Micromax™ 2150

Microcircuit and Component Materials

2100 Series Resistor Compositions For Hybrid Circuites

Micromax™ 2100 Series resistor compositions are designed to provide excellent electrical properties, lower overall process sensitivity, for Hybrid circuits with new resistor materials technology.

Performance characteristics

- HTCR's of less than 50 ppm/°C @0 – 70°C
- Low noise
- Excellent electrostatics
- Discharge (ESD)
- Excellent short term
- Overload (STOL)

Processing features

- Low sensitivity to peak firing temperature
- No blend break from 1Ω to 10MΩ/sq.
- Small shifts of resistivity and TCR on re-firing
- Designed to give high power performance at low thickness (18µm dry thickness)
- Compatible with Hi-Ag termination Micromax™ 5164N (Pt/Ag), or Pd/Ag.
- Excellent printability
- Small length and thickness effects on resistivity and TCR
- Cadmium, Nickel and Phthalate free*

*Cadmium, Nickel and Phthalate 'free' as used herein means that cadmium, nickel and phthalate are not intentional ingredients in and are not intentionally added to the referenced product. Trace amount however may be present.

Product information

Solvent or thinner	Micromax™ 8250
Blend member or series	2100srs

Application technique

Mask mesh	325[1]	
Mask emulsion	5 - 10	µm
Drying time	10	min
Drying temperature	150	°C
Recommended film thickness, dried	16 - 20	µm
Leveling time	5 - 10	min

[1]: Screen Types: Stainless steel

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Electrical properties

Surface resistivity	8E7 - 1.2E8[2]	mOhm per square
Hot Temperature Coefficient Resistance	-50 - 50[3]	ppm/K
Cold Temperature Coefficient Resistance	-50 - 50[4]	ppm/K
Temperature Coefficient Resistance, length effect	≤40[5]	ppm
Temperature Coefficient Resistance, firing sensitivity	≤0.5[6]	ppm/K
Electrostatic discharge, 5kV	≤0.1[7]	(avgDeltaR)(%)
Electrostatic discharge, other voltage	≤2[8]	(avgDeltaR)(%)
Noise	≤-6[9]	dB

[2]: Unless otherwise noted, resistors were printed on Micromax™ 5164N terminations at 18µm dried thickness. Then fired in 30 minute cycle with 850°C peak for 10 minutes. Resistor geometry is 1.0mm x 1.0mm. Shipping specifications for resistivity are as shown.

[3]: Temperature coefficient of resistance from +25 to +70 for hot TCR

[4]: Temperature coefficient of resistance from +25 to 0°C for cold TCR

[5]: Difference in TCR between 0.3mm and 0.8mm resistor length.

[6]: The effect of firing temperature on TCRs between 825 and 875°C, ppm/°C/°C.

[7]: Untrimmed resistors, 0.8mm x 0.8mm @ 5kV. Electrostatic discharge using 100pF/1500ΩR/C network.

[8]: Untrimmed resistors, 0.5mm x 0.5mm @ 25kV. Electrostatic discharge using 100pF/1500ΩR/C network.

[9]: Quan-Tech model 315C, Untrimmed resistors, 0.8mm x 0.8mm.

Storage and stability

Shelf life	6[10]	months

[10]: in unopened containers, from date of shipment, at room temperature (<25°C)

Additional information

How to use

Processing

- **Termination**
  - Micromax™ 2100 Series are designed for use with high silver terminations. Reported properties are obtained on Micromax™ 5164N Pt/Ag terminations.
- **Blendability**
  - Adjacent members of Micromax™ 2100 Series are totally blendable. Electrical performance between members approaches linear behavior. Log resistance versus blind ratio is nearly linear.
- **Substrates**
  - Reported properties are based on tests with 96% alumina substrates. Substrates of other compositions may yield variation in performance properties.
- **Printing**
  - Properties are based on resistors printed to 18±2µm dried thickness. This is achieved by using 325 mesh stainless steel screen with emulsion thickness of 5 to 10µm. Resistors smaller

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than 0.3mm x 0.3mm are best printed using a 400 mesh stainless steel screen.

- Thinning
  - Micromax™ 2100 Series is optimized for screen printing and thinning is not normally required. For minor adjustment, Micromax™ thinner 8250 is recommended.
- Drying
  - Prints should be allowed to level at room temperature then dried.
- Firing
  - Properties are based on a 30 minutes firing cycle with 10 minutes at a peak of 850°C.
- Encapsulant
  - Micromax™ 2100 Series is compatible with glass encapsulant fired at 500-560°C.
- Laser trimming
  - Micromax™ 2100 Series is designed to allow fast laser trimming to achieve tight resistor tolerances. Table gives suggested laser trimming parameters. Laser trimming may be optimized by the user.

Storage and shelf life

Containers should be stored, tightly sealed, in a clean, stable environment at room temperature (<25°C). Shelf life of material in unopened containers is six months from date of shipment. Some settling of solids may occur and compositions should be thoroughly mixed prior to use.

Safety and handling

For safety and handling information pertaining to this product, read Safety Data Sheet (SDS).

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