

Aluminum Capacitors Power Ultra High Ripple Current Snap-In for Solar

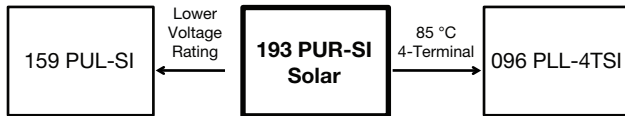


Fig. 1

| QUICK REFERENCE DATA | |
|---|----------------------------|
| DESCRIPTION | VALUE |
| Nominal case size (D x L in mm) | 35 x 30 to 35 x 40 |
| Rated capacitance range, C_R | 220 μ F to 560 μ F |
| Tolerance on C_R | $\pm 20\%$ |
| Rated voltage, U_R | 500 V |
| Rated temperature range | - 40 °C to + 50 °C |
| Category voltage, U_C | 450 V |
| Category temperature range | - 40 °C to + 105 °C |
| Useful life at U_C , 105 °C, I_R applied | 6000 h |
| Endurance at U_R , 50 °C, no ripple applied | 5000 h |
| Shelf life at 0 V, 105 °C | 1000 h |
| Based on sectional specification | IEC 60384-4/EN130300 |
| Climatic category IEC 60068 | 40/105/56 |
| Max. RMS value of ripple voltage | 12 V |

FEATURES

- Specified for 500 V, 50 °C operation
- Long useful life at 450 V, 105 °C
- Long useful life at 500 V, 50 °C with no ripple current applied
- Low ESR, high ripple current capability

APPLICATIONS

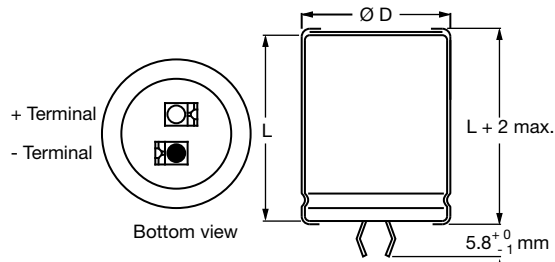
- Solar PV inverters
- Industrial motor control
- Power supply

MARKING

The capacitors are marked (where possible) with the following information:

- Rated capacitance (in μ F)
- Tolerance code on rated capacitance, code letter in accordance with IEC 60062 ($\pm 20\%$)
- Rated voltage (in V)
- Two digit date code, in accordance with IEC 60062
- Name of manufacturer
- Code for factory of origin
- “-” sign to identify the negative terminal, visible from the top and side of the capacitor
- Code number
- Climatic category in accordance with IEC 60068
- “LL” for long life grade

| SELECTION CHART FOR C_R , U_R , AND RELEVANT NOMINAL CASE SIZES (\varnothing D x L in mm) | | | | | |
|--|-----------|---------|---------|---------|---------|
| C_R (μ F) | U_R (V) | | | | |
| | 500 | | | | |
| 220 | 35 x 30 | - | - | - | - |
| 330 | - | 35 x 40 | - | - | - |
| 390 | - | - | 35 x 45 | - | - |
| 470 | - | - | - | 35 x 50 | - |
| 560 | - | - | - | - | 35 x 60 |

DIMENSIONS in millimeters AND AVAILABLE FORMS
TWO TERMINAL SNAP-IN


The minus terminal can be marked with a black dot or with an imprinted “-” sign.

Fig. 2 - Two terminal snap-in

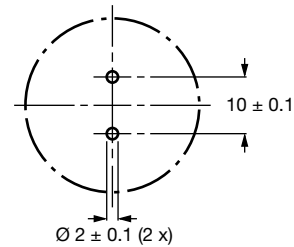


Fig. 3 - Mounting hole diagram

Table 1

| DIMENSIONS in millimeters, MASS AND PACKAGING QUANTITIES | | | | | |
|--|-------------------------------|-------------------|----------|-------------------------------------|------------------------------------|
| NOMINAL CASE SIZE | $\varnothing D_{\text{max.}}$ | $L_{\text{max.}}$ | MASS (g) | PACKAGING QUANTITIES (unit per box) | CARDBOARD BOX DIMENSIONS L x W x H |
| 35 x 30 | 36 | 32 | 40 | 50 | 390 x 198 x 44 |
| 35 x 40 | 36 | 42 | 56 | 50 | 390 x 198 x 54 |
| 35 x 45 | 36 | 47 | 64 | 50 | 390 x 198 x 59 |
| 35 x 50 | 36 | 52 | 72 | 50 | 390 x 198 x 64 |
| 35 x 60 | 36 | 62 | 88 | 50 | 390 x 198 x 74 |

Note

- Other case sizes, terminations and capacitance values available on request.

| ELECTRICAL DATA | |
|-----------------|---|
| SYMBOL | DESCRIPTION |
| C_R | Rated capacitance at 100 Hz |
| I_R | Rated RMS ripple current at 100 Hz and 105 °C |
| I_{L1} | Max. leakage current after 1 min at U_R |
| ESR | Max. equivalent series resistance at 100 Hz |
| Z | Max. impedance at 10 kHz |

Note

- Unless otherwise specified, all electrical values in Table 2 apply at $T_{\text{amb}} = 20 \text{ °C}$, $P = 86 \text{ kPa}$ to 106 kPa , $RH = 45 \%$ to 75% .

ORDERING EXAMPLE

Electrolytic capacitors 470 $\mu\text{F}/500 \text{ V}$
 Nominal case size: $\varnothing 35 \text{ mm} \times 50 \text{ mm}$
 Ordering code: MAL219390104E3

Table 2

| ELECTRICAL DATA AND ORDERING INFORMATION | | | | | | | | |
|--|-----------|-------------------------|---|--|------------------|-------------------------------|-----------------------------|----------------|
| U_R (V) | U_C (V) | C_R (μF) | CASE SIZE $\varnothing D \times L$ (mm) | I_R 100 Hz 105 °C (A) ⁽¹⁾ | I_L 1 min (mA) | ESR 100 Hz MAX. (m Ω) | Z 10 kHz MAX. (m Ω) | ORDERING CODE |
| 500 | 450 | 220 | 35 x 30 | 1.35 | 0.6 | 900 | 600 | MAL219390101E3 |
| | | 330 | 35 x 40 | 1.74 | 0.9 | 600 | 400 | MAL219390102E3 |
| | | 390 | 35 x 45 | 1.94 | 1.1 | 500 | 350 | MAL219390103E3 |
| | | 470 | 35 x 50 | 2.18 | 1.3 | 450 | 300 | MAL219390104E3 |
| | | 560 | 35 x 60 | 2.52 | 1.5 | 350 | 250 | MAL219390105E3 |

Note

- ⁽¹⁾ At $U_{\text{max.}} \leq U_C$



| ADDITIONAL ELECTRICAL DATA | | |
|------------------------------------|----------------------|------------------------------------|
| PARAMETER | CONDITIONS | VALUE |
| Voltage | | |
| Surge voltage | | $U_s = 1.1 \times U_C$ |
| Reverse voltage | | $U_{rev} \leq 1 \text{ V}$ |
| RMS value of ripple voltage | | $U_{RPL} \leq 12 \text{ V}$ |
| Current | | |
| Leakage current | After 1 min at U_R | $I_{L1} \leq 0.006 C_R \times U_C$ |
| | After 5 min at U_R | $I_{L5} \leq 0.002 C_R \times U_C$ |
| Inductance | | |
| Equivalent series inductance (ESL) | All case sizes | ca. 20 nH |

Table 3

| TEST PROCEDURES AND REQUIREMENTS | | | |
|--|--|--|---|
| TEST | | PROCEDURE (quick reference) | REQUIREMENTS |
| NAME OF TEST | REFERENCE | | |
| Endurance | IEC 60384-4/ EN130301 subclause 4.13 | $T_{amb} = 50 \text{ }^\circ\text{C}$; $U_R = 500 \text{ V}$ applied; 5000 h | $\Delta C/C: \pm 15 \%$ $ESR \leq 1.5 \times \text{spec. limit}$ $Z \leq 2 \times \text{spec. limit}$ $I_{L5} \leq \text{spec. limit}$ |
| Useful life | EN130301 subclause 1.8.1 | $T_{amb} = 105 \text{ }^\circ\text{C}$; U_C and I_R applied; 6000 h | $\Delta C/C: \pm 30 \%$ $ESR \leq 3 \times \text{spec. limit}$ $Z \leq 3 \times \text{spec. limit}$ $I_{L5} \leq \text{spec. limit}$ no short or open circuit, no visible damage total failure percentage $\leq 1 \%$ |
| Shelf life (storage at high temperature) | IEC 60384-4/ EN130300 subclause 4.17 | $T_{amb} = 105 \text{ }^\circ\text{C}$; no voltage applied; 1000 h after test: U_C to be applied for 30 min, 24 h to 48 h before measurement | $\Delta C/C: \pm 15 \%$ $ESR \leq 1.5 \times \text{spec. limit}$ $I_{L5} \leq 2 \times \text{spec. limit}$ |



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