

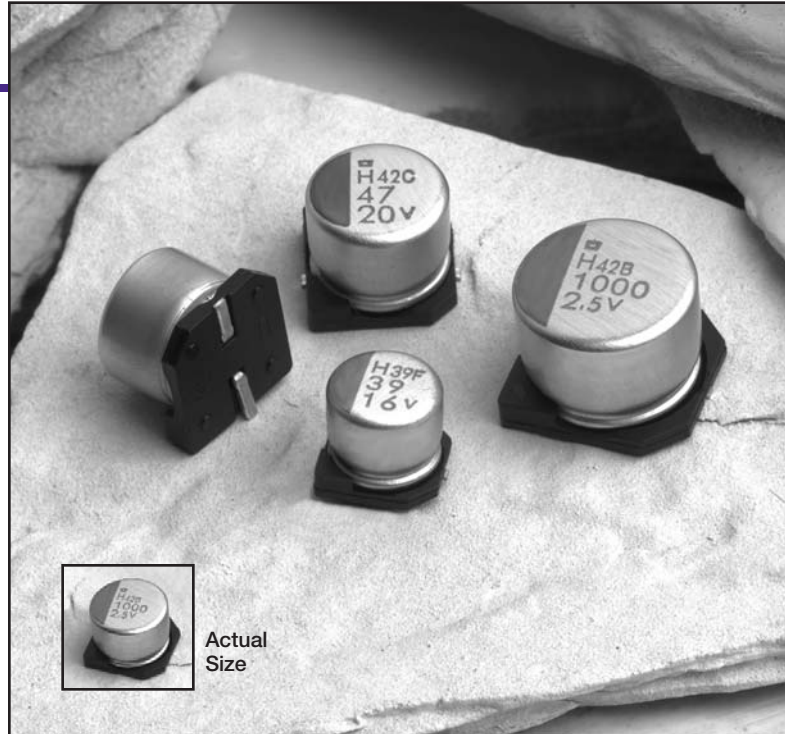
PXH Series

NEW SERIES
Engineering Bulletin Jun 04



**PXH POLYMER
ALUMINUM CHIP**

- **Solid Functional Polymer Aluminum**
- **High Temperature Up To +125°C**
- **Lead-Free Construction**
- **Ultra Low ESR**
- **Solvent Proof**



The PXH series is a new high temperature aluminum chip series that uses a solid functional polymer as the electrolyte. The high conductivity and good environmental stability of the polymer material results in excellent performance over the rated lifetime of 1,000 hours at +125°C. These PXH capacitors are high heat resistant with ultra low ESR and high ripple current capability. Constructed of durable lead-free materials, the PXH capacitors can withstand two reflow soldering cycles when exposed to lead-free alloy melting points up to 230°C. These capacitors are targeted for use in high temperature automotive applications but are also recommended for DC-DC converters, voltage regulators and decoupling applications for computer motherboards.

The PXH series capacitors are solvent proof. Refer to the Mini-Glossary for cleaning guidelines and recommended cleaning agents that are compatible with United Chemi-Con products.

Summary of Specifications

- **Surface mount terminals.**
- **Capacitance range: 22 to 1,000µF.**
- **Voltage range: 2.5 to 20VDC.**
- **Category temperature range: -55°C to +125°C.**
- **Leakage current: 0.2CV maximum after 2 minutes at +20°C.**
- **Standard capacitance tolerance: ±20%**
- **Nominal case size (D × L): 6.3 × 5.7mm, 8 × 6.7mm and 10 × 7.7mm.**
- **Rated lifetime: 1,000 hours at +125°C.**

PXH Specifications

| Item | Characteristics | | | | | | |
|---|--|-------------------|--------|---|-------------|---|-------------|
| Category Temperature Range | -55 to +125°C | | | | | | |
| Rated Voltage Range | 2.5 to 20VDC | | | | | | |
| Capacitance Range | 22 to 1,000 μ F | | | | | | |
| Capacitance Tolerance | $\pm 20\%$ (M) at +20°C, 120Hz | | | | | | |
| Leakage Current | <p>$I = 0.2CV$ maximum after 2 minutes at +20°C. Note: If you need to measure the leakage current, apply a voltage treatment by subjecting the capacitors to the DC rated voltage for 120 minutes at +125°C before the measurement. Where I = Max. leakage current (μA), C = Nominal capacitance (μF) and V = Rated voltage (V)</p> | | | | | | |
| Dissipation Factor (Tan δ) | 0.12 maximum at +20°C, 120Hz | | | | | | |
| Low Temperature Characteristics | <p>At 100kHz, impedance (Z) ratio between the -25°C or -55°C value and +20°C value shall not exceed the values given below.</p> <table border="1"> <tr> <td>Rated Voltage (V)</td> <td>2.5-20</td> </tr> <tr> <td>$Z(-25^\circ\text{C})/Z(+20^\circ\text{C})$</td> <td>$\leq 1.15$</td> </tr> <tr> <td>$Z(-55^\circ\text{C})/Z(+20^\circ\text{C})$</td> <td>$\leq 1.25$</td> </tr> </table> | Rated Voltage (V) | 2.5-20 | $Z(-25^\circ\text{C})/Z(+20^\circ\text{C})$ | ≤ 1.15 | $Z(-55^\circ\text{C})/Z(+20^\circ\text{C})$ | ≤ 1.25 |
| Rated Voltage (V) | 2.5-20 | | | | | | |
| $Z(-25^\circ\text{C})/Z(+20^\circ\text{C})$ | ≤ 1.15 | | | | | | |
| $Z(-55^\circ\text{C})/Z(+20^\circ\text{C})$ | ≤ 1.25 | | | | | | |
| Endurance (Load Life) | <p>The following specifications shall be satisfied when the capacitors are restored to +20°C after subjecting them to the DC rated voltage for 1,000 hours at +125°C.</p> <p>Appearance : no significant damage Capacitance change: $\leq \pm 20\%$ of initial measured value Tan δ (DF) : $\leq 200\%$ of initial specified value ESR : $\leq 200\%$ of initial specified value Leakage current : \leq initial specified value</p> | | | | | | |
| Bias Humidity Test | <p>The following specifications shall be satisfied when the capacitors are restored to +20°C after subjecting them to the DC rated voltage for 1,000 hours at +60°C, 90-95%RH.</p> <p>Appearance : no significant damage Capacitance change: $\leq \pm 20\%$ of initial measured value Tan δ (DF) : $\leq 150\%$ of initial specified value ESR : $\leq 150\%$ of initial specified value Leakage current : \leq initial specified value</p> | | | | | | |
| Surge Voltage Test | <p>The following specifications shall be satisfied when the capacitors are restored to +20°C after the surge voltage is applied at +105°C through a protective resistor of 1,000 ohms at a cycling of 30 seconds on, 5.5 minutes off for 1,000 cycles. The surge voltage shall not exceed 115% of the rated voltage.</p> <p>Appearance : no significant damage Capacitance change: $\leq \pm 20\%$ of initial measured value Tan δ (DF) : $\leq 150\%$ of initial specified value ESR : $\leq 150\%$ of initial specified value Leakage current : \leq initial specified value</p> | | | | | | |
| Failure Rate | 1% maximum per 1,000 hours at +125°C with rated voltage applied. (Confidence level 60%) | | | | | | |

Part Numbering System for PXH Series

When ordering, always specify complete catalog number for PXH Series.

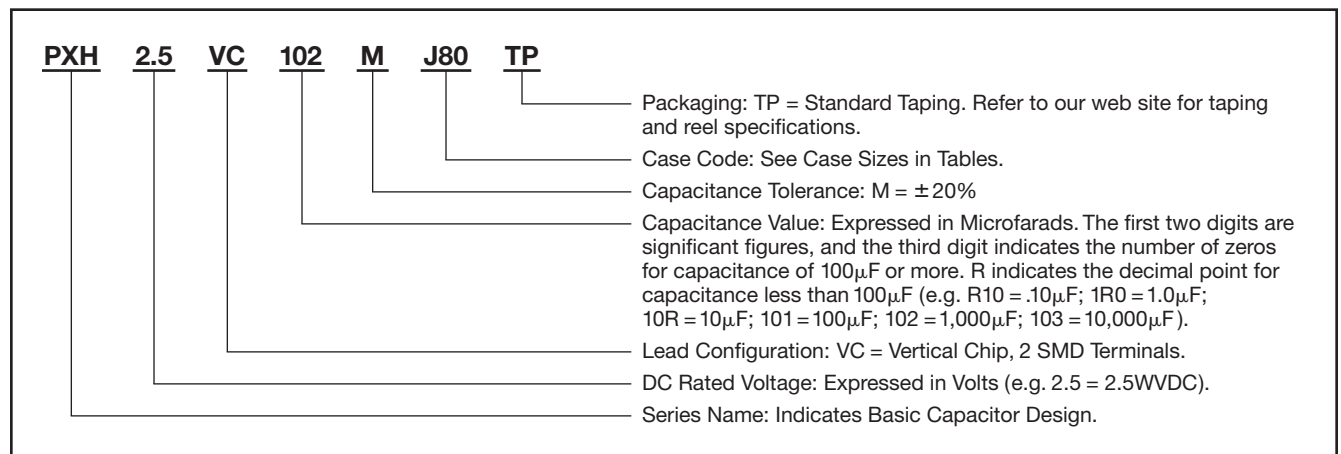


Diagram of Dimensions

Vertical Chip SMD Lead Terminals

VC Type

MARKING STYLE A

Unit: mm

Recommended PCB Land Pattern

Location of Capacitor

Solder Land

Case and PCB Land Pattern Dimensions

| Case Code | øD ±0.5 | L ±0.3 | A ±0.2 | B ±0.2 | C ±0.2 | W | P | a | b | c |
|-----------|---------|--------|--------|--------|--------|---------|-----|-----|-----|-----|
| F60 | ø6.3 | 5.7 | 6.6 | 6.6 | 7.2 | 0.5-0.8 | 1.9 | 1.9 | 3.5 | 1.6 |
| H70 | ø8 | 6.7 | 8.3 | 8.3 | 9.0 | 0.7-1.1 | 3.1 | 3.1 | 4.2 | 2.2 |
| J80 | ø10 | 7.7 | 10.3 | 10.3 | 11.0 | 0.7-1.1 | 4.5 | 4.5 | 4.4 | 2.2 |

Recommended Reflow Soldering Conditions

Temperature Profile for Air or Infrared Reflow Soldering Methods

Refer to our web site for additional reflow soldering guidelines and precautions for surface mount capacitors.

Time and Temperature Ranges

| Reflow Conditions | | For One Reflow Cycle | For Two Reflow Cycles (if necessary) |
|-------------------|-----------------------|----------------------|--------------------------------------|
| Preheat | Max. Time | 120 seconds | 120 seconds |
| | Temperature | 150°C | 150°C |
| Reflow | Max. Time Over 200°C | 60 (50*) seconds | 50 seconds |
| | Max. Time Over 230°C | 40 (30*) seconds | 30 seconds |
| | Max. Peak Temperature | 250°C (240°C*) | 250°C (240°C*) |

* Applies to 20V, 82µF J80 model only.

Standard Voltage Ratings - Surface Mount

| Rated Voltage (WVDC) | Capacitance (μF) | Catalog Part Number | Nominal Case Size* D × L (mm) | Case Code | Maximum ESR (mΩ) at +20°C 100k-300kHz | Rated Ripple Current (mA rms) at 100k-300kHz | |
|-------------------------------------|------------------|---------------------|-------------------------------|-----------|---------------------------------------|--|------------------|
| | | | | | | -55°C to +105°C | +105°C to +125°C |
| 2.5 Volts 2.9 Volts Surge | 220 | PXH2.5VC221MF60TP | 6.3 × 5.7 | F60 | 35 | 2,500 | 770 |
| | 560 | PXH2.5VC561MH70TP | 8 × 6.7 | H70 | 30 | 3,100 | 960 |
| | 1,000 | PXH2.5VC102MJ80TP | 10 × 7.7 | J80 | 25 | 3,700 | 1,100 |
| 4 Volts 4.6 Volts Surge | 150 | PXH4VC151MF60TP | 6.3 × 5.7 | F60 | 35 | 2,450 | 770 |
| | 220 | PXH4VC221MH70TP | 8 × 6.7 | H70 | 30 | 3,020 | 960 |
| | 680 | PXH4VC681MJ80TP | 10 × 7.7 | J80 | 25 | 3,700 | 1,100 |
| 6.3 Volts 7.2 Volts Surge | 82 | PXH6.3VC82RMF60TP | 6.3 × 5.7 | F60 | 40 | 2,400 | 720 |
| | 100 | PXH6.3VC101MF60TP | 6.3 × 5.7 | F60 | 40 | 2,400 | 720 |
| | 150 | PXH6.3VC151MH70TP | 8 × 6.7 | H70 | 30 | 3,020 | 960 |
| | 220 | PXH6.3VC221MH70TP | 8 × 6.7 | H70 | 30 | 3,020 | 960 |
| | 470 | PXH6.3VC471MJ80TP | 10 × 7.7 | J80 | 25 | 3,700 | 1,100 |
| 10 Volts 11.5 Volts Surge | 56 | PXH10VC56RMF60TP | 6.3 × 5.7 | F60 | 45 | 2,250 | 680 |
| | 120 | PXH10VC121MH70TP | 8 × 6.7 | H70 | 35 | 2,800 | 880 |
| | 150 | PXH10VC151MH70TP | 8 × 6.7 | H70 | 35 | 2,800 | 880 |
| | 330 | PXH10VC331MJ80TP | 10 × 7.7 | J80 | 30 | 3,700 | 1,010 |
| 16 Volts 18.4 Volts Surge | 39 | PXH16VC39RMF60TP | 6.3 × 5.7 | F60 | 50 | 2,050 | 650 |
| | 82 | PXH16VC82RMH70TP | 8 × 6.7 | H70 | 40 | 2,700 | 830 |
| | 150 | PXH16VC151MJ80TP | 10 × 7.7 | J80 | 35 | 3,020 | 930 |
| | 180 | PXH16VC181MJ80TP | 10 × 7.7 | J80 | 35 | 3,020 | 930 |
| 20 Volts 23 Volts Surge | 22 | PXH20VC22RMF60TP | 6.3 × 5.7 | F60 | 60 | 1,650 | 590 |
| | 47 | PXH20VC47RMH70TP | 8 × 6.7 | H70 | 45 | 2,000 | 780 |
| | 82 | PXH20VC82RMJ80TP | 10 × 7.7 | J80 | 45 | 2,400 | 820 |

* Refer to diagrams for detailed case size dimensions.