

Overview

Multilayer, metallized paper encapsulated and impregnated in self-extinguishing material that meets the requirements of UL 94 V-0.

Applications

Typical applications include interference suppressors with X2 + 2x Y2 capacitors in a delta configuration.

Benefits

- Approvals: ENEC, UL, cUL
- Rated Voltage: 275 VAC 50/60 Hz
- Capacitance X Value: 0.1 μ F, and 0.15 μ F
- Capacitance Y Value: 0.0022 μ F, 0.0033 μ F, and 0.0044 μ F
- Lead Spacing: 20 mm
- Capacitance Tolerance: $\pm 20\%$



Customer Part Number System

| PZB300 | M | C | 11 | R30 |
|--|---------------------|-------------------|---|----------------------------|
| Series | Rated Voltage (VAC) | Lead Spacing (mm) | Capacitance Code (pF) | Packaging |
| Delta EMI, X2 + 2xY2, Metallized Paper | M = 275 | C = 20.0 | The first digit indicates the value of the X capacitor: 1 = 0.10 μ F 2 = 0.15 μ F The second digit indicates the value of the Y capacitor: 1 = 0.0022 μ F 2 = 0.0033 μ F 3 = 0.0047 μ F | See Ordering Options Table |

KEMET Internal Part Number System

| P | 300 | P | L | 104 | M | 275 | A | C222 |
|-----------------|---|-------------------|---------------------|---|-----------------------|---------------------|----------------------------|---|
| Capacitor Class | Series | Lead Spacing (mm) | Size Code | X Capacitance Code (pF) | Capacitance Tolerance | Rated Voltage (VAC) | Packaging | Y Capacitance Code |
| P = Paper | Delta EMI, X2 + 2x Y2, Metallized Paper | P = 20 | See Dimension Table | The first two digits indicate the two most significant digits of the capacitance value in picofarads. The third digit is the number of following zeros. | M = $\pm 20\%$ | 275 = 275 | See Ordering Options Table | C plus the first two digits represent significant figures. The third digit specifies number of zeros. |

Built Into Tomorrow

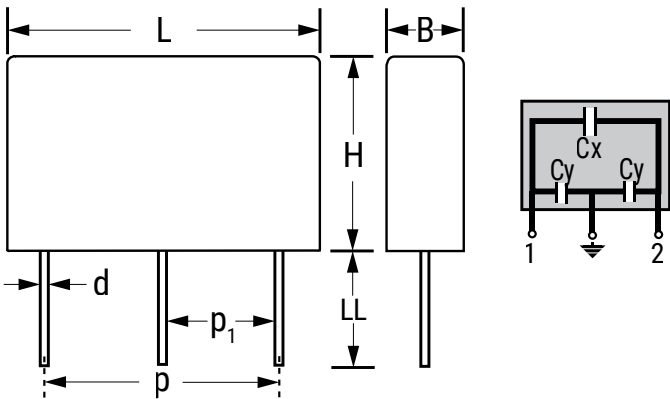
Benefits cont.

- Climatic Category: 40/100/56/B, IEC 60068-1
 - Tape & Reel packaging in accordance with IEC 60286-2
 - RoHS compliance and lead-free terminations
 - Operating temperature range of -40°C to +100°C
 - 100% screening factory test at 2,150 VDC/1,500 VAC
 - Excellent self-healing properties ensure long life, even when subjected to frequent overvoltages
- Good resistance to ionization due to impregnated paper dielectric
 - High dv/dt capability
 - Impregnated paper that ensures excellent stability and reliability properties, particularly in applications with continuous operation

Ordering Options Table

| Lead Spacing Nominal (mm) | Type of Leads and Packaging | Lead Length (mm) | KEMET Lead and Packaging Code | Legacy Lead and Packaging Code |
|---------------------------|-------------------------------------|------------------|-------------------------------|--------------------------------|
| 20 | Standard Lead and Packaging Options | | | |
| | Bulk (Bag) – Short Leads | 6 +0/-1 | C | R06 |
| | Bulk (Bag)– Maximum Length Leads | 30 +5/-0 | A | R30 |

Dimensions – Millimeters



| p | | p ₁ | | B | | H | | L | | d | |
|--|-----------|----------------|-----------|---------|-----------|---------|-----------|---------|-----------|---------|-----------|
| Nominal | Tolerance | Nominal | Tolerance | Nominal | Tolerance | Nominal | Tolerance | Nominal | Tolerance | Nominal | Tolerance |
| 20.0 | ±0.5 | 10.0 | Nominal | 12.5 | Maximum | 16.0 | Maximum | 24.0 | Maximum | 0.8 | ±0.05 |
| Note: See the Ordering Options Table for lead length (LL) options. | | | | | | | | | | | |



Performance Characteristics

| | | |
|--------------------------------|--|------|
| Rated Voltage | 275 VAC 50/60 Hz | |
| Capacitance Range | 0.1 μ F – 0.15 μ F | |
| Capacitance Tolerance | \pm 20% | |
| Temperature Range | –40°C to +100°C | |
| Climatic Category | 40/100/56/B | |
| Approvals | ENEC, UL, CSA | |
| Dissipation Factor | Maximum Values at +23°C | |
| | 1 kHz | 1.3% |
| Test Voltage Between Terminals | The 100% screening factory test is carried out at 2,150 VDC for X2 capacitors and 3,000 VDC for Y2 capacitors. The voltage level is selected to meet the requirements in applicable equipment standards. All electrical characteristics are checked after the test. This test may not be repeated due to potential capacitor damage. KEMET is not liable for any failures that result from repeating the test. | |
| Insulation Resistance | Between Terminals | |
| | \geq 12,000 M Ω | |

Environmental Test Data

| Test | IEC Publication | Procedure |
|----------------------|------------------------|--|
| Vibration | IEC 60068–2–6 Test Fc | 3 directions at 2 hours each, 10 – 500 Hz at 0.75 mm or 98 m/s ² (PZB300 MCx mounted on PC board) |
| Bump | IEC 60068–2–29 Test Eb | 4,000 bumps at 390 m/s ² |
| Solderability | IEC 60068–2–20 Test Ta | Solder globule method Wetting time < 1 second |
| Active Flammability | IEC 60384–14 | V _R + 20 surge pulses at 2.5 kV (pulse every 5 seconds) |
| Passive Flammability | IEC 60384–14 | IEC 60384–1, IEC 60695–11–5 Needle-flame test |
| Humidity | IEC 60068–2–3 Test Ca | +40°C and 90 – 95% R.H., 56 days |

Approvals

| Certification Body | Mark | Specification | File Number |
|--------------------|---|-------------------------------------|-------------|
| Intertek Semko AB |  | EN/IEC 60384-14 | SE/0140-24E |
| UL |  | UL 60384-14 CAN/CSA-E60384-14-09 | E73869 |

Environmental Compliance

All KEMET EMI capacitors are RoHS compliant.



Table 1 – Ratings & Part Number Reference

| Cx (μF) | Cy (μF) | Maximum Dimensions in mm | | | Lead Spacing (p) | Package Quantity | | | | New KEMET Part Number | Legacy Part Number |
|------------|------------|-----------------------------|--------|--------|------------------------|------------------|---------|-------------|-------------|--------------------------|-----------------------|
| | | B | H | L | | A (R30) | C (R06) | dV/dt Cx | dV/dt Cy | | |
| 0.10 | 0.0022 | 12.5 | 16.0 | 24.0 | 20.0 | 150 | 1,000 | 600 | 1,000 | P300PL104M275(1)C222 | PZB300MC11(1) |
| 0.10 | 0.0033 | 12.5 | 16.0 | 24.0 | 20.0 | 150 | 1,000 | 600 | 1,000 | P300PL104M275(1)C332 | PZB300MC12(1) |
| 0.10 | 0.0047 | 12.5 | 16.0 | 24.0 | 20.0 | 150 | 1,000 | 600 | 1,000 | P300PL104M275(1)C472 | PZB300MC13(1) |
| 0.15 | 0.0022 | 12.5 | 16.0 | 24.0 | 20.0 | 150 | 1,000 | 600 | 1,000 | P300PL154M275(1)C222 | PZB300MC21(1) |
| 0.15 | 0.0033 | 12.5 | 16.0 | 24.0 | 20.0 | 150 | 1,000 | 600 | 1,000 | P300PL154M275(1)C332 | PZB300MC22(1) |
| 0.15 | 0.0047 | 12.5 | 16.0 | 24.0 | 20.0 | 150 | 1,000 | 600 | 1,000 | P300PL154M275(1)C472 | PZB300MC23(1) |
| Cx (μF) | Cy (μF) | B (mm) | H (mm) | L (mm) | Lead Spacing (p) | A (R30) | C (R06) | dV/dt Cx | dV/dt Cy | New KEMET Part Number | Legacy Part Number |

(1) Insert lead and packaging code. See Ordering Options Table for available options.

Soldering Process

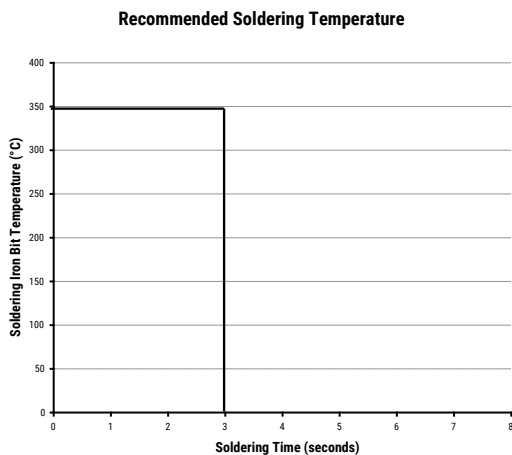
The implementation of the RoHS directive has resulted in the selection of SnAuCu (SAC) alloys or SnCu alloys as primary solder. This has increased the liquidus temperature from 183°C for SnPb eutectic alloys to 217 – 221°C for the new alloys. As a result the heat stress to the components, even in wave soldering, has increased considerably due to higher pre-heat and wave temperatures. Polypropylene capacitors are especially sensitive to heat (the melting point of polypropylene is 160 – 170°C). Wave soldering can be destructive, especially for mechanically small polypropylene capacitors (with lead spacing of 5 – 15 mm), and great care must be taken during soldering. The recommended solder profiles from KEMET should be used. Consult KEMET with any questions. In general, the wave soldering curve from IEC Publication 61760-1 Edition 2 serves as a solid guideline for successful soldering. See Figure 1.

Reflow soldering is not recommended for through-hole film capacitors. Exposing capacitors to a soldering profile in excess of the recommended limits may result in degradation of or permanent damage to the capacitors.

Do not place the polypropylene capacitor through an adhesive curing oven to cure resin for surface mount components. Insert through-hole parts after curing the surface mount parts. Consult KEMET to discuss the actual temperature profile in the oven, if through-hole components must pass through the adhesive curing process. A maximum of two soldering cycles is recommended. Allow time for the capacitor surface temperature to return to a normal temperature before the second soldering cycle.

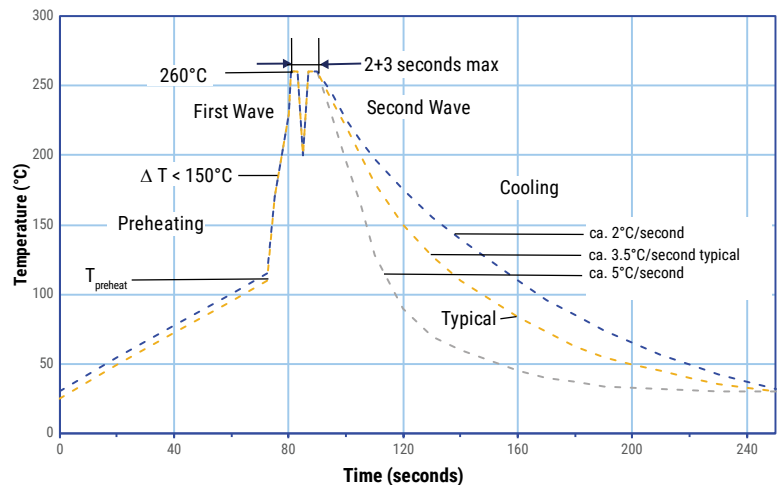
Manual Soldering Recommendations

Following is the recommendation for manual soldering with a soldering iron.



The soldering iron tip temperature should be set at 350°C (+10°C maximum) with the soldering duration not to exceed more than 3 seconds.

Wave Soldering Recommendations



Soldering Process cont.

Wave Soldering Recommendations cont.

1. The table indicates the maximum setup temperature of the soldering process.

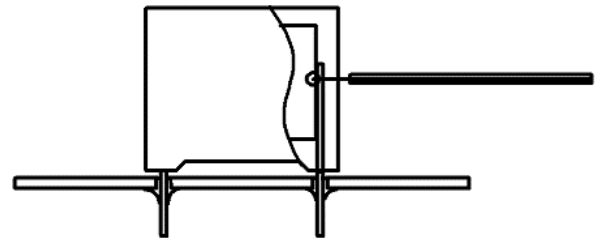
Figure 1

| Dielectric Film Material | Maximum Preheat Temperature | | | Maximum Peak Soldering Temperature | |
|--------------------------|-----------------------------|-------------------------|-------------------------|------------------------------------|-------------------------|
| | Capacitor Pitch ≤ 10 mm | Capacitor Pitch = 15 mm | Capacitor Pitch > 15 mm | Capacitor Pitch ≤ 15 mm | Capacitor Pitch > 15 mm |
| Polyester | 130°C | 130°C | 130°C | 270°C | 270°C |
| Polypropylene | 100°C | 110°C | 130°C | 260°C | 270°C |
| Paper | 130°C | 130°C | 140°C | 270°C | 270°C |
| Polyphenylene Sulphide | 150°C | 150°C | 160°C | 270°C | 270°C |

2. The maximum temperature measured inside the capacitor: set the temperature so that the maximum temperature is below the limit inside the element.

| Dielectric Film Material | Maximum Temperature Measured Inside the Element |
|--------------------------|---|
| Polyester | 160°C |
| Polypropylene | 110°C |
| Paper | 160°C |
| Polyphenylene Sulphide | 160°C |

The temperature is monitored inside the capacitor.

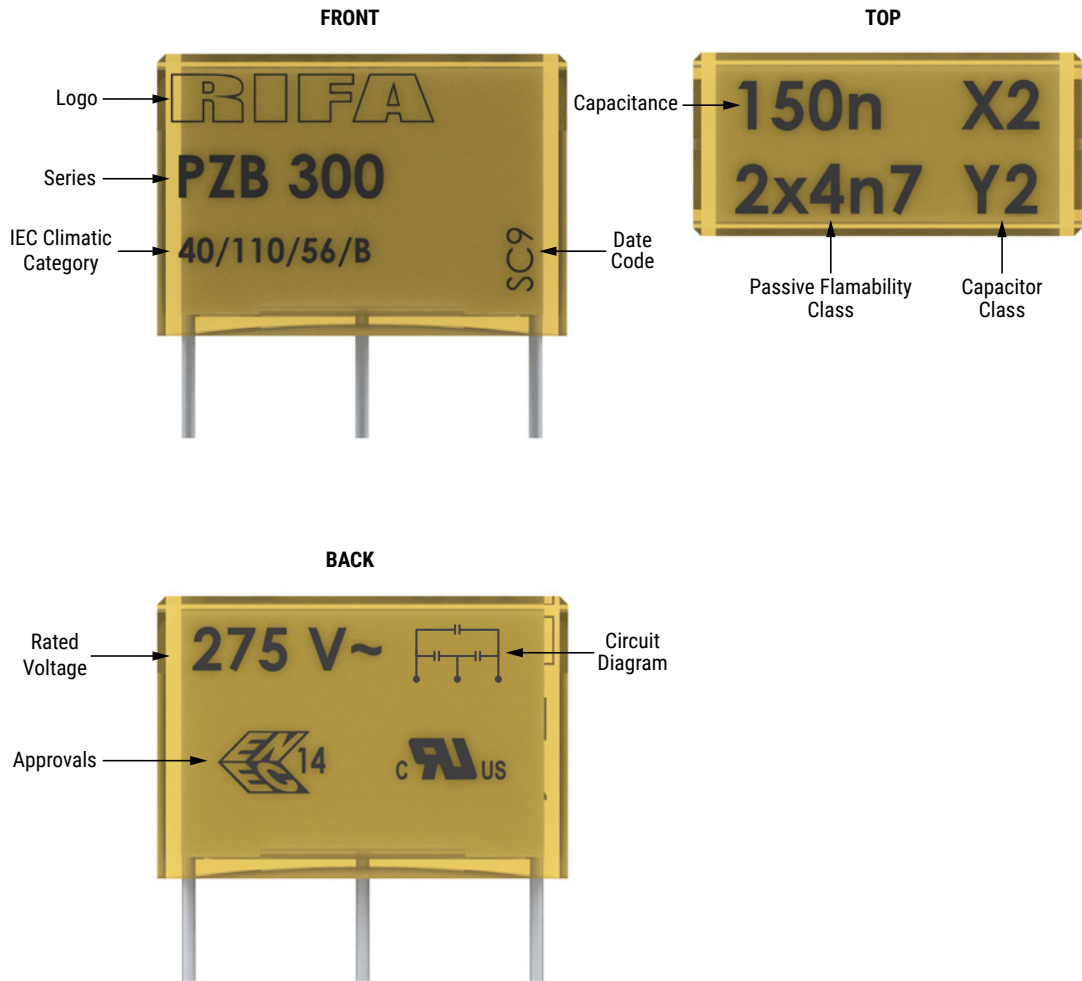


Selective Soldering Recommendations

Selective dip soldering is a variation of reflow soldering. In this method the printed circuit board with through-hole components to be soldered is preheated and transported over the solder bath, as in normal flow soldering, without touching the solder. When the board is over the bath, it is stopped. Pre-designed solder pots are lifted from the bath with molten solder only at the places of the selected components, and then pressed against the lower surface of the board to solder the components.

The temperature profile for selective soldering is similar to the profile for double wave flow soldering outlined in this document. **However, instead of two baths, there is only one with a time from 3 to 10 seconds.** In selective soldering, the risk of overheating is greater than in double wave flow soldering, and great care must be taken so that the parts do not overheat.

Marking



Manufacturing Date Code (IEC-60062)

| Y = Year, Z = Month | | | | | |
|---------------------|------|------|------|-----------|------|
| Year | Code | Year | Code | Month | Code |
| 2010 | A | 2022 | P | January | 1 |
| 2011 | B | 2023 | R | February | 2 |
| 2012 | C | 2024 | S | March | 3 |
| 2013 | D | 2025 | T | April | 4 |
| 2014 | E | 2026 | U | May | 5 |
| 2015 | F | 2027 | V | June | 6 |
| 2016 | H | 2028 | W | July | 7 |
| 2017 | J | 2029 | X | August | 8 |
| 2018 | K | 2030 | A | September | 9 |
| 2019 | L | | | October | 0 |
| 2020 | M | | | November | N |
| 2021 | N | | | December | D |

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