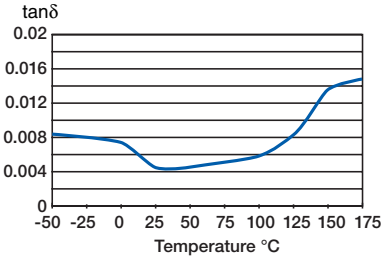
Dissipation factor
Max values at +23°C

	C ≤ 100 nF	100 nF < C ≤ 1µF	C > 1µF
1 kHz	0.6%	0.6%	0.6%
10 kHz	1.0%	1.0%	1.2%
100 kHz	2.0%	2.5%	

Pulse rise time
The capacitors can withstand an unlimited number of pulses with a dU/dt according to article table. For voltages (U) lower than the rated voltage (U_R), the specified dU/dt can be multiplied by U_R/U.



Typical capacitance vs temperature at 1 kHz



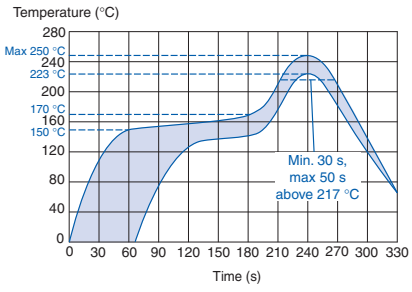
Typical dissipation factor vs temperature at 1 kHz

ORDERING INFORMATION

See article table and page 10 for options and article code construction.

RECOMMENDED SOLDERING CONDITIONS

Reflow soldering temperature measured on the top body surface of the component
Preheating temperature should be less than 170°C. The time above 217°C should be less than 50 s. The peak temperature must not exceed 250°C.



MARKING

- Rated capacitance
- Capacitance tolerance code
- Rated voltage code
- Capacitor type P for GPC
- Manufacturing date code according to IEC 60062 (year, month)

See also page 18.

ARTICLE TABLE

63 VDC/40 VAC

CHIP LENGTH 7.3 MM CODE 2824

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.00047	K31	6.0	2.5	400	GPC7.3 471K63K31 TR12
0.00068	K31	6.0	2.5	400	GPC7.3 681K63K31 TR12
0.0010	K31	6.0	2.5	400	GPC7.3 102K63K31 TR12
0.0015	K31	6.0	2.5	400	GPC7.3 152K63K31 TR12
0.0022	K31	6.0	2.5	400	GPC7.3 222K63K31 TR12
0.0033	K31	6.0	2.5	400	GPC7.3 332K63K31 TR12
0.0047	K31	6.0	2.5	400	GPC7.3 472K63K31 TR12
0.0068	K31	6.0	2.5	400	GPC7.3 682K63K31 TR12
0.010	K31	6.0	2.5	400	GPC7.3 103K63K31 TR12
0.015	K31	6.0	2.5	400	GPC7.3 153K63K31 TR12
0.022	K31	6.0	2.5	400	GPC7.3 223K63K31 TR12
0.033	K33	6.0	3.0	400	GPC7.3 333K63K33 TR12
0.047	K33	6.0	3.0	400	GPC7.3 473K63K33 TR12
0.068	K35	6.0	3.5	400	GPC7.3 683K63K35 TR12
0.10	K37	6.0	4.5	400	GPC7.3 104K63K37 TR12

CHIP LENGTH 10.2 MM CODE 4036

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.0068	A31	9.1	5.5	300	GPC10.2 682K63A31 TR16
0.010	A31	9.1	5.5	300	GPC10.2 103K63A31 TR16
0.015	A31	9.1	5.5	300	GPC10.2 153K63A31 TR16
0.022	A31	9.1	5.5	300	GPC10.2 223K63A31 TR16
0.027	A31	9.1	5.5	300	GPC10.2 273K63A31 TR16
0.033	A31	9.1	5.5	300	GPC10.2 333K63A31 TR16
0.047	A31	9.1	5.5	300	GPC10.2 473K63A31 TR16
0.068	A31	9.1	5.5	300	GPC10.2 683K63A31 TR16
0.10	A31	9.1	5.5	300	GPC10.2 104K63A31 TR16
0.15	A31	9.1	5.5	300	GPC10.2 154K63A31 TR16
0.22	A31	9.1	5.5	300	GPC10.2 224K63A31 TR16
0.33	A31	9.1	5.5	300	GPC10.2 334K63A31 TR16

CHIP LENGTH 12.7 MM CODE 5045

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.47	B31	11.5	6.5	200	GPC12.7 474K63B31 TR24

CHIP LENGTH 16.5 MM CODE 6560

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.68	C31	15.0	7.0	100	GPC16.5 684K63C31 TR24
1.0	C31	15.0	7.0	100	GPC16.5 105K63C31 TR24

100 VDC/63 VAC

CHIP LENGTH 7.3 MM CODE 2824

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.00047	K31	6.0	2.5	800	GPC7.3 471K100K31 TR12
0.00068	K31	6.0	2.5	800	GPC7.3 681K100K31 TR12
0.0010	K31	6.0	2.5	800	GPC7.3 102K100K31 TR12
0.0015	K31	6.0	2.5	800	GPC7.3 152K100K31 TR12
0.0022	K31	6.0	2.5	800	GPC7.3 222K100K31 TR12
0.0033	K31	6.0	2.5	800	GPC7.3 332K100K31 TR12
0.0047	K31	6.0	2.5	800	GPC7.3 472K100K31 TR12
0.0068	K31	6.0	2.5	800	GPC7.3 682K100K31 TR12
0.010	K31	6.0	2.5	800	GPC7.3 103K100K31 TR12
0.015	K33	6.0	3.0	800	GPC7.3 153K100K33 TR12
0.022	K33	6.0	3.0	800	GPC7.3 223K100K33 TR12
0.033	K35	6.0	3.5	800	GPC7.3 333K100K35 TR12
0.047	K37	6.0	4.5	800	GPC7.3 473K100K37 TR12

CHIP LENGTH 10.2 MM CODE 4036

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.0068	A31	9.1	5.5	600	GPC10.2 682K100A31 TR16
0.010	A31	9.1	5.5	600	GPC10.2 103K100A31 TR16
0.015	A31	9.1	5.5	600	GPC10.2 153K100A31 TR16
0.022	A31	9.1	5.5	600	GPC10.2 223K100A31 TR16
0.027	A31	9.1	5.5	600	GPC10.2 273K100A31 TR16
0.033	A31	9.1	5.5	600	GPC10.2 333K100A31 TR16
0.047	A31	9.1	5.5	600	GPC10.2 473K100A31 TR16
0.068	A31	9.1	5.5	600	GPC10.2 683K100A31 TR16
0.10	A31	9.1	5.5	600	GPC10.2 104K100A31 TR16
0.15	A31	9.1	5.5	600	GPC10.2 154K100A31 TR16

CHIP LENGTH 12.7 MM CODE 5045

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.22	B31	11.5	6.5	400	GPC12.7 224K100B31 TR24
0.33	B31	11.5	6.5	400	GPC12.7 334K100B31 TR24

CHIP LENGTH 16.5 MM CODE 6560

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.47	C31	15.0	7.0	150	GPC16.5 474K100C31 TR24
0.68	C31	15.0	7.0	150	GPC16.5 684K100C31 TR24
1.0	C31	15.0	7.0	150	GPC16.5 105K100C31 TR24

160 VDC/100 VAC

CHIP LENGTH 7.3 MM CODE 2824

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.00047	K31	6.0	2.5	1000	GPC7.3 471K160K31 TR12
0.00068	K31	6.0	2.5	1000	GPC7.3 681K160K31 TR12
0.0010	K31	6.0	2.5	1000	GPC7.3 102K160K31 TR12
0.0015	K31	6.0	2.5	1000	GPC7.3 152K160K31 TR12
0.0022	K31	6.0	2.5	1000	GPC7.3 222K160K31 TR12
0.0033	K31	6.0	2.5	1000	GPC7.3 332K160K31 TR12
0.0047	K31	6.0	2.5	1000	GPC7.3 472K160K31 TR12
0.0068	K31	6.0	2.5	1000	GPC7.3 682K160K31 TR12
0.010	K33	6.0	3.0	1000	GPC7.3 103K160K33 TR12
0.015	K33	6.0	3.0	1000	GPC7.3 153K160K33 TR12
0.022	K35	6.0	3.5	1000	GPC7.3 223K160K35 TR12
0.033	K37	6.0	4.5	1000	GPC7.3 333K160K37 TR12

CHIP LENGTH 10.2 MM CODE 4036

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.0068	A31	9.1	5.5	800	GPC10.2 682K160A31 TR16
0.010	A31	9.1	5.5	800	GPC10.2 103K160A31 TR16
0.015	A31	9.1	5.5	800	GPC10.2 153K160A31 TR16
0.022	A31	9.1	5.5	800	GPC10.2 223K160A31 TR16
0.027	A31	9.1	5.5	800	GPC10.2 273K160A31 TR16
0.033	A31	9.1	5.5	800	GPC10.2 333K160A31 TR16
0.047	A31	9.1	5.5	800	GPC10.2 473K160A31 TR16
0.068	A31	9.1	5.5	800	GPC10.2 683K160A31 TR16
0.10	A31	9.1	5.5	800	GPC10.2 104K160A31 TR16

CHIP LENGTH 12.7 MM CODE 5045

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.15	B31	11.5	6.5	600	GPC12.7 154K160B31 TR24
0.22	B31	11.5	6.5	600	GPC12.7 224K160B31 TR24

CHIP LENGTH 16.5 MM CODE 6560

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.33	C31	15.0	7.0	250	GPC16.5 334K160C31 TR24
0.47	C31	15.0	7.0	250	GPC16.5 474K160C31 TR24
0.68	C31	15.0	7.0	250	GPC16.5 684K160C31 TR24

ARTICLE TABLE

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
250 VDC/160 VAC					
CHIP LENGTH 7.3 MM CODE 2824					
0.00047	K31	6.0	2.5	1200	GPC7.3 471K250K31 TR12
0.00068	K31	6.0	2.5	1200	GPC7.3 681K250K31 TR12
0.0010	K31	6.0	2.5	1200	GPC7.3 102K250K31 TR12
0.0015	K31	6.0	2.5	1200	GPC7.3 152K250K31 TR12
0.0022	K31	6.0	2.5	1200	GPC7.3 222K250K31 TR12
0.0033	K31	6.0	2.5	1200	GPC7.3 332K250K31 TR12
0.0047	K31	6.0	2.5	1200	GPC7.3 472K250K31 TR12
0.0068	K33	6.0	3.0	1200	GPC7.3 682K250K33 TR12
0.010	K33	6.0	3.0	1200	GPC7.3 103K250K33 TR12
0.015	K35	6.0	3.5	1200	GPC7.3 153K250K35 TR12
0.022	K37	6.0	4.5	1200	GPC7.3 223K250K37 TR12
CHIP LENGTH 10.2 MM CODE 4036					
0.0068	A31	9.1	5.5	1000	GPC10.2 682K250A31 TR16
0.010	A31	9.1	5.5	1000	GPC10.2 103K250A31 TR16
0.015	A31	9.1	5.5	1000	GPC10.2 153K250A31 TR16
0.022	A31	9.1	5.5	1000	GPC10.2 223K250A31 TR16
0.027	A31	9.1	5.5	1000	GPC10.2 273K250A31 TR16
0.033	A31	9.1	5.5	1000	GPC10.2 333K250A31 TR16
0.047	A31	9.1	5.5	1000	GPC10.2 473K250A31 TR16
0.068	A31	9.1	5.5	1000	GPC10.2 683K250A31 TR16
CHIP LENGTH 12.7 MM CODE 5045					
0.10	B31	11.5	6.5	700	GPC12.7 104K250B31 TR24
0.15	B31	11.5	6.5	700	GPC12.7 154K250B31 TR24
CHIP LENGTH 16.5 MM CODE 6560					
0.22	C31	15.0	7.0	350	GPC16.5 224K250C31 TR24
0.33	C31	15.0	7.0	350	GPC16.5 334K250C31 TR24
0.47	C31	15.0	7.0	350	GPC16.5 474K250C31 TR24
400 VDC/200 VAC					
CHIP LENGTH 7.3 MM CODE 2824					
0.00047	K31	6.0	2.5	1600	GPC7.3 471K400K31 TR12
0.00068	K31	6.0	2.5	1600	GPC7.3 681K400K31 TR12
0.0010	K31	6.0	2.5	1600	GPC7.3 102K400K31 TR12
0.0015	K31	6.0	2.5	1600	GPC7.3 152K400K31 TR12
0.0022	K31	6.0	2.5	1600	GPC7.3 222K400K31 TR12
0.0033	K31	6.0	2.5	1600	GPC7.3 332K400K31 TR12
0.0047	K33	6.0	3.0	1600	GPC7.3 472K400K33 TR12
0.0068	K35	6.0	3.5	1600	GPC7.3 682K400K35 TR12
0.010	K37	6.0	4.5	1600	GPC7.3 103K400K37 TR12
CHIP LENGTH 10.2 MM CODE 4036					
0.0068	A31	9.1	5.5	1300	GPC10.2 682K400A31 TR16
0.010	A31	9.1	5.5	1300	GPC10.2 103K400A31 TR16
0.015	A31	9.1	5.5	1300	GPC10.2 153K400A31 TR16
0.022	A31	9.1	5.5	1300	GPC10.2 223K400A31 TR16
0.027	A31	9.1	5.5	1300	GPC10.2 273K400A31 TR16
CHIP LENGTH 12.7 MM CODE 5045					
0.033	B31	11.5	6.5	900	GPC12.7 333K400B31 TR24
0.047	B31	11.5	6.5	900	GPC12.7 473K400B31 TR24
0.068	B31	11.5	6.5	900	GPC12.7 683K400B31 TR24
400 VDC/200 VAC					
CHIP LENGTH 16.5 MM CODE 6560					
0.10	C31	15.0	7.0	450	GPC16.5 104K400C31 TR24
0.15	C31	15.0	7.0	450	GPC16.5 154K400C31 TR24
0.22	C31	15.0	7.0	450	GPC16.5 224K400C31 TR24
630 VDC/300 VAC					
CHIP LENGTH 7.3 MM CODE 2824					
0.00047	K31	6.0	2.5	2000	GPC7.3 471K630K31 TR12
0.00068	K31	6.0	2.5	2000	GPC7.3 681K630K31 TR12
0.0010	K31	6.0	2.5	2000	GPC7.3 102K630K31 TR12
0.0015	K31	6.0	2.5	2000	GPC7.3 152K630K31 TR12
0.0022	K33	6.0	3.0	2000	GPC7.3 222K630K33 TR12
0.0033	K33	6.0	3.0	2000	GPC7.3 332K630K33 TR12
0.0047	K35	6.0	3.5	2000	GPC7.3 472K630K35 TR12
0.0068	K37	6.0	4.5	2000	GPC7.3 682K630K37 TR12
CHIP LENGTH 10.2 MM CODE 4036					
0.0068	A31	9.1	5.5	1600	GPC10.2 682K630A31 TR16
0.010	A31	9.1	5.5	1600	GPC10.2 103K630A31 TR16
0.015	A31	9.1	5.5	1600	GPC10.2 153K630A31 TR16
0.022	A31	9.1	5.5	1600	GPC10.2 223K630A31 TR16
CHIP LENGTH 12.7 MM CODE 5045					
0.033	B31	11.5	6.5	1100	GPC12.7 333K630B31 TR24
0.047	B31	11.5	6.5	1100	GPC12.7 473K630B31 TR24
CHIP LENGTH 16.5 MM CODE 6560					
0.068	C31	15.0	7.0	550	GPC16.5 683K630C31 TR24
0.10	C31	15.0	7.0	550	GPC16.5 104K630C31 TR24
1000 VDC/350 VAC					
CHIP LENGTH 7.3 MM CODE 2824					
0.00047	K31	6.0	2.5	2200	GPC7.3 471K1000K31 TR12
0.00068	K31	6.0	2.5	2200	GPC7.3 681K1000K31 TR12
0.0010	K31	6.0	2.5	2200	GPC7.3 102K1000K31 TR12
0.0015	K33	6.0	3.0	2200	GPC7.3 152K1000K33 TR12
0.0022	K33	6.0	3.0	2200	GPC7.3 222K1000K33 TR12
0.0033	K35	6.0	3.5	2200	GPC7.3 332K1000K35 TR12
0.0047	K37	6.0	4.5	2200	GPC7.3 472K1000K37 TR12
CHIP LENGTH 10.2 MM CODE 4036					
0.0068	A31	9.1	5.5	1700	GPC10.2 682K1000A31 TR16
0.010	A31	9.1	5.5	1700	GPC10.2 103K1000A31 TR16
0.015	A31	9.1	5.5	1700	GPC10.2 153K1000A31 TR16
CHIP LENGTH 12.7 MM CODE 5045					
0.022	B31	11.5	6.5	1200	GPC12.7 223K1000B31 TR24
0.033	B31	11.5	6.5	1200	GPC12.7 333K1000B31 TR24
CHIP LENGTH 16.5 MM CODE 6560					
0.047	C31	15.0	7.0	600	GPC16.5 473K1000C31 TR24
0.068	C31	15.0	7.0	600	GPC16.5 683K1000C31 TR24

SMC

- **Metallized polyphenylene sulphide (PPS) SMD**
- **According to IEC 60384-20**

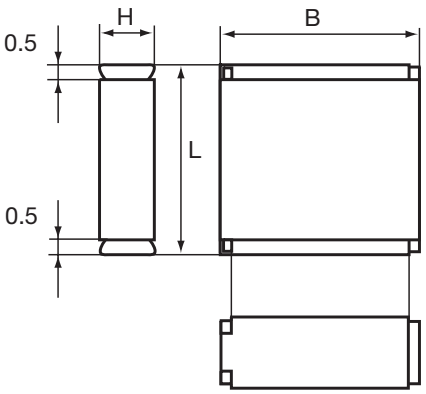
RoHS Compliant

TYPICAL APPLICATIONS

Timing, filtering. Memory capacitor. High stability and accuracy. High temperature use.

CONSTRUCTION

Polyphenylene sulphide (PPS) film capacitor for surface mounting. Encapsulation in self-extinguishing material meeting the requirements of UL 94V-0.



Components may be vertically mounted for decreased footprint. See page 20.

TECHNICAL DATA

Rated voltage U_R, VDC	50	100	250	400
Rated voltage U_R, VAC	30	63	160	200
Capacitance range, nF	1 - 3300	1 - 1500	1 - 470	1 - 220

Capacitance tolerance
±5%, ±2.5%, ±2% other tolerances on request.

Category temperature range
-55°C to +125°C

Rated temperature
+100°C

Voltage derating
The rated voltage should be decreased with 1.5%/°C from +125°C to 175°C. No derating from +100°C to +125°C.

Climatic category
55/125/56

Voltage proof
1.6 x U_R, 60s

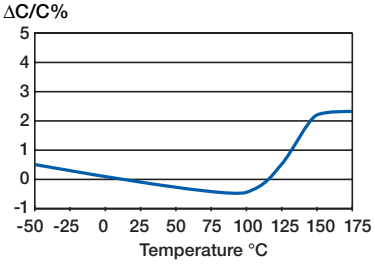
Insulation resistance
Minimum value between terminals
Measured at +20°C according to IEC 60384-20.

	C ≤ 0.33µF	C > 0.33µF
U_R ≤ 100 V	15 000 MΩ	5 000 s
U_R > 100 V	30 000 MΩ	10 000 s

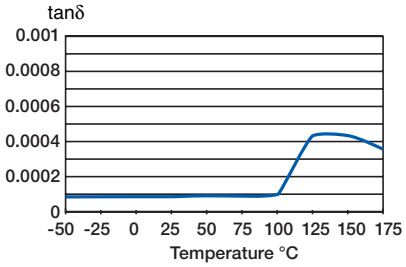
Dissipation factor
Max values at +23°C

	C ≤ 100nF	100nF < C ≤ 1µF	C > 1µF
1 kHz	0.15 %	0.15 %	0.15 %
10 kHz	0.25 %	0.25 %	0.30 %
100 kHz	0.50 %	0.60 %	

Pulse rise time
The capacitors can withstand an unlimited number of pulses with a dU/dt according to article table. For voltages (U) lower than the rated voltage (U_R), the specified dU/dt can be multiplied by U_R/U.



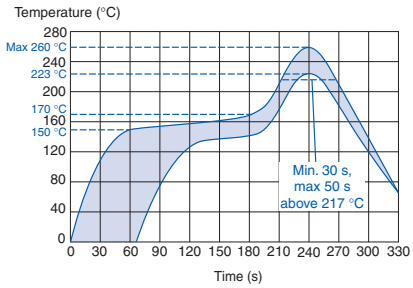
Typical capacitance vs temperature at 1 kHz



Typical dissipation factor vs temperature at 1 kHz

RECOMMENDED SOLDERING CONDITIONS

Reflow soldering temperature measured on the top body surface of the component
Preheating temperature should be less than 170°C. The time above 217°C should be less than 50 s. The peak temperature must not exceed 260°C.



MARKING

- Rated capacitance
- Capacitance tolerance code
- Rated voltage code
- Capacitor type S for SMC
- Manufacturing date code according to IEC 60062 (year, month)

See also page 18.

ORDERING INFORMATION

See article table and page 10 for options and article code construction.

ARTICLE TABLE

50 VDC/30 VAC

CHIP LENGTH 5.7 MM CODE 2220

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.0010	J31	5.0	2.5	20	SMC5.7 102J50J31 TR12
0.0012	J31	5.0	2.5	20	SMC5.7 122J50J31 TR12
0.0015	J31	5.0	2.5	20	SMC5.7 152J50J31 TR12
0.0018	J31	5.0	2.5	20	SMC5.7 182J50J31 TR12
0.0022	J31	5.0	2.5	20	SMC5.7 222J50J31 TR12
0.0027	J31	5.0	2.5	20	SMC5.7 272J50J31 TR12
0.0033	J31	5.0	2.5	20	SMC5.7 332J50J31 TR12
0.0039	J31	5.0	2.5	20	SMC5.7 392J50J31 TR12
0.0047	J31	5.0	2.5	20	SMC5.7 472J50J31 TR12
0.0056	J31	5.0	2.5	20	SMC5.7 562J50J31 TR12
0.0068	J31	5.0	2.5	20	SMC5.7 682J50J31 TR12
0.0082	J31	5.0	2.5	20	SMC5.7 822J50J31 TR12
0.010	J31	5.0	2.5	20	SMC5.7 103J50J31 TR12
0.012	J31	5.0	2.5	20	SMC5.7 123J50J31 TR12
0.015	J31	5.0	2.5	15	SMC5.7 153J50J31 TR12
0.018	J31	5.0	2.5	15	SMC5.7 183J50J31 TR12
0.022	J31	5.0	2.5	15	SMC5.7 223J50J31 TR12
0.027	J31	5.0	2.5	15	SMC5.7 273J50J31 TR12
0.033	J31	5.0	2.5	15	SMC5.7 333J50J31 TR12
0.039	J33	5.0	3.0	6	SMC5.7 393J50J33 TR12
0.047	J33	5.0	3.0	6	SMC5.7 473J50J33 TR12
0.056	J35	5.0	4.0	6	SMC5.7 563J50J35 TR12
0.068	J35	5.0	4.0	6	SMC5.7 683J50J35 TR12
0.082	J35	5.0	4.0	6	SMC5.7 823J50J35 TR12
0.10	J35	5.0	4.0	6	SMC5.7 104J50J35 TR12

CHIP LENGTH 7.3 MM CODE 2824

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.0010	K31	6.0	2.5	20	SMC7.3 102J50K31 TR12
0.0012	K31	6.0	2.5	20	SMC7.3 122J50K31 TR12
0.0015	K31	6.0	2.5	20	SMC7.3 152J50K31 TR12
0.0018	K31	6.0	2.5	20	SMC7.3 182J50K31 TR12
0.0022	K31	6.0	2.5	20	SMC7.3 222J50K31 TR12
0.0027	K31	6.0	2.5	20	SMC7.3 272J50K31 TR12
0.0033	K31	6.0	2.5	20	SMC7.3 332J50K31 TR12
0.0039	K31	6.0	2.5	20	SMC7.3 392J50K31 TR12
0.0047	K31	6.0	2.5	20	SMC7.3 472J50K31 TR12
0.0056	K31	6.0	2.5	20	SMC7.3 562J50K31 TR12
0.0068	K31	6.0	2.5	20	SMC7.3 682J50K31 TR12
0.0082	K31	6.0	2.5	20	SMC7.3 822J50K31 TR12
0.010	K31	6.0	2.5	20	SMC7.3 103J50K31 TR12
0.012	K31	6.0	2.5	20	SMC7.3 123J50K31 TR12
0.015	K31	6.0	2.5	20	SMC7.3 153J50K31 TR12
0.018	K31	6.0	2.5	20	SMC7.3 183J50K31 TR12
0.022	K31	6.0	2.5	20	SMC7.3 223J50K31 TR12
0.027	K31	6.0	2.5	20	SMC7.3 273J50K31 TR12
0.033	K31	6.0	2.5	15	SMC7.3 333J50K31 TR12
0.039	K31	6.0	2.5	15	SMC7.3 393J50K31 TR12
0.047	K31	6.0	2.5	15	SMC7.3 473J50K31 TR12
0.056	K31	6.0	2.5	15	SMC7.3 563J50K31 TR12
0.068	K31	6.0	2.5	15	SMC7.3 683J50K31 TR12
0.082	K33	6.0	3.0	6	SMC7.3 823J50K33 TR12
0.10	K33	6.0	3.0	6	SMC7.3 104J50K33 TR12
0.12	K35	6.0	3.5	6	SMC7.3 124J50K35 TR12
0.15	K35	6.0	3.5	6	SMC7.3 154J50K35 TR12
0.18	K35	6.0	3.5	6	SMC7.3 184J50K35 TR12
0.22	K37	6.0	4.5	6	SMC7.3 224J50K37 TR12

50 VDC/30 VAC

CHIP LENGTH 10.2 MM CODE 4036

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.010	A31	9.1	5.5	4	SMC10.2 103J50A31 TR16
0.012	A31	9.1	5.5	4	SMC10.2 123J50A31 TR16
0.015	A31	9.1	5.5	4	SMC10.2 153J50A31 TR16
0.018	A31	9.1	5.5	4	SMC10.2 183J50A31 TR16
0.022	A31	9.1	5.5	4	SMC10.2 223J50A31 TR16
0.027	A31	9.1	5.5	4	SMC10.2 273J50A31 TR16
0.033	A31	9.1	5.5	4	SMC10.2 333J50A31 TR16
0.039	A31	9.1	5.5	4	SMC10.2 393J50A31 TR16
0.047	A31	9.1	5.5	4	SMC10.2 473J50A31 TR16
0.056	A31	9.1	5.5	4	SMC10.2 563J50A31 TR16
0.068	A31	9.1	5.5	4	SMC10.2 683J50A31 TR16
0.082	A31	9.1	5.5	4	SMC10.2 823J50A31 TR16
0.10	A31	9.1	5.5	4	SMC10.2 104J50A31 TR16
0.12	A31	9.1	5.5	4	SMC10.2 124J50A31 TR16
0.15	A31	9.1	5.5	4	SMC10.2 154J50A31 TR16
0.18	A31	9.1	5.5	4	SMC10.2 184J50A31 TR16
0.22	A31	9.1	5.5	4	SMC10.2 224J50A31 TR16
0.27	A31	9.1	5.5	4	SMC10.2 274J50A31 TR16
0.33	A31	9.1	5.5	4	SMC10.2 334J50A31 TR16
0.39	A31	9.1	5.5	4	SMC10.2 394J50A31 TR16
0.47	A31	9.1	5.5	4	SMC10.2 474J50A31 TR16
0.56	A31	9.1	5.5	4	SMC10.2 564J50A31 TR16
0.68	A31	9.1	5.5	4	SMC10.2 684J50A31 TR16
0.82	A31	9.1	5.5	4	SMC10.2 824J50A31 TR16

CHIP LENGTH 12.7 MM CODE 5045

1.0	B31	11.5	6.5	3	SMC12.7 105J50B31 TR24
1.2	B31	11.5	6.5	3	SMC12.7 125J50B31 TR24
1.5	B31	11.5	6.5	3	SMC12.7 155J50B31 TR24

CHIP LENGTH 16.5 MM CODE 6560

1.8	C31	15.0	7.0	2	SMC16.5 185J50C31 TR24
2.2	C31	15.0	7.0	2	SMC16.5 225J50C31 TR24
2.7	C31	15.0	7.0	2	SMC16.5 275J50C31 TR24
3.3	C31	15.0	7.0	2	SMC16.5 335J50C31 TR24

100 VDC/63 VAC

CHIP LENGTH 5.7 MM CODE 2220

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.0010	J31	5.0	2.5	20	SMC5.7 102J100J31 TR12
0.0012	J31	5.0	2.5	20	SMC5.7 122J100J31 TR12
0.0015	J31	5.0	2.5	20	SMC5.7 152J100J31 TR12
0.0018	J31	5.0	2.5	20	SMC5.7 182J100J31 TR12
0.0022	J31	5.0	2.5	20	SMC5.7 222J100J31 TR12
0.0027	J31	5.0	2.5	20	SMC5.7 272J100J31 TR12
0.0033	J31	5.0	2.5	20	SMC5.7 332J100J31 TR12
0.0039	J31	5.0	2.5	20	SMC5.7 392J100J31 TR12
0.0047	J31	5.0	2.5	20	SMC5.7 472J100J31 TR12
0.0056	J31	5.0	2.5	20	SMC5.7 562J100J31 TR12
0.0068	J31	5.0	2.5	20	SMC5.7 682J100J31 TR12
0.0082	J31	5.0	2.5	20	SMC5.7 822J100J31 TR12
0.010	J31	5.0	2.5	20	SMC5.7 103J100J31 TR12
0.012	J31	5.0	2.5	20	SMC5.7 123J100J31 TR12
0.015	J31	5.0	2.5	15	SMC5.7 153J100J31 TR12
0.018	J33	5.0	3.0	15	SMC5.7 183J100J33 TR12
0.022	J33	5.0	3.0	15	SMC5.7 223J100J33 TR12
0.027	J35	5.0	4.0	15	SMC5.7 273J100J35 TR12
0.033	J35	5.0	4.0	15	SMC5.7 333J100J35 TR12

ARTICLE TABLE

100 VDC/63 VAC

CHIP LENGTH 7.3 MM CODE 2824

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.0010	K31	6.0	2.5	20	SMC7.3 102J100K31 TR12
0.0012	K31	6.0	2.5	20	SMC7.3 122J100K31 TR12
0.0015	K31	6.0	2.5	20	SMC7.3 152J100K31 TR12
0.0018	K31	6.0	2.5	20	SMC7.3 182J100K31 TR12
0.0022	K31	6.0	2.5	20	SMC7.3 222J100K31 TR12
0.0027	K31	6.0	2.5	20	SMC7.3 272J100K31 TR12
0.0033	K31	6.0	2.5	20	SMC7.3 332J100K31 TR12
0.0039	K31	6.0	2.5	20	SMC7.3 392J100K31 TR12
0.0047	K31	6.0	2.5	20	SMC7.3 472J100K31 TR12
0.0056	K31	6.0	2.5	20	SMC7.3 562J100K31 TR12
0.0068	K31	6.0	2.5	20	SMC7.3 682J100K31 TR12
0.0082	K31	6.0	2.5	20	SMC7.3 822J100K31 TR12
0.010	K31	6.0	2.5	20	SMC7.3 103J100K31 TR12
0.012	K31	6.0	2.5	20	SMC7.3 123J100K31 TR12
0.015	K31	6.0	2.5	20	SMC7.3 153J100K31 TR12
0.018	K31	6.0	2.5	20	SMC7.3 183J100K31 TR12
0.022	K31	6.0	2.5	20	SMC7.3 223J100K31 TR12
0.027	K33	6.0	3.0	15	SMC7.3 273J100K33 TR12
0.033	K33	6.0	3.0	15	SMC7.3 333J100K33 TR12
0.039	K35	6.0	3.5	15	SMC7.3 393J100K35 TR12
0.047	K35	6.0	3.5	15	SMC7.3 473J100K35 TR12
0.056	K37	6.0	4.5	15	SMC7.3 563J100K37 TR12
0.068	K37	6.0	4.5	15	SMC7.3 683J100K37 TR12

CHIP LENGTH 10.2 MM CODE 4036

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.010	A31	9.1	5.5	6	SMC10.2 103J100A31 TR16
0.012	A31	9.1	5.5	6	SMC10.2 123J100A31 TR16
0.015	A31	9.1	5.5	6	SMC10.2 153J100A31 TR16
0.018	A31	9.1	5.5	6	SMC10.2 183J100A31 TR16
0.022	A31	9.1	5.5	6	SMC10.2 223J100A31 TR16
0.027	A31	9.1	5.5	6	SMC10.2 273J100A31 TR16
0.033	A31	9.1	5.5	6	SMC10.2 333J100A31 TR16
0.039	A31	9.1	5.5	6	SMC10.2 393J100A31 TR16
0.047	A31	9.1	5.5	6	SMC10.2 473J100A31 TR16
0.056	A31	9.1	5.5	6	SMC10.2 563J100A31 TR16
0.068	A31	9.1	5.5	6	SMC10.2 683J100A31 TR16
0.082	A31	9.1	5.5	6	SMC10.2 823J100A31 TR16
0.10	A31	9.1	5.5	6	SMC10.2 104J100A31 TR16
0.12	A31	9.1	5.5	6	SMC10.2 124J100A31 TR16
0.15	A31	9.1	5.5	6	SMC10.2 154J100A31 TR16
0.18	A31	9.1	5.5	6	SMC10.2 184J100A31 TR16
0.22	A31	9.1	5.5	6	SMC10.2 224J100A31 TR16
0.27	A31	9.1	5.5	6	SMC10.2 274J100A31 TR16

CHIP LENGTH 12.7 MM CODE 5045

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.33	B31	11.5	6.5	5	SMC12.7 334J100B31 TR24
0.39	B31	11.5	6.5	5	SMC12.7 394J100B31 TR24
0.47	B31	11.5	6.5	5	SMC12.7 474J100B31 TR24
0.56	B31	11.5	6.5	5	SMC12.7 564J100B31 TR24

CHIP LENGTH 16.5 MM CODE 6560

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.68	C31	15.0	7.0	3	SMC16.5 684J100C31 TR24
0.82	C31	15.0	7.0	3	SMC16.5 824J100C31 TR24
1.0	C31	15.0	7.0	3	SMC16.5 105J100C31 TR24
1.2	C31	15.0	7.0	3	SMC16.5 125J100C31 TR24
1.5	C31	15.0	7.0	3	SMC16.5 155J100C31 TR24

250 VDC/160 VAC

CHIP LENGTH 5.7 MM CODE 2220

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.0010	J31	5.0	2.5	20	SMC5.7 102J250J31 TR12
0.0012	J31	5.0	2.5	20	SMC5.7 122J250J31 TR12
0.0015	J31	5.0	2.5	20	SMC5.7 152J250J31 TR12
0.0018	J31	5.0	2.5	20	SMC5.7 182J250J31 TR12
0.0022	J31	5.0	2.5	20	SMC5.7 222J250J31 TR12
0.0027	J31	5.0	2.5	20	SMC5.7 272J250J31 TR12
0.0033	J31	5.0	2.5	20	SMC5.7 332J250J31 TR12
0.0039	J31	5.0	2.5	20	SMC5.7 392J250J31 TR12
0.0047	J31	5.0	2.5	20	SMC5.7 472J250J31 TR12
0.0056	J33	5.0	3.0	20	SMC5.7 562J250J33 TR12
0.0068	J33	5.0	3.0	20	SMC5.7 682J250J33 TR12
0.0082	J35	5.0	4.0	20	SMC5.7 822J250J35 TR12
0.010	J35	5.0	4.0	20	SMC5.7 103J250J35 TR12

CHIP LENGTH 7.3 MM CODE 2824

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.0010	K31	6.0	2.5	20	SMC7.3 102J250K31 TR12
0.0012	K31	6.0	2.5	20	SMC7.3 122J250K31 TR12
0.0015	K31	6.0	2.5	20	SMC7.3 152J250K31 TR12
0.0018	K31	6.0	2.5	20	SMC7.3 182J250K31 TR12
0.0022	K31	6.0	2.5	20	SMC7.3 222J250K31 TR12
0.0027	K31	6.0	2.5	20	SMC7.3 272J250K31 TR12
0.0033	K31	6.0	2.5	20	SMC7.3 332J250K31 TR12
0.0039	K31	6.0	2.5	20	SMC7.3 392J250K31 TR12
0.0047	K31	6.0	2.5	20	SMC7.3 472J250K31 TR12
0.0056	K31	6.0	2.5	20	SMC7.3 562J250K31 TR12
0.0068	K31	6.0	2.5	20	SMC7.3 682J250K31 TR12
0.0082	K31	6.0	2.5	20	SMC7.3 822J250K31 TR12
0.010	K33	6.0	3.0	20	SMC7.3 103J250K33 TR12
0.012	K33	6.0	3.0	20	SMC7.3 123J250K33 TR12
0.015	K33	6.0	3.0	20	SMC7.3 153J250K33 TR12
0.018	K35	6.0	3.5	20	SMC7.3 183J250K35 TR12
0.022	K35	6.0	3.5	20	SMC7.3 223J250K35 TR12

CHIP LENGTH 10.2 MM CODE 4036

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.010	A31	9.1	5.5	10	SMC10.2 103J250A31 TR16
0.012	A31	9.1	5.5	10	SMC10.2 123J250A31 TR16
0.015	A31	9.1	5.5	10	SMC10.2 153J250A31 TR16
0.018	A31	9.1	5.5	10	SMC10.2 183J250A31 TR16
0.022	A31	9.1	5.5	10	SMC10.2 223J250A31 TR16
0.027	A31	9.1	5.5	10	SMC10.2 273J250A31 TR16
0.033	A31	9.1	5.5	10	SMC10.2 333J250A31 TR16
0.039	A31	9.1	5.5	10	SMC10.2 393J250A31 TR16
0.047	A31	9.1	5.5	10	SMC10.2 473J250A31 TR16
0.056	A31	9.1	5.5	10	SMC10.2 563J250A31 TR16
0.068	A31	9.1	5.5	10	SMC10.2 683J250A31 TR16
0.082	A31	9.1	5.5	10	SMC10.2 823J250A31 TR16
0.10	A31	9.1	5.5	10	SMC10.2 104J250A31 TR16

CHIP LENGTH 12.7 MM CODE 5045

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.12	B31	11.5	6.5	8	SMC12.7 124J250B31 TR24
0.15	B31	11.5	6.5	8	SMC12.7 154J250B31 TR24
0.18	B31	11.5	6.5	8	SMC12.7 184J250B31 TR24

NOTE: These products are not yet suitable for lead free soldering. For actual status, please contact manufacturer.

ARTICLE TABLE

250 VDC/160 VAC

CHIP LENGTH 16.5 MM CODE 6560

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.22	C31	15.0	7.0	5	SMC16.5 224J250C31 TR24
0.27	C31	15.0	7.0	5	SMC16.5 274J250C31 TR24
0.33	C31	15.0	7.0	5	SMC16.5 334J250C31 TR24
0.39	C31	15.0	7.0	5	SMC16.5 394J250C31 TR24
0.47	C31	15.0	7.0	5	SMC16.5 474J250C31 TR24

400 VDC/200 VAC

CHIP LENGTH 5.7 MM CODE 2220

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.0010	J31	5.0	2.5	40	SMC5.7 102J400J31 TR12
0.0012	J31	5.0	2.5	40	SMC5.7 122J400J31 TR12
0.0015	J31	5.0	2.5	40	SMC5.7 152J400J31 TR12
0.0018	J33	5.0	3.0	40	SMC5.7 182J400J33 TR12
0.0022	J33	5.0	3.0	40	SMC5.7 222J400J33 TR12
0.0027	J35	5.0	4.0	40	SMC5.7 272J400J35 TR12
0.0033	J35	5.0	4.0	40	SMC5.7 332J400J35 TR12

CHIP LENGTH 7.3 MM CODE 2824

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.0010	K31	6.0	2.5	25	SMC7.3 102J400K31 TR12
0.0012	K31	6.0	2.5	25	SMC7.3 122J400K31 TR12
0.0015	K31	6.0	2.5	25	SMC7.3 152J400K31 TR12
0.0018	K31	6.0	2.5	25	SMC7.3 182J400K31 TR12
0.0022	K31	6.0	2.5	25	SMC7.3 222J400K31 TR12
0.0027	K31	6.0	2.5	25	SMC7.3 272J400K31 TR12
0.0033	K33	6.0	3.0	25	SMC7.3 332J400K33 TR12
0.0039	K33	6.0	3.0	25	SMC7.3 392J400K33 TR12
0.0047	K33	6.0	3.0	25	SMC7.3 472J400K33 TR12
0.0056	K35	6.0	3.5	25	SMC7.3 562J400K35 TR12
0.0068	K35	6.0	3.5	25	SMC7.3 682J400K35 TR12
0.0082	K37	6.0	4.5	25	SMC7.3 822J400K37 TR12
0.010	K37	6.0	4.5	25	SMC7.3 103J400K37 TR12

NOTE: These products are not yet suitable for lead free soldering. For actual status, please contact manufacturer.

400 VDC/200 VAC

CHIP LENGTH 10.2 MM CODE 4036

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.010	A31	9.1	5.5	15	SMC10.2 103J400A31 TR16
0.012	A31	9.1	5.5	15	SMC10.2 123J400A31 TR16
0.015	A31	9.1	5.5	15	SMC10.2 153J400A31 TR16
0.018	A31	9.1	5.5	15	SMC10.2 183J400A31 TR16
0.022	A31	9.1	5.5	15	SMC10.2 223J400A31 TR16
0.027	A31	9.1	5.5	15	SMC10.2 273J400A31 TR16
0.033	A31	9.1	5.5	15	SMC10.2 333J400A31 TR16
0.039	A31	9.1	5.5	15	SMC10.2 393J400A31 TR16

CHIP LENGTH 12.7 MM CODE 5045

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.047	B31	11.5	6.5	10	SMC12.7 473J400B31 TR24
0.056	B31	11.5	6.5	10	SMC12.7 563J400B31 TR24
0.068	B31	11.5	6.5	10	SMC12.7 683J400B31 TR24
0.082	B31	11.5	6.5	10	SMC12.7 823J400B31 TR24

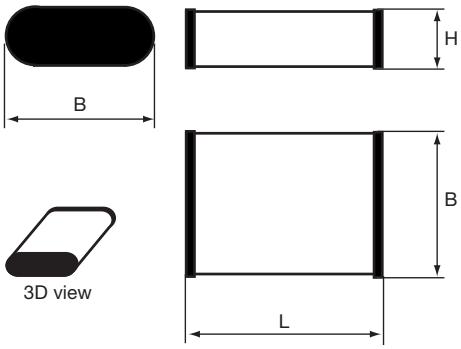
CHIP LENGTH 16.5 MM CODE 6560

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.10	C31	15.0	7.0	8	SMC16.5 104J400C31 TR24
0.12	C31	15.0	7.0	8	SMC16.5 124J400C31 TR24
0.15	C31	15.0	7.0	8	SMC16.5 154J400C31 TR24
0.18	C31	15.0	7.0	8	SMC16.5 184J400C31 TR24
0.22	C31	15.0	7.0	8	SMC16.5 224J400C31 TR24

SMW

- Metallized polyphenylene sulphide (PPS) SMD
- Miniature size naked capacitor
- Low profile
- Wound construction
- According to IEC 60384-20

RoHS Compliant



TYPICAL APPLICATIONS

Timing, filtering. Memory capacitor. High stability and accuracy. High temperature use.

CONSTRUCTION

Polyphenylene sulphide (PPS) film capacitor for surface mounting.

TECHNICAL DATA

Rated voltage U_R, VDC	50	100	250	400
Rated voltage U_R, VAC	30	63	160	200
Capacitance range, nF	1 - 560	1 - 180	1 - 68	1 - 22

Capacitance tolerance
±10%, ±5% standard; ±2.5%, ±2% on request.

Category temperature range
-55°C to +125°C.

Rated temperature
+100°C

Voltage derating
The rated voltage should be decreased with 1.5%/°C from +125°C to 175°C. No derating from +100°C to +125°C.

Climatic category
55/125/56

Voltage proof
1.6 x U_R, 60s

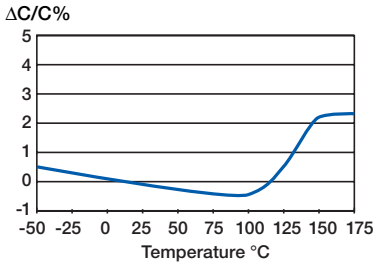
Insulation resistance
Minimum value between terminals
Measured at +20°C according to IEC 60384-20

	C ≤ 0.56 µF
U_R ≤ 100 V	15 000 MΩ
U_R > 100 V	30 000 MΩ

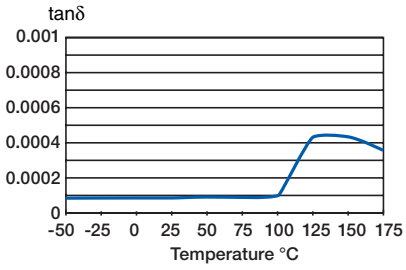
Dissipation factor
Max values at +23°C

	C ≤ 100nF	100nF < C ≤ 560 nF
1 kHz	0.15 %	0.15 %
10 kHz	0.25 %	0.25 %
100 kHz	0.50 %	0.60 %

Pulse rise time
The capacitors can withstand an unlimited number of pulses with a dU/dt according to article table. For voltages (U) lower than the rated voltage (U_R), the specified dU/dt can be multiplied by U_R/U.



Typical capacitance vs temperature at 1 kHz



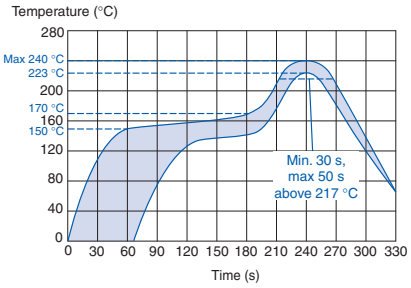
Typical dissipation factor vs temperature at 1 kHz

ORDERING INFORMATION

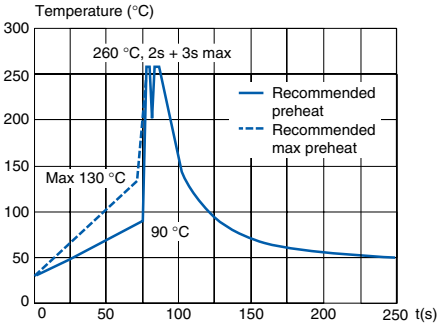
See article table and page 10 for options and article code construction.

RECOMMENDED SOLDERING CONDITIONS

Reflow soldering temperature measured on the top body surface of the component
Preheating temperature should be less than 170°C. The time above 217°C should be less than 50 s. The peak temperature must not exceed 240°C.



Electrode temperature, Wave soldering
The recommended preheating temperature is 90 °C, max 130 °C. The peak temperature 260°C may be applied for 2 + 3 s max. Evox Rifa recommends wave soldering for SMW parts with up to H = 2 mm.



Recommended wave soldering profile

MARKING

- Rated capacitance
- Capacitance tolerance code
- Rated voltage code
- Capacitor type S for SMW
- Manufacturing date code according to IEC 60062 (year, month)

ARTICLE TABLE

50 VDC/30 VAC

CHIP LENGTH 5.7 MM CODE 2220

Capacitance µF	Size code	Dimensions in mm B ±0.4	H max	Max dU/dt V/µs	Article code
0.0010	J91	5.0	2.0	20	SMW5.7 102K50J91 TR12
0.0012	J91	5.0	2.0	20	SMW5.7 122K50J91 TR12
0.0015	J91	5.0	2.0	20	SMW5.7 152K50J91 TR12
0.0018	J91	5.0	2.0	20	SMW5.7 182K50J91 TR12
0.0022	J91	5.0	2.0	20	SMW5.7 222K50J91 TR12
0.0027	J91	5.0	2.0	20	SMW5.7 272K50J91 TR12
0.0033	J91	5.0	2.0	20	SMW5.7 332K50J91 TR12
0.0039	J91	5.0	2.0	20	SMW5.7 392K50J91 TR12
0.0047	J91	5.0	2.0	20	SMW5.7 472K50J91 TR12
0.0056	J91	5.0	2.0	20	SMW5.7 562K50J91 TR12
0.0068	J91	5.0	2.0	20	SMW5.7 682K50J91 TR12
0.0082	J91	5.0	2.0	20	SMW5.7 822K50J91 TR12
0.010	J91	5.0	2.0	20	SMW5.7 103K50J91 TR12
0.012	J91	5.0	2.0	20	SMW5.7 123K50J91 TR12
0.015	J91	5.0	2.0	20	SMW5.7 153K50J91 TR12
0.018	J91	5.0	2.0	15	SMW5.7 183K50J91 TR12
0.022	J91	5.0	2.0	15	SMW5.7 223K50J91 TR12
0.027	J91	5.0	2.0	15	SMW5.7 273K50J91 TR12
0.033	J91	5.0	2.0	15	SMW5.7 333K50J91 TR12
0.039	J91	5.0	2.0	15	SMW5.7 393K50J91 TR12
0.047	J91	5.0	2.0	15	SMW5.7 473K50J91 TR12
0.056	J91	5.0	2.0	15	SMW5.7 563K50J91 TR12
0.068	J91	5.0	2.0	15	SMW5.7 683K50J91 TR12
0.082	J91	5.0	2.0	10	SMW5.7 823K50J91 TR12
0.10	J91	5.0	2.0	10	SMW5.7 104K50J91 TR12
0.12	J91	5.0	2.0	10	SMW5.7 124K50J91 TR12
0.15	J91	5.0	2.0	10	SMW5.7 154K50J91 TR12
0.18	J93	5.0	3.0	10	SMW5.7 184K50J93 TR12
0.22	J93	5.0	3.0	10	SMW5.7 224K50J93 TR12
0.27	J93	5.0	3.0	10	SMW5.7 274K50J93 TR12
0.33	J95	5.0	4.0	10	SMW5.7 334K50J95 TR12

CHIP LENGTH 7.3 MM CODE 2824

Capacitance µF	Size code	Dimensions in mm B ±0.4	H max	Max dU/dt V/µs	Article code
0.0022	K91	6.0	2.0	20	SMW7.3 222K50K91 TR12
0.0027	K91	6.0	2.0	20	SMW7.3 272K50K91 TR12
0.0033	K91	6.0	2.0	20	SMW7.3 332K50K91 TR12
0.0039	K91	6.0	2.0	20	SMW7.3 392K50K91 TR12
0.0047	K91	6.0	2.0	20	SMW7.3 472K50K91 TR12
0.0056	K91	6.0	2.0	20	SMW7.3 562K50K91 TR12
0.0068	K91	6.0	2.0	20	SMW7.3 682K50K91 TR12
0.0082	K91	6.0	2.0	20	SMW7.3 822K50K91 TR12
0.010	K91	6.0	2.0	20	SMW7.3 103K50K91 TR12
0.012	K91	6.0	2.0	20	SMW7.3 123K50K91 TR12
0.015	K91	6.0	2.0	20	SMW7.3 153K50K91 TR12
0.018	K91	6.0	2.0	20	SMW7.3 183K50K91 TR12
0.022	K91	6.0	2.0	20	SMW7.3 223K50K91 TR12
0.027	K91	6.0	2.0	15	SMW7.3 273K50K91 TR12
0.033	K91	6.0	2.0	15	SMW7.3 333K50K91 TR12
0.039	K91	6.0	2.0	15	SMW7.3 393K50K91 TR12
0.047	K91	6.0	2.0	15	SMW7.3 473K50K91 TR12
0.056	K91	6.0	2.0	15	SMW7.3 563K50K91 TR12
0.068	K91	6.0	2.0	15	SMW7.3 683K50K91 TR12
0.082	K91	6.0	2.0	8	SMW7.3 823K50K91 TR12
0.10	K91	6.0	2.0	8	SMW7.3 104K50K91 TR12
0.12	K91	6.0	2.0	8	SMW7.3 124K50K91 TR12
0.15	K91	6.0	2.0	8	SMW7.3 154K50K91 TR12
0.18	K91	6.0	2.0	8	SMW7.3 184K50K91 TR12
0.22	K91	6.0	2.0	8	SMW7.3 224K50K91 TR12
0.27	K91	6.0	2.0	8	SMW7.3 274K50K91 TR12
0.33	K93	6.0	2.7	8	SMW7.3 334K50K93 TR12
0.39	K95	6.0	3.2	8	SMW7.3 394K50K95 TR12
0.47	K95	6.0	3.2	8	SMW7.3 474K50K95 TR12
0.56	K97	6.0	4.2	8	SMW7.3 564K50K97 TR12

100 VDC/63 VAC

CHIP LENGTH 5.7 MM CODE 2220

Capacitance µF	Size code	Dimensions in mm B ±0.4	H max	Max dU/dt V/µs	Article code
0.0010	J91	5.0	2.0	20	SMW5.7 102K100J91 TR12
0.0012	J91	5.0	2.0	20	SMW5.7 122K100J91 TR12
0.0015	J91	5.0	2.0	20	SMW5.7 152K100J91 TR12
0.0018	J91	5.0	2.0	20	SMW5.7 182K100J91 TR12
0.0022	J91	5.0	2.0	20	SMW5.7 222K100J91 TR12
0.0027	J91	5.0	2.0	20	SMW5.7 272K100J91 TR12
0.0033	J91	5.0	2.0	20	SMW5.7 332K100J91 TR12
0.0039	J91	5.0	2.0	20	SMW5.7 392K100J91 TR12
0.0047	J91	5.0	2.0	20	SMW5.7 472K100J91 TR12
0.0056	J91	5.0	2.0	20	SMW5.7 562K100J91 TR12
0.0068	J91	5.0	2.0	20	SMW5.7 682K100J91 TR12
0.0082	J91	5.0	2.0	20	SMW5.7 822K100J91 TR12
0.010	J91	5.0	2.0	20	SMW5.7 103K100J91 TR12
0.012	J91	5.0	2.0	20	SMW5.7 123K100J91 TR12
0.015	J91	5.0	2.0	20	SMW5.7 153K100J91 TR12
0.018	J91	5.0	2.0	15	SMW5.7 183K100J91 TR12
0.022	J91	5.0	2.0	15	SMW5.7 223K100J91 TR12
0.027	J91	5.0	2.0	15	SMW5.7 273K100J91 TR12
0.033	J91	5.0	2.0	15	SMW5.7 333K100J91 TR12
0.039	J91	5.0	2.0	15	SMW5.7 393K100J91 TR12
0.047	J91	5.0	2.0	15	SMW5.7 473K100J91 TR12
0.056	J91	5.0	2.0	15	SMW5.7 563K100J91 TR12
0.068	J91	5.0	2.0	15	SMW5.7 683K100J91 TR12
0.082	J93	5.0	3.0	15	SMW5.7 823K100J93 TR12
0.10	J93	5.0	3.0	15	SMW5.7 104K100J93 TR12
0.12	J95	5.0	4.0	15	SMW5.7 124K100J95 TR12
0.15	J95	5.0	4.0	15	SMW5.7 154K100J95 TR12

CHIP LENGTH 7.3 MM CODE 2824

Capacitance µF	Size code	Dimensions in mm B ±0.4	H max	Max dU/dt V/µs	Article code
0.0022	K91	6.0	2.0	20	SMW7.3 222K100K91 TR12
0.0027	K91	6.0	2.0	20	SMW7.3 272K100K91 TR12
0.0033	K91	6.0	2.0	20	SMW7.3 332K100K91 TR12
0.0039	K91	6.0	2.0	20	SMW7.3 392K100K91 TR12
0.0047	K91	6.0	2.0	20	SMW7.3 472K100K91 TR12
0.0056	K91	6.0	2.0	20	SMW7.3 562K100K91 TR12
0.0068	K91	6.0	2.0	20	SMW7.3 682K100K91 TR12
0.0082	K91	6.0	2.0	20	SMW7.3 822K100K91 TR12
0.010	K91	6.0	2.0	20	SMW7.3 103K100K91 TR12
0.012	K91	6.0	2.0	20	SMW7.3 123K100K91 TR12
0.015	K91	6.0	2.0	20	SMW7.3 153K100K91 TR12
0.018	K91	6.0	2.0	20	SMW7.3 183K100K91 TR12
0.022	K91	6.0	2.0	20	SMW7.3 223K100K91 TR12
0.027	K91	6.0	2.0	15	SMW7.3 273K100K91 TR12
0.033	K91	6.0	2.0	15	SMW7.3 333K100K91 TR12
0.039	K91	6.0	2.0	15	SMW7.3 393K100K91 TR12
0.047	K91	6.0	2.0	15	SMW7.3 473K100K91 TR12
0.056	K91	6.0	2.0	15	SMW7.3 563K100K91 TR12
0.068	K91	6.0	2.0	15	SMW7.3 683K100K91 TR12
0.082	K91	6.0	2.0	15	SMW7.3 823K100K91 TR12
0.10	K93	6.0	2.7	15	SMW7.3 104K100K93 TR12

ARTICLE TABLE

100 VDC/63 VAC

CHIP LENGTH 7.3 MM CODE 2824

Capacitance µF	Size code	Dimensions in mm B ±0.4	H max	Max dU/dt V/µs	Article code
0.12	K93	6.0	2.7	15	SMW7.3 124K100K93 TR12
0.15	K95	6.0	3.2	15	SMW7.3 154K100K95 TR12
0.18	K97	6.0	4.2	15	SMW7.3 184K100K97 TR12

250 VDC/160 VAC

CHIP LENGTH 5.7 MM CODE 2220

Capacitance µF	Size code	Dimensions in mm B ±0.4	H max	Max dU/dt V/µs	Article code
0.0010	J91	5.0	2.0	20	SMW5.7 102K250J91 TR12
0.0012	J91	5.0	2.0	20	SMW5.7 122K250J91 TR12
0.0015	J91	5.0	2.0	20	SMW5.7 152K250J91 TR12
0.0018	J91	5.0	2.0	20	SMW5.7 182K250J91 TR12
0.0022	J91	5.0	2.0	20	SMW5.7 222K250J91 TR12
0.0027	J91	5.0	2.0	20	SMW5.7 272K250J91 TR12
0.0033	J91	5.0	2.0	20	SMW5.7 332K250J91 TR12
0.0039	J91	5.0	2.0	20	SMW5.7 392K250J91 TR12
0.0047	J91	5.0	2.0	20	SMW5.7 472K250J91 TR12
0.0056	J91	5.0	2.0	20	SMW5.7 562K250J91 TR12
0.0068	J91	5.0	2.0	20	SMW5.7 682K250J91 TR12
0.0082	J91	5.0	2.0	20	SMW5.7 822K250J91 TR12
0.010	J91	5.0	2.0	20	SMW5.7 103K250J91 TR12
0.012	J91	5.0	2.0	20	SMW5.7 123K250J91 TR12
0.015	J91	5.0	2.0	20	SMW5.7 153K250J91 TR12
0.018	J93	5.0	3.0	20	SMW5.7 183K250J93 TR12
0.022	J93	5.0	3.0	20	SMW5.7 223K250J93 TR12
0.027	J93	5.0	3.0	20	SMW5.7 273K250J93 TR12
0.033	J95	5.0	4.0	20	SMW5.7 333K250J95 TR12

CHIP LENGTH 7.3 MM CODE 2824

Capacitance µF	Size code	Dimensions in mm B ±0.4	H max	Max dU/dt V/µs	Article code
0.0022	K91	6.0	2.0	20	SMW7.3 222K250K91 TR12
0.0027	K91	6.0	2.0	20	SMW7.3 272K250K91 TR12
0.0033	K91	6.0	2.0	20	SMW7.3 332K250K91 TR12
0.0039	K91	6.0	2.0	20	SMW7.3 392K250K91 TR12
0.0047	K91	6.0	2.0	20	SMW7.3 472K250K91 TR12
0.0056	K91	6.0	2.0	20	SMW7.3 562K250K91 TR12
0.0068	K91	6.0	2.0	20	SMW7.3 682K250K91 TR12
0.0082	K91	6.0	2.0	20	SMW7.3 822K250K91 TR12
0.010	K91	6.0	2.0	20	SMW7.3 103K250K91 TR12
0.012	K91	6.0	2.0	20	SMW7.3 123K250K91 TR12
0.015	K91	6.0	2.0	20	SMW7.3 153K250K91 TR12
0.018	K91	6.0	2.0	20	SMW7.3 183K250K91 TR12
0.022	K91	6.0	2.0	20	SMW7.3 223K250K91 TR12
0.027	K91	6.0	2.0	15	SMW7.3 273K250K91 TR12
0.033	K93	6.0	2.7	15	SMW7.3 333K250K93 TR12
0.039	K93	6.0	2.7	15	SMW7.3 393K250K93 TR12
0.047	K95	6.0	3.2	15	SMW7.3 473K250K95 TR12
0.056	K97	6.0	4.2	15	SMW7.3 563K250K97 TR12
0.068	K97	6.0	4.2	15	SMW7.3 683K250K97 TR12

400 VDC/200 VAC

CHIP LENGTH 5.7 MM CODE 2220

Capacitance µF	Size code	Dimensions in mm B ±0.4	H max	Max dU/dt V/µs	Article code
0.0010	J91	5.0	2.0	20	SMW5.7 102K400J91 TR12
0.0012	J91	5.0	2.0	20	SMW5.7 122K400J91 TR12
0.0015	J91	5.0	2.0	20	SMW5.7 152K400J91 TR12
0.0018	J91	5.0	2.0	20	SMW5.7 182K400J91 TR12
0.0022	J91	5.0	2.0	20	SMW5.7 222K400J91 TR12
0.0027	J91	5.0	2.0	20	SMW5.7 272K400J91 TR12
0.0033	J91	5.0	2.0	20	SMW5.7 332K400J91 TR12
0.0039	J91	5.0	2.0	20	SMW5.7 392K400J91 TR12
0.0047	J91	5.0	2.0	20	SMW5.7 472K400J91 TR12
0.0056	J93	5.0	3.0	20	SMW5.7 562K400J93 TR12
0.0068	J93	5.0	3.0	20	SMW5.7 682K400J93 TR12
0.0082	J93	5.0	3.0	20	SMW5.7 822K400J93 TR12
0.010	J93	5.0	3.0	20	SMW5.7 103K400J93 TR12
0.012	J95	5.0	4.0	20	SMW5.7 123K400J95 TR12
0.015	J95	5.0	4.0	20	SMW5.7 153K400J95 TR12

CHIP LENGTH 7.3 MM CODE 2824

Capacitance µF	Size code	Dimensions in mm B ±0.4	H max	Max dU/dt V/µs	Article code
0.0022	K91	6.0	2.0	20	SMW7.3 222K400K91 TR12
0.0027	K91	6.0	2.0	20	SMW7.3 272K400K91 TR12
0.0033	K91	6.0	2.0	20	SMW7.3 332K400K91 TR12
0.0039	K91	6.0	2.0	20	SMW7.3 392K400K91 TR12
0.0047	K91	6.0	2.0	20	SMW7.3 472K400K91 TR12
0.0056	K91	6.0	2.0	20	SMW7.3 562K400K91 TR12
0.0068	K91	6.0	2.0	20	SMW7.3 682K400K91 TR12
0.0082	K91	6.0	2.0	20	SMW7.3 822K400K91 TR12
0.010	K91	6.0	2.0	20	SMW7.3 103K400K91 TR12
0.012	K93	6.0	2.7	20	SMW7.3 123K400K93 TR12
0.015	K93	6.0	2.7	20	SMW7.3 153K400K93 TR12
0.018	K95	6.0	3.2	20	SMW7.3 183K400K95 TR12
0.022	K95	6.0	3.2	20	SMW7.3 223K400K95 TR12

SPC

- **Double sided metallized film as electrode**
- **Plain polyphenylene sulphide (PPS) as dielectric**
- **According to IEC 60384-20**

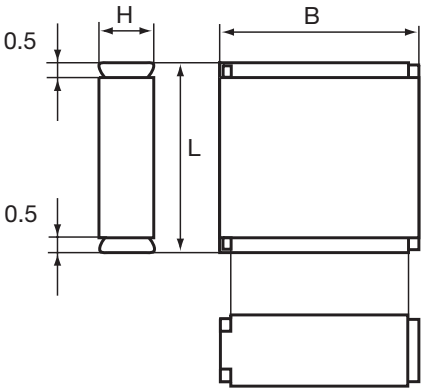
RoHS Compliant

TYPICAL APPLICATIONS

High frequency coupling and decoupling and in general high speed applications requiring high dU/dt, such as pulse operation in SMPS and snubber.

CONSTRUCTION

Film capacitor for surface mounting. Double sided metallized film as electrode. Plain PPS as dielectric. Rugged box encapsulation in self-extinguishing material meeting the requirements of UL 94V-0.



Components may be vertically mounted for decreased footprint. See page 20.

TECHNICAL DATA

Rated voltage U_R, VDC **Rated voltage U_R, VAC**	100 63	250 160	400 250	630 350
Capacitance range, nF	0.47-680	0.47-330	0.47-150	0.47-100

Capacitance values
In accordance with IEC E6 series. IEC E12 and other values on request.

Capacitance tolerance
±10%, ±5%, ±2.5%, ±2%, other tolerances on request.

Category temperature range
-55°C to +125°C

Rated temperature
+100°C

Voltage derating
The rated voltage should be decreased with 1.5%/°C from +125°C to 175°C. No derating from +100°C to +125°C.

Climatic category
55/125/56

Voltage proof
1.6 x U_R, 60s

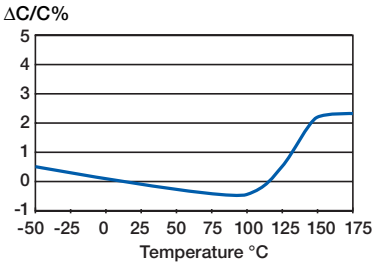
Insulation resistance
Minimum values between terminals
Measured at +20°C

	C ≤ 0.33 µF	C > 0.33 µF
U_R ≤ 100 V	50 000 MΩ	16 500 s
U_R > 100 V	100 000 MΩ	

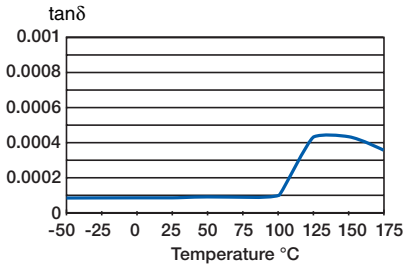
Dissipation factor
Max values at +23°C

	C ≤ 100 nF	100 nF < C ≤ 680 nF
1 kHz	0.10%	0.10%
10 kHz	0.15%	0.15%
100 kHz	0.20%	0.40%

Pulse rise time
The capacitors can withstand an unlimited number of pulses with a dU/dt according to article table. For voltages (U) lower than the rated voltage (U_R), the specified dU/dt can be multiplied by U_R/U.



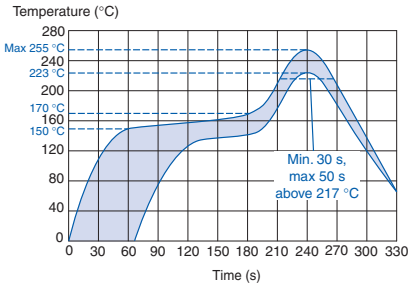
Typical capacitance vs temperature at 1 kHz



Typical dissipation factor vs temperature at 1 kHz

RECOMMENDED SOLDERING CONDITIONS

Reflow soldering temperature measured on the top body surface of the component
Preheating temperature should be less than 170°C. The time above 217°C should be less than 50 s. The peak temperature must not exceed 255°C.



ORDERING INFORMATION

See article table and page 10 for options and article code construction.

MARKING

- Rated capacitance
- Capacitance tolerance code
- Rated voltage code
- Capacitor type D for SPC
- Manufacturing date code according to IEC 60062 (year, month)

See also page 18.

ARTICLE TABLE

100 VDC/ 63 VAC

CHIP LENGTH 7.3 MM CODE 2824

Capacitance µF	Size code	Dimensions in mm ±0.2 B	H	Max dU/dt V/µs	Article code
0.00047	K31	6.0	2.5	800	SPC7.3 471K100K31 TR12
0.00068	K31	6.0	2.5	800	SPC7.3 681K100K31 TR12
0.0010	K31	6.0	2.5	800	SPC7.3 102K100K31 TR12
0.0015	K31	6.0	2.5	800	SPC7.3 152K100K31 TR12
0.0022	K31	6.0	2.5	800	SPC7.3 222K100K31 TR12
0.0033	K31	6.0	2.5	800	SPC7.3 332K100K31 TR12
0.0047	K31	6.0	2.5	800	SPC7.3 472K100K31 TR12
0.0068	K31	6.0	2.5	800	SPC7.3 682K100K31 TR12
0.010	K31	6.0	2.5	800	SPC7.3 103K100K31 TR12
0.015	K33	6.0	3.0	800	SPC7.3 153K100K33 TR12
0.022	K35	6.0	3.5	800	SPC7.3 223K100K35 TR12
0.033	K37	6.0	4.5	800	SPC7.3 333K100K37 TR12

CHIP LENGTH 10.2 MM CODE 4036

0.0068	A31	9.1	5.5	600	SPC10.2 682K100A31 TR16
0.010	A31	9.1	5.5	600	SPC10.2 103K100A31 TR16
0.015	A31	9.1	5.5	600	SPC10.2 153K100A31 TR16
0.022	A31	9.1	5.5	600	SPC10.2 223K100A31 TR16
0.033	A31	9.1	5.5	600	SPC10.2 333K100A31 TR16
0.047	A31	9.1	5.5	600	SPC10.2 473K100A31 TR16
0.068	A31	9.1	5.5	600	SPC10.2 683K100A31 TR16
0.10	A31	9.1	5.5	600	SPC10.2 104K100A31 TR16

CHIP LENGTH 12.7 MM CODE 5045

0.15	B31	11.5	6.5	400	SPC12.7 154K100B31 TR24
0.22	B31	11.5	6.5	400	SPC12.7 224K100B31 TR24

CHIP LENGTH 16.5 MM CODE 6560

0.33	C31	15.0	7.0	150	SPC16.5 334K100C31 TR24
0.47	C31	15.0	7.0	150	SPC16.5 474K100C31 TR24
0.68	C31	15.0	7.0	150	SPC16.5 684K100C31 TR24

250 VDC/ 160 VAC

CHIP LENGTH 7.3 MM CODE 2824

0.00047	K31	6.0	2.5	1200	SPC7.3 471K250K31 TR12
0.00068	K31	6.0	2.5	1200	SPC7.3 681K250K31 TR12
0.0010	K31	6.0	2.5	1200	SPC7.3 102K250K31 TR12
0.0015	K31	6.0	2.5	1200	SPC7.3 152K250K31 TR12
0.0022	K31	6.0	2.5	1200	SPC7.3 222K250K31 TR12
0.0033	K31	6.0	2.5	1200	SPC7.3 332K250K31 TR12
0.0047	K31	6.0	2.5	1200	SPC7.3 472K250K31 TR12
0.0068	K33	6.0	3.0	1200	SPC7.3 682K250K33 TR12
0.010	K35	6.0	3.5	1200	SPC7.3 103K250K35 TR12
0.015	K37	6.0	4.5	1200	SPC7.3 153K250K37 TR12

CHIP LENGTH 10.2 MM CODE 4036

0.0068	A31	9.1	5.5	1000	SPC10.2 682K250A31 TR16
0.010	A31	9.1	5.5	1000	SPC10.2 103K250A31 TR16
0.015	A31	9.1	5.5	1000	SPC10.2 153K250A31 TR16
0.022	A31	9.1	5.5	1000	SPC10.2 223K250A31 TR16
0.033	A31	9.1	5.5	1000	SPC10.2 333K250A31 TR16
0.047	A31	9.1	5.5	1000	SPC10.2 473K250A31 TR16

CHIP LENGTH 12.7 MM CODE 5045

0.068	B31	11.5	6.5	700	SPC12.7 683K250B31 TR24
0.10	B31	11.5	6.5	700	SPC12.7 104K250B31 TR24

250 VDC/ 160 VAC

CHIP LENGTH 16.5 MM CODE 6560

0.15	C31	15.0	7.0	350	SPC16.5 154K250C31 TR24
0.22	C31	15.0	7.0	350	SPC16.5 224K250C31 TR24
0.33	C31	15.0	7.0	350	SPC16.5 334K250C31 TR24

400 VDC/ 250 VAC

CHIP LENGTH 7.3 MM CODE 2824

0.00047	K31	6.0	2.5	1600	SPC7.3 471K400K31 TR12
0.00068	K31	6.0	2.5	1600	SPC7.3 681K400K31 TR12
0.0010	K31	6.0	2.5	1600	SPC7.3 102K400K31 TR12
0.0015	K31	6.0	2.5	1600	SPC7.3 152K400K31 TR12
0.0022	K31	6.0	2.5	1600	SPC7.3 222K400K31 TR12
0.0033	K33	6.0	3.0	1600	SPC7.3 332K400K33 TR12
0.0047	K35	6.0	3.5	1600	SPC7.3 472K400K35 TR12
0.0068	K37	6.0	4.5	1600	SPC7.3 682K400K37 TR12

CHIP LENGTH 10.2 MM CODE 4036

0.0068	A31	9.1	5.5	1300	SPC10.2 682K400A31 TR16
0.010	A31	9.1	5.5	1300	SPC10.2 103K400A31 TR16
0.015	A31	9.1	5.5	1300	SPC10.2 153K400A31 TR16
0.022	A31	9.1	5.5	1300	SPC10.2 223K400A31 TR16

CHIP LENGTH 12.7 MM CODE 5045

0.033	B31	11.5	6.5	900	SPC12.7 333K400B31 TR24
0.047	B31	11.5	6.5	900	SPC12.7 473K400B31 TR24

CHIP LENGTH 16.5 MM CODE 6560

0.068	C31	15.0	7.0	450	SPC16.5 683K400C31 TR24
0.10	C31	15.0	7.0	450	SPC16.5 104K400C31 TR24
0.15	C31	15.0	7.0	450	SPC16.5 154K400C31 TR24

630 VDC/ 350 VAC

CHIP LENGTH 7.3 MM CODE 2824

0.00047	K31	6.0	2.5	2000	SPC7.3 471K630K31 TR12
0.00068	K31	6.0	2.5	2000	SPC7.3 681K630K31 TR12
0.0010	K31	6.0	2.5	2000	SPC7.3 102K630K31 TR12
0.0015	K31	6.0	2.5	2000	SPC7.3 152K630K31 TR12
0.0022	K33	6.0	3.0	2000	SPC7.3 222K630K33 TR12
0.0033	K35	6.0	3.5	2000	SPC7.3 332K630K35 TR12
0.0047	K37	6.0	4.5	2000	SPC7.3 472K630K37 TR12

CHIP LENGTH 10.2 MM CODE 4036

0.0068	A31	9.1	5.5	1600	SPC10.2 682K630A31 TR16
0.010	A31	9.1	5.5	1600	SPC10.2 103K630A31 TR16
0.015	A31	9.1	5.5	1600	SPC10.2 153K630A31 TR16

CHIP LENGTH 12.7 MM CODE 5045

0.022	B31	11.5	6.5	1100	SPC12.7 223K630B31 TR24
0.033	B31	11.5	6.5	1100	SPC12.7 333K630B31 TR24

CHIP LENGTH 16.5 MM CODE 6560

0.047	C31	15.0	7.0	550	SPC16.5 473K630C31 TR24
0.068	C31	15.0	7.0	550	SPC16.5 683K630C31 TR24
0.10	C31	15.0	7.0	550	SPC16.5 104K630C31 TR24

SMP253

- **EMI suppressor, class Y2, metallized paper SMD**
- **0.001 – 0.0047 µF, 250 VAC, +100 °C**

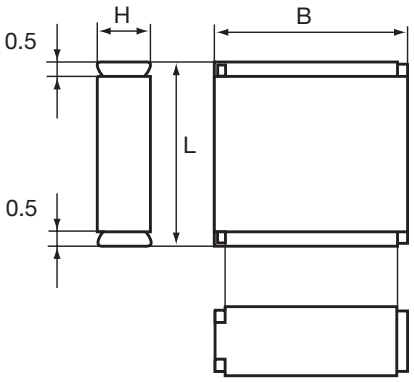
RoHS Compliant

TYPICAL APPLICATIONS

The capacitors are intended for use as interference suppressors in Y2 applications, line-to-earth.

CONSTRUCTION

Multi-layer metallized paper. Encapsulated and impregnated in self-extinguishing material meeting the requirements of UL 94V-0.



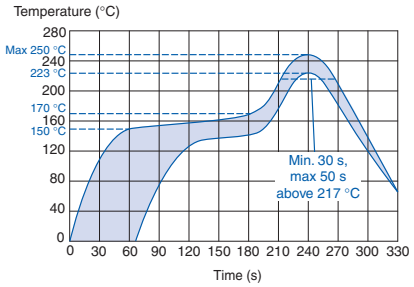
Components may be vertically mounted for decreased footprint. See page 20.

TECHNICAL DATA

Rated voltage	250 VAC 50/60 Hz
Capacitance range	0.001 – 0.0047 µF
Capacitance tolerance	± 20%
Temperature range	–40 to +100°C
Climatic category IEC	40/100/56/B
Approvals	S, UL, CSA
Dissipation factor tanδ	≤ 1.3 % at 1 kHz
Insulation resistance	≥ 12000 MΩ Measured at 500 VDC after 60 s, +23°C
Test voltage between terminals	The 100% screening factory test is carried out at 3000 VDC. The voltage level is selected to meet the requirements in applicable equipment standards. All electrical characteristics are checked after the test.

RECOMMENDED SOLDERING CONDITIONS

Reflow soldering temperature measured on the top body surface of the component
Preheating temperature should be less than 170°C. The time above 217°C should be less than 50 s. The peak temperature must not exceed 250°C.



ENVIRONMENTAL TEST DATA

Vibration	IEC 60068-2-6 Test Fc	3 directions at 2 hour each 10 – 500 Hz at 0.75 mm or 98 m/s²	No visible damage No open or short circuit
Active flammability	EN 132400		
Passive flammability	IEC 60384-14 (1993) EN 132400		Class B
Humidity	IEC 60068-2-3 Test Ca	+40°C and 90 – 95% R.H.	56 days

ARTICLE TABLE

Capacitance µF	Dimensions in mm ±0.2 mm B	H	L	Quantity per package Bulk	Reel	Max dU/dt V/µs	Approvals S	UL	CSA	Article code
CHIP LENGTH 12.7 MM CODE 5045										
0.0010	11.5	6.5	12.7	1000	600	2000	√	√	√	SMP253 MA4100M TR24
0.0015	11.5	6.5	12.7	1000	600	2000	√	√	√	SMP253 MA4150M TR24
0.0022	11.5	6.5	12.7	1000	600	2000	√	√	√	SMP253 MA4220M TR24
0.0025	11.5	6.5	12.7	1000	600	2000	√	√	√	SMP253 MA4250M TR24
0.0033	11.5	6.5	12.7	1000	600	2000	√	√	√	SMP253 MA4330M TR24
0.0039	11.5	6.5	12.7	1000	600	2000	√	√	√	SMP253 MA4390M TR24
0.0047	11.5	6.5	12.7	1000	600	2000	√	√	√	SMP253 MA4470M TR24

APPROVALS/REFERENCE DOCUMENTS

Certification Body	Specification	Approval reference
S	EN 132400	9949069/01
UL	UL 1414	E73869
cUL recognition (CSA)	C 22.2 No. 1	E73869

MARKING

- RIFA
- Article code SMP
- Rated capacitance
- Rated voltage
- Y2
- Manufacturing code (year, month)

ORDERING INFORMATION

See article table and below for options and article code construction. Tape packaging, see page 20.

SMP253 **M** **A** **4220** **M** **TR24**

Capacitor type

Rated voltage in volts AC:
M = 250 VAC

Chip length
A = 12.7 mm

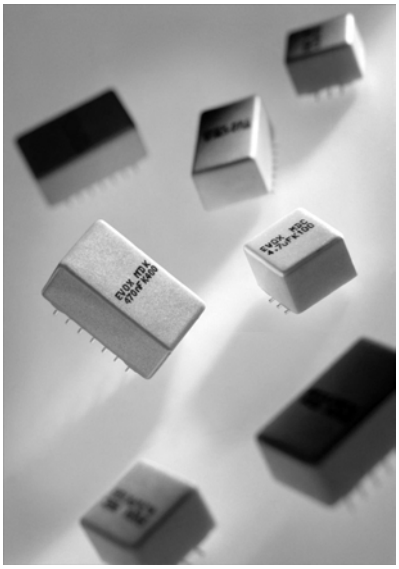
Rated capacitance
Expressed in picofarads. Four digit code where the first digit is the number of digits in the capacitance value in pF. The next three digits are the three significant digits in the capacitance value.
4220 = 2200 pF = 0.0022 µF

Capacitance tolerance
M = ± 20 %

Packaging

No code [1]	Bulk; loose parts in a box
TR24 [1]	Horizontally taped SMD capacitors.
TV24 [2]	Vertically taped SMD capacitors.

[1] Quantity/package according to article table
[2] Quantity per package 400



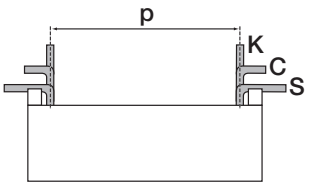
DIL Film Capacitors

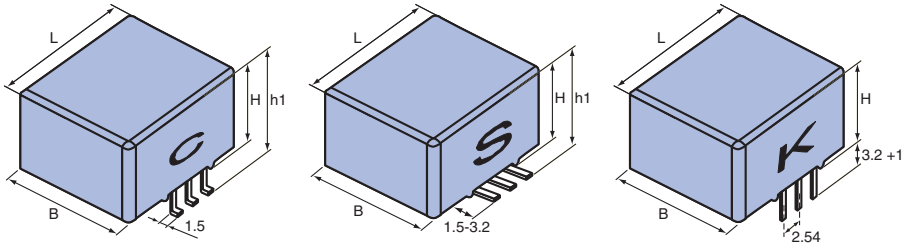
This section covers Dual-In-Line film capacitors for surface and through-hole mounting.

Type	Dielectric	Rated voltage VDC	Rated voltage VAC	Capacitance µF	Page
MDC 10 - 15	PET (MKT)	50 - 630	30 - 220	0.033-15	**50**
MDK 10 - 15	PET (MKT)	50 - 630	30 - 220	0.033-15	**54**
MDS 10 - 15	PET (MKT)	50 - 630	30 - 220	0.033-6.8	**58**

DESIGN OF DIL CAPACITORS

The terminals of the Evox Rifa DIL capacitors have three different kinds of designs. The C type (MDC) and S type (MDS) are for surface mounting and the K type (MDK) is for through-hole assembly. The difference in the terminal design is illustrated in the picture below.





MARKING OF DIL CAPACITORS

The **capacitor type**s are as follows:

MDC	PET film	SMD
MDK	PET film	SMD
MDS	PET film	SMD

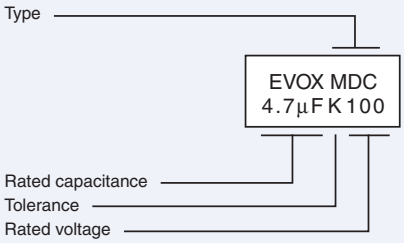
The nominal **capacitance value** is expressend in nF, if C < 1000 nF and in µF, if C ≥ 1000 nF

Examples: 470 nF = 470 nF
1000 nF = 1.0 µF

The **capacitance tolerance** is expressed with letter codes:

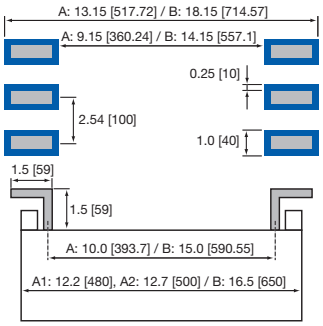
M	± 20 %
K	± 10 %
J	± 5 %

The **rated voltage** is expressed in V in DC.



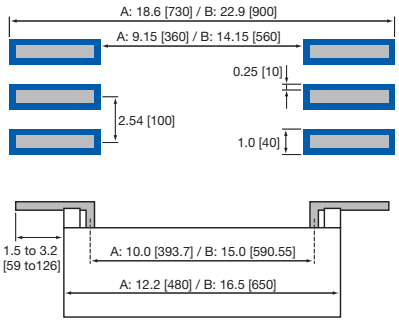
SOLDERING OF DIL CAPACITORS

The Evox Rifa DIL capacitors can be soldered on printed boards either by Reflow soldering (MDC and MDS) or Wave soldering (MDK). The recommended soldering land dimensions in mm [mils] are:



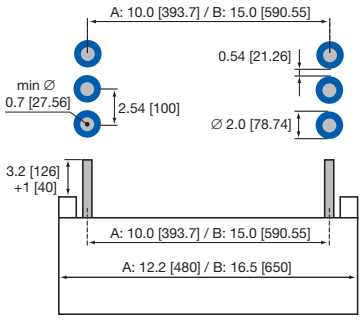
Case:
A: A52, A53, A54
A55, A57, A58
B: B53, B55

Type C (MDC)



Case:
A: A52, A54, A55
B: B53, B55

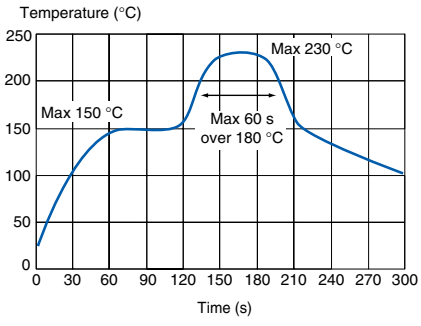
Type S (MDS)



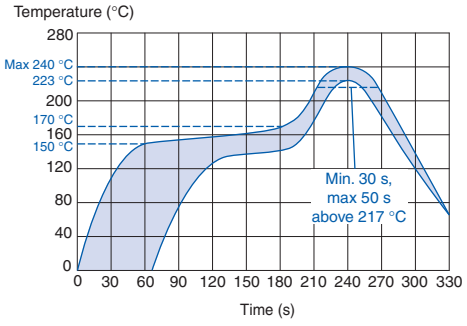
Case:
A: A52, A53, A54
A55, A57, A58
B: B53, B55

Type K (MDK)

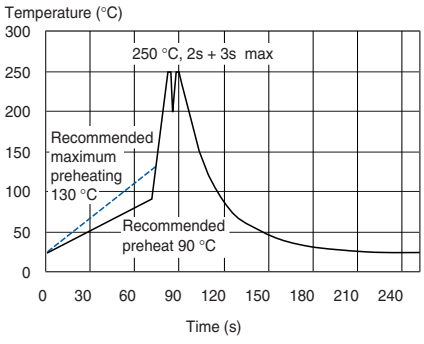
Soldering curves



Recommended reflow soldering profile for MDC and MDS, for lead containing solder.



Recommended reflow soldering profile for MDC and MDS, for lead free solder.

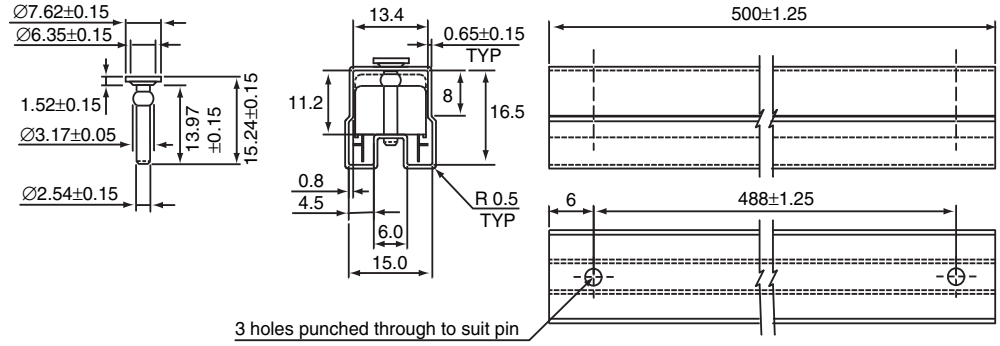


Recommended wave soldering profile for MDK, total time in solder wave < 5s.

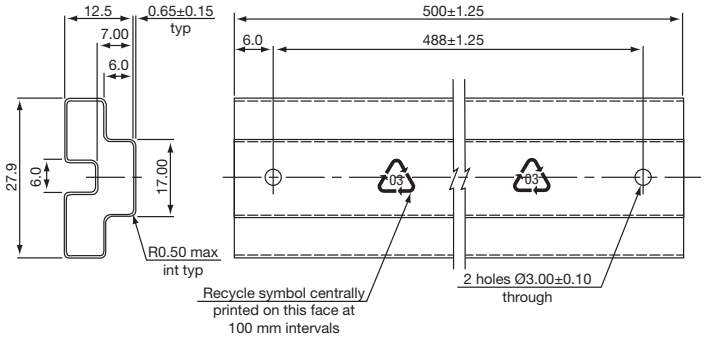
TUBE PACKAGING OF DIL CAPACITORS

Ordering code: TUBE

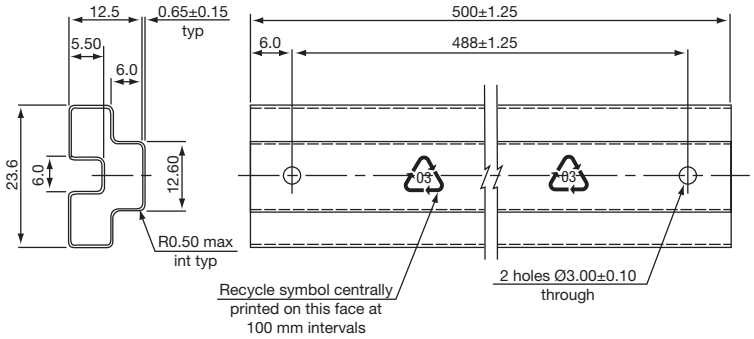
Box sizes A53, A57, A58



Box sizes B53, B55



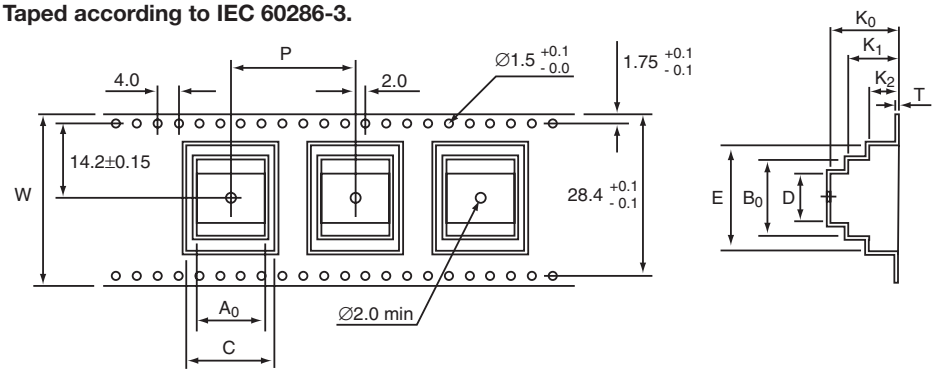
Box sizes A52, A54, A55



TAPE PACKAGING OF DIL CAPACITORS

Ordering code: TR32
Box size A53, other sizes, please contact Evox Rifa

Taped according to IEC 60286-3.



A_0	13.6 ± 0.1
B_0	14.3 ± 0.1
K_0	12.8 ± 0.1
C	18.0 ± 0.1
D	9.3 ± 0.1
E	19.6 ± 0.1
K_1	9.2 ± 0.1
K_2	5.0 ± 0.1
P	24.0 ± 0.1
T	0.4 ± 0.1
W	32.0 ± 0.1

MDC

- **Metallized polyester (PET) SMD in DIL**
- **Low ESR and ESL**
- **Three and four pole connection possible**
- **Good temperature stability**
- **No voltage dependence of capacitance and dissipation factor**

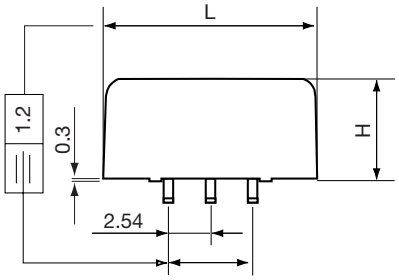
RoHS Compliant

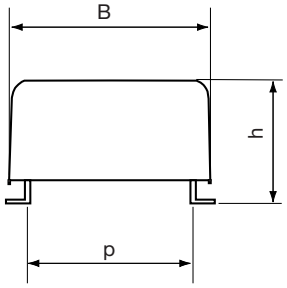
TYPICAL APPLICATIONS

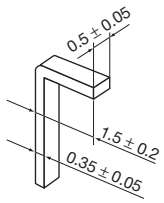
High frequency switched mode power supplies and DC-DC converters. Input/ output filtering.

CONSTRUCTION

DIL metallized polyester (PET) film capacitor for surface mounting. Encapsulation in self-extinguishing material meeting the requirements of UL 94V-0.







Detail of a lead

TECHNICAL DATA

Rated voltage U_R VDC	50	100	250	400	630
Rated voltage U_R VAC	30	63	160	200	220
Capacitance range, µF	0.033 - 15	0.033 - 10	0.033 - 1.5	0.033 - 0.47	0.033 - 0.18

Capacitance tolerance
± 10%, ± 5%, other tolerances on request

Category temperature range
–55 to +125°C

Rated temperature
+85 °C

Voltage derating
The rated voltage is decreased with 1.25%/°C from +85 °C

Climatic category
55/125/56

Test voltage
1.6 x U_R, 60s

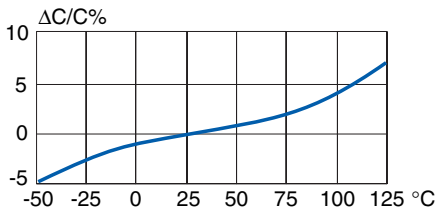
Insulation resistance
Minimum value between terminals
Measured at +20 °C according to IEC 60384-2

	C ≤ 0.33 µF	C > 0.33 µF
U_R ≤ 100 V	15 000 MΩ	5 000 s
U_R > 100 V	30 000 MΩ	10 000 s

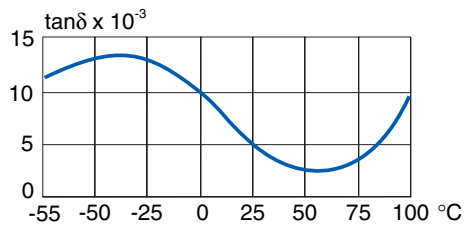
Dissipation factor
Maximum values at +23°C

	C ≤ 0.1 µF	0.1 < C ≤ 3.3 µF	3.3 < C < 10 µF	C ≥ 10 µF
1 kHz	0.8 %	0.8 %	0.8 %	0.8 %
10 kHz	1.5 %	1.5 %	1.5 %	2.0 %
100 kHz	2.5 %	5.0 %	—	—

Self inductancy
Approximately 4 nH



Typical capacitance vs temperature at 1 kHz

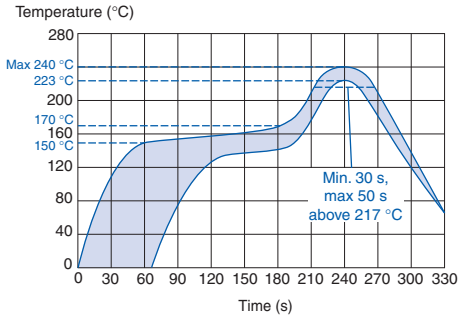


Typical dissipation factor vs temperature at 1 kHz

RECOMMENDED SOLDERING CONDITIONS

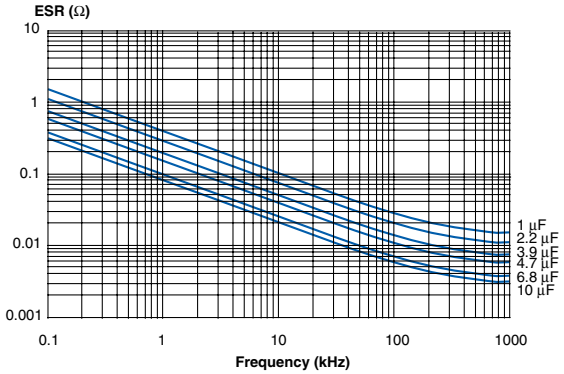
Reflow soldering temperature measured on the top body surface of the component

Preheating temperature should be less than 170°C. The time above 217°C should be less than 50 s. The peak temperature must not exceed 240°C. This series for Lead Free soldering process is partly under development. Please consult manufacturer.

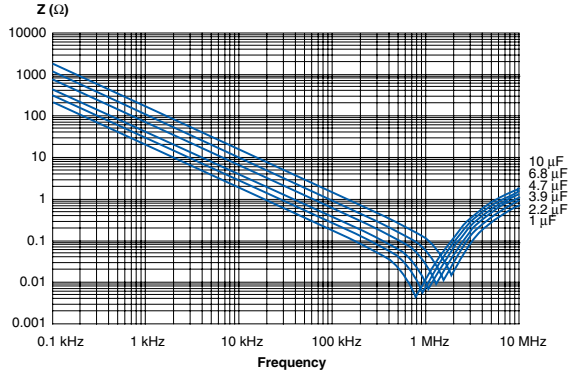


TYPICAL DATA

ESR vs. frequency



Impedance vs. frequency



Maximum RMS voltage U_{RMS} (V) vs. frequency

Value	Rated voltage	Case size	1 kHz	10 kHz	100 kHz	500 kHz	1 MHz
1.0 µF	250 V	A57	150.0	36.0	9.2	2.9	1.3
2.2 µF	100 V	A52	50.0	25.0	5.0	1.2	0.6
3.9 µF	100 V	A52	50.0	18.0	4.0	1.0	0.3
4.7 µF	100 V	A54	50.0	16.0	3.5	0.7	0.2
6.8 µF	100 V	A57	50.0	15.5	2.2	0.5	0.2
10 µF	100 V	A58	50.0	15.0	2.0	0.4	0.2

Maximum RMS current I_{RMS} (A) vs. frequency

Value	Rated voltage	Case size	1 kHz	10 kHz	100 kHz	500 kHz	1 MHz
1.0 µF	250 V	A57	1.0	2.2	5.5	9.0	10.0
2.2 µF	100 V	A52	1.5	2.3	6.0	7.5	10.0
3.9 µF	100 V	A52	2.0	4.0	10.0	11.0	11.5
4.7 µF	100 V	A54	2.0	4.5	10.0	12.5	12.5
6.8 µF	100 V	A57	3.0	6.0	11.0	13.0	13.5
10 µF	100 V	A58	4.0	9.0	13.0	14.0	14.5

ORDERING INFORMATION

See article table and page 10 for options and article code construction.

MARKING

- EVOX
- Rated capacitance according to IEC 60062
- Capacitance tolerance code
- Rated voltage
- Capacitor family code MDC

ARTICLE TABLE

50 VDC/30 VAC

LEAD SPACING 10 MM

Capacitance µF	Dimensions in mm B ±0.2	H ±0.2	L ±0.2	h1	ESR 500kHz mΩ	Article code
0.033	12.2	6.05	11.0	7.75	390	MDC10 333K50A52P3 TUBE
0.039	12.2	6.05	11.0	7.75	330	MDC10 393K50A52P3 TUBE
0.047	12.2	6.05	11.0	7.75	270	MDC10 473K50A52P3 TUBE
0.056	12.2	6.05	11.0	7.75	230	MDC10 563K50A52P3 TUBE
0.068	12.2	6.05	11.0	7.75	190	MDC10 683K50A52P3 TUBE
0.082	12.2	6.05	11.0	7.75	160	MDC10 823K50A52P3 TUBE
0.10	12.2	6.05	11.0	7.75	130	MDC10 104K50A52P3 TUBE
0.12	12.2	6.05	11.0	7.75	110	MDC10 124K50A52P3 TUBE
0.15	12.2	6.05	11.0	7.75	85	MDC10 154K50A52P3 TUBE
0.18	12.2	6.05	11.0	7.75	70	MDC10 184K50A52P3 TUBE
0.22	12.2	6.05	11.0	7.75	58	MDC10 224K50A52P3 TUBE
0.27	12.2	6.05	11.0	7.75	47	MDC10 274K50A52P3 TUBE
0.33	12.2	6.05	11.0	7.75	39	MDC10 334K50A52P3 TUBE
0.39	12.2	6.05	11.0	7.75	33	MDC10 394K50A52P3 TUBE
0.47	12.2	6.05	11.0	7.75	30	MDC10 474K50A52P3 TUBE
0.56	12.2	6.05	11.0	7.75	26	MDC10 564K50A52P3 TUBE
0.68	12.2	6.05	11.0	7.75	21	MDC10 684K50A52P3 TUBE
0.82	12.2	6.05	11.0	7.75	18	MDC10 824K50A52P3 TUBE
1.0	12.2	6.05	11.0	7.75	15	MDC10 105K50A52P3 TUBE
1.2	12.2	6.05	11.0	7.75	14	MDC10 125K50A52P3 TUBE
1.5	12.2	6.05	11.0	7.75	13	MDC10 155K50A52P3 TUBE
1.8	12.2	6.05	11.0	7.75	12	MDC10 185K50A52P3 TUBE
2.2	12.2	6.05	11.0	7.75	11	MDC10 225K50A52P3 TUBE
2.7	12.2	6.05	11.0	7.75	10	MDC10 275K50A52P3 TUBE
3.3	12.2	6.05	11.0	7.75	8	MDC10 335K50A52P3 TUBE
3.9	12.2	6.05	11.0	7.75	7	MDC10 395K50A52P3 TUBE
4.7	12.2	6.05	11.0	7.75	6	MDC10 475K50A52P3 TUBE
5.6	12.2	6.05	13.5	7.75	5	MDC10 565K50A54Px TUBE
6.8	12.2	6.05	16.5	7.75	5	MDC10 685K50A55Pz TUBE
8.2	12.7	9.0	23.0	10.7	4	MDC10 825K50A57Py TUBE
10	12.7	9.0	23.0	10.7	3	MDC10 106K50A57Py TUBE
12	12.7	11.0	23.0	12.5	3	MDC10 126K50A58Py TUBE
15	12.7	11.0	23.0	12.5	3	MDC10 156K50A58Py TUBE

LEAD SPACING 15 MM

Capacitance µF	Dimensions in mm B ±0.2	H ±0.2	L ±0.2	h1	ESR 500kHz mΩ	Article code
0.033	16.5	6.05	11.0	7.75	390	MDC15 333K50B53P3 TUBE
0.039	16.5	6.05	11.0	7.75	330	MDC15 393K50B53P3 TUBE
0.047	16.5	6.05	11.0	7.75	270	MDC15 473K50B53P3 TUBE
0.056	16.5	6.05	11.0	7.75	230	MDC15 563K50B53P3 TUBE
0.068	16.5	6.05	11.0	7.75	190	MDC15 683K50B53P3 TUBE
0.082	16.5	6.05	11.0	7.75	160	MDC15 823K50B53P3 TUBE
0.10	16.5	6.05	11.0	7.75	130	MDC15 104K50B53P3 TUBE
0.12	16.5	6.05	11.0	7.75	110	MDC15 124K50B53P3 TUBE
0.15	16.5	6.05	11.0	7.75	85	MDC15 154K50B53P3 TUBE
0.18	16.5	6.05	11.0	7.75	70	MDC15 184K50B53P3 TUBE
0.22	16.5	6.05	11.0	7.75	58	MDC15 224K50B53P3 TUBE
0.27	16.5	6.05	11.0	7.75	47	MDC15 274K50B53P3 TUBE
0.33	16.5	6.05	11.0	7.75	39	MDC15 334K50B53P3 TUBE
0.39	16.5	6.05	11.0	7.75	39	MDC15 394K50B53P3 TUBE
0.47	16.5	6.05	11.0	7.75	30	MDC15 474K50B53P3 TUBE
0.56	16.5	6.05	11.0	7.75	26	MDC15 564K50B53P3 TUBE
0.68	16.5	6.05	11.0	7.75	21	MDC15 684K50B53P3 TUBE
0.82	16.5	6.05	11.0	7.75	18	MDC15 824K50B53P3 TUBE
1.0	16.5	6.05	11.0	7.75	15	MDC15 105K50B53P3 TUBE
1.2	16.5	6.05	11.0	7.75	15	MDC15 125K50B53P3 TUBE
1.5	16.5	6.05	11.0	7.75	13	MDC15 155K50B53P3 TUBE
1.8	16.5	6.05	11.0	7.75	13	MDC15 185K50B53P3 TUBE
2.2	16.5	6.05	11.0	7.75	11	MDC15 225K50B53P3 TUBE
2.7	16.5	6.05	11.0	7.75	11	MDC15 275K50B53P3 TUBE
3.3	16.5	6.05	11.0	7.75	8	MDC15 335K50B53P3 TUBE
3.9	16.5	6.05	11.0	7.75	8	MDC15 395K50B53P3 TUBE
4.7	16.5	6.05	11.0	7.75	6	MDC15 475K50B53P3 TUBE
5.6	16.5	6.05	11.0	7.75	5	MDC15 565K50B53P3 TUBE
6.8	16.5	6.05	11.0	7.75	5	MDC15 685K50B53P3 TUBE

100 VDC/63 VAC

LEAD SPACING 10 MM

Capacitance µF	Dimensions in mm B ±0.2	H ±0.2	L ±0.2	h1	ESR 500kHz mΩ	Article code
0.033	12.2	6.05	11.0	7.75	390	MDC10 333K100A52P3 TUBE
0.039	12.2	6.05	11.0	7.75	330	MDC10 393K100A52P3 TUBE
0.047	12.2	6.05	11.0	7.75	270	MDC10 473K100A52P3 TUBE
0.056	12.2	6.05	11.0	7.75	230	MDC10 563K100A52P3 TUBE
0.068	12.2	6.05	11.0	7.75	190	MDC10 683K100A52P3 TUBE
0.082	12.2	6.05	11.0	7.75	160	MDC10 823K100A52P3 TUBE
0.10	12.2	6.05	11.0	7.75	130	MDC10 104K100A52P3 TUBE
0.12	12.2	6.05	11.0	7.75	110	MDC10 124K100A52P3 TUBE
0.15	12.2	6.05	11.0	7.75	85	MDC10 154K100A52P3 TUBE
0.18	12.2	6.05	11.0	7.75	70	MDC10 184K100A52P3 TUBE
0.22	12.2	6.05	11.0	7.75	58	MDC10 224K100A52P3 TUBE
0.27	12.2	6.05	11.0	7.75	47	MDC10 274K100A52P3 TUBE
0.33	12.2	6.05	11.0	7.75	39	MDC10 334K100A52P3 TUBE
0.39	12.2	6.05	11.0	7.75	33	MDC10 394K100A52P3 TUBE
0.47	12.2	6.05	11.0	7.75	30	MDC10 474K100A52P3 TUBE
0.56	12.2	6.05	11.0	7.75	26	MDC10 564K100A52P3 TUBE
0.68	12.2	6.05	11.0	7.75	21	MDC10 684K100A52P3 TUBE
0.82	12.2	6.05	11.0	7.75	18	MDC10 824K100A52P3 TUBE
1.0	12.2	6.05	11.0	7.75	15	MDC10 105K100A52P3 TUBE
1.2	12.2	6.05	11.0	7.75	14	MDC10 125K100A52P3 TUBE
1.5	12.2	6.05	11.0	7.75	13	MDC10 155K100A52P3 TUBE
1.8	12.2	6.05	11.0	7.75	12	MDC10 185K100A52P3 TUBE
2.2	12.2	6.05	11.0	7.75	11	MDC10 225K100A52P3 TUBE
2.7	12.2	6.05	11.0	7.75	10	MDC10 275K100A52P3 TUBE *
3.3	12.2	6.05	11.0	7.75	8	MDC10 335K100A52P3 TUBE *
3.9	12.2	6.05	11.0	7.75	7	MDC10 395K100A52P3 TUBE *
4.7	12.2	6.05	13.5	7.75	6	MDC10 475K100A54Px TUBE *
4.7	12.7	9.0	14.0	10.5	6	MDC10 475K100A53Px TR32 *
5.6	12.2	6.05	16.5	7.75	5	MDC10 565K100A55Pz TUBE *
6.8	12.7	9.0	23.0	10.7	5	MDC10 685K100A57Py TUBE
8.2	12.7	11.0	23.0	12.5	4	MDC10 825K100A58Py TUBE
10	12.7	11.0	23.0	12.5	3	MDC10 106K100A58Py TUBE

LEAD SPACING 15 MM

Capacitance µF	Dimensions in mm B ±0.2	H ±0.2	L ±0.2	h1	ESR 500kHz mΩ	Article code
0.033	16.5	6.05	11.0	7.75	390	MDC15 333K100B53P3 TUBE
0.039	16.5	6.05	11.0	7.75	330	MDC15 393K100B53P3 TUBE
0.047	16.5	6.05	11.0	7.75	270	MDC15 473K100B53P3 TUBE
0.056	16.5	6.05	11.0	7.75	230	MDC15 563K100B53P3 TUBE
0.068	16.5	6.05	11.0	7.75	190	MDC15 683K100B53P3 TUBE
0.082	16.5	6.05	11.0	7.75	160	MDC15 823K100B53P3 TUBE
0.10	16.5	6.05	11.0	7.75	130	MDC15 104K100B53P3 TUBE
0.12	16.5	6.05	11.0	7.75	110	MDC15 124K100B53P3 TUBE
0.15	16.5	6.05	11.0	7.75	85	MDC15 154K100B53P3 TUBE
0.18	16.5	6.05	11.0	7.75	70	MDC15 184K100B53P3 TUBE
0.22	16.5	6.05	11.0	7.75	58	MDC15 224K100B53P3 TUBE
0.27	16.5	6.05	11.0	7.75	47	MDC15 274K100B53P3 TUBE
0.33	16.5	6.05	11.0	7.75	39	MDC15 334K100B53P3 TUBE
0.39	16.5	6.05	11.0	7.75	39	MDC15 394K100B53P3 TUBE
0.47	16.5	6.05	11.0	7.75	30	MDC15 474K100B53P3 TUBE
0.56	16.5	6.05	11.0	7.75	26	MDC15 564K100B53P3 TUBE

* 100 VDC/35 VAC

ARTICLE TABLE

100 VDC/63 VAC

LEAD SPACING 15 MM

Capacitance µF	Dimensions in mm B ±0.2	H ±0.2	L ±0.2	h1	ESR 500kHz mΩ	Article code
0.68	16.5	6.05	11.0	7.75	21	MDC15 684K100B53P3 TUBE
0.82	16.5	6.05	11.0	7.75	18	MDC15 824K100B53P3 TUBE
1.0	16.5	6.05	11.0	7.75	15	MDC15 105K100B53P3 TUBE
1.2	16.5	6.05	11.0	7.75	15	MDC15 125K100B53P3 TUBE
1.5	16.5	6.05	11.0	7.75	13	MDC15 155K100B53P3 TUBE
1.8	16.5	6.05	11.0	7.75	13	MDC15 185K100B53P3 TUBE
2.2	16.5	6.05	11.0	7.75	11	MDC15 225K100B53P3 TUBE
2.7	16.5	6.05	11.0	7.75	11	MDC15 275K100B53P3 TUBE
3.3	16.5	6.05	11.0	7.75	8	MDC15 335K100B53P3 TUBE
3.9	16.5	6.05	11.0	7.75	8	MDC15 395K100B53P3 TUBE
4.7	16.5	6.05	11.0	7.75	6	MDC15 475K100B53P3 TUBE *
5.6	16.5	6.05	12.2	7.75	5	MDC15 565K100B55Px TUBE

250 VDC/160 VAC

LEAD SPACING 10 MM

Capacitance µF	Dimensions in mm B ±0.2	H ±0.2	L ±0.2	h1	ESR 500kHz mΩ	Article code
0.033	12.2	6.05	11.0	7.75	390	MDC10 333K250A52P3 TUBE
0.039	12.2	6.05	11.0	7.75	330	MDC10 393K250A52P3 TUBE
0.047	12.2	6.05	11.0	7.75	270	MDC10 473K250A52P3 TUBE
0.056	12.2	6.05	11.0	7.75	230	MDC10 563K250A52P3 TUBE
0.068	12.2	6.05	11.0	7.75	190	MDC10 683K250A52P3 TUBE
0.082	12.2	6.05	11.0	7.75	160	MDC10 823K250A52P3 TUBE
0.10	12.2	6.05	11.0	7.75	130	MDC10 104K250A52P3 TUBE
0.12	12.2	6.05	11.0	7.75	130	MDC10 124K250A52P3 TUBE
0.15	12.2	6.05	11.0	7.75	130	MDC10 154K250A52P3 TUBE
0.18	12.2	6.05	11.0	7.75	70	MDC10 184K250A52P3 TUBE
0.22	12.2	6.05	11.0	7.75	58	MDC10 224K250A52P3 TUBE
0.27	12.2	6.05	11.0	7.75	47	MDC10 274K250A52P3 TUBE
0.33	12.2	6.05	11.0	7.75	39	MDC10 334K250A52P3 TUBE
0.39	12.2	6.05	11.0	7.75	33	MDC10 394K250A52P3 TUBE
0.47	12.2	6.05	11.0	7.75	30	MDC10 474K250A52P3 TUBE
0.56	12.2	6.05	13.5	7.75	26	MDC10 564K250A54Px TUBE
0.68	12.2	6.05	16.5	7.75	21	MDC10 684K250A55Pz TUBE
0.82	12.7	9.0	23.0	10.7	18	MDC10 824K250A57Py TUBE
1.0	12.7	9.0	23.0	10.7	15	MDC10 105K250A57Py TUBE
1.2	12.7	11.0	23.0	12.5	14	MDC10 125K250A58Py TUBE
1.5	12.7	11.0	23.0	12.5	13	MDC10 155K250A58Py TUBE

LEAD SPACING 15 MM

Capacitance µF	Dimensions in mm B ±0.2	H ±0.2	L ±0.2	h1	ESR 500kHz mΩ	Article code
0.033	16.5	6.05	11.0	7.75	390	MDC15 333K250B53P3 TUBE
0.039	16.5	6.05	11.0	7.75	330	MDC15 393K250B53P3 TUBE
0.047	16.5	6.05	11.0	7.75	270	MDC15 473K250B53P3 TUBE
0.056	16.5	6.05	11.0	7.75	230	MDC15 563K250B53P3 TUBE
0.068	16.5	6.05	11.0	7.75	190	MDC15 683K250B53P3 TUBE
0.082	16.5	6.05	11.0	7.75	160	MDC15 823K250B53P3 TUBE
0.10	16.5	6.05	11.0	7.75	130	MDC15 104K250B53P3 TUBE
0.12	16.5	6.05	11.0	7.75	110	MDC15 124K250B53P3 TUBE
0.15	16.5	6.05	11.0	7.75	85	MDC15 154K250B53P3 TUBE
0.18	16.5	6.05	11.0	7.75	70	MDC15 184K250B53P3 TUBE
0.22	16.5	6.05	11.0	7.75	58	MDC15 224K250B53P3 TUBE
0.27	16.5	6.05	11.0	7.75	47	MDC15 274K250B53P3 TUBE
0.33	16.5	6.05	11.0	7.75	39	MDC15 334K250B53P3 TUBE
0.39	16.5	6.05	11.0	7.75	39	MDC15 394K250B53P3 TUBE
0.47	16.5	6.05	11.0	7.75	30	MDC15 474K250B53P3 TUBE
0.56	16.5	6.05	11.0	7.75	26	MDC15 564K250B53P3 TUBE
0.68	16.5	6.05	11.0	7.75	21	MDC15 684K250B53P3 TUBE

* 100 VDC/35 VAC

400 VDC/200 VAC

LEAD SPACING 10 MM

Capacitance µF	Dimensions in mm B ±0.2	H ±0.2	L ±0.2	h1	ESR 500kHz mΩ	Article code
0.033	12.2	6.05	11.0	7.75	390	MDC10 333K400A52P3 TUBE
0.039	12.2	6.05	11.0	7.75	330	MDC10 393K400A52P3 TUBE
0.047	12.2	6.05	11.0	7.75	270	MDC10 473K400A52P3 TUBE
0.056	12.2	6.05	11.0	7.75	230	MDC10 563K400A52P3 TUBE
0.068	12.2	6.05	11.0	7.75	190	MDC10 683K400A52P3 TUBE
0.082	12.2	6.05	11.0	7.75	160	MDC10 823K400A52P3 TUBE
0.10	12.2	6.05	11.0	7.75	130	MDC10 104K400A52P3 TUBE
0.12	12.2	6.05	11.0	7.75	110	MDC10 124K400A52P3 TUBE
0.15	12.2	6.05	11.0	7.75	85	MDC10 154K400A52P3 TUBE
0.18	12.2	6.05	11.0	7.75	70	MDC10 184K400A52P3 TUBE
0.22	12.7	9.0	23.0	10.7	58	MDC10 224K400A57Py TUBE
0.27	12.7	9.0	23.0	10.7	47	MDC10 274K400A57Py TUBE
0.33	12.7	9.0	23.0	10.7	39	MDC10 334K400A57Py TUBE
0.39	12.7	11.0	23.0	12.5	33	MDC10 394K400A58Py TUBE
0.47	12.7	11.0	23.0	12.5	30	MDC10 474K400A58Py TUBE

LEAD SPACING 15 MM

Capacitance µF	Dimensions in mm B ±0.2	H ±0.2	L ±0.2	h1	ESR 500kHz mΩ	Article code
0.033	16.5	6.05	11.0	7.75	390	MDC15 333K400B53P3 TUBE
0.039	16.5	6.05	11.0	7.75	330	MDC15 393K400B53P3 TUBE
0.047	16.5	6.05	11.0	7.75	270	MDC15 473K400B53P3 TUBE
0.056	16.5	6.05	11.0	7.75	230	MDC15 563K400B53P3 TUBE
0.068	16.5	6.05	11.0	7.75	190	MDC15 683K400B53P3 TUBE
0.082	16.5	6.05	11.0	7.75	160	MDC15 823K400B53P3 TUBE
0.10	16.5	6.05	11.0	7.75	130	MDC15 104K400B53P3 TUBE
0.12	16.5	6.05	11.0	7.75	110	MDC15 124K400B53P3 TUBE
0.15	16.5	6.05	11.0	7.75	85	MDC15 154K400B53P3 TUBE
0.18	16.5	6.05	11.0	7.75	70	MDC15 184K400B53P3 TUBE
0.22	16.5	6.05	11.0	7.75	58	MDC15 224K400B53P3 TUBE
0.27	16.5	6.05	11.0	7.75	47	MDC15 274K400B53P3 TUBE
0.33	16.5	6.05	12.2	7.75	39	MDC15 334K400B55Px TUBE

630 VDC/220 VAC

LEAD SPACING 10 MM

Capacitance µF	Dimensions in mm B ±0.2	H ±0.2	L ±0.2	h1	ESR 500kHz mΩ	Article code
0.033	12.2	6.05	11.0	7.75	390	MDC10 333K630A52P3 TUBE
0.039	12.2	6.05	11.0	7.75	330	MDC10 393K630A52P3 TUBE
0.047	12.2	6.05	11.0	7.75	270	MDC10 473K630A52P3 TUBE
0.056	12.2	6.05	11.0	7.75	230	MDC10 563K630A52P3 TUBE
0.068	12.2	6.05	13.5	7.75	190	MDC10 683K630A54Px TUBE
0.082	12.7	11.0	23.0	12.5	160	MDC10 823K630A58Py TUBE
0.10	12.7	11.0	23.0	12.5	130	MDC10 104K630A58Py TUBE
0.12	12.7	11.0	23.0	12.5	110	MDC10 124K630A58Py TUBE
0.15	12.7	11.0	23.0	12.5	85	MDC10 154K630A58Py TUBE
0.18	12.7	11.0	23.0	12.5	70	MDC10 184K630A58Py TUBE

LEAD SPACING 15 MM

Capacitance µF	Dimensions in mm B ±0.2	H ±0.2	L ±0.2	h1	ESR 500kHz mΩ	Article code
0.033	16.5	6.05	11.0	7.75	390	MDC15 333K630B53P3 TUBE
0.039	16.5	6.05	11.0	7.75	330	MDC15 393K630B53P3 TUBE
0.047	16.5	6.05	11.0	7.75	270	MDC15 473K630B53P3 TUBE
0.056	16.5	6.05	11.0	7.75	230	MDC15 563K630B53P3 TUBE
0.068	16.5	6.05	11.0	7.75	190	MDC15 683K630B53P3 TUBE
0.082	16.5	6.05	11.0	7.75	160	MDC15 823K630B53P3 TUBE
0.10	16.5	6.05	11.0	7.75	130	MDC15 104K630B53P3 TUBE

x = Number of leads per side, 3 or 4
z = Number of leads per side, 3, 4 or 5
y = Number of leads per side, 7 or 8

MDK

- **Metallized polyester (PET) DIL**
- **Low ESR and ESL**
- **Three and four pole connection possible**
- **Good temperature stability**
- **No voltage dependence of capacitance and dissipation factor**

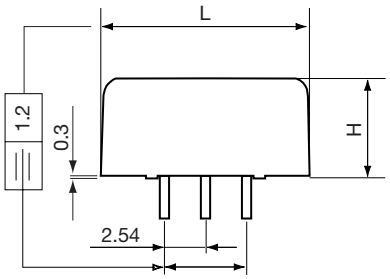
RoHS Compliant

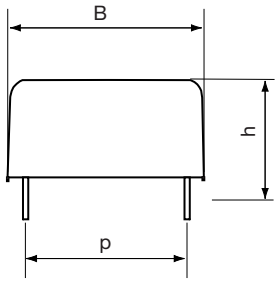
TYPICAL APPLICATIONS

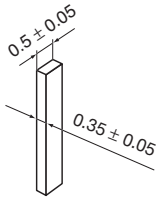
High frequency switched mode power supplies and DC-DC converters. Input/ output filtering.

CONSTRUCTION

DIL metallized polyester (PET) film capacitor. Encapsulation in self-extinguishing material meeting the requirements of UL 94V-0.







Detail of a lead

TECHNICAL DATA

Rated voltage U_R VDC	50	100	250	400	630
Rated voltage U_R VAC	30	63	160	200	220
Capacitance range, µF	0.033 - 15	0.033 - 10	0.033 - 1.5	0.033 - 0.47	0.033 - 0.18

Capacitance tolerance
± 10%, ± 5%, other tolerances on request

Category temperature range
–55 to +125°C

Rated temperature
+85 °C

Voltage derating
The rated voltage is decreased with 1.25%/°C from +85 °C

Climatic category
55/125/56

Test voltage
1.6 x U_R, 60s

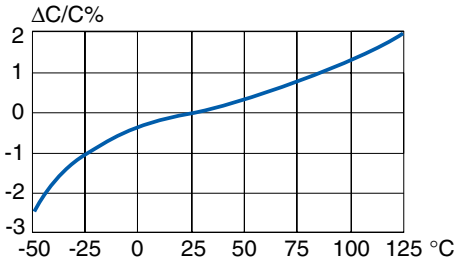
Insulation resistance
Minimum value between terminals
Measured at +20 °C according to IEC 60384-2

	C ≤ 0.33 µF	C > 0.33 µF
U_R ≤ 100 V	15 000 MΩ	5 000 s
U_R > 100 V	30 000 MΩ	10 000 s

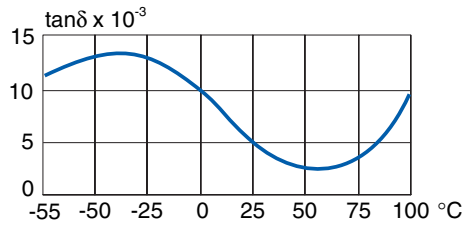
Dissipation factor
Maximum values at +23°C

	C ≤ 0.1 µF	0.1 < C ≤ 3.3 µF	3.3 < C < 10 µF	C ≥ 10 µF
1 kHz	0.8 %	0.8 %	0.8 %	0.8 %
10 kHz	1.5 %	1.5 %	1.5 %	2.0 %
100 kHz	2.5 %	5.0 %	—	—

Self inductancy
Approximately 4 nH



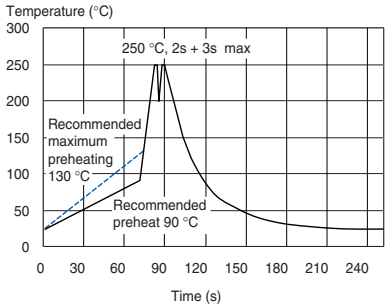
Typical capacitance vs temperature at 1 kHz



Typical dissipation factor vs temperature at 1 kHz

RECOMMENDED SOLDERING CONDITIONS

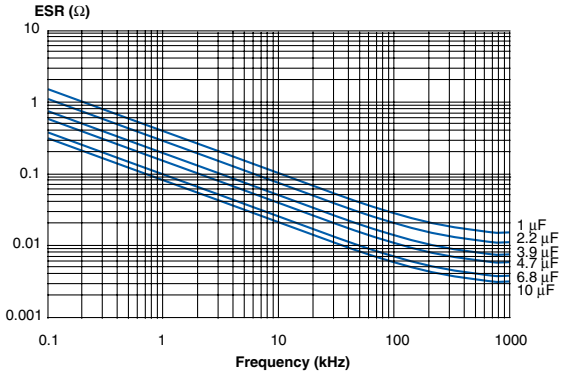
Electrode temperature, Wave soldering
Preheating temperature should be less than 130°C. The peak temperature must not exceed 250°C.



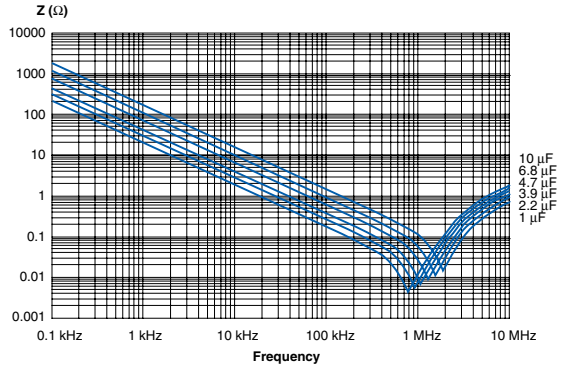
Recommended wave soldering profile

TYPICAL DATA

ESR vs. frequency



Impedance vs. frequency



Maximum RMS voltage U_{RMS} (V) vs. frequency

Value	Rated voltage	Case size	1 kHz	10 kHz	100 kHz	500 kHz	1 MHz
1.0 µF	250 V	A57	150.0	36.0	9.2	2.9	1.3
2.2 µF	100 V	A52	50.0	25.0	5.0	1.2	0.6
3.9 µF	100 V	A52	50.0	18.0	4.0	1.0	0.3
4.7 µF	100 V	A54	50.0	16.0	3.5	0.7	0.2
6.8 µF	100 V	A57	50.0	15.5	2.2	0.5	0.2
10 µF	100 V	A58	50.0	15.0	2.0	0.4	0.2

Maximum RMS current I_{RMS} (A) vs. frequency

Value	Rated voltage	Case size	1 kHz	10 kHz	100 kHz	500 kHz	1 MHz
1.0 µF	250 V	A57	1.0	2.2	5.5	9.0	10.0
2.2 µF	100 V	A52	1.5	2.3	6.0	7.5	10.0
3.9 µF	100 V	A52	2.0	4.0	10.0	11.0	11.5
4.7 µF	100 V	A54	2.0	4.5	10.0	12.5	12.5
6.8 µF	100 V	A57	3.0	6.0	11.0	13.0	13.5
10 µF	100 V	A58	4.0	9.0	13.0	14.0	14.5

ORDERING INFORMATION

See article table and page 10 for options and article code construction.

MARKING

- EVOX
- Rated capacitance according to IEC 60062
- Capacitance tolerance code
- Rated voltage
- Capacitor family code MDK

ARTICLE TABLE

50 VDC/30 VAC

LEAD SPACING 10 MM

Capacitance µF	Dimensions in mm B ±0.2	H ±0.2	L ±0.2	h	ESR 500kHz mΩ	Article code
0.033	12.2	6.05	11.0	6.25	390	MDK10 333K50A52P3 TUBE
0.039	12.2	6.05	11.0	6.25	330	MDK10 393K50A52P3 TUBE
0.047	12.2	6.05	11.0	6.25	270	MDK10 473K50A52P3 TUBE
0.056	12.2	6.05	11.0	6.25	230	MDK10 563K50A52P3 TUBE
0.068	12.2	6.05	11.0	6.25	190	MDK10 683K50A52P3 TUBE
0.082	12.2	6.05	11.0	6.25	160	MDK10 823K50A52P3 TUBE
0.10	12.2	6.05	11.0	6.25	130	MDK10 104K50A52P3 TUBE
0.12	12.2	6.05	11.0	6.25	110	MDK10 124K50A52P3 TUBE
0.15	12.2	6.05	11.0	6.25	85	MDK10 154K50A52P3 TUBE
0.18	12.2	6.05	11.0	6.25	70	MDK10 184K50A52P3 TUBE
0.22	12.2	6.05	11.0	6.25	58	MDK10 224K50A52P3 TUBE
0.27	12.2	6.05	11.0	6.25	47	MDK10 274K50A52P3 TUBE
0.33	12.2	6.05	11.0	6.25	39	MDK10 334K50A52P3 TUBE
0.39	12.2	6.05	11.0	6.25	33	MDK10 394K50A52P3 TUBE
0.47	12.2	6.05	11.0	6.25	30	MDK10 474K50A52P3 TUBE
0.56	12.2	6.05	11.0	6.25	26	MDK10 564K50A52P3 TUBE
0.68	12.2	6.05	11.0	6.25	21	MDK10 684K50A52P3 TUBE
0.82	12.2	6.05	11.0	6.25	18	MDK10 824K50A52P3 TUBE
1.0	12.2	6.05	11.0	6.25	15	MDK10 105K50A52P3 TUBE
1.2	12.2	6.05	11.0	6.25	14	MDK10 125K50A52P3 TUBE
1.5	12.2	6.05	11.0	6.25	13	MDK10 155K50A52P3 TUBE
1.8	12.2	6.05	11.0	6.25	12	MDK10 185K50A52P3 TUBE
2.2	12.2	6.05	11.0	6.25	11	MDK10 225K50A52P3 TUBE
2.7	12.2	6.05	11.0	6.25	10	MDK10 275K50A52P3 TUBE
3.3	12.2	6.05	11.0	6.25	8	MDK10 335K50A52P3 TUBE
3.9	12.2	6.05	11.0	6.25	7	MDK10 395K50A52P3 TUBE
4.7	12.2	6.05	11.0	6.25	6	MDK10 475K50A52P3 TUBE
5.6	12.2	6.05	13.5	6.25	5	MDK10 565K50A54Px TUBE
6.8	12.2	6.05	16.5	6.25	5	MDK10 685K50A55Pz TUBE
8.2	12.7	9.0	23.0	10.7	4	MDK10 825K50A57Py TUBE
10	12.7	9.0	23.0	10.7	3	MDK10 106K50A57Py TUBE
12	12.7	11.0	23.0	12.5	3	MDK10 126K50A58Py TUBE
15	12.7	11.0	23.0	12.5	3	MDK10 156K50A58Py TUBE

LEAD SPACING 15 MM

Capacitance µF	Dimensions in mm B ±0.2	H ±0.2	L ±0.2	h	ESR 500kHz mΩ	Article code
0.033	16.5	6.05	11.0	6.25	390	MDK15 333K50B53P3 TUBE
0.039	16.5	6.05	11.0	6.25	330	MDK15 393K50B53P3 TUBE
0.047	16.5	6.05	11.0	6.25	270	MDK15 473K50B53P3 TUBE
0.056	16.5	6.05	11.0	6.25	230	MDK15 563K50B53P3 TUBE
0.068	16.5	6.05	11.0	6.25	190	MDK15 683K50B53P3 TUBE
0.082	16.5	6.05	11.0	6.25	160	MDK15 823K50B53P3 TUBE
0.10	16.5	6.05	11.0	6.25	130	MDK15 104K50B53P3 TUBE
0.12	16.5	6.05	11.0	6.25	110	MDK15 124K50B53P3 TUBE
0.15	16.5	6.05	11.0	6.25	85	MDK15 154K50B53P3 TUBE
0.18	16.5	6.05	11.0	6.25	70	MDK15 184K50B53P3 TUBE
0.22	16.5	6.05	11.0	6.25	58	MDK15 224K50B53P3 TUBE
0.27	16.5	6.05	11.0	6.25	47	MDK15 274K50B53P3 TUBE
0.33	16.5	6.05	11.0	6.25	39	MDK15 334K50B53P3 TUBE
0.39	16.5	6.05	11.0	6.25	39	MDK15 394K50B53P3 TUBE
0.47	16.5	6.05	11.0	6.25	30	MDK15 474K50B53P3 TUBE
0.56	16.5	6.05	11.0	6.25	26	MDK15 564K50B53P3 TUBE
0.68	16.5	6.05	11.0	6.25	21	MDK15 684K50B53P3 TUBE
0.82	16.5	6.05	11.0	6.25	18	MDK15 824K50B53P3 TUBE
1.0	16.5	6.05	11.0	6.25	15	MDK15 105K50B53P3 TUBE
1.2	16.5	6.05	11.0	6.25	15	MDK15 125K50B53P3 TUBE
1.5	16.5	6.05	11.0	6.25	13	MDK15 155K50B53P3 TUBE
1.8	16.5	6.05	11.0	6.25	13	MDK15 185K50B53P3 TUBE
2.2	16.5	6.05	11.0	6.25	11	MDK15 225K50B53P3 TUBE
2.7	16.5	6.05	11.0	6.25	11	MDK15 275K50B53P3 TUBE
3.3	16.5	6.05	11.0	6.25	8	MDK15 335K50B53P3 TUBE
3.9	16.5	6.05	11.0	6.25	8	MDK15 395K50B53P3 TUBE
4.7	16.5	6.05	11.0	6.25	6	MDK15 475K50B53P3 TUBE
5.6	16.5	6.05	11.0	6.25	5	MDK15 565K50B53P3 TUBE
6.8	16.5	6.05	11.0	6.25	5	MDK15 685K50B53P3 TUBE

100 VDC/63 VAC

LEAD SPACING 10 MM

Capacitance µF	Dimensions in mm B ±0.2	H ±0.2	L ±0.2	h	ESR 500kHz mΩ	Article code
0.033	12.2	6.05	11.0	6.25	390	MDK10 333K100A52P3 TUBE
0.039	12.2	6.05	11.0	6.25	330	MDK10 393K100A52P3 TUBE
0.047	12.2	6.05	11.0	6.25	270	MDK10 473K100A52P3 TUBE
0.056	12.2	6.05	11.0	6.25	230	MDK10 563K100A52P3 TUBE
0.068	12.2	6.05	11.0	6.25	190	MDK10 683K100A52P3 TUBE
0.082	12.2	6.05	11.0	6.25	160	MDK10 823K100A52P3 TUBE
0.10	12.2	6.05	11.0	6.25	130	MDK10 104K100A52P3 TUBE
0.12	12.2	6.05	11.0	6.25	110	MDK10 124K100A52P3 TUBE
0.15	12.2	6.05	11.0	6.25	85	MDK10 154K100A52P3 TUBE
0.18	12.2	6.05	11.0	6.25	70	MDK10 184K100A52P3 TUBE
0.22	12.2	6.05	11.0	6.25	58	MDK10 224K100A52P3 TUBE
0.27	12.2	6.05	11.0	6.25	47	MDK10 274K100A52P3 TUBE
0.33	12.2	6.05	11.0	6.25	39	MDK10 334K100A52P3 TUBE
0.39	12.2	6.05	11.0	6.25	33	MDK10 394K100A52P3 TUBE
0.47	12.2	6.05	11.0	6.25	30	MDK10 474K100A52P3 TUBE
0.56	12.2	6.05	11.0	6.25	26	MDK10 564K100A52P3 TUBE
0.68	12.2	6.05	11.0	6.25	21	MDK10 684K100A52P3 TUBE
0.82	12.2	6.05	11.0	6.25	18	MDK10 824K100A52P3 TUBE
1.0	12.2	6.05	11.0	6.25	15	MDK10 105K100A52P3 TUBE
1.2	12.2	6.05	11.0	6.25	14	MDK10 125K100A52P3 TUBE
1.5	12.2	6.05	11.0	6.25	13	MDK10 155K100A52P3 TUBE
1.8	12.2	6.05	11.0	6.25	12	MDK10 185K100A52P3 TUBE
2.2	12.2	6.05	11.0	6.25	11	MDK10 225K100A52P3 TUBE
2.7	12.2	6.05	11.0	6.25	10	MDK10 275K100A52P3 TUBE *
3.3	12.2	6.05	11.0	6.25	8	MDK10 335K100A52P3 TUBE *
3.9	12.2	6.05	11.0	6.25	7	MDK10 395K100A52P3 TUBE *
4.7	12.2	6.05	13.5	6.25	6	MDK10 475K100A54Px TUBE *
4.7	12.7	9.0	14.0	10.5	6	MDK10 475K100A53Px TR32 *
5.6	12.2	6.05	16.5	6.25	5	MDK10 565K100A55Pz TUBE *
6.8	12.7	9.0	23.0	10.7	5	MDK10 685K100A57Py TUBE
8.2	12.7	11.0	23.0	12.5	4	MDK10 825K100A58Py TUBE
10	12.7	11.0	23.0	12.5	3	MDK10 106K100A58Py TUBE

LEAD SPACING 15 MM

Capacitance µF	Dimensions in mm B ±0.2	H ±0.2	L ±0.2	h	ESR 500kHz mΩ	Article code
0.033	16.5	6.05	11.0	6.25	390	MDK15 333K100B53P3 TUBE
0.039	16.5	6.05	11.0	6.25	330	MDK15 393K100B53P3 TUBE
0.047	16.5	6.05	11.0	6.25	270	MDK15 473K100B53P3 TUBE
0.056	16.5	6.05	11.0	6.25	230	MDK15 563K100B53P3 TUBE
0.068	16.5	6.05	11.0	6.25	190	MDK15 683K100B53P3 TUBE
0.082	16.5	6.05	11.0	6.25	160	MDK15 823K100B53P3 TUBE
0.10	16.5	6.05	11.0	6.25	130	MDK15 104K100B53P3 TUBE
0.12	16.5	6.05	11.0	6.25	110	MDK15 124K100B53P3 TUBE
0.15	16.5	6.05	11.0	6.25	85	MDK15 154K100B53P3 TUBE
0.18	16.5	6.05	11.0	6.25	70	MDK15 184K100B53P3 TUBE
0.22	16.5	6.05	11.0	6.25	58	MDK15 224K100B53P3 TUBE
0.27	16.5	6.05	11.0	6.25	47	MDK15 274K100B53P3 TUBE
0.33	16.5	6.05	11.0	6.25	39	MDK15 334K100B53P3 TUBE
0.39	16.5	6.05	11.0	6.25	39	MDK15 394K100B53P3 TUBE
0.47	16.5	6.05	11.0	6.25	30	MDK15 474K100B53P3 TUBE
0.56	16.5	6.05	11.0	6.25	26	MDK15 564K100B53P3 TUBE

* 100 VDC/35 VAC

ARTICLE TABLE

100 VDC/63 VAC

LEAD SPACING 15 MM

Capacitance µF	B ±0.2	H ±0.2	L ±0.2	h	ESR 500kHz mΩ	Article code
0.68	16.5	6.05	11.0	6.25	21	MDK15 684K100B53P3 TUBE
0.82	16.5	6.05	11.0	6.25	18	MDK15 824K100B53P3 TUBE
1.0	16.5	6.05	11.0	6.25	15	MDK15 105K100B53P3 TUBE
1.2	16.5	6.05	11.0	6.25	15	MDK15 125K100B53P3 TUBE
1.5	16.5	6.05	11.0	6.25	13	MDK15 155K100B53P3 TUBE
1.8	16.5	6.05	11.0	6.25	13	MDK15 185K100B53P3 TUBE
2.2	16.5	6.05	11.0	6.25	11	MDK15 225K100B53P3 TUBE
2.7	16.5	6.05	11.0	6.25	11	MDK15 275K100B53P3 TUBE
3.3	16.5	6.05	11.0	6.25	8	MDK15 335K100B53P3 TUBE
3.9	16.5	6.05	11.0	6.25	8	MDK15 395K100B53P3 TUBE
4.7	16.5	6.05	11.0	6.25	6	MDK15 475K100B53P3 TUBE *
5.6	16.5	6.05	12.2	6.25	5	MDK15 565K100B55Px TUBE *

250 VDC/160 VAC

LEAD SPACING 10 MM

Capacitance µF	B ±0.2	H ±0.2	L ±0.2	h	ESR 500kHz mΩ	Article code
0.033	12.2	6.05	11.0	6.25	390	MDK10 333K250A52P3 TUBE
0.039	12.2	6.05	11.0	6.25	330	MDK10 393K250A52P3 TUBE
0.047	12.2	6.05	11.0	6.25	270	MDK10 473K250A52P3 TUBE
0.056	12.2	6.05	11.0	6.25	230	MDK10 563K250A52P3 TUBE
0.068	12.2	6.05	11.0	6.25	190	MDK10 683K250A52P3 TUBE
0.082	12.2	6.05	11.0	6.25	160	MDK10 823K250A52P3 TUBE
0.10	12.2	6.05	11.0	6.25	130	MDK10 104K250A52P3 TUBE
0.12	12.2	6.05	11.0	6.25	110	MDK10 124K250A52P3 TUBE
0.15	12.2	6.05	11.0	6.25	85	MDK10 154K250A52P3 TUBE
0.18	12.2	6.05	11.0	6.25	70	MDK10 184K250A52P3 TUBE
0.22	12.2	6.05	11.0	6.25	58	MDK10 224K250A52P3 TUBE
0.27	12.2	6.05	11.0	6.25	47	MDK10 274K250A52P3 TUBE
0.33	12.2	6.05	11.0	6.25	39	MDK10 334K250A52P3 TUBE
0.39	12.2	6.05	11.0	6.25	33	MDK10 394K250A52P3 TUBE
0.47	12.2	6.05	11.0	6.25	30	MDK10 474K250A52P3 TUBE
0.56	12.2	6.05	13.5	6.25	26	MDK10 564K250A54Px TUBE
0.68	12.2	6.05	16.5	6.25	21	MDK10 684K250A55Pz TUBE
0.82	12.7	9.0	23.0	10.7	18	MDK10 824K250A57Py TUBE
1.0	12.7	9.0	23.0	10.7	15	MDK10 105K250A57Py TUBE
1.2	12.7	11.0	23.0	12.5	14	MDK10 125K250A58Py TUBE
1.5	12.7	11.0	23.0	12.5	13	MDK10 155K250A58Py TUBE

LEAD SPACING 15 MM

Capacitance µF	B ±0.2	H ±0.2	L ±0.2	h	ESR 500kHz mΩ	Article code
0.033	16.5	6.05	11.0	6.25	390	MDK15 333K250B53P3 TUBE
0.039	16.5	6.05	11.0	6.25	330	MDK15 393K250B53P3 TUBE
0.047	16.5	6.05	11.0	6.25	270	MDK15 473K250B53P3 TUBE
0.056	16.5	6.05	11.0	6.25	230	MDK15 563K250B53P3 TUBE
0.068	16.5	6.05	11.0	6.25	190	MDK15 683K250B53P3 TUBE
0.082	16.5	6.05	11.0	6.25	160	MDK15 823K250B53P3 TUBE
0.10	16.5	6.05	11.0	6.25	130	MDK15 104K250B53P3 TUBE
0.12	16.5	6.05	11.0	6.25	110	MDK15 124K250B53P3 TUBE
0.15	16.5	6.05	11.0	6.25	85	MDK15 154K250B53P3 TUBE
0.18	16.5	6.05	11.0	6.25	70	MDK15 184K250B53P3 TUBE
0.22	16.5	6.05	11.0	6.25	58	MDK15 224K250B53P3 TUBE
0.27	16.5	6.05	11.0	6.25	47	MDK15 274K250B53P3 TUBE
0.33	16.5	6.05	11.0	6.25	39	MDK15 334K250B53P3 TUBE
0.39	16.5	6.05	11.0	6.25	39	MDK15 394K250B53P3 TUBE
0.47	16.5	6.05	11.0	6.25	30	MDK15 474K250B53P3 TUBE
0.56	16.5	6.05	11.0	6.25	26	MDK15 564K250B53P3 TUBE
0.68	16.5	6.05	11.0	6.25	21	MDK15 684K250B53P3 TUBE

* 100 VDC/35 VAC

400 VDC/200 VAC

LEAD SPACING 10 MM

Capacitance µF	B ±0.2	H ±0.2	L ±0.2	h	ESR 500kHz mΩ	Article code
0.033	12.2	6.05	11.0	6.25	390	MDK10 333K400A52P3 TUBE
0.039	12.2	6.05	11.0	6.25	330	MDK10 393K400A52P3 TUBE
0.047	12.2	6.05	11.0	6.25	270	MDK10 473K400A52P3 TUBE
0.056	12.2	6.05	11.0	6.25	230	MDK10 563K400A52P3 TUBE
0.068	12.2	6.05	11.0	6.25	190	MDK10 683K400A52P3 TUBE
0.082	12.2	6.05	11.0	6.25	160	MDK10 823K400A52P3 TUBE
0.10	12.2	6.05	11.0	6.25	130	MDK10 104K400A52P3 TUBE
0.12	12.2	6.05	11.0	6.25	110	MDK10 124K400A52P3 TUBE
0.15	12.2	6.05	11.0	6.25	85	MDK10 154K400A52P3 TUBE
0.18	12.2	6.05	11.0	6.25	70	MDK10 184K400A52P3 TUBE
0.22	12.7	9.0	23.0	10.7	58	MDK10 224K400A57Py TUBE
0.27	12.7	9.0	23.0	10.7	47	MDK10 274K400A57Py TUBE
0.33	12.7	9.0	23.0	10.7	39	MDK10 334K400A57Py TUBE
0.39	12.7	11.0	23.0	12.5	33	MDK10 394K400A58Py TUBE
0.47	12.7	11.0	23.0	12.5	30	MDK10 474K400A58Py TUBE

LEAD SPACING 15 MM

Capacitance µF	B ±0.2	H ±0.2	L ±0.2	h	ESR 500kHz mΩ	Article code
0.033	16.5	6.05	11.0	6.25	390	MDK15 333K400B53P3 TUBE
0.039	16.5	6.05	11.0	6.25	330	MDK15 393K400B53P3 TUBE
0.047	16.5	6.05	11.0	6.25	270	MDK15 473K400B53P3 TUBE
0.056	16.5	6.05	11.0	6.25	230	MDK15 563K400B53P3 TUBE
0.068	16.5	6.05	11.0	6.25	190	MDK15 683K400B53P3 TUBE
0.082	16.5	6.05	11.0	6.25	160	MDK15 823K400B53P3 TUBE
0.10	16.5	6.05	11.0	6.25	130	MDK15 104K400B53P3 TUBE
0.12	16.5	6.05	11.0	6.25	110	MDK15 124K400B53P3 TUBE
0.15	16.5	6.05	11.0	6.25	85	MDK15 154K400B53P3 TUBE
0.18	16.5	6.05	11.0	6.25	70	MDK15 184K400B53P3 TUBE
0.22	16.5	6.05	11.0	6.25	58	MDK15 224K400B53P3 TUBE
0.27	16.5	6.05	11.0	6.25	47	MDK15 274K400B53P3 TUBE
0.33	16.5	6.05	12.2	6.25	39	MDK15 334K400B55Px TUBE

630 VDC/220 VAC

LEAD SPACING 10 MM

Capacitance µF	B ±0.2	H ±0.2	L ±0.2	h	ESR 500kHz mΩ	Article code
0.033	12.2	6.05	11.0	6.25	390	MDK10 333K630A52P3 TUBE
0.039	12.2	6.05	11.0	6.25	330	MDK10 393K630A52P3 TUBE
0.047	12.2	6.05	11.0	6.25	270	MDK10 473K630A52P3 TUBE
0.056	12.2	6.05	11.0	6.25	230	MDK10 563K630A52P3 TUBE
0.068	12.2	6.05	13.5	6.25	190	MDK10 683K630A54Px TUBE
0.082	12.7	11.0	23.0	12.5	160	MDK10 823K630A58Py TUBE
0.10	12.7	11.0	23.0	12.5	130	MDK10 104K630A58Py TUBE
0.12	12.7	11.0	23.0	12.5	110	MDK10 124K630A58Py TUBE
0.15	12.7	11.0	23.0	12.5	85	MDK10 154K630A58Py TUBE
0.18	12.7	11.0	23.0	12.5	70	MDK10 184K630A58Py TUBE

LEAD SPACING 15 MM

Capacitance µF	B ±0.2	H ±0.2	L ±0.2	h	ESR 500kHz mΩ	Article code
0.033	16.5	6.05	11.0	6.25	390	MDK15 333K630B53P3 TUBE
0.039	16.5	6.05	11.0	6.25	330	MDK15 393K630B53P3 TUBE
0.047	16.5	6.05	11.0	6.25	270	MDK15 473K630B53P3 TUBE
0.056	16.5	6.05	11.0	6.25	230	MDK15 563K630B53P3 TUBE
0.068	16.5	6.05	11.0	6.25	190	MDK15 683K630B53P3 TUBE
0.082	16.5	6.05	11.0	6.25	160	MDK15 823K630B53P3 TUBE
0.10	16.5	6.05	11.0	6.25	130	MDK15 104K630B53P3 TUBE

x = Number of leads per side, 3 or 4
z = Number of leads per side, 3, 4 or 5
y = Number of leads per side, 7 or 8

MDS

- **Metallized polyester (PET) DIL**
- **Low ESR and ESL**
- **Three and four pole connection possible**
- **Good temperature stability**
- **No voltage dependence of capacitance and dissipation factor**

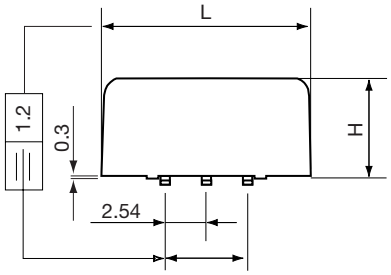
RoHS Compliant

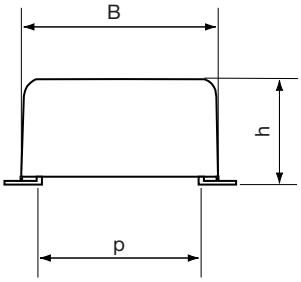
TYPICAL APPLICATIONS

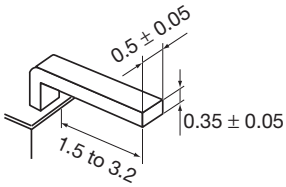
High frequency switched mode power supplies and DC-DC converters. Input/ output filtering.

CONSTRUCTION

DIL metallized polyester (PET) film capacitor. Encapsulation in self-extinguishing material meeting the requirements of UL 94V-0.







Detail of a lead

TECHNICAL DATA

Rated voltage U_R VDC	50	100	250	400	630
Rated voltage U_R VAC	30	63	160	200	220
Capacitance range, µF	0.033 - 6.8	0.033 - 5.6	0.033 - 0.68	0.033 - 0.33	0.033 - 0.10

Capacitance tolerance
± 10%, ± 5%, other tolerances on request

Category temperature range
–55 to +125°C

Rated temperature
+85 °C

Voltage derating
The rated voltage is decreased with 1.25%/°C from +85 °C

Climatic category
55/125/56

Test voltage
1.6 x U_R, 60s

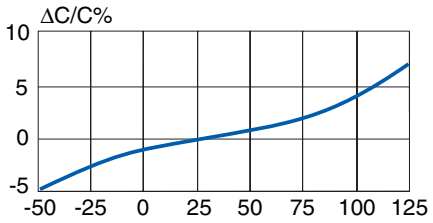
Insulation resistance
Minimum value between terminals
Measured at +20 °C according to IEC 60384-2

	C ≤ 0.33 µF	C > 0.33 µF
U_R ≤ 100 V	15 000 MΩ	5 000 s
U_R > 100 V	30 000 MΩ	10 000 s

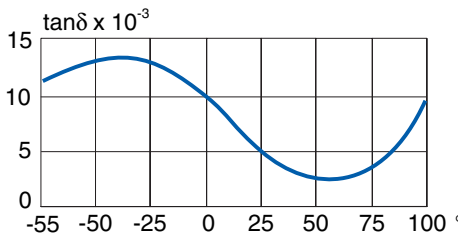
Dissipation factor
Maximum values at +23°C

	C ≤ 0.1 µF	0.1 < C ≤ 3.3 µF	3.3 < C < 10 µF	C ≥ 10 µF
1 kHz	0.8 %	0.8 %	0.8 %	0.8 %
10 kHz	1.5 %	1.5 %	1.5 %	2.0 %
100 kHz	2.5 %	5.0 %	—	—

Self inductancy
Approximately 4 nH



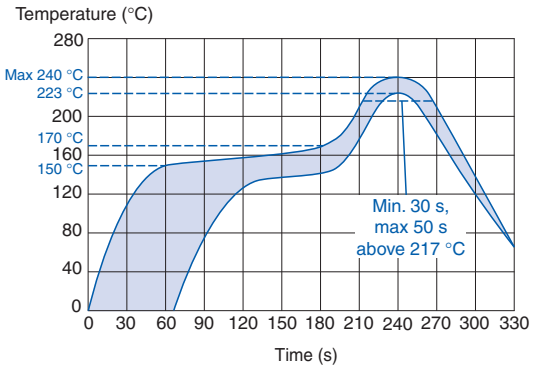
Typical capacitance vs temperature at 1 kHz



Typical dissipation factor vs temperature at 1 kHz

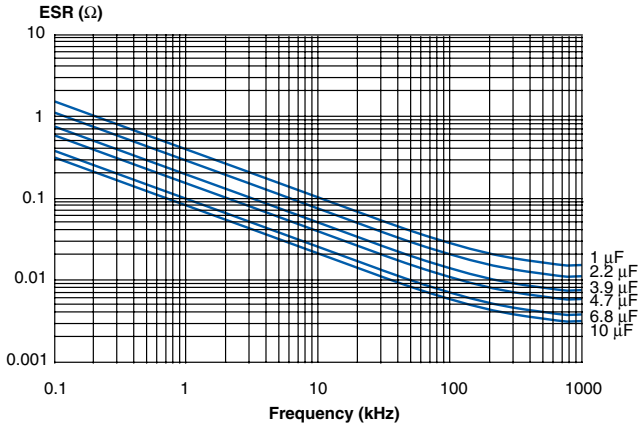
RECOMMENDED SOLDERING CONDITIONS

Reflow soldering temperature measured on the top body surface of the component
Preheating temperature should be less than 170°C. The time above 217°C should be less than 50 s. The peak temperature must not exceed 240°C. This series for Lead Free soldering process is partly under development. Please consult manufacturer.

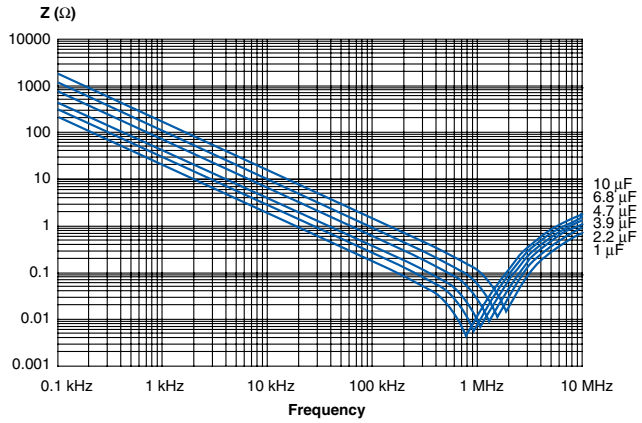


TYPICAL DATA

ESR vs. frequency



Impedance vs. frequency



Maximum RMS voltage U_{RMS} (V) vs. frequency

Value	Rated voltage	Case size	1 kHz	10 kHz	100 kHz	500 kHz	1 MHz
1.0 µF	250 V	A57	150.0	36.0	9.2	2.9	1.3
2.2 µF	100 V	A52	50.0	25.0	5.0	1.2	0.6
3.9 µF	100 V	A52	50.0	18.0	4.0	1.0	0.3
4.7 µF	100 V	A54	50.0	16.0	3.5	0.7	0.2
6.8 µF	100 V	A57	50.0	15.5	2.2	0.5	0.2
10 µF	100 V	A58	50.0	15.0	2.0	0.4	0.2

Maximum RMS current I_{RMS} (A) vs. frequency

Value	Rated voltage	Case size	1 kHz	10 kHz	100 kHz	500 kHz	1 MHz
1.0 µF	250 V	A57	1.0	2.2	5.5	9.0	10.0
2.2 µF	100 V	A52	1.5	2.3	6.0	7.5	10.0
3.9 µF	100 V	A52	2.0	4.0	10.0	11.0	11.5
4.7 µF	100 V	A54	2.0	4.5	10.0	12.5	12.5
6.8 µF	100 V	A57	3.0	6.0	11.0	13.0	13.5
10 µF	100 V	A58	4.0	9.0	13.0	14.0	14.5

ORDERING INFORMATION

See article table and page 10 for options and article code construction.

MARKING

- EVOX
- Rated capacitance according to IEC 60062
- Capacitance tolerance code
- Rated voltage
- Capacitor family code MDS

ARTICLE TABLE

50 VDC/30 VAC

LEAD SPACING 10 MM

Capacitance µF	Dimensions in mm B ±0.2	H ±0.2	L ±0.2	h1	ESR 500kHz mΩ	Article code
0.033	12.2	6.05	11.0	6.6	390	MDS10 333K50A52P3 TUBE
0.039	12.2	6.05	11.0	6.6	330	MDS10 393K50A52P3 TUBE
0.047	12.2	6.05	11.0	6.6	270	MDS10 473K50A52P3 TUBE
0.056	12.2	6.05	11.0	6.6	230	MDS10 563K50A52P3 TUBE
0.068	12.2	6.05	11.0	6.6	190	MDS10 683K50A52P3 TUBE
0.082	12.2	6.05	11.0	6.6	160	MDS10 823K50A52P3 TUBE
0.10	12.2	6.05	11.0	6.6	130	MDS10 104K50A52P3 TUBE
0.12	12.2	6.05	11.0	6.6	110	MDS10 124K50A52P3 TUBE
0.15	12.2	6.05	11.0	6.6	85	MDS10 154K50A52P3 TUBE
0.18	12.2	6.05	11.0	6.6	70	MDS10 184K50A52P3 TUBE
0.22	12.2	6.05	11.0	6.6	58	MDS10 224K50A52P3 TUBE
0.27	12.2	6.05	11.0	6.6	47	MDS10 274K50A52P3 TUBE
0.33	12.2	6.05	11.0	6.6	39	MDS10 334K50A52P3 TUBE
0.39	12.2	6.05	11.0	6.6	33	MDS10 394K50A52P3 TUBE
0.47	12.2	6.05	11.0	6.6	30	MDS10 474K50A52P3 TUBE
0.56	12.2	6.05	11.0	6.6	26	MDS10 564K50A52P3 TUBE
0.68	12.2	6.05	11.0	6.6	21	MDS10 684K50A52P3 TUBE
0.82	12.2	6.05	11.0	6.6	18	MDS10 824K50A52P3 TUBE
1.0	12.2	6.05	11.0	6.6	15	MDS10 105K50A52P3 TUBE
1.2	12.2	6.05	11.0	6.6	14	MDS10 125K50A52P3 TUBE
1.5	12.2	6.05	11.0	6.6	13	MDS10 155K50A52P3 TUBE
1.8	12.2	6.05	11.0	6.6	12	MDS10 185K50A52P3 TUBE
2.2	12.2	6.05	11.0	6.6	11	MDS10 225K50A52P3 TUBE
2.7	12.2	6.05	11.0	6.6	10	MDS10 275K50A52P3 TUBE
3.3	12.2	6.05	11.0	6.6	8	MDS10 335K50A52P3 TUBE
3.9	12.2	6.05	11.0	6.6	7	MDS10 395K50A52P3 TUBE
4.7	12.2	6.05	11.0	6.6	6	MDS10 475K50A52P3 TUBE
5.6	12.2	6.05	13.5	6.6	5	MDS10 565K50A54Px TUBE
6.8	12.2	6.05	16.5	6.6	5	MDS10 685K50A55Pz TUBE

LEAD SPACING 15 MM

Capacitance µF	Dimensions in mm B ±0.2	H ±0.2	L ±0.2	h1	ESR 500kHz mΩ	Article code
0.033	16.5	6.05	11.0	6.6	390	MDS15 333K50B53P3 TUBE
0.039	16.5	6.05	11.0	6.6	330	MDS15 393K50B53P3 TUBE
0.047	16.5	6.05	11.0	6.6	270	MDS15 473K50B53P3 TUBE
0.056	16.5	6.05	11.0	6.6	230	MDS15 563K50B53P3 TUBE
0.068	16.5	6.05	11.0	6.6	190	MDS15 683K50B53P3 TUBE
0.082	16.5	6.05	11.0	6.6	160	MDS15 823K50B53P3 TUBE
0.10	16.5	6.05	11.0	6.6	130	MDS15 104K50B53P3 TUBE
0.12	16.5	6.05	11.0	6.6	110	MDS15 124K50B53P3 TUBE
0.15	16.5	6.05	11.0	6.6	85	MDS15 154K50B53P3 TUBE
0.18	16.5	6.05	11.0	6.6	70	MDS15 184K50B53P3 TUBE
0.22	16.5	6.05	11.0	6.6	58	MDS15 224K50B53P3 TUBE
0.27	16.5	6.05	11.0	6.6	47	MDS15 274K50B53P3 TUBE
0.33	16.5	6.05	11.0	6.6	39	MDS15 334K50B53P3 TUBE
0.39	16.5	6.05	11.0	6.6	39	MDS15 394K50B53P3 TUBE
0.47	16.5	6.05	11.0	6.6	30	MDS15 474K50B53P3 TUBE
0.56	16.5	6.05	11.0	6.6	26	MDS15 564K50B53P3 TUBE
0.68	16.5	6.05	11.0	6.6	21	MDS15 684K50B53P3 TUBE
0.82	16.5	6.05	11.0	6.6	18	MDS15 824K50B53P3 TUBE
1.0	16.5	6.05	11.0	6.6	15	MDS15 105K50B53P3 TUBE
1.2	16.5	6.05	11.0	6.6	13	MDS15 125K50B53P3 TUBE
1.5	16.5	6.05	11.0	6.6	13	MDS15 155K50B53P3 TUBE
1.8	16.5	6.05	11.0	6.6	13	MDS15 185K50B53P3 TUBE
2.2	16.5	6.05	11.0	6.6	11	MDS15 225K50B53P3 TUBE
2.7	16.5	6.05	11.0	6.6	13	MDS15 275K50B53P3 TUBE
3.3	16.5	6.05	11.0	6.6	8	MDS15 335K50B53P3 TUBE
3.9	16.5	6.05	11.0	6.6	13	MDS15 395K50B53P3 TUBE
4.7	16.5	6.05	11.0	6.6	6	MDS15 475K50B53P3 TUBE
5.6	16.5	6.05	11.0	6.6	5	MDS15 565K50B53P3 TUBE
6.8	16.5	6.05	11.0	6.6	5	MDS15 685K50B53P3 TUBE

100 VDC/63 VAC

LEAD SPACING 10 MM

Capacitance µF	Dimensions in mm B ±0.2	H ±0.2	L ±0.2	h1	ESR 500kHz mΩ	Article code
0.033	12.2	6.05	11.0	6.6	390	MDS10 333K100A52P3 TUBE
0.039	12.2	6.05	11.0	6.6	330	MDS10 393K100A52P3 TUBE
0.047	12.2	6.05	11.0	6.6	270	MDS10 473K100A52P3 TUBE
0.056	12.2	6.05	11.0	6.6	230	MDS10 563K100A52P3 TUBE
0.068	12.2	6.05	11.0	6.6	190	MDS10 683K100A52P3 TUBE
0.082	12.2	6.05	11.0	6.6	160	MDS10 823K100A52P3 TUBE
0.10	12.2	6.05	11.0	6.6	130	MDS10 104K100A52P3 TUBE
0.12	12.2	6.05	11.0	6.6	110	MDS10 124K100A52P3 TUBE
0.15	12.2	6.05	11.0	6.6	85	MDS10 154K100A52P3 TUBE
0.18	12.2	6.05	11.0	6.6	70	MDS10 184K100A52P3 TUBE
0.22	12.2	6.05	11.0	6.6	58	MDS10 224K100A52P3 TUBE
0.27	12.2	6.05	11.0	6.6	47	MDS10 274K100A52P3 TUBE
0.33	12.2	6.05	11.0	6.6	39	MDS10 334K100A52P3 TUBE
0.39	12.2	6.05	11.0	6.6	33	MDS10 394K100A52P3 TUBE
0.47	12.2	6.05	11.0	6.6	30	MDS10 474K100A52P3 TUBE
0.56	12.2	6.05	11.0	6.6	26	MDS10 564K100A52P3 TUBE
0.68	12.2	6.05	11.0	6.6	21	MDS10 684K100A52P3 TUBE
0.82	12.2	6.05	11.0	6.6	18	MDS10 824K100A52P3 TUBE
1.0	12.2	6.05	11.0	6.6	15	MDS10 105K100A52P3 TUBE
1.2	12.2	6.05	11.0	6.6	14	MDS10 125K100A52P3 TUBE
1.5	12.2	6.05	11.0	6.6	13	MDS10 155K100A52P3 TUBE
1.8	12.2	6.05	11.0	6.6	12	MDS10 185K100A52P3 TUBE
2.2	12.2	6.05	11.0	6.6	11	MDS10 225K100A52P3 TUBE
2.7	12.2	6.05	11.0	6.6	10	MDS10 275K100A52P3 TUBE *
3.3	12.2	6.05	11.0	6.6	8	MDS10 335K100A52P3 TUBE *
3.9	12.2	6.05	11.0	6.6	7	MDS10 395K100A52P3 TUBE *
4.7	12.2	6.05	13.5	6.6	6	MDS10 475K100A54Px TUBE *
5.6	12.2	6.05	16.5	6.6	5	MDS10 565K100A55Pz TUBE *

LEAD SPACING 15 MM

Capacitance µF	Dimensions in mm B ±0.2	H ±0.2	L ±0.2	h1	ESR 500kHz mΩ	Article code
0.033	16.5	6.05	11.0	6.6	390	MDS15 333K100B53P3 TUBE
0.039	16.5	6.05	11.0	6.6	330	MDS15 393K100B53P3 TUBE
0.047	16.5	6.05	11.0	6.6	270	MDS15 473K100B53P3 TUBE
0.056	16.5	6.05	11.0	6.6	230	MDS15 563K100B53P3 TUBE
0.068	16.5	6.05	11.0	6.6	190	MDS15 683K100B53P3 TUBE
0.082	16.5	6.05	11.0	6.6	160	MDS15 823K100B53P3 TUBE
0.10	16.5	6.05	11.0	6.6	130	MDS15 104K100B53P3 TUBE
0.12	16.5	6.05	11.0	6.6	110	MDS15 124K100B53P3 TUBE
0.15	16.5	6.05	11.0	6.6	85	MDS15 154K100B53P3 TUBE
0.18	16.5	6.05	11.0	6.6	70	MDS15 184K100B53P3 TUBE
0.22	16.5	6.05	11.0	6.6	58	MDS15 224K100B53P3 TUBE
0.27	16.5	6.05	11.0	6.6	47	MDS15 274K100B53P3 TUBE
0.33	16.5	6.05	11.0	6.6	39	MDS15 334K100B53P3 TUBE
0.39	16.5	6.05	11.0	6.6	39	MDS15 394K100B53P3 TUBE
0.47	16.5	6.05	11.0	6.6	30	MDS15 474K100B53P3 TUBE
0.56	16.5	6.05	11.0	6.6	26	MDS15 564K100B53P3 TUBE
0.68	16.5	6.05	11.0	6.6	21	MDS15 684K100B53P3 TUBE
0.82	16.5	6.05	11.0	6.6	18	MDS15 824K100B53P3 TUBE
1.0	16.5	6.05	11.0	6.6	15	MDS15 105K100B53P3 TUBE
1.2	16.5	6.05	11.0	6.6	15	MDS15 125K100B53P3 TUBE
1.5	16.5	6.05	11.0	6.6	13	MDS15 155K100B53P3 TUBE
1.8	16.5	6.05	11.0	6.6	13	MDS15 185K100B53P3 TUBE
2.2	16.5	6.05	11.0	6.6	11	MDS15 225K100B53P3 TUBE
2.7	16.5	6.05	11.0	6.6	11	MDS15 275K100B53P3 TUBE
3.3	16.5	6.05	11.0	6.6	8	MDS15 335K100B53P3 TUBE
3.9	16.5	6.05	11.0	6.6	8	MDS15 395K100B53P3 TUBE *
4.7	16.5	6.05	11.0	6.6	6	MDS15 475K100B53P3 TUBE *
5.6	16.5	6.05	12.2	6.6	5	MDS15 565K100B55Px TUBE *

* 100 VDC/35 VAC

ARTICLE TABLE

250 VDC/160 VAC

LEAD SPACING 10 MM

Capacitance µF	B ±0.2	H ±0.2	L ±0.2	h1	ESR 500kHz mΩ	Article code
0.033	12.2	6.05	11.0	6.6	390	MDS10 333K250A52P3 TUBE
0.039	12.2	6.05	11.0	6.6	330	MDS10 393K250A52P3 TUBE
0.047	12.2	6.05	11.0	6.6	270	MDS10 473K250A52P3 TUBE
0.056	12.2	6.05	11.0	6.6	230	MDS10 563K250A52P3 TUBE
0.068	12.2	6.05	11.0	6.6	190	MDS10 683K250A52P3 TUBE
0.082	12.2	6.05	11.0	6.6	160	MDS10 823K250A52P3 TUBE
0.10	12.2	6.05	11.0	6.6	130	MDS10 104K250A52P3 TUBE
0.12	12.2	6.05	11.0	6.6	110	MDS10 124K250A52P3 TUBE
0.15	12.2	6.05	11.0	6.6	85	MDS10 154K250A52P3 TUBE
0.18	12.2	6.05	11.0	6.6	70	MDS10 184K250A52P3 TUBE
0.22	12.2	6.05	11.0	6.6	58	MDS10 224K250A52P3 TUBE
0.27	12.2	6.05	11.0	6.6	47	MDS10 274K250A52P3 TUBE
0.33	12.2	6.05	11.0	6.6	39	MDS10 334K250A52P3 TUBE
0.39	12.2	6.05	11.0	6.6	33	MDS10 394K250A52P3 TUBE
0.47	12.2	6.05	11.0	6.6	30	MDS10 474K250A52P3 TUBE
0.56	12.2	6.05	13.5	6.6	26	MDS10 564K250A54Px TUBE
0.68	12.2	6.05	16.5	6.6	21	MDS10 684K250A55Pz TUBE

LEAD SPACING 15 MM

Capacitance µF	B ±0.2	H ±0.2	L ±0.2	h1	ESR 500kHz mΩ	Article code
0.033	16.5	6.05	11.0	6.6	390	MDS15 333K250B53P3 TUBE
0.039	16.5	6.05	11.0	6.6	330	MDS15 393K250B53P3 TUBE
0.047	16.5	6.05	11.0	6.6	270	MDS15 473K250B53P3 TUBE
0.056	16.5	6.05	11.0	6.6	230	MDS15 563K250B53P3 TUBE
0.068	16.5	6.05	11.0	6.6	190	MDS15 683K250B53P3 TUBE
0.082	16.5	6.05	11.0	6.6	160	MDS15 823K250B53P3 TUBE
0.10	16.5	6.05	11.0	6.6	130	MDS15 104K250B53P3 TUBE
0.12	16.5	6.05	11.0	6.6	110	MDS15 124K250B53P3 TUBE
0.15	16.5	6.05	11.0	6.6	85	MDS15 154K250B53P3 TUBE
0.18	16.5	6.05	11.0	6.6	70	MDS15 184K250B53P3 TUBE
0.22	16.5	6.05	11.0	6.6	58	MDS15 224K250B53P3 TUBE
0.27	16.5	6.05	11.0	6.6	47	MDS15 274K250B53P3 TUBE
0.33	16.5	6.05	11.0	6.6	39	MDS15 334K250B53P3 TUBE
0.39	16.5	6.05	11.0	6.6	39	MDS15 394K250B53P3 TUBE
0.47	16.5	6.05	11.0	6.6	30	MDS15 474K250B53P3 TUBE
0.56	16.5	6.05	11.0	6.6	26	MDS15 564K250B53P3 TUBE
0.68	16.5	6.05	11.0	6.6	21	MDS15 684K250B53P3 TUBE

400 VDC/200 VAC

LEAD SPACING 10 MM

Capacitance µF	B ±0.2	H ±0.2	L ±0.2	h1	ESR 500kHz mΩ	Article code
0.033	12.2	6.05	11.0	6.6	390	MDS10 333K400A52P3 TUBE
0.039	12.2	6.05	11.0	6.6	330	MDS10 393K400A52P3 TUBE
0.047	12.2	6.05	11.0	6.6	270	MDS10 473K400A52P3 TUBE
0.056	12.2	6.05	11.0	6.6	230	MDS10 563K400A52P3 TUBE
0.068	12.2	6.05	11.0	6.6	190	MDS10 683K400A52P3 TUBE
0.082	12.2	6.05	11.0	6.6	160	MDS10 823K400A52P3 TUBE
0.10	12.2	6.05	11.0	6.6	130	MDS10 104K400A52P3 TUBE
0.12	12.2	6.05	11.0	6.6	110	MDS10 124K400A52P3 TUBE
0.15	12.2	6.05	11.0	6.6	85	MDS10 154K400A52P3 TUBE
0.18	12.2	6.05	11.0	6.6	70	MDS10 184K400A52P3 TUBE

400 VDC/200 VAC

LEAD SPACING 15 MM

Capacitance µF	B ±0.2	H ±0.2	L ±0.2	h1	ESR 500kHz mΩ	Article code
0.033	16.5	6.05	11.0	6.6	390	MDS15 333K400B53P3 TUBE
0.039	16.5	6.05	11.0	6.6	330	MDS15 393K400B53P3 TUBE
0.047	16.5	6.05	11.0	6.6	270	MDS15 473K400B53P3 TUBE
0.056	16.5	6.05	11.0	6.6	230	MDS15 563K400B53P3 TUBE
0.068	16.5	6.05	11.0	6.6	190	MDS15 683K400B53P3 TUBE
0.082	16.5	6.05	11.0	6.6	160	MDS15 823K400B53P3 TUBE
0.10	16.5	6.05	11.0	6.6	130	MDS15 104K400B53P3 TUBE
0.12	16.5	6.05	11.0	6.6	110	MDS15 124K400B53P3 TUBE
0.15	16.5	6.05	11.0	6.6	85	MDS15 154K400B53P3 TUBE
0.18	16.5	6.05	11.0	6.6	70	MDS15 184K400B53P3 TUBE
0.22	16.5	6.05	11.0	6.6	58	MDS15 224K400B53P3 TUBE
0.27	16.5	6.05	11.0	6.6	47	MDS15 274K400B53P3 TUBE
0.33	16.5	6.05	12.2	6.6	39	MDS15 334K400B55Px TUBE

630 VDC/220 VAC

LEAD SPACING 10 MM

Capacitance µF	B ±0.2	H ±0.2	L ±0.2	h1	ESR 500kHz mΩ	Article code
0.033	12.2	6.05	11.0	6.6	390	MDS10 333K630A52P3 TUBE
0.039	12.2	6.05	11.0	6.6	330	MDS10 393K630A52P3 TUBE
0.047	12.2	6.05	11.0	6.6	270	MDS10 473K630A52P3 TUBE
0.056	12.2	6.05	11.0	6.6	230	MDS10 563K630A52P3 TUBE
0.068	12.2	6.05	13.5	6.6	190	MDS10 683K630A54Px TUBE

LEAD SPACING 15 MM

Capacitance µF	B ±0.2	H ±0.2	L ±0.2	h1	ESR 500kHz mΩ	Article code
0.033	16.5	6.05	11.0	6.6	390	MDS15 333K630B53P3 TUBE
0.039	16.5	6.05	11.0	6.6	330	MDS15 393K630B53P3 TUBE
0.047	16.5	6.05	11.0	6.6	270	MDS15 473K630B53P3 TUBE
0.056	16.5	6.05	11.0	6.6	230	MDS15 563K630B53P3 TUBE
0.068	16.5	6.05	11.0	6.6	190	MDS15 683K630B53P3 TUBE
0.082	16.5	6.05	11.0	6.6	160	MDS15 823K630B53P3 TUBE
0.10	16.5	6.05	11.0	6.6	130	MDS15 104K630B53P3 TUBE

x = Number of leads per side, 3 or 4
z = Number of leads per side, 3, 4 or 5

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