Film Capacitors

Metallized Polypropylene Film Capacitors (MKP)

Series/Type: **B32794 ... B32798**

Date: August 2014

Typical applications

- Output AC filtering for power converters UPS, solar inverters, motor drives

Climatic

- Max. operating temperature: 105 °C
- Climatic category (IEC 60068-1): 40/85/56

Construction

- Dielectric: Polypropylene (PP)
- Plastic case (UL 94 V-0)
- Epoxy resin sealing (UL 94 V-0)

Features

- Optimized AC voltage performance
- High ripple current/frequency capability
- Small dimensions
- For PCB mounting
- RoHS-compatible

Terminals

- Parallel wire leads, lead-free tinned
- 2-pin and 4-pin versions
- Standard lead lengths: 6 −1 mm
- Special lead lengths available on request

Marking

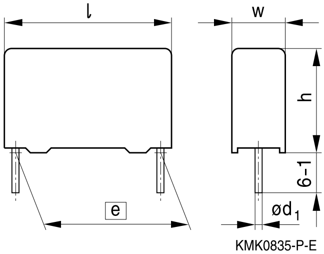
Manufacturer's logo, date code, rated capacitance (coded), capacitance tolerance (code letter), rated AC voltage

Delivery mode

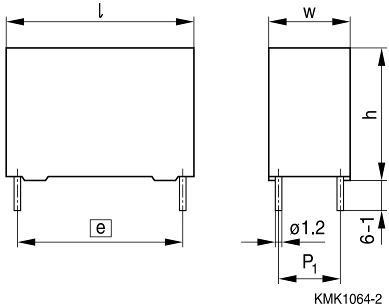
Bulk (untaped, lead length 6 −1 mm)

Dimensional drawings

2-pin version



4-pin version



Dimensions in mm

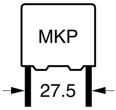
Version	Lead spacing e ±0.4	Lead diameter d_1	Type
2-pin	27.5	0.8	B32794D
2-pin	37.5	1.0	B32796E/T
4-pin	37.5	1.2	B32796G
4-pin	52.5	1.2	B32798G

Overview of available types

Lead spacing	27.5 mm			
Type	B32794			
Page	6			
V_{RMS} (V AC)	250	300	350	400
C_R (µF)				
0.82				
1.2				
1.5				
2.0				
2.2				
2.5				
3.3				
3.5				
4.0				
5.0				
6.3				
7.5				
8.0				
10				
12				
15				

Lead spacing	37.5 mm			
Type	B32796			
Page	7			
V_{RMS} (V AC)	250	300	350	400
C_R (µF)				
2.7				
3.5				
4.0				
5.0				
5.6				
7.5				
8.0				
10				
11				
13				
14				
15				
16				
20				
22				
24				
25				
30				
34				
40				
45				

Lead spacing	52.5 mm			
Type	B32798			
Page	9			
V_{RMS} (V AC)	250	300	350	400
C_R (µF)				
18				
20				
25				
26				
30				
35				
40				
55				
75				



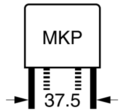
Ordering codes and packing units (lead spacing 27.5 mm)

V_{RMS} V AC	V_R V DC	C_R µF	Max. dimensions w × h × l mm	P_1 mm	Ordering code (composition see below)	I_{RMS} 60 °C 10 kHz A	ESL nH	ESR 10 kHz mΩ	Untaped pcs./ MOQ
250	630	2.5	11.0 × 19.0 × 31.5	–	B32794D2255+000	4	24	14.1	2352
		4.0	11.0 × 21.0 × 31.5	–	B32794D2405+000	6	25	9.1	2352
		6.3	15.0 × 24.5 × 31.5	–	B32794D2635+000	8	26	6.1	1680
		10	16.0 × 32.0 × 31.5	–	B32794D2106+000	11	27	4.2	1064
		15	22.0 × 36.5 × 31.5	–	B32794D2156+000	13	28	3.1	784
300	700	2.0	11.0 × 19.0 × 31.5	–	B32794D3205+000	4	24	15.6	2352
		3.3	13.5 × 23.0 × 31.5	–	B32794D3335+000	6	25	9.7	1932
		5.0	14.0 × 24.5 × 31.5	–	B32794D3505+000	7	26	6.7	1848
		8.0	18.0 × 33.0 × 31.5	–	B32794D3805+000	9	27	4.6	952
		12	22.0 × 36.5 × 31.5	–	B32794D3126+000	11	28	3.5	784
350	875	1.2	11.0 × 19.0 × 31.5	–	B32794D8125+000	3	24	21.2	2352
		2.2	12.5 × 21.5 × 31.5	–	B32794D8225+000	5	25	11.9	2100
		3.3	15.0 × 24.5 × 31.5	–	B32794D8335+000	7	26	8.2	1680
		5.0	18.0 × 33.0 × 31.5	–	B32794D8505+000	9	27	5.8	952
		7.5	22.0 × 36.5 × 31.5	–	B32794D8755+000	12	28	4.5	784
400	1050	0.82	11.0 × 19.0 × 31.5	–	B32794D4824+000	3	24	26.5	2352
		1.5	13.5 × 23.0 × 31.5	–	B32794D4155+000	4	25	14.8	1932
		2.2	14.0 × 24.5 × 31.5	–	B32794D4225+000	6	26	10.4	1848
		3.5	18.0 × 33.0 × 31.5	–	B32794D4355+000	8	27	6.9	952
		5.0	22.0 × 36.5 × 31.5	–	B32794D4505+000	11	28	5.5	784

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%



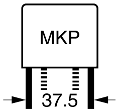
Ordering codes and packing units (lead spacing 37.5 mm)

V_{RMS} V AC	V_R V DC	C_R µF	Max. dimensions w × h × l mm	P_1 mm	Ordering code (composition see below)	I_{RMS} 60 °C 10 kHz A	ESL nH	ESR 10 kHz mΩ	Untaped pcs./ MOQ
250	630	8	24.0 × 15.0 × 41.5	–	B32796T2805+000	8	21	9	1040
		11	24.0 × 19.0 × 41.5	–	B32796T2116+000	10	23	8	780
		22	20.0 × 39.5 × 42.0	10.2	B32796G2226+000	15	30	3.2	640
		22	20.0 × 39.5 × 42.0	–	B32796E2226+000	14	30	3.2	640
		25	28.0 × 37.0 × 42.0	10.2	B32796G2256+000	17	30	2.9	440
		25	28.0 × 37.0 × 42.0	–	B32796E2256+000	16	30	2.9	440
		40	30.0 × 45.0 × 42.0	20.3	B32796G2406+000	21	33	2.3	400
		40	30.0 × 45.0 × 42.0	–	B32796E2406+000	20	33	2.3	400
		45	33.0 × 48.0 × 42.5	20.3	B32796G2456+000	23	33	1.9	180
300	700	5.6	24.0 × 15.0 × 41.5	–	B32796T3565+000	7	21	12	1040
		7.5	24.0 × 19.0 × 41.5	–	B32796T3755+000	9	23	10	780
		16	20.0 × 39.5 × 42.0	10.2	B32796G3166+000	14	30	3.9	640
		16	20.0 × 39.5 × 42.0	–	B32796E3166+000	13	30	3.9	640
		20	28.0 × 37.0 × 42.0	10.2	B32796G3206+000	15	30	3.1	440
		20	28.0 × 37.0 × 42.0	–	B32796E3206+000	14	30	3.1	440
		30	30.0 × 45.0 × 42.0	20.3	B32796G3306+000	19	33	2.2	400
		30	30.0 × 45.0 × 42.0	–	B32796E3306+000	18	33	2.2	400
		34	33.0 × 48.0 × 42.5	20.3	B32796E3346+000	20	33	1.9	180
350	875	4	24.0 × 15.0 × 41.5	–	B32796T8405+000	7	21	13	1040
		5	24.0 × 19.0 × 41.5	–	B32796T8505+000	9	23	11	780
		10	20.0 × 39.5 × 42.0	10.2	B32796G8106+000	12	30	4.9	640
		10	20.0 × 39.5 × 42.0	–	B32796E8106+000	11	30	4.9	640
		14	28.0 × 37.0 × 42.0	10.2	B32796G8146+000	15	30	3.6	440
		14	28.0 × 37.0 × 42.0	–	B32796E8146+000	14	30	3.6	440
		15	30.0 × 45.0 × 42.0	20.3	B32796G8156+000	15	30	3.0	400
		20	30.0 × 45.0 × 42.0	20.3	B32796G8206+000	19	30	2.6	400
		20	30.0 × 45.0 × 42.0	–	B32796E8206+000	18	30	2.6	400
		24	33.0 × 48.0 × 42.5	20.3	B32796G8246+000	20	30	2.5	180

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%



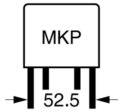
Ordering codes and packing units (lead spacing 37.5 mm)

V_{RMS} V AC	V_R V DC	C_R µF	Max. dimensions w × h × l mm	P_1 mm	Ordering code (composition see below)	I_{RMS} 60 °C 10 kHz A	ESL nH	ESR 10 kHz mΩ	Untaped pcs./ MOQ
400	1050	2.7	24.0 × 15.0 × 41.5	–	B32796T4275+000	7	21	15	1040
		3.5	24.0 × 19.0 × 41.5	–	B32796T4355+000	8	23	13	780
		7.5	20.0 × 39.5 × 42.0	10.2	B32796G4755+000	11	30	5.5	640
		7.5	20.0 × 39.5 × 42.0	–	B32796E4755+000	10	30	5.5	640
		10	28.0 × 37.0 × 42.0	10.2	B32796G4106+000	14	30	4.5	440
		10	28.0 × 37.0 × 42.0	–	B32796E4106+000	13	30	4.5	440
		13	30.0 × 45.0 × 42.0	20.3	B32796G4136+000	17	33	3.5	400
		13	30.0 × 45.0 × 42.0	–	B32796E4136+000	16	33	3.5	400
		16	33.0 × 48.0 × 42.5	20.3	B32796G4166+000	18	33	3.5	180

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%



Ordering codes and packing units (lead spacing 52.5 mm)

V_{RMS} V AC	V_R V DC	C_R µF	Max. dimensions w × h × l mm	P_1 mm	Ordering code (composition see below)	I_{RMS} 60 °C 10 kHz A	ESL nH	ESR 10 kHz mΩ	Untaped pcs./ MOQ
250	630	55	30.0 × 45.0 × 57.5	20.3	B32798G2556+000	21	35	2.7	280
		75	35.0 × 50.0 × 57.5	20.3	B32798G2756+000	25	38	2.1	108
300	700	40	30.0 × 45.0 × 57.5	20.3	B32798G3406+000	19	35	3.2	280
		55	35.0 × 50.0 × 57.5	20.3	B32798G3556+000	24	38	2.5	108
350	875	26	30.0 × 45.0 × 57.5	20.3	B32798G8266+000	18	35	4.5	280
		30	30.0 × 45.0 × 57.5	20.3	B32798G8306K000	20	37	4.0	108
		30	35.0 × 50.0 × 57.5	20.3	B32798G8306J000	20	37	4.0	108
		35	35.0 × 50.0 × 57.5	20.3	B32798G8356+000	22	38	3.0	108
		40	35.0 × 50.0 × 57.5	20.3	B32798G8406K000	22	38	3.0	108
400	1050	18	30.0 × 45.0 × 57.5	20.3	B32798G4186+000	16	35	4.7	280
		20	35.0 × 50.0 × 57.5	20.3	B32798G4206+000	17	37	4.5	108
		25	35.0 × 50.0 × 57.5	20.3	B32798G4256+000	20	38	3.5	108

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%

Technical data

Reference standard: IEC 61071, EN 61071, VDE 0560-120

Operating temperature range (case)	Max. operating temperature, $T_{op,max}$ +105 °C Upper category temperature T_{max} +85 °C Lower category temperature T_{min} –40 °C Note: At T > 85 °C de-rating for V_{RMS} (V AC) should be 1.5%/°C
Capacitance drift in range (−40 °C, −85 °C)	2% respect the value measured at reference conditions
Insulation Resistance R_{ins} given as time constant $\tau = C_R \cdot R_{ins}$, rel. humidity ≤ 65% (minimum as-delivered values)	30 000 s
Test voltage between terminals	$1.5 \cdot V_R$ for 10 s $1.65 \cdot V_R$ for 2 s
Test voltage terminal case (10 s)	$2 \cdot V_{RMS}$ + 1000 V AC (min. 2000 V AC) at 50 Hz
Maximum permissible overvoltage for short operating periods (max 1 min/day)	$1.3 \cdot V_{RMS}$
Maximum peak current (A)	$I_{P,max} = C_R \cdot \frac{dV}{dt}$
Damp heat test Limit values after damp heat test	56 days/40 °C/93% relative humidity Capacitance change $\lvert \Delta C/C \rvert$ ≤ 5% Dissipation factor change $\Delta \tan \delta$ ≤ $1.5 \cdot 10^{-3}$ (at 1 kHz) Insulation resistance R_{ins} ≥ 50% of minimum as-delivered values
Change of temperature	In accordance with IEC 60068-2-14 (Test Nb)
Reliability: Failure rate λ	300 fit
Service life t_{SL}	> 60 000 h at V_{RMS}, 60 °C For conversion to other operating conditions, refer to chapter "Reliability" on page 439 from Data Book 2009.
Failure criteria: Total failure	Short/open circuit
Failure due to variation of parameters	Capacitance change $\lvert \Delta C/C \rvert$ ≥ 10% Dissipation factor change $\Delta \tan \delta$ > 4 · upper limit value Insulation resistance R_{ins} < 1500 MΩ (C_R≤0.33µF) or time constant $\tau = C_R \cdot R_{ins}$ < 500 s (C_R>0.33µF)

Pulse handling capability

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

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

Lead spacing	27.5 mm				37.5 mm				52.5 mm			
Type	B32794				B32796				B32798			
V_{RMS} (V AC)	250	300	350	400	250	300	350	400	250	300	350	400
	dV/dt in V/µs											
	27	31	39	47	19	21	26	32	12	14	18	21

Notes: Please take all additional data not mentioned above from our Data Book 2009

Mounting guidelines

1 Soldering

1.1 Solderability of leads

The solderability of terminal leads is tested to IEC 60068-2-20, test Ta, method 1.

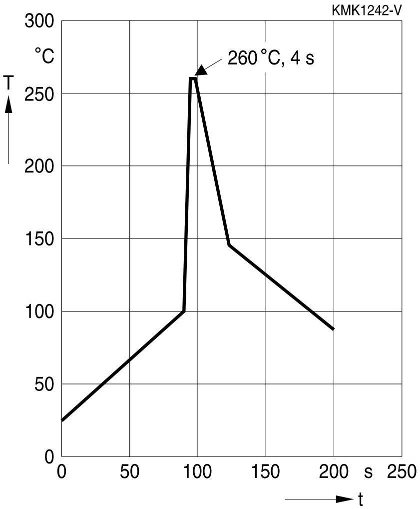
Before a solderability test is carried out, terminals are subjected to accelerated ageing (to IEC 60068-2-2, test Ba: 4 h exposure to dry heat at 155 °C). Since the ageing temperature is far higher than the upper category temperature of the capacitors, the terminal wires should be cut off from the capacitor before the ageing procedure to prevent the solderability being impaired by the products of any capacitor decomposition that might occur.

Solder bath temperature	235 ±5 °C
Soldering time	2.0 ±0.5 s
Immersion depth	2.0 +0/−0.5 mm from capacitor body or seating plane
Evaluation criteria: Visual inspection	Wetting of wire surface by new solder ≥90%, free-flowing solder

1.2 Resistance to soldering heat

Resistance to soldering heat is tested to IEC 60068-2-20, test Tb, method 1A.
Conditions:

Series		Solder bath temperature	Soldering time
MKT	boxed (except 2.5 × 6.5 × 7.2 mm) coated uncoated (lead spacing > 10 mm)	260 ±5 °C	10 ±1 s
MFP MKP	 (lead spacing > 7.5 mm)		
MKT	boxed (case 2.5 × 6.5 × 7.2 mm)		5 ±1 s
MKP MKT	(lead spacing ≤ 7.5 mm) uncoated (lead spacing ≤ 10 mm) insulated (B32559)		< 4 s recommended soldering profile for MKT uncoated (lead spacing ≤ 10 mm) and insulated (B32559)



Immersion depth	2.0 +0/−0.5 mm from capacitor body or seating plane
Shield	Heat-absorbing board, (1.5 ±0.5) mm thick, between capacitor body and liquid solder
Evaluation criteria:	
Visual inspection	No visible damage
$\Delta C/C_0$	2% for MKT/MKP/MFP 5% for EMI suppression capacitors
tan δ	As specified in sectional specification

1.3 General notes on soldering

Permissible heat exposure loads on film capacitors are primarily characterized by the upper category temperature T_{max}. Long exposure to temperatures above this type-related temperature limit can lead to changes in the plastic dielectric and thus change irreversibly a capacitor's electrical characteristics. For short exposures (as in practical soldering processes) the heat load (and thus the possible effects on a capacitor) will also depend on other factors like:

- Pre-heating temperature and time
- Forced cooling immediately after soldering
- Terminal characteristics:
  diameter, length, thermal resistance, special configurations (e.g. crimping)
- Height of capacitor above solder bath
- Shadowing by neighboring components
- Additional heating due to heat dissipation by neighboring components
- Use of solder-resist coatings

The overheating associated with some of these factors can usually be reduced by suitable countermeasures. For example, if a pre-heating step cannot be avoided, an additional or reinforced cooling process may possibly have to be included.

EPCOS recommends the following conditions:

- Pre-heating with a maximum temperature of 110 °C
- Temperature inside the capacitor should not exceed the following limits:
  - MKP/MFP 110 °C
  - MKT 160 °C
- When SMD components are used together with leaded ones, the leaded film capacitors should not pass into the SMD adhesive curing oven. The leaded components should be assembled after the SMD curing step.
- Leaded film capacitors are not suitable for reflow soldering.

Uncoated capacitors

For uncoated MKT capacitors with lead spacings ≤10 mm (B32560/B32561) the following measures are recommended:

- pre-heating to not more than 110 °C in the preheater phase
- rapid cooling after soldering

Cautions and warnings

- Do not exceed the upper category temperature (UCT).
- Do not apply any mechanical stress to the capacitor terminals.
- Avoid any compressive, tensile or flexural stress.
- Do not move the capacitor after it has been soldered to the PC board.
- Do not pick up the PC board by the soldered capacitor.
- Do not place the capacitor on a PC board whose PTH hole spacing differs from the specified lead spacing.
- Do not exceed the specified time or temperature limits during soldering.
- Avoid external energy inputs, such as fire or electricity.
- Avoid overload of the capacitors.

The table below summarizes the safety instructions that must always be observed. A detailed description can be found in the relevant sections of the chapters "General technical information" and "Mounting guidelines".

Topic	Safety information	Reference chapter "General technical information"
Storage conditions	Make sure that capacitors are stored within the specified range of time, temperature and humidity conditions.	4.5 "Storage conditions"
Flammability	Avoid external energy, such as fire or electricity (passive flammability), avoid overload of the capacitors (active flammability) and consider the flammability of materials.	5.3 "Flammability"
Resistance to vibration	Do not exceed the tested ability to withstand vibration. The capacitors are tested to IEC 60068-2-6. EPCOS offers film capacitors specially designed for operation under more severe vibration regimes such as those found in automotive applications. Consult our catalog "Film Capacitors for Automotive Electronics".	5.2 "Resistance to vibration"

Topic	Safety information	Reference chapter "Mounting guidelines"
Soldering	Do not exceed the specified time or temperature limits during soldering.	1 "Soldering"
Cleaning	Use only suitable solvents for cleaning capacitors.	2 "Cleaning"
Embedding of capacitors in finished assemblies	When embedding finished circuit assemblies in plastic resins, chemical and thermal influences must be taken into account. Caution: Consult us first, if you also wish to embed other uncoated component types!	3 "Embedding of capacitors in finished assemblies"

Effect of humidity on capacitance stability

Long contact of a film capacitor with humidity can produce irreversible effects. Direct contact with liquid water or excess exposure to high ambient humidity or dew will eventually remove the film metallization and thus destroy the capacitor. Plastic boxed capacitors must be properly tested in the final application at the worst expected conditions of temperature and humidity in order to check if any parameter drift may provoke a circuit malfunction.

In case of penetration of humidity through the film, the layer of Zinc can be degraded, specially under AC operation (change of polarity), accelerated by the temperature, provoking an increment of the serial resistance of the electrode and eventually a reduction of the capacitance value.
For DC operation, the parameter drift is much less.

Plastic boxes and resins can not protect 100% against humidity. Metal enclosures, resin potting or coatings or similar measures by customers in their applications will offer additional protection against humidity penetration.

Display of ordering codes for EPCOS products

The ordering code for one and the same product can be represented differently in data sheets, data books, other publications and the website of EPCOS, or in order-related documents such as shipping notes, order confirmations and product labels. **The varying representations of the ordering codes are due to different processes employed and do not affect the specifications of the respective products**. Detailed information can be found on the Internet under www.epcos.com/orderingcodes.

Symbols and terms

Symbol	English	German
α	Heat transfer coefficient	Wärmeübergangszahl
α_C	Temperature coefficient of capacitance	Temperaturkoeffizient der Kapazität
A	Capacitor surface area	Kondensatoroberfläche
β_C	Humidity coefficient of capacitance	Feuchtekoeffizient der Kapazität
C	Capacitance	Kapazität
C_R	Rated capacitance	Nennkapazität
ΔC	Absolute capacitance change	Absolute Kapazitätsänderung
$\Delta C/C$	Relative capacitance change (relative deviation of actual value)	Relative Kapazitätsänderung (relative Abweichung vom Ist-Wert)
$\Delta C/C_R$	Capacitance tolerance (relative deviation from rated capacitance)	Kapazitätstoleranz (relative Abweichung vom Nennwert)
dt	Time differential	Differentielle Zeit
Δt	Time interval	Zeitintervall
ΔT	Absolute temperature change (self-heating)	Absolute Temperaturänderung (Selbsterwärmung)
$\Delta \tan \delta$	Absolute change of dissipation factor	Absolute Änderung des Verlustfaktors
ΔV	Absolute voltage change	Absolute Spannungsänderung
dV/dt	Time differential of voltage function (rate of voltage rise)	Differentielle Spannungsänderung (Spannungsflankensteilheit)
$\Delta V/\Delta t$	Voltage change per time interval	Spannungsänderung pro Zeitintervall
E	Activation energy for diffusion	Aktivierungsenergie zur Diffusion
ESL	Self-inductance	Eigeninduktivität
ESR	Equivalent series resistance	Ersatz-Serienwiderstand
f	Frequency	Frequenz
f_1	Frequency limit for reducing permissible AC voltage due to thermal limits	Grenzfrequenz für thermisch bedingte Reduzierung der zulässigen Wechselspannung
f_2	Frequency limit for reducing permissible AC voltage due to current limit	Grenzfrequenz für strombedingte Reduzierung der zulässigen Wechselspannung
f_r	Resonant frequency	Resonanzfrequenz
F_D	Thermal acceleration factor for diffusion	Therm. Beschleunigungsfaktor zur Diffusion
F_T	Derating factor	Deratingfaktor
i	Current (peak)	Stromspitze
I_C	Category current (max. continuous current)	Kategoriestrom (max. Dauerstrom)

Symbol	English	German
I_{RMS}	(Sinusoidal) alternating current, root-mean-square value	(Sinusförmiger) Wechselstrom
i_z	Capacitance drift	Inkonstanz der Kapazität
k_0	Pulse characteristic	Impulskennwert
L_S	Series inductance	Serieninduktivität
λ	Failure rate	Ausfallrate
λ_0	Constant failure rate during useful service life	Konstante Ausfallrate in der Nutzungsphase
λ_{test}	Failure rate, determined by tests	Experimentell ermittelte Ausfallrate
P_{diss}	Dissipated power	Abgegebene Verlustleistung
P_{gen}	Generated power	Erzeugte Verlustleistung
Q	Heat energy	Wärmeenergie
ρ	Density of water vapor in air	Dichte von Wasserdampf in Luft
R	Universal molar constant for gases	Allg. Molarkonstante für Gas
R	Ohmic resistance of discharge circuit	Ohmscher Widerstand des Entladekreises
R_i	Internal resistance	Innenwiderstand
R_{ins}	Insulation resistance	Isolationswiderstand
R_P	Parallel resistance	Parallelwiderstand
R_S	Series resistance	Serienwiderstand
S	severity (humidity test)	Schärfegrad (Feuchtetest)
t	Time	Zeit
T	Temperature	Temperatur
τ	Time constant	Zeitkonstante
tan δ	Dissipation factor	Verlustfaktor
tan δ_D	Dielectric component of dissipation factor	Dielektrischer Anteil des Verlustfaktors
tan δ_P	Parallel component of dissipation factor	Parallelanteil des Verlfustfaktors
tan δ_S	Series component of dissipation factor	Serienanteil des Verlustfaktors
T_A	Temperature of the air surrounding the component	Temperatur der Luft, die das Bauteil umgibt
T_{max}	Upper category temperature	Obere Kategorietemperatur
T_{min}	Lower category temperature	Untere Kategorietemperatur
t_{OL}	Operating life at operating temperature and voltage	Betriebszeit bei Betriebstemperatur und -spannung
T_{op}	Operating temperature	Beriebstemperatur
T_R	Rated temperature	Nenntemperatur
T_{ref}	Reference temperature	Referenztemperatur
t_{SL}	Reference service life	Referenz-Lebensdauer

Symbol	English	German
V_{AC}	AC voltage	Wechselspannung
V_C	Category voltage	Kategoriespannung
$V_{C,RMS}$	Category AC voltage	(Sinusförmige) Kategorie-Wechselspannung
V_{CD}	Corona-discharge onset voltage	Teilentlade-Einsatzspannung
V_{ch}	Charging voltage	Ladespannung
V_{DC}	DC voltage	Gleichspannung
V_{FB}	Fly-back capacitor voltage	Spannung (Flyback)
V_i	Input voltage	Eingangsspannung
V_o	Output voltage	Ausgangssspannung
V_{op}	Operating voltage	Betriebsspannung
V_p	Peak pulse voltage	Impuls-Spitzenspannung
V_{pp}	Peak-to-peak voltage Impedance	Spannungshub
V_R	Rated voltage	Nennspannung
$\hat{v}_R$	Amplitude of rated AC voltage	Amplitude der Nenn-Wechselspannung
V_{RMS}	(Sinusoidal) alternating voltage, root-mean-square value	(Sinusförmige) Wechselspannung
V_{SC}	S-correction voltage	Spannung bei Anwendung "S-correction"
V_{sn}	Snubber capacitor voltage	Spannung bei Anwendung "Beschaltung"
Z	Impedance	Scheinwiderstand
$\boxed{e}$	Lead spacing	Rastermaß

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