



PWS

- MKP with metal foil current carriers • axial terminals
- snubber • very high pulse applications
- high current • high frequency



Main applications

Snubber and SCR commutating circuits in SMPSs, high voltage, high current and high pulse applications up to very high operation frequencies

Dielectric

Polypropylene

Electrodes

Metal foils (lead free)

Coating

UL 510 / CSA TIL I-26 polyester tape wrapping; UL 94 V-0 resin end fill. Flame retardant execution

Construction

Extended foil with internal series connection and metallized film (refer to General Technical Information)

Terminals

Tinned copper wire (lead free)

Reference standard

IEC 60384/13, IEC 60068, RoHS compliant

Climatic category

55/100/56 (IEC 60068/1), FMD (DIN 40040)

Operating temperature range (case)

-55...+105°C

Nominal Capacitance (Cn) µF

1000pF to 0,56µF, in compliance with IEC 60063, E6 series. Refer to article table

Capacitance tolerance (at 1kHz)

±10% (code=K), ±5% (code=J) and ±20% (code=M). Other tolerances upon request

Capacitance temperature coefficient

Refer to General Technical Information

Long term stability (at 1kHz)

Capacitance variation ≤ ±0.5% after a period of 2 years at standard environmental conditions

Rated voltage (Ur) (Vdc) at 85°C

630, 1000, 1500, 2000 Vdc

Permissible AC voltage at 60Hz (Vac)

300, 400, 450, 500 Vac

Category voltage (Uc)

Uc=Ur at +85°C; Uc=0,8xUr at +100°C

Temperature derated voltage

For T > +85°C, Ur must be decreased 1,25% for every °C exceeding +85°C

Self inductance

≤ 1nH/mm of capacitor and leads length used for connection

Maximum pulse rise time V/µs

Refer to article table. The pulse characteristic Ko depends on the voltage waveform. In any case the value given in the article table must not be exceeded

Dissipation factor (DF), max.

tgδ x 10⁻⁴, measured at 25 ± 5°C

Freq.	Cn ≤ 1000 pF	1000 pF < Cn ≤ 0.1 µF	Cn > 0.1 µF
10kHz	-	5	10
100kHz	10	-	-

Insulation resistance (R_{INS})

Measured between terminals, at 25±5°C, after 1 minute of electrification at 100Vdc

≥ 100 GΩ for Cn ≤ 0.1 µF

≥ 10000s for Cn > 0.1 µF

Test voltage between terminals (Ut)

2xUr (DC) applied for 2s, at 25±5°C (1 minute for type test)

Damp heat test (steady state)

List of admitted high humidity and temperature tests (please refer to paragraph C10 of the GTI);

Biased tests applicable from 03/2019 production codes only

Test ID	Reference	Permissible
a	Damp heat test (steady state) not biased - IEC60068	YES
b	Damp heat test (steady state) biased - AEC Q-200 cockpit	YES
c	Robustness under high humidity, Grade II - IEC 60384-17:2019	YES
d	High robustness under high humidity, Grade III - IEC 60384-17:2019	NO
e	Damp heat test (steady state) biased - 70/70/1000	NO
f	Humidity load test, Test Cy, Severity II - IEC 60068-2-67	NO
g	Humidity load test, Test Cy, Severity III - IEC 60068-2-67 and 85/85/1000 Level 1 - AEC Q-200	NO

Rated Ur (DC ONLY) applied for biased tests

Performance:

Capacitance change ≤ ±1% (for test "a")

Capacitance change ≤ ±10% (for test "b" and "c")

DF change ≤ 0.0005 at 10kHz for Cn ≤ 0.1 µF (for test "a")

DF change ≤ 0.0010 at 1kHz for Cn > 0.1 µF (for test "a")

DF change ≤ 2 x initial limit at 1kHz (for test "b" and "c")

R_{INS} ≥ 50% of initial limit value

Endurance test

Test conditions:

Temperature= +85±2°C

Test duration= 1000h

Voltage applied=1,5xUr(DC)

Performance:

Capacitance change ≤ ±1%

DF change ≤ 0.0005 at 10kHz for Cn ≤ 0.1µF

DF change ≤ 0.0010 at 1kHz for Cn > 0.1µF

R_{INS} ≥ 50% of initial limit value

Resistance to soldering heat test

Test conditions:

Solder bath temperature= +260±5°C

Dipping time (with heat screen)= 10±1s

Performance:

Capacitance change ≤ ±1%

DF change ≤ 0.0005 at 1kHz

R_{INS} ≥ 50% of initial limit value

Reliability (MIL HDB 217)

Application conditions:

Applied voltage= 0,5 x Ur(DC)

Temperature= +40±2°C

Failure rate: (1FIT=1x10⁻⁹ failures/components x hours)

≤ 1FIT

Failure criteria (DIN44122):

Capacitance change > ±10%

DF change > 2 x initial value

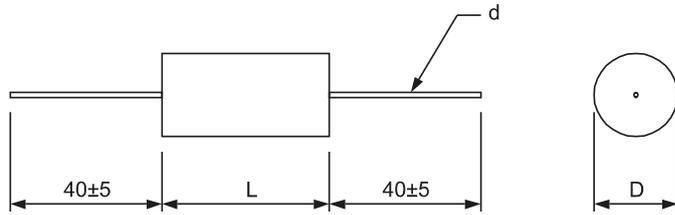
R_{INS} < 0,005 x initial limit value

Short or open circuit



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Dimensional tolerances (mm)

L	L±	D±
19.0	1.5	1.5
27.0	2.0	2.0
32.0	2.0	2.0

PWS article table (different values available upon request)

Voltage at +85°C		Cn µF	Dimensions (mm)			du/dt V/µs	K ₀ V ² /µs	ICEL CODE ⁽¹⁾ -
Ur (Vdc)	Urms (Vac) ⁽²⁾		D	L	d			
630	300	0,015	7	19	0,8	4300	5420000	PWS1632150*D
630	300	0,022	8	19	0,8	4300	5420000	PWS1632220*D
630	300	0,033	10	19	0,8	4300	5420000	PWS1632330*D
630	300	0,033	7,5	27	0,8	2600	3270000	PWS1632330*G
630	300	0,047	8,5	27	0,8	2600	3270000	PWS1632470*G
630	300	0,068	10	27	0,8	2600	3270000	PWS1632680*G
630	300	0,1	12	27	0,8	2600	3270000	PWS1633100*G
630	300	0,15	15	27	0,8	2600	3270000	PWS1633150*G
630	300	0,15	12,5	32	0,8	1800	2260000	PWS1633150*J
630	300	0,22	15	32	0,8	1800	2260000	PWS1633220*J
630	300	0,33	18	32	1	1800	2260000	PWS1633330*J
630	300	0,47	22	32	1	1800	2260000	PWS1633470*J
630	300	0,56	25	32	1	1800	2260000	PWS1633560*J
1000	400	0,0033	7	19	0,8	14000	28000000	PWS2101330*D
1000	400	0,0047	8	19	0,8	14000	28000000	PWS2101470*D
1000	400	0,0068	10	19	0,8	14000	28000000	PWS2101680*D
1000	400	0,0068	6,5	27	0,8	5000	10000000	PWS2101680*G
1000	400	0,01	7	27	0,8	5000	10000000	PWS2102100*G
1000	400	0,015	8,5	27	0,8	5000	10000000	PWS2102150*G
1000	400	0,022	10	27	0,8	5000	10000000	PWS2102220*G
1000	400	0,033	12	27	0,8	5000	10000000	PWS2102330*G
1000	400	0,047	15	27	0,8	5000	10000000	PWS2102470*G
1000	400	0,047	12,5	32	0,8	3700	7400000	PWS2102470*J
1000	400	0,068	15	32	0,8	3700	7400000	PWS2102680*J
1000	400	0,1	17,5	32	1	3700	7400000	PWS2103100*J
1000	400	0,15	21,5	32	1	3700	7400000	PWS2103150*J
1000	400	0,22	26	32	1	3700	7400000	PWS2103220*J
1500	450	0,0022	7,5	19	0,8	17000	51000000	PWS2151220*D
1500	450	0,0033	8,5	19	0,8	17000	51000000	PWS2151330*D
1500	450	0,0047	10,5	19	0,8	17000	51000000	PWS2151470*D
1500	450	0,0047	7	27	0,8	6000	18000000	PWS2151470*G
1500	450	0,0068	7,5	27	0,8	6000	18000000	PWS2151680*G
1500	450	0,01	8,5	27	0,8	6000	18000000	PWS2152100*G
1500	450	0,015	10,5	27	0,8	6000	18000000	PWS2152150*G
1500	450	0,022	12,5	27	0,8	6000	18000000	PWS2152220*G
1500	450	0,033	16	27	0,8	6000	18000000	PWS2152330*G
1500	450	0,033	13	32	0,8	4500	13500000	PWS2152330*J
1500	450	0,047	15,5	32	0,8	4500	13500000	PWS2152470*J
1500	450	0,068	18,5	32	1	4500	13500000	PWS2152680*J
1500	450	0,1	22	32	1	4500	13500000	PWS2153100*J
1500	450	0,12	25	32	1	4500	13500000	PWS2153120*J

⁽¹⁾ Change the * symbol with the needed capacitance tolerance code: J=±5%, K=±10%, M=±20%

⁽²⁾ Not suitable for across the line application



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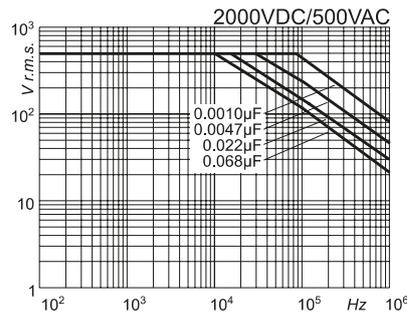
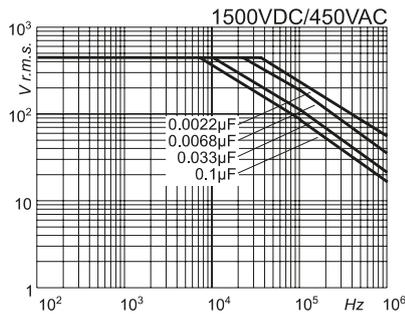
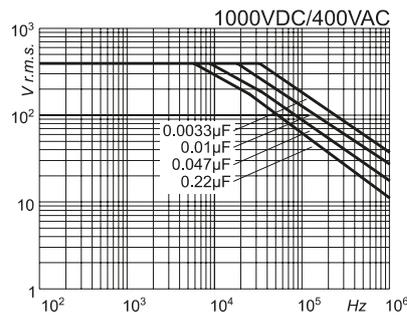
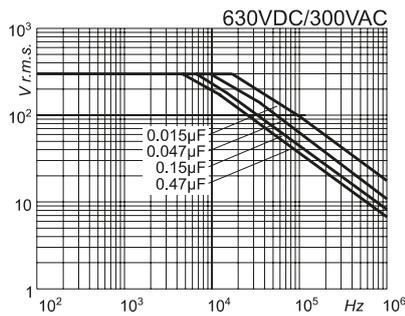


Voltage at +85°C		Cn μF	Dimensions (mm)			du/dt V/μs	K ₀ V ² /μs	ICEL CODE ⁽¹⁾ -
Ur (Vdc)	Urms (Vac) ⁽²⁾		D	L	d			
2000	500	0,001	7,5	19	0,8	27000	108000000	PWS2201100*D
2000	500	0,0015	8,5	19	0,8	27000	108000000	PWS2201150*D
2000	500	0,0022	10,5	19	0,8	27000	108000000	PWS2201220*D
2000	500	0,0033	7,5	27	0,8	9800	39200000	PWS2201330*G
2000	500	0,0047	8,5	27	0,8	9800	39200000	PWS2201470*G
2000	500	0,0068	10	27	0,8	9800	39200000	PWS2201680*G
2000	500	0,01	12	27	0,8	9800	39200000	PWS2202100*G
2000	500	0,015	14,5	27	0,8	9800	39200000	PWS2202150*G
2000	500	0,022	14,5	32	0,8	7000	28000000	PWS2202220*J
2000	500	0,033	18	32	1	7000	28000000	PWS2202330*J
2000	500	0,047	20,5	32	1	7000	28000000	PWS2202470*J
2000	500	0,068	25	32	1	7000	28000000	PWS2202680*J

⁽¹⁾ Change the * symbol with the needed capacitance tolerance code: J=±5%, K=±10%, M=±20%

⁽²⁾ Not suitable for across the line application

Permissible AC voltage versus frequency (sinusoidal waveform) for ΔT=+10°C Referred to the largest length execution among available ones



Warning: this specification must be completed with the data given in the "General technical information" chapter