

# 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 <sup>[1]</sup> Pa.s
[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 <sup>[2]</sup> mOhm per square
Hot Temperature Coefficient Resistance	-100 - 100 <sup>[3]</sup> ppm/K
Cold Temperature Coefficient Resistance	-100 - 100 <sup>[3]</sup> ppm/K
Voltage Coefficient of Resistance	-60 <sup>[4]</sup> 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 <sup>[5]</sup> 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

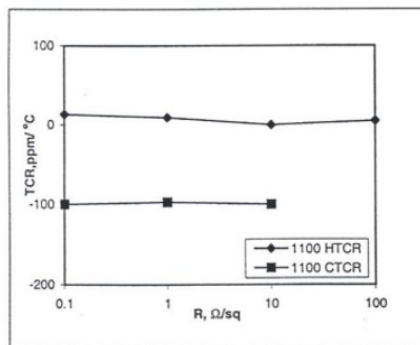


Figure 2. Micromax™ 110X Series Blend

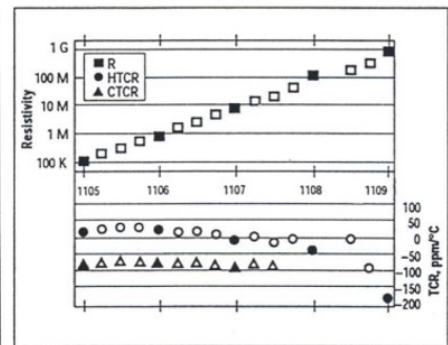


Figure 3. VCR vs. R

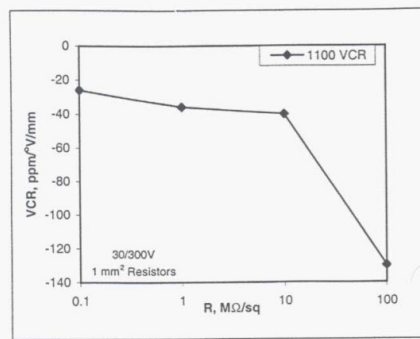


Figure 4. Load Life vs. Time

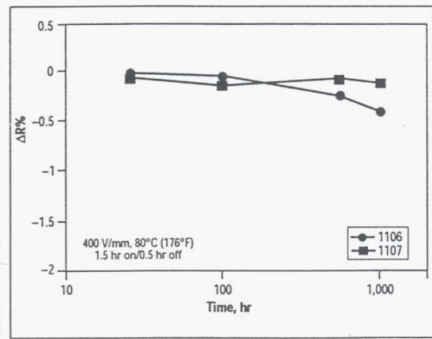


Figure 5. Resistivity vs. Firing Temperature

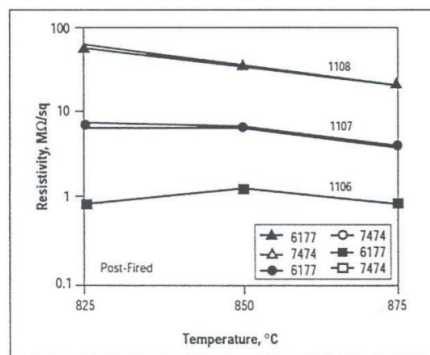
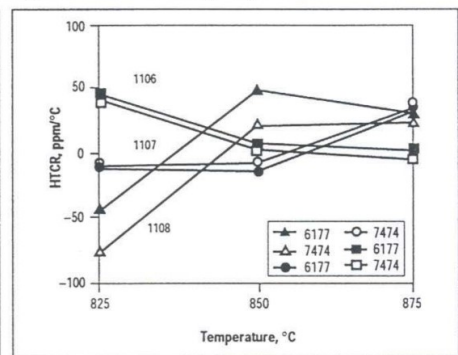


Figure 6. HTCR vs. Firing Temperature



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Figure 7. Cofired vs. Post-Fired Resistors

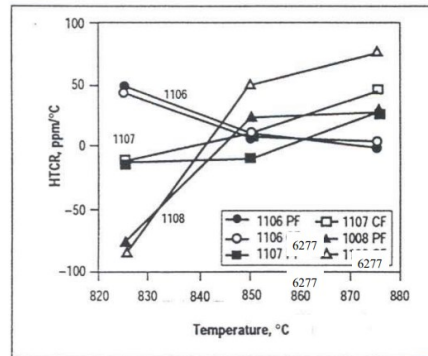


Figure 8. Length Effects

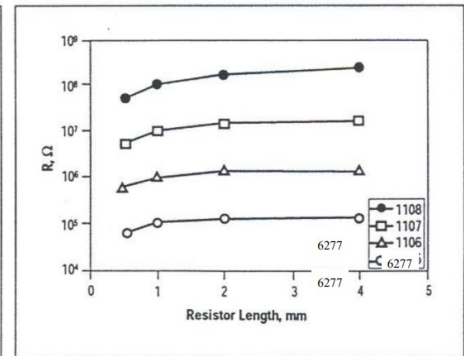


Figure 9. Length Effects

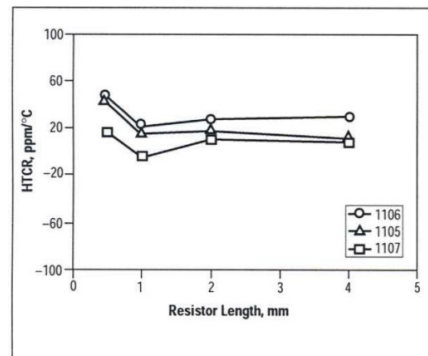
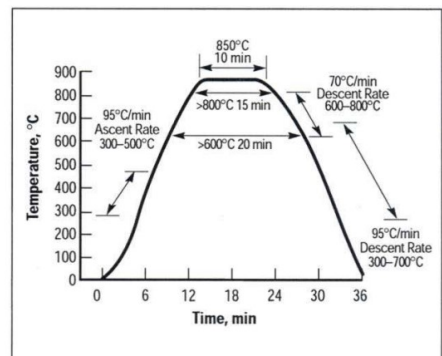


Figure 10. Recommended 30 minute Profile



### 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).