

## Aluminum Capacitors, Power High Ripple Current, Screw Terminals



Fig. 1

| QUICK REFERENCE DATA                                |  |                |
|---|--|----------------|
| DESCRIPTION   | VALUE  |                |
|   | 101  | 102            |
| Nominal case size (Ø D x L in mm)                   | 35 x 60 to 90 x 220                            |                |
| Rated capacitance range (E6 series), C <sub>R</sub> | 220 µF to 1 F                                  |                |
| Tolerance on C <sub>R</sub>                         | ± 20 %   |                |
| Rated voltage range, U <sub>R</sub>                 | 25 V to 100 V                                  | 200 V to 450 V |
| Category temperature range                          | - 40 °C to + 85 °C                             |                |
| Endurance test at 85 °C                             | 2000 h   |                |
| Useful life at 85 °C                                | 10 000 h (D ≤ 50 mm)<br>15 000 h (D ≥ 65 mm)   | 10 000 h       |
| Useful life at 40 °C, 1.4 x I <sub>R</sub> applied  | 400 000 h (D ≤ 50 mm)<br>600 000 h (D ≥ 65 mm) | 400 000 h      |
| Shelf life at 0 V, 85 °C                            | 500 h  |                |
| Based on sectional specification                    | IEC 60384-4/EN130300                           |                |
| Climatic category IEC 60068                         | 40/085/056                                     |                |

### FEATURES

- Long useful life: 10 000 h to 15 000 h at + 85 °C
- Available in case sizes up to Ø 90 mm x 220 mm
- Polarized aluminum electrolytic capacitors, non-solid electrolyte
- Large types, cylindrical aluminum case, insulated with a blue sleeve
- Pressure relief in the sealing
- Material categorization: For definitions please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT

### APPLICATIONS

- Buffering and filtering
- Motor drives, inverters, UPS, and traction systems
- Pulsed power supplies

### MARKING

The capacitors are marked with the following information:

- Rated capacitance (in µF)
- Tolerance on rated capacitance, code letter in accordance with IEC 60062 (M for ± 20 %)
- Rated voltage (in V)
- Date code (YYMM or in 2 digits according to 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

| SELECTION CHART FOR C <sub>R</sub> , U <sub>R</sub> , AND RELEVANT NOMINAL CASE SIZES (Ø D x L in mm) |                    |    |    |         |          |          |          |          |          |          |
|---|--------------------|----|----|---------|----------|----------|----------|----------|----------|----------|
| C <sub>R</sub><br>(µF)  | U <sub>R</sub> (V) |    |    |         |          |          |          |          |          |          |
|   | 25                 | 40 | 63 | 100     | 200      | 250      | 350      | 385      | 400      | 450      |
| 220   | -                  | -  | -  | -       | -        | -        | -        | 35 x 60  | 35 x 60  | 35 x 60  |
| 330   | -                  | -  | -  | -       | -        | -        | 35 x 60  | -        | 35 x 60  | -        |
|   | -                  | -  | -  | -       | -        | -        | -        | -        | 35 x 80  | -        |
| 470   | -                  | -  | -  | -       | -        | 35 x 60  | -        | 35 x 80  | 35 x 80  | -        |
|   | -                  | -  | -  | -       | -        | -        | 35 x 80  | -        | 35 x 105 | 35 x 105 |
| 680   | -                  | -  | -  | -       | 35 x 60  | 35 x 80  | -        | -        | 35 x 105 | -        |
|   | -                  | -  | -  | -       | -        | -        | -        | -        | 50 x 80  | 50 x 80  |
| 1000  | -                  | -  | -  | -       | 35 x 80  | 35 x 80  | -        | 50 x 80  | 50 x 80  | 50 x 80  |
|   | -                  | -  | -  | -       | 35 x 105 | 35 x 105 | -        | -        | 50 x 105 | 50 x 105 |
| 1500  | -                  | -  | -  | -       | 35 x 105 | 35 x 105 | -        | -        | -        | 50 x 105 |
|   | -                  | -  | -  | -       | 50 x 80  | 50 x 80  | 50 x 105 | 50 x 105 | 50 x 105 | 65 x 105 |
| 2200  | -                  | -  | -  | 35 x 60 | 50 x 80  | 50 x 80  | 50 x 105 | -        | -        | 65 x 105 |
|   | -                  | -  | -  | -       | -        | 50 x 105 | 65 x 105 | 65 x 105 | 65 x 105 | 76 x 105 |

| SELECTION CHART FOR $C_R$ , $U_R$ , AND RELEVANT NOMINAL CASE SIZES ( $\varnothing D \times L$ in mm) |           |          |          |          |          |          |          |          |          |          |
|---|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| $C_R$<br>( $\mu F$ )  | $U_R$ (V) |          |          |          |          |          |          |          |          |          |
|   | 25        | 40       | 63       | 100      | 200      | 250      | 350      | 385      | 400      | 450      |
| 3300  | -         | -        | -        | 35 x 60  | 50 x 80  | 50 x 105 | -        | -        | 65 x 105 | 76 x 105 |
|   | -         | -        | -        | 35 x 80  | 50 x 105 | 65 x 105 | 65 x 105 | 76 x 105 | 76 x 105 | 76 x 146 |
| 4700  | -         | -        | 35 x 60  | 35 x 80  | -        | 65 x 105 | 76 x 105 | 76 x 105 | 76 x 105 | 76 x 146 |
|   | -         | -        | -        | 35 x 105 | 65 x 105 | 76 x 105 | 76 x 146 | 76 x 146 | 76 x 146 | -        |
| 5600  | -         | -        | -        | -        | -        | -        | -        | -        | -        | -        |
| 6800  | -         | -        | 35 x 60  | 35 x 105 | 65 x 105 | 76 x 105 | -        | -        | 76 x 146 | 76 x 220 |
|   | -         | -        | 35 x 80  | 50 x 80  | 76 x 105 | 76 x 146 | 76 x 146 | 76 x 146 | -        | 90 x 146 |
| 10 000  | -         | 35 x 60  | 35 x 80  | 50 x 80  | 76 x 105 | 76 x 105 | 76 x 220 | -        | -        | -        |
|   | -         | -        | 35 x 105 | 50 x 105 | 76 x 146 | 76 x 146 | 90 x 146 | -        | -        | 90 x 220 |
| 15 000  | 35 x 60   | 35 x 60  | 35 x 105 | 50 x 105 | 76 x 146 | 76 x 146 | -        | -        | -        | -        |
|   | -         | 35 x 80  | 50 x 80  | -        | -        | -        | 90 x 220 | -        | -        | -        |
| 22 000  | 35 x 60   | 35 x 80  | 50 x 80  | 65 x 105 | 76 x 220 | 76 x 220 | -        | -        | -        | -        |
|   | -         | 50 x 80  | 50 x 105 | 76 x 105 | 90 x 146 | 90 x 146 | -        | -        | -        | -        |
| 33 000  | 35 x 80   | 35 x 105 | 50 x 105 | 76 x 105 | -        | -        | -        | -        | -        | -        |
|   | 50 x 80   | 50 x 80  | 65 x 105 | 76 x 146 | 90 x 220 | 90 x 220 | -        | -        | -        | -        |
| 47 000  | 35 x 105  | 50 x 80  | 65 x 105 | -        | -        | -        | -        | -        | -        | -        |
|   | 50 x 80   | 50 x 105 | 76 x 105 | 76 x 146 | -        | -        | -        | -        | -        | -        |
| 68 000  | 50 x 80   | 50 x 105 | 76 x 105 | 76 x 146 | -        | -        | -        | -        | -        | -        |
|   | 50 x 105  | 65 x 105 | 76 x 146 | -        | -        | -        | -        | -        | -        | -        |
| 100 000   | 50 x 105  | 65 x 105 | -        | 76 x 220 | -        | -        | -        | -        | -        | -        |
|   | 65 x 105  | 76 x 105 | 76 x 146 | 90 x 146 | -        | -        | -        | -        | -        | -        |
| 150 000   | 65 x 105  | 76 x 105 | 76 x 146 | -        | -        | -        | -        | -        | -        | -        |
|   | 76 x 105  | 76 x 146 | -        | 90 x 220 | -        | -        | -        | -        | -        | -        |
| 220 000   | 65 x 105  | -        | 76 x 220 | -        | -        | -        | -        | -        | -        | -        |
|   | 76 x 105  | 76 x 146 | 90 x 146 | -        | -        | -        | -        | -        | -        | -        |
| 330 000   | 76 x 146  | 76 x 220 | -        | -        | -        | -        | -        | -        | -        | -        |
|   | -         | 90 x 146 | 90 x 220 | -        | -        | -        | -        | -        | -        | -        |
| 470 000   | 76 x 220  | -        | -        | -        | -        | -        | -        | -        | -        | -        |
|   | 90 x 146  | 90 x 220 | -        | -        | -        | -        | -        | -        | -        | -        |
| 680 000   | 76 x 220  | -        | -        | -        | -        | -        | -        | -        | -        | -        |
| 1 000 000   | 90 x 220  | -        | -        | -        | -        | -        | -        | -        | -        | -        |

### DIMENSIONS in millimeters AND AVAILABLE FORMS

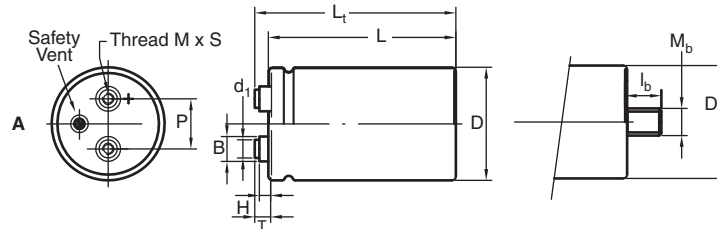
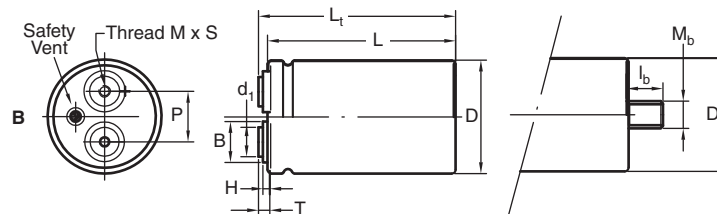


Fig. 2 A: Standard M5 disc: screw terminal (ST) and screw terminal bolt nut (STB)



**Note:** Maximum permissible torque which may be applied to the termination screws: 2 Nm for M5; 2.5 Nm for M6  
For accessories refer to datasheet "Mounting Accessories".  
The capacitors are delivered with screws and washers.

Fig. 2 B: High current M6 disc: screw terminal (ST) and screw terminal bolt nut (STB)

#### Note

- High current disc with 1/4 28 UNF (US) thread is available on request.



Table 1

| DIMENSIONS in millimeters, MASS AND PACKAGING QUANTITIES |         |       |                    |       |         |         |         |         |                      |    |       |                |                      |          |
|--|---------|-------|--------------------|-------|---------|---------|---------|---------|----------------------|----|-------|----------------|----------------------|----------|
| DESIGN   | DRAWING | L ± 1 | L <sub>t</sub> ± 1 | D ± 1 | P ± 0.3 | T ± 0.2 | H ± 0.3 | B ± 0.3 | d <sub>1</sub> ± 0.1 | M  | S - 0 | M <sub>b</sub> | l <sub>b</sub> ± 0.1 | MASS (g) |
| 35 x 60  | 2A      | 63.3  | 68.7               | 35.3  | 12.8    | 7       | 4.6     | 11      | 7.9                  | M5 | 9.5   | M8             | 12                   | 75       |
| 35 x 80  | 2A      | 81.3  | 86.7               | 35.3  | 12.8    | 7       | 4.6     | 11      | 7.9                  | M5 | 9.5   | M8             | 12                   | 95       |
| 35 x 105   | 2A      | 103.3 | 108.7              | 35.3  | 12.8    | 7       | 4.6     | 11      | 7.9                  | M5 | 9.5   | M8             | 12                   | 130      |
| 50 x 80  | 2A      | 82.8  | 88.8               | 51    | 22.2    | 7.1     | 4.8     | 11      | 7.9                  | M5 | 9.5   | M12            | 16                   | 200      |
| 50 x 105   | 2A      | 104.8 | 110.8              | 51    | 22.2    | 7.1     | 4.8     | 11      | 7.9                  | M5 | 9.5   | M12            | 16                   | 300      |
| 65 x 105   | 2A      | 104.8 | 110.7              | 65    | 28.5    | 7       | 4.6     | 11.9    | 7.9                  | M5 | 9.5   | M12            | 16                   | 480      |
| 65 x 105 HC  | 2B      | 104.8 | 109.2              | 65    | 28.5    | 5.5     | 3.5     | 18      | 13                   | M6 | 8.5   | M12            | 16                   | 480      |
| 76 x 105   | 2A      | 105.8 | 111.7              | 76.4  | 31.8    | 7       | 4.6     | 11.7    | 7.9                  | M5 | 9.5   | M12            | 16                   | 700      |
| 76 x 105 HC  | 2B      | 105.8 | 110.2              | 76.4  | 31.8    | 5.5     | 3.5     | 18.3    | 13                   | M6 | 8.5   | M12            | 16                   | 700      |
| 76 x 146   | 2A      | 145.8 | 151.7              | 76.4  | 31.8    | 7       | 4.6     | 11.7    | 7.9                  | M5 | 9.5   | M12            | 16                   | 1000     |
| 76 x 146 HC  | 2B      | 145.8 | 150.2              | 76.4  | 31.8    | 5.5     | 3.5     | 18.3    | 13                   | M6 | 8.5   | M12            | 16                   | 1000     |
| 76 x 220   | 2A      | 219.8 | 225.7              | 76.4  | 31.8    | 7       | 4.6     | 11.7    | 7.9                  | M5 | 9.5   | M12            | 16                   | 1500     |
| 76 x 220 HC  | 2B      | 219.8 | 224.2              | 76.4  | 31.8    | 5.5     | 3.5     | 18.3    | 13                   | M6 | 8.5   | M12            | 16                   | 1500     |
| 90 x 146 HC  | 2B      | 150.1 | 155.4              | 89.4  | 31.8    | 7.9     | 0       | 13      | 13                   | M6 | 10    | M12            | 16                   | 1300     |
| 90 x 220 HC  | 2B      | 218.1 | 223.4              | 89.4  | 31.8    | 7.9     | 0       | 13      | 13                   | M6 | 10    | M12            | 16                   | 2000     |

Note

- For bolt version holds:  
L = L standard - 0.5 mm  
L<sub>t</sub> = L<sub>t</sub> standard - 0.5 mm

| DIMENSIONS in millimeters, MASS AND PACKAGING QUANTITIES |                                      |                                   |
|--|--------------------------------------|-----------------------------------|
| DESIGN   | PACKAGING QUANTITIES (units per box) | CARDBOX DIMENSIONS L x W x H (mm) |
| 35 x 60  | 50                                   | 377 x 375 x 88                    |
| 35 x 80  | 50                                   | 377 x 375 x 123                   |
| 35 x 105   | 50                                   | 377 x 375 x 129                   |
| 50 x 80  | 25                                   | 377 x 375 x 123                   |
| 50 x 105   | 25                                   | 377 x 375 x 129                   |
| 65 x 105   | 16                                   | 377 x 375 x 129                   |
| 65 x 105 HC  | 16                                   | 377 x 375 x 129                   |
| 76 x 105   | 12                                   | 377 x 375 x 129                   |
| 76 x 105 HC  | 12                                   | 377 x 375 x 129                   |
| 76 x 146   | 12                                   | 377 x 375 x 168                   |
| 76 x 146 HC  | 12                                   | 377 x 375 x 168                   |
| 76 x 220   | 18                                   | 520 x 270 x 280                   |
| 76 x 220 HC  | 18                                   | 520 x 270 x 280                   |
| 90 x 146 HC  | 8                                    | 520 x 270 x 190                   |
| 90 x 220 HC  | 8                                    | 520 x 270 x 280                   |

Note

- For bolt version holds:  
H cardbox box: + 10 mm

| ELECTRICAL DATA |  |
|-----------------|--|
| SYMBOL          | DESCRIPTION  |
| C <sub>R</sub>  | Rated capacitance at 100 Hz, tolerance ± 20 %      |
| I <sub>R</sub>  | Rated RMS ripple current at 100 Hz, 85 °C          |
| I <sub>L5</sub> | Max. leakage current after 5 min at U <sub>R</sub> |
| ESR             | Max. equivalent series resistance at 100 Hz        |
| Z               | Max. impedance at 20 kHz                           |

Note

- Unless otherwise specified, all electrical values in tables 2 and 3 apply at T<sub>amb</sub> = 20 °C, P = 86 kPa to 106 kPa, RH = 45 % to 75 %

ORDERING EXAMPLE

Electrolytic capacitor 101 series  
10 000 µF/40 V; ± 20 %  
Nominal case size: Ø 35 mm x 60 mm;  
ST version, high post M5 disc  
Ordering code: MAL2 10117103E3  
Former 12NC: 2222 10117103



Table 2

| ELECTRICAL DATA AND ORDERING INFORMATION FOR 101 SERIES |                                  |   |  |                                  |                               |                             |                               |                                 |                         |                                 |
|---|----------------------------------|---|--|----------------------------------|-------------------------------|-----------------------------|-------------------------------|---------------------------------|-------------------------|---------------------------------|
| U <sub>R</sub><br>(V)                                   | C <sub>R</sub><br>100 Hz<br>(μF) | NOMINAL<br>CASE SIZE<br>Ø D x L<br>(mm) | I <sub>R</sub><br>100 Hz<br>85 °C<br>(A) | I <sub>L5</sub><br>5 min<br>(mA) | ESR<br>MAX.<br>100 Hz<br>(mΩ) | Z<br>MAX.<br>20 kHz<br>(mΩ) | STANDARD HIGH POST<br>M5 DISC |                                 | HIGH CURRENT<br>M6 DISC |                                 |
|   |                                  |   |  |                                  |                               |                             | ST<br>ORDERING<br>CODE        | ST BOLT NUT<br>ORDERING<br>CODE | ST<br>ORDERING<br>CODE  | ST BOLT NUT<br>ORDERING<br>CODE |
|   |                                  |   |  |                                  |                               |                             | MAL2101.....                  | MAL2101.....                    | MAL2101.....            | MAL2101.....                    |
| 25  | 15 000                           | 35 x 60                                 | 7.7                                      | 0.75                             | 29                            | 22                          | 16153E3                       | 56153E3                         | -                       | -                               |
|   | 22 000                           | 35 x 60                                 | 8.3                                      | 1.10                             | 27                            | 22                          | 16223E3                       | 56223E3                         | -                       | -                               |
|   | 33 000                           | 35 x 80                                 | 9.0                                      | 1.65                             | 19                            | 17                          | 16333E3                       | 56333E3                         | -                       | -                               |
|   | 33 000                           | 50 x 80                                 | 10.0                                     | 1.65                             | 17                            | 14                          | 26333E3                       | 66333E3                         | -                       | -                               |
|   | 47 000                           | 35 x 105                                | 12.1                                     | 2.35                             | 15                            | 13                          | 16473E3                       | 56473E3                         | -                       | -                               |
|   | 47 000                           | 50 x 80                                 | 14.8                                     | 2.35                             | 12                            | 10                          | 26473E3                       | 66473E3                         | -                       | -                               |
|   | 68 000                           | 50 x 80                                 | 12.8                                     | 3.40                             | 15                            | 13                          | 16683E3                       | 56683E3                         | -                       | -                               |
|   | 68 000                           | 50 x 105                                | 17.1                                     | 3.40                             | 9                             | 8                           | 26683E3                       | 66683E3                         | -                       | -                               |
|   | 100 000                          | 50 x 105                                | 14.7                                     | 5.00                             | 12                            | 11                          | 16104E3                       | 56104E3                         | -                       | -                               |
|   | 100 000                          | 65 x 105                                | 19.6                                     | 5.00                             | 7                             | 6                           | 26104E3                       | 66104E3                         | 46104E3                 | 86104E3                         |
|   | 150 000                          | 65 x 105                                | 17.6                                     | 7.50                             | 8                             | 7                           | 16154E3                       | 56154E3                         | 36154E3                 | 76154E3                         |
|   | 150 000                          | 76 x 105                                | 21.4                                     | 7.50                             | 6                             | 5                           | 26154E3                       | 66154E3                         | 46154E3                 | 86154E3                         |
|   | 220 000                          | 65 x 105                                | 20.2                                     | 11.0                             | 6                             | 5                           | 16224E3                       | 56224E3                         | 36224E3                 | 76224E3                         |
|   | 220 000                          | 76 x 105                                | 22.5                                     | 11.0                             | 6                             | 5                           | 26224E3                       | 66224E3                         | 46224E3                 | 86224E3                         |
|   | 330 000                          | 76 x 146                                | 25.8                                     | 16.5                             | 4                             | 4                           | 26334E3                       | 66334E3                         | 46334E3                 | 86334E3                         |
|   | 470 000                          | 76 x 220                                | 29.9                                     | 23.5                             | 5                             | 5                           | 16474E3                       | 56474E3                         | 36474E3                 | 76474E3                         |
|   | 470 000                          | 90 x 146                                | 38.2                                     | 23.5                             | 5                             | 5                           | -                             | -                               | 46474E3                 | 86474E3                         |
| 680 000   | 76 x 220                         | 29.0                                    | 34.0                                     | 5                                | 5                             | 16684E3                     | 56684E3                       | 36684E3                         | 76684E3                 |                                 |
| 1 000 000   | 90 x 220                         | 46.6                                    | 50.0                                     | 5                                | 5                             | -                           | -                             | 46105E3                         | 86105E3                 |                                 |
| 40  | 10 000                           | 35 x 60                                 | 7.1                                      | 0.80                             | 31                            | 23                          | 17103E3                       | 57103E3                         | -                       | -                               |
|   | 15 000                           | 35 x 60                                 | 7.8                                      | 1.20                             | 28                            | 22                          | 17153E3                       | 57153E3                         | -                       | -                               |
|   | 15 000                           | 35 x 80                                 | 8.7                                      | 1.20                             | 22                            | 17                          | 27153E3                       | 67153E3                         | -                       | -                               |
|   | 22 000                           | 35 x 80                                 | 9.4                                      | 1.76                             | 20                            | 17                          | 17223E3                       | 57223E3                         | -                       | -                               |
|   | 22 000                           | 50 x 80                                 | 11.2                                     | 1.76                             | 19                            | 15                          | 27223E3                       | 67223E3                         | -                       | -                               |
|   | 33 000                           | 35 x 105                                | 11.0                                     | 2.64                             | 15                            | 13                          | 17333E3                       | 57333E3                         | -                       | -                               |
|   | 33 000                           | 50 x 80                                 | 13.7                                     | 2.64                             | 13                            | 10                          | 27333E3                       | 67333E3                         | -                       | -                               |
|   | 47 000                           | 50 x 80                                 | 14.6                                     | 3.76                             | 12                            | 10                          | 17473E3                       | 57473E3                         | -                       | -                               |
|   | 47 000                           | 50 x 105                                | 15.9                                     | 3.76                             | 10                            | 8                           | 27473E3                       | 67473E3                         | -                       | -                               |
|   | 68 000                           | 50 x 105                                | 16.9                                     | 5.44                             | 9                             | 8                           | 17683E3                       | 57683E3                         | -                       | -                               |
|   | 68 000                           | 65 x 105                                | 18.1                                     | 5.44                             | 7                             | 6                           | 27683E3                       | 67683E3                         | 47683E3                 | 87683E3                         |
|   | 100 000                          | 65 x 105                                | 19.2                                     | 8.0                              | 7                             | 6                           | 17104E3                       | 57104E3                         | 37104E3                 | 77104E3                         |
|   | 100 000                          | 76 x 105                                | 21.3                                     | 8.0                              | 7                             | 6                           | 27104E3                       | 67104E3                         | 47104E3                 | 87104E3                         |
|   | 150 000                          | 76 x 105                                | 20.5                                     | 12.0                             | 7                             | 6                           | 17154E3                       | 57154E3                         | 37154E3                 | 77154E3                         |
|   | 150 000                          | 76 x 146                                | 24.0                                     | 12.0                             | 5                             | 5                           | 27154E3                       | 67154E3                         | 47154E3                 | 87154E3                         |
|   | 220 000                          | 76 x 146                                | 24.5                                     | 17.6                             | 5                             | 5                           | 27224E3                       | 67224E3                         | 47224E3                 | 87224E3                         |
|   | 330 000                          | 76 x 220                                | 28.2                                     | 26.4                             | 5                             | 5                           | 17334E3                       | 57334E3                         | 37334E3                 | 77334E3                         |
| 330 000   | 90 x 146                         | 38.6                                    | 26.4                                     | 5                                | 5                             | -                           | -                             | 47334E3                         | 87334E3                 |                                 |
| 470 000   | 90 x 220                         | 41.5                                    | 37.6                                     | 5                                | 5                             | -                           | -                             | 47474E3                         | 87474E3                 |                                 |



| ELECTRICAL DATA AND ORDERING INFORMATION FOR 101 SERIES |                                  |   |  |                                  |                               |                             |  |   |  |   |
|---|----------------------------------|---|--|----------------------------------|-------------------------------|-----------------------------|--|---|--|---|
| U <sub>R</sub><br>(V)                                   | C <sub>R</sub><br>100 Hz<br>(μF) | NOMINAL<br>CASE SIZE<br>Ø D x L<br>(mm) | I <sub>R</sub><br>100 Hz<br>85 °C<br>(A) | I <sub>L5</sub><br>5 min<br>(mA) | ESR<br>MAX.<br>100 Hz<br>(mΩ) | Z<br>MAX.<br>20 kHz<br>(mΩ) | STANDARD HIGH POST<br>M5 DISC          |   | HIGH CURRENT<br>M6 DISC                |   |
|   |                                  |   |  |                                  |                               |                             | ST<br>ORDERING<br>CODE<br>MAL2101..... | ST BOLT NUT<br>ORDERING<br>CODE<br>MAL2101..... | ST<br>ORDERING<br>CODE<br>MAL2101..... | ST BOLT NUT<br>ORDERING<br>CODE<br>MAL2101..... |
|   |                                  |   |  |                                  |                               |                             | 63                                     | 4700  | 35 x 60                                | 5.9   |
| 6800  | 35 x 60                          | 6.6                                     | 0.86                                     | 38                               | 25                            | 18682E3                     |  | 58682E3   | -                                      | -   |
| 6800  | 35 x 80                          | 7.3                                     | 0.86                                     | 30                               | 19                            | 28682E3                     |  | 68682E3   | -                                      | -   |
| 10 000  | 35 x 80                          | 8.1                                     | 1.26                                     | 27                               | 19                            | 18103E3                     |  | 58103E3   | -                                      | -   |
| 10 000  | 35 x 105                         | 8.8                                     | 1.26                                     | 22                               | 14                            | 28103E3                     |  | 68103E3   | -                                      | -   |
| 15 000  | 35 x 105                         | 9.7                                     | 1.89                                     | 19                               | 14                            | 18153E3                     |  | 58153E3   | -                                      | -   |
| 15 000  | 50 x 80                          | 12.1                                    | 1.89                                     | 16                               | 11                            | 28153E3                     |  | 68153E3   | -                                      | -   |
| 22 000  | 50 x 80                          | 11.1                                    | 2.77                                     | 19                               | 15                            | 18223E3                     |  | 58223E3   | -                                      | -   |
| 22 000  | 50 x 105                         | 14.3                                    | 2.77                                     | 12                               | 9                             | 28223E3                     |  | 68223E3   | -                                      | -   |
| 33 000  | 50 x 105                         | 12.9                                    | 4.16                                     | 14                               | 12                            | 18333E3                     |  | 58333E3   | -                                      | -   |
| 33 000  | 65 x 105                         | 16.5                                    | 4.16                                     | 9                                | 6                             | 28333E3                     |  | 68333E3   | 48333E3                                | 88333E3   |
| 47 000  | 65 x 105                         | 15.6                                    | 5.92                                     | 10                               | 8                             | 18473E3                     |  | 58473E3   | 38473E3                                | 78473E3   |
| 47 000  | 76 x 105                         | 18.6                                    | 5.92                                     | 8                                | 6                             | 28473E3                     |  | 68473E3   | 48473E3                                | 88473E3   |
| 68 000  | 76 x 105                         | 20.0                                    | 8.57                                     | 7                                | 6                             | 18683E3                     |  | 58683E3   | 38683E3                                | 78683E3   |
| 68 000  | 76 x 146                         | 21.9                                    | 8.57                                     | 6                                | 5                             | 28683E3                     |  | 68683E3   | 48683E3                                | 88683E3   |
| 100 000   | 76 x 146                         | 23.4                                    | 12.6                                     | 5                                | 5                             | 28104E3                     |  | 68104E3   | 48104E3                                | 88104E3   |
| 150 000   | 76 x 146                         | 22.2                                    | 18.9                                     | 6                                | 5                             | 18154E3                     |  | 58154E3   | 38154E3                                | 78154E3   |
| 220 000   | 76 x 220                         | 27.0                                    | 27.7                                     | 5                                | 5                             | 18224E3                     |  | 58224E3   | 38224E3                                | 78224E3   |
| 220 000   | 90 x 146                         | 36.5                                    | 27.7                                     | 5                                | 5                             | -                           | -                                      | 48224E3   | 88224E3                                |   |
| 330 000   | 90 x 220                         | 42.9                                    | 41.6                                     | 5                                | 5                             | -                           | -                                      | 48334E3   | 88334E3                                |   |
| 100   | 2200                             | 35 x 60                                 | 5.2                                      | 0.44                             | 50                            | 29                          | 19222E3                                | 59222E3   | -                                      | -   |
|   | 3300                             | 35 x 60                                 | 6.0                                      | 0.66                             | 42                            | 27                          | 19332E3                                | 59332E3   | -                                      | -   |
|   | 3300                             | 35 x 80                                 | 6.6                                      | 0.66                             | 35                            | 21                          | 29332E3                                | 69332E3   | -                                      | -   |
|   | 4700                             | 35 x 80                                 | 7.3                                      | 0.94                             | 31                            | 20                          | 19472E3                                | 59472E3   | -                                      | -   |
|   | 4700                             | 35 x 105                                | 7.9                                      | 0.94                             | 26                            | 16                          | 29472E3                                | 69472E3   | -                                      | -   |
|   | 6800                             | 35 x 105                                | 8.8                                      | 1.36                             | 23                            | 15                          | 19682E3                                | 59682E3   | -                                      | -   |
|   | 6800                             | 50 x 80                                 | 10.9                                     | 1.36                             | 19                            | 12                          | 29682E3                                | 69682E3   | -                                      | -   |
|   | 10 000                           | 50 x 80                                 | 10.5                                     | 2.00                             | 21                            | 15                          | 19103E3                                | 59103E3   | -                                      | -   |
|   | 10 000                           | 50 x 105                                | 13.1                                     | 2.00                             | 14                            | 9                           | 29103E3                                | 69103E3   | -                                      | -   |
|   | 15 000                           | 50 x 105                                | 12.3                                     | 3.00                             | 16                            | 12                          | 19153E3                                | 59153E3   | -                                      | -   |
|   | 22 000                           | 65 x 105                                | 14.8                                     | 4.40                             | 11                            | 8                           | 19223E3                                | 59223E3   | 39223E3                                | 79223E3   |
|   | 22 000                           | 76 x 105                                | 17.4                                     | 4.40                             | 9                             | 6                           | 29223E3                                | 69223E3   | 49223E3                                | 89223E3   |
|   | 33 000                           | 76 x 105                                | 19.0                                     | 6.60                             | 8                             | 6                           | 19333E3                                | 59333E3   | 39333E3                                | 79333E3   |
|   | 33 000                           | 76 x 146                                | 20.7                                     | 6.60                             | 7                             | 5                           | 29333E3                                | 69333E3   | 49333E3                                | 89333E3   |
|   | 47 000                           | 76 x 146                                | 22.4                                     | 9.40                             | 6                             | 5                           | 29473E3                                | 69473E3   | 49473E3                                | 89473E3   |
|   | 68 000                           | 76 x 146                                | 25.6                                     | 13.6                             | 6                             | 5                           | 19683E3                                | 59683E3   | 39683E3                                | 79683E3   |
|   | 100 000                          | 76 x 220                                | 31.2                                     | 20.0                             | 5                             | 5                           | 19104E3                                | 59104E3   | 39104E3                                | 79104E3   |
|   | 100 000                          | 90 x 146                                | 41.5                                     | 20.0                             | 5                             | 5                           | -                                      | -   | 49104E3                                | 89104E3   |
| 150 000   | 90 x 220                         | 49.1                                    | 30.0                                     | 5                                | 5                             | -                           | -                                      | 49154E3   | 89154E3                                |   |



Table 3

| ELECTRICAL DATA AND ORDERING INFORMATION FOR 102 SERIES |                                  |   |  |                                  |                               |                             |                        |                                 |                        |                                 |
|---|----------------------------------|---|--|----------------------------------|-------------------------------|-----------------------------|------------------------|---------------------------------|------------------------|---------------------------------|
| U <sub>R</sub><br>(V)                                   | C <sub>R</sub><br>100 Hz<br>(µF) | NOMINAL<br>CASE SIZE<br>Ø D x L<br>(mm) | I <sub>R</sub><br>100 Hz<br>85 °C<br>(A) | I <sub>L5</sub><br>5 min<br>(mA) | ESR<br>MAX.<br>100 Hz<br>(mΩ) | Z<br>MAX.<br>20 kHz<br>(mΩ) | HIGH POST M5 DISC      |                                 | HIGH CURRENT M6 DISC   |                                 |
|   |                                  |   |  |                                  |                               |                             | ST<br>ORDERING<br>CODE | ST BOLT NUT<br>ORDERING<br>CODE | ST<br>ORDERING<br>CODE | ST BOLT NUT<br>ORDERING<br>CODE |
|   |                                  |   |  |                                  |                               |                             | MAL2102.....           | MAL2102.....                    | MAL2102.....           | MAL2102.....                    |
| 200   | 680                              | 35 x 60                                 | 3.5                                      | 0.27                             | 207                           | 136                         | 12681E3                | 52681E3                         | -                      | -                               |
|   | 1000                             | 35 x 80                                 | 4.4                                      | 0.40                             | 144                           | 95                          | 12102E3                | 52102E3                         | -                      | -                               |
|   | 1000                             | 35 x 105                                | 4.7                                      | 0.40                             | 140                           | 91                          | 22102E3                | 62102E3                         | -                      | -                               |
|   | 1500                             | 35 x 105                                | 5.5                                      | 0.60                             | 100                           | 67                          | 12152E3                | 52152E3                         | -                      | -                               |
|   | 1500                             | 50 x 80                                 | 6.2                                      | 0.60                             | 106                           | 74                          | 22152E3                | 62152E3                         | -                      | -                               |
|   | 2200                             | 50 x 80                                 | 8.0                                      | 0.88                             | 67                            | 44                          | 12222E3                | 52222E3                         | -                      | -                               |
|   | 3300                             | 50 x 80                                 | 8.9                                      | 1.32                             | 50                            | 35                          | 12332E3                | 52332E3                         | -                      | -                               |
|   | 3300                             | 50 x 105                                | 9.9                                      | 1.32                             | 46                            | 32                          | 22332E3                | 62332E3                         | -                      | -                               |
|   | 4700                             | 65 x 105                                | 12.5                                     | 1.88                             | 37                            | 26                          | 22472E3                | 62472E3                         | 42472E3                | 82472E3                         |
|   | 6800                             | 65 x 105                                | 15.2                                     | 2.72                             | 25                            | 18                          | 12682E3                | 52682E3                         | 32682E3                | 72682E3                         |
|   | 6800                             | 76 x 105                                | 16.9                                     | 2.72                             | 25                            | 18                          | 22682E3                | 62682E3                         | 42682E3                | 82682E3                         |
|   | 10 000                           | 76 x 105                                | 19.9                                     | 4.00                             | 18                            | 13                          | 12103E3                | 52103E3                         | 32103E3                | 72103E3                         |
|   | 10 000                           | 76 x 146                                | 20.4                                     | 4.00                             | 18                            | 13                          | 22103E3                | 62103E3                         | 42103E3                | 82103E3                         |
|   | 15 000                           | 76 x 146                                | 24.1                                     | 6.00                             | 12                            | 9                           | 12153E3                | 52153E3                         | 32153E3                | 72153E3                         |
|   | 22 000                           | 76 x 220                                | 29.5                                     | 8.8                              | 9                             | 7                           | 12223E3                | 52223E3                         | 32223E3                | 72223E3                         |
| 22 000  | 90 x 146                         | 34.1                                    | 8.8                                      | 8                                | 6                             | -                           | -                      | 42223E3                         | 82223E3                |                                 |
| 33 000  | 90 x 220                         | 41.7                                    | 13.2                                     | 6                                | 5                             | -                           | -                      | 42333E3                         | 82333E3                |                                 |
| 250   | 470                              | 35 x 60                                 | 3.1                                      | 0.24                             | 250                           | 152                         | 13471E3                | 53471E3                         | -                      | -                               |
|   | 680                              | 35 x 80                                 | 3.8                                      | 0.34                             | 175                           | 107                         | 13681E3                | 53681E3                         | -                      | -                               |
|   | 1000                             | 35 x 80                                 | 4.4                                      | 0.50                             | 128                           | 82                          | 13102E3                | 53102E3                         | -                      | -                               |
|   | 1000                             | 35 x 105                                | 4.8                                      | 0.50                             | 122                           | 76                          | 23102E3                | 63102E3                         | -                      | -                               |
|   | 1500                             | 35 x 105                                | 5.4                                      | 0.75                             | 90                            | 58                          | 13152E3                | 53152E3                         | -                      | -                               |
|   | 1500                             | 50 x 80                                 | 7.0                                      | 0.75                             | 81                            | 50                          | 23152E3                | 63152E3                         | -                      | -                               |
|   | 2200                             | 50 x 80                                 | 8.0                                      | 1.10                             | 60                            | 39                          | 13222E3                | 53222E3                         | -                      | -                               |
|   | 2200                             | 50 x 105                                | 8.7                                      | 1.10                             | 57                            | 35                          | 23222E3                | 63222E3                         | -                      | -                               |
|   | 3300                             | 50 x 105                                | 9.8                                      | 1.65                             | 42                            | 28                          | 13332E3                | 53332E3                         | -                      | -                               |
|   | 3300                             | 65 x 105                                | 11.4                                     | 1.65                             | 42                            | 28                          | 23332E3                | 63332E3                         | 43332E3                | 83332E3                         |
|   | 4700                             | 65 x 105                                | 13.8                                     | 2.35                             | 29                            | 19                          | 13472E3                | 53472E3                         | 33472E3                | 73472E3                         |
|   | 4700                             | 76 x 105                                | 15.3                                     | 2.35                             | 29                            | 19                          | 23472E3                | 63472E3                         | 43472E3                | 83472E3                         |
|   | 6800                             | 76 x 105                                | 18.1                                     | 3.40                             | 21                            | 14                          | 13682E3                | 53682E3                         | 33682E3                | 73682E3                         |
|   | 6800                             | 76 x 146                                | 18.6                                     | 3.40                             | 21                            | 14                          | 23682E3                | 63682E3                         | 43682E3                | 83682E3                         |
|   | 10 000                           | 76 x 105                                | 19.3                                     | 5.00                             | 17                            | 12                          | 13103E3                | 53103E3                         | 33103E3                | 73103E3                         |
|   | 10 000                           | 76 x 146                                | 22.0                                     | 5.00                             | 15                            | 10                          | 23103E3                | 63103E3                         | 43103E3                | 83103E3                         |
|   | 15 000                           | 76 x 146                                | 23.3                                     | 7.5                              | 12                            | 10                          | 13153E3                | 53153E3                         | 33153E3                | 73153E3                         |
| 22 000  | 76 x 220                         | 29.1                                    | 11.0                                     | 9                                | 7                             | 13223E3                     | 53223E3                | 33223E3                         | 73223E3                |                                 |
| 22 000  | 90 x 146                         | 35.3                                    | 11.0                                     | 7                                | 5                             | -                           | -                      | 43223E3                         | 83223E3                |                                 |
| 33 000  | 90 x 220                         | 43.2                                    | 16.5                                     | 5                                | 5                             | -                           | -                      | 43333E3                         | 83333E3                |                                 |
| 350   | 330                              | 35 x 60                                 | 2.5                                      | 0.23                             | 435                           | 305                         | 15331E3                | 55331E3                         | -                      | -                               |
|   | 470                              | 35 x 80                                 | 3.1                                      | 0.33                             | 308                           | 216                         | 25471E3                | 65471E3                         | -                      | -                               |
|   | 680                              | 35 x 105                                | 3.8                                      | 0.48                             | 216                           | 152                         | 25681E3                | 65681E3                         | -                      | -                               |
|   | 1000                             | 50 x 80                                 | 5.6                                      | 0.70                             | 145                           | 102                         | 25102E3                | 65102E3                         | -                      | -                               |
|   | 1500                             | 50 x 80                                 | 6.5                                      | 1.05                             | 102                           | 74                          | 15152E3                | 55152E3                         | -                      | -                               |
|   | 1500                             | 50 x 105                                | 7.0                                      | 1.05                             | 99                            | 70                          | 25152E3                | 65152E3                         | -                      | -                               |
|   | 2200                             | 50 x 105                                | 8.0                                      | 1.54                             | 72                            | 52                          | 15222E3                | 55222E3                         | -                      | -                               |
|   | 2200                             | 65 x 105                                | 9.3                                      | 1.54                             | 72                            | 52                          | 25222E3                | 65222E3                         | 45222E3                | 85222E3                         |
|   | 3300                             | 65 x 105                                | 11.4                                     | 2.31                             | 48                            | 35                          | 25332E3                | 65332E3                         | 45332E3                | 85332E3                         |
|   | 4700                             | 76 x 105                                | 15.0                                     | 3.29                             | 34                            | 25                          | 15472E3                | 55472E3                         | 35472E3                | 75472E3                         |
|   | 4700                             | 76 x 146                                | 15.4                                     | 3.29                             | 34                            | 25                          | 25472E3                | 65472E3                         | 45472E3                | 85472E3                         |
|   | 6800                             | 76 x 146                                | 18.3                                     | 4.76                             | 24                            | 18                          | 25682E3                | 65682E3                         | 45682E3                | 85682E3                         |
|   | 10 000                           | 76 x 220                                | 23.2                                     | 7.0                              | 15                            | 12                          | 15103E3                | 55103E3                         | 35103E3                | 75103E3                         |
|   | 10 000                           | 90 x 146                                | 25.1                                     | 7.0                              | 15                            | 12                          | -                      | -                               | 45103E3                | 85103E3                         |
|   | 15 000                           | 90 x 220                                | 31.2                                     | 10.5                             | 10                            | 8                           | -                      | -                               | 45153E3                | 85153E3                         |



| ELECTRICAL DATA AND ORDERING INFORMATION FOR 102 SERIES |                                  |   |  |                                  |                               |                             |  |   |  |   |
|---|----------------------------------|---|--|----------------------------------|-------------------------------|-----------------------------|--|---|--|---|
| U <sub>R</sub><br>(V)                                   | C <sub>R</sub><br>100 Hz<br>(μF) | NOMINAL<br>CASE SIZE<br>Ø D x L<br>(mm) | I <sub>R</sub><br>100 Hz<br>85 °C<br>(A) | I <sub>L5</sub><br>5 min<br>(mA) | ESR<br>MAX.<br>100 Hz<br>(mΩ) | Z<br>MAX.<br>20 kHz<br>(mΩ) | HIGH POST M5 DISC                      |   | HIGH CURRENT M6 DISC                   |   |
|   |                                  |   |  |                                  |                               |                             | ST<br>ORDERING<br>CODE<br>MAL2102..... | ST BOLT NUT<br>ORDERING<br>CODE<br>MAL2102..... | ST<br>ORDERING<br>CODE<br>MAL2102..... | ST BOLT NUT<br>ORDERING<br>CODE<br>MAL2102..... |
| 385   | 220                              | 35 x 60                                 | 2.1                                      | 0.17                             | 575                           | 380                         | 18221E3                                | 58221E3   | -                                      | -   |
|   | 330                              | 35 x 80                                 | 2.7                                      | 0.26                             | 386                           | 257                         | 18331E3                                | 58331E3   | -                                      | -   |
|   | 470                              | 35 x 80                                 | 3.1                                      | 0.37                             | 279                           | 188                         | 18471E3                                | 58471E3   | -                                      | -   |
|   | 680                              | 35 x 105                                | 3.9                                      | 0.53                             | 196                           | 133                         | 18681E3                                | 58681E3   | -                                      | -   |
|   | 1000                             | 50 x 80                                 | 5.6                                      | 0.77                             | 132                           | 89                          | 18102E3                                | 58102E3   | -                                      | -   |
|   | 1500                             | 50 x 105                                | 7.1                                      | 1.16                             | 90                            | 61                          | 18152E3                                | 58152E3   | -                                      | -   |
|   | 2200                             | 65 x 105                                | 10.0                                     | 1.70                             | 61                            | 42                          | 18222E3                                | 58222E3   | 38222E3                                | 78222E3   |
|   | 3300                             | 76 x 105                                | 13.4                                     | 2.55                             | 42                            | 29                          | 18332E3                                | 58332E3   | 38332E3                                | 78332E3   |
|   | 4700                             | 76 x 105                                | 15.0                                     | 3.62                             | 31                            | 22                          | 18472E3                                | 58472E3   | 38472E3                                | 78472E3   |
|   | 4700                             | 76 x 146                                | 16.3                                     | 3.62                             | 29                            | 20                          | 28472E3                                | 68472E3   | 48472E3                                | 88472E3   |
| 6800  | 76 x 146                         | 18.3                                    | 5.24                                     | 22                               | 16                            | 18682E3                     | 58682E3                                | 38682E3   | 78682E3                                |   |
| 400   | 220                              | 35 x 60                                 | 2.1                                      | 0.18                             | 557                           | 363                         | 16221E3                                | 56221E3   | -                                      | -   |
|   | 330                              | 35 x 60                                 | 2.5                                      | 0.26                             | 383                           | 254                         | 16331E3                                | 56331E3   | -                                      | -   |
|   | 330                              | 35 x 80                                 | 2.7                                      | 0.26                             | 374                           | 245                         | 26331E3                                | 66331E3   | -                                      | -   |
|   | 470                              | 35 x 80                                 | 3.1                                      | 0.38                             | 271                           | 180                         | 16471E3                                | 56471E3   | -                                      | -   |
|   | 470                              | 35 x 105                                | 3.3                                      | 0.38                             | 265                           | 175                         | 26471E3                                | 66471E3   | -                                      | -   |
|   | 680                              | 35 x 105                                | 3.9                                      | 0.55                             | 191                           | 128                         | 16681E3                                | 56681E3   | -                                      | -   |
|   | 680                              | 50 x 80                                 | 4.5                                      | 0.54                             | 199                           | 136                         | 26681E3                                | 66681E3   | -                                      | -   |
|   | 1000                             | 50 x 80                                 | 5.7                                      | 0.80                             | 128                           | 86                          | 16102E3                                | 56102E3   | -                                      | -   |
|   | 1000                             | 50 x 105                                | 6.0                                      | 0.80                             | 125                           | 83                          | 26102E3                                | 66102E3   | -                                      | -   |
|   | 1500                             | 50 x 105                                | 7.1                                      | 1.20                             | 88                            | 59                          | 26152E3                                | 66152E3   | -                                      | -   |
|   | 2200                             | 65 x 105                                | 10.0                                     | 1.76                             | 60                            | 40                          | 26222E3                                | 66222E3   | 46222E3                                | 86222E3   |
|   | 3300                             | 65 x 105                                | 12.1                                     | 2.64                             | 40                            | 27                          | 16332E3                                | 56332E3   | 36332E3                                | 76332E3   |
|   | 3300                             | 76 x 105                                | 13.4                                     | 2.64                             | 40                            | 27                          | 26332E3                                | 66332E3   | 46332E3                                | 86332E3   |
|   | 4700                             | 76 x 105                                | 15.0                                     | 3.76                             | 31                            | 21                          | 16472E3                                | 56472E3   | 36472E3                                | 76472E3   |
| 4700  | 76 x 146                         | 16.4                                    | 3.76                                     | 28                               | 19                            | 26472E3                     | 66472E3                                | 46472E3   | 86472E3                                |   |
| 6800  | 76 x 146                         | 18.3                                    | 5.44                                     | 22                               | 15                            | 26682E3                     | 66682E3                                | 46682E3   | 86682E3                                |   |
| 10000   | 76 x 220                         | 22.1                                    | 8.0                                      | 14                               | 11                            | 16103E3                     | 56103E3                                | 36103E3   | 76103E3                                |   |
| 450   | 220                              | 35 x 60                                 | 2.1                                      | 0.20                             | 503                           | 313                         | 17221E3                                | 57221E3   | -                                      | -   |
|   | 330                              | 35 x 80                                 | 2.7                                      | 0.30                             | 339                           | 212                         | 27331E3                                | 67331E3   | -                                      | -   |
|   | 470                              | 35 x 105                                | 3.4                                      | 0.42                             | 241                           | 151                         | 27471E3                                | 67471E3   | -                                      | -   |
|   | 680                              | 50 x 80                                 | 4.9                                      | 0.61                             | 159                           | 98                          | 27681E3                                | 67681E3   | -                                      | -   |
|   | 1000                             | 50 x 80                                 | 5.7                                      | 0.90                             | 118                           | 75                          | 17102E3                                | 57102E3   | -                                      | -   |
|   | 1000                             | 50 x 105                                | 6.1                                      | 0.90                             | 114                           | 72                          | 27102E3                                | 67102E3   | -                                      | -   |
|   | 1500                             | 50 x 105                                | 7.1                                      | 1.35                             | 81                            | 52                          | 17152E3                                | 57152E3   | -                                      | -   |
|   | 1500                             | 65 x 105                                | 8.3                                      | 1.35                             | 81                            | 52                          | 27152E3                                | 67152E3   | 47152E3                                | 87152E3   |
|   | 2200                             | 65 x 105                                | 10.1                                     | 1.98                             | 55                            | 35                          | 17222E3                                | 57222E3   | 37222E3                                | 77222E3   |
|   | 2200                             | 76 x 105                                | 11.2                                     | 1.98                             | 55                            | 35                          | 27222E3                                | 67222E3   | 47222E3                                | 87222E3   |
|   | 3300                             | 76 x 105                                | 13.5                                     | 2.97                             | 37                            | 24                          | 17332E3                                | 57332E3   | 37332E3                                | 77332E3   |
|   | 3300                             | 76 x 146                                | 13.9                                     | 2.97                             | 37                            | 24                          | 27332E3                                | 67332E3   | 47332E3                                | 87332E3   |
|   | 4700                             | 76 x 146                                | 16.4                                     | 4.23                             | 26                            | 17                          | 17472E3                                | 57472E3   | 37472E3                                | 77472E3   |
|   | 5600                             | 76 x 146                                | 17.3                                     | 5.04                             | 23                            | 15                          | 17562E3                                | 57562E3   | 37562E3                                | 77562E3   |
|   | 6800                             | 76 x 220                                | 19.8                                     | 6.1                              | 25                            | 20                          | 17682E3                                | 57682E3   | 37682E3                                | 77682E3   |
|   | 6800                             | 90 x 146                                | 21.3                                     | 6.1                              | 24                            | 19                          | -                                      | -   | 47682E3                                | 87682E3   |
| 10 000  | 90 x 220                         | 26.5                                    | 9.0                                      | 17                               | 14                            | -                           | -                                      | 47103E3   | 87103E3                                |   |



| ADDITIONAL ELECTRICAL DATA         |                      |                                    |
|------------------------------------|----------------------|------------------------------------|
| PARAMETER                          | CONDITIONS           | VALUE                              |
| <b>Voltage</b>                     |                      |                                    |
| Surge voltage                      | ≤ 250 V versions     | $U_S = 1.15 \times U_R$            |
|                                    | ≥ 350 V versions     | $U_S = 1.1 \times U_R$             |
| Reverse voltage                    |                      | $U_{rev} \leq 1 \text{ V}$         |
| <b>Current</b>                     |                      |                                    |
| Leakage current                    | After 1 min at $U_R$ | $I_{L1} \leq 0.006 C_R \times U_R$ |
|                                    | After 5 min at $U_R$ | $I_{L5} \leq 0.002 C_R \times U_R$ |
| <b>Inductance</b>                  |                      |                                    |
| Equivalent series inductance (ESL) | Case Ø D = 35 mm     | Typ. 13 nH                         |
|                                    | Case Ø D = 50 mm     | Typ. 16 nH                         |
|                                    | Case Ø D = 65 mm     | Typ. 19 nH <sup>(1)</sup>          |
|                                    | Case Ø D = 76 mm     | Typ. 20 nH <sup>(1)</sup>          |
|                                    | Case Ø D = 90 mm     | Typ. 21 nH <sup>(1)</sup>          |

**Note**

<sup>(1)</sup> Low ESL designs available on request

**RIPPLE CURRENT AND USEFUL LIFE**

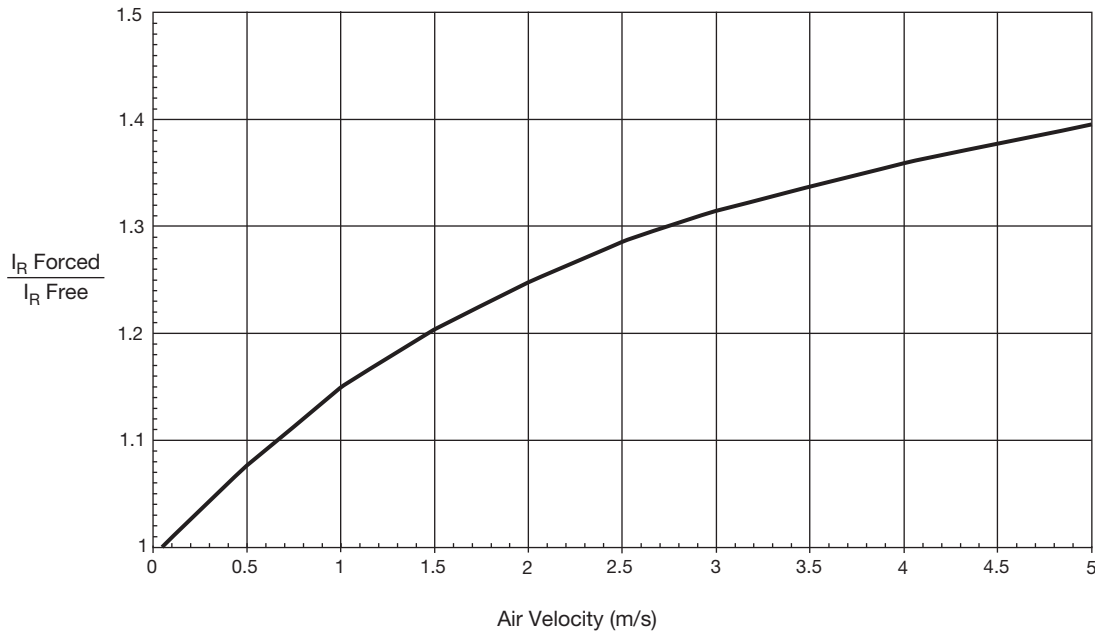


Fig. 3 - Multiplier of ripple current ( $I_R$ ) as a function of air flow

| MAXIMUM RIPPLE CURRENT            |           |                                   |       |
|-----------------------------------|-----------|-----------------------------------|-------|
| PARAMETER                         | CONDITION | MAXIMUM RIPPLE CURRENT MULTIPLIER | VALUE |
| Ambient temperature ( $T_{amb}$ ) | 70 °C     | from nomogram; see fig. 4         | 1.6   |
| Operating frequency (f)           | 400 Hz    | from frequency; see table 4       | 1.3   |
| Air flow                          | 2 m/s     | from air flow; see fig. 3         | 1.25  |

**Note**

- Calculation example for 102 series. maximum ripple current multiplier =  $1.6 \times 1.3 \times 1.25 = 2.6$





CCC205-05

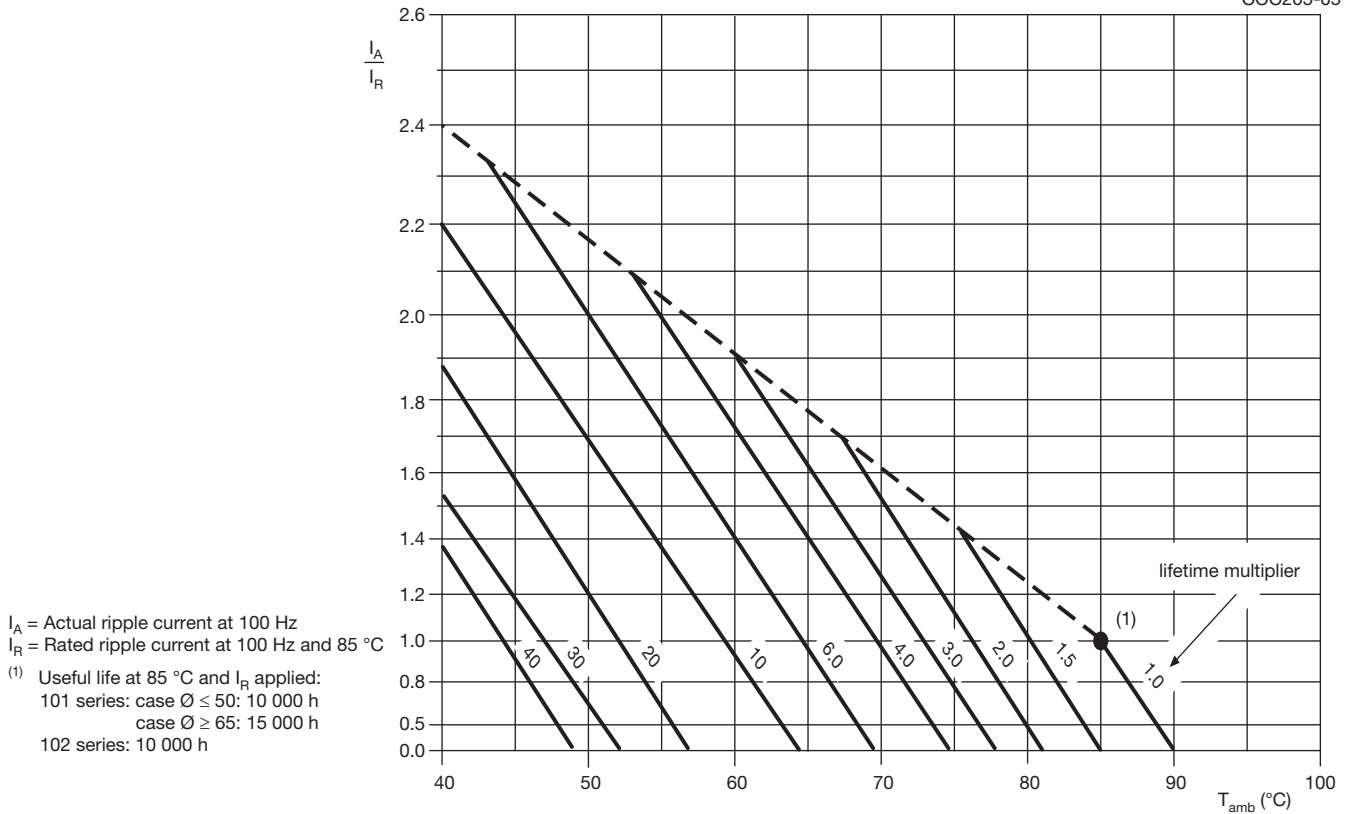


Fig. 4 - Multiplier of useful life as a function of ambient temperature and ripple current load

Table 4

| MULTIPLIER OF RIPPLE CURRENT ( $I_R$ ) AS A FUNCTION OF FREQUENCY |                  |      |
|---|------------------|------|
| FREQUENCY (Hz)  | $I_R$ MULTIPLIER |      |
|   | 101              | 102  |
| 50  | 0.85             | 0.90 |
| 100   | 1.00             | 1.00 |
| 200   | 1.10             | 1.20 |
| 400   | 1.15             | 1.30 |
| 1000  | 1.20             | 1.40 |
| 10 000  | 1.30             | 1.50 |



Table 5

| TEST PROCEDURES AND REQUIREMENTS               |  |  |   |
|--|--|--|---|
| TEST   |  | PROCEDURE<br>(quick reference)   | REQUIREMENTS  |
| NAME OF TEST                                   | REFERENCE                              |  |   |
| Endurance                                      | IEC 60384-4/EN130300<br>subclause 4.13 | $T_{amb} = 85\text{ }^{\circ}\text{C}$ ; $U_R$ applied;<br>2000 h  | $U_R \leq 100\text{ V}$ ; $\Delta C/C: \pm 15\%$<br>$U_R > 100\text{ V}$ ; $\Delta C/C: \pm 10\%$<br>$\tan \delta \leq 1.3 \times \text{spec. limit}$<br>$Z \leq 2 \times \text{spec. limit}$<br>$I_{L5} \leq \text{spec. limit}$   |
| Useful life                                    | CECC 30301<br>subclause 1.8.1          | $T_{amb} = 85\text{ }^{\circ}\text{C}$ ; $U_R$ and $I_R$ applied<br><br>101 series:<br>case $\varnothing D \leq 50$ : 10 000 h<br>case $\varnothing D \geq 65$ : 15 000 h<br><br>102 series:<br>10 000 h | $U_R \leq 100\text{ V}$ ; $\Delta C/C: \pm 45\%$<br>$U_R > 100\text{ V}$ ; $\Delta C/C: \pm 30\%$<br>$\tan \delta \leq 3 \times \text{spec. limit}$<br>$Z \leq 3 \times \text{spec. limit}$<br>$I_{L5} \leq \text{spec. limit}$<br>no short or open circuit,<br>no visible damage<br>Total failure percentage:<br>$U_R \leq 100\text{ V}; \leq 1\%$<br>$U_R > 100\text{ V}; \leq 3\%$ |
| Shelf life<br>(storage at<br>high temperature) | IEC 60384-4/EN130300<br>subclause 4.17 | $T_{amb} = 85\text{ }^{\circ}\text{C}$ ; no voltage applied;<br>500 h<br><br>after test: $U_R$ to be applied for 30 min,<br>24 h to 48 h before measurement  | $\Delta C/C: \pm 10\%$<br>$\tan \delta \leq 1.2 \times \text{spec. limit}$<br>$I_{L5} \leq 2 \times \text{spec. limit}$   |



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### Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: [info@moschip.ru](mailto:info@moschip.ru)

Skype отдела продаж:

moschip.ru

moschip.ru\_4

moschip.ru\_6

moschip.ru\_9