



Film Capacitors

Metallized Polypropylene Film Capacitors (MKP)

Series/Type: B32651 ... B32656

Date: May 2009

High pulse (wound)
Typical applications

- Electronic ballasts
- Switch-mode power supplies

Climatic

- Max. operating temperature: 110 °C
- Climatic category (IEC 60068-1): 55/100/56

Construction

- Dielectric: polypropylene (PP)
- Wound capacitor technology with internal series connection for $V_R \geq 1250$ V DC
- Plastic case (UL 94 V-0)
- Epoxy resin sealing

Features

- High pulse strength
- High contact reliability

Terminals

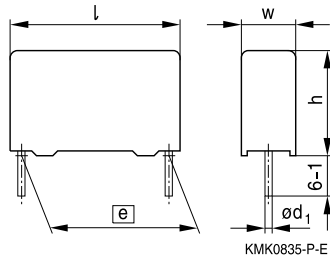
- Parallel wire leads, lead-free tinned
- Special lead lengths available on request

Marking

Manufacturer's logo,
 lot number ($\square e \leq 27.5$ mm), series number
 (e.g. 651),
 rated capacitance (coded), cap. tolerance (code letter),
 rated DC voltage
 (AC voltage for 1600 V DC/700 V AC and
 2000 V DC/1000 V AC),
 date of manufacture (coded)

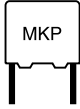
Delivery mode

Bulk (untaped)
 Taped (Ammo pack or reel)
 For notes on taping, refer to chapter "Taping and packing".

Dimensional drawing


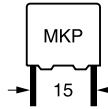
Dimensions in mm

Lead spacing	Lead diameter	Type
$\square e \pm 0.4$	d_1	
10	0.6	B32651
15	0.8	B32652
22.5	0.8	B32653
27.5	0.8	B32654
37.5	1.0	B32656



Overview of available types

Lead spacing	15 mm							
Type	B32652							
Page	9							
V_R (V DC)	250	400	630	1000	1250	1600	1600	2000
V_{RMS} (V AC)	160	200	250	250	500	500	700	700
C_R (nF)								
1.0								
1.5								
2.2								
3.3								
4.7								
5.6								
6.8								
10								
12								
15								
22								
33								
47								
56								
68								
100								
120								
150								
220								
330								
390								
470								
560								
680								
820								
1000								


Ordering codes and packing units (lead spacing 15 mm)

V_R	V_{RMS} $f \leq 1 \text{ kHz}$	C_R	Max. dimensions $w \times h \times l$ mm	Ordering code (composition see below)	Ammo pack pcs./MOQ	Reel pcs./ MOQ	Untaped pcs./ MOQ
V DC	V AC	nF					
250	160	150	5.0 × 10.5 × 18.0	B32652A3154+***	4680	5200	4000
		220	6.0 × 11.0 × 18.0	B32652A3224+***	3840	4400	4000
		330	7.0 × 12.5 × 18.0	B32652A3334+***	3320	3600	1000
		470	8.5 × 14.5 × 18.0	B32652A3474+***	2720	2800	2000
		680	9.0 × 17.5 × 18.0	B32652A3684+***	2560	2800	2000
		820	11.0 × 18.5 × 18.0	B32652A3824+***	–	2200	1000
		1000	11.0 × 18.5 × 18.0	B32652A3105+***	–	2200	1000
400	200	68	5.0 × 10.5 × 18.0	B32652A4683+***	4680	5200	4000
		100	5.0 × 10.5 × 18.0	B32652A4104+***	4680	5200	4000
		150	6.0 × 11.0 × 18.0	B32652A4154+***	3840	4400	4000
		220	7.0 × 12.5 × 18.0	B32652A4224+***	3320	3600	4000
		330	8.5 × 14.5 × 18.0	B32652A4334+***	2720	2800	2000
		470	9.0 × 17.5 × 18.0	B32652A4474+***	2560	2800	2000
		560	11.0 × 18.5 × 18.0	B32652A4564+***	–	2200	1000
		680	11.0 × 18.5 × 18.0	B32652A4684+***	–	2200	1000
630	250	33	5.0 × 10.5 × 18.0	B32652A6333+***	4680	5200	4000
		47	5.0 × 10.5 × 18.0	B32652A6473+***	4680	2800	4000
		68	6.0 × 11.0 × 18.0	B32652A6683+***	3840	4400	4000
		100	7.0 × 12.5 × 18.0	B32652A6104+***	3320	3600	4000
		150	8.5 × 14.5 × 18.0	B32652A6154+***	2720	2800	2000
		220	9.0 × 17.5 × 18.0	B32652A6224+***	2560	2800	2000
		330	11.0 × 18.5 × 18.0	B32652A6334+***	–	2200	1000
		390	11.0 × 18.5 × 18.0	B32652A6394+***	–	2200	1000

MOQ = Minimum Order Quantity, consisting of 4 packing units.
Further E series and intermediate capacitance values on request.

Composition of ordering code

+ = Capacitance tolerance code:

K = ±10%

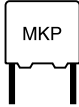
J = ±5%

*** = Packaging code:

289 = Ammo pack

189 = Reel

000 = Untaped (lead length 6 – 1 mm)

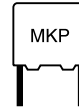


B32651 ... B32656

High pulse (wound)

Technical data

Operating temperature range	Max. operating temperature $T_{op,max}$			+110 °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)	at	≤ 27 nF	27 nF $< C_R \leq 0.1$ μ F	0.1 μ F $< C_R \leq 1$ μ F	> 1 μ F
	1 kHz	0.8	0.8	0.8	0.8
	10 kHz	1.0	1.0	1.0	—
	100 kHz	2.0	3.0	—	—
Insulation resistance R_{ins} or time constant $\tau = C_R \cdot R_{ins}$ at 20 °C, rel. humidity $\leq 65\%$ (minimum as-delivered values)	$C_R \leq 0.33$ μ F		$C_R > 0.33$ μ F		
	100 G Ω		30000 s		
DC test voltage	$1.6 \cdot V_R, 2$ s				
Category voltage V_C (continuous operation with V_{DC} or V_{AC} at $f \leq 1$ kHz)	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 $f \leq 1$ kHz)	T_A (°C)	DC voltage (max. hours)		AC voltage (max. hours)	
	$T_A \leq 85$ $85 < T_A \leq 100$	$V_{op} = 1.25 \cdot V_C$ (2000 h) $V_{op} = 1.25 \cdot V_C$ (2000 h)		$V_{op} = 1.0 \cdot V_{C,RMS}$ (2000 h) $V_{op} = 1.0 \cdot V_{C,RMS}$ (2000 h)	
Damp heat test Limit values after damp heat test	56 days/40 °C/93% relative humidity				
	Capacitance change $ \Delta C/C $			$\leq 3\%$	
	Dissipation factor change $\Delta \tan \delta$			$\leq 0.5 \cdot 10^{-3}$ (at 1 kHz) $\leq 1.0 \cdot 10^{-3}$ (at 10 kHz)	
	Insulation resistance R_{ins} or time constant $\tau = C_R \cdot R_{ins}$			$\geq 50\%$ of minimum as-delivered values	
Reliability: Failure rate λ Service life t_{SL}	1 fit ($\leq 1 \cdot 10^{-9}/h$) at $0.5 \cdot V_R, 40$ °C				
	200 000 h at $1.0 \cdot V_R, 85$ °C				
For conversion to other operating conditions and temperatures, refer to chapter "Quality, 2 Reliability".					
Failure criteria: Total failure Failure due to variation of parameters	Short circuit or open circuit				
	Capacitance change $ \Delta C/C $			$> 10\%$	
	Dissipation factor $\tan \delta$			$> 4 \cdot$ upper limit value	
	Insulation resistance R_{ins} or time constant $\tau = C_R \cdot R_{ins}$			< 1500 M Ω ($C_R \leq 0.33$ μ F) < 500 s ($C_R > 0.33$ μ F)	



Pulse handling capability

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

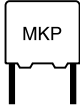
"k₀" represents the maximum permissible pulse characteristic of the waveform applied to the capacitor, expressed in V²/μs.

Note:

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

dV/dt values

Lead spacing		10 mm	15 mm	22.5 mm	27.5 mm	37.5 mm
V _R V DC	V _{RMS} V AC	dV/dt in V/μs				
250	160	–	200	120	50	–
400	200	–	300	180	100	–
630	250	–	400	300	150	–
850	450	–	–	–	–	90
1000	250	–	975	600	300	–
	500	–	–	–	–	100
1250	450	4000	–	–	–	–
	500	–	1850	1150	600	140
1600	500	–	4500	2400	1000	–
	600	–	–	–	–	210
	700	–	5200	–	–	–
2000	700	–	8000	7000	2300	200
	1000	–	–	7500	–	–



B32651 ... B32656

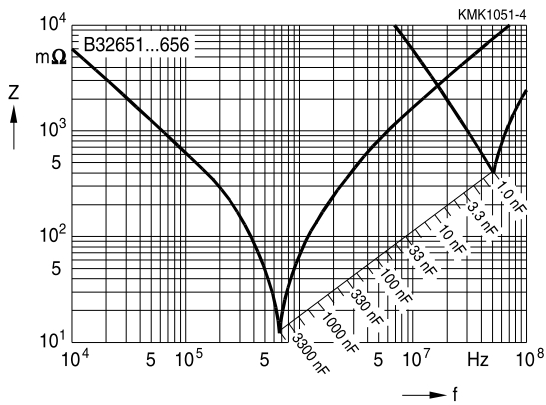
High pulse (wound)

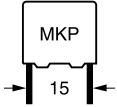
k_0 values

Lead spacing		10 mm	15 mm	22.5 mm	27.5 mm	37.5 mm
V_R V DC	V_{RMS} V AC	k_0 in $V^2/\mu s$				
250	160	–	100 000	60 000	25 000	–
400	200	–	250 000	200 000	110 000	–
630	250	–	500 000	350 000	250 000	–
850	450	–	–	–	–	153 000
1000	250	–	3 000 000	1 500 000	1 000 000	–
	500	–	–	–	–	180 000
1250	450	25 000 000	–	–	–	–
	500	–	9 000 000	3 750 000	2 000 000	350 000
1600	500	–	20 000 000	10 000 000	4 000 000	–
	600	–	–	–	–	672 000
	700	–	28 000 000	–	–	–
2000	700	–	60 000 000	40 000 000	15 000 000	800 000
	1000	–	–	50 000 000	–	–

Impedance Z versus frequency f

(typical values)



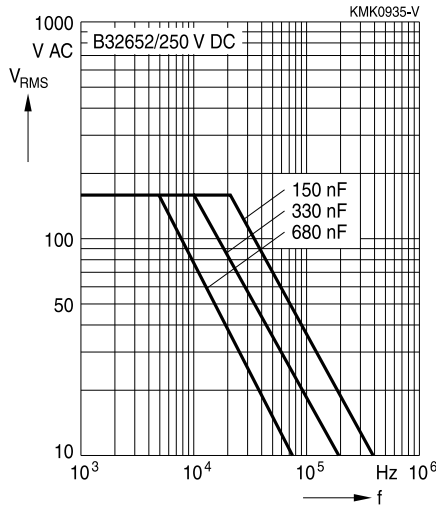


B32652
High pulse (wound)

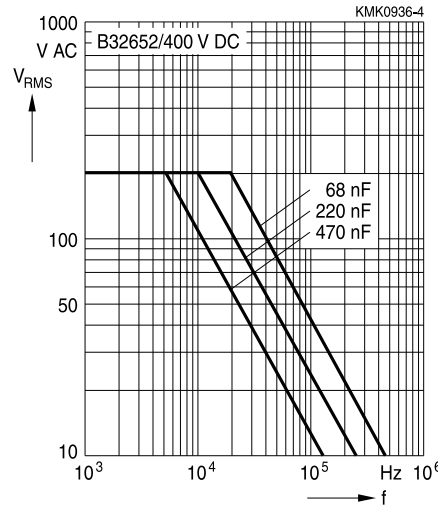
Permissible AC voltage V_{RMS} versus frequency f (for sinusoidal waveforms, $T_A \leq 90^\circ C$)
 For $T_A > 90^\circ C$, please refer to "General technical information", section 3.2.3.

Lead spacing 15 mm

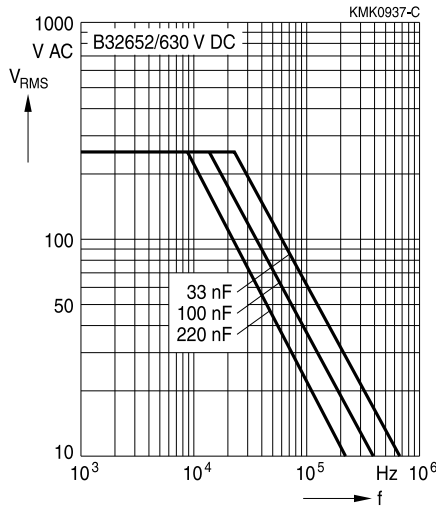
250 V DC/160 V AC



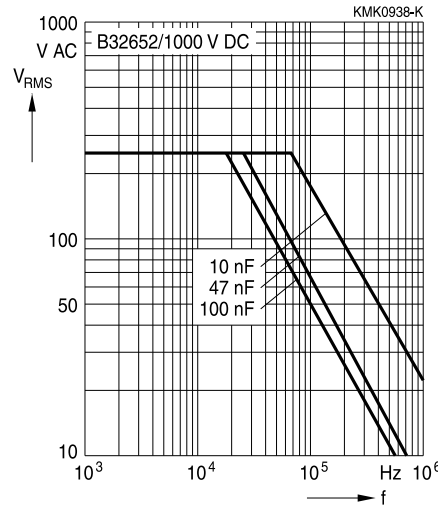
400 V DC/200 V AC

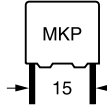


630 V DC/250 V AC



1000 V DC/250 V AC



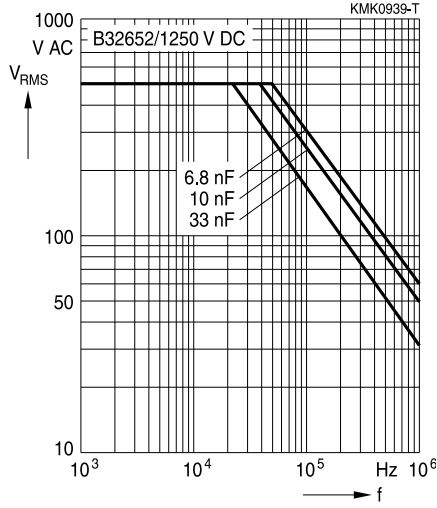


Permissible AC voltage V_{RMS} versus frequency f (for sinusoidal waveforms, $T_A \leq 90^\circ C$)

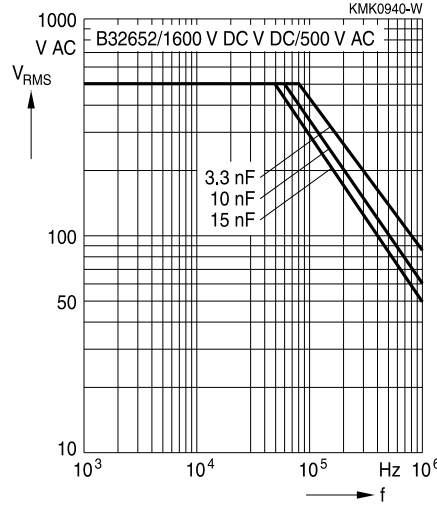
For $T_A > 90^\circ C$, please refer to "General technical information", section 3.2.3.

Lead spacing 15 mm

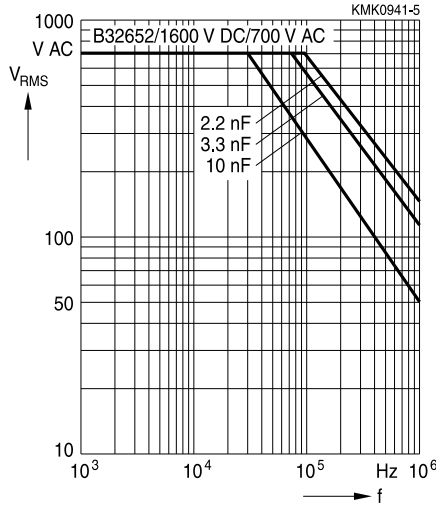
1250 V DC/500 V AC



1600 V DC/500 V AC



1600 V DC/700 V AC



2000 V DC/700 V AC

