Film capacitors – Power Electronic Capacitors

MKP DC

Series/Type:
Ordering code: **B2562***

Date: June 2012
Version: 5

Construction and general data

Resin filling:	Non PCB, hard polyurethane (Dry type)
Mounting and grounding:	M12 Stud on bottom of the aluminum case
Cooling:	Naturally air-cooled (or forced air cooling)
Max. Permissible altitude:	2000 m above sea level
Degree of protection:	Indoor mounting

Characteristics	
Capacitance tolerance	±10%
tan δ_o	$2 \cdot 10^{-4}$
tan $\delta_{(100\ Hz)}$	$\leq 2 \cdot 10^{-3}$
Θ_{stg}	–55 ... +85 °C
t_{LD}	100 000 h

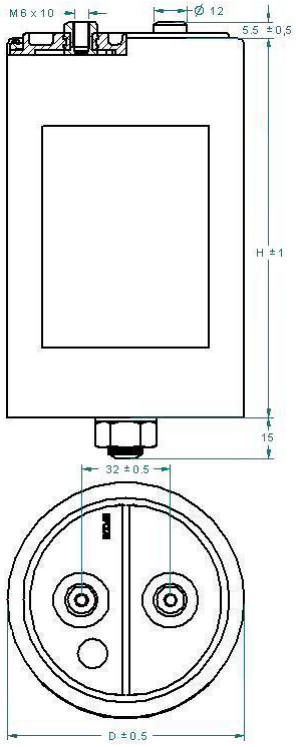
Climatic category 55/60/56	
Minimum temperature $\Theta_{min.}$	–55 °C
Maximum temperature $\Theta_{max.}$	+60 ºC
Storage temperature Θ_{stg}	–55 ... +85 °C
Maximum hotspot temperature Θ_{hs}	+75 ºC
Humidity	93 % (t_{test} = 56 days)
Maximum altitude	2000 m above sea level

Test data	
Voltage between terminals V_{TT}	1.5 • V_{RDC}, 10 s
Voltage between terminals and aluminium can V_{TC}	2 • V_i + 1000 V, 10 s
Dissipation factor tan δ (100 Hz)	≤ $1.0 \cdot 10^{-3}$
Life test	IEC 61071
Life expectancy	Up to 100 000 hours

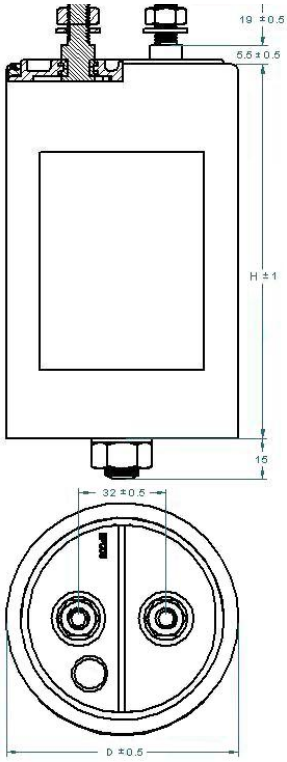
Design data	
Dimensions (d x h)	According to specification table
Weight approx.	According to specification table
Impregnation	Resin filling: Non PCB, hard polyurethane (Dry type)
Fixing	Threaded bolt M12
Max. torque (case) M12 stud	12 Nm
Max. torque terminal	8 Nm

Reference standards
IEC 61071
RoHS compliance
Certification: UL 810-5th edition

B2562*
Female terminals (M6, M8 or M10)



B2562*
Male terminals (M6, M8 or M10)



- M12 stud on bottom of the aluminum case, nut and washer for fixing are standard for all types.
- Other available distance between terminals: 35 and 50 mm.

Note: distance between terminals of 50 mm is available only for capacitors with diameter 116 mm.

Terms and formulas

The following definitions apply to power capacitors according to IEC 61071.

Rated capacitance C_R
Nominal value of the capacitance at 20 °C and measuring frequency range of 50 to 120 Hz.

Rated DC voltage V_R
Maximum operating peak voltage of either polarity but of a non-reversing type wave form, for which the capacitor has been designed, for continuous operation.

Ripple voltage V_r
Peak-to-peak alternating component of the unidirectional voltage.

Maximum surge voltage V_s
Peak voltage induced by a switching or any other disturbance of the system which is allowed for a limited number of times and duration.
- Maximum duration: 50 ms / pulse
- Maximum number of occurrences: 1000 (during load)

Insulation voltage V_i
Rms rated value of the insulation voltage of capacitive elements and terminals to case or earth. When it is not specified in the product data sheet, the insulation voltage is at least:

$$V_i = \frac{V_R}{\sqrt{2}}$$

Maximum rate of voltage rise $(dV/dt)_{max}$
Maximum permissible repetitive rate of voltage rise of the operational voltage.

Maximum current I_{max}
Maximum rms current for continuous operation.

Maximum peak current $\hat{I}$
Maximum permissible repetitive current amplitude during continuous operation.
Maximum peak current ($\hat{I}$) and maximum rate of voltage rise $(dV/dt)_{max}$ on a capacitor are related as follows:

$$\hat{I} = C \cdot (dV/dt)_{max}$$

Maximum surge current $\hat{I}_s$
Admissible peak current induced by a switching or any other disturbance of the system which is allowed for a limited number of times (1000 times) and duration (50 ms / pulse).

$$\hat{I}_s = C \cdot (dV/dt)_s$$

Ambient temperature Θ_A
Temperature of the surrounding air, measured at 10 cm distance and 2/3 of the case height of the capacitor.

Lowest operating temperature Θ_{min}
Lowest permitted ambient temperature at which a capacitor may be energized.

Maximum operating temperature Θ_{max}
Highest permitted capacitor temperature during operation, i.e. temperature at the hottest point of the case.

Hot-spot temperature Θ_{hs}
Temperature zone inside of the capacitor at hottest spot.

Tangent of the loss angle of a capacitor tan δ
Ratio between the equivalent series resistance and the capacitive reactance of a capacitor at a specified sinusoidal alternating voltage, frequency and temperature.

Series resistance R_s
The sum of all Ohmic resistances occurring inside the capacitor.

Thermal resistance R_{th}
The thermal resistance indicates by how many degrees the capacitor temperature at the hot spot rises in relation to the dissipation losses.

Maximum power loss P_{max}
Maximum permissible power dissipation for the capacitor's operation.

$$P_{max} = \frac{\Theta_{hs} - \Theta_A}{R_{th}}$$

Self inductance L_{self}
The sum of all inductive elements which are contained in a capacitor.

Resonance frequency f_r
The lowest frequency at which the impedance of the capacitor becomes minimum.

$$f_r = \frac{1}{2\pi \cdot \sqrt{L_{self} \cdot C_R}}$$

Specifications and characteristics

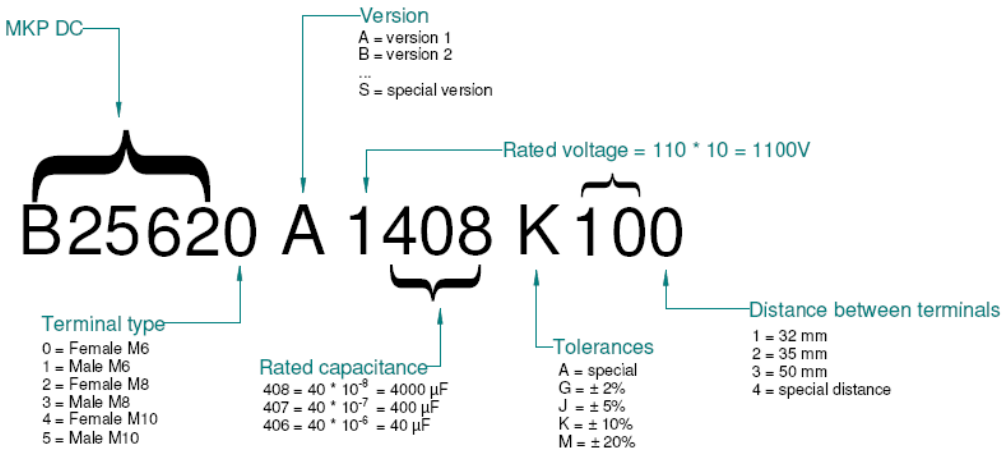
Application:
The MKP DC series is designed for DC-link applications. Some typical examples of DC-Link applications are as follows: converters, frequency drives, power conversion, uninterruptible power supplies, transportation, wind power, solar power, power distribution, etc.

Specifications and ordering codes

V_{RMS}	C µF	I_{max} A	R_s mΩ	L_{self} nH	Θ_{max} °C	D mm	H mm	Ordering code
880	160	40	2.2	≤ 80	50	75	70	B25620B0167K881
	220	50	1.9	≤ 60	50	85	70	B25620B0227K881
	260	45	2.8	≤ 80	50	75	95	B25620B0267K881
	260	45	2.8	≤ 80	50	85	95	B25620S0267K881
	350	50	2.4	≤ 60	50	85	95	B25620B0357K881
	400	45	3.8	≤ 80	50	75	132	B25620B0407K881
	440	65	1.5	≤ 60	50	116	70	B25620B0447K882
	480	55	2.8	≤ 60	50	85	120	B25620B0487K881
	550	50	3.0	≤ 60	50	85	132	B25620B0557K881
	700	70	1.7	≤ 60	50	116	95	B25620B0707K882
	750	55	3.7	≤ 60	50	85	173	B25620B0757K881
	970	75	1.9	≤ 60	50	116	120	B25620B0977K882
	1100	75	2.0	≤ 60	50	116	132	B25620B0118K882
	1500	80	2.4	≤ 60	50	116	173	B25620B0158K882
1100	100	35	2.5	≤ 80	50	75	70	B25620B1107K101
	140	45	2.1	≤ 60	50	85	70	B25620B1147K101
	170	40	3.2	≤ 80	50	75	95	B25620B1177K101
	230	40	4.1	≤ 80	50	75	120	B25620B1237K101
	260	40	4.4	≤ 80	50	75	132	B25620B1267K101
	280	60	1.6	≤ 60	50	116	70	B25620B1287K102
	310	50	3.2	≤ 60	50	85	120	B25620B1317K101
	350	40	5.6	≤ 80	50	75	173	B25620B1357K101
	400	55	2.4	≤ 60	50	85	132	B25620B1407K101
	420	55	2.2	≤ 60	50	85	138	B25620B1427A101
	450	65	1.9	≤ 60	50	116	95	B25620B1457K102
	480	50	4.3	≤ 60	50	85	173	B25620B1487K101
	610	70	2.2	≤ 60	50	116	120	B25620B1617K102
	700	70	2.3	≤ 60	50	116	132	B25620B1707K102
	940	70	1.6	≤ 60	50	116	173	B25620B1947K102
	1100	80	1.5	≤ 100	50	116	223	B25620B1118K103

V_{RMS}	C µF	I_{max} A	R_S mΩ	L_{self} nH	Θ_{max} °C	D mm	H mm	Ordering code
1320	70	35	2.8	≤ 80	50	75	70	B25620B1706K321
	110	35	3.8	≤ 80	50	75	95	B25620B1117K321
	160	40	4.6	≤ 80	50	75	120	B25620B1167K321
	180	40	5.1	≤ 80	50	75	132	B25620B1187K321
	220	45	3.6	≤ 60	50	85	120	B25620B1227K321
	260	45	3.9	≤ 60	50	85	132	B25620B1267K321
	310	65	2.0	≤ 60	50	116	95	B25620B1317K322
	340	50	4.9	≤ 60	50	85	173	B25620B1347K321
	420	65	2.4	≤ 60	50	116	120	B25620B1427K322
	480	70	2.6	≤ 60	50	116	132	B25620B1487K322
	660	70	3.1	≤ 60	50	116	173	B25620B1667K322
1980	30	25	3.8	≤ 80	50	75	70	B25620B1306K981
	40	30	3.1	≤ 60	50	85	70	B25620B1406K981
	50	30	5.1	≤ 80	50	75	95	B25620B1506K981
	70	35	3.9	≤ 60	50	85	95	B25620B1706K981
	80	30	7.1	≤ 80	50	75	132	B25620B1806K981
	110	30	9.1	≤ 80	50	75	173	B25620B1117K981
	145	40	7.1	≤ 60	50	85	173	B25620B1147K981
	190	60	3.0	≤ 60	50	116	120	B25620B1197K982
	215	60	3.3	≤ 60	50	116	132	B25620B1217K982
	295	60	4.0	≤ 60	50	116	173	B25620B1297K982

Structure of ordering code



Please note that special types may differ from the regular structure.

Cautions and warnings

- In case of dents of more than 1 mm depth or any other mechanical damage, capacitors must not be used at all.
- Check tightness of the connections/terminals periodically.
- The energy stored in capacitors may be lethal. To prevent any chance of shock, discharge and short-circuit the capacitor before handling.
- Failure to follow cautions may result, worst case, in premature failures, bursting and fire.
- EPCOS AG is not responsible for any kind of possible damages to persons or things due to improper installation and application of capacitors for power electronics.

Safety

- Electrical or mechanical misapplication of capacitors may be hazardous. Personal injury or property damage may result from bursting of the capacitor or from expulsion of oil or melted material due to mechanical disruption of the capacitor.
- Ensure good, effective grounding for capacitor enclosures.
- Observe appropriate safety precautions during operation (self-recharging phenomena and the high energy contained in capacitors).
- Handle capacitors carefully, because they may still be charged even after disconnection.
- The terminals of capacitors, connected bus bars and cables as well as other devices may also be energized.
- Follow good engineering practice.

Thermal load

After installation of the capacitor it is necessary to verify that maximum hot-spot temperature is not exceeded at extreme service conditions.

Mechanical protection

The capacitor has to be installed in a way that mechanical damages and dents in the aluminum can are avoided.

Storage and operating conditions

Do not use or store capacitors in corrosive atmosphere, especially where chloride gas, sulfide gas, acid, alkali, salt or the like are present. In dusty environments regular maintenance and cleaning especially of the terminals is required to avoid conductive path between phases and/or phases and ground.

The maximum storage temperature is 85 °C.

Service life expectancy

Electrical components do not have an unlimited service life expectancy; this applies to self-healing capacitors, too. The maximum service life expectancy may vary depending on the application the capacitor is used in.

Important notes

The following applies to all products named in this publication:

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