



## EPB SERIES

### MKP DC-LINK CAPACITOR

**METALLIZED POLYPROPYLENE CAPACITOR ▲ THT type**

Low inductive winding

AEC-Q200 on request, contact MGT for more details

Self-healing property

High ripple current

**Available in 2 pin and 4 pin version**

### SPECIFICATION

| Item                                           |                    | Characteristics    |                    |                     |                     |
|------------------------------------------------|--------------------|--------------------|--------------------|---------------------|---------------------|
| Related Documents                              |                    | IEC 61071 / 60068  |                    |                     |                     |
| Rated Temperature Range                        |                    | -40°C to +85°C     |                    |                     |                     |
| Usable Temperature Range <sup>Note 1</sup>     |                    | -40°C to +105°C    |                    |                     |                     |
| Capacitance Range                              | C <sub>R</sub>     | 1.0μF to 60μF      |                    |                     |                     |
| Capacitance Tolerance                          | ΔC                 | ±5% ▲ ±10%         |                    |                     |                     |
| Operating DC Voltage at 70°C                   | V <sub>OP DC</sub> | 800V <sub>DC</sub> | 900V <sub>DC</sub> | 1100V <sub>DC</sub> | 1300V <sub>DC</sub> |
| Nominal DC Voltage at 85°C                     | V <sub>N DC</sub>  | 700V <sub>DC</sub> | 800V <sub>DC</sub> | 900V <sub>DC</sub>  | 1100V <sub>DC</sub> |
| Operating DC Voltage at 105°C                  | V <sub>OP DC</sub> | 500V <sub>DC</sub> | 550V <sub>DC</sub> | 600V <sub>DC</sub>  | 800V <sub>DC</sub>  |
| Dissipation Factor <sup>Note 2</sup>           | tan δ              | 0.08% to 0.25%     |                    |                     |                     |
| Dissipation Factor <sup>Note 3</sup>           | tan δ              | 0.45% to 2.4%      |                    |                     |                     |
| Peak Current                                   | I <sub>PEAK</sub>  | 75A to 1500A       |                    |                     |                     |
| RMS Current <sup>Note 4</sup>                  | I <sub>RMS</sub>   | 2.5A to 18A        |                    |                     |                     |
| Equivalent Series Resistance <sup>Note 5</sup> | ESR                | 4.5mΩ to 65mΩ      |                    |                     |                     |
| Maximum Pulse Rise Slope<br>dV/dt              | Pitch<br>(mm)      | 700V <sub>DC</sub> | 800V <sub>DC</sub> | 900V <sub>DC</sub>  | 1100V <sub>DC</sub> |
|                                                | 27.5               | 75V/μs             | 80V/μs             | 80V/μs              | 100V/μs             |
|                                                | 37.5               | 40V/μs             | 45V/μs             | 54V/μs              | 73V/μs              |
|                                                | 52.5               | 20V/μs             | 25V/μs             | 35V/μs              | 50V/μs              |

Note:

- 1: With specified voltage derating
- 2: Measured at 1kHz
- 3: Measured at 10kHz
- 4: Measured at 10kHz
- 5: Measured at 10kHz

### APPLICATIONS

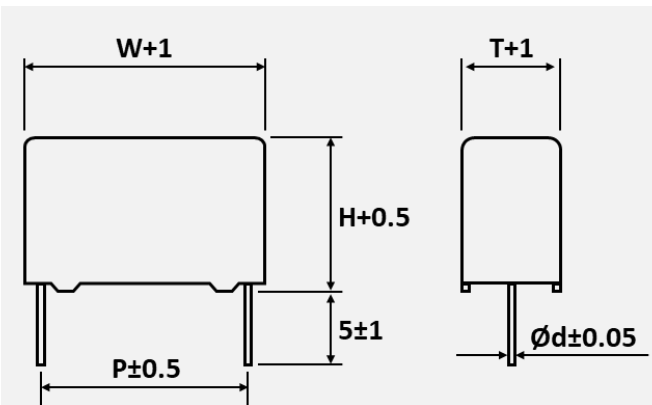
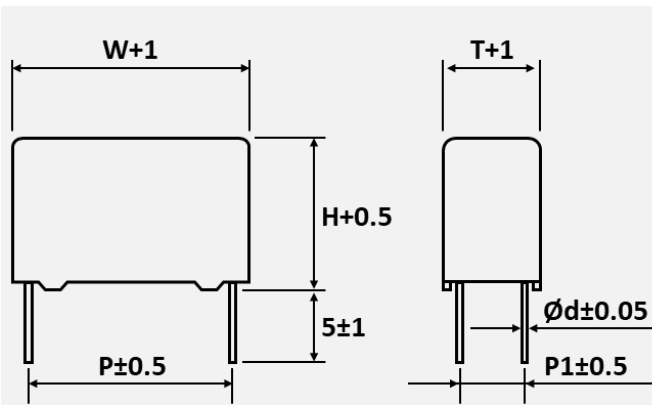
| AC/DC Converter                                                                     | Battery Charger                                                                     | DC/DC Converter                                                                     | Industrial                                                                          | Motors & Drives                                                                      | Renewable Energy                                                                      | Welding Inverter                                                                      |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  |  |  |  |  |  |  |

## ELECTRICAL CHARACTERISTICS

| $V_{NDC}$<br>at 85°C | $C_R$<br>( $\mu F$ ) | Dimensions (mm) |      |      | P<br>(mm) | P1<br>(mm) | $\phi d$<br>(mm) | dV/dt<br>(V/ $\mu s$ ) | $I_{PEAK}$<br>(A) | ESR<br>at<br>10kHz<br>(m $\Omega$ ) | $I_{RMS}$<br>at<br>10kHz<br>(A) | tan $\delta$<br>at<br>1kHz<br>(%) | tan $\delta$<br>at<br>10kHz<br>(%) | SPQ<br>(pcs) | Part Number <sup>Note</sup> |
|----------------------|----------------------|-----------------|------|------|-----------|------------|------------------|------------------------|-------------------|-------------------------------------|---------------------------------|-----------------------------------|------------------------------------|--------------|-----------------------------|
|                      |                      | W               | H    | T    |           |            |                  |                        |                   |                                     |                                 |                                   |                                    |              |                             |
| 700V <sub>DC</sub>   | 1.0                  | 31              | 18   | 9    | 27.5      | -          | 0.8              | 75                     | 75                | 60                                  | 2.5                             | 0.09                              | 0.65                               | 252          | EPB-105□0700DB127B          |
|                      | 3.0                  | 31              | 20   | 11   | 27.5      | -          | 0.8              | 75                     | 225               | 25                                  | 4                               | 0.09                              | 0.65                               | 207          | EPB-305□0700DB127B          |
|                      | 5.0                  | 31              | 24.5 | 15   | 27.5      | -          | 0.8              | 75                     | 375               | 17                                  | 6                               | 0.09                              | 0.65                               | 153          | EPB-505□0700DB127B          |
|                      | 7.0                  | 31              | 28   | 18   | 27.5      | -          | 0.8              | 75                     | 525               | 12                                  | 8                               | 0.09                              | 0.65                               | 126          | EPB-705□0700DB127B          |
|                      | 10.0                 | 31              | 31   | 22   | 27.5      | -          | 0.8              | 75                     | 750               | 9                                   | 10                              | 0.10                              | 0.70                               | 99           | EPB-106□0700DB127B          |
|                      | 12.0                 | 31              | 37   | 22   | 27.5      | -          | 0.8              | 75                     | 900               | 7                                   | 11.5                            | 0.10                              | 0.70                               | 99           | EPB-126□0700DB127B          |
|                      | 15.0                 | 41.5            | 35   | 20   | 37.5      | -          | 1.0              | 40                     | 600               | 10                                  | 9                               | 0.15                              | 1.3                                | 84           | EPB-156□0700DB137B          |
|                      | 15.0                 | 41.5            | 35   | 20   | 37.5      | 10.2       | 1.2              | 40                     | 600               | 9                                   | 10                              | 0.13                              | 1.2                                | 84           | EPB-156□0700DB137B-F        |
|                      | 20.0                 | 41.5            | 39   | 24   | 37.5      | -          | 1.0              | 40                     | 800               | 8                                   | 11                              | 0.15                              | 1.3                                | 70           | EPB-206□0700DB137B          |
|                      | 20.0                 | 41.5            | 39   | 24   | 37.5      | 10.2       | 1.2              | 40                     | 800               | 7                                   | 12                              | 0.13                              | 1.2                                | 70           | EPB-206□0700DB137B-F        |
|                      | 22.0                 | 41.5            | 38   | 28   | 37.5      | -          | 1.0              | 40                     | 880               | 6                                   | 13                              | 0.15                              | 1.3                                | 56           | EPB-226□0700DB137B          |
|                      | 22.0                 | 41.5            | 38   | 28   | 37.5      | 10.2       | 1.2              | 40                     | 880               | 6                                   | 13.5                            | 0.13                              | 1.2                                | 56           | EPB-226□0700DB137B-F        |
|                      | 25.0                 | 41.5            | 41   | 27.5 | 37.5      | -          | 1.0              | 40                     | 1000              | 6                                   | 13.5                            | 0.15                              | 1.3                                | 56           | EPB-256□0700DB137B          |
|                      | 25.0                 | 41.5            | 41   | 27.5 | 37.5      | 10.2       | 1.2              | 40                     | 1000              | 5.5                                 | 14.5                            | 0.13                              | 1.2                                | 56           | EPB-256□0700DB137B-F        |
|                      | 30.0                 | 41.5            | 45   | 30   | 37.5      | -          | 1.0              | 40                     | 1200              | 5                                   | 16                              | 0.15                              | 1.3                                | 56           | EPB-306□0700DB137B          |
|                      | 30.0                 | 41.5            | 45   | 30   | 37.5      | 20.3       | 1.2              | 40                     | 1200              | 4.5                                 | 17                              | 0.13                              | 1.2                                | 56           | EPB-306□0700DB137B-FF       |
|                      | 45.0                 | 58              | 45   | 30   | 52.5      | 20.3       | 1.2              | 20                     | 900               | 6                                   | 15                              | 0.25                              | 2.4                                | 40           | EPB-456□0700DB152B-FF       |
|                      | 50.0                 | 58              | 50   | 35   | 52.5      | 20.3       | 1.2              | 20                     | 1000              | 5.5                                 | 15.5                            | 0.25                              | 2.4                                | 35           | EPB-506□0700DB152B-FF       |
|                      | 55.0                 | 58              | 50   | 35   | 52.5      | 20.3       | 1.2              | 20                     | 1100              | 5                                   | 18                              | 0.25                              | 2.4                                | 35           | EPB-556□0700DB152B-FF       |
|                      | 60.0                 | 58              | 50   | 35   | 52.5      | 20.3       | 1.2              | 20                     | 1200              | 5                                   | 19                              | 0.25                              | 2.4                                | 34           | EPB-606□0700DB152B-FF       |

Note: Enter the appropriate tolerance code □ from the product code table  
SPQ = Standard Pack Quantity in pcs

## PACKAGE OUTLINE ▲ All dimensions in mm

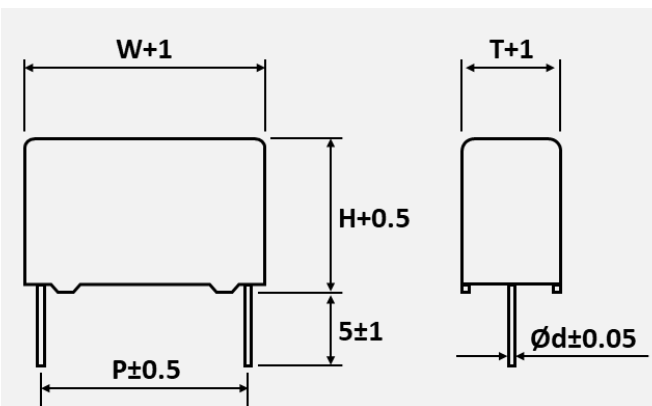
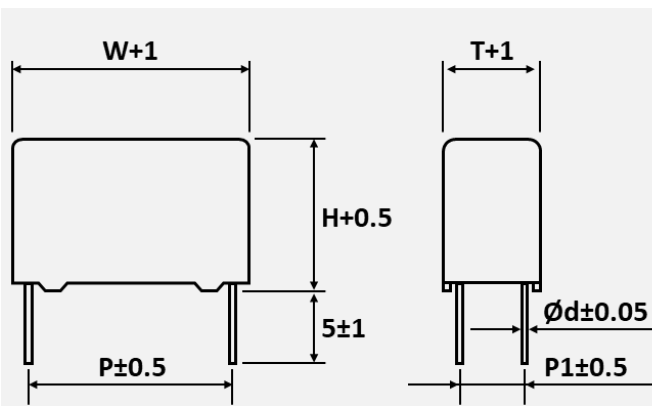
| 2-Pin Version                                                                                                                                                                                                                                                                                                    | 4-Pin Version                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p>Diagram showing the 2-Pin Version package outline. Dimensions include: W+1 (width), T+1 (terminal width), H+0.5 (height), 5±1 (terminal height), P±0.5 (pitch), and <math>\phi d \pm 0.05</math> (terminal diameter).</p> |  <p>Diagram showing the 4-Pin Version package outline. Dimensions include: W+1 (width), T+1 (terminal width), H+0.5 (height), 5±1 (terminal height), P±0.5 (pitch), <math>\phi d \pm 0.05</math> (terminal diameter), and P1±0.5 (pin 1 position).</p> |

## ELECTRICAL CHARACTERISTICS

| $V_{NDC}$<br>at 85°C | $C_R$<br>(μF) | Dimensions (mm) |      |      | P<br>(mm) | P1<br>(mm) | Ød<br>(mm) | dV/dt<br>(V/μs) | $I_{PEAK}$<br>(A) | ESR<br>at<br>10kHz<br>(mΩ) | $I_{RMS}$<br>at<br>10kHz<br>(A) | tanδ<br>at<br>1kHz<br>(%) | tanδ<br>at<br>10kHz<br>(%) | SPQ<br>(pcs) | Part Number <sup>Note</sup> |
|----------------------|---------------|-----------------|------|------|-----------|------------|------------|-----------------|-------------------|----------------------------|---------------------------------|---------------------------|----------------------------|--------------|-----------------------------|
|                      |               | W               | H    | T    |           |            |            |                 |                   |                            |                                 |                           |                            |              |                             |
| 800V <sub>DC</sub>   | 1.0           | 31              | 18   | 9    | 27.5      | -          | 0.8        | 80              | 80                | 65                         | 2                               | 0.08                      | 0.6                        | 252          | EPB-105□0800DB127B          |
|                      | 2.0           | 31              | 20   | 11   | 27.5      | -          | 0.8        | 80              | 160               | 35                         | 3.5                             | 0.08                      | 0.6                        | 207          | EPB-205□0800DB127B          |
|                      | 3.0           | 31              | 22   | 13   | 27.5      | -          | 0.8        | 80              | 240               | 25                         | 4.5                             | 0.08                      | 0.6                        | 171          | EPB-305□0800DB127B          |
|                      | 4.0           | 31              | 24.5 | 15   | 27.5      | -          | 0.8        | 80              | 320               | 17                         | 5.5                             | 0.08                      | 0.6                        | 153          | EPB-405□0800DB127B          |
|                      | 5.0           | 31              | 28   | 18   | 27.5      | -          | 0.8        | 80              | 400               | 14                         | 7                               | 0.08                      | 0.6                        | 126          | EPB-505□0800DB127B          |
|                      | 6.0           | 31              | 28   | 18   | 27.5      | -          | 0.8        | 80              | 480               | 11                         | 7.5                             | 0.10                      | 0.65                       | 126          | EPB-605□0800DB127B          |
|                      | 7.0           | 31              | 33   | 18   | 27.5      | -          | 0.8        | 80              | 560               | 10                         | 9                               | 0.10                      | 0.65                       | 117          | EPB-705□0800DB127B          |
|                      | 8.0           | 31              | 31   | 22   | 27.5      | -          | 0.8        | 80              | 640               | 9                          | 9.5                             | 0.10                      | 0.65                       | 99           | EPB-805□0800DB127B          |
|                      | 9.0           | 31              | 37   | 22   | 27.5      | -          | 0.8        | 80              | 720               | 8.5                        | 10                              | 0.10                      | 0.65                       | 99           | EPB-905□0800DB127B          |
|                      | 10.0          | 41.5            | 35   | 20   | 37.5      | -          | 1.0        | 45              | 450               | 14                         | 8                               | 0.14                      | 1.2                        | 84           | EPB-106□0800DB137B          |
|                      | 10.0          | 41.5            | 35   | 20   | 37.5      | 10.2       | 1.2        | 45              | 450               | 13                         | 8.5                             | 0.12                      | 1.1                        | 84           | EPB-106□0800DB137B-F        |
|                      | 12.0          | 41.5            | 35.5 | 22.5 | 37.5      | -          | 1.0        | 45              | 540               | 11                         | 8.5                             | 0.14                      | 1.2                        | 70           | EPB-126□0800DB137B          |
|                      | 12.0          | 41.5            | 35.5 | 22.5 | 37.5      | 10.2       | 1.2        | 45              | 540               | 10                         | 9                               | 0.12                      | 1.1                        | 70           | EPB-126□0800DB137B-F        |
|                      | 15.0          | 41.5            | 39   | 24   | 37.5      | -          | 1.0        | 45              | 675               | 9                          | 10                              | 0.14                      | 1.2                        | 70           | EPB-156□0800DB137B          |
|                      | 15.0          | 41.5            | 39   | 24   | 37.5      | 10.2       | 1.2        | 45              | 675               | 8                          | 11                              | 0.12                      | 1.1                        | 70           | EPB-156□0800DB137B-F        |
|                      | 20.0          | 41.5            | 41   | 27.5 | 37.5      | -          | 1.0        | 45              | 900               | 7                          | 13                              | 0.14                      | 1.2                        | 56           | EPB-206□0800DB137B          |
|                      | 20.0          | 41.5            | 41   | 27.5 | 37.5      | 10.2       | 1.2        | 45              | 900               | 6                          | 13.5                            | 0.12                      | 1.1                        | 56           | EPB-206□0800DB137B-F        |
|                      | 22.0          | 41.5            | 45   | 30   | 37.5      | -          | 1.0        | 45              | 990               | 6                          | 14.5                            | 0.14                      | 1.2                        | 56           | EPB-226□0800DB137B          |
|                      | 22.0          | 41.5            | 45   | 30   | 37.5      | 20.3       | 1.2        | 45              | 990               | 5.5                        | 15.5                            | 0.12                      | 1.1                        | 56           | EPB-226□0800DB137B-FF       |
|                      | 25.0          | 41.5            | 45   | 32   | 37.5      | -          | 1.0        | 45              | 1125              | 5.5                        | 16                              | 0.14                      | 1.2                        | 49           | EPB-256□0800DB137B          |
|                      | 25.0          | 41.5            | 45   | 32   | 37.5      | 20.3       | 1.2        | 45              | 1125              | 5                          | 16                              | 0.12                      | 1.1                        | 49           | EPB-256□0800DB137B-FF       |
|                      | 30.0          | 58              | 45   | 30   | 52.5      | 20.3       | 1.2        | 25              | 750               | 8                          | 12                              | 0.22                      | 2.2                        | 40           | EPB-306□0800DB152B-FF       |
|                      | 35.0          | 58              | 45   | 30   | 52.5      | 20.3       | 1.2        | 25              | 875               | 7                          | 14.5                            | 0.22                      | 2.2                        | 40           | EPB-356□0800DB152B-FF       |
|                      | 40.0          | 58              | 50   | 35   | 52.5      | 20.3       | 1.2        | 25              | 1000              | 6                          | 15                              | 0.22                      | 2.2                        | 35           | EPB-406□0800DB152B-FF       |
|                      | 45.0          | 58              | 50   | 35   | 52.5      | 20.3       | 1.2        | 25              | 1125              | 5.5                        | 17                              | 0.22                      | 2.2                        | 35           | EPB-456□0800DB152B-FF       |
|                      | 50.0          | 58              | 53   | 38   | 52.5      | 20.3       | 1.2        | 25              | 1250              | 5                          | 18                              | 0.22                      | 2.2                        | 30           | EPB-506□0800DB152B-FF       |

Note: Enter the appropriate tolerance code □ from the product code table  
SPQ = Standard Pack Quantity in pcs

## PACKAGE OUTLINE ▲ All dimensions in mm

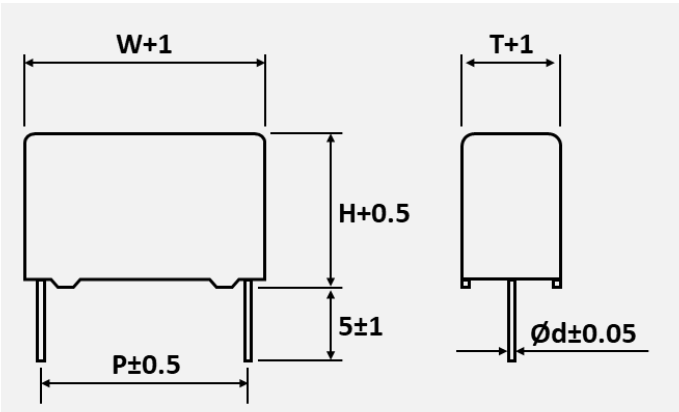
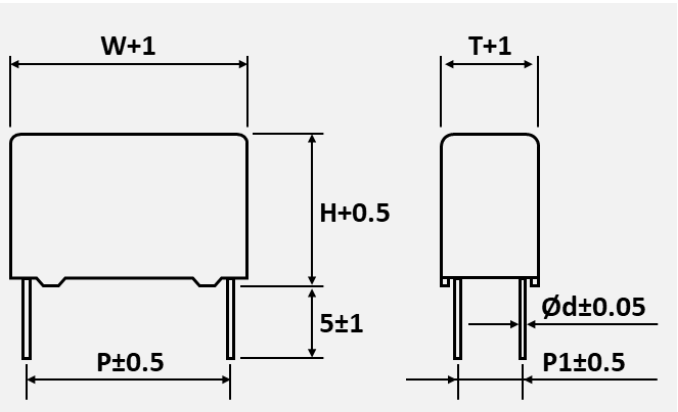
| 2-Pin Version                                                                                                                                                                                                                                                                               | 4-Pin Version                                                                                                                                                                                                                                                                                |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p>Diagram showing the 2-Pin Version package outline. Dimensions include: W+1 (width), T+1 (terminal width), H+0.5 (height), 5±1 (terminal height), P±0.5 (pitch), and Ød±0.05 (terminal diameter).</p> |  <p>Diagram showing the 4-Pin Version package outline. Dimensions include: W+1 (width), T+1 (terminal width), H+0.5 (height), 5±1 (terminal height), P±0.5 (pitch), and Ød±0.05 (terminal diameter).</p> |

## ELECTRICAL CHARACTERISTICS

| $V_{NDC}$<br>at 85°C | $C_R$<br>( $\mu F$ ) | Dimensions (mm) |      |      | P<br>(mm) | P1<br>(mm) | $\phi d$<br>(mm) | dV/dt<br>(V/ $\mu s$ ) | $I_{PEAK}$<br>(A) | ESR<br>at<br>10kHz<br>(m $\Omega$ ) | $I_{RMS}$<br>at<br>10kHz<br>(A) | tan $\delta$<br>at<br>1kHz<br>(%) | tan $\delta$<br>at<br>10kHz<br>(%) | SPQ<br>(pcs) | Part Number <sup>Note</sup> |
|----------------------|----------------------|-----------------|------|------|-----------|------------|------------------|------------------------|-------------------|-------------------------------------|---------------------------------|-----------------------------------|------------------------------------|--------------|-----------------------------|
|                      |                      | W               | H    | T    |           |            |                  |                        |                   |                                     |                                 |                                   |                                    |              |                             |
| 900V <sub>DC</sub>   | 1.0                  | 31              | 18   | 9    | 27.5      | -          | 0.8              | 80                     | 80                | 65                                  | 2                               | 0.08                              | 0.55                               | 252          | EPB-105□0900DB127B          |
|                      | 2.0                  | 31              | 22   | 13   | 27.5      | -          | 0.8              | 80                     | 160               | 30                                  | 3.5                             | 0.08                              | 0.55                               | 171          | EPB-205□0900DB127B          |
|                      | 5.0                  | 31              | 30.5 | 20   | 27.5      | -          | 0.8              | 80                     | 400               | 15                                  | 7.5                             | 0.08                              | 0.55                               | 108          | EPB-505□0900DB127B          |
|                      | 7.0                  | 31              | 37   | 22   | 27.5      | -          | 0.8              | 80                     | 560               | 9                                   | 9                               | 0.10                              | 0.6                                | 99           | EPB-705□0900DB127B          |
|                      | 10.0                 | 41.5            | 35.5 | 22.5 | 37.5      | -          | 1.0              | 54                     | 540               | 15                                  | 8.5                             | 0.12                              | 1.0                                | 70           | EPB-106□0900DB137B          |
|                      | 10.0                 | 41.5            | 35.5 | 22.5 | 37.5      | 10.2       | 1.2              | 54                     | 540               | 12                                  | 9                               | 0.11                              | 0.95                               | 70           | EPB-106□0900DB137B-F        |
|                      | 12.0                 | 41.5            | 39   | 24   | 37.5      | -          | 1.0              | 54                     | 648               | 11                                  | 9.5                             | 0.12                              | 1.0                                | 70           | EPB-126□0900DB137B          |
|                      | 12.0                 | 41.5            | 39   | 24   | 37.5      | 10.2       | 1.2              | 54                     | 648               | 10.5                                | 10                              | 0.11                              | 0.95                               | 70           | EPB-126□0900DB137B-F        |
|                      | 14.0                 | 41.5            | 38   | 28   | 37.5      | -          | 1.0              | 54                     | 756               | 10                                  | 10                              | 0.12                              | 1.0                                | 56           | EPB-146□0900DB137B          |
|                      | 14.0                 | 41.5            | 38   | 28   | 37.5      | -          | 1.2              | 54                     | 756               | 9                                   | 11                              | 0.11                              | 0.95                               | 56           | EPB-146□0900DB137B-F        |
|                      | 16.0                 | 41.5            | 41   | 27.5 | 37.5      | -          | 1.0              | 54                     | 864               | 8                                   | 11                              | 0.12                              | 1.0                                | 56           | EPB-166□0900DB137B          |
|                      | 16.0                 | 41.5            | 41   | 27.5 | 37.5      | 10.2       | 1.2              | 54                     | 864               | 7.5                                 | 12                              | 0.11                              | 0.95                               | 56           | EPB-166□0900DB137B-F        |
|                      | 20.0                 | 41.5            | 45   | 30   | 37.5      | -          | 1.0              | 54                     | 1080              | 6                                   | 14                              | 0.12                              | 1.0                                | 56           | EPB-206□0900DB137B          |
|                      | 20.0                 | 41.5            | 45   | 30   | 37.5      | 20.3       | 1.2              | 54                     | 1080              | 5.5                                 | 15.5                            | 0.11                              | 0.95                               | 56           | EPB-206□0900DB152B-FF       |
|                      | 25.0                 | 58              | 45   | 30   | 52.5      | 20.3       | 1.2              | 35                     | 875               | 9                                   | 11.5                            | 0.20                              | 1.9                                | 40           | EPB-256□0900DB152B-FF       |
|                      | 30.0                 | 58              | 45   | 30   | 52.5      | 20.3       | 1.2              | 35                     | 1050              | 8                                   | 13                              | 0.20                              | 1.9                                | 40           | EPB-306□0900DB152B-FF       |
|                      | 35.0                 | 58              | 50   | 35   | 52.5      | 20.3       | 1.2              | 35                     | 1225              | 7                                   | 15.5                            | 0.20                              | 1.9                                | 35           | EPB-356□0900DB152B-FF       |
|                      | 40.0                 | 58              | 50   | 35   | 52.5      | 20.3       | 1.2              | 35                     | 1400              | 6                                   | 17                              | 0.20                              | 1.9                                | 35           | EPB-406□0900DB152B-FF       |

Note: Enter the appropriate tolerance code □ from the product code table  
SPQ = Standard Pack Quantity in pcs

## PACKAGE OUTLINE ▲ All dimensions in mm

| 2-Pin Version                                                                                                                                                                                                                                                                                                    | 4-Pin Version                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p>Diagram showing the 2-Pin Version package outline. Dimensions include: W+1 (width), T+1 (terminal width), H+0.5 (height), 5±1 (terminal height), P±0.5 (pitch), and <math>\phi d \pm 0.05</math> (terminal diameter).</p> |  <p>Diagram showing the 4-Pin Version package outline. Dimensions include: W+1 (width), T+1 (terminal width), H+0.5 (height), 5±1 (terminal height), P±0.5 (pitch), <math>\phi d \pm 0.05</math> (terminal diameter), and P1±0.5 (pin 1 position).</p> |

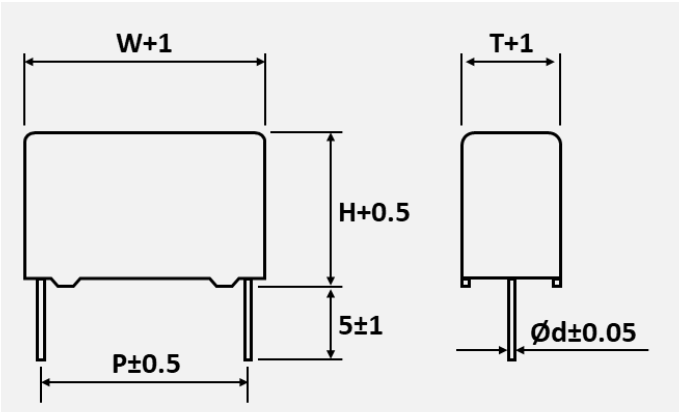
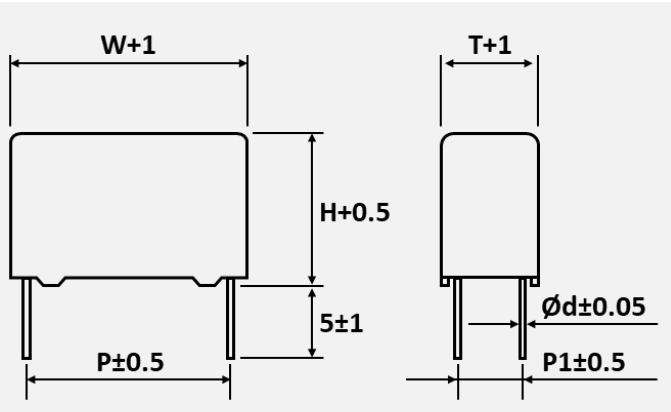
## ELECTRICAL CHARACTERISTICS

| $V_{NDC}$<br>at 85°C | $C_R$<br>(μF) | Dimensions (mm) |    |    | P<br>(mm) | P1<br>(mm) | Ød<br>(mm) | dV/dt<br>(V/μs) | $I_{PEAK}$<br>(A) | ESR<br>at<br>10kHz<br>(mΩ) | $I_{RMS}$<br>at<br>10kHz<br>(A) | tanδ<br>at<br>1kHz<br>(%) | tanδ<br>at<br>10kHz<br>(%) | SPQ<br>(pcs) | Part Number <sup>Note</sup> |
|----------------------|---------------|-----------------|----|----|-----------|------------|------------|-----------------|-------------------|----------------------------|---------------------------------|---------------------------|----------------------------|--------------|-----------------------------|
|                      |               | W               | H  | T  |           |            |            |                 |                   |                            |                                 |                           |                            |              |                             |
| 1100V <sub>DC</sub>  | 1.5           | 31              | 22 | 13 | 27.5      | -          | 0.8        | 100             | 15                | 25                         | 4                               | 0.08                      | 0.45                       | 171          | EPB-155□1100DB127B          |
|                      | 3.0           | 31              | 28 | 18 | 27.5      | -          | 0.8        | 100             | 300               | 18                         | 6                               | 0.08                      | 0.45                       | 126          | EPB-305□1100DB127B          |
|                      | 5.0           | 31              | 37 | 22 | 27.5      | -          | 0.8        | 100             | 500               | 10                         | 9                               | 0.08                      | 0.45                       | 99           | EPB-505□1100DB127B          |
|                      | 8.0           | 41.5            | 39 | 24 | 37.5      | -          | 1.0        | 73              | 584               | 12                         | 9                               | 0.11                      | 0.9                        | 70           | EPB-805□1100DB137B          |
|                      | 8.0           | 41.5            | 39 | 24 | 37.5      | 10.2       | 1.2        | 73              | 584               | 11                         | 9.5                             | 0.10                      | 0.8                        | 70           | EPB-805□1100DB137B-F        |
|                      | 10.0          | 41.5            | 38 | 28 | 37.5      | -          | 1.0        | 73              | 730               | 1                          | 10.5                            | 0.11                      | 0.9                        | 56           | EPB-106□1100DB137B          |
|                      | 10.0          | 41.5            | 38 | 28 | 37.5      | 10.2       | 1.2        | 73              | 730               | 10                         | 11                              | 0.10                      | 0.8                        | 56           | EPB-106□1100DB137B-F        |
|                      | 12.0          | 41.5            | 45 | 30 | 37.5      | -          | 1.0        | 73              | 876               | 9                          | 12.5                            | 0.11                      | 0.9                        | 56           | EPB-126□1100DB137B          |
|                      | 12.0          | 41.5            | 45 | 30 | 37.5      | 20.3       | 1.2        | 73              | 876               | 8                          | 13.5                            | 0.10                      | 0.8                        | 56           | EPB-126□1100DB137B-FF       |
|                      | 14.0          | 41.5            | 45 | 30 | 37.5      | -          | 1.0        | 73              | 1022              | 8                          | 13.5                            | 0.11                      | 0.9                        | 56           | EPB-146□1100DB137B          |
|                      | 14.0          | 41.5            | 45 | 30 | 37.5      | 20.3       | 1.2        | 73              | 1022              | 7                          | 14.5                            | 0.10                      | 0.8                        | 56           | EPB-146□1100DB137B-FF       |
|                      | 15.0          | 41.5            | 45 | 33 | 37.5      | 20.3       | 1.2        | 73              | 1095              | 6.5                        | 15                              | 0.11                      | 0.9                        | 48           | EPB-156□1100DB137B-FF       |
|                      | 20.0          | 58              | 45 | 30 | 52.5      | 20.3       | 1.2        | 50              | 1000              | 10                         | 12.5                            | 0.17                      | 1.6                        | 40           | EPB-206□1100DB152B-FF       |
|                      | 25.0          | 58              | 50 | 30 | 52.5      | 20.3       | 1.2        | 50              | 1250              | 8                          | 15                              | 0.17                      | 1.6                        | 40           | EPB-256□1100DB152B-FF       |
|                      | 27.0          | 58              | 50 | 35 | 52.5      | 20.3       | 1.2        | 50              | 1350              | 7                          | 16                              | 0.17                      | 1.6                        | 35           | EPB-276□1100DB152B-FF       |
|                      | 30.0          | 58              | 53 | 38 | 52.5      | 20.3       | 1.2        | 50              | 1500              | 6                          | 16.5                            | 0.17                      | 1.6                        | 35           | EPB-306□1100DB152B-FF       |

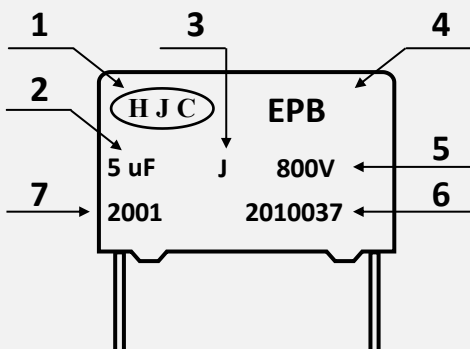
Note: Enter the appropriate tolerance code □ from the product code table

SPQ = Standard Pack Quantity in pcs

## PACKAGE OUTLINE ▲ All dimensions in mm

| 2-Pin Version                                                                                                                                                                                                                                                                               | 4-Pin Version                                                                                                                                                                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p>Diagram showing the 2-Pin Version package outline. Dimensions include: W+1 (width), T+1 (terminal width), H+0.5 (height), 5±1 (terminal height), P±0.5 (pitch), and Ød±0.05 (terminal diameter).</p> |  <p>Diagram showing the 4-Pin Version package outline. Dimensions include: W+1 (width), T+1 (terminal width), H+0.5 (height), 5±1 (terminal height), P±0.5 (pitch), Ød±0.05 (terminal diameter), and P1±0.5 (pin 1 position).</p> |

## PRODUCT MARKING

| Marking                                                                           | Details                                   |
|-----------------------------------------------------------------------------------|-------------------------------------------|
|  | <b>No.</b><br><b>Description</b>          |
|                                                                                   | 1<br>Manufacturer Logo                    |
|                                                                                   | 2<br>Nominal capacitance in $\mu\text{F}$ |
|                                                                                   | 3<br>Capacitance tolerance                |
|                                                                                   | 4<br>Series name                          |
|                                                                                   | 5<br>DC rated voltage                     |
|                                                                                   | 6<br>Lot number                           |
|                                                                                   | 7<br>Date code                            |

## DATE CODE & APPLICATION CATEGORY

Example:

### Date code

2001: 2001 = 1<sup>st</sup> week of 2020

### Lot number

2010037: 20 = Year, here 2020

1 = Month, here January

0001 to XXXX = Serial number

| 20   |      | 01   |                  |
|------|------|------|------------------|
| Year |      | Week |                  |
| 19   | 2019 | 01   | 1 <sup>st</sup>  |
| 20   | 2020 | 02   | 2 <sup>nd</sup>  |
| 21   | 2021 | 03   | 3 <sup>rd</sup>  |
| 22   | 2022 | 04   | 4 <sup>th</sup>  |
| 23   | 2023 | 05   | 5 <sup>th</sup>  |
| ...  | ...  | ...  | ...              |
| 30   | 2030 | 53   | 53 <sup>rd</sup> |

## PRODUCT CODE

Example: HPB series ▲ 25 $\mu\text{F}$  ▲ 1100V<sub>DC</sub> ▲  $\pm 10\%$  ▲ P=52.5mm ▲ 4-Pins ▲ P1=20.3mm ▲ Bulk ▲ Straight leads ▲ 5mm lead length

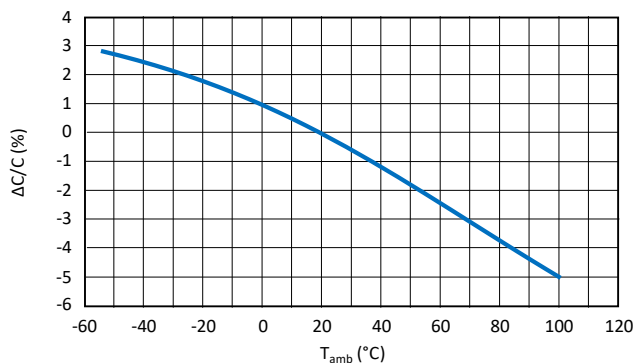
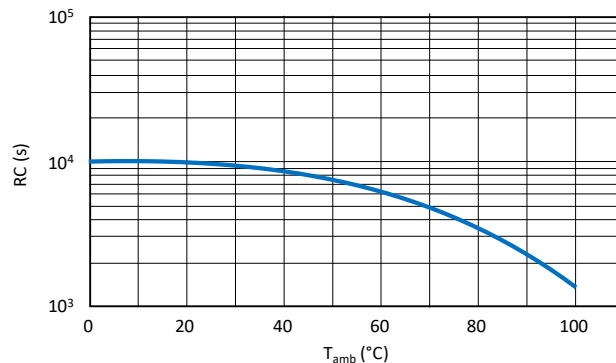
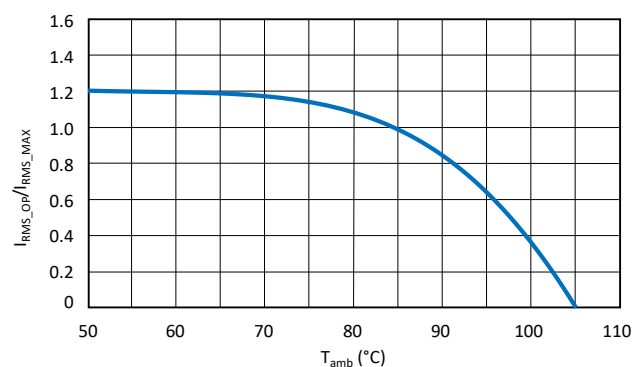
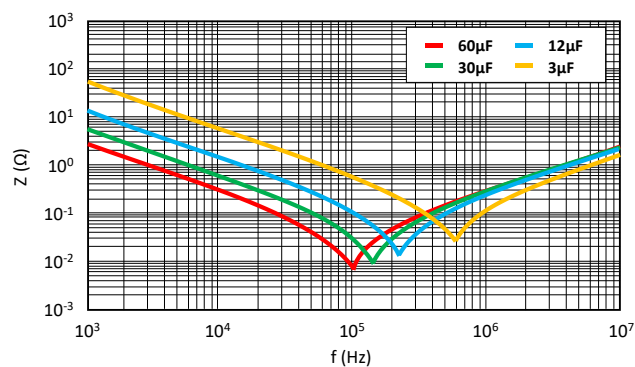
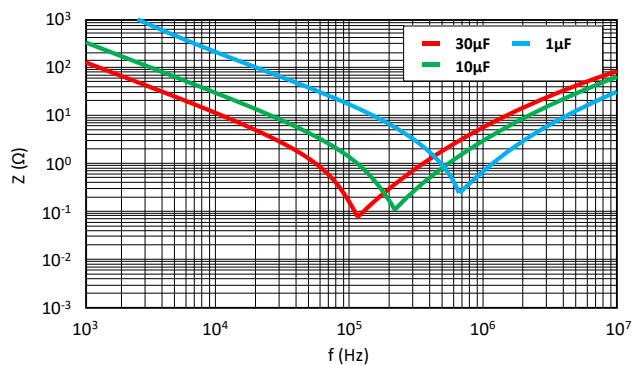
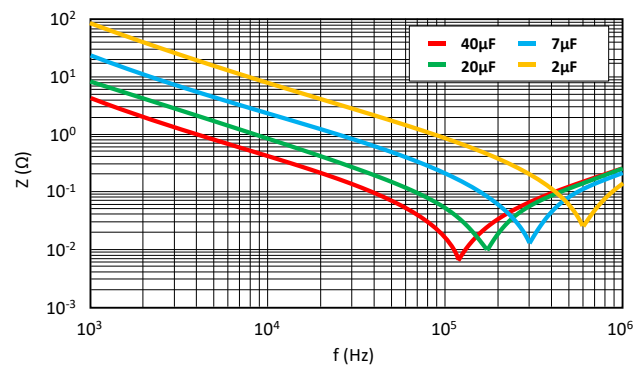
| HPB-   |        | 256                                       |               | K                         |          | 1100                             |      | D            |      | B              |      | 1                                   |       | 52         |      | B                |     | -FF                       |         |
|--------|--------|-------------------------------------------|---------------|---------------------------|----------|----------------------------------|------|--------------|------|----------------|------|-------------------------------------|-------|------------|------|------------------|-----|---------------------------|---------|
| Series |        | Capacitance Code <sup>Note1</sup><br>(pF) |               | Capacitance Tolerance (%) |          | Rated Voltage (V <sub>DC</sub> ) |      | Voltage Type |      | Packaging Type |      | Lead Configuration <sup>Note2</sup> |       | Pitch (mm) |      | Lead Length (mm) |     | Special Terminal (4 Pins) |         |
| Code   | Series | Code                                      | $\mu\text{F}$ | Code                      | Tol.     | Code                             | VDC  | Code         | Type | Code           | Type | Code                                | Style | Code       | mm   | Code             | mm  | Code                      | P1 (mm) |
| HPB    | HPB    | 105                                       | 1.0           | J                         | $\pm 5$  | 0700                             | 700  | D            | DC   | B              | Bulk | 1                                   | SL    | 27         | 27.5 | B                | 5.0 | F                         | 10.2    |
|        |        | 505                                       | 5.0           | K                         | $\pm 10$ | 0800                             | 800  |              |      |                |      |                                     |       | 37         | 37.5 |                  |     | 2F                        | 12.7    |
|        |        | 106                                       | 10.0          |                           |          | 0900                             | 900  |              |      |                |      |                                     |       | 52         | 52.5 |                  |     | FF                        | 20.3    |
|        |        | 276                                       | 27.0          |                           |          | 1100                             | 1100 |              |      |                |      |                                     |       |            |      |                  |     |                           |         |
|        |        | 606                                       | 60.0          |                           |          |                                  |      |              |      |                |      |                                     |       |            |      |                  |     |                           |         |

Note:

1 Capacitance code expressed in pF. The first two digits represent significant figures. The last digit specifies the total number of zeros to be added.

2 SL = Straight leads

## REFERENCE DATA

**Fig. 1 • Capacitance Drift vs. Ambient Temperature**

**Fig. 2 • Insulation Resistance vs. Ambient Temperature**

**Fig. 3 • Maximum  $I_{RMS}$  Current vs. Ambient Temperature**

**Fig. 4 • Impedance vs. Frequency •  $V_{NDC} = 700V$** 

**Fig. 5 • Impedance vs. Frequency •  $V_{NDC} = 800V$** 

**Fig. 6 • Impedance vs. Frequency •  $V_{NDC} = 900V$** 


## REFERENCE DATA

Fig. 7 • Impedance vs. Frequency •  $V_{NDC} = 1100V$

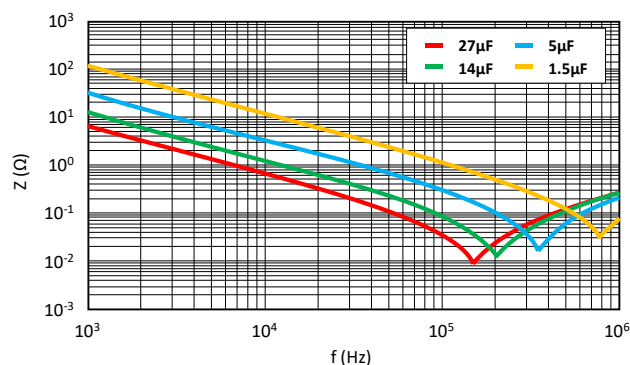
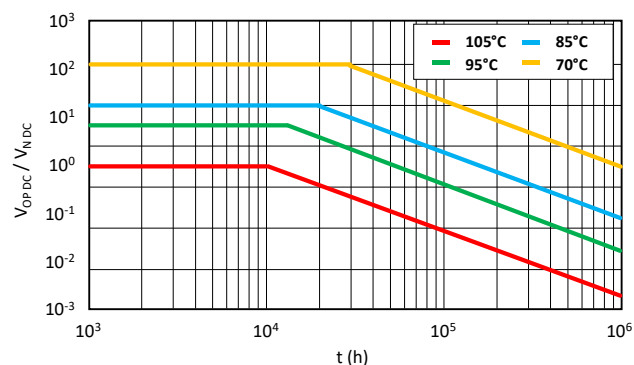


Fig. 8 • Expected Lifetime



Note: The temperatures-curves are the case-temperatures measured at the hottest point of the capacitor has reached its thermal equilibrium.

## HEAT CONDUCTIVITY

In order not to exceed the maximum allowed case temperature rise ( $\Delta T$ ), the formula used to calculate the maximum power that may be dissipated by the capacitor is:

Rise of the case temperature in °C:

$$\Delta T = T_{CASE} - T_{AMBIENT}$$

$$\Delta T = \frac{P}{G}$$

With G, the heat conductivity of the capacitor in mW/°C.

Maximum power that may be dissipated by the capacitor in mW:

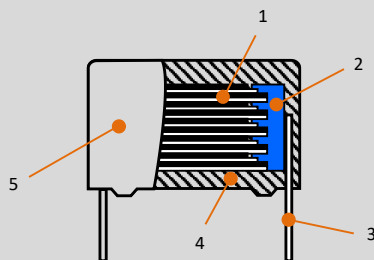
$$P = I_{RMS}^2 \cdot ESR$$

The power-dissipation must be limited so that the case-temperature in the application never exceeds 105°C (observing voltage-de-rating).

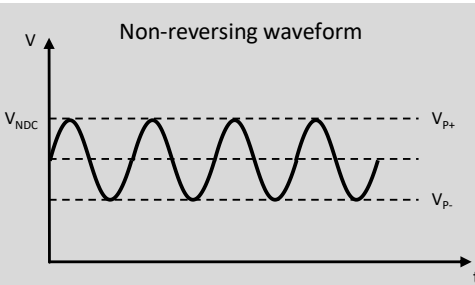
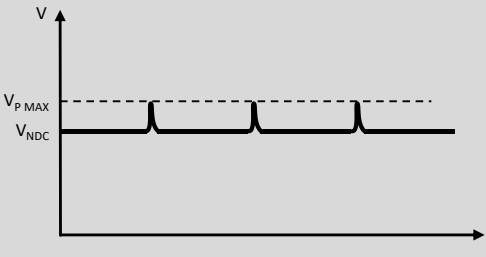
| Dimensions (mm) |      |      | G (mW/°C) |
|-----------------|------|------|-----------|
| W               | H    | T    |           |
| 31              | 18   | 9    | 31        |
| 31              | 20   | 9    | 36        |
| 31              | 22   | 11   | 41        |
| 31              | 24.5 | 15   | 46        |
| 31              | 28   | 18   | 54        |
| 31              | 33   | 18   | 58        |
| 31              | 30.5 | 20   | 59        |
| 31              | 31   | 22   | 62        |
| 31              | 37   | 22   | 68        |
| 41.5            | 35   | 20   | 63        |
| 41.5            | 35.5 | 20.5 | 68        |
| 41.5            | 39   | 24   | 73        |
| 41.5            | 41   | 27.5 | 85        |
| 41.5            | 38   | 28   | 83        |
| 41.5            | 45   | 30   | 93        |
| 41.5            | 45   | 32   | 95        |
| 58              | 45   | 30   | 95        |
| 58              | 50   | 35   | 108       |
| 58              | 53   | 38   | 115       |



## TECHNICAL SPECIFICATION

| No. | Category                                    | Specification                                                                                                                                                        |  |                                                           |      |      |                      |       |
|-----|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------------------------------|------|------|----------------------|-------|
| 1   | Scope                                       | This specification applies to capacitors for power electronics applications.<br>Reference standards: IEC 61071 / IEC 60068                                           |  |                                                           |      |      |                      |       |
| 2   | Product Name                                | Metallized polypropylene film capacitor, Type EPB                                                                                                                    |  |                                                           |      |      |                      |       |
| 3   | Construction                                | Dimensions:                                                                                                                                                          |  | Refer to dimensions drawing                               |      |      |                      |       |
|     |                                             |                                                                                     |  |                                                           |      |      |                      |       |
|     |                                             | 1 = Element                                                                                                                                                          |  | Metallized Polypropylene film                             |      |      |                      |       |
|     |                                             | 2 = Metal spray                                                                                                                                                      |  | Special solder. (Lead Free) compliant to RoHS directive   |      |      |                      |       |
|     |                                             | 3 = Lead wire                                                                                                                                                        |  | Tinned wire. (Lead Free) compliant to RoHS directive      |      |      |                      |       |
|     |                                             | 4 = Inner coating                                                                                                                                                    |  | Epoxy resin filled. (UL-94V-0 Standard)                   |      |      |                      |       |
|     |                                             | 5 = Outer coating                                                                                                                                                    |  | Plastic case. (UL-94V-0 Standard)                         |      |      |                      |       |
| 4   | Atmospheric and Temperature Characteristics | <b>Standard atmospheric conditions.</b><br>Unless otherwise specified, the standard range of atmospheric conditions for making measurements and tests is as follows: |  |                                                           |      |      |                      |       |
|     |                                             | Ambient temperature:                                                                                                                                                 |  | 15 to 35°C                                                |      |      |                      |       |
|     |                                             | Relative humidity                                                                                                                                                    |  | 25% to 75%                                                |      |      |                      |       |
|     |                                             | Air pressure                                                                                                                                                         |  | 86 to 106 kPa                                             |      |      |                      |       |
|     |                                             | <b>If there may be any doubt on the results, measurements shall be made within the following limits.</b>                                                             |  |                                                           |      |      |                      |       |
|     |                                             | Ambient temperature:                                                                                                                                                 |  | 20°C ± 5°C                                                |      |      |                      |       |
|     |                                             | Relative humidity:                                                                                                                                                   |  | Below 50%                                                 |      |      |                      |       |
|     |                                             | <b>Operating temperature range</b>                                                                                                                                   |  |                                                           |      |      |                      |       |
|     |                                             | Lowest operating temperature:                                                                                                                                        |  | -40°C                                                     |      |      |                      |       |
|     |                                             | Maximum operating temperature:                                                                                                                                       |  | +105°C (case-temperature) with specified voltage-derating |      |      |                      |       |
| 5   | Electrical Characteristics                  | <b>All data given at an ambient temperature of 23°C ± 1°C and a relative humidity of 50% ± 2%, unless otherwise specified.</b>                                       |  |                                                           |      |      |                      |       |
|     |                                             | Rated temperature:                                                                                                                                                   |  | +85°C                                                     |      |      |                      |       |
|     |                                             | Nominal voltage:                                                                                                                                                     |  | V <sub>NDC</sub> at 85°C                                  | 700V | 800V | 900V                 | 1100V |
|     |                                             | Operating voltage:                                                                                                                                                   |  | V <sub>OPDC</sub> at 70°C                                 | 800V | 900V | 1100V                | 1300V |
|     |                                             | Operating voltage:                                                                                                                                                   |  | V <sub>OPDC</sub> at 105°C                                | 500V | 550V | 650V                 | 800V  |
|     |                                             | Capacitance range:                                                                                                                                                   |  | 1μF to 60μF                                               |      |      |                      |       |
|     |                                             | Capacitance tolerance:                                                                                                                                               |  | ±5% (J), ±10% (K), ±20% (M)                               |      |      | Measured at 1kHz, 1V |       |
|     |                                             | Self-inductance (L <sub>s</sub> )                                                                                                                                    |  | < 1nH per mm of lead spacing                              |      |      |                      |       |

## TECHNICAL SPECIFICATION

| No.                                        | Category                                                             | Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                        |                                            |                                 |                        |                      |                         |            |                        |           |                        |          |
|--------------------------------------------|----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|--------------------------------------------|---------------------------------|------------------------|----------------------|-------------------------|------------|------------------------|-----------|------------------------|----------|
| 5                                          | Electrical Characteristics                                           | <b>Insulation resistance between terminals</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                        |                                            |                                 |                        |                      |                         |            |                        |           |                        |          |
|                                            |                                                                      | Test conditions:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                        |                                            |                                 |                        |                      |                         |            |                        |           |                        |          |
|                                            |                                                                      | Temperature:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 20°C ± 5°C                                             |                                            |                                 |                        |                      |                         |            |                        |           |                        |          |
|                                            |                                                                      | Voltage charge:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 100V <sub>DC</sub> (V <sub>NDC</sub> ≤ 500V)           |                                            |                                 |                        |                      |                         |            |                        |           |                        |          |
|                                            |                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 500V <sub>DC</sub> (V <sub>NDC</sub> > 500V)           |                                            |                                 |                        |                      |                         |            |                        |           |                        |          |
|                                            |                                                                      | Performance:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | After voltage charge 1 minute > 10GΩ x μF              |                                            |                                 |                        |                      |                         |            |                        |           |                        |          |
|                                            |                                                                      | <b>Test voltage between terminals</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                        |                                            |                                 |                        |                      |                         |            |                        |           |                        |          |
|                                            |                                                                      | 1.5 × V <sub>NDC</sub> applied for 10 sec, at 20°C ±5°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                        |                                            |                                 |                        |                      |                         |            |                        |           |                        |          |
|                                            |                                                                      | Cut off current:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 10mA, slow up voltage speed: 100V/sec                  |                                            |                                 |                        |                      |                         |            |                        |           |                        |          |
|                                            |                                                                      | Current limiting resistance of 1Ω/V shall be connected to the test circuit                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                        |                                            |                                 |                        |                      |                         |            |                        |           |                        |          |
|                                            |                                                                      | Performance:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | There shall be no dielectric breakdown or other damage |                                            |                                 |                        |                      |                         |            |                        |           |                        |          |
|                                            |                                                                      | <b>Test voltage between terminal and case</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                        |                                            |                                 |                        |                      |                         |            |                        |           |                        |          |
|                                            |                                                                      | 2000V <sub>AC</sub> (50Hz) applied for 10 sec                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                        |                                            |                                 |                        |                      |                         |            |                        |           |                        |          |
|                                            |                                                                      | Performance:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | There shall be no flashover or other damage            |                                            |                                 |                        |                      |                         |            |                        |           |                        |          |
|                                            |                                                                      | <b>Maximum applicable peak to peak ripple voltage</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                        |                                            |                                 |                        |                      |                         |            |                        |           |                        |          |
|                                            |                                                                      | <div><p>The continuous peak voltage (V<sub>P+</sub>) shall be ≤ V<sub>NDC</sub></p><p>The peak-to-peak ripple voltage (V<sub>P-P</sub>) shall be ≤ 0.20 × V<sub>NDC</sub></p></div> <div></div>                                                                                                                                                                                                                                      |                                                        |                                            |                                 |                        |                      |                         |            |                        |           |                        |          |
|                                            |                                                                      | <b>Maximum repetitive peak voltages</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                        |                                            |                                 |                        |                      |                         |            |                        |           |                        |          |
|                                            |                                                                      | <table><tr><td>Repetitive surge voltage (V<sub>P</sub>)</td><td>Maximum duration within one day</td></tr><tr><td>1.1 × V<sub>NDC</sub></td><td>30% on load duration</td></tr><tr><td>1.15 × V<sub>NDC</sub></td><td>30 minutes</td></tr><tr><td>1.2 × V<sub>NDC</sub></td><td>5 minutes</td></tr><tr><td>1.3 × V<sub>NDC</sub></td><td>1 minute</td></tr><tr><td>1.5 × V<sub>NDC</sub></td><td>100 ms</td></tr></table> <div></div> |                                                        | Repetitive surge voltage (V <sub>P</sub> ) | Maximum duration within one day | 1.1 × V <sub>NDC</sub> | 30% on load duration | 1.15 × V <sub>NDC</sub> | 30 minutes | 1.2 × V <sub>NDC</sub> | 5 minutes | 1.3 × V <sub>NDC</sub> | 1 minute |
| Repetitive surge voltage (V <sub>P</sub> ) | Maximum duration within one day                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                        |                                            |                                 |                        |                      |                         |            |                        |           |                        |          |
| 1.1 × V <sub>NDC</sub>                     | 30% on load duration                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                        |                                            |                                 |                        |                      |                         |            |                        |           |                        |          |
| 1.15 × V <sub>NDC</sub>                    | 30 minutes                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                        |                                            |                                 |                        |                      |                         |            |                        |           |                        |          |
| 1.2 × V <sub>NDC</sub>                     | 5 minutes                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                        |                                            |                                 |                        |                      |                         |            |                        |           |                        |          |
| 1.3 × V <sub>NDC</sub>                     | 1 minute                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                        |                                            |                                 |                        |                      |                         |            |                        |           |                        |          |
| 1.5 × V <sub>NDC</sub>                     | 100 ms                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                        |                                            |                                 |                        |                      |                         |            |                        |           |                        |          |
| <b>Life time expectancy</b>                |                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                        |                                            |                                 |                        |                      |                         |            |                        |           |                        |          |
| Operating life:                            | > 100000h at V <sub>OPDC</sub> and 70°C                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                        |                                            |                                 |                        |                      |                         |            |                        |           |                        |          |
| Failure rate:                              | < 10 FIT (10 × 10 <sup>-9</sup> /h) at 0.5 × V <sub>NDC</sub> , 40°C |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                        |                                            |                                 |                        |                      |                         |            |                        |           |                        |          |

## TECHNICAL SPECIFICATION

| No. | Category                   | Specification                                    |                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                 |
|-----|----------------------------|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| 6   | Mechanical Characteristics | Test Item                                        | Conditions                                                                                                                                                                                                                                                                                                                | Performance                                                                                                                                     |
|     |                            | Robustness of terminations<br>(IEC68-2-21)       | Tensile Ua1                                                                                                                                                                                                                                                                                                               | There shall be no such mechanical damage as terminal damage etc.                                                                                |
|     |                            |                                                  | Wire diameter                                                                                                                                                                                                                                                                                                             |                                                                                                                                                 |
|     |                            |                                                  | Section                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                 |
|     |                            |                                                  | Load                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                 |
|     |                            |                                                  | ≤ 0.8mm                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                 |
|     |                            |                                                  | ≤ 0.5mm <sup>2</sup>                                                                                                                                                                                                                                                                                                      |                                                                                                                                                 |
|     |                            |                                                  | 10N                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                 |
|     |                            |                                                  | ≤ 1.25mm                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                 |
|     |                            |                                                  | ≤ 1.2mm <sup>2</sup>                                                                                                                                                                                                                                                                                                      |                                                                                                                                                 |
|     |                            |                                                  | 20N                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                 |
|     |                            |                                                  | Duration: 10s ± 1s                                                                                                                                                                                                                                                                                                        |                                                                                                                                                 |
|     |                            |                                                  | Bending Ub method 1                                                                                                                                                                                                                                                                                                       |                                                                                                                                                 |
|     |                            |                                                  | Wire diameter                                                                                                                                                                                                                                                                                                             |                                                                                                                                                 |
|     |                            |                                                  | Section                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                 |
|     |                            |                                                  | Load                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                 |
|     |                            |                                                  | ≤ 0.8mm                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                 |
|     |                            |                                                  | ≤ 0.5mm <sup>3</sup>                                                                                                                                                                                                                                                                                                      |                                                                                                                                                 |
|     |                            |                                                  | 10N                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                 |
|     |                            |                                                  | ≤ 1.25mm                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                 |
|     |                            |                                                  | ≤ 0.019mm <sup>3</sup>                                                                                                                                                                                                                                                                                                    |                                                                                                                                                 |
|     |                            |                                                  | 20N                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                 |
|     |                            |                                                  | 4 × 90°; Duration: 2s to 3 s/bend                                                                                                                                                                                                                                                                                         |                                                                                                                                                 |
| 7   | Endurance Characteristics  | Vibration proof<br>(IEC68-2-6)                   | 10Hz to 55Hz: amplitude ± 0.35mm or acceleration 98m/s <sup>2</sup>                                                                                                                                                                                                                                                       | No visible damage                                                                                                                               |
|     |                            |                                                  | Test duration: 10 frequency cycles, 3 axes offset from each other by 90°<br>1 octave/min<br>Visual examination                                                                                                                                                                                                            |                                                                                                                                                 |
|     |                            | Solderability<br>(IEC68-2-20 Ta)                 | Solder bath: 245°C ± 5°C<br>Immersion time: 2.5±0.5sec<br>Visual examination                                                                                                                                                                                                                                              | At least 95% of the circumferential face of lead wire up to immersed level shall be covered with new solder                                     |
|     |                            | Resistance to soldering heat<br>(IEC 68-2-20Tb)  | Solder bath: 260 °C ± 5 °C<br>Immersion time: 10±1sec<br>Thickness of heat shunt (Printed wiring board): 1.6mm<br>Capacitance at 1kHz<br>tan δ at 10kHz                                                                                                                                                                   | $ \Delta C/C  \leq 1\%$<br>Increase of tan δ ≤ 50 × 10 <sup>-4</sup>                                                                            |
|     |                            | Voltage test between terminal                    | 1.5 × V <sub>NDC</sub> at ambient temperature.<br>Duration 60sec<br>Capacitance at 1kHz<br>tan δ at 10kHz                                                                                                                                                                                                                 | $ \Delta C/C  \leq 0.5\%$<br>Increase of tan δ ≤ 1.2 initial tan δ <sub>0</sub> + 1×10 <sup>-4</sup><br>R insulation ≥ 50 % of specified values |
|     |                            | Surge discharge test                             | 1.1 × V <sub>NDC</sub><br>Number of discharges: 5<br>Time lapse: every 2 min (10min total).<br>Within 5 min after the surge discharge test, the units shall be subjected to a voltage test between terminals<br>Duration 60sec<br>1.5 × V <sub>NDC</sub> at ambient temperature.<br>Capacitance at 1kHz<br>tan δ at 10kHz | $ \Delta C/C  \leq 1\%$<br>tan δ ≤ 1.2 initial tan δ <sub>0</sub> + 1 × 10 <sup>-4</sup>                                                        |
|     |                            | Change of temperature<br>(IEC68-2-14)<br>Test Nb | Test Nb<br>T <sub>MAX</sub> = 85°C<br>T <sub>MIN</sub> = - 40°C<br>Transition time: 1 h, equivalent to 1°C/min<br>5 cycles<br>Capacitance at 1kHz<br>tan δ at 10kHz                                                                                                                                                       | $ \Delta C/C  \leq 2\%$<br>Increase of tan δ ≤ 150 × 10 <sup>-4</sup>                                                                           |

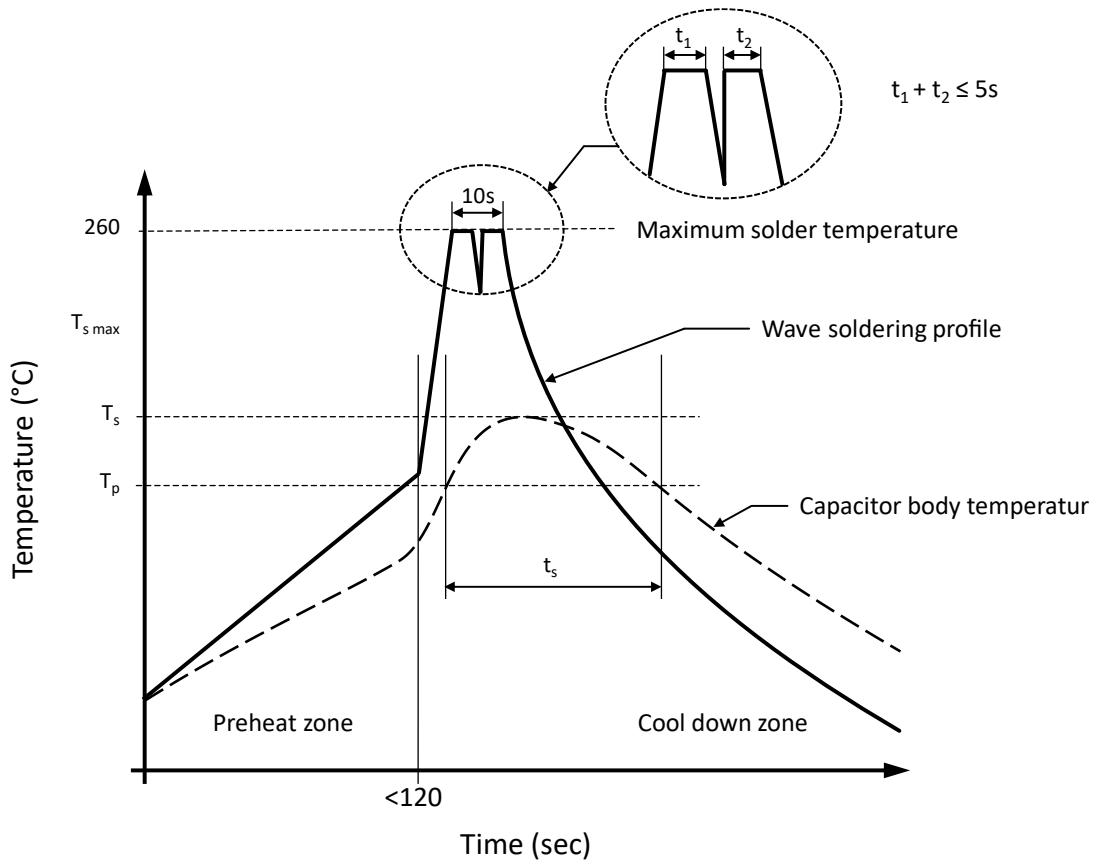
## TECHNICAL SPECIFICATION

| No. | Category                  | Specification                                    |                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                             |
|-----|---------------------------|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     |                           | Test Item                                        | Conditions                                                                                                                                                                                                                                                                                                                  | Performance                                                                                                                                                 |
| 7   | Endurance Characteristics | Damp heat steady state (IEC68-2-78)              | Test Ca<br>$T_{MAX} = 40 \pm 2^{\circ}\text{C}$<br>$RH = 93 \pm 3\%$<br>Duration 56 days<br>$1.5 \times V_{NDC}$ at ambient temperature<br>Duration 60sec<br>Visual examination<br>Capacitance at 1kHz<br>$\tan \delta$ at 10kHz                                                                                            | No puncturing or flashover<br>Self-healing punctures are permitted.<br>$ \Delta C/C  \leq 2.0\%$<br>Increase of $\tan \delta \leq 150 \times 10^{-4}$       |
|     |                           | Self-healing test                                | $1.5 \times V_{NDC}$<br>Duration 10sec<br>Number of clearings $\leq 5$<br>Clearing = voltage drop of 5 %<br>increase the voltage at 100 V/s till 5 clearings occur with a max. of $2.5 \times V_{NDC}$ for a duration of 10sec.<br>Capacitance at 1kHz<br>$\tan \delta$ at 10kHz                                            | $ \Delta C/C  \leq 0.5\%$<br>$\tan \delta \leq 1.2 \times \text{initial } \tan \delta_0 + 1 \times 10^{-4}$                                                 |
|     |                           | Thermal stability test under overload conditions | Natural cooling $T_{AMB} \pm 5^{\circ}\text{C}$<br>$1.21 \times P_{MAX}$<br>$1.1 \times I_{MAX}$<br>( $I_{MAX}$ see specific reference data)<br>Test duration 48h.<br>Measure the temperature every 1.5h during the last 6 h.<br><br>Capacitance at 1kHz<br>$\tan \delta$ at 10kHz                                          | Temperature rise $< 1^{\circ}\text{C}$<br>$ \Delta C/C  \leq 2\%$<br>Increase of $\tan \delta \leq 1.2 \text{ initial } \tan \delta_0 + 150 \times 10^{-4}$ |
|     |                           | Endurance test between terminals                 | Sequence<br>$1.4 \times V_{NDC}$ at $T_{MAX} = 85^{\circ}\text{C}$<br>Duration 250 h<br>$1000 \times$ discharge at $1.4 \times I$ (maximum repetitive peak current in continuous operation)<br>$1.4 \times V_{NDC}$ at $T_{MAX} = 85^{\circ}\text{C}$<br>Duration 250h<br><br>Capacitance at 1kHz<br>$\tan \delta$ at 10kHz | $ \Delta C/C  \leq 3\%$<br>Increase of $\tan \delta \leq 150 \times 10^{-4}$                                                                                |
|     |                           | Destruction test sequence                        | At $T_{MAX} = 85^{\circ}\text{C}$                                                                                                                                                                                                                                                                                           | No puncturing or flashover<br>Self-healing punctures are permitted                                                                                          |
|     |                           | High DC voltage test                             | Switch to high DC voltage = $2 \times V_{NDC}$<br>Duration 5sec                                                                                                                                                                                                                                                             |                                                                                                                                                             |
|     |                           | High AC voltage test                             | Switch to high AC voltage = $V_{NDC} / \sqrt{2}$<br>Duration 5min                                                                                                                                                                                                                                                           |                                                                                                                                                             |
|     |                           |                                                  | Repeat destruction sequence 3 times.<br>Visual examination                                                                                                                                                                                                                                                                  |                                                                                                                                                             |

## TECHNICAL SPECIFICATION

| No. | Category           | Specification                                                                                                                                                                                                                                                                                                             |
|-----|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8   | Storage conditions | It should be noted that the solderability of the terminals may be deteriorated when stored barely in an atmosphere for a long period.                                                                                                                                                                                     |
|     |                    | It should not be located in particularly high temperature and high humidity, it must submit to the following conditions (Keeping in the original package)<br>Temperature: 5°C to 35°C<br>Relative humidity: ≤ 70%<br>Storage period: ≤ 12 months<br>(Following the manufacturing date marked on the label in package bag) |
|     |                    | Avoid wetting the capacitor by water, oil, salt and/or poisonous gas.                                                                                                                                                                                                                                                     |
|     |                    | If used the capacitor that overdue the storage time, it should be test, the characteristics of the capacitor or contact with our technical engineer.                                                                                                                                                                      |
|     |                    |                                                                                                                                                                                                                                                                                                                           |

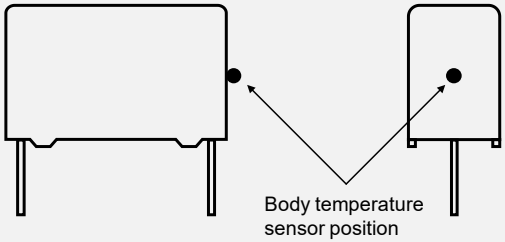
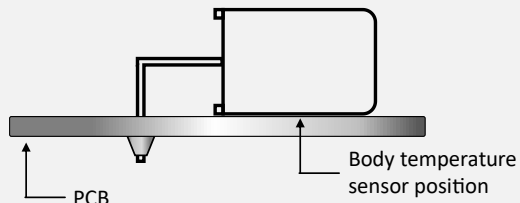
## RECOMMENDED WAVE SOLDERING PROFILE ▲ THT PACKAGE



Capacitor body temperature should follow the description below:

| Profile Features                                     |       | Polypropylene Film Capacitor                           | Polyester Film Capacitor                               |
|------------------------------------------------------|-------|--------------------------------------------------------|--------------------------------------------------------|
| Capacitor body maximum temperature at preheating     | $T_p$ | $\leq 110^\circ\text{C} / 120 \text{ seconds}$         | $\leq 125^\circ\text{C} / 120 \text{ seconds}$         |
| Capacitor body maximum temperature at wave soldering | $T_s$ | $\leq 120^\circ\text{C} / t_s \leq 45 \text{ seconds}$ | $\leq 150^\circ\text{C} / t_s \leq 45 \text{ seconds}$ |

## DETERMINING THE CAPACITOR BODY TEMPERATURE

| Vertical Mounting                                                                                                                                                                                                                              | Horizontal Mounting                                                                                                                                                                                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p>Body temperature sensor position</p> <p>The body temperature sensor position is defined as the highest temperature point around the capacitor body.</p> |  <p>PCB</p> <p>Body temperature sensor position</p> <p>If there is 90 degree bending product, the sensor position shall between product and PCB</p> |

## SOLDERING SUGGESTIONS

When solder a capacitor, heat in soldering is conducted to the element of the capacitor from wire lead and an enclosure, and hence it should be noted that soldering under high temperature and a long period may cause deterioration of breakdown of capacitors. Be sure to solder within the recommended temperature condition range.

### HAND SOLDERING

- a.) Soldering iron top temperature:  $\leq 350^{\circ}\text{C}$
- b.) Soldering time:  $\leq 3\text{sec}$

If re-work or dipping twice is necessary, it should be done after the capacitor returned to the normal temperature. Suggestion time is 24 hours.

THT film capacitors are not suitable for reflow soldering.

When SMD components are used together with film capacitor, the film capacitor should not pass into the SMD adhesive curing oven. The film capacitor should be assembled after the SMD process.

In order to ensure proper conditions for manual or selective soldering, the body (surface) temperature of the film capacitor ( $T_s$ ) must be  $\leq 120^{\circ}\text{C}$ .

## REVISION TABLE

| Revision | Date       | Status          | Notes               |
|----------|------------|-----------------|---------------------|
| 001      | 01/10/2021 | Initial release | Initial publication |
|          |            |                 |                     |
|          |            |                 |                     |
|          |            |                 |                     |
|          |            |                 |                     |
|          |            |                 |                     |

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It is subject to the user's duty of care to design and validate his products in such a way that appropriate measures are taken, such as protective circuits or redundant systems to ensure the safety standards required in the application.

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