



Film Capacitors

Metallized Polyester Film Capacitors (MKT-S)

Series/Type: B32538
Date: August 2004

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High reliability (wound)
Typical applications

- Test and measurement equipment
- Rough environments

Climatic

- Max. operating temperature: 125 °C
- Climatic category (IEC 60068-1): 55/100/56

Features

- Optimum self-healing capability
- Excellent short circuit protection
- Very high reliability

Construction

- Dielectric: polyethylene terephthalate (polyester, PET)
- Construction with structured metallization
- Tubular winding
- Insulating sleeve
- Face ends sealed with epoxy resin

Terminals

- Central axial leads, lead-free tinned

Marking

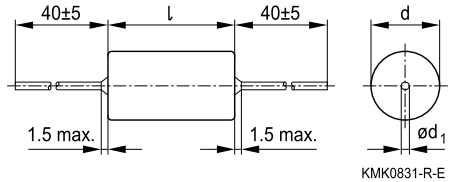
Manufacturer's logo,
 style(MKT-S), rated capacitance (coded),
 capacitance tolerance (code letter),
 rated voltage, date of manufacture (coded)

Delivery mode

Bulk (untaped)

Taped (Ammo pack)

For notes on taping, refer to chapter "Taping and packing".

Dimensional drawing


Dimensions in mm

Diameter d	<7.8	7.8 ... 16	>16
Lead diameter d ₁	0.6	0.8	1.0

When bending leads take care to leave a clearance of 1 mm to the capacitor body.



Overview of types

Type	B32538				
V_R (VDC)	50	100	160	250	630
V_{rms} (VAC)	20	35	60	90	200
C_R (μ F)					
0.033					
0.047					
0.068					
0.10					
0.15					
0.22					
0.33					
0.47					
0.68					
1.0					
1.5					
2.2					
3.3					
4.7					
6.8					
10					
22					
47					
100					

Ordering codes and packing units

V_R	V_{rms} $f \leq 60$ Hz	C_R	Max. dimensions $d \times l$ mm	Ordering code (composition see below)	Ammo pack pcs./unit	Untaped pcs./unit
VDC	VAC	μF				
50	20	0.47	6.1 × 16.0	B32538B5474+***	1100	50
		0.68	6.3 × 16.0	B32538B5684+***	1000	50
		1.0	6.9 × 16.0	B32538B5105+***	950	50
		1.5	7.6 × 16.0	B32538B5155+***	870	50
		2.2	7.4 × 20.0	B32538B5225+***	900	50
		3.3	8.2 × 20.0	B32538B5335+***	800	50
		4.7	9.3 × 20.0	B32538B5475+***	700	20
		6.8	10.8 × 20.0	B32538B5685+***	400	20
		10	12.6 × 20.0	B32538B5106+***	350	20
100	35	0.10	6.2 × 16.0	B32538B1104+***	1000	50
		0.15	6.4 × 16.0	B32538B1154+***	1000	50
		0.22	6.9 × 16.0	B32538B1224+***	950	50
		0.33	7.0 × 16.0	B32538B1334+***	950	50
		0.47	6.7 × 16.0	B32538B1474+***	950	50
		0.68	6.7 × 16.0	B32538B1684+***	950	50
		1.0	6.7 × 20.0	B32538B1105+***	950	50
		1.5	7.4 × 20.0	B32538B1155+***	900	50
		2.2	8.0 × 20.0	B32538B1225+***	800	50
		3.3	9.2 × 20.0	B32538B1335+***	700	20
		4.7	10.4 × 20.0	B32538B1475+***	400	20
		6.8	9.0 × 32.5	B32538B1685+***	700	20
		10	10.7 × 32.5	B32538B1106+***	400	20
		22	14.6 × 32.5	B32538B1226+***	PU on request	20
		47	20.2 × 32.5	B32538B1476+***	PU on request	20
		100	28.2 × 32.5	B32538B1107+***	PU on request	20

Further E series and intermediate capacitance values on request.

Composition of ordering code

+ = Capacitance tolerance code:

M = ±20%

K = ±10%

*** = Packaging code:

007 = Ammo pack

000 = Untaped

Ordering codes and packing units

V_R	V_{rms} $f \leq 60$ Hz VAC	C_R μF	Max. dimensions $d \times l$ mm	Ordering code (composition see below)	Ammo pack pcs./unit	Untaped pcs./unit
160	60	0.10	6.1×16.0	B32538B2104+***	1100	50
		0.15	6.2×16.0	B32538B2154+***	1000	50
		0.22	6.4×16.0	B32538B2224+***	1000	50
		0.33	7.0×16.0	B32538B2334+***	950	50
		0.47	6.9×20.0	B32538B2474+***	950	50
		0.68	7.5×20.0	B32538B2684+***	870	50
		1.0	8.3×20.0	B32538B2105+***	800	50
		1.5	10.5×20.0	B32538B2155+***	400	20
		2.2	11.0×20.0	B32538B2225+***	400	20
		3.3	10.0×32.5	B32538B2335+***	450	20
		4.7	11.3×32.5	B32538B2475+***	380	20
		6.8	13.1×32.5	B32538B2685+***	PU on request	20
		10	15.3×32.5	B32538B2106+***	PU on request	20
250	90	0.10	6.7×16.0	B32538B3104+***	950	50
		0.15	7.2×16.0	B32538B3154+***	900	50
		0.22	7.3×16.0	B32538B3224+***	900	50
		0.33	7.3×20.0	B32538B3334+***	900	50
		0.47	8.0×20.0	B32538B3474+***	800	50
		0.68	9.0×20.0	B32538B3684+***	700	20
		1.0	10.3×20.0	B32538B3105+***	400	20
		1.5	12.0×20.0	B32538B3155+***	380	20
		2.2	14.0×20.0	B32538B3225+***	300	20
		3.3	12.6×32.5	B32538B3335+***	350	20
		4.7	14.5×32.5	B32538B3475+***	PU on request	20
		6.8	17.0×32.5	B32538B3685+***	PU on request	20
		10	20.1×32.5	B32538B3106+000	—	20

Further E series and intermediate capacitance values on request.

Composition of ordering code

+ = Capacitance tolerance code:
M = $\pm 20\%$
K = $\pm 10\%$

*** = Packaging code:
007 = Ammo pack
000 = Untaped

Ordering codes and packing units

V_R	V_{rms} $f \leq 60$ Hz	C_R	Max. dimensions $d \times l$ mm	Ordering code (composition see below)	Ammo pack pcs./unit	Untaped pcs./unit
VDC	VAC	μF				
630	200	0.033	6.7×16.0	B32538B8333+***	950	50
		0.047	7.3×16.0	B32538B8473+***	900	50
		0.068	7.2×20.0	B32538B8683+***	900	50
		0.10	7.9×20.0	B32538B8104+***	800	50
		0.15	9.0×20.0	B32538B8154+***	700	20
		0.22	10.5×20.0	B32538B8224+***	400	20
		0.33	12.0×20.0	B32538B8334+***	380	20
		0.47	13.9×20.0	B32538B8474+***	300	20
		0.68	12.3×32.5	B32538B8684+***	350	20
		1.0	14.3×32.5	B32538B8105+***	PU on request	20
		1.5	17.0×32.5	B32538B8155+***	PU on request	20
		2.2	20.0×32.5	B32538B8225+000	–	20
		3.3	23.9×32.5	B32538B8335+000	–	20
4.7	28.1×32.5	B32538B8475+000	–	20		

Further E series and intermediate capacitance values on request.

Composition of ordering code

+ = Capacitance tolerance code:

M = $\pm 20\%$

K = $\pm 10\%$

*** = Packaging code:

007 = Ammo pack

000 = Untaped

Technical data

Operating temperature range	Max. operating temperature $T_{op,max}$		+125 °C		
	Upper category temperature T_{max}		+100 °C		
	Lower category temperature T_{min}		-55 °C		
	Rated temperature T_R		+85 °C		
Dissipation factor $\tan \delta$ (in 10^{-3}) at 20 °C (upper limit values)	C_R (μ F)	≤ 0.47	$0.47 < C_R \leq 4.7$	$4.7 < C_R \leq 10.0$	> 10.0
	at 1 kHz	7	8	8	10
	at 10 kHz	15	22	25	–
Insulation resistance R_{ins} or time constant $\tau = C_R \cdot R_{ins}$ at 20 °C, rel. humidity $\leq 65\%$ (minimum as-delivered values)	C_R				
	$\leq 0.33 \mu$ F	$> 15000 \text{ M}\Omega$			
	$> 0.33 \mu$ F	$> 5000 \text{ s}$			
DC test voltage	$1.4 \cdot V_R, 2 \text{ s}$				
Category voltage V_C (continuous operation with V_{DC} or V_{AC} at $f \leq 60 \text{ Hz}$)	T_A (°C)	DC voltage derating		AC voltage derating	
	$T_A \leq 85$ $85 < T_A \leq 100$	$V_C = V_R$ $V_C = V_R \cdot (165 - T_A)/80$		$V_{C,rms} = V_{rms}$ $V_{C,rms} = V_{rms} \cdot (165 - T_A)/80$	
Operating voltage V_{op} for short operating periods (V_{DC} or V_{AC} at $f \leq 60 \text{ Hz}$)	T_A (°C)	DC voltage (max. hours)		AC voltage (max. hours)	
	$T_A \leq 100$ $100 < T_A \leq 125$	$V_{op} = 1.25 \cdot V_C$ (2000 h) $V_{op} = 0.5 \cdot V_R$ (1000 h)		$V_{op} = 1.0 \cdot V_{C,rms}$ (2000 h) $V_{op} = 0.5 \cdot V_{rms}$ (1000 h)	
Damp heat test Limit values after damp heat test	56 days/40 °C/93% relative humidity				
	Capacitance change $ \Delta C/C $		$\leq 5\%$		
	Dissipation factor change $\Delta \tan \delta$		$\leq 5 \cdot 10^{-3}$ (at 1 kHz)		
	Insulation resistance R_{ins}		$\geq 50\%$ of minimum as-delivered values		
Reliability: Failure rate λ Service life t_{SL}	1 fit ($\leq 1 \cdot 10^{-9}/\text{h}$) at $0.5 \cdot V_R, 40 \text{ °C}$ 200 000 h at $1.0 \cdot V_R, 40 \text{ °C}$ For conversion to other operating conditions and temperatures, refer to chapter "Quality assurance", page .				
Failure criteria: Total failure Failure due to variation of parameters	Short circuit or open circuit				
	Capacitance change $ \Delta C/C $		$> 10\%$		
	Dissipation factor $\tan \delta$		$> 1.5 \cdot$ upper limit value		
	Insulation resistance R_{ins} or time constant $\tau = C_R \cdot R_{ins}$		$< 150 \text{ M}\Omega$ ($C_R \leq 0.33 \mu$ F) $< 50 \text{ s}$ ($C_R > 0.33 \mu$ F)		

Pulse handling capability

"dV/dt" represents the maximum permissible voltage change per unit of time for non-sinusoidal voltages, expressed in V/ μ s.

"k₀" represents the maximum permissible pulse characteristic of the waveform applied to the capacitor, expressed in V²/ μ s.

Note:

The values of dV/dt and k₀ provided below must not be exceeded in order to avoid damaging the capacitor.

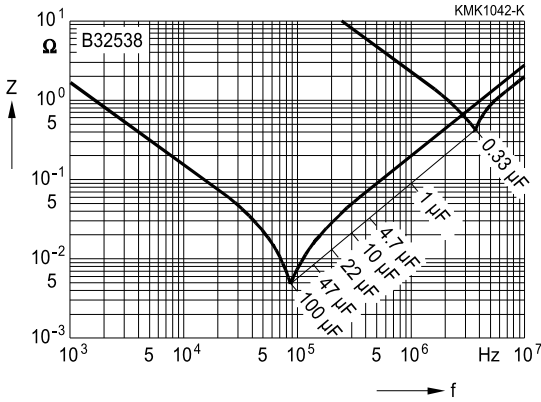
dV/dt values

Length of capacitor		16 mm	20 mm	32.5 mm
V _R VDC	V _{rms} VAC	dV/dt in V/ μ s		
50	20	2.5	1.5	–
100	35	13	9	6
160	60	20	12	8
250	90	23	16	10
630	200	40	26	18

k₀ values

Length of capacitor		16 mm	20 mm	32.5 mm
V _R VDC	V _{rms} VAC	k ₀ in V ² / μ s		
50	20	250	150	–
100	35	2 600	1 800	1 200
160	60	6 400	3 840	2 560
250	90	11 500	8 000	5 000
630	200	50 400	32 800	22 700

Impedance Z versus frequency f
(typical values)



Permissible AC voltage V_{rms} versus frequency f

Values can be obtained on request. In specific cases please provide a scaled voltage/ time graph and state operating conditions.