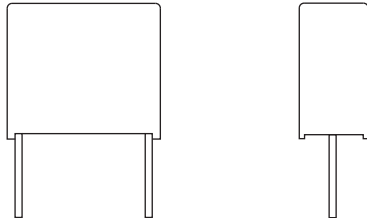


## AC and Pulse Double Metallized Polypropylene Film Capacitors MMKP Radial Potted Type



## FEATURES

- 7.5 mm to 37.5 mm lead pitch
- Material categorization:  
for definitions of compliance please see [www.vishay.com/doc?999912](http://www.vishay.com/doc?999912)



**RoHS**  
COMPLIANT

**HALOGEN  
FREE**

**GREEN**  
**(5-2008)**

## APPLICATIONS

- High voltage, high current and high pulse operations **GREEN (5-2008)**
- Protection circuits in SMPS's, snubber and electronic ballast circuits

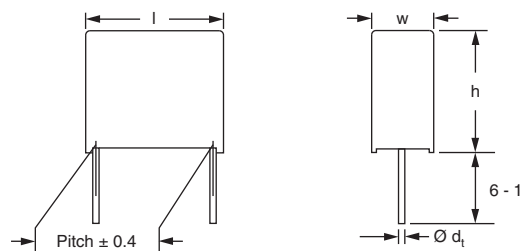
## QUICK REFERENCE DATA

|                                           |                                                                                                                                                         |
|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Rated DC voltage                          | 250 V <sub>DC</sub> ; 400 V <sub>DC</sub> ; 630 V <sub>DC</sub> ; 1000 V <sub>DC</sub> ; 1600 V <sub>DC</sub> ; 2000 V <sub>DC</sub>                    |
| Rated AC voltage                          | 160 V <sub>AC</sub> ; 220 V <sub>AC</sub> ; 250 V <sub>AC</sub> ; 400 V <sub>AC</sub> ; 600 V <sub>AC</sub> ; 650 V <sub>AC</sub> ; 700 V <sub>AC</sub> |
| Capacitance range                         | 470 pF to 6.8 µF                                                                                                                                        |
| Capacitance tolerance                     | ± 5 %                                                                                                                                                   |
| Climatic testing class acc. to EN 60068-1 | 55/100/56                                                                                                                                               |
| Maximum application temperature           | 100 °C                                                                                                                                                  |
| Reference standards                       | IEC 60384-16                                                                                                                                            |
| Dielectric                                | Polypropylene film                                                                                                                                      |
| Electrodes                                | Metallized                                                                                                                                              |
| Construction                              | Internal series construction                                                                                                                            |
| Encapsulation                             | Plastic case, epoxy resin sealed, flame retardant, UL-class 94 V-0                                                                                      |
| Leads                                     | Tinned wire                                                                                                                                             |
| Marking                                   | C-value; tolerance; rated voltage; manufacturer's type; code for dielectric material; manufacturer location; manufacturer's logo; year and week         |

### Note

- For more detailed data and test requirements, contact [dc-film@vishay.com](mailto:dc-film@vishay.com)

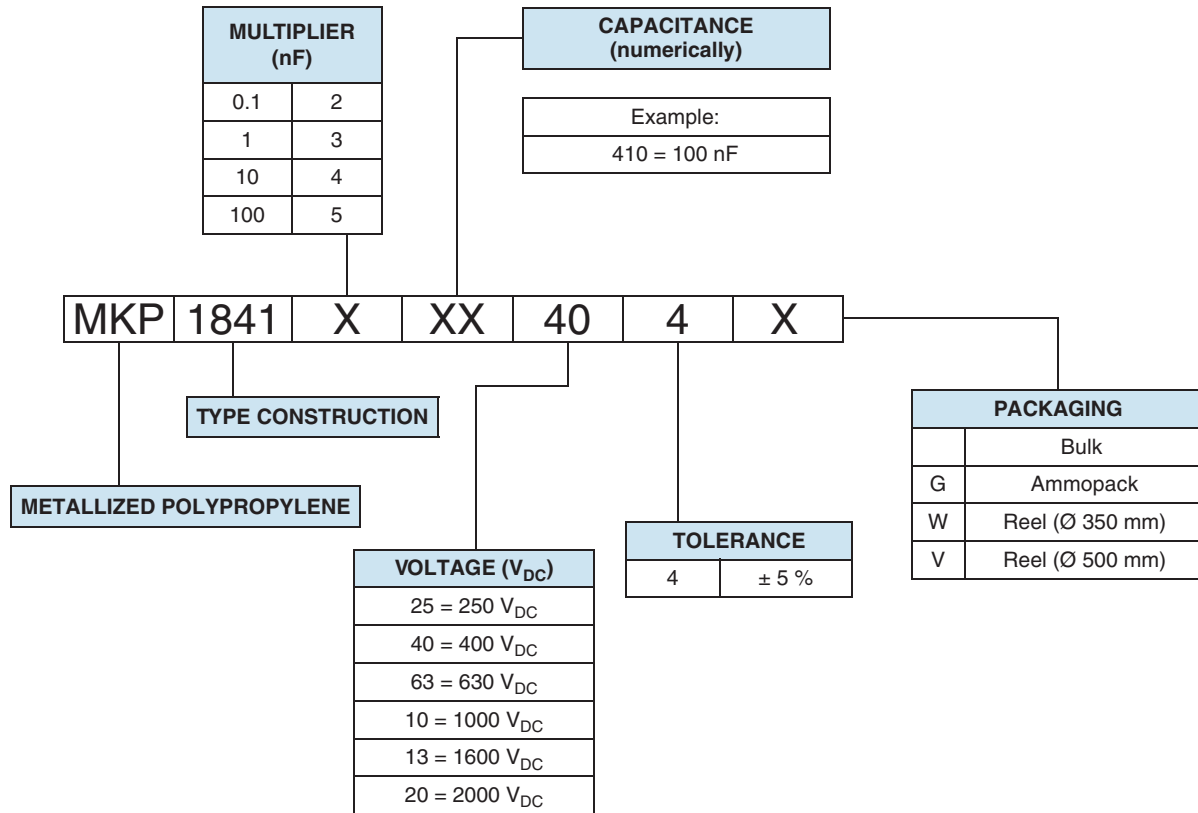
**DIMENSIONS** in millimeters



| PITCH        | w      | Ø d <sub>t</sub> |
|--------------|--------|------------------|
| 7.5          | -      | 0.5 ± 0.05       |
| 10           | -      | 0.6 ± 0.06       |
| 15           | ≤ 6    | 0.6 ± 0.06       |
| 15           | > 6    | 0.8 ± 0.08       |
| 22.5 to 27.5 | -      | 0.8 ± 0.08       |
| 37.5         | < 16.0 | 0.8 ± 0.08       |
| 37.5         | ≥ 16.0 | 1.0 ± 0.1        |



**COMPOSITION OF CATALOG NUMBER**



**Note**

- For detailed tape specifications refer to "Packaging Information" [www.vishay.com/doc?28139](http://www.vishay.com/doc?28139) or end of catalog

| SPECIFIC REFERENCE DATA                                                                 |                                                     |                     |                     |                     |                        |                                |                         |
|-----------------------------------------------------------------------------------------|-----------------------------------------------------|---------------------|---------------------|---------------------|------------------------|--------------------------------|-------------------------|
| DESCRIPTION                                                                             |                                                     |                     |                     |                     | VALUE                  |                                |                         |
| Tangent of loss angle:<br>C ≤ 0.1 µF<br>0.1 µF < C ≤ 1.0 µF<br>C > 1.0 µF               |                                                     |                     |                     |                     | at 1 kHz               | at 10 kHz                      | at 100 kHz              |
|                                                                                         |                                                     |                     |                     |                     | ≤ 5 x 10 <sup>-4</sup> | ≤ 10 x 10 <sup>-4</sup>        | ≤ 15 x 10 <sup>-4</sup> |
|                                                                                         |                                                     |                     |                     |                     | ≤ 5 x 10 <sup>-4</sup> | ≤ 10 x 10 <sup>-4</sup>        | -                       |
|                                                                                         |                                                     |                     |                     |                     | ≤ 5 x 10 <sup>-4</sup> | -                              | -                       |
| PITCH (mm)                                                                              | MAXIMUM PULSE RISE TIME (dU/dt) <sub>R</sub> [V/µs] |                     |                     |                     |                        |                                |                         |
|                                                                                         | 160 V <sub>DC</sub>                                 | 250 V <sub>DC</sub> | 400 V <sub>DC</sub> | 630 V <sub>DC</sub> | 1000 V <sub>DC</sub>   | 1600 V <sub>DC</sub>           | 2000 V <sub>DC</sub>    |
| 7.5                                                                                     | 1800                                                | 2200                | 3600                | 4500                | -                      | -                              | -                       |
| 10                                                                                      | 820                                                 | 1140                | 1840                | 2280                | -                      | -                              | -                       |
| 15                                                                                      | 410                                                 | 560                 | 910                 | 3430                | 6600                   | 11 100                         | 20 300                  |
| 22.5                                                                                    | 260                                                 | 320                 | 520                 | 2120                | 2800                   | 3800                           | 6200                    |
| 27.5                                                                                    | 202                                                 | 240                 | 400                 | 1524                | 2000                   | 2680                           | 4200                    |
| 37.5                                                                                    | 140                                                 | 170                 | 280                 | 980                 | 1280                   | 1690                           | 2600                    |
| R between leads, for C ≤ 0.33 µF at 100 V; 1 min                                        |                                                     |                     |                     |                     |                        | > 100 000 MΩ                   |                         |
| R between leads and case: 100 V; 1 min                                                  |                                                     |                     |                     |                     |                        | > 30 000 MΩ                    |                         |
| Withstanding (DC) voltage between leads and case                                        |                                                     |                     |                     |                     |                        | 2840 V; 1 min                  |                         |
| Withstanding (DC) voltage (cut off current 10 mA) <sup>(1)</sup> ; rise time ≤ 1000 V/s |                                                     |                     |                     |                     |                        | 1.6 x U <sub>RDC</sub> ; 1 min |                         |
| Maximum application temperature                                                         |                                                     |                     |                     |                     |                        | 100 °C                         |                         |

**Note**

- <sup>(1)</sup> See "Voltage Proof Test for Metalized Film Capacitors": [www.vishay.com/doc?28169](http://www.vishay.com/doc?28169)



| <b>ELECTRICAL DATA</b>               |                            |                                   |                               |                       |                                         |            |
|--------------------------------------|----------------------------|-----------------------------------|-------------------------------|-----------------------|-----------------------------------------|------------|
| <b>U<sub>RDC</sub></b><br><b>(V)</b> | <b>CAP.</b><br><b>(μF)</b> | <b>CAPACITANCE</b><br><b>CODE</b> | <b>VOLTAGE</b><br><b>CODE</b> | <b>V<sub>AC</sub></b> | <b>DIMENSIONS</b><br><b>(w x h x l)</b> | <b>PCM</b> |
| 160                                  | 0.010                      | 310                               | 16                            | 100                   | 4.5 x 9.5 x 10.0                        | 7.5        |
|                                      | 0.015                      | 315                               |                               |                       | 4.5 x 9.5 x 10.0                        | 7.5        |
|                                      | 0.022                      | 322                               |                               |                       | 4.0 x 10.0 x 12.5                       | 10         |
|                                      | 0.033                      | 333                               |                               |                       | 4.0 x 10.0 x 12.5                       | 10         |
|                                      | 0.047                      | 347                               |                               |                       | 5.0 x 11.0 x 12.5                       | 10         |
|                                      | 0.068                      | 368                               |                               |                       | 6.0 x 12.0 x 12.5                       | 10         |
|                                      | 0.10                       | 410                               |                               |                       | 5.0 x 11.0 x 17.5                       | 15         |
|                                      | 0.15                       | 415                               |                               |                       | 6.0 x 12.0 x 17.5                       | 15         |
|                                      | 0.22                       | 422                               |                               |                       | 7.0 x 13.5 x 17.5                       | 15         |
|                                      | 0.33                       | 433                               |                               |                       | 8.5 x 15.0 x 17.5                       | 15         |
|                                      | 0.47                       | 447                               |                               |                       | 8.5 x 18.0 x 26.0                       | 22.5       |
|                                      | 0.68                       | 468                               |                               |                       | 10.0 x 19.5 x 26.0                      | 22.5       |
|                                      | 1.0                        | 510                               |                               |                       | 12.0 x 22.0 x 26.0                      | 22.5       |
|                                      | 1.5                        | 515                               |                               |                       | 13.0 x 23.0 x 31.5                      | 27.5       |
|                                      | 2.2                        | 522                               |                               |                       | 18.0 x 28.0 x 31.5                      | 27.5       |
|                                      | 3.3                        | 533                               |                               |                       | 21.0 x 31.0 x 31.0                      | 27.5       |
|                                      | 4.7                        | 547                               |                               |                       | 30.0 x 45.0 x 42.0                      | 37.5       |
| 250                                  | 0.0068                     | 268                               | 25                            | 160                   | 4.0 x 9.0 x 10.0                        | 7.5        |
|                                      | 0.010                      | 310                               |                               |                       | 4.5 x 9.5 x 10.0                        | 7.5        |
|                                      | 0.015                      | 315                               |                               |                       | 4.5 x 9.5 x 10.0                        | 7.5        |
|                                      | 0.022                      | 322                               |                               |                       | 4.0 x 10.0 x 12.5                       | 10         |
|                                      | 0.033                      | 333                               |                               |                       | 4.0 x 10.0 x 12.5                       | 10         |
|                                      | 0.047                      | 347                               |                               |                       | 5.0 x 11.0 x 12.5                       | 10         |
|                                      | 0.068                      | 368                               |                               |                       | 5.0 x 11.0 x 17.5                       | 15         |
|                                      | 0.10                       | 410                               |                               |                       | 5.0 x 11.0 x 17.5                       | 15         |
|                                      | 0.15                       | 415                               |                               |                       | 6.0 x 12.0 x 17.5                       | 15         |
|                                      | 0.22                       | 422                               |                               |                       | 8.5 x 15.0 x 17.5                       | 15         |
|                                      | 0.33                       | 433                               |                               |                       | 7.0 x 16.5 x 26.0                       | 22.5       |
|                                      | 0.47                       | 447                               |                               |                       | 8.5 x 18.0 x 26.0                       | 22.5       |
|                                      | 0.68                       | 468                               |                               |                       | 10.0 x 19.5 x 26.0                      | 22.5       |
|                                      | 1.0                        | 510                               |                               |                       | 11.0 x 21.0 x 31.0                      | 27.5       |
|                                      | 1.5                        | 515                               |                               |                       | 13.0 x 23.0 x 31.0                      | 27.5       |
|                                      | 2.2                        | 522                               |                               |                       | 18.0 x 28.0 x 31.5                      | 27.5       |
|                                      | 3.3                        | 533                               |                               |                       | 21.0 x 31.0 x 31.0                      | 27.5       |
|                                      | 4.7                        | 547                               |                               |                       | 30.0 x 45.0 x 42.0                      | 37.5       |
| 400                                  | 0.0047                     | 247                               | 40                            | 220                   | 4.5 x 9.5 x 10.0                        | 7.5        |
|                                      | 0.0068                     | 268                               |                               |                       | 5.0 x 10.5 x 10.0                       | 7.5        |
|                                      | 0.010                      | 310                               |                               |                       | 4.0 x 10.0 x 12.5                       | 10         |
|                                      | 0.015                      | 315                               |                               |                       | 4.0 x 10.0 x 12.5                       | 10         |
|                                      | 0.022                      | 322                               |                               |                       | 4.0 x 10.0 x 12.5                       | 10         |
|                                      | 0.033                      | 333                               |                               |                       | 5.0 x 11.0 x 17.5                       | 15         |
|                                      | 0.047                      | 347                               |                               |                       | 5.0 x 11.0 x 17.5                       | 15         |
|                                      | 0.068                      | 368                               |                               |                       | 6.0 x 12.0 x 17.5                       | 15         |
|                                      | 0.10                       | 410                               |                               |                       | 7.0 x 13.5 x 17.5                       | 15         |
|                                      | 0.15                       | 415                               |                               |                       | 7.0 x 16.5 x 26.0                       | 22.5       |
|                                      | 0.22                       | 422                               |                               |                       | 8.5 x 18.0 x 26.0                       | 22.5       |
|                                      | 0.33                       | 433                               |                               |                       | 12.0 x 22.0 x 26.0                      | 22.5       |
|                                      | 0.47                       | 447                               |                               |                       | 13.0 x 23.0 x 31.0                      | 27.5       |
|                                      | 0.68                       | 468                               |                               |                       | 15.0 x 25.0 x 31.5                      | 27.5       |
|                                      | 1.0                        | 510                               |                               |                       | 14.5 x 24.5 x 41.5                      | 37.5       |
|                                      | 1.5                        | 515                               |                               |                       | 16.0 x 28.5 x 41.5                      | 37.5       |
|                                      | 2.2                        | 522                               |                               |                       | 18.5 x 35.5 x 43.0                      | 37.5       |



| ELECTRICAL DATA  |                    |                     |                 |          |                           |      |
|------------------|--------------------|---------------------|-----------------|----------|---------------------------|------|
| $U_{RDC}$<br>(V) | CAP.<br>( $\mu$ F) | CAPACITANCE<br>CODE | VOLTAGE<br>CODE | $V_{AC}$ | DIMENSIONS<br>(w x h x l) | PCM  |
| 630              | 0.00047            | 147                 | 63              | 250      | 3.0 x 8.5 x 10.0          | 7.5  |
|                  | 0.00068            | 168                 |                 |          | 3.0 x 8.5 x 10.0          | 7.5  |
|                  | 0.0010             | 210                 |                 |          | 3.0 x 8.5 x 10.0          | 7.5  |
|                  | 0.0015             | 215                 |                 |          | 3.0 x 8.5 x 10.0          | 7.5  |
|                  | 0.0022             | 222                 |                 |          | 3.0 x 8.5 x 10.0          | 7.5  |
|                  | 0.0033             | 233                 |                 |          | 4.0 x 9.0 x 10.0          | 7.5  |
| 630              | 0.0047             | 247                 | 63              | 400      | 5.0 x 11.0 x 17.5         | 15   |
|                  | 0.0068             | 268                 |                 |          | 5.0 x 11.0 x 17.5         | 15   |
|                  | 0.010              | 310                 |                 |          | 5.0 x 11.0 x 17.5         | 15   |
|                  | 0.015              | 315                 |                 |          | 5.0 x 11.0 x 17.5         | 15   |
|                  | 0.022              | 322                 |                 |          | 6.0 x 12.0 x 17.5         | 15   |
|                  | 0.033              | 333                 |                 |          | 6.0 x 15.5 x 26.0         | 22.5 |
|                  | 0.047              | 347                 |                 |          | 6.0 x 15.5 x 26.0         | 22.5 |
|                  | 0.068              | 368                 |                 |          | 7.0 x 16.5 x 26.0         | 22.5 |
|                  | 0.10               | 410                 |                 |          | 9.0 x 19.0 x 31.0         | 27.5 |
|                  | 0.15               | 415                 |                 |          | 11.0 x 21.0 x 31.0        | 27.5 |
|                  | 0.22               | 422                 |                 |          | 12.5 x 22.5 x 41.5        | 37.5 |
|                  | 0.33               | 433                 |                 |          | 14.5 x 24.5 x 41.5        | 37.5 |
|                  | 0.47               | 447                 |                 |          | 14.5 x 24.5 x 41.5        | 37.5 |
|                  | 0.68               | 468                 |                 |          | 16.0 x 28.5 x 41.5        | 37.5 |
| 1000             | 0.0022             | 222                 | 10              | 600      | 5.0 x 11.0 x 17.5         | 15   |
|                  | 0.0033             | 233                 |                 |          | 5.0 x 11.0 x 17.5         | 15   |
|                  | 0.0047             | 247                 |                 |          | 6.0 x 12.0 x 17.5         | 15   |
|                  | 0.0068             | 268                 |                 |          | 7.0 x 13.5 x 17.5         | 15   |
|                  | 0.010              | 310                 |                 |          | 6.0 x 15.5 x 26.0         | 22.5 |
|                  | 0.015              | 315                 |                 |          | 7.0 x 16.5 x 26.0         | 22.5 |
|                  | 0.022              | 322                 |                 |          | 8.5 x 18.0 x 26.0         | 22.5 |
|                  | 0.033              | 333                 |                 |          | 10.0 x 19.5 x 26.0        | 22.5 |
|                  | 0.047              | 347                 |                 |          | 11.0 x 21.0 x 31.0        | 27.5 |
|                  | 0.068              | 368                 |                 |          | 13.0 x 23.0 x 31.0        | 27.5 |
|                  | 0.10               | 410                 |                 |          | 15.0 x 25.0 x 31.5        | 27.5 |
|                  | 0.15               | 415                 |                 |          | 12.5 x 22.5 x 41.5        | 37.5 |
|                  | 0.22               | 422                 |                 |          | 12.5 x 22.5 x 41.5        | 37.5 |
|                  | 0.33               | 433                 |                 |          | 14.5 x 24.5 x 41.5        | 37.5 |
|                  | 0.47               | 447                 |                 |          | 16.0 x 28.5 x 41.5        | 37.5 |



| ELECTRICAL DATA  |                    |                     |                 |          |                           |      |
|------------------|--------------------|---------------------|-----------------|----------|---------------------------|------|
| $U_{RDC}$<br>(V) | CAP.<br>( $\mu$ F) | CAPACITANCE<br>CODE | VOLTAGE<br>CODE | $V_{AC}$ | DIMENSIONS<br>(w x h x l) | PCM  |
| 1600             | 0.0010             | 210                 | 13              | 650      | 5.0 x 11.0 x 17.5         | 15   |
|                  | 0.0015             | 215                 |                 |          | 5.0 x 11.0 x 17.5         | 15   |
|                  | 0.0022             | 222                 |                 |          | 5.0 x 11.0 x 17.5         | 15   |
|                  | 0.0033             | 233                 |                 |          | 6.0 x 15.5 x 26.0         | 22.5 |
|                  | 0.0047             | 247                 |                 |          | 6.0 x 15.5 x 26.0         | 22.5 |
|                  | 0.0068             | 268                 |                 |          | 6.0 x 15.5 x 26.0         | 22.5 |
|                  | 0.010              | 310                 |                 |          | 6.0 x 15.5 x 26.0         | 22.5 |
|                  | 0.015              | 315                 |                 |          | 7.0 x 16.5 x 26.0         | 22.5 |
|                  | 0.022              | 322                 |                 |          | 8.5 x 18.0 x 26.0         | 22.5 |
|                  | 0.033              | 333                 |                 |          | 9.0 x 19.0 x 31.0         | 27.5 |
|                  | 0.047              | 347                 |                 |          | 11.0 x 21.0 x 31.0        | 27.5 |
|                  | 0.068              | 368                 |                 |          | 12.5 x 22.5 x 41.5        | 37.5 |
|                  | 0.10               | 410                 |                 |          | 12.5 x 22.5 x 41.5        | 37.5 |
|                  | 0.15               | 415                 |                 |          | 16.0 x 28.5 x 41.5        | 37.5 |
|                  | 0.22               | 422                 |                 |          | 18.0 x 32.5 x 41.5        | 37.5 |
| 2000             | 0.00047            | 147                 | 20              | 700      | 5.0 x 11.0 x 17.5         | 15   |
|                  | 0.00068            | 168                 |                 |          | 5.0 x 11.0 x 17.5         | 15   |
|                  | 0.0010             | 210                 |                 |          | 6.0 x 15.5 x 26.0         | 22.5 |
|                  | 0.0015             | 215                 |                 |          | 6.0 x 15.5 x 26.0         | 22.5 |
|                  | 0.0022             | 222                 |                 |          | 6.0 x 15.5 x 26.0         | 22.5 |
|                  | 0.0033             | 233                 |                 |          | 6.0 x 15.5 x 26.0         | 22.5 |
|                  | 0.0047             | 247                 |                 |          | 6.0 x 15.5 x 26.0         | 22.5 |
|                  | 0.0068             | 268                 |                 |          | 7.0 x 16.5 x 26.0         | 22.5 |
|                  | 0.010              | 310                 |                 |          | 8.5 x 18.0 x 26.0         | 22.5 |
|                  | 0.015              | 315                 |                 |          | 9.0 x 19.0 x 31.0         | 27.5 |
|                  | 0.022              | 322                 |                 |          | 11.0 x 21.0 x 31.0        | 27.5 |
|                  | 0.033              | 333                 |                 |          | 11.0 x 21.0 x 31.0        | 27.5 |
|                  | 0.047              | 347                 |                 |          | 12.5 x 22.5 x 41.5        | 37.5 |
|                  | 0.068              | 368                 |                 |          | 12.5 x 22.5 x 41.5        | 37.5 |
|                  | 0.10               | 410                 |                 |          | 14.5 x 24.5 x 41.5        | 37.5 |

| RECOMMENDED PACKAGING |                      |                    |                          |                           |           |                     |             |
|-----------------------|----------------------|--------------------|--------------------------|---------------------------|-----------|---------------------|-------------|
| LETTER<br>CODE        | TYPE OF<br>PACKAGING | HEIGHT (H)<br>(mm) | REEL<br>DIAMETER<br>(mm) | ORDERING CODE<br>EXAMPLES | PCM<br>15 | PCM<br>22.5 TO 27.5 | PCM<br>37.5 |
| G                     | Ammo                 | 18.5               | S <sup>(1)</sup>         | MKP1841315635G            | X         | -                   | -           |
| W                     | Reel                 | 18.5               | 350                      | MKP1841315635W            | X         | -                   | -           |
| V                     | Reel                 | 18.5               | 500                      | MKP1841410105V            | X         | X                   | -           |
| G                     | Ammo                 | 18.5               | L <sup>(2)</sup>         | MKP1841410105G            | -         | X                   | -           |
| -                     | Bulk                 | -                  | -                        | MKP1841447105             | X         | X                   | X           |

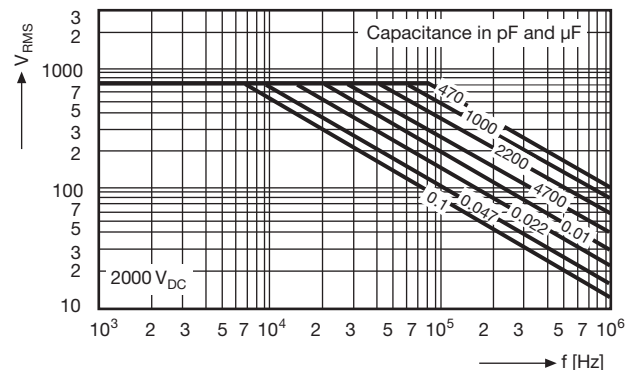
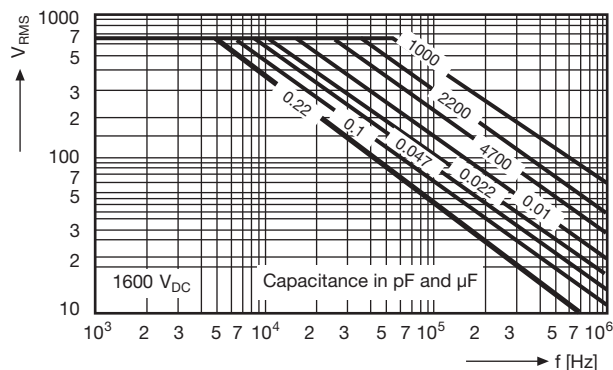
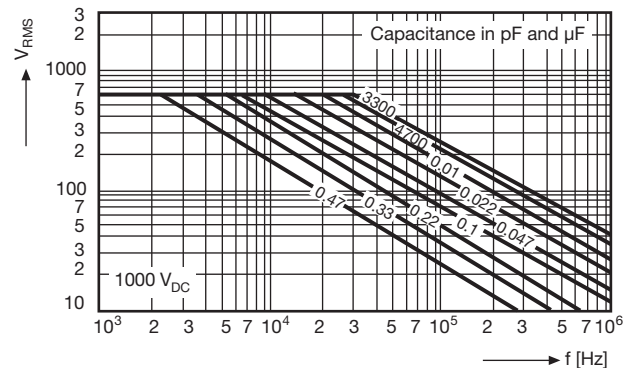
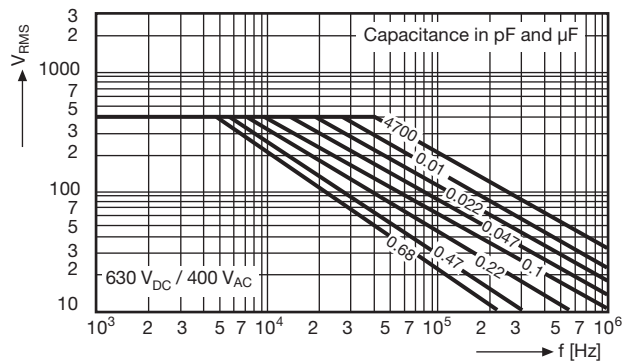
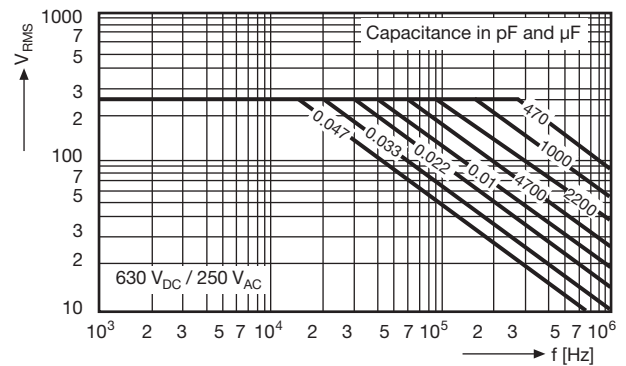
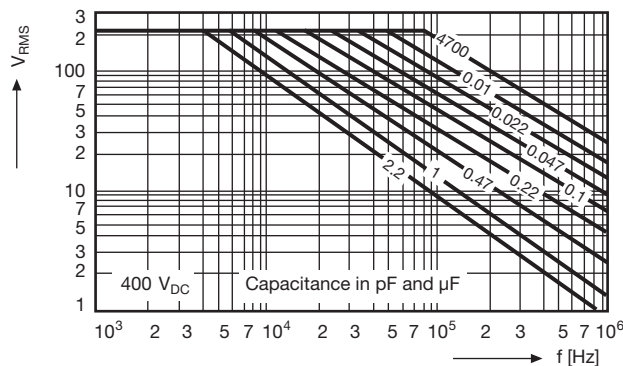
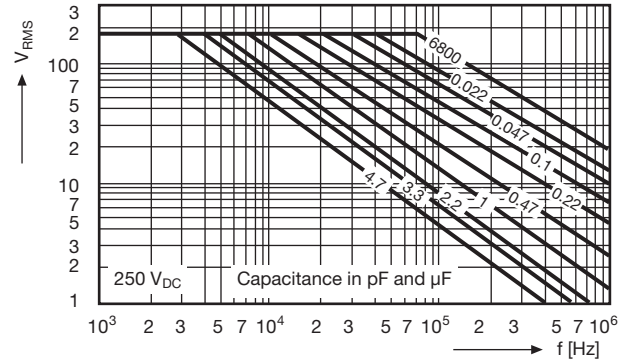
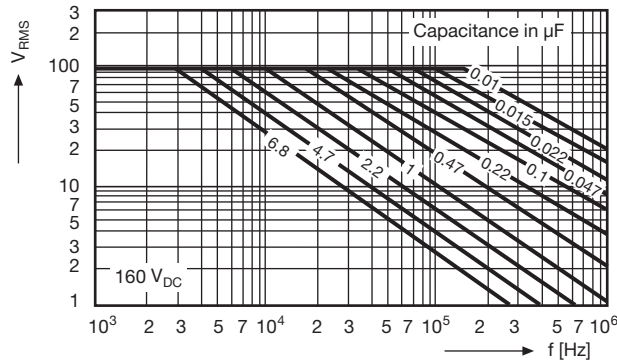
**Notes**

<sup>(1)</sup> S = box size 55 mm x 210 mm x 340 mm (W x H x L)

<sup>(2)</sup> L = box size 60 mm x 510 mm x 360 mm (W x H x L)



**PERMISSIBLE AC VOLTAGE VS. FREQUENCY**





## Disclaimer

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