

Impregnated Metallized Paper EMI Suppression Capacitors SMP253, Class Y2, 250 VAC SMD (Automotive Grade)

Overview

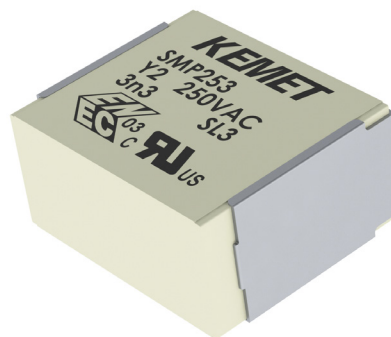
Multilayer, metallized paper, encapsulated and impregnated in self-extinguishing material that meets the requirements of UL 94 V-0.

Applications

For worldwide use as an electromagnetic interference suppressor in all Y2 applications, line-to-earth.

Benefits

- High dv/dt capability
- Impregnated paper that ensures excellent stability and reliability properties, particularly in applications with continuous operation
- Approvals: ENEC, cULus
- Rated voltage: 250 VAC 50/60 Hz, maximum recommended DC voltage 1,500 VDC
- Capacitance range: 0.001 – 0.0047 μ F
- Size code: 5045, 12.7 mm
- Capacitance tolerance: \pm 20%
- Automotive (AEC-Q200) grade



Customer Part Number System

| SMP253 | M | A | 4100 | M | TR24 |
|----------------------|---------------------|------------------|--|-----------------------|-------------|
| Series | Rated Voltage (VAC) | Chip Length (mm) | Capacitance Code (pF) | Capacitance Tolerance | Packaging |
| Y2, Metallized Paper | M = 250 | A = 12.7 | The last three digits represent significant figures. The first digit specifies the total number of digits. | M = \pm 20% | See Table 1 |

KEMET Internal Part Number System

| P | 101 | AA | 102 | M | 250 | V |
|-----------------|----------------------|---------------------|--|-----------------------|---------------------|----------------------------|
| Capacitor Class | Series | Chip Size | Capacitance Code (pF) | Capacitance Tolerance | Rated Voltage (VAC) | Packaging |
| P = Paper | Y2, Metallized Paper | See Dimension Table | First two digits represent significant figures. Third digit specifies number of zeros. | M = \pm 20% | 250 = 250 | See Ordering Options Table |

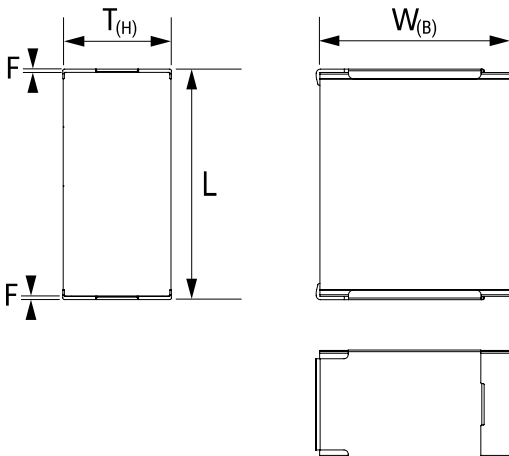
Benefits cont.

- Climatic category: 40/100/56/B, IEC 60068-1
- Tape & Reel packaging in accordance with IEC 60286-3
- RoHS compliance and lead-free terminations
- Operating temperature range of -40°C to +100°C
- 100% screening factory test at 3,000 VDC
- Highest possible safety regarding active and passive flammability
- Excellent self-healing properties ensure long life, even when subjected to frequent overvoltages
- Good resistance to ionization due to impregnated dielectric
- High dv/dt capability
- Impregnated paper that ensures excellent stability and reliability, particularly in applications with continuous operation

Ordering Options Table

| Packaging Type | KEMET Packaging Code | Legacy Packaging Code |
|--|----------------------|-----------------------|
| Standard Lead and Packaging Options | | |
| Tape & Reel (Standard Reel) | V | TR24 |
| Bulk (Bag) | A | BULK |
| Other Lead and Packaging Options | | |
| Tape & Reel (Vertical Orientation Standard Reel) | Y | TV24 |

Dimensions – Millimeters



| Chip Size | W | | T | | L | | F | |
|-----------|---------|-----------|---------|-----------|---------|-----------|---------|-----------|
| | Nominal | Tolerance | Nominal | Tolerance | Nominal | Tolerance | Nominal | Tolerance |
| 5045 | 11.5 | -0 /+0.6 | 6.5 | -0/+0.4 | 12.7 | -0/+0.4 | 0.5 | Nominal |

Performance Characteristics

| | | |
|--------------------------------|--|------|
| Rated Voltage | 250 VAC 50/60 Hz | |
| Capacitance Range | 0.001 – 0.0047 μ F | |
| Capacitance Tolerance | \pm 20% | |
| Temperature Range | -40°C to +100°C | |
| Climatic Category | 40/100/56/B | |
| Approvals | ENEC, cULus | |
| Dissipation Factor | Maximum Values at +23°C | |
| | 1 kHz | 1.3% |
| Test Voltage Between Terminals | The 100% screening factory test is carried out at 3,000 VDC. 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 | |
| | 12,000 M Ω | |

Qualification

Automotive grade products meet or exceed the requirements outlined by the Automotive Electronics Council. Details regarding test methods and conditions are referenced in document AEC-Q200, Stress Test Qualification for Passive Components. For additional information regarding the Automotive Electronics Council and AEC-Q200, please visit their website at www.aecouncil.com.

Cleaning/Storage and Moisture Recommendations

Cleaning Suggestions

To clean the PCB assembly KEMET recommends to use a suitable solvent like Isopropyl alcohol, deionized water or neutral pH detergents. Aggressive solvents shall not be used. For any different cleaning solvent used please contact KEMET Technical Services to analyze the potential impact on KEMET products.



Storage and Moisture Recommendations

KEMET SMD film capacitors are supplied in a moisture barrier bag (MBB) Class 1. We can guarantee a 24 month shelf life (temperature \leq 40°C/relative humidity \leq 90%). After the MBB has been opened, components may stay in areas with controlled temperature and humidity (temperature \leq 30°C/relative humidity \leq 60%) for 168 hours (MSL 3). For longer periods of time and/or higher temperature and/or higher relative humidity values, it is absolutely necessary to protect the components against humidity. If the reel inside the MBB is partially used, KEMET recommends to re-use the same MBB or to avoid areas without controlled temperature and humidity (see above). If the above conditions are not respected, components require baking (minimum time: 48 hours at 55 \pm 5°C, \leq 5% RH) before the reflow.

Environmental Test Data

| Test | IEC Publication | Procedure |
|-------------------------------|--------------------------------|---|
| Impulse Voltage and Endurance | IEC 60384-14 | 1.7 x V _R VAC 50 Hz, once every hour increase to 1,000 VAC for 0.1 second, 1,000 hours at upper rated temperature. |
| 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 |
| Bump | IEC 60068-2-27 Test Eb | 4,000 bumps at 390 m/s ² |
| Rapid Change of Temperature | IEC 60068-2-14 Test Na | Upper and lower rated temperature 5 cycles |
| Active Flammability | IEC 60384-14 | V _R + 20 surge pulses at 5 kV (pulse every 5 seconds) |
| Passive Flammability | IEC 60384-14 IEC 60695-11-5 | Needle-flame test |
| Humidity | IEC 60068-2-3 Test Ca | +40°C and 90 – 95% R.H. |
| Damp Heat Steady State | IEC 60068-2-78 Test Cab | +40 ±2°C and 93 ±3% R.H., 56 days |

Approvals

| Certification Body | Mark | Specification | File Number |
|--------------------|---|-----------------------------------|-------------|
| IMQ S.p.A. |  | EN/IEC 60384-14 | CA08.00226 |
| UL |  | UL 60384 and CAN/CSA E60384-14 | E97797 |

Environmental Compliance

All KEMET EMI capacitors are RoHS compliant.



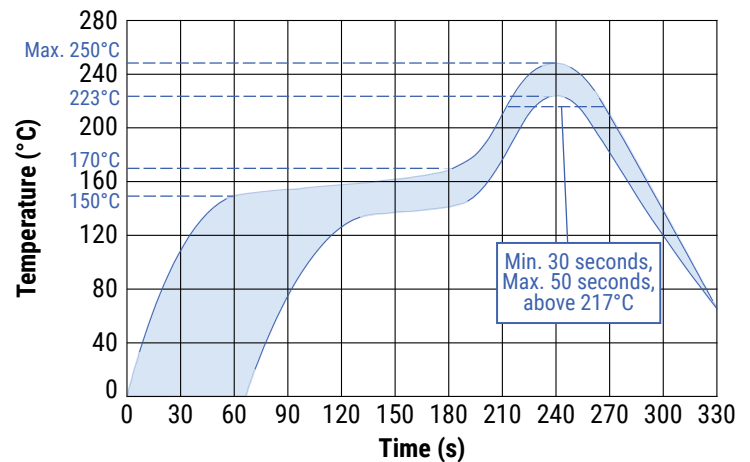
Table 1 – Ratings & Part Number Reference

| Capacitance Value (μF) | Maximum Dimensions in mm | | | dV/dt ($\text{V}/\mu\text{s}$) | KEMET Part Number | Customer Part Number |
|-------------------------------------|--------------------------|--------------|--------------|----------------------------------|-------------------|----------------------|
| | W -0/+0.6 | T -0/+0.4 | L -0/+0.4 | | | |
| 0.0010 | 11.5 | 6.5 | 12.7 | 2,000 | P101AA102M250(1) | SMP253MA4100M(1) |
| 0.0015 | 11.5 | 6.5 | 12.7 | 2,000 | P101AA152M250(1) | SMP253MA4150M(1) |
| 0.0022 | 11.5 | 6.5 | 12.7 | 2,000 | P101AA222M250(1) | SMP253MA4220M(1) |
| 0.0025 | 11.5 | 6.5 | 12.7 | 2,000 | P101AA252M250(1) | SMP253MA4250M(1) |
| 0.0033 | 11.5 | 6.5 | 12.7 | 2,000 | P101AA332M250(1) | SMP253MA4330M(1) |
| 0.0039 | 11.5 | 6.5 | 12.7 | 2,000 | P101AA392M250(1) | SMP253MA4390M(1) |
| 0.0047 | 11.5 | 6.5 | 12.7 | 2,000 | P101AA472M250(1) | SMP253MA4470M(1) |
| Capacitance Value (μF) | W (mm) | T (mm) | L (mm) | dV/dt ($\text{V}/\mu\text{s}$) | KEMET Part Number | Customer Part Number |

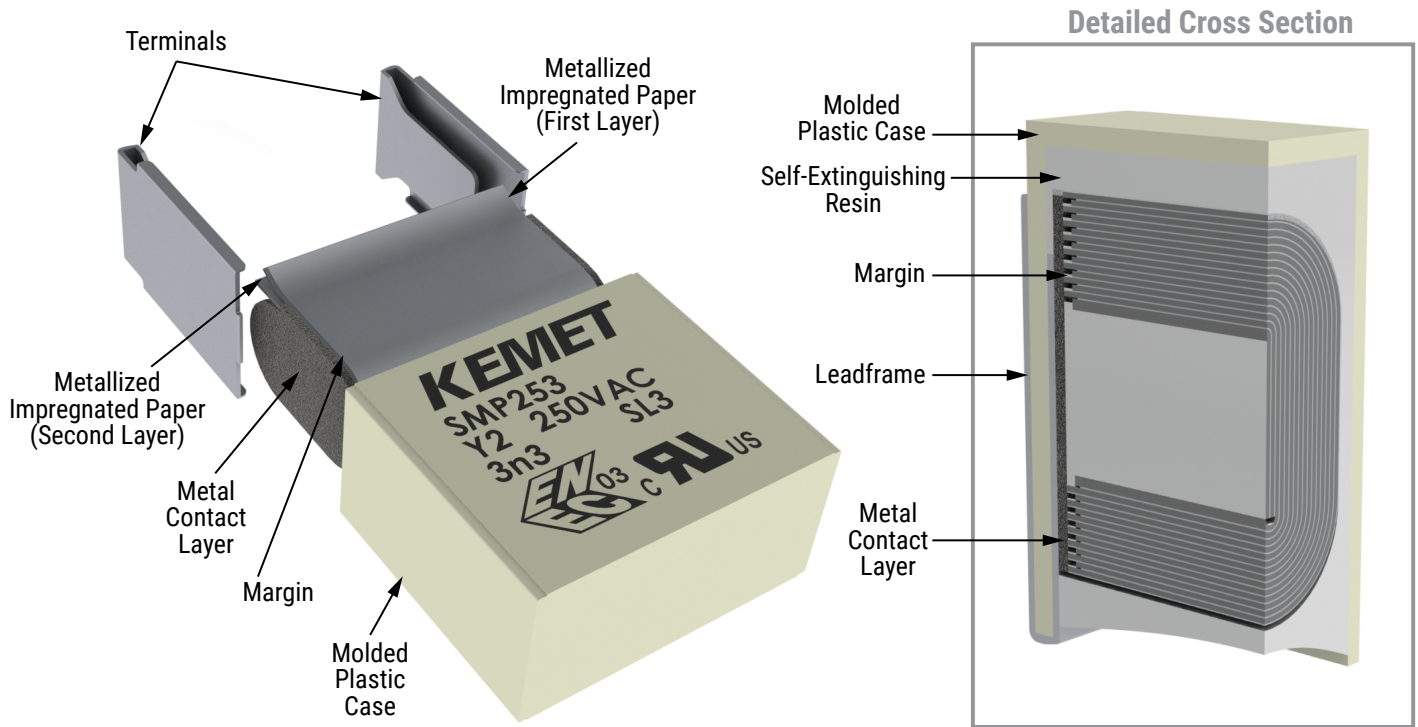
(1) Insert packaging code. See Ordering Options Table for available options.

Soldering Process

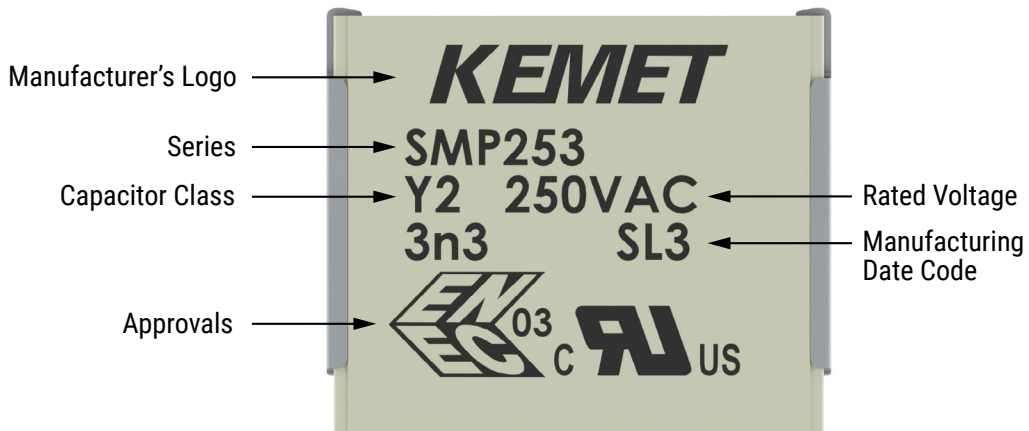
Reflow soldering temperature is measured on the top body surface of the component. Use the recommended soldering profiles for convection reflow ovens and IR reflow ovens. If a vapor phase reflow oven is used, consult KEMET. Exceeding the manufacturer's process recommendations may harm the component. KEMET is not liable for any defect caused by exceeding recommendations. According to international standards, the maximum temperature capability must be measured on the top surface of a component. The international standards do not define how the thermocouple should be fastened on the component. Our recommendation for attaching the thermocouple to the top surface of the component is to glue it with high-temperature resistant glue.



Construction



Marking

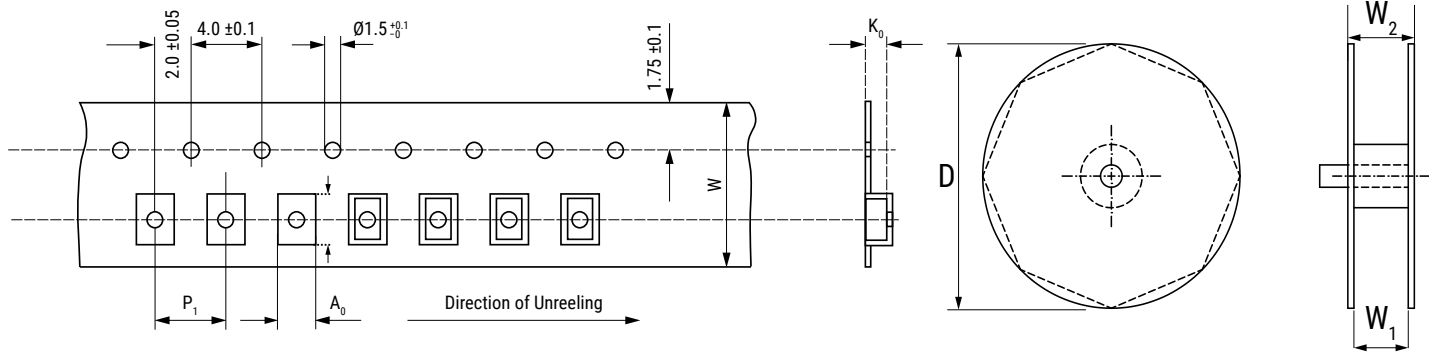


Packaging Quantities

| Chip Size EIA | Thickness (mm) | Height (mm) | Length (mm) | Standard Reel (330 mm) | |
|---------------|----------------|-------------|-------------|------------------------|----------------------|
| | | | | Horizontal Orientation | Vertical Orientation |
| 5045 | 11.5 | 6.5 | 12.7 | 600 | 400 |

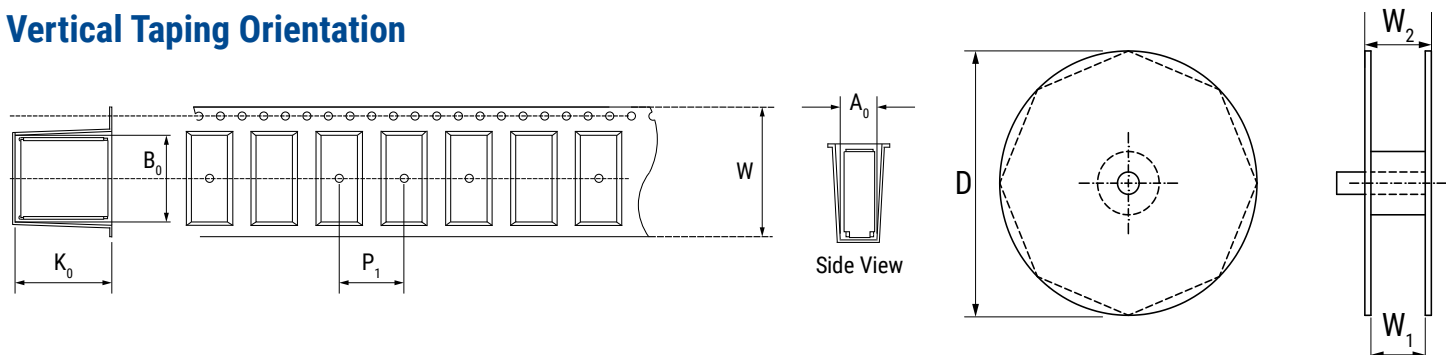
Carrier Taping & Packaging (IEC 60286-2)

Horizontal Taping Orientation



| EIA Size Code Horizontal Mounting | Dimensions in mm | | | Taping Specification | | | | | | | |
|---|------------------|---------|---------|----------------------|----------------|----------------|----------------|----------------|------|----------------|----------------|
| | B | H | L | W | P ₁ | A ₀ | B ₀ | K ₀ | D | W ₁ | W ₂ |
| | Nominal | Nominal | Nominal | -0/+0.3 | +/-0.1 | Nominal | Nominal | Nominal | ±2.0 | -0/+2 | Maximum |
| 5045 | 11.5 | 6.5 | 12.7 | 24.0 | 16.0 | 11.9 | 13.1 | 6.8 | 330 | 24.4 | 30.0 |

Vertical Taping Orientation



| EIA Size Code Vertical Mounting | Dimensions in mm | | | Taping Specification | | | | | | | |
|---------------------------------------|------------------|---------|---------|----------------------|----------------|----------------|----------------|----------------|------|----------------|----------------|
| | B | H | L | W | P ₁ | A ₀ | B ₀ | K ₀ | D | W ₁ | W ₂ |
| | Nominal | Nominal | Nominal | -0/+0.3 | +/-0.1 | Nominal | Nominal | Nominal | ±2.0 | -0/+2 | Maximum |
| 5026 (5045) | 12.7 | 6.5 | 11.5 | 24.0 | 16.0 | 6.9 | 13.1 | 11.8 | 330 | 24.4 | 30.0 |

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