Film Capacitors

Metallized Polyester Film Capacitors (MKT-S)

Series/Type: **B32537**
Date: August 2004

Typical applications

- Measurement equipment
- Rough environments
- High-rel circuits in industrial electronics

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
- Encapsulated in metal tube
- Insulating sleeve
- Face ends sealed with epoxy resin

Terminals

- Central axial leads, lead-free tinned

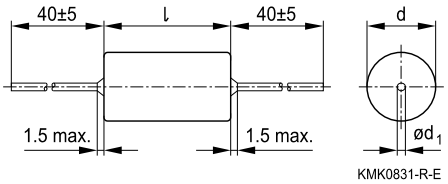
Marking

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



KMK0831-R-E

Dimensions in mm

Diameter d	<8.5	8.5 ... 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	B32537				
V_R (VDC)	50	100	160	250	630
V_{rms} (VAC)	20	35	60	90	200
C_R (µF)					
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 VDC	V_{rms} f ≤60 Hz VAC	C_R µF	Max. dimensions d × l mm	Ordering code (composition see below)	Ammo pack pcs./unit	Untaped pcs./unit
50	20	0.47	7.4 × 18.5	B32537B5474+***	900	50
		0.68	7.4 × 18.5	B32537B5684+***	900	50
		1.0	7.4 × 18.5	B32537B5105+***	800	50
		1.5	7.4 × 18.5	B32537B5155+***	800	50
		2.2	8.4 × 21.0	B32537B5225+***	800	50
		3.3	9.4 × 21.0	B32537B5335+***	700	20
		4.7	10.7 × 21.0	B32537B5475+***	400	20
		6.8	11.7 × 21.0	B32537B5685+***	380	20
		10	12.7 × 21.0	B32537B5106+***	350	20
100	35	0.10	7.4 × 18.5	B32537B1104+***	900	50
		0.15	7.4 × 18.5	B32537B1154+***	900	50
		0.22	7.4 × 18.5	B32537B1224+***	800	50
		0.33	7.4 × 18.5	B32537B1334+***	800	50
		0.47	7.4 × 18.5	B32537B1474+***	800	50
		0.68	7.4 × 18.5	B32537B1684+***	800	50
		1.0	8.4 × 21.0	B32537B1105+***	800	50
		1.5	8.4 × 21.0	B32537B1155+***	800	50
		2.2	9.4 × 21.0	B32537B1225+***	700	20
		3.3	9.4 × 21.0	B32537B1335+***	400	20
		4.7	11.7 × 21.0	B32537B1475+***	380	20
		6.8	10.7 × 34.0	B32537B1685+***	400	20
		10	10.7 × 34.0	B32537B1106+***	380	20
		22	15.7 × 34.0	B32537B1226+***	PU on request	20
		47	20.7 × 34.0	B32537B1476+***	–	20
		100	29.7 × 34.0	B32537B1107+***	–	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 ≤60 Hz	C_R	Max. dimensions d × l	Ordering code (composition see	Ammo pack	Untaped
VDC	VAC	µF	mm	below)	pcs./unit	pcs./unit
160	60	0.10	7.4 × 18.5	B32537B2104+***	900	50
		0.15	7.4 × 18.5	B32537B2154+***	900	50
		0.22	7.4 × 18.5	B32537B2224+***	900	50
		0.33	7.4 × 18.5	B32537B2334+***	800	50
		0.47	8.4 × 21.0	B32537B2474+***	800	50
		0.68	8.4 × 21.0	B32537B2684+***	800	50
		1.0	9.4 × 21.0	B32537B2105+***	700	20
		1.5	10.7 × 21.0	B32537B2155+***	400	20
		2.2	11.7 × 21.0	B32537B2225+***	380	20
		3.3	10.7 × 34.0	B32537B2335+***	400	20
		4.7	12.7 × 34.0	B32537B2475+***	350	20
		6.8	12.7 × 34.0	B32537B2685+***	PU on request	20
		10	15.7 × 34.0	B32537B2106+***	PU on request	20
250	90	0.10	7.4 × 18.5	B32537B3104+***	800	50
		0.15	7.4 × 18.5	B32537B3154+***	800	50
		0.22	7.4 × 18.5	B32537B3224+***	800	50
		0.33	8.4 × 21.0	B32537B3334+***	800	50
		0.47	9.4 × 21.0	B32537B3474+***	700	20
		0.68	9.4 × 21.0	B32537B3684+***	400	20
		1.0	11.7 × 21.0	B32537B3105+***	380	20
		1.5	12.7 × 21.0	B32537B3155+***	350	20
		2.2	13.7 × 21.0	B32537B3225+***	PU on request	20
		3.3	12.7 × 34.0	B32537B3335+***	PU on request	20
		4.7	15.7 × 34.0	B32537B3475+***	PU on request	20
		6.8	17.7 × 34.0	B32537B3685+***	PU on request	20
		10	20.7 × 34.0	B32537B3106+***	–	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 ≤60 Hz	C_R	Max. dimensions d × l	Ordering code (composition see	Ammo pack	Untaped
VDC	VAC	µF	mm	below)	pcs./unit	pcs./unit
630	200	0.033	7.4 × 18.5	B32537B8333+***	800	50
		0.047	7.4 × 18.5	B32537B8473+***	800	50
		0.068	8.4 × 21.0	B32537B8683+***	800	50
		0.10	9.4 × 21.0	B32537B8104+***	700	20
		0.15	9.4 × 21.0	B32537B8154+***	400	20
		0.22	11.7 × 21.0	B32537B8224+***	380	20
		0.33	12.7 × 21.0	B32537B8334+***	350	20
		0.47	13.7 × 21.0	B32537B8474+***	PU on request	20
		0.68	12.7 × 34.0	B32537B8684+***	PU on request	20
		1.0	15.7 × 34.0	B32537B8105+***	PU on request	20
		1.5	17.7 × 34.0	B32537B8155+***	PU on request	20
		2.2	20.7 × 34.0	B32537B8225+***	PU on request	20
		3.3	25.7 × 34.0	B32537B8335+***	–	20
		4.7	29.7 × 34.0	B32537B8475+***	–	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

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

Pulse handling capability

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

"k_0" represents the maximum permissible pulse characteristic of the waveform applied to the capacitor, expressed in V^2/µs.

Note:
The values of dV/dt and k_0 provided below must not be exceeded in order to avoid damaging the capacitor.

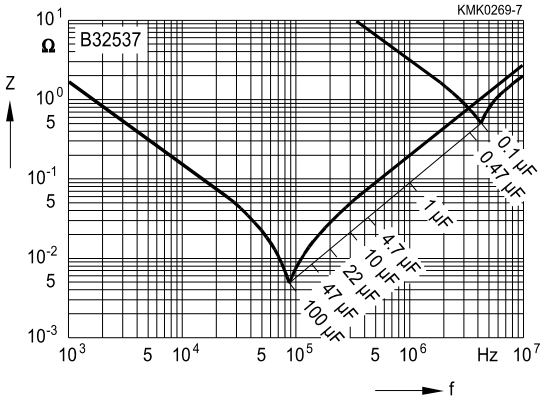
dV/dt values

Lenght of capacitor		18.5 mm	21 mm	34 mm
V_R VDC	V_{rms} VAC	dV/dt in V/µs		
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

k_0 values

Lenght of capacitor		18.5 mm	21 mm	34 mm
V_R VDC	V_{rms} VAC	k_0 in V^2/µs		
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.