

## Metallized Polypropylene Film Capacitors DC-Link Capacitor



### FEATURES

- High performance DC filter
- Low ESR
- High peak current capabilities
- High RMS current capabilities
- AEC-Q200 qualified
- Mounting: radial
- Material categorization:  
for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

 AUTOMOTIVE  
GRADE

**RoHS**  
COMPLIANT

### APPLICATIONS

- High performance DC filtering
- HEV / EV: i.e. power train and OBC
- Renewable energies inverters
- Motor drives
- Power supplies

### QUICK REFERENCE DATA

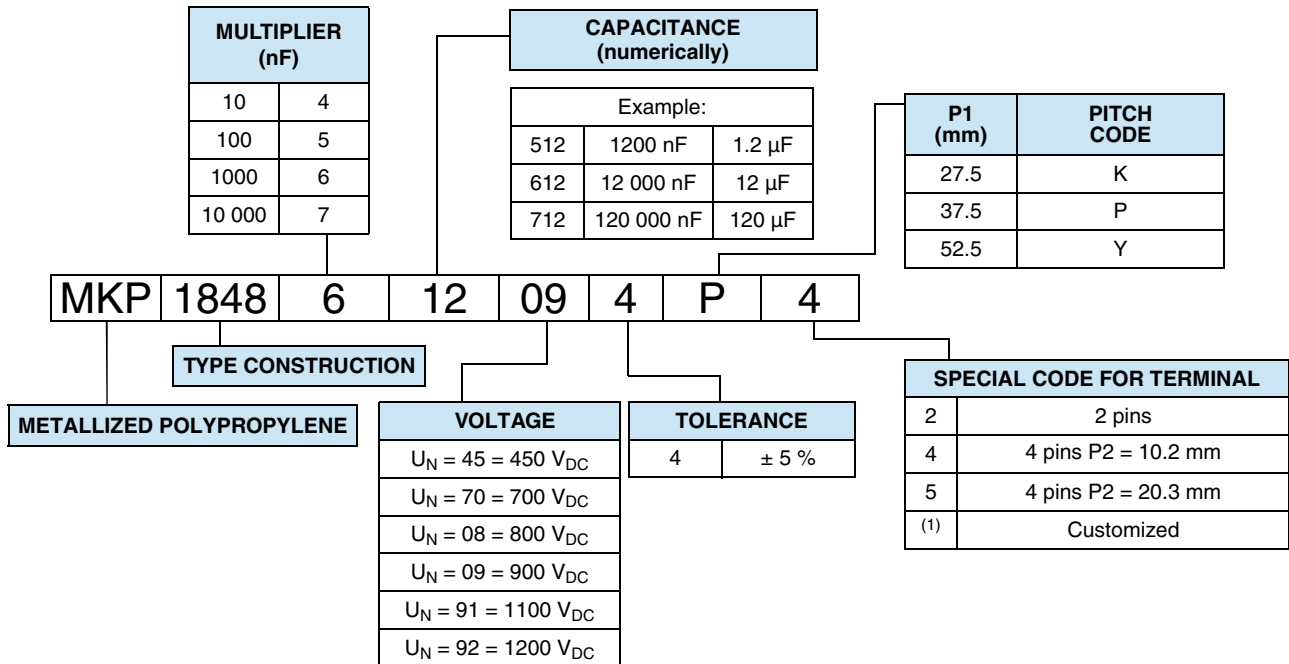
|  |  |
|--|--|
| Rated capacitance range                                  | 1 µF to 400 µF   |
| Capacitance tolerance                                    | 5 %  |
| Rated voltage range, U <sub>NDC</sub>                    | 450 V to 1200 V  |
| Climatic testing class                                   | 40/105/56  |
| Rated temperature  | 85 °C  |
| Maximum permissible case temperature                     | 105 °C, observing voltage derating   |
| Maximum applicable peak to peak ripple voltage           | 0.2 x U <sub>NDC</sub>   |
| Reference standards                                      | IEC 61071, IEC 60068   |
| Dielectric   | Polypropylene film   |
| Electrodes   | Metallized dielectric capacitor  |
| Construction   | Mono construction  |
| Encapsulation  | Plastic case, sealed with resin; flame retardant   |
| Terminals  | Tinned wires   |
| Self inductance (L <sub>S</sub> )                        | < 1 nH per mm of lead spacing  |
| Withstanding DC voltage between terminals <sup>(1)</sup> | 1.5 U <sub>NDC</sub> for 10 s, cut off current 10 mA, rise time ≤ 1000 V/s   |
| Insulation resistance                                    | RC between leads, after 1 min > 10 000 s<br>For U <sub>NDC</sub> ≤ 500 V measuring voltage 100 V<br>For U <sub>NDC</sub> > 500 V measuring voltage 500 V                                 |
| Life time expectancy                                     | Useful life time: > 100 000 h at U <sub>NDC</sub> and 70 °C<br>FIT: < 10 x 10 <sup>-9</sup> /h (10 per 10 <sup>9</sup> component h) at 0.5 x U <sub>NDC</sub> , 40 °C                    |
| Marking  | C-value; tolerance; rated voltage; code for dielectric material;<br>code for manufacturing origin; manufacturer's type designation;<br>manufacturer's logo; year and week of manufacture |

#### Notes

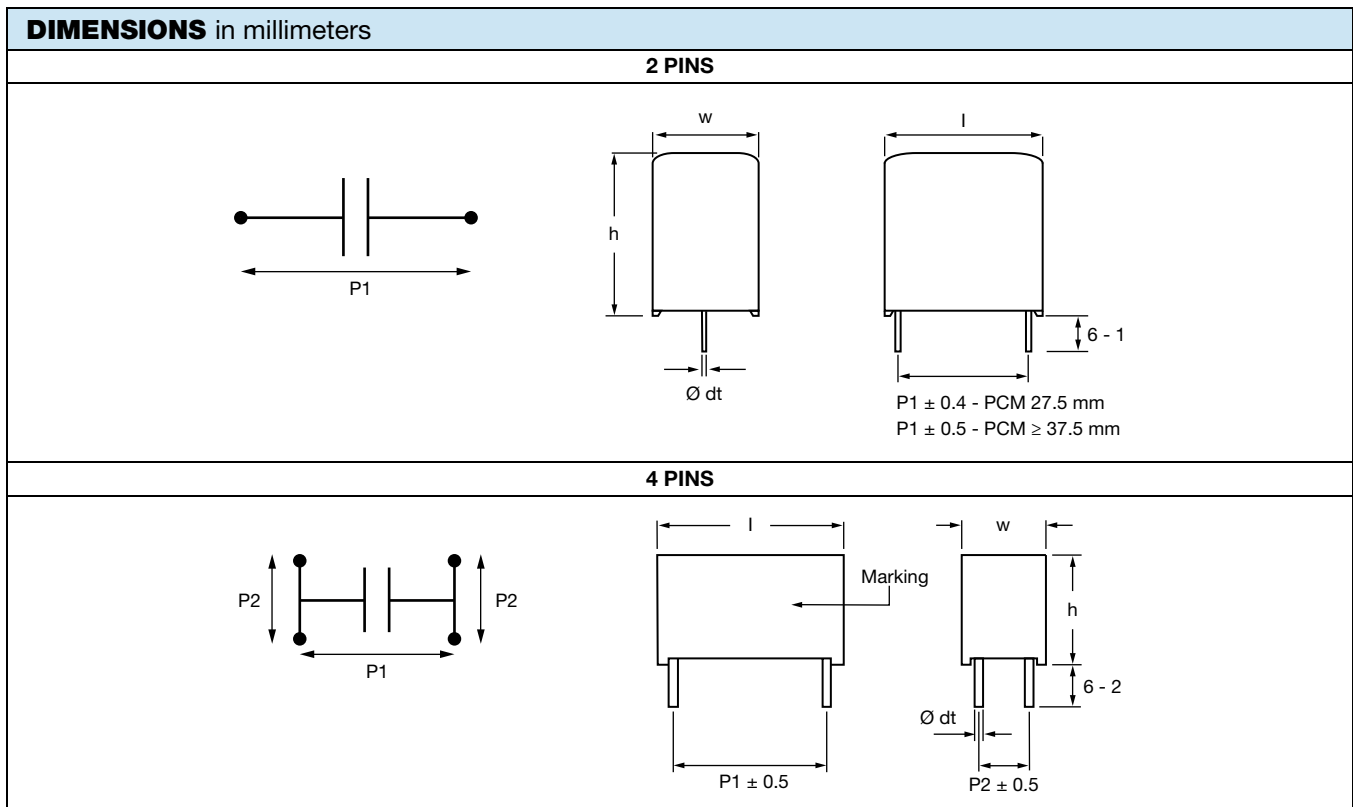
- For more detailed data and test requirements, contact [dc-film@vishay.com](mailto:dc-film@vishay.com)
- For general information like characteristics and definitions used for film capacitors follow the link: [www.vishay.com/doc?28147](http://www.vishay.com/doc?28147)
- <sup>(1)</sup> See document "Voltage Proof Test for Metallized Film Capacitors" ([www.vishay.com/doc?28169](http://www.vishay.com/doc?28169))

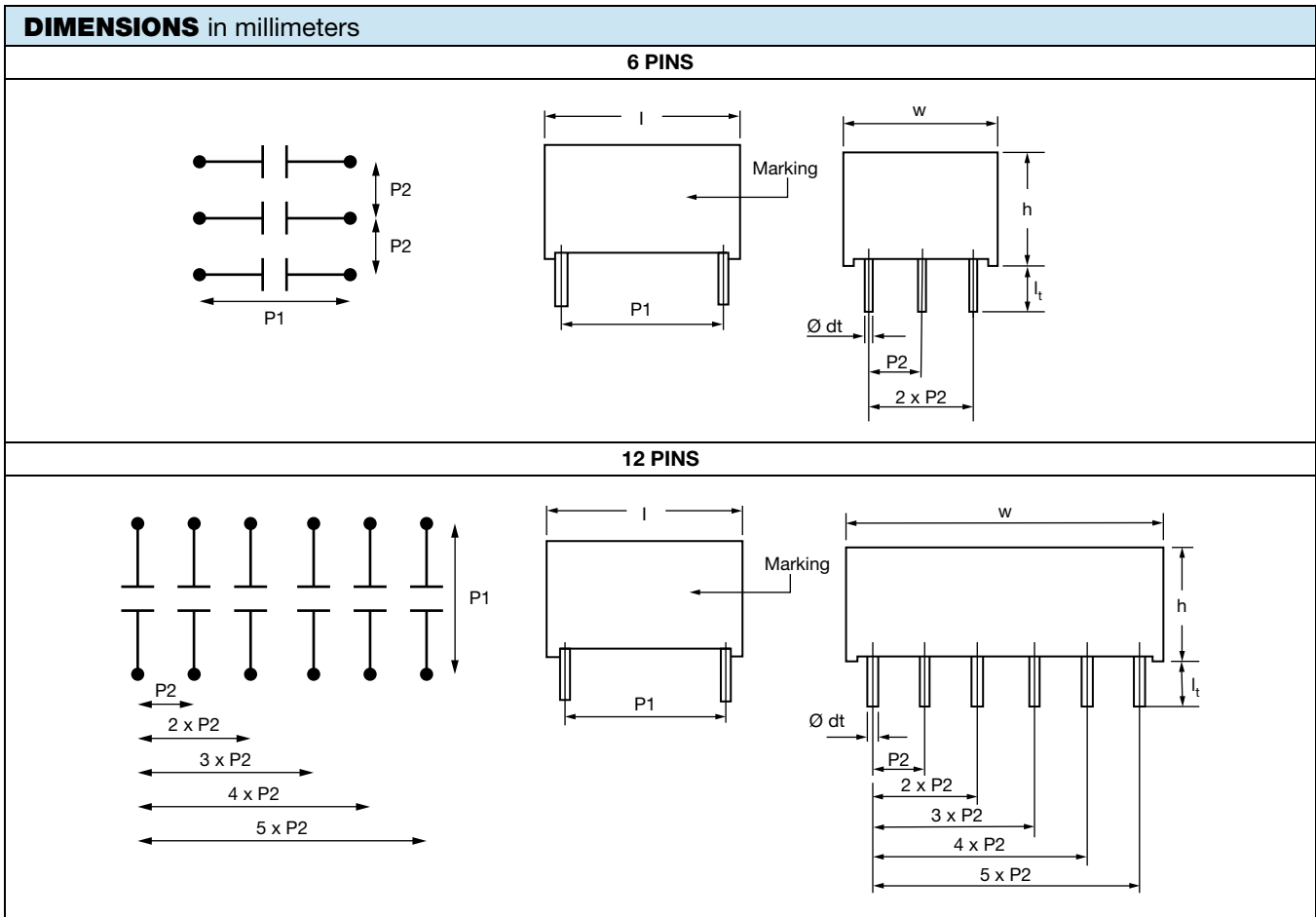
### DC VOLTAGE RATINGS

|                             |       |       |       |        |        |        |
|-----------------------------|-------|-------|-------|--------|--------|--------|
| U <sub>NDC</sub> at 85 °C   | 450 V | 700 V | 800 V | 900 V  | 1100 V | 1200 V |
| U <sub>OPDC</sub> at 70 °C  | 500 V | 800 V | 900 V | 1100 V | 1350 V | 1500 V |
| U <sub>OPDC</sub> at 105 °C | 300 V | 500 V | 570 V | 650 V  | 800 V  | 850 V  |

**COMPOSITION OF CATALOG NUMBER**

**Note**

(1) Tabs terminals or customized terminals are available on request




**Note**

- $\varnothing dt \pm 10\%$  of standard diameter specified

| <b>ELECTRICAL DATA AND ORDERING CODE</b> |   |                                  |      |      |            |            |                       |                   |                                 |           |                                     |           |   |                 |                              |
|--|---|----------------------------------|------|------|------------|------------|-----------------------|-------------------|---------------------------------|-----------|-------------------------------------|-----------|---|-----------------|------------------------------|
| $U_{NDC}$<br>AT<br>85 °C<br>(V)          | CAP. <sup>(8)</sup><br>( $\mu$ F)                         | DIMENSION <sup>(5)</sup><br>(mm) |      |      | P1<br>(mm) | P2<br>(mm) | dV/dt<br>(V/ $\mu$ s) | $I_{PEAK}$<br>(A) | $I_{RMS}$ <sup>(2)</sup><br>(A) |           | ESR <sup>(3)</sup><br>(m $\Omega$ ) |           | $\tan \delta$<br>10 kHz<br>( $< 10^{-4}$ ) <sup>(4)</sup> |                 | ORDERING CODE <sup>(1)</sup> |
|  |   | w                                | h    | l    |            |            |                       |                   | 2<br>PINS                       | 4<br>PINS | 2<br>PINS                           | 4<br>PINS | 2<br>PINS   | 4<br>PINS       |                              |
| 450                                      | $U_{OPDC}$ AT 70 °C = 500 V, $U_{OPDC}$ AT 105 °C = 300 V |                                  |      |      |            |            |                       |                   |                                 |           |                                     |           |   |                 |                              |
|  | 1   | 9.0                              | 19.0 | 32.0 | 27.5       | -          | 75                    | 75                | 2.5                             | -         | 54                                  | -         | 85  | -               | MKP1848510454K2              |
|  | 2   | 9.0                              | 19.0 | 32.0 | 27.5       | -          | 75                    | 150               | 3                               | -         | 34.5                                | -         | 85  | -               | MKP1848520454K2              |
|  | 3   | 11.0                             | 21.0 | 32.0 | 27.5       | -          | 75                    | 225               | 4                               | -         | 23.0                                | -         | 85  | -               | MKP1848530454K2              |
|  | 4   | 11.0                             | 21.0 | 32.0 | 27.5       | -          | 75                    | 300               | 4                               | -         | 20.5                                | -         | 85  | -               | MKP1848540454K2              |
|  | 5   | 13.0                             | 23.0 | 32.0 | 27.5       | -          | 75                    | 375               | 5                               | -         | 16.5                                | -         | 85  | -               | MKP1848550454K2              |
|  | 6   | 15.0                             | 25.0 | 32.0 | 27.5       | -          | 75                    | 450               | 6                               | -         | 13.5                                | -         | 85  | -               | MKP1848560454K2              |
|  | 7   | 15.0                             | 25.0 | 32.0 | 27.5       | -          | 75                    | 525               | 6.5                             | -         | 11.5                                | -         | 85  | -               | MKP1848570454K2              |
|  | 8   | 18.0                             | 28.0 | 32.0 | 27.5       | -          | 75                    | 600               | 8.5                             | -         | 8.5                                 | -         | 85  | -               | MKP1848580454K2              |
|  | 9   | 18.0                             | 28.0 | 32.0 | 27.5       | -          | 75                    | 675               | 8.5                             | -         | 9.0                                 | -         | 85  | -               | MKP1848590454K2              |
|  | 10  | 18.0                             | 28.0 | 32.0 | 27.5       | -          | 75                    | 750               | 9                               | -         | 8.0                                 | -         | 85  | -               | MKP1848610454K2              |
|  | 12  | 21.0                             | 31.0 | 32.0 | 27.5       | -          | 75                    | 900               | 10                              | -         | 7.0                                 | -         | 85  | -               | MKP1848612454K2              |
| 15                                       | 20.0  | 35.0                             | 32.0 | 27.5 | -          | 75         | 1125                  | 11.5              | -                               | 6.0       | -                                   | 85        | -   | MKP1848615454K2 |                              |
| 10                                       | 18.5  | 35.5                             | 43.0 | 37.5 | 10.2       | 40         | 400                   | 7.5               | 8                               | 13.5      | 12.0                                | 160       | 140   | MKP1848610454P* |                              |



| ELECTRICAL DATA AND ORDERING CODE      |   |   |      |      |             |             |                 |                          |  |           |                            |           |   |                                |                              |
|--|---|---|------|------|-------------|-------------|-----------------|--------------------------|--|-----------|----------------------------|-----------|---|--------------------------------|------------------------------|
| U <sub>NDC</sub><br>AT<br>85 °C<br>(V) | CAP. <sup>(6)</sup><br>(µF)   | DIMENSION <sup>(5)</sup><br>(mm)  |      |      | P1<br>(mm)  | P2<br>(mm)  | dV/dt<br>(V/µs) | I <sub>PEAK</sub><br>(A) | I <sub>RMS</sub> <sup>(2)</sup><br>(A) |           | ESR <sup>(3)</sup><br>(mΩ) |           | tan δ<br>10 kHz<br>( $< 10^{-4}$ ) <sup>(4)</sup> |                                | ORDERING CODE <sup>(1)</sup> |
|  |   | w   | h    | l    |             |             |                 |                          | 2<br>PINS                              | 4<br>PINS | 2<br>PINS                  | 4<br>PINS | 2<br>PINS   | 4<br>PINS                      |                              |
|  |   | U <sub>OPDC</sub> AT 70 °C = 500 V, U <sub>OPDC</sub> AT 105 °C = 300 V |      |      |             |             |                 |                          |  |           |                            |           |   |                                |                              |
| 450                                    | 12  | 18.5  | 35.5 | 43.0 | 37.5        | 10.2        | 40              | 480                      | 8                                      | 8.5       | 11.5                       | 10.0      | 160   | 140                            | MKP1848612454P*              |
|  | 15  | 18.5  | 35.5 | 43.0 | 37.5        | 10.2        | 40              | 600                      | 9                                      | 10        | 9.0                        | 8.0       | 160   | 140                            | MKP1848615454P*              |
|  | 20  | 21.5  | 38.5 | 43.0 | 37.5        | 10.2        | 40              | 800                      | 11                                     | 12        | 7.0                        | 6.0       | 160   | 140                            | MKP1848620454P*              |
|  | 22  | 21.5  | 38.5 | 43.0 | 37.5        | 10.2        | 40              | 880                      | 11                                     | 11.5      | 7.5                        | 6.5       | 160   | 140                            | MKP1848622454P*              |
|  | 25  | 21.5  | 38.5 | 43.0 | 37.5        | 10.2        | 40              | 1000                     | 11.5                                   | 12.5      | 6.5                        | 5.5       | 160   | 140                            | MKP1848625454P*              |
|  | 30  | 24.0  | 44.0 | 42.0 | 37.5        | 10.2        | 40              | 1200                     | 13.5                                   | 15        | 5.5                        | 4.5       | 160   | 140                            | MKP1848630454P*              |
|  | 35  | 30.0  | 45.0 | 42.0 | 37.5        | 10.2 / 20.3 | 40              | 1400                     | 17                                     | 18.5      | 4.0                        | 3.5       | 160   | 140                            | MKP1848635454P*              |
|  | 40  | 30.0  | 45.0 | 42.0 | 37.5        | 10.2 / 20.3 | 40              | 1600                     | 17                                     | 18.5      | 4.0                        | 3.5       | 160   | 140                            | MKP1848640454P*              |
|  | 40  | 25.0  | 45.0 | 57.5 | 52.5        | 10.2        | 20              | 800                      | 13                                     | 13.5      | 6.5                        | 6.0       | 310   | 280                            | MKP1848640454Y*              |
|  | 45  | 25.0  | 45.0 | 57.5 | 52.5        | 10.2        | 20              | 900                      | 12.5                                   | 13.5      | 7.0                        | 6.0       | 310   | 280                            | MKP1848645454Y*              |
|  | 50  | 30.0  | 45.0 | 57.5 | 52.5        | 20.3        | 20              | 1000                     | 15                                     | 15.5      | 5.5                        | 5.0       | 310   | 280                            | MKP1848650454Y*              |
|  | 55  | 30.0  | 45.0 | 57.5 | 52.5        | 20.3        | 20              | 1100                     | 15                                     | 15.5      | 5.5                        | 5.0       | 310   | 280                            | MKP1848655454Y*              |
|  | 60  | 30.0  | 45.0 | 57.5 | 52.5        | 20.3        | 20              | 1200                     | 15.5                                   | 16.5      | 5.0                        | 4.5       | 310   | 280                            | MKP1848660454Y*              |
|  | 65  | 35.0  | 50.0 | 57.5 | 52.5        | 20.3        | 20              | 1300                     | 19                                     | 20.5      | 4.0                        | 3.5       | 310   | 280                            | MKP1848665454Y*              |
|  | 70  | 35.0  | 50.0 | 57.5 | 52.5        | 20.3        | 20              | 1400                     | 18                                     | 19        | 4.5                        | 4.0       | 310   | 280                            | MKP1848670454Y*              |
|  | 75  | 35.0  | 50.0 | 57.5 | 52.5        | 20.3        | 20              | 1500                     | 19                                     | 20.5      | 4.0                        | 3.5       | 310   | 280                            | MKP1848675454Y*              |
|  | 80  | 35.0  | 50.0 | 57.5 | 52.5        | 20.3        | 20              | 1600                     | 19                                     | 20.5      | 4.0                        | 3.5       | 310   | 280                            | MKP1848680454Y*              |
|  | 90  | 45.0  | 45.0 | 57.5 | 52.5        | 20.3        | 20              | 1800                     | -                                      | 21.5      | -                          | 3.0       | -   | 280                            | MKP1848690454Y5              |
| 95                                     | 45.0  | 45.0  | 57.5 | 52.5 | 20.3        | 20          | 1900            | -                        | 21.5                                   | -         | 3.0                        | -         | 280   | MKP1848695454Y5                |                              |
| 100                                    | 45.0  | 45.0  | 57.5 | 52.5 | 20.3        | 20          | 2000            | -                        | 23.5                                   | -         | 2.5                        | -         | 280   | MKP1848710454Y5                |                              |
| 200                                    | 70.0  | 65.0  | 57.5 | 52.5 | 20.3        | 20          | 2000            | -                        | 30.5                                   | -         | 2.0                        | -         | 310   | MKP1848720454Y5 <sup>(6)</sup> |                              |
| 400                                    | 130   | 65.0  | 57.5 | 52.5 | 20.3        | 10          | 4000            | -                        | 50.5                                   | -         | 1.5                        | -         | 380   | MKP1848740454Y5 <sup>(7)</sup> |                              |
| 700                                    | U <sub>OPDC</sub> AT 70 °C = 800 V, U <sub>OPDC</sub> AT 105 °C = 500 V |   |      |      |             |             |                 |                          |  |           |                            |           |   |                                |                              |
|  | 1   | 9   | 19   | 32   | 27.5        | -           | 75              | 75                       | 2.5                                    | -         | 54                         | -         | 68  | -                              | MKP1848510704K2              |
|  | 2   | 9   | 19   | 32   | 27.5        | -           | 75              | 150                      | 3                                      | -         | 34.5                       | -         | 68  | -                              | MKP1848520704K2              |
|  | 3   | 11  | 21   | 32   | 27.5        | -           | 75              | 225                      | 4                                      | -         | 23                         | -         | 68  | -                              | MKP1848530704K2              |
|  | 4   | 13  | 23   | 32   | 27.5        | -           | 75              | 300                      | 5                                      | -         | 17                         | -         | 68  | -                              | MKP1848540704K2              |
|  | 5   | 15  | 25   | 32   | 27.5        | -           | 75              | 375                      | 6                                      | -         | 14                         | -         | 68  | -                              | MKP1848550704K2              |
|  | 6   | 18  | 28   | 32   | 27.5        | -           | 75              | 450                      | 7.5                                    | -         | 11.5                       | -         | 68  | -                              | MKP1848560704K2              |
|  | 7   | 18  | 28   | 32   | 27.5        | -           | 75              | 525                      | 8                                      | -         | 10                         | -         | 68  | -                              | MKP1848570704K2              |
|  | 8   | 18  | 28   | 32   | 27.5        | -           | 75              | 600                      | 8.5                                    | -         | 8.5                        | -         | 68  | -                              | MKP1848580704K2              |
|  | 9   | 21  | 31   | 32   | 27.5        | -           | 75              | 675                      | 10                                     | -         | 7.5                        | -         | 68  | -                              | MKP1848590704K2              |
|  | 10  | 21  | 31   | 32   | 27.5        | -           | 75              | 750                      | 10                                     | -         | 7                          | -         | 68  | -                              | MKP1848610704K2              |
|  | 12  | 20  | 35   | 32   | 27.5        | -           | 75              | 900                      | 11.5                                   | -         | 6                          | -         | 68  | -                              | MKP1848612704K2              |
|  | 10  | 18.5  | 35.5 | 43   | 37.5        | 10.2        | 40              | 400                      | 7.5                                    | 8         | 13.5                       | 12        | 135   | 120                            | MKP1848610704P*              |
|  | 12  | 18.5  | 35.5 | 43   | 37.5        | 10.2        | 40              | 480                      | 8                                      | 8.5       | 11.5                       | 10        | 135   | 120                            | MKP1848612704P*              |
|  | 15  | 18.5  | 35.5 | 43   | 37.5        | 10.2        | 40              | 600                      | 9                                      | 10        | 9                          | 8         | 135   | 120                            | MKP1848615704P*              |
|  | 20  | 21.5  | 38.5 | 43   | 37.5        | 10.2        | 40              | 800                      | 11                                     | 12        | 7                          | 6         | 135   | 120                            | MKP1848620704P*              |
|  | 22  | 24  | 44   | 42   | 37.5        | 10.2        | 40              | 880                      | 13                                     | 13.5      | 6                          | 5.5       | 135   | 120                            | MKP1848622704P*              |
|  | 25  | 24  | 44   | 42   | 37.5        | 10.2        | 40              | 1000                     | 13.5                                   | 14.5      | 5.5                        | 5         | 135   | 120                            | MKP1848625704P*              |
| 30                                     | 30  | 45  | 42   | 37.5 | 10.2 / 20.3 | 40          | 1200            | 16                       | 17                                     | 4.5       | 4                          | 135       | 120   | MKP1848630704P*                |                              |



| ELECTRICAL DATA AND ORDERING CODE      |   |   |      |      |            |             |                 |                          |  |           |                            |           |   |                                |                                |
|--|---|---|------|------|------------|-------------|-----------------|--------------------------|--|-----------|----------------------------|-----------|---|--------------------------------|--------------------------------|
| U <sub>NDC</sub><br>AT<br>85 °C<br>(V) | CAP. <sup>(6)</sup><br>(µF)   | DIMENSION <sup>(5)</sup><br>(mm)  |      |      | P1<br>(mm) | P2<br>(mm)  | dV/dt<br>(V/µs) | I <sub>PEAK</sub><br>(A) | I <sub>RMS</sub> <sup>(2)</sup><br>(A) |           | ESR <sup>(3)</sup><br>(mΩ) |           | tan δ<br>10 kHz<br>( $< 10^{-4}$ ) <sup>(4)</sup> |                                | ORDERING CODE <sup>(1)</sup>   |
|  |   | w   | h    | l    |            |             |                 |                          | 2<br>PINS                              | 4<br>PINS | 2<br>PINS                  | 4<br>PINS | 2<br>PINS   | 4<br>PINS                      |                                |
|  |   | U <sub>OPDC</sub> AT 70 °C = 800 V, U <sub>OPDC</sub> AT 105 °C = 500 V |      |      |            |             |                 |                          |  |           |                            |           |   |                                |                                |
| 700                                    | 35  | 30  | 45   | 42   | 37.5       | 10.2 / 20.3 | 40              | 1400                     | 17                                     | 18.5      | 4                          | 3.5       | 135   | 120                            | MKP1848635704P*                |
|  | 30  | 25  | 45   | 57.5 | 52.5       | 10.2        | 20              | 600                      | 11                                     | 12        | 9                          | 8         | 270   | 240                            | MKP1848630704Y*                |
|  | 35  | 25  | 45   | 57.5 | 52.5       | 10.2        | 20              | 700                      | 12                                     | 12.5      | 7.5                        | 7         | 270   | 240                            | MKP1848635704Y*                |
|  | 40  | 25  | 45   | 57.5 | 52.5       | 10.2        | 20              | 800                      | 13                                     | 13.5      | 6.5                        | 6         | 270   | 240                            | MKP1848640704Y*                |
|  | 45  | 30  | 45   | 57.5 | 52.5       | 20.3        | 20              | 900                      | 14.5                                   | 15        | 6                          | 5.5       | 270   | 240                            | MKP1848645704Y*                |
|  | 50  | 30  | 45   | 57.5 | 52.5       | 20.3        | 20              | 1000                     | 15                                     | 15.5      | 5.5                        | 5         | 270   | 240                            | MKP1848650704Y*                |
|  | 55  | 35  | 50   | 57.5 | 52.5       | 20.3        | 20              | 1100                     | 17                                     | 18        | 5                          | 4.5       | 270   | 240                            | MKP1848655704Y*                |
|  | 60  | 35  | 50   | 57.5 | 52.5       | 20.3        | 20              | 1200                     | 18                                     | 19        | 4.5                        | 4         | 270   | 240                            | MKP1848660704Y*                |
|  | 65  | 35  | 50   | 57.5 | 52.5       | 20.3        | 20              | 1300                     | 19                                     | 20.5      | 4                          | 3.5       | 270   | 240                            | MKP1848665704Y*                |
|  | 70  | 45  | 45   | 57.5 | 52.5       | 20.3        | 20              | 1400                     | -                                      | 20        | -                          | 3.5       | -   | 240                            | MKP1848670704Y5                |
|  | 75  | 45  | 45   | 57.5 | 52.5       | 20.3        | 20              | 1500                     | -                                      | 21.5      | -                          | 3         | -   | 240                            | MKP1848675704Y5                |
|  | 80  | 45  | 45   | 57.5 | 52.5       | 20.3        | 20              | 1600                     | -                                      | 21.5      | -                          | 3         | -   | 240                            | MKP1848680704Y5                |
|  | 160   | 70  | 65   | 57.5 | 52.5       | 20.3        | 20              | 3200                     | -                                      | 30.5      | -                          | 2.5       | -   | 280                            | MKP1848716704Y5 <sup>(6)</sup> |
| 320                                    | 130   | 65  | 57.5 | 52.5 | 20.3       | 20          | 6400            | -                        | 54                                     | -         | 1.3                        | -         | 280   | MKP1848732704Y5 <sup>(7)</sup> |                                |
| 800                                    | U <sub>OPDC</sub> AT 70 °C = 900 V, U <sub>OPDC</sub> AT 105 °C = 570 V |   |      |      |            |             |                 |                          |  |           |                            |           |   |                                |                                |
|  | 1   | 9   | 19   | 32   | 27.5       | -           | 75              | 75                       | 2                                      | -         | 62.5                       | -         | 60  | -                              | MKP1848510084K2                |
|  | 2   | 11  | 21   | 32   | 27.5       | -           | 75              | 150                      | 3.5                                    | -         | 31                         | -         | 60  | -                              | MKP1848520084K2                |
|  | 3   | 13  | 23   | 32   | 27.5       | -           | 75              | 225                      | 4.5                                    | -         | 21                         | -         | 60  | -                              | MKP1848530084K2                |
|  | 4   | 15  | 25   | 32   | 27.5       | -           | 75              | 300                      | 5.5                                    | -         | 15.5                       | -         | 60  | -                              | MKP1848540084K2                |
|  | 5   | 18  | 28   | 32   | 27.5       | -           | 75              | 375                      | 7                                      | -         | 12.5                       | -         | 60  | -                              | MKP1848550084K2                |
|  | 6   | 18  | 28   | 32   | 27.5       | -           | 75              | 450                      | 7.5                                    | -         | 10.5                       | -         | 60  | -                              | MKP1848560084K2                |
|  | 7   | 21  | 31   | 32   | 27.5       | -           | 75              | 525                      | 9                                      | -         | 9                          | -         | 60  | -                              | MKP1848570084K2                |
|  | 8   | 21  | 31   | 32   | 27.5       | -           | 75              | 600                      | 9.5                                    | -         | 8                          | -         | 60  | -                              | MKP1848580084K2                |
|  | 9   | 20  | 35   | 32   | 27.5       | -           | 75              | 675                      | 10                                     | -         | 8                          | -         | 60  | -                              | MKP1848590084K2                |
|  | 10  | 18.5  | 35.5 | 43   | 37.5       | 10.2        | 40              | 400                      | 8                                      | 8.5       | 12.5                       | 11        | 122   | 110                            | MKP1848610084P*                |
|  | 12  | 18.5  | 35.5 | 43   | 37.5       | 10.2        | 40              | 480                      | 8.5                                    | 9         | 10.5                       | 9         | 122   | 110                            | MKP1848612084P*                |
|  | 15  | 21.5  | 38.5 | 43   | 37.5       | 10.2        | 40              | 600                      | 10                                     | 11        | 8.5                        | 7.5       | 122   | 110                            | MKP1848615084P*                |
|  | 20  | 24  | 44   | 42   | 37.5       | 10.2        | 40              | 800                      | 13                                     | 13.5      | 6                          | 5.5       | 122   | 110                            | MKP1848620084P*                |
|  | 22  | 30  | 45   | 42   | 37.5       | 10.2 / 20.3 | 40              | 880                      | 14.5                                   | 15.5      | 5.5                        | 5         | 122   | 110                            | MKP1848622084P*                |
|  | 25  | 30  | 45   | 42   | 37.5       | 10.2 / 20.3 | 40              | 1000                     | 15.5                                   | 16        | 5                          | 4.5       | 122   | 110                            | MKP1848625084P*                |
|  | 30  | 25  | 45   | 57.5 | 52.5       | 10.2        | 10              | 300                      | 12                                     | 12        | 8                          | 7.5       | 240   | 215                            | MKP1848630084Y*                |
|  | 35  | 30  | 45   | 57.5 | 52.5       | 20.3        | 10              | 350                      | 13                                     | 14.5      | 7                          | 6         | 240   | 215                            | MKP1848635084Y*                |
|  | 40  | 30  | 45   | 57.5 | 52.5       | 20.3        | 10              | 400                      | 14.5                                   | 15        | 6                          | 5.5       | 240   | 215                            | MKP1848640084Y*                |
|  | 45  | 35  | 50   | 57.5 | 52.5       | 20.3        | 10              | 450                      | 16                                     | 17        | 5.5                        | 5         | 240   | 215                            | MKP1848645084Y*                |
|  | 50  | 35  | 50   | 57.5 | 52.5       | 20.3        | 10              | 500                      | 17                                     | 18        | 5                          | 4.5       | 240   | 215                            | MKP1848650084Y*                |
| 55                                     | 45  | 45  | 57.5 | 52.5 | 20.3       | 10          | 550             | -                        | 18.5                                   | -         | 4                          | -         | 215   | MKP1848655084Y5                |                                |
| 60                                     | 45  | 45  | 57.5 | 52.5 | 20.3       | 10          | 600             | -                        | 20                                     | -         | 3.5                        | -         | 215   | MKP1848660084Y5                |                                |
| 120                                    | 70  | 65  | 57.5 | 52.5 | 20.3       | 10          | 1600            | -                        | 27                                     | -         | 3.2                        | -         | 215   | MKP1848712084Y5 <sup>(6)</sup> |                                |
| 240                                    | 130   | 65  | 57.5 | 52.5 | 20.3       | 10          | 3200            | -                        | 48.5                                   | -         | 1.6                        | -         | 215   | MKP1848724084Y5 <sup>(7)</sup> |                                |



| ELECTRICAL DATA AND ORDERING CODE      |  |  |      |      |            |             |                 |                          |  |           |                            |           |   |                                |                              |
|--|--|--|------|------|------------|-------------|-----------------|--------------------------|--|-----------|----------------------------|-----------|---|--------------------------------|------------------------------|
| U <sub>NDC</sub><br>AT<br>85 °C<br>(V) | CAP. <sup>(6)</sup><br>(µF)  | DIMENSION <sup>(5)</sup><br>(mm)   |      |      | P1<br>(mm) | P2<br>(mm)  | dV/dt<br>(V/µs) | I <sub>PEAK</sub><br>(A) | I <sub>RMS</sub> <sup>(2)</sup><br>(A) |           | ESR <sup>(3)</sup><br>(mΩ) |           | tan δ<br>10 kHz<br>( $< 10^{-4}$ ) <sup>(4)</sup> |                                | ORDERING CODE <sup>(1)</sup> |
|  |  | w  | h    | l    |            |             |                 |                          | 2<br>PINS                              | 4<br>PINS | 2<br>PINS                  | 4<br>PINS | 2<br>PINS   | 4<br>PINS                      |                              |
|  |  | U <sub>OPDC</sub> AT 70 °C = 1100 V, U <sub>OPDC</sub> AT 105 °C = 650 V |      |      |            |             |                 |                          |  |           |                            |           |   |                                |                              |
| 900                                    | 1  | 9  | 19   | 32   | 27.5       | -           | 40              | 40                       | 2                                      | -         | 63                         | -         | 50  | -                              | MKP1848510094K2              |
|  | 2  | 13   | 23   | 32   | 27.5       | -           | 80              | 160                      | 3.5                                    | -         | 32                         | -         | 50  | -                              | MKP1848520094K2              |
|  | 3  | 15   | 25   | 32   | 27.5       | -           | 80              | 240                      | 5                                      | -         | 21                         | -         | 50  | -                              | MKP1848530094K2              |
|  | 4  | 18   | 28   | 32   | 27.5       | -           | 80              | 320                      | 6                                      | -         | 16                         | -         | 50  | -                              | MKP1848540094K2              |
|  | 5  | 21   | 31   | 32   | 27.5       | -           | 80              | 400                      | 7.5                                    | -         | 13                         | -         | 50  | -                              | MKP1848550094K2              |
|  | 6  | 21   | 31   | 32   | 27.5       | -           | 80              | 480                      | 8.5                                    | -         | 10                         | -         | 50  | -                              | MKP1848560094K2              |
|  | 7  | 20   | 35   | 32   | 27.5       | -           | 80              | 560                      | 9                                      | -         | 9                          | -         | 50  | -                              | MKP1848570094K2              |
|  | 5  | 18.5   | 35.5 | 43   | 37.5       | 10.2        | 20              | 100                      | 6                                      | 6.5       | 21                         | 19        | 100   | 90                             | MKP1848550094P*              |
|  | 6  | 18.5   | 35.5 | 43   | 37.5       | 10.2        | 40              | 240                      | 6.5                                    | 7         | 18                         | 16        | 100   | 90                             | MKP1848560094P*              |
|  | 7  | 18.5   | 35.5 | 43   | 37.5       | 10.2        | 40              | 280                      | 6.5                                    | 7         | 18                         | 16        | 100   | 90                             | MKP1848570094P*              |
|  | 8  | 18.5   | 35.5 | 43   | 37.5       | 10.2        | 40              | 320                      | 7                                      | 7.5       | 16                         | 14        | 100   | 90                             | MKP1848580094P*              |
|  | 9  | 18.5   | 35.5 | 43   | 37.5       | 10.2        | 40              | 360                      | 7.5                                    | 8         | 14                         | 12        | 100   | 90                             | MKP1848590094P*              |
|  | 10   | 21.5   | 38.5 | 43   | 37.5       | 10.2        | 40              | 400                      | 8.5                                    | 9         | 12                         | 11        | 100   | 90                             | MKP1848610094P*              |
|  | 12   | 21.5   | 38.5 | 43   | 37.5       | 10.2        | 40              | 480                      | 9.5                                    | 10        | 10                         | 9         | 100   | 90                             | MKP1848612094P*              |
|  | 15   | 24   | 44   | 42   | 37.5       | 10.2        | 40              | 600                      | 11                                     | 12        | 8                          | 7         | 100   | 90                             | MKP1848615094P*              |
|  | 16   | 24   | 44   | 42   | 37.5       | 10.2        | 40              | 640                      | 11                                     | 12        | 8                          | 7         | 100   | 90                             | MKP1848616094P*              |
|  | 20   | 30   | 45   | 42   | 37.5       | 10.2 / 20.3 | 40              | 800                      | 14                                     | 15.5      | 6                          | 5         | 100   | 90                             | MKP1848620094P*              |
|  | 15   | 25   | 45   | 57.5 | 52.5       | 10.2        | 20              | 300                      | 9                                      | 9.5       | 14                         | 12        | 200   | 185                            | MKP1848615094Y*              |
|  | 20   | 25   | 45   | 57.5 | 52.5       | 10.2        | 20              | 400                      | 9.5                                    | 10        | 12                         | 11        | 200   | 185                            | MKP1848620094Y*              |
|  | 22   | 25   | 45   | 57.5 | 52.5       | 10.2        | 20              | 440                      | 10                                     | 10.5      | 11                         | 10        | 200   | 185                            | MKP1848622094Y*              |
| 25                                     | 30   | 45   | 57.5 | 52.5 | 20.3       | 20          | 500             | 11                       | 11.5                                   | 10        | 9                          | 200       | 185   | MKP1848625094Y*                |                              |
| 30                                     | 30   | 45   | 57.5 | 52.5 | 20.3       | 20          | 600             | 12.5                     | 13                                     | 8         | 7                          | 200       | 185   | MKP1848630094Y*                |                              |
| 35                                     | 35   | 50   | 57.5 | 52.5 | 20.3       | 20          | 700             | 14.5                     | 15.5                                   | 7         | 6                          | 200       | 185   | MKP1848635094Y*                |                              |
| 40                                     | 35   | 50   | 57.5 | 52.5 | 20.3       | 20          | 800             | 15.5                     | 17                                     | 6         | 5                          | 200       | 185   | MKP1848640094Y*                |                              |
| 45                                     | 45   | 45   | 57.5 | 52.5 | 20.3       | 20          | 900             | -                        | 16.5                                   | -         | 5                          | -         | 185   | MKP1848645094Y5                |                              |
| 50                                     | 45   | 45   | 57.5 | 52.5 | 20.3       | 20          | 1000            | -                        | 18.5                                   | -         | 4                          | -         | 185   | MKP1848650094Y5                |                              |
| 100                                    | 70   | 65   | 57.5 | 52.5 | 20.3       | 20          | 2000            | -                        | 26.5                                   | -         | 3.3                        | -         | 205   | MKP1848710094Y5 <sup>(6)</sup> |                              |
| 200                                    | 130  | 65   | 57.5 | 52.5 | 20.3       | 20          | 4000            | -                        | 48.5                                   | -         | 1.6                        | -         | 205   | MKP1848720094Y5 <sup>(7)</sup> |                              |
| 1100                                   | U <sub>OPDC</sub> AT 70 °C = 1350 V, U <sub>OPDC</sub> AT 105 °C = 800 V |  |      |      |            |             |                 |                          |  |           |                            |           |   |                                |                              |
|  | 1  | 11   | 21   | 32   | 27.5       | -           | 95              | 95                       | 3                                      | -         | 45.5                       | -         | 45  | -                              | MKP1848510914K2              |
|  | 2  | 15   | 25   | 32   | 27.5       | -           | 95              | 190                      | 4.5                                    | -         | 23                         | -         | 45  | -                              | MKP1848520914K2              |
|  | 3  | 18   | 28   | 32   | 27.5       | -           | 95              | 285                      | 6                                      | -         | 15.5                       | -         | 45  | -                              | MKP1848530914K2              |
|  | 4  | 21   | 31   | 32   | 27.5       | -           | 95              | 380                      | 8                                      | -         | 11.5                       | -         | 45  | -                              | MKP1848540914K2              |
|  | 5  | 20   | 35   | 32   | 27.5       | -           | 95              | 475                      | 9                                      | -         | 9.5                        | -         | 45  | -                              | MKP1848550914K2              |
|  | 5  | 18.5   | 35.5 | 43   | 37.5       | 10.2        | 45              | 225                      | 6.5                                    | 7         | 18                         | 16        | 90  | 80                             | MKP1848550914P*              |
|  | 6  | 18.5   | 35.5 | 43   | 37.5       | 10.2        | 45              | 270                      | 7                                      | 7.5       | 15                         | 13.5      | 90  | 80                             | MKP1848560914P*              |
|  | 7  | 21.5   | 38.5 | 43   | 37.5       | 10.2        | 45              | 315                      | 8                                      | 8.5       | 13                         | 11.5      | 90  | 80                             | MKP1848570914P*              |
|  | 8  | 21.5   | 38.5 | 43   | 37.5       | 10.2        | 45              | 360                      | 9                                      | 9.5       | 11                         | 10        | 90  | 80                             | MKP1848580914P*              |
|  | 9  | 24   | 44   | 42   | 37.5       | 10.2        | 45              | 405                      | 10                                     | 10.5      | 10                         | 9         | 90  | 80                             | MKP1848590914P*              |
|  | 10   | 24   | 44   | 42   | 37.5       | 10.2        | 45              | 450                      | 10.5                                   | 11        | 9                          | 8         | 90  | 80                             | MKP1848610914P*              |
|  | 12   | 30   | 45   | 42   | 37.5       | 10.2 / 20.3 | 45              | 540                      | 12.5                                   | 13.5      | 7.5                        | 6.5       | 90  | 80                             | MKP1848612914P*              |



| ELECTRICAL DATA AND ORDERING CODE      |  |  |      |      |            |            |                 |                          |  |           |                            |           |   |                                |                                |
|--|--|--|------|------|------------|------------|-----------------|--------------------------|--|-----------|----------------------------|-----------|---|--------------------------------|--------------------------------|
| U <sub>NDC</sub><br>AT<br>85 °C<br>(V) | CAP. <sup>(6)</sup><br>(μF)  | DIMENSION <sup>(5)</sup><br>(mm)   |      |      | P1<br>(mm) | P2<br>(mm) | dV/dt<br>(V/μs) | I <sub>PEAK</sub><br>(A) | I <sub>RMS</sub> <sup>(2)</sup><br>(A) |           | ESR <sup>(3)</sup><br>(mΩ) |           | tan δ<br>10 kHz<br>( $< 10^{-4}$ ) <sup>(4)</sup> |                                | ORDERING CODE <sup>(1)</sup>   |
|  |  | w  | h    | l    |            |            |                 |                          | 2<br>PINS                              | 4<br>PINS | 2<br>PINS                  | 4<br>PINS | 2<br>PINS   | 4<br>PINS                      |                                |
|  |  | U <sub>OPDC</sub> AT 70 °C = 1350 V, U <sub>OPDC</sub> AT 105 °C = 800 V |      |      |            |            |                 |                          |  |           |                            |           |   |                                |                                |
| 1100                                   | 10   | 25   | 45   | 57.5 | 52.5       | 10.2       | 23              | 230                      | 8                                      | 8.5       | 18                         | 16        | 175   | 155                            | MKP1848610914Y*                |
|  | 12   | 25   | 45   | 57.5 | 52.5       | 10.2       | 23              | 276                      | 8.5                                    | 9         | 15                         | 13        | 175   | 155                            | MKP1848612914Y*                |
|  | 15   | 25   | 45   | 57.5 | 52.5       | 10.2       | 23              | 345                      | 9.5                                    | 10.5      | 12                         | 10.5      | 175   | 155                            | MKP1848615914Y*                |
|  | 20   | 30   | 45   | 57.5 | 52.5       | 20.3       | 23              | 460                      | 11.5                                   | 12.5      | 9                          | 8         | 175   | 155                            | MKP1848620914Y*                |
|  | 22   | 35   | 50   | 57.5 | 52.5       | 20.3       | 23              | 506                      | 13.5                                   | 14.5      | 8                          | 7         | 175   | 155                            | MKP1848622914Y*                |
|  | 25   | 35   | 50   | 57.5 | 52.5       | 20.3       | 23              | 575                      | 14.5                                   | 15        | 7                          | 6.5       | 175   | 155                            | MKP1848625914Y*                |
|  | 30   | 45   | 45   | 57.5 | 52.5       | 20.3       | 23              | 690                      | -                                      | 16.5      | -                          | 5         | -   | 155                            | MKP1848630914Y5                |
|  | 60   | 70   | 65   | 57.5 | 52.5       | 20.3       | 23              | 1380                     | -                                      | 40        | -                          | 2.5       | -   | 180                            | MKP1848660914Y5 <sup>(6)</sup> |
|  | 70   | 70   | 65   | 57.5 | 52.5       | 20.3       | 23              | 1610                     | -                                      | 34.5      | -                          | 2         | -   | 180                            | MKP1848670914Y5 <sup>(6)</sup> |
|  | 120  | 130  | 65   | 57.5 | 52.5       | 20.3       | 23              | 2760                     | -                                      | 39.5      | -                          | 2.4       | -   | 180                            | MKP1848712914Y5 <sup>(7)</sup> |
| 140                                    | 130  | 65   | 57.5 | 52.5 | 20.3       | 23         | 3220            | -                        | 43.5                                   | -         | 2                          | -         | 180   | MKP1848714914Y5 <sup>(7)</sup> |                                |
| 1200                                   | U <sub>OPDC</sub> AT 70 °C = 1500 V, U <sub>OPDC</sub> AT 105 °C = 850 V |  |      |      |            |            |                 |                          |  |           |                            |           |   |                                |                                |
|  | 1  | 11   | 21   | 32   | 27.5       | -          | 100             | 100                      | 3                                      | -         | 43                         | -         | 40  | -                              | MKP1848510924K2                |
|  | 2  | 15   | 25   | 32   | 27.5       | -          | 100             | 200                      | 5                                      | -         | 21.5                       | -         | 40  | -                              | MKP1848520924K2                |
|  | 3  | 18   | 28   | 32   | 27.5       | -          | 100             | 300                      | 6.5                                    | -         | 14.5                       | -         | 40  | -                              | MKP1848530924K2                |
|  | 4  | 21   | 31   | 32   | 27.5       | -          | 100             | 400                      | 8                                      | -         | 11                         | -         | 40  | -                              | MKP1848540924K2                |
|  | 5  | 18.5   | 35.5 | 43   | 37.5       | 10.2       | 48              | 240                      | 6.5                                    | 7         | 17                         | 15        | 80  | 70                             | MKP1848550924P*                |
|  | 6  | 18.5   | 35.5 | 43   | 37.5       | 10.2       | 48              | 288                      | 7.5                                    | 8         | 14                         | 12.5      | 80  | 70                             | MKP1848560924P*                |
|  | 7  | 21.5   | 38.5 | 43   | 37.5       | 10.2       | 48              | 336                      | 8.5                                    | 9         | 12                         | 11        | 80  | 70                             | MKP1848570924P*                |
|  | 8  | 21.5   | 38.5 | 43   | 37.5       | 10.2       | 48              | 384                      | 9                                      | 9.5       | 10.5                       | 9.5       | 80  | 70                             | MKP1848580924P*                |
|  | 9  | 24   | 44   | 42   | 37.5       | 10.2       | 48              | 432                      | 10.5                                   | 11        | 9.5                        | 8.5       | 80  | 70                             | MKP1848590924P*                |
|  | 10   | 24   | 44   | 42   | 37.5       | 10.2       | 48              | 480                      | 11                                     | 11.5      | 8.5                        | 7.5       | 80  | 70                             | MKP1848610924P*                |
|  | 12   | 30   | 45   | 42   | 37.5       | 10.2/20.3  | 48              | 576                      | 13                                     | 13.5      | 7                          | 6.5       | 80  | 70                             | MKP1848612924P*                |
|  | 10   | 25   | 45   | 57.5 | 52.5       | 10.2       | 24              | 240                      | 8                                      | 8.5       | 17                         | 15        | 165   | 150                            | MKP1848610924Y*                |
|  | 12   | 25   | 45   | 57.5 | 52.5       | 10.2       | 24              | 288                      | 9                                      | 9.5       | 14                         | 12.5      | 165   | 150                            | MKP1848612924Y*                |
|  | 15   | 25   | 45   | 57.5 | 52.5       | 10.2       | 24              | 360                      | 10                                     | 10.5      | 11                         | 10        | 165   | 150                            | MKP1848615924Y*                |
|  | 20   | 35   | 50   | 57.5 | 52.5       | 20.3       | 24              | 480                      | 13                                     | 14        | 8.5                        | 7.5       | 165   | 150                            | MKP1848620924Y*                |
|  | 22   | 35   | 50   | 57.5 | 52.5       | 20.3       | 24              | 528                      | 14                                     | 14.5      | 7.5                        | 7         | 165   | 150                            | MKP1848622924Y*                |
|  | 25   | 35   | 50   | 57.5 | 52.5       | 20.3       | 24              | 600                      | 15                                     | 15.5      | 6.5                        | 6         | 165   | 150                            | MKP1848625924Y*                |
|  | 30   | 45   | 45   | 57.5 | 52.5       | 20.3       | 24              | 720                      | -                                      | 16.5      | -                          | 5         | -   | 150                            | MKP1848630924Y5                |
|  | 60   | 70   | 65   | 57.5 | 52.5       | 20.3       | 24              | 1440                     | -                                      | 23        | -                          | 4.5       | -   | 170                            | MKP1848660924Y5 <sup>(6)</sup> |
| 120                                    | 130  | 65   | 57.5 | 52.5 | 20.3       | 24         | 2280            | -                        | 40.5                                   | -         | 2.3                        | -         | 170   | MKP1848712924Y5 <sup>(7)</sup> |                                |

Notes

- (1) Change the \* symbol with special code for the terminals
- (2) Maximum RMS current at 10 kHz, +85 °C, Δt = +15 °C, capacitance tolerance ≤ ± 5 %
- (3) Equivalent series resistance typical values at f = 10 kHz to 100 kHz for P = 27.5 mm, at f = 10 kHz to 70 kHz for P = 37.5 mm, at f = 10 kHz to 50 kHz for P = 52.5 mm
- (4) Maximum tan δ values
- (5) Standard dimension
- (6) 6 pins
- (7) 12 pins
- (8) Intermediate capacitance values available on request



| PACKAGING INFORMATION               |   |                             |                                |                              |             |                             |
|-------------------------------------|---|-----------------------------|--------------------------------|------------------------------|-------------|-----------------------------|
| U <sub>NDC</sub><br>AT 85 °C<br>(V) | HEIGHT<br>(mm)  | CAP. <sup>(5)</sup><br>(µF) | Ø dt                           | ORDERING CODE <sup>(1)</sup> | MASS<br>(g) | SPQ <sup>(2)</sup><br>(pcs) |
| 450                                 | U <sub>OPDC</sub> AT 70 °C = 500 V, U <sub>OPDC</sub> AT 105 °C = 300 V |                             |                                |                              |             |                             |
|                                     | 19  | 1                           | 0.8                            | MKP1848510454K2              | 6           | 160                         |
|                                     | 19  | 2                           | 0.8                            | MKP1848520454K2              | 5.5         | 160                         |
|                                     | 21  | 3                           | 0.8                            | MKP1848530454K2              | 8.5         | 130                         |
|                                     | 21  | 4                           | 0.8                            | MKP1848540454K2              | 8.5         | 130                         |
|                                     | 23  | 5                           | 0.8                            | MKP1848550454K2              | 10.5        | 115                         |
|                                     | 25  | 6                           | 0.8                            | MKP1848560454K2              | 12.5        | 100                         |
|                                     | 25  | 7                           | 0.8                            | MKP1848570454K2              | 11.5        | 100                         |
|                                     | 28  | 8                           | 0.8                            | MKP1848580454K2              | 15          | 80                          |
|                                     | 28  | 9                           | 0.8                            | MKP1848590454K2              | 16          | 80                          |
|                                     | 28  | 10                          | 0.8                            | MKP1848610454K2              | 15          | 80                          |
|                                     | 31  | 12                          | 0.8                            | MKP1848612454K2              | 21.5        | 65                          |
|                                     | 35  | 15                          | 0.8                            | MKP1848615454K2              | 20          | 70                          |
|                                     | 35.5  | 10                          | 1.0                            | MKP1848610454P*              | 34          | 105                         |
|                                     | 35.5  | 12                          | 1.0                            | MKP1848612454P*              | 32          | 105                         |
|                                     | 35.5  | 15                          | 1.0                            | MKP1848615454P*              | 30          | 105                         |
|                                     | 38.5  | 20                          | 1.0                            | MKP1848620454P*              | 36          | 91                          |
|                                     | 38.5  | 22                          | 1.0                            | MKP1848622454P*              | 38          | 91                          |
|                                     | 38.5  | 25                          | 1.0                            | MKP1848625454P*              | 36          | 91                          |
|                                     | 44  | 30                          | 1.0                            | MKP1848630454P*              | 48          | 77                          |
|                                     | 45  | 35                          | 1.0                            | MKP1848635454P*              | 57          | 63                          |
|                                     | 45  | 40                          | 1.0                            | MKP1848640454P*              | 60          | 63                          |
|                                     | 45  | 40                          | 1.2                            | MKP1848640454Y*              | 66          | 55                          |
|                                     | 45  | 45                          | 1.2                            | MKP1848645454Y*              | 70          | 55                          |
|                                     | 45  | 50                          | 1.2                            | MKP1848650454Y*              | 88          | 45                          |
|                                     | 45  | 55                          | 1.2                            | MKP1848655454Y*              | 96          | 45                          |
|                                     | 45  | 60                          | 1.2                            | MKP1848660454Y*              | 91          | 45                          |
|                                     | 50  | 65                          | 1.2                            | MKP1848665454Y*              | 100         | 40                          |
|                                     | 50  | 70                          | 1.2                            | MKP1848670454Y*              | 112         | 40                          |
|                                     | 50  | 75                          | 1.2                            | MKP1848675454Y*              | 108         | 40                          |
| 50                                  | 80  | 1.2                         | MKP1848680454Y*                | 102                          | 40          |                             |
| 45                                  | 90  | 1.2                         | MKP1848690454Y5                | 127                          | 30          |                             |
| 45                                  | 95  | 1.2                         | MKP1848695454Y5                | 124                          | 30          |                             |
| 45                                  | 100   | 1.2                         | MKP1848710454Y5                | 120                          | 30          |                             |
| 65                                  | 200   | 1.2                         | MKP1848720454Y5 <sup>(3)</sup> | 266                          | 20          |                             |
| 65                                  | 400   | 1.2                         | MKP1848740454Y5 <sup>(4)</sup> | 490                          | 10          |                             |
| 700                                 | U <sub>OPDC</sub> AT 70 °C = 800 V, U <sub>OPDC</sub> AT 105 °C = 500 V |                             |                                |                              |             |                             |
|                                     | 19  | 1                           | 0.8                            | MKP1848510704K2              | 6           | 160                         |
|                                     | 19  | 2                           | 0.8                            | MKP1848520704K2              | 5.5         | 160                         |
|                                     | 21  | 3                           | 0.8                            | MKP1848530704K2              | 8.5         | 130                         |
|                                     | 23  | 4                           | 0.8                            | MKP1848540704K2              | 10.5        | 115                         |
|                                     | 25  | 5                           | 0.8                            | MKP1848550704K2              | 12          | 100                         |
|                                     | 28  | 6                           | 0.8                            | MKP1848560704K2              | 17          | 80                          |
|                                     | 28  | 7                           | 0.8                            | MKP1848570704K2              | 16          | 80                          |





| PACKAGING INFORMATION               |  |                             |                                |                              |             |                             |
|-------------------------------------|--|-----------------------------|--------------------------------|------------------------------|-------------|-----------------------------|
| U <sub>NDC</sub><br>AT 85 °C<br>(V) | HEIGHT<br>(mm)   | CAP. <sup>(5)</sup><br>(µF) | Ø dt                           | ORDERING CODE <sup>(1)</sup> | MASS<br>(g) | SPQ <sup>(2)</sup><br>(pcs) |
| 700                                 | <b>U<sub>OPDC</sub> AT 70 °C = 800 V, U<sub>OPDC</sub> AT 105 °C = 500 V</b> |                             |                                |                              |             |                             |
|                                     | 28   | 8                           | 0.8                            | MKP1848580704K2              | 15          | 80                          |
|                                     | 31   | 9                           | 0.8                            | MKP1848590704K2              | 22          | 65                          |
|                                     | 31   | 10                          | 0.8                            | MKP1848610704K2              | 21          | 65                          |
|                                     | 35   | 12                          | 0.8                            | MKP1848612704K2              | 20          | 70                          |
|                                     | 35.5   | 10                          | 1.0                            | MKP1848610704P*              | 34          | 105                         |
|                                     | 35.5   | 12                          | 1.0                            | MKP1848612704P*              | 32          | 105                         |
|                                     | 35.5   | 15                          | 1.0                            | MKP1848615704P*              | 30          | 105                         |
|                                     | 38.5   | 20                          | 1.0                            | MKP1848620704P*              | 36          | 91                          |
|                                     | 44   | 22                          | 1.0                            | MKP1848622704P*              | 49          | 77                          |
|                                     | 44   | 25                          | 1.0                            | MKP1848625704P*              | 47          | 77                          |
|                                     | 45   | 30                          | 1.0                            | MKP1848630704P*              | 62          | 63                          |
|                                     | 45   | 35                          | 1.0                            | MKP1848635704P*              | 55          | 63                          |
|                                     | 45   | 30                          | 1.2                            | MKP1848630704Y*              | 76          | 55                          |
|                                     | 45   | 35                          | 1.2                            | MKP1848635704Y*              | 71          | 55                          |
|                                     | 45   | 40                          | 1.2                            | MKP1848640704Y*              | 66          | 55                          |
|                                     | 45   | 45                          | 1.2                            | MKP1848645704Y*              | 95          | 45                          |
|                                     | 45   | 50                          | 1.2                            | MKP1848650704Y*              | 88          | 45                          |
|                                     | 50   | 55                          | 1.2                            | MKP1848655704Y*              | 112         | 40                          |
|                                     | 50   | 60                          | 1.2                            | MKP1848660704Y*              | 107         | 40                          |
|                                     | 50   | 65                          | 1.2                            | MKP1848665704Y*              | 100         | 40                          |
| 45                                  | 70   | 1.2                         | MKP1848670704Y5                | 128                          | 30          |                             |
| 45                                  | 75   | 1.2                         | MKP1848675704Y5                | 123                          | 30          |                             |
| 45                                  | 80   | 1.2                         | MKP1848680704Y5                | 119                          | 30          |                             |
| 65                                  | 160  | 1.2                         | MKP1848716704Y5 <sup>(3)</sup> | 264                          | 20          |                             |
| 65                                  | 320  | 1.2                         | MKP1848732704Y5 <sup>(4)</sup> | 359                          | 10          |                             |
| 800                                 | <b>U<sub>OPDC</sub> AT 70 °C = 900 V, U<sub>OPDC</sub> AT 105 °C = 570 V</b> |                             |                                |                              |             |                             |
|                                     | 19   | 1                           | 0.8                            | MKP1848510084K2              | 6.5         | 160                         |
|                                     | 21   | 2                           | 0.8                            | MKP1848520084K2              | 9           | 130                         |
|                                     | 23   | 3                           | 0.8                            | MKP1848530084K2              | 11          | 115                         |
|                                     | 25   | 4                           | 0.8                            | MKP1848540084K2              | 12          | 100                         |
|                                     | 28   | 5                           | 0.8                            | MKP1848550084K2              | 17          | 80                          |
|                                     | 28   | 6                           | 0.8                            | MKP1848560084K2              | 16          | 80                          |
|                                     | 31   | 7                           | 0.8                            | MKP1848570084K2              | 23          | 65                          |
|                                     | 31   | 8                           | 0.8                            | MKP1848580084K2              | 21          | 65                          |
|                                     | 35   | 9                           | 0.8                            | MKP1848590084K2              | 21          | 70                          |
|                                     | 35.5   | 10                          | 1.0                            | MKP1848610084P*              | 32          | 105                         |
|                                     | 35.5   | 12                          | 1.0                            | MKP1848612084P*              | 30          | 105                         |
|                                     | 38.5   | 15                          | 1.0                            | MKP1848615084P*              | 37          | 91                          |
|                                     | 44   | 20                          | 1.0                            | MKP1848620084P*              | 47          | 77                          |
|                                     | 45   | 22                          | 1.0                            | MKP1848622084P*              | 65          | 63                          |
|                                     | 45   | 25                          | 1.0                            | MKP1848625084P*              | 61          | 63                          |
|                                     | 45   | 30                          | 1.2                            | MKP1848630084Y*              | 69          | 55                          |
|                                     | 45   | 35                          | 1.2                            | MKP1848635084Y*              | 97          | 45                          |



| PACKAGING INFORMATION               |   |                             |                                |                                |             |                             |
|-------------------------------------|---|-----------------------------|--------------------------------|--------------------------------|-------------|-----------------------------|
| U <sub>NDC</sub><br>AT 85 °C<br>(V) | HEIGHT<br>(mm)  | CAP. <sup>(5)</sup><br>(µF) | Ø dt                           | ORDERING CODE <sup>(1)</sup>   | MASS<br>(g) | SPQ <sup>(2)</sup><br>(pcs) |
| 800                                 | <b>U<sub>OPDC</sub> AT 70 °C = 900 V, U<sub>OPDC</sub> AT 105 °C = 570 V</b>  |                             |                                |                                |             |                             |
|                                     | 45  | 40                          | 1.2                            | MKP1848640084Y*                | 91          | 45                          |
|                                     | 50  | 45                          | 1.2                            | MKP1848645084Y*                | 112         | 40                          |
|                                     | 50  | 50                          | 1.2                            | MKP1848650084Y*                | 104         | 40                          |
|                                     | 45  | 55                          | 1.2                            | MKP1848655084Y5                | 131         | 30                          |
|                                     | 45  | 60                          | 1.2                            | MKP1848660084Y5                | 125         | 30                          |
|                                     | 65  | 120                         | 1.2                            | MKP1848712084Y5 <sup>(3)</sup> | 276         | 20                          |
| 65                                  | 240   | 1.2                         | MKP1848724084Y5 <sup>(4)</sup> | 393                            | 10          |                             |
| 900                                 | <b>U<sub>OPDC</sub> AT 70 °C = 1100 V, U<sub>OPDC</sub> AT 105 °C = 650 V</b> |                             |                                |                                |             |                             |
|                                     | 19  | 1                           | 0.8                            | MKP1848510094K2                | 6           | 160                         |
|                                     | 23  | 2                           | 0.8                            | MKP1848520094K2                | 11          | 115                         |
|                                     | 25  | 3                           | 0.8                            | MKP1848530094K2                | 12          | 100                         |
|                                     | 28  | 4                           | 0.8                            | MKP1848540094K2                | 16.5        | 80                          |
|                                     | 31  | 5                           | 0.8                            | MKP1848550094K2                | 22.5        | 65                          |
|                                     | 31  | 6                           | 0.8                            | MKP1848560094K2                | 21          | 65                          |
|                                     | 35  | 7                           | 0.8                            | MKP1848570094K2                | 21          | 70                          |
|                                     | 35.5  | 5                           | 1.0                            | MKP1848550094P*                | 32          | 105                         |
|                                     | 35.5  | 6                           | 1.0                            | MKP1848560094P*                | 30          | 105                         |
|                                     | 35.5  | 7                           | 1.0                            | MKP1848570094P*                | 33          | 105                         |
|                                     | 35.5  | 8                           | 1.0                            | MKP1848580094P*                | 31          | 105                         |
|                                     | 35.5  | 9                           | 1.0                            | MKP1848590094P*                | 30          | 105                         |
|                                     | 38.5  | 10                          | 1.0                            | MKP1848610094P*                | 39          | 91                          |
|                                     | 38.5  | 12                          | 1.0                            | MKP1848612094P*                | 36          | 91                          |
|                                     | 44  | 15                          | 1.0                            | MKP1848615094P*                | 47          | 77                          |
|                                     | 44  | 16                          | 1.0                            | MKP1848616094P*                | 45          | 77                          |
|                                     | 45  | 20                          | 1.0                            | MKP1848620094P*                | 57          | 63                          |
|                                     | 45  | 15                          | 1.2                            | MKP1848615094Y*                | 70          | 55                          |
|                                     | 45  | 20                          | 1.2                            | MKP1848620094Y*                | 73          | 55                          |
|                                     | 45  | 22                          | 1.2                            | MKP1848622094Y*                | 70          | 55                          |
|                                     | 45  | 25                          | 1.2                            | MKP1848625094Y*                | 98          | 45                          |
|                                     | 45  | 30                          | 1.2                            | MKP1848630094Y*                | 89          | 45                          |
|                                     | 50  | 35                          | 1.2                            | MKP1848635094Y*                | 109         | 40                          |
| 50                                  | 40  | 1.2                         | MKP1848640094Y*                | 99                             | 40          |                             |
| 45                                  | 45  | 1.2                         | MKP1848645094Y5                | 124                            | 30          |                             |
| 45                                  | 50  | 1.2                         | MKP1848650094Y5                | 117                            | 30          |                             |
| 65                                  | 100   | 1.2                         | MKP1848710094Y5 <sup>(3)</sup> | 259                            | 20          |                             |
| 65                                  | 200   | 1.2                         | MKP1848720094Y5 <sup>(4)</sup> | 608                            | 10          |                             |
| 1100                                | <b>U<sub>OPDC</sub> AT 70 °C = 1350 V, U<sub>OPDC</sub> AT 105 °C = 800 V</b> |                             |                                |                                |             |                             |
|                                     | 21  | 1                           | 0.8                            | MKP1848510914K2                | 9           | 130                         |
|                                     | 25  | 2                           | 0.8                            | MKP1848520914K2                | 12          | 100                         |
|                                     | 28  | 3                           | 0.8                            | MKP1848530914K2                | 16          | 80                          |
|                                     | 31  | 4                           | 0.8                            | MKP1848540914K2                | 21.5        | 65                          |
|                                     | 35.5  | 5                           | 1.0                            | MKP1848550914P*                | 33          | 105                         |



| PACKAGING INFORMATION               |   |                             |                                |                                |             |                             |
|-------------------------------------|---|-----------------------------|--------------------------------|--------------------------------|-------------|-----------------------------|
| U <sub>NDC</sub><br>AT 85 °C<br>(V) | HEIGHT<br>(mm)  | CAP. <sup>(5)</sup><br>(µF) | Ø dt                           | ORDERING CODE <sup>(1)</sup>   | MASS<br>(g) | SPQ <sup>(2)</sup><br>(pcs) |
| 1100                                | <b>U<sub>OPDC</sub> AT 70 °C = 1350 V, U<sub>OPDC</sub> AT 105 °C = 800 V</b> |                             |                                |                                |             |                             |
|                                     | 35.5  | 6                           | 1.0                            | MKP1848560914P*                | 30          | 105                         |
|                                     | 38.5  | 7                           | 1.0                            | MKP1848570914P*                | 39          | 91                          |
|                                     | 38.5  | 8                           | 1.0                            | MKP1848580914P*                | 37          | 91                          |
|                                     | 44  | 9                           | 1.0                            | MKP1848590914P*                | 50          | 77                          |
|                                     | 44  | 10                          | 1.0                            | MKP1848610914P*                | 48          | 77                          |
|                                     | 45  | 12                          | 1.0                            | MKP1848612914P*                | 63          | 63                          |
|                                     | 45  | 10                          | 1.2                            | MKP1848610914Y*                | 81          | 55                          |
|                                     | 45  | 12                          | 1.2                            | MKP1848612914Y*                | 77          | 55                          |
|                                     | 45  | 15                          | 1.2                            | MKP1848615914Y*                | 70          | 55                          |
|                                     | 45  | 20                          | 1.2                            | MKP1848620914Y*                | 91          | 45                          |
|                                     | 50  | 22                          | 1.2                            | MKP1848622914Y*                | 115         | 40                          |
|                                     | 50  | 25                          | 1.2                            | MKP1848625914Y*                | 108         | 40                          |
|                                     | 45  | 30                          | 1.2                            | MKP1848630914Y5                | 126         | 30                          |
|                                     | 65  | 60                          | 1.2                            | MKP1848660914Y5 <sup>(3)</sup> | 256         | 20                          |
|                                     | 65  | 70                          | 1.2                            | MKP1848670914Y5 <sup>(3)</sup> | 257         | 20                          |
| 65                                  | 120   | 1.2                         | MKP1848712914Y5 <sup>(4)</sup> | 606                            | 10          |                             |
| 65                                  | 140   | 1.2                         | MKP1848714914Y5 <sup>(4)</sup> | 608                            | 10          |                             |
| 1200                                | <b>U<sub>OPDC</sub> AT 70 °C = 1500 V, U<sub>OPDC</sub> AT 105 °C = 850 V</b> |                             |                                |                                |             |                             |
|                                     | 21  | 1                           | 0.8                            | MKP1848510924K2                | 9           | 130                         |
|                                     | 25  | 2                           | 0.8                            | MKP1848520924K2                | 11.5        | 100                         |
|                                     | 28  | 3                           | 0.8                            | MKP1848530924K2                | 15          | 80                          |
|                                     | 31  | 4                           | 0.8                            | MKP1848540924K2                | 20          | 65                          |
|                                     | 35.5  | 5                           | 1.0                            | MKP1848550924P*                | 31          | 105                         |
|                                     | 35.5  | 6                           | 1.0                            | MKP1848560924P*                | 29          | 105                         |
|                                     | 38.5  | 7                           | 1.0                            | MKP1848570924P*                | 37          | 91                          |
|                                     | 38.5  | 8                           | 1.0                            | MKP1848580924P*                | 35          | 91                          |
|                                     | 44  | 9                           | 1.0                            | MKP1848590924P*                | 48          | 77                          |
|                                     | 44  | 10                          | 1.0                            | MKP1848610924P*                | 45          | 77                          |
|                                     | 45  | 12                          | 1.0                            | MKP1848612924P*                | 60          | 63                          |
|                                     | 45  | 10                          | 1.2                            | MKP1848610924Y*                | 79          | 55                          |
|                                     | 45  | 12                          | 1.2                            | MKP1848612924Y*                | 74          | 55                          |
|                                     | 45  | 15                          | 1.2                            | MKP1848615924Y*                | 67          | 55                          |
|                                     | 50  | 20                          | 1.2                            | MKP1848620924Y*                | 115         | 40                          |
|                                     | 50  | 22                          | 1.2                            | MKP1848622924Y*                | 109         | 40                          |
|                                     | 50  | 25                          | 1.2                            | MKP1848625924Y*                | 100         | 40                          |
|                                     | 45  | 30                          | 1.2                            | MKP1848630924Y5                | 119         | 30                          |
|                                     | 65  | 60                          | 1.2                            | MKP1848660924Y5 <sup>(3)</sup> | 264         | 20                          |
| 65                                  | 120   | 1.2                         | MKP1848712924Y5 <sup>(4)</sup> | 612                            | 10          |                             |

**Notes**

- (1) Change the \* symbol with special code for the terminals
- (2) SPQ = Standard Packing Quantity
- (3) 6 pins
- (4) 12 pins
- (5) Intermediate capacitance values available on request

**CONSTRUCTION DESCRIPTION**

Low inductive wound cell elements of metallized polypropylene film, potted with resin in a flame retardant case.

**Specific Method of Mounting to Withstand Vibration and Shock**

The capacitor unit is designed for mounting on a printed circuit board.

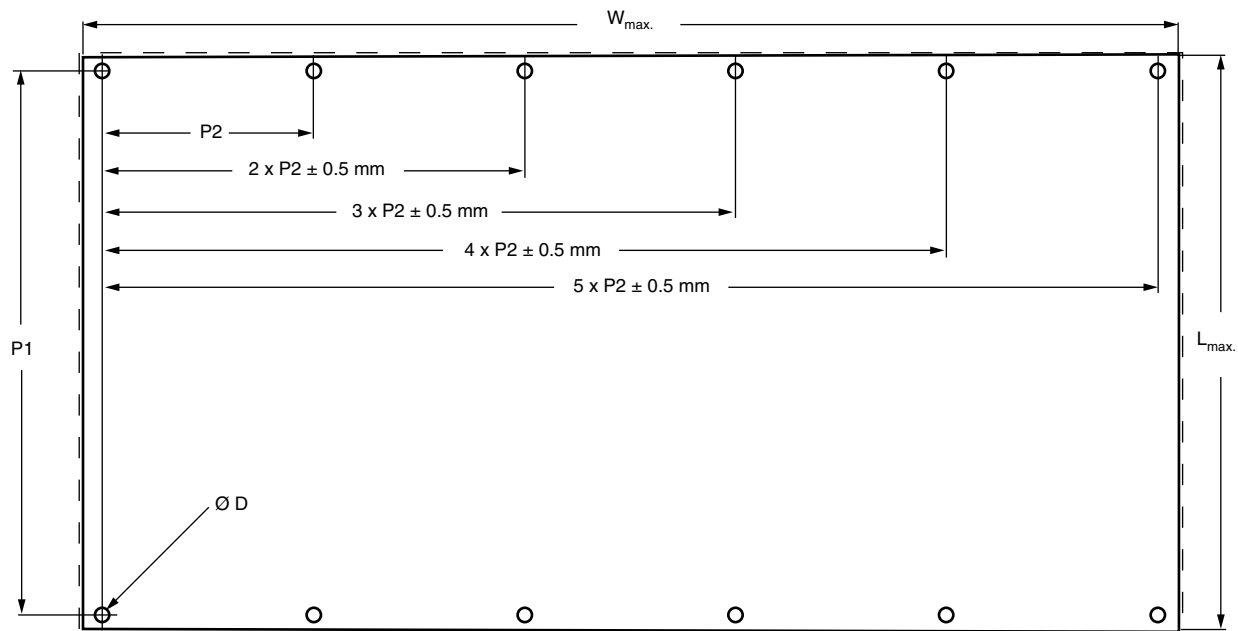
In order to withstand vibration and shock tests, it must be insured that the stand-off pips are in good contact with the printed circuit board.

The capacitors shall be mechanically fixed by the leads and the body clamped.

**Space Requirements on Printed-Circuit Board**

The maximum length and width of film capacitors is shown in the figure:

- Product height with seating plane as given by "IEC 60717" as reference:



| P1 (mm) | L <sub>max.</sub> (mm) | W <sub>max.</sub> (mm) | Ø D (mm) | H (mm)  |
|---------|------------------------|------------------------|----------|---------|
| 27.5    | l + 1.6                | w + 2.0                | 1.2      | h + 0.2 |
| 37.5    | l + 2.0                | w + 3.0                | 1.5      | h + 0.5 |
| 52.5    | l + 2.4                | w + 4.0                | 1.7      | h + 0.5 |

**SOLDERING CONDITIONS**

For general soldering conditions and wave soldering profile, we refer to the application note:

"Soldering Guidelines for Film Capacitors": [www.vishay.com/doc?28171](http://www.vishay.com/doc?28171)

**Storage Temperature**

T<sub>stg</sub> = -25 °C to +35 °C with RH maximum 75 % without condensation.

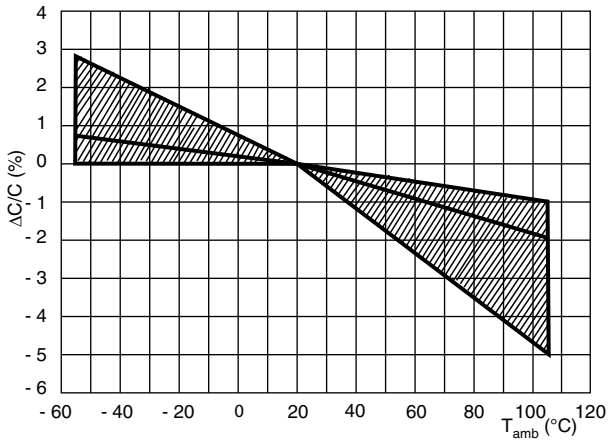
**Ratings and Characteristics Reference Conditions**

Unless otherwise specified, all electrical values apply to an ambient temperature of 23 °C ± 1 °C, an atmospheric pressure of 86 kPa to 106 kPa and a relative humidity of 50 % ± 2 %.

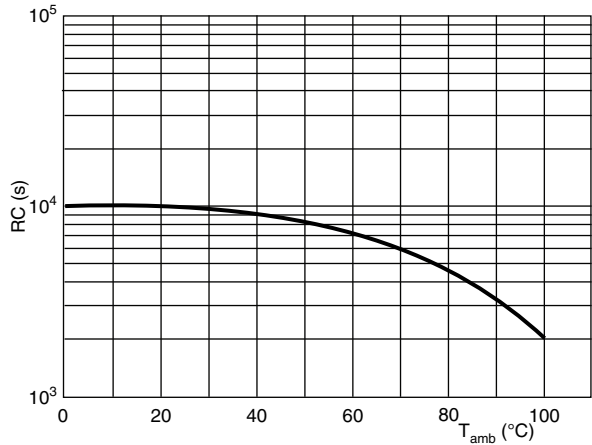
For reference testing, a conditioning period shall be applied over 96 h ± 4 h by heating the products in a circulating air oven at the rated temperature and a relative humidity not exceeding 20 %.



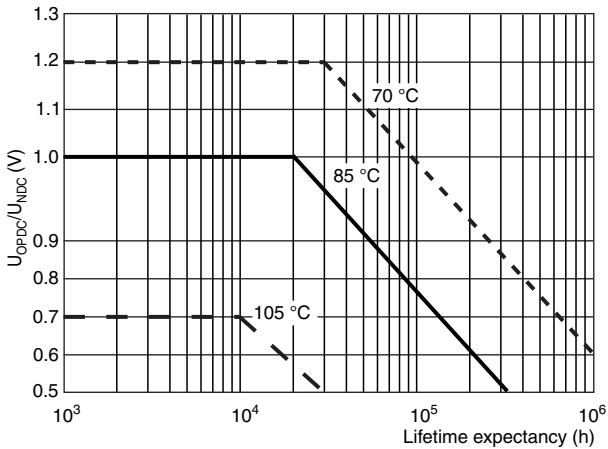
## CHARACTERISTICS



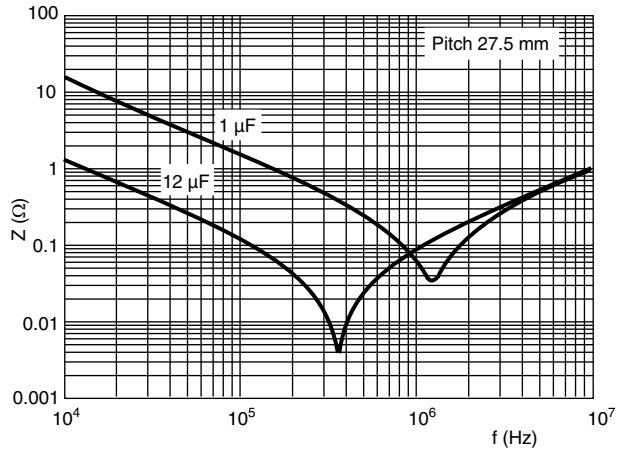
Capacitance (typical curve)



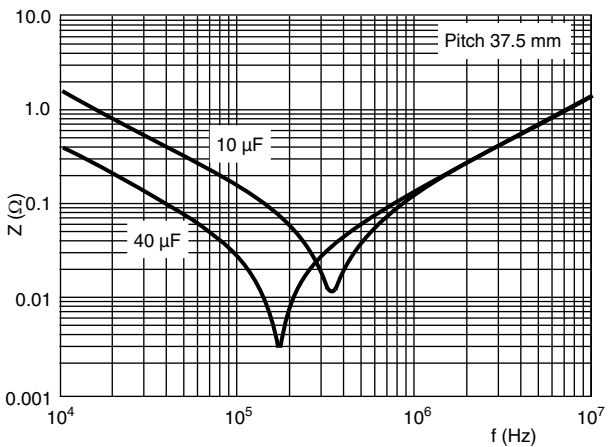
Insulation resistance (typical curve)



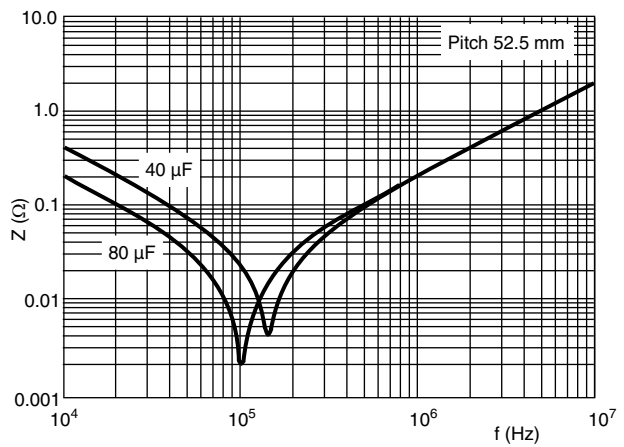
Lifetime expectancy (typical curve)



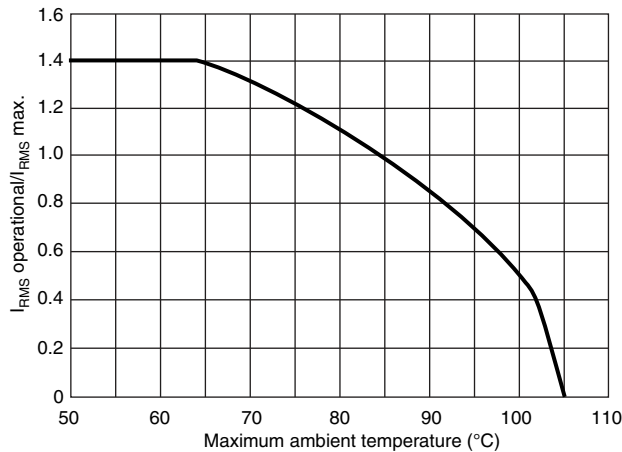
Impedance vs. frequency (typical curve)



Impedance vs. frequency (typical curve)



Impedance vs. frequency (typical curve)



Maximum IRMS current in function of the ambient temperature

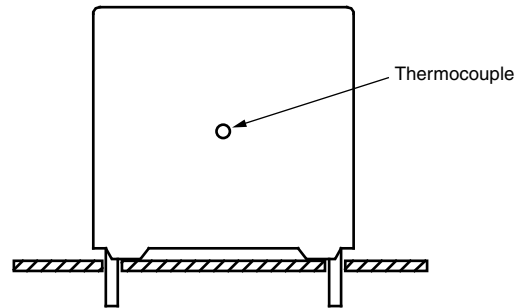
| HEAT CONDUCTIVITY |      |      |                           |
|-------------------|------|------|---------------------------|
| DIMENSIONS (mm)   |      |      | HEAT CONDUCTIVITY (mW/°C) |
| w                 | h    | l    |                           |
| 9.0               | 19.0 | 32.0 | 24                        |
| 11.0              | 21.0 | 32.0 | 28                        |
| 13.0              | 23.0 | 32.0 | 32                        |
| 15.0              | 25.0 | 32.0 | 36                        |
| 18.0              | 28.0 | 32.0 | 44                        |
| 21.0              | 31.0 | 32.0 | 51                        |
| 21.0              | 35.0 | 32.0 | 56                        |
| 18.5              | 35.5 | 43.0 | 54                        |
| 21.5              | 38.5 | 43.0 | 61                        |
| 24.0              | 44.0 | 42.0 | 70                        |
| 30.0              | 45.0 | 42.0 | 81                        |
| 25.0              | 45.0 | 57.5 | 77                        |
| 30.0              | 45.0 | 57.5 | 85                        |
| 35.0              | 50.0 | 57.5 | 100                       |
| 45.0              | 45.0 | 57.5 | 94                        |
| 70.0              | 65.0 | 57.5 | 152                       |
| 130.0             | 65.0 | 57.5 | 243                       |

**POWER DISSIPATION AND MAXIMUM COMPONENT TEMPERATURE RISE**

The power dissipation must be limited in order not to exceed the maximum allowed component temperature rise as a function of the free air ambient temperature.

The component temperature rise ( $\Delta T$ ) can be measured or calculated by  $\Delta T = P/G$ :

- $\Delta T = T_C - T_{amb} =$  case temperature rise (°C) with a maximum of 15 °C at rated temperature.
- $P = I_{RMS}^2 \times ESR =$  power dissipation of the component (mW)
- $G =$  heat conductivity of the component (mW/°C)

**MEASURING THE COMPONENT TEMPERATURE**


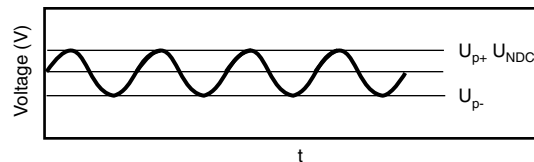
The case temperature is measured in unloaded ( $T_{amb}$ ) and maximum loaded condition ( $T_C$ ). To avoid thermal radiation or convection, the capacitor must be tested in a closed area from air circulation.

**APPLICATION NOTE AND LIMITING CONDITIONS**

These capacitors are not suitable for mains applications as across-the-line capacitors without additional protection. These mains applications are strictly regulated in safety standards and therefore electromagnetic interference suppression capacitors conforming the standards must be used.

To select the capacitor for a certain application, the following conditions must be checked:

- The continuous peak voltage ( $U_{P+}$ ) shall not exceed the rated DC voltage rating ( $U_{NDC}$ )
- The peak-to-peak ripple voltage ( $U_{PP}$ ) shall not be greater than  $0.2 \times (U_{NDC})$

**Non reversing recurrent waveform**


- For capacitors connected in parallel, normally the proof voltage and possibly the rated voltage must be reduced. For information depending of the capacitance value and the number of parallel connections contact: [dc-film@vishay.com](mailto:dc-film@vishay.com)
- The voltage peak slope ( $dU/dt$ ) shall not exceed the pulse slope at the DC voltage rating. If the pulse voltage is lower than the rated DC voltage, the rated voltage pulse slope may be multiplied by  $U_{NDC}$  and divided by the applied voltage.

For all other pulses following equation must be fulfilled:

$$2 \times \int_0^T \left( \frac{dU}{dt} \right)^2 \times dt < U_{NDC} \times \left( \frac{dU}{dt} \right)_{\text{rated}}$$

T is the pulse duration

**Maximum Repetitive Peak Voltages**

The capacitor unit may be subjected to the following surge without any significant reduction of lifetime expectancy

| REPETITIVE SURGE VOLTAGE | MAXIMUM DURATION PER DAY |
|--------------------------|--------------------------|
| $1.1 \times U_{NDC}$     | 30 % on load duration    |
| $1.15 \times U_{NDC}$    | 30 min                   |
| $1.2 \times U_{NDC}$     | 5 min                    |
| $1.3 \times U_{NDC}$     | 1 min                    |
| $1.5 \times U_{NDC}$     | 110 ms                   |



INSPECTION REQUIREMENTS

General Notes

Sub-clause numbers of tests and performance requirements refer to the "Sectional Specification, Publication IEC 61071".

| SUB-CLAUSE NUMBER AND TEST                           | CONDITIONS  | PERFORMANCE REQUIREMENTS   |
|--|---|--|
| <b>ROUTINE TEST-FINAL INSPECTION</b>                 |   |  |
| 5.14.2.1 External inspection, visual examination     |   | Legible marking as specified   |
| 5.14.2.2 Dimensions                                  |   | See specification drawing  |
| 5.3.1 Capacitance                                    | 1 kHz at room temperature   | See specific reference data  |
| 5.3.2 tan δ  | 1 kHz at room temperature<br>10 kHz at room temperature   | See specific reference data  |
| 5.5.1.2 Voltage test between terminal                | 1.5 x U <sub>NDC</sub> at T <sub>amb</sub><br>Duration 10 s   | No visible damage or puncture<br>No flashover  |
| 5.7 Insulation resistance                            | U <sub>NDC</sub> ≤ 500 V measuring voltage 100 V at room temperature<br><br>U <sub>NDC</sub> > 500 V measuring voltage 500 V at room temperature<br>Duration 1 min  | See specific reference data  |
| <b>TYPE TESTS</b>                                    |   |  |
| 5.14.2 External inspection                           | Check for finish, marking and overall dimensions  | Legible marking and finish as specified<br>Dimensions: see specific drawing          |
| 5.14.0 Initial measurements                          | Capacitance at 1 kHz<br>tan δ at 10 kHz   |  |
| 5.14.1.1.4 Robustness of terminations IEC 60068-2-21 | Tensile U <sub>a1</sub><br>Wire diameter section load<br>≤ 0.8 mm ≤ 0.5 mm <sup>2</sup> 10 N<br>≤ 1.25 mm ≤ 1.2 mm <sup>2</sup> 20 N<br>Duration 10 s ± 1 s<br><br>Bending U <sub>b</sub> method 1<br>Wire diameter section load<br>≤ 0.8 mm ≤ 0.05 mm <sup>3</sup> 10 N<br>≤ 1.25 mm ≤ 0.019 mm <sup>3</sup> 20 N<br>4 x 90 °,<br>Duration 2 s to 3 s/bend |  |
| 5.14.1.6 Resistance to soldering heat IEC 60068-2-20 | No predrying, method 1A<br>Solder bath: 260 °C<br>Duration 10 s ± 1 s   |  |
| 5.14.4 Final measurements                            | Capacitance<br>tan δ  | ΔC/C  ≤ 0.5 %<br>Increase of tan δ ≤ 0.0050<br>Compared to values measured in 5.14.0 |
| 5.14.0 Initial measurements                          | Capacitance at 1 kHz<br>tan δ at 10 kHz   |  |





| SUB-CLAUSE NUMBER AND TEST                | CONDITIONS  | PERFORMANCE REQUIREMENTS   |
|---|---|--|
| <b>TYPE TESTS</b>                         |   |  |
| 5.14.3.1 Vibration<br>IEC 60068-2-6       | 10 Hz to 55 Hz: amplitude $\pm 0.35$ mm or<br>acceleration $98 \text{ m/s}^2$<br><br>Test duration: 10 frequency cycles, 3 axes<br>offset from each other by $90^\circ$<br>1 octave/min<br>Visual examination   | No visible damages   |
| 5.14.3.2 Shock or impact<br>IEC 60068-2-6 | Pulse shape: half sine<br>Acceleration: $490 \text{ m/s}^2$<br>Duration t of pulse: 11 ms<br>Visual examination   | No visible damage  |
| 5.14.4 Final measurements                 | Capacitance<br>$\tan \delta$  | $ \Delta C/C  \leq 0.5 \%$<br>Increase of $\tan \delta \leq 0.0050$<br>Compared to values measured in 5.14.0                                     |
| 5.5.3.1 Initial measurements              | Capacitance at 1 kHz<br>$\tan \delta$ at 10 kHz<br>R insulation   |  |
| 5.5.3.2 Voltage test between terminal     | $1.5 \times U_{\text{NDC}}$ at $T_{\text{amb}}$<br>Duration 60 s  |  |
| 5.5.3.3 Final measurements                | Capacitance<br>$\tan \delta$<br>R insulation  | $ \Delta C/C  \leq 0.5 \%$<br>Increase of $\tan \delta \leq 1.2$ initial $\tan \delta + 0.0001$<br>R insulation $\geq 50 \%$ of specified values |
| 5.9.1 Initial measurements                | Capacitance at 1 kHz<br>$\tan \delta$ at 10 kHz   |  |
| 5.9.2 Surge discharge test                | $1.1 \times U_{\text{NDC}}$<br>Number of discharges: 5<br>Time lapse: every 2 min (10 min total)  |  |
| 5.9.3 Voltage test between terminal       | Within 5 min after the surge discharge test<br>Duration 60 s<br>$1.5 \times U_{\text{NDC}}$ at $T_{\text{amb}}$   |  |
| 5.9.3 Final measurements                  | Capacitance<br>$\tan \delta$ at 10 kHz  | $ \Delta C/C  \leq 1.0 \%$<br>$\tan \delta \leq 1.2$ initial $\tan \delta + 0.0001$<br>Compared to values measured in 5.9.1                      |
| 5.11.1 Initial measurements               | Capacitance at 1 kHz<br>$\tan \delta$ at 10 kHz   |  |
| 5.11.2 Self healing test                  | $1.5 \times U_{\text{NDC}}$<br>Duration 10 s<br>Number of clearings $\leq 5$<br>Clearing = voltage drop of 5 %<br>increase the voltage at $100 \text{ V/s}$ till 5 clearings<br>occur<br>with a max. of $2.5 \times U_{\text{NDC}}$<br>for a duration of 10 s |  |
| 5.11.3 Final measurements                 | Capacitance<br>$\tan \delta$  | $ \Delta C/C  \leq 0.5 \%$<br>$\tan \delta \leq 1.2 \times$ initial $\tan \delta + 0.0001$<br>Compared to values measured in 5.11.1              |



| SUB-CLAUSe NUMBER AND TEST                                 | CONDITIONS   | PERFORMANCE REQUIREMENTS  |
|--|--|---|
| <b>TYPE TESTS</b>  |  |   |
| 5.13.0 Initial measurements                                | Capacitance at 1 kHz<br>tan $\delta$ at 10 kHz   |   |
| 5.13.1 Change of temperature<br>acc. to IEC 60068-2-14     | Test Nb<br>$T_{max.} = 85\text{ }^{\circ}\text{C}$<br>$T_{min.} = -40\text{ }^{\circ}\text{C}$<br>Transition time: 1 h, equivalent to $1\text{ }^{\circ}\text{C}/\text{min}$   |   |
| 5.13.2 Damp heat steady state<br>acc. to IEC 60068-2-78    | Test Ca<br>$T_{max.} = 40\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$<br>RH = 93 % $\pm$ 3 %<br>Duration 56 days  |   |
| 5.5.3.2 Voltage test between terminal                      | $1.5 \times U_{NDC}$ at ambient temperature<br>Duration 60 s   |   |
| 5.13.3 Final measurements                                  | Visual examination<br><br>Capacitance<br>tan $\delta$ at $1 U_{RMS}$ 10 kHz  | No puncturing or flashover<br>Self healing punctures are permitted<br><br>$ \Delta C/C  \leq 2.0\text{ }%$<br>Increase of tan $\delta \leq 0.0150$<br>Compared to values measured in 5.13.0 |
| 5.10.0 Initial measurements                                | Capacitance at 1 kHz<br>tan $\delta$ at 10 kHz   |   |
| 5.10.1 Thermal stability test under<br>overload conditions | Natural cooling $T_{amb} \pm 5\text{ }^{\circ}\text{C}$<br>$1.21 \times P_{max.} = (U_2/2) \times W_2 \times C \times \tan \delta =$<br>$121 \times (I_{max.}^2/W_2 \times c) \times \tan \delta_2$ with<br>$W_2 = 2 \times p \times f_2$ for $I_{max.}$<br>(see specific reference data)<br>$f_2 = 10\text{ kHz}$<br>Duration 48 h  |   |
| 5.10.2 Final measurements                                  | Measure the temperature every 1.5 h during<br>the last 6 h<br>Capacitance<br>tan $\delta$ at 10 kHz  | Temperature rise $< 1\text{ }^{\circ}\text{C}$<br>$ \Delta C/C  \leq 2\text{ }%$<br>Increase of tan $\delta \leq 1.2 \times \text{initial } \delta + 0.0150$                                |
| 5.12 Resonance frequency measurement                       | Impedance analyzer at $T_{amb}$  | $< 0.9$ times the value as specified in typical<br>curve "Resonant frequency" of this<br>specification  |
| 5.10.0 Initial measurements                                | Capacitance at 1 kHz<br>tan $\delta$ at 10 kHz   |   |
| 5.15.1 Endurance test between terminals                    | Sequence<br>$1.4 \times U_{NDC}$ at $T_{max.} = 85\text{ }^{\circ}\text{C}$<br>$1.4 \times U_{OPDC}$ at $105\text{ }^{\circ}\text{C}$<br>Duration 250 h<br>1000 x discharge at $1.4 \times I$ (maximum<br>repetitive peak current in continuous<br>operation)<br>$1.4 \times U_{NDC}$ at $T_{max.} = 85\text{ }^{\circ}\text{C}$<br>$1.4 \times U_{OPDC}$ at $105\text{ }^{\circ}\text{C}$<br>Duration 250 h |   |
| 5.15.2 Final measurements                                  | Capacitance<br>tan $\delta$  | $ \Delta C/C  \leq 3\text{ }%$<br>Increase of tan $\delta \leq 0.0150$<br>Compared to values measured in 5.15.0   |



| SUB-CLAUSE NUMBER AND TEST                                 | CONDITIONS  | PERFORMANCE REQUIREMENTS   |
|--|---|--|
| <b>TYPE TESTS</b>  |   |  |
| 5.16.3.0 Initial measurements                              | Capacitance at 1 kHz<br>at $T_{max.} = 85\text{ }^{\circ}\text{C}$  |  |
| 5.16.3.1 Destruction test sequence<br>High DC voltage test | Product enveloped with cheese cloth<br>$3 \times U_{NDC}$ or DC voltage<br>Until repetitive product healings occur<br>Duration = 15 min | Audible healings or check healings with<br>oscilloscope            |
| High AC voltage test                                       | $AC_{RMS}$ voltage = $U_{NDC} \times 2 \sqrt{2}$<br>with minimum of 250 $V_{AC}$<br>Duration = 5 min<br>Repeat destruction sequence 3 x |  |
| 5.16.3.2 Final measurements                                | Visual examination  | No puncturing or flashover<br>Self healing punctures are permitted |



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