

Organic Conductive Polymer Capacitors



FEATURES

- 105 °C, 2000 h
- Ultra low ESR
- Solid capacitors of SMD type
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


RoHS
COMPLIANT

APPLICATIONS

- Industrial
- Telecommunications and IT
- Portable and mobile equipment

QUICK REFERENCE DATA

| DESCRIPTION | UNIT | VALUE |
|----------------------------|-----------------|-------------------------|
| Nominal case sizes (Ø D) | mm | 5 to 10 |
| Rated capacitance range | µF | 6.8 to 1500 |
| Capacitance tolerance | % | ± 20 (at 120 Hz, 20 °C) |
| Rated voltage range | V _{DC} | 2.5 to 35 |
| Category temperature range | °C | -55 to +105 |
| Endurance | h | 2000 |

ORDERING INFORMATION

Part number example: PSC471MOJTR-0812

| PSC | 471 | M | 0J | TR | - | 0812 | |
|-------------|--------------|-----------------------|---------------|-------------------|---------------|-------------------|-------------------------------------|
| SERIES NAME | CAPACITANCE | CAPACITANCE TOLERANCE | RATED VOLTAGE | PACKAGE TYPE | TERMINAL TYPE | CASE SIZE | LEAD WIRE AND COATING TYPE |
| PSC series | 471 = 470 µF | M = ± 20 % | 0J = 6.3 V | TR = carrier tape | | 0812 = Ø 8 x 12 L | Lead (Pb)-free and PET coating case |

ADDITIONAL ELECTRICAL DATA

LEAKAGE CURRENT (Test conditions: U_R, 20 °C)

| CONDITIONS | CASE SIZE | VALUE |
|-------------|-------------------|--|
| After 2 min | Ø 5 mm to Ø 10 mm | See Electrical Data table ⁽¹⁾ |

Note

- ⁽¹⁾ For any doubt about measured values, measure the leakage current again after the following voltage treatment.
Voltage treatment: DC rated voltage is applied to the capacitors for 2 hours at 105 °C

DISSIPATION FACTOR (tan δ at 120 Hz, 20 °C)

| RATED VOLTAGE | 2.5 | 4 | 6.3 | 10 | 16 | 20 | 25 | 35 |
|---------------|---------------------------|---|-----|----|----|----|----|----|
| tan δ (max.) | See Electrical Data table | | | | | | | |

| MULTIPLIER OF RIPPLE CURRENT AS A FUNCTION OF FREQUENCY | |
|---|------------|
| FREQUENCY (Hz) | MULTIPLIER |
| $120 \leq f < 1K$ | 0.05 |
| $1K \leq f < 10K$ | 0.3 |
| $10K \leq f < 100K$ | 0.7 |
| $100K \leq f < 500K$ | 1.0 |

| TEST PROCEDURES AND REQUIREMENTS | | | | | |
|---|-----------|------------------------------------|--------------------------------------|------------------------------------|------------------------|
| TEST | TEST TIME | CAPACITANCE CHANGE | DISSIPATION FACTOR ($\tan \delta$) | ESR | LEAKAGE CURRENT |
| Endurance ⁽¹⁾ | 2000 h | Within ± 20 % of initial value | Less than 150 % of specified value | Less than 150 % of specified value | Within specified value |
| Moisture resistance ⁽²⁾ | 1000 h | Within ± 20 % of initial value | Less than 150 % of specified value | Less than 150 % of specified value | Within specified value |
| Resistance to soldering heat ⁽³⁾ | - | Within ± 10 % of initial value | Within specified value | Within specified value | Within specified value |

Notes

- (1) The above specifications shall be satisfied when the capacitors are restored to 20 °C after the rated voltage applied for 2000 hours at 105 °C
- (2) The above specifications shall be satisfied when the capacitors are restored to 20 °C after subjecting them at 60 °C, 90 % to 95 % RH for 1000 hours. Leakage current should be tested after voltage treatment (refer to note ⁽³⁾)
- (3) For any doubt about measured values, measure the leakage current again after the following voltage treatment.
Voltage treatment: DC rated voltage is applied to the capacitors for 2 hours at 105 °C

| DIMENSIONS in millimeters | | | | | | | |
|---------------------------|--------------------|------|------|------|------------|---------|--|
| | | | | | | | |
| Ø D | L | A | B | C | W | P ± 0.2 | |
| 5 | 5.7 ± 0.3 | 5.3 | 5.3 | 5.9 | 0.5 to 0.8 | 1.5 | |
| 6.3 | 5.9 + 0.1 / - 0.3 | 6.6 | 6.6 | 7.2 | 0.5 to 0.8 | 2.0 | |
| 6.3 | 7.0 ± 0.2 | 6.6 | 6.6 | 7.2 | 0.5 to 0.8 | 2.0 | |
| 8 | 6.7 ± 0.3 | 8.3 | 8.3 | 9.0 | 0.7 to 1.1 | 3.1 | |
| 8 | 12.0 ± 0.5 | 8.3 | 8.3 | 9.0 | 0.7 to 1.1 | 3.1 | |
| 10 | 7.7 ± 0.3 | 10.3 | 10.3 | 11.0 | 0.7 to 1.3 | 4.7 | |
| 10 | 9.9 + 0.1 / - 0.3 | 10.3 | 10.3 | 11.0 | 0.7 to 1.3 | 4.7 | |
| 10 | 12.6 + 0.1 / - 0.4 | 10.3 | 10.3 | 11.0 | 0.7 to 1.3 | 4.7 | |

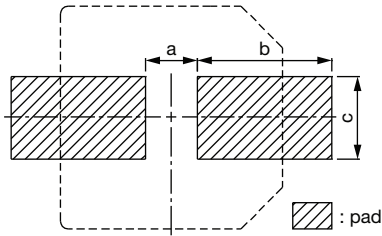
Note

- (1) For Ø 5 mm to Ø 6.3 mm is 0.4 mm max.

| MARKING | |
|-----------------------------|----------------------------|
| <p>Ø D = 5 mm to 6.3 mm</p> | <p>Ø D = 8 mm to 10 mm</p> |

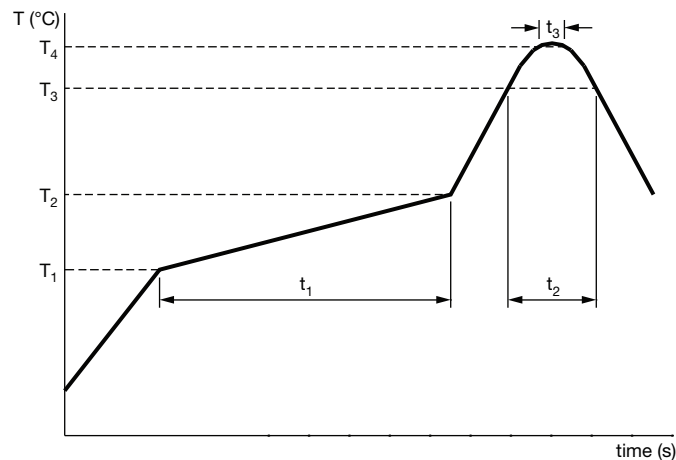


| ELECTRICAL DATA | | | | | | | |
|-------------------|-------------------|------------------|-------------------|------------------------|----------------------------|--|--|
| RATED VOLTAGE (V) | SURGE VOLTAGE (V) | CAPACITANCE (μF) | SIZE Ø D x L (mm) | tan δ AT 120 Hz, 20 °C | LEAKAGE CURRENT 2 MIN (μA) | ESR AT 100 kHz TO 300 kHz, 20 °C MAX. (mΩ) | RATED RIPPLE CURRENT AT 100 kHz, 105 °C (mA/RMS) |
| 2.5 (0E) | 2.9 | 220 | 6.3 x 5.9 | 0.12 | 110 | 25 | 2500 |
| | | 560 | 8 x 6.7 | 0.12 | 280 | 23 | 3100 |
| | | 680 | 8 x 12 | 0.18 | 340 | 12 | 4770 |
| | | 1000 | 10 x 7.7 | 0.12 | 500 | 19 | 4240 |
| | | 1200 | 10 x 9.9 | 0.18 | 750 | 13 | 5200 |
| | | 1500 | 10 x 12.6 | 0.18 | 750 | 10 | 5500 |
| 4 (0G) | 4.6 | 150 | 5 x 5.7 | 0.12 | 120 | 30 | 1490 |
| | | 150 | 6.3 x 5.9 | 0.12 | 120 | 26 | 2450 |
| | | 220 | 8 x 6.7 | 0.12 | 176 | 25 | 3020 |
| | | 330 | 8 x 6.7 | 0.12 | 264 | 25 | 3020 |
| | | 470 | 10 x 7.7 | 0.12 | 376 | 20 | 4130 |
| | | 560 | 8 x 12 | 0.18 | 448 | 12 | 4770 |
| | | 680 | 10 x 7.7 | 0.12 | 544 | 20 | 4130 |
| | | 820 | 10 x 9.9 | 0.18 | 656 | 13 | 5200 |
| 1200 | 10 x 12.6 | 0.18 | 960 | 10 | 5500 | | |
| 6.3 (0J) | 7.2 | 82 | 6.3 x 5.9 | 0.12 | 103 | 27 | 2400 |
| | | 100 | 5 x 5.7 | 0.12 | 126 | 35 | 1380 |
| | | 100 | 6.3 x 5.9 | 0.12 | 126 | 27 | 2400 |
| | | 120 | 6.3 x 7 | 0.12 | 151 | 30 | 2010 |
| | | 150 | 6.3 x 7 | 0.12 | 189 | 30 | 2250 |
| | | 150 | 8 x 6.7 | 0.12 | 189 | 25 | 3020 |
| | | 220 | 6.3 x 7 | 0.12 | 277 | 30 | 2250 |
| | | 220 | 8 x 6.7 | 0.12 | 277 | 25 | 3020 |
| | | 330 | 10 x 7.7 | 0.12 | 416 | 20 | 4130 |
| | | 470 | 8 x 12 | 0.15 | 592 | 12 | 4770 |
| | | 560 | 10 x 9.9 | 0.15 | 706 | 16 | 4700 |
| | | 820 | 10 x 12.6 | 0.15 | 1033 | 10 | 5500 |
| 10 (1A) | 12.0 | 47 | 5 x 5.7 | 0.12 | 94 | 40 | 1270 |
| | | 56 | 6.3 x 5.9 | 0.10 | 112 | 31 | 2250 |
| | | 150 | 8 x 6.7 | 0.10 | 300 | 27 | 2800 |
| | | 330 | 8 x 12 | 0.15 | 660 | 14 | 4420 |
| | | 330 | 10 x 7.7 | 0.10 | 660 | 24 | 3770 |
| | | 470 | 10 x 9.9 | 0.15 | 940 | 18 | 4400 |
| 560 | 10 x 12.6 | 0.15 | 1120 | 12 | 5300 | | |
| 16 (1C) | 18.0 | 22 | 5 x 5.7 | 0.12 | 70 | 45 | 1210 |
| | | 47 | 6.3 x 5.9 | 0.10 | 150 | 50 | 1650 |
| | | 82 | 8 x 6.7 | 0.10 | 262 | 30 | 2700 |
| | | 180 | 8 x 12 | 0.15 | 576 | 16 | 4360 |
| | | 180 | 10 x 7.7 | 0.10 | 576 | 26 | 3430 |
| | | 220 | 10 x 9.9 | 0.15 | 704 | 20 | 4200 |
| | | 330 | 10 x 12.6 | 0.15 | 792 | 14 | 5050 |
| 820 | 10 x 12.6 | 0.12 | 2624 | 18 | 4200 | | |
| 20 (1D) | 23.0 | 22 | 6.3 x 5.9 | 0.10 | 88 | 50 | 1650 |
| | | 47 | 8 x 6.7 | 0.10 | 188 | 45 | 2000 |
| | | 82 | 10 x 7.7 | 0.10 | 328 | 40 | 2500 |
| | | 100 | 8 x 12 | 0.15 | 400 | 24 | 3320 |
| | | 100 | 10 x 9.9 | 0.15 | 400 | 25 | 3700 |
| | | 150 | 10 x 12.6 | 0.15 | 600 | 20 | 4320 |
| 330 | 10 x 12.6 | 0.12 | 1320 | 26 | 2700 | | |
| 25 (1E) | 29.0 | 6.8 | 6.3 x 5.9 | 0.10 | 170 | 80 | 1200 |
| | | 10 | 8 x 6.7 | 0.10 | 125 | 60 | 1500 |
| | | 22 | 10 x 7.7 | 0.10 | 275 | 50 | 2000 |
| | | 33 | 8 x 12 | 0.12 | 413 | 30 | 2980 |
| | | 56 | 10 x 12.6 | 0.12 | 700 | 28 | 3800 |
| 270 | 10 x 12.6 | 0.12 | 1350 | 27 | 2700 | | |
| 35 (1V) | 40.0 | 39 | 8 x 12 | 0.12 | 273 | 31 | 2100 |
| | | 68 | 10 x 12.6 | 0.12 | 476 | 28 | 2700 |

SOLDERING


Recommended soldering pad dimensions

| RECOMMENDED SOLDERING PAD DIMENSIONS in millimeters | | | |
|--|-----------|-----|-----|
| CASE SIZE (\emptyset) | LAND SIZE | | |
| | a | b | c |
| 5 | 1.4 | 3.0 | 1.6 |
| 6.3 | 1.9 | 3.5 | 1.6 |
| 8 x 6.5 | 2.1 | 4.0 | 1.6 |
| 8 | 3.0 | 3.5 | 2.5 |
| 10 | 4.0 | 4.0 | 2.5 |

STANDARD SOLDERING PROFILE FOR LEAD (Pb)-FREE REFLOW PROCESS


Maximum temperature load during reflow soldering

| REFLOW SOLDERING CONDITIONS | | |
|------------------------------------|------------------------------------|------------|
| Rated voltage (V) | | 2.5 to 35 |
| Case size (\emptyset) | | 5 to 10 |
| Preheat | Temperature (T_1 to T_2 , °C) | 150 to 200 |
| | Time (t_1) (max., s) | 180 |
| Duration | Temperature (T_3 , °C) | 230 |
| | Time (t_2) (max., s) | 60 |
| Peak | Temperature (T_4 , °C) | 260 |
| | Time (t_3 , s) | 5 |
| Reflow cycles | | 1 |