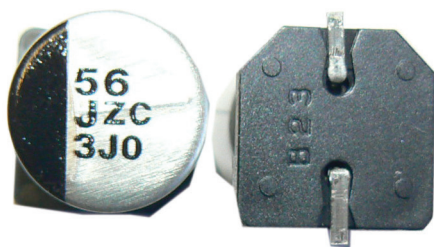


# Type HZC -55 °C to +125 °C

## SMT Hybrid Polymer-Aluminum Electrolytic Capacitors

For filtering, Bypassing and Power Supply Decoupling with Long Life Requirements



Type HZC hybrid capacitors are a combination of solid polymer aluminum technology with wet aluminum electrolytic technology. This results in a surface mount capacitor with a 4,000 hour life, low leakage current, high voltage capability, very low esr and small case sizes. They are ideal for high temperature and high reliability PC board designs. The vertical cylindrical cases facilitate automatic mounting and feature high reflow soldering temperature capability. Type HZC is RoHS compliant.

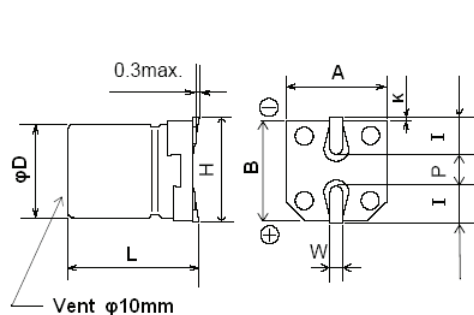
### Highlights

- +125 °C, Up to 4,000 Hours Load Life
- Low Leakage Current
- Very Low ESR and High Ripple Current
- 260 °C reflow soldering

### Specifications

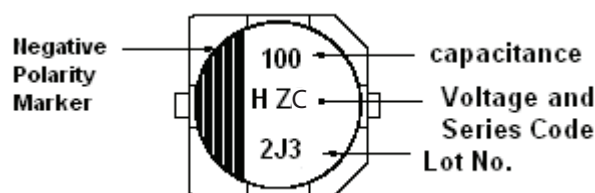
|                                             |                                                                                                                                                                      |        |         |           |         |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------|-----------|---------|
| Capacitance Range                           | 10 to 330 μF                                                                                                                                                         |        |         |           |         |
| Capacitance Tolerance                       | ±20% @ 120 Hz/+20 °C                                                                                                                                                 |        |         |           |         |
| Rated Voltage                               | 25, 35, 50, 63 Vdc                                                                                                                                                   |        |         |           |         |
| Leakage Current (at 20°C)                   | I = .01CV or 3 μA max., whichever is greater after 2 minutes<br>I = leakage current in μAmps<br>C = rated capacitance in μF<br>V = rated DC Working voltage in Volts |        |         |           |         |
| Low Temperature Characteristics (at 120 Hz) | Z(-25 °C)/Z(+20 °C): 2<br>Z(-55 °C)/Z(+20 °C): 2.5                                                                                                                   |        |         |           |         |
| Ripple Current Frequency Multiplier         | Frequency                                                                                                                                                            | 120 Hz | 1000 Hz | 10,000 Hz | 100 KHz |
|                                             | Correction Factor                                                                                                                                                    | 0.1    | 0.3     | 0.6       | 1       |
| RoHS Compliant                              |                                                                                                                                                                      |        |         |           |         |

### Outline Drawing



| Case Code | D<br>( $\pm 0.5$ ) | L<br>( $\pm 0.3$ ) | A<br>( $\pm 0.2$ ) | B<br>( $\pm 0.2$ ) | H<br>(max.) | I<br>(ref.) | W              | P<br>(ref.) | K                    |
|-----------|--------------------|--------------------|--------------------|--------------------|-------------|-------------|----------------|-------------|----------------------|
| C         | 5.0                | 5.8                | 5.3                | 5.3                | 6.5         | 2.2         | $0.65 \pm 0.1$ | 1.5         | $0.35^{+0.15/-0.20}$ |
| D         | 6.3                | 5.8                | 6.6                | 6.6                | 7.8         | 2.6         | $0.65 \pm 0.1$ | 1.8         | $0.35^{+0.15/-0.20}$ |
| X         | 6.3                | 7.7                | 6.6                | 6.6                | 7.8         | 2.6         | $0.65 \pm 0.1$ | 1.8         | $0.35^{+0.15/-0.20}$ |
| F         | 8.0                | 10.2               | 8.3                | 8.3                | 10.0        | 3.4         | $0.90 \pm 0.2$ | 3.1         | $0.70 \pm 0.2$       |
| G         | 10.0               | 10.2               | 10.3               | 10.3               | 12.0        | 3.5         | $0.90 \pm 0.2$ | 4.6         | $0.70 \pm 0.2$       |

### Capacitor Markings



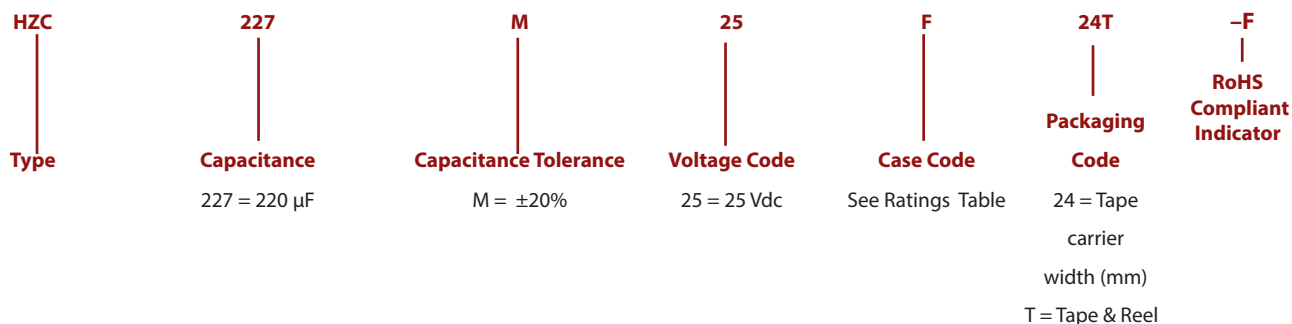
| Voltage Code | Voltage Vdc |
|--------------|-------------|
| E            | 25          |
| V            | 35          |
| H            | 50          |
| J            | 63          |

Lot, Number: Year, Line, Month

# Type HZC -55 °C to +125 °C

## SMT Hybrid Polymer-Aluminum Electrolytic Capacitors

### Part Numbering System



### Ratings

| Capacitance (µF)        | Voltage Rating (Vdc) | CDE Part Number  | MAX DCL (µA) | MAX DF @ 120 Hz/20°C | MAX E.S.R. @ 100kHz/+20°C (ohms) | MAX Ripple Current @ 100kHz/+125°C (A rms) | D (mm) | L (mm) | Case Code | QTY/reel |
|-------------------------|----------------------|------------------|--------------|----------------------|----------------------------------|--------------------------------------------|--------|--------|-----------|----------|
| 25 Vdc ( 32 Vdc Surge ) |                      |                  |              |                      |                                  |                                            |        |        |           |          |
| 33                      | 25                   | HZC336M025C12T-F | 8.2          | 0.14                 | 0.080                            | 0.55                                       | 5.0    | 5.8    | C         | 1000     |
| 56                      | 25                   | HZC566M025D16T-F | 14.0         | 0.14                 | 0.050                            | 0.90                                       | 6.3    | 5.8    | D         | 1000     |
| 100                     | 25                   | HZC107M025X16T-F | 25.0         | 0.14                 | 0.030                            | 1.40                                       | 6.3    | 7.7    | X         | 900      |
| 220                     | 25                   | HZC227M025F24T-F | 55.0         | 0.14                 | 0.027                            | 1.60                                       | 8.0    | 10.2   | F         | 500      |
| 330                     | 25                   | HZC337M025G24T-F | 82.5         | 0.14                 | 0.020                            | 2.00                                       | 10.0   | 10.2   | G         | 500      |
| 35 Vdc ( 44 Vdc Surge ) |                      |                  |              |                      |                                  |                                            |        |        |           |          |
| 22                      | 35                   | HZC226M035C12T-F | 7.7          | 0.12                 | 0.100                            | 0.55                                       | 5.0    | 5.8    | C         | 1000     |
| 47                      | 35                   | HZC476M035D16T-F | 16.4         | 0.12                 | 0.060                            | 0.90                                       | 6.3    | 5.8    | D         | 1000     |
| 68                      | 35                   | HZC686M035X16T-F | 23.8         | 0.12                 | 0.035                            | 1.40                                       | 6.3    | 7.7    | X         | 900      |
| 150                     | 35                   | HZC157M035F24T-F | 52.5         | 0.12                 | 0.027                            | 1.60                                       | 8.0    | 10.2   | F         | 500      |
| 270                     | 35                   | HZC277M035G24T-F | 94.5         | 0.12                 | 0.020                            | 2.00                                       | 10.0   | 10.2   | G         | 500      |
| 50 Vdc ( 63 Vdc Surge ) |                      |                  |              |                      |                                  |                                            |        |        |           |          |
| 10                      | 50                   | HZC106M050C12T-F | 5.0          | 0.10                 | 0.120                            | 0.50                                       | 5.0    | 5.8    | C         | 1000     |
| 22                      | 50                   | HZC226M050D16T-F | 11.0         | 0.10                 | 0.080                            | 0.75                                       | 6.3    | 5.8    | D         | 1000     |
| 33                      | 50                   | HZC336M050X16T-F | 16.5         | 0.10                 | 0.040                            | 1.10                                       | 6.3    | 7.7    | X         | 900      |
| 68                      | 50                   | HZC686M050F24T-F | 34.0         | 0.10                 | 0.030                            | 1.25                                       | 8.0    | 10.2   | F         | 500      |
| 100                     | 50                   | HZC107M050G24T-F | 50.0         | 0.10                 | 0.028                            | 1.60                                       | 10.0   | 10.2   | G         | 500      |
| 63 Vdc ( 79 Vdc Surge ) |                      |                  |              |                      |                                  |                                            |        |        |           |          |
| 10                      | 63                   | HZC106M063D16T-F | 6.3          | 0.08                 | 0.120                            | 0.70                                       | 6.3    | 5.8    | D         | 1000     |
| 22                      | 63                   | HZC226M063X16T-F | 13.8         | 0.08                 | 0.080                            | 0.90                                       | 6.3    | 7.7    | X         | 900      |
| 33                      | 63                   | HZC336M063F24T-F | 20.7         | 0.08                 | 0.040                            | 1.10                                       | 8.0    | 10.2   | F         | 500      |
| 56                      | 63                   | HZC566M063G24T-F | 35.2         | 0.08                 | 0.030                            | 1.40                                       | 10.0   | 10.2   | G         | 500      |

# Type HZC -55 °C to +125 °C

## SMT Hybrid Polymer-Aluminum Electrolytic Capacitors

### Load Life Test

|                                                       |                                                                                                                                                                                                        |
|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Test</b>                                           | Apply the maximum rated voltage for 4,000 hrs at +125 °C with full rated ripple current. After the test measure the capacitance, DF, DCL and ESR at +20 °C. Also measure the ESR at -40 °C and 100kHz. |
| <b>ΔC at 120Hz</b>                                    | Capacitance will be within ±30% of the initial measured value                                                                                                                                          |
| <b>DF at 120 Hz</b>                                   | DF will be ≤ 200% of the initial specified value                                                                                                                                                       |
| <b>DCL after 2 minute charge</b>                      | Leakage current will be ≤ the initial specified value                                                                                                                                                  |
| <b>ESR at 100kHz/+20 °C</b>                           | ESR will be ≤ 200% of the initial specified value                                                                                                                                                      |
| <b>Max. ESR at 100kHz/-40 °C after Load Life test</b> | Case Code C : 2.0 Ω; Case Code D : 1.4 Ω; Case Code X : 0.8 Ω;<br>Case Code F : 0.4 Ω; Case Code G : 0.3 Ω                                                                                             |

### Shelf Life Test

|                                  |                                                                                                                                                                                                                                                                                   |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Test</b>                      | Subject the capacitor to 1000 hrs at +125 °C without voltage. After the test, return the capacitor to room temperature for two hours and then apply rated voltage for 30 minutes. The after test measurements for capacitance, DF, DCL and ESR at +20 °C will meet the following. |
| <b>ΔC at 120 Hz</b>              | Capacitance will be within ±30% of the initial measured value                                                                                                                                                                                                                     |
| <b>DF at 120 Hz</b>              | DF will be ≤ 200% of the initial specified value                                                                                                                                                                                                                                  |
| <b>DCL after 2 minute charge</b> | Leakage current will be ≤ the initial specified value                                                                                                                                                                                                                             |
| <b>ESR at 100Khz/+20 °C</b>      | ESR will be ≤ 200% of the initial specified value                                                                                                                                                                                                                                 |

### Moisture Resistance Test

|                                  |                                                                                                                                                                                                                                                            |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Test</b>                      | Subject the capacitor to 2000 hrs at +85 °C/85%RH with rated voltage. After the test, return the capacitor to room temperature and humidity for two hours. The after test measurements for capacitance, DF, DCL and ESR at +20 °C will meet the following. |
| <b>ΔC at 120 Hz</b>              | Capacitance will be within ±30% of the initial measured value                                                                                                                                                                                              |
| <b>DF at 120 Hz</b>              | DF will be ≤ 200% of the initial specified value                                                                                                                                                                                                           |
| <b>DCL after 2 minute charge</b> | Leakage current will be ≤ the initial specified value                                                                                                                                                                                                      |
| <b>ESR at 100Khz/+20 °C</b>      | ESR will be ≤ 200% of the initial specified value                                                                                                                                                                                                          |

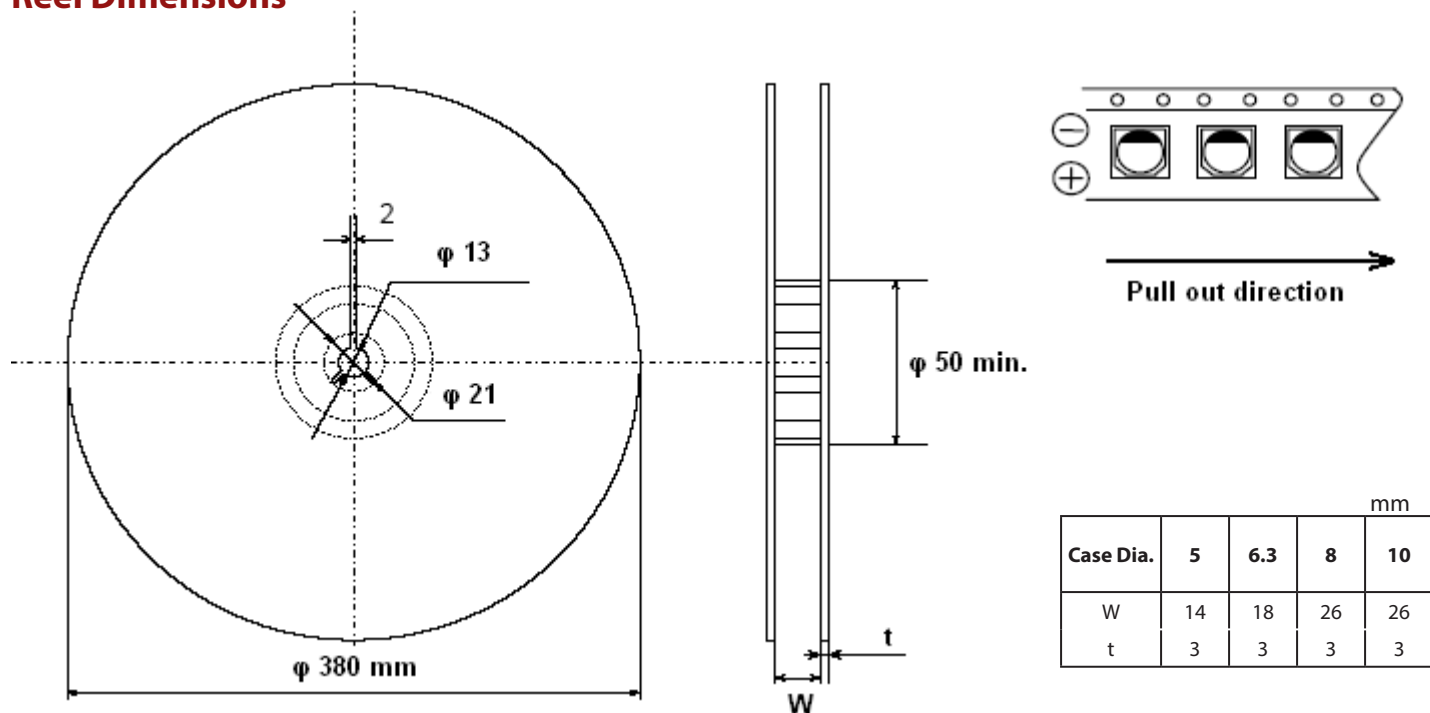
### Temperature Cycle Test

|                                  |                                                                                                                                                                                    |                    |                            |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------------------------|
| <b>Test</b>                      | Subject the capacitor to 1000 cycles of temperature change from -55 °C to +125 °C using the following sequence and durations.                                                      |                    |                            |
|                                  | <b>Step</b>                                                                                                                                                                        | <b>Temperature</b> | <b>Time at Temperature</b> |
|                                  | 1                                                                                                                                                                                  | -55 °C             | 30 minutes                 |
|                                  | 2                                                                                                                                                                                  | +20 °C             | 3 minutes max              |
|                                  | 3                                                                                                                                                                                  | +125 °C            | 30 minutes                 |
|                                  | 4                                                                                                                                                                                  | +20 °C             | 3 minutes max              |
|                                  | After the test, return the capacitor to +20°C for one to two hours before measurement. The after test measurements for capacitance, DF, and DCL at +20 °C will meet the following; |                    |                            |
| <b>ΔC at 120 Hz</b>              | Capacitance will be within ±20% of the initial measured value                                                                                                                      |                    |                            |
| <b>DF at 120 Hz</b>              | DF will be ≤ 200% of the initial specified value                                                                                                                                   |                    |                            |
| <b>DCL after 2 minute charge</b> | Leakage current will be ≤ the initial specified value                                                                                                                              |                    |                            |
| <b>Appearance</b>                | No significant change in appearance                                                                                                                                                |                    |                            |

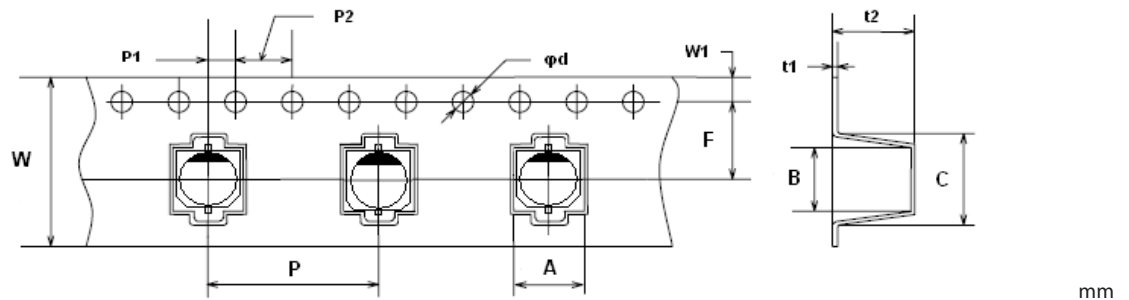
# Type HZC -55 °C to +125 °C

## SMT Hybrid Polymer-Aluminum Electrolytic Capacitors

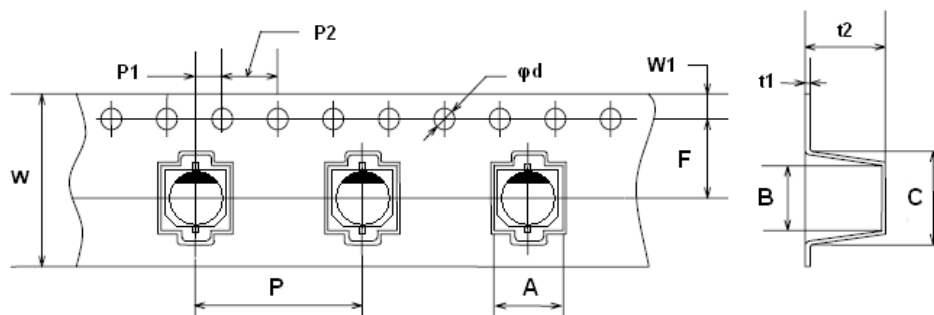
### Reel Dimensions



### Tape Dimensions



| Case Size (mm) | Case Code | $W \pm 0.3$ | $A \pm 0.2$ | $B^{+0.3/-0.2}$ | $C \pm 0.5$ | $F \pm 0.1$ | $P \pm 0.1$ | $t1$ | $t2 \pm 0.2$ | $\phi d^{+0.1/-0}$ | $P1 \pm 0.1$ | $P2 \pm 0.1$ | $W1 \pm 0.1$ |
|----------------|-----------|-------------|-------------|-----------------|-------------|-------------|-------------|------|--------------|--------------------|--------------|--------------|--------------|
| 5 x 5.8        | C         | 12          | 5.7         | 5.7             | 8.0         | 5.5         | 12          | 0.4  | 6.4          | 1.5                | 2            | 4            | 1.75         |

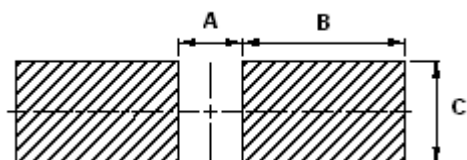


|                   |           |         |         |                        |         |         |         |     |          |            |          |          | mm       |
|-------------------|-----------|---------|---------|------------------------|---------|---------|---------|-----|----------|------------|----------|----------|----------|
| Case Size<br>(mm) | Case Code | W ± 0.3 | A ± 0.2 | B <sup>+0.3/-0.2</sup> | C ± 0.5 | F ± 0.1 | P ± 0.1 | t1  | t2 ± 0.2 | φd +0.1/-0 | P1 ± 0.1 | P2 ± 0.1 | W1 ± 0.1 |
| 6.3 x 5.8         | D         | 16      | 7       | 7                      | 9.0     | 7.5     | 12      | 0.4 | 6.4      | 1.5        | 2        | 4        | 1.75     |
| 6.3 x 7.7         | X         |         |         |                        |         |         |         |     | 8.4      |            |          |          |          |
| 8 x 10.2          | F         | 24      | 8.7     | 8.7                    | 12.5    | 11.5    | 16      | 0.4 | 11       |            |          |          |          |
| 10 x 10.2         | G         |         | 10.7    | 10.7                   | 14.5    |         |         |     |          |            |          |          |          |

# Type HZC -55 °C to +125 °C

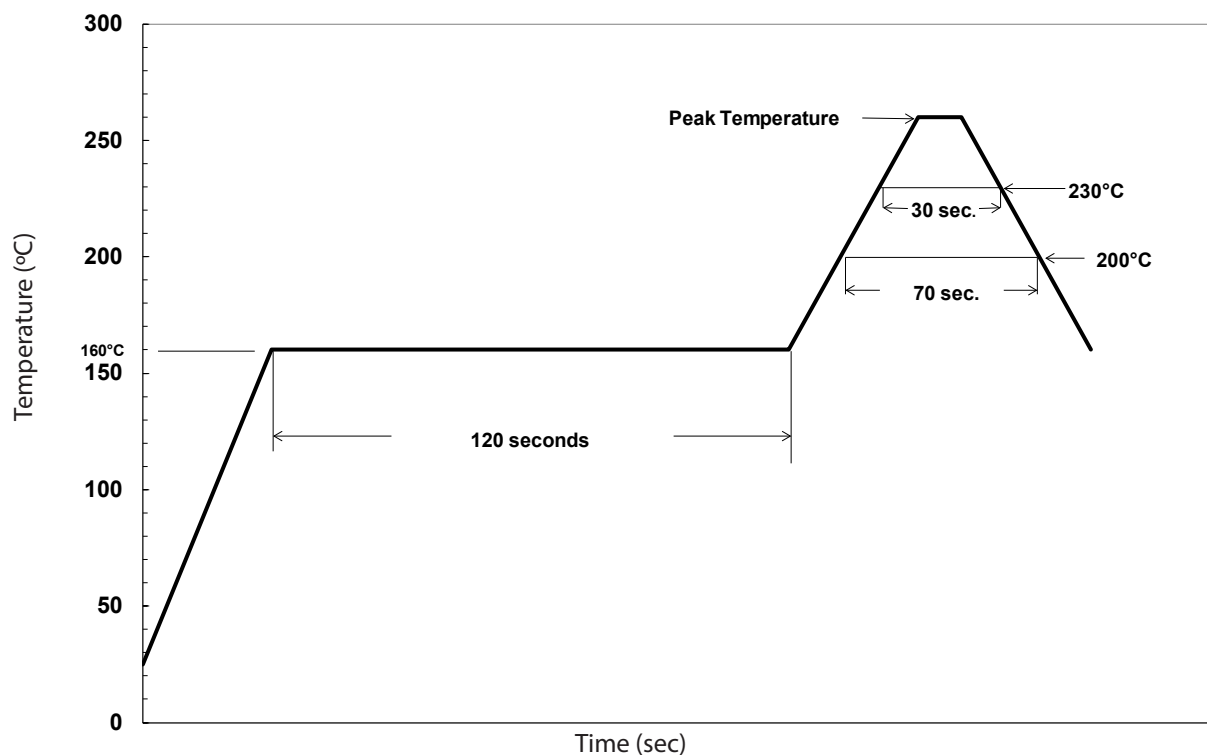
## SMT Hybrid Polymer-Aluminum Electrolytic Capacitors

### Recommended Land Dimensions



| Case Code | D (mm) | A   | B   | C   |
|-----------|--------|-----|-----|-----|
| C         | 5      | 1.5 | 2.8 | 1.6 |
| D         | 6.3    | 1.8 | 3.2 | 1.6 |
| X         | 6.3    | 1.8 | 3.2 | 1.6 |
| F         | 8      | 3.1 | 4.0 | 2.0 |
| G         | 10     | 4.6 | 4.1 | 2.0 |

### Recommended Reflow Soldering



| Case Code | Case Dia. (mm) | Peak Temperature | Time at or above 250 °C | Time at or above 230 °C | Time at or above 217 °C | Time at or above 200 °C | Number of Reflow Processes |
|-----------|----------------|------------------|-------------------------|-------------------------|-------------------------|-------------------------|----------------------------|
| C         | 5              | 260°C            | 5 seconds               | 30 seconds              | 40 seconds              | 70 seconds              | 2                          |
| D         | 6.3            |                  |                         |                         |                         |                         |                            |
| X         | 6.3            |                  |                         |                         |                         |                         |                            |
| F         | 8              | 260°C            | 5 seconds               | 30 seconds              | 40 seconds              | 70 seconds              | 1                          |
| G         | 10             |                  |                         |                         |                         |                         |                            |

#### Notes:

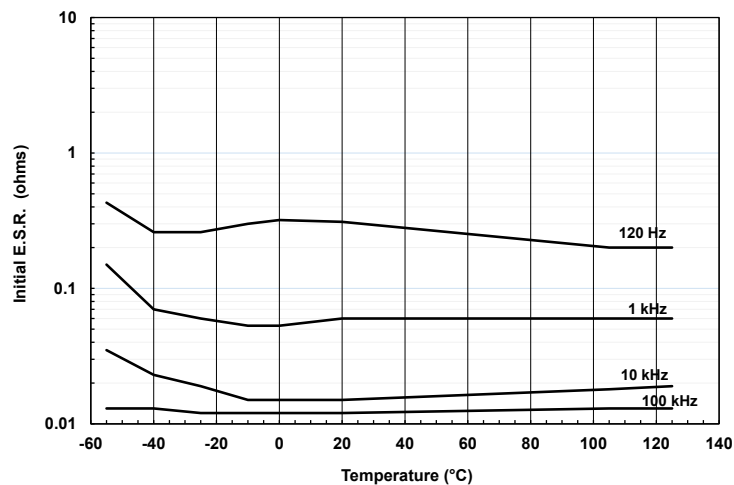
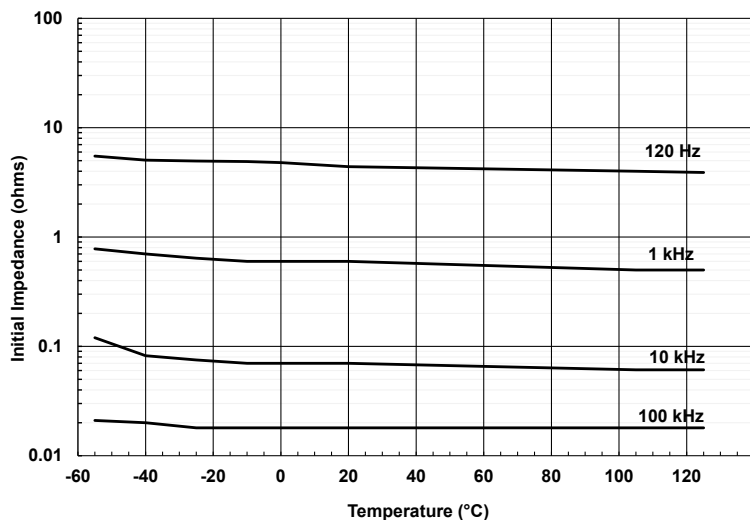
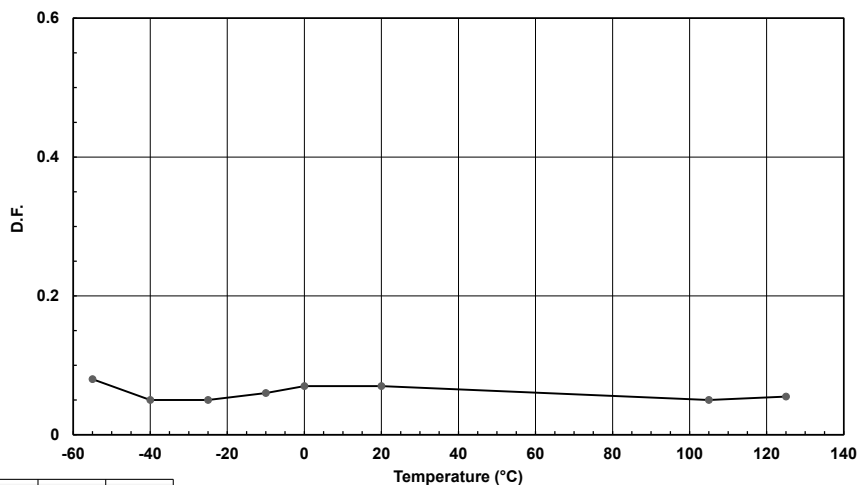
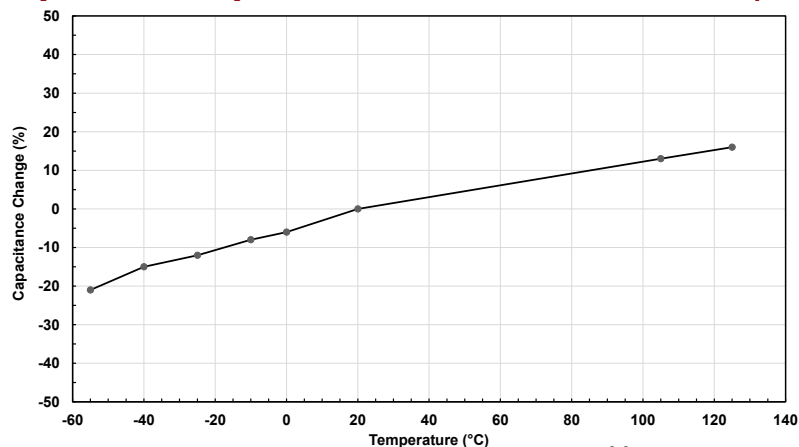
- For 5mm and 6.3 mm case dia., if the peak temperature does not exceed 255 °C the time at or above 250 °C can increase to 10 seconds.
- The capacitors in the 8mm and 10 mm case dia. can withstand 2 reflow processes, if the peak temperature does not exceed 245 °C and the time at or above 240 °C does not exceed 10 seconds.
- The 2nd reflow process should be performed after the capacitors have returned to room temperature.
- Temperature should be measured with a thermal couple placed on the top surface of the capacitor.
- After reflow soldering, the leakage current, D.F., and e.s.r., will meet the initial specifications, and the capacitance will be within  $\pm 10\%$  of the initial measured value when measured at room conditions.

# Type HZC -55 °C to +125 °C

## SMT Hybrid Polymer-Aluminum Electrolytic Capacitors

### Capacitor Temperature Characteristics

330  $\mu$ F/25V



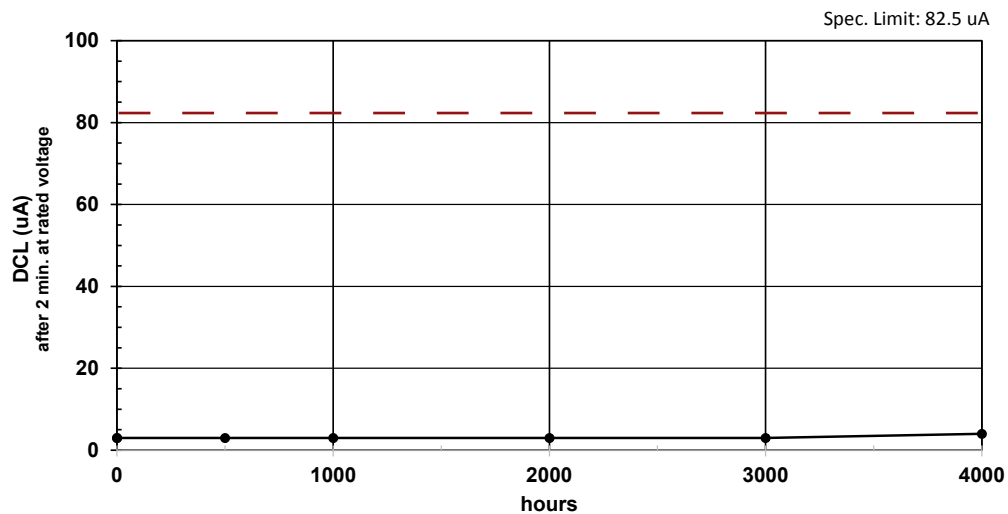
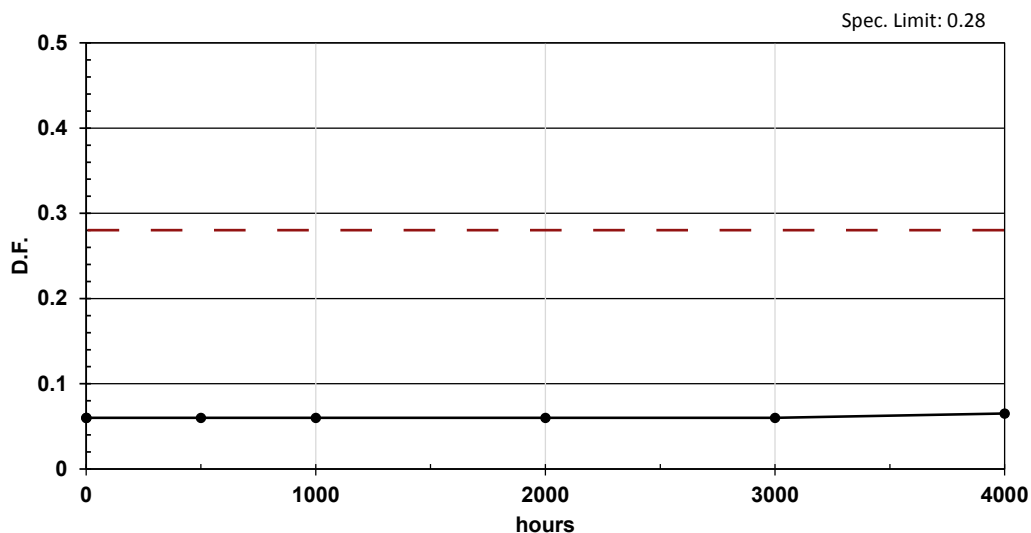
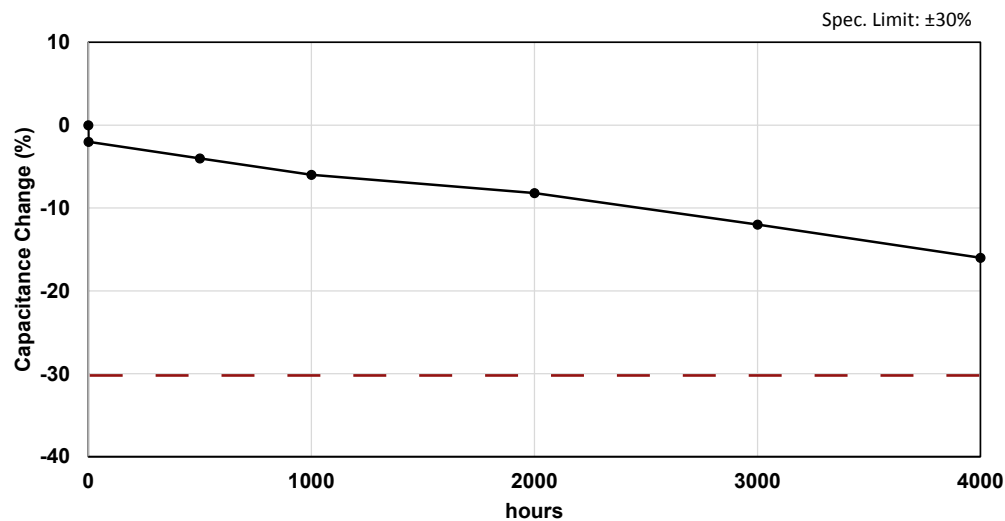
# Type HZC -55 °C to +125 °C

## SMT Hybrid Polymer-Aluminum Electrolytic Capacitors

### Capacitor Temperature Characteristics

#### Life Test Results

330  $\mu$ F/25V at +125 °C with rated voltage



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