

Micromax™ 1105

Electronic Inks and Pastes

High Voltage Thick Film Resistor Composition

Product benefits

- 100KΩ/sq - 1GΩ/sq resistivity
- Superior TCR
- Excellent VCR behavior
- Co-fireable with terminations
- Excellent blend behavior

Product information

Solvent or thinner	Micromax™ 4553
Blend member or series	110Xsrs

Rheological properties

Viscosity	80 - 100 ^[1] Pa.s
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[1]: Brookfield HAT, UC&SP, SC4-14/6R, 10 rpm, 25°C

Application technique

Drying time	10 - 15 min
Drying temperature	150 °C
Recommended film thickness, dried	18 - 22 µm
Leveling time	5 - 10 min

Electrical properties

Surface resistivity	8E7 - 1E8 ^[2] mOhm per square
Hot Temperature Coefficient Resistance	-100 - 100 ^[3] ppm/K
Cold Temperature Coefficient Resistance	-100 - 100 ^[3] ppm/K
Voltage Coefficient of Resistance	-60 ^[4] ppm

[2]: Coefficient of Variation (CV) <5, test on 1.0mm x 1.0mm untrimmed resistors unless otherwise noted.

[3]: test on 1.0mm x 1.0mm untrimmed resistors unless otherwise noted

[4]: ppm/V/mm, 30V/300V, test on 1.0mm x 1.0mm untrimmed resistors unless otherwise noted

Storage and stability

Shelf life	6 ^[5] months
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[5]: in unopened containers, from date of shipment, at temperature <25°C

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Additional information

How to use

Processing

- **Terminations**

- Unless otherwise stated, reported properties are based on tests with Micromax™ 6277 silver/palladium conductor composition prefired at 850 °C.
- TCR and resistivity (R) offset data have been provided for Micromax™ 7770, a silver/platinum conductor composition and Micromax™ 7474, a 3:1 silver/palladium conductor composition.

- **Substrates**

- Reported properties are based on tests with Coors 96% alumina substrates. Substrates of other chemical composition or from other manufacturers may result in variations in performance.

- **Printing**

- Specified properties are based on resistors printed to $20 \pm 2 \mu\text{m}$ dried print thickness.

- **Drying**

- Prints should be allowed to level 5-10 min at room temperature and then dried 10-15 min at 150 °C.

- **Firing**

- Micromax™ 110X Series resistor properties are based on resistors fired with a 850 °C, 30-min profile.

- **Resistor geometry**

- Micromax™ 110X Series compositions are Quality Assurance tested using a 1.0mm x 1.0mm resistor with prefired Micromax™ 6277 silver/palladium conductor termination. Variations in resistor geometry will cause variations in R and TCR.

Properties

Fire Resistor Properties

Test	Properties
Load Life 1000hr Irreversible, %DR	-0.5
Short Term Overload Voltage (STOL), 1000V 5sec, %DR	-0.5
Short Term Overload Voltage (STOL), 1000V 10sec, %DR	-1.0
Pulsed Voltage, %DR, Stability, 1kV,	0.0

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100 pulses 1.5mm x 1.5mm

All test on 1.0mm x 1.0mm untrimmed resistors unless otherwise noted.

Information in this datasheet shows anticipated typical physical properties for Micromax™ 110X series based on specific controlled experiments in our labs and are not intended to represent the product specifications, details of which are available upon request.

Figure 1. TCR vs R

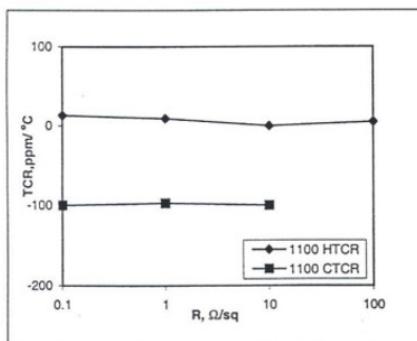


Figure 2. Micromax™ 110X Series Blend

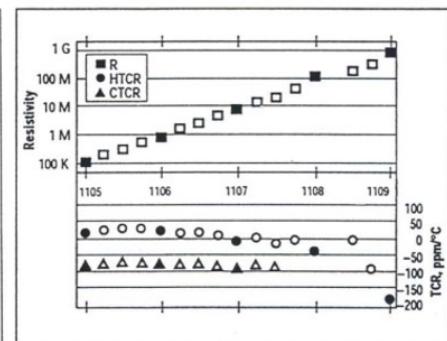


Figure 3. VCR vs. R

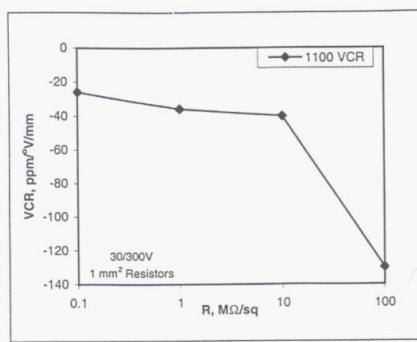


Figure 4. Load Life vs. Time

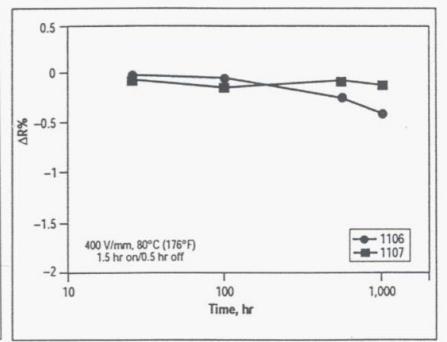


Figure 5. Resistivity vs. Firing Temperature

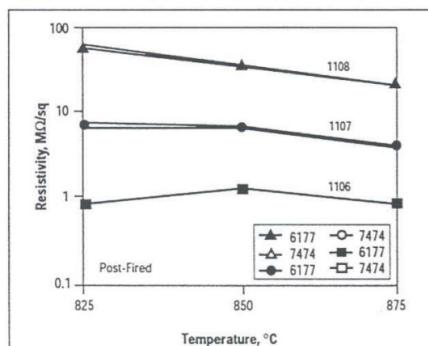
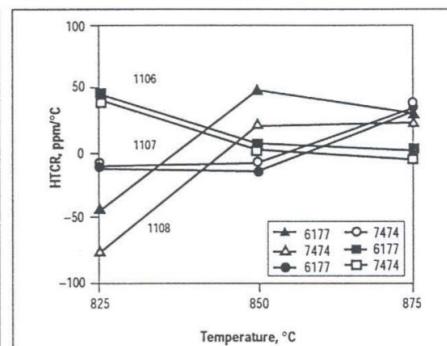


Figure 6. HTCR vs. Firing Temperature



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Figure 7. Cofired vs. Post-Fired Resistors

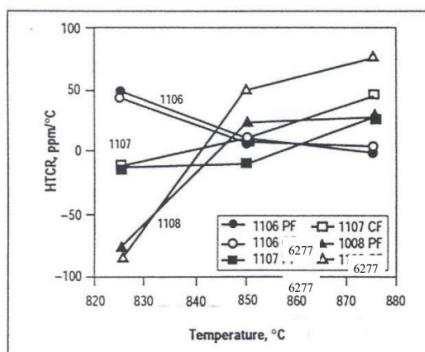


Figure 8. Length Effects

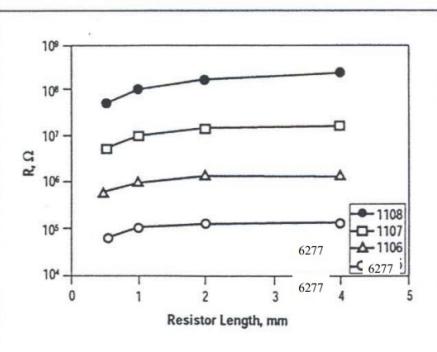


Figure 9. Length Effects

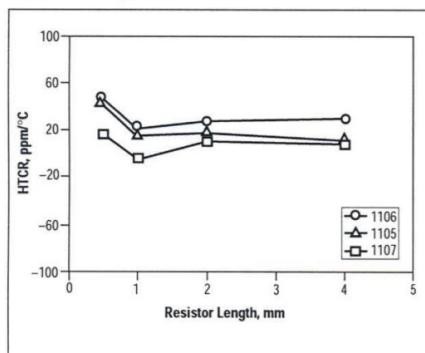
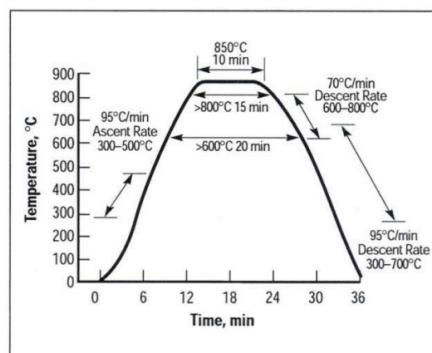


Figure 10. Recommended 30 minute Profile



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).