



# Thin Film Resistor Foils Combined with Polyimide Laminate for Embedded Resistors

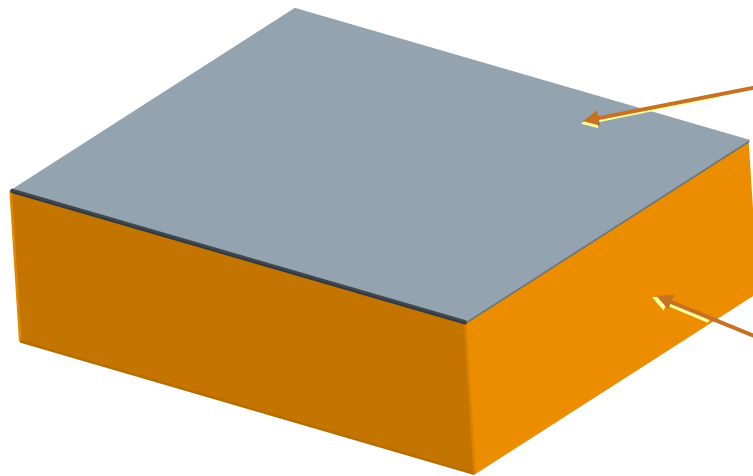
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# Ticer Technologies TCR Material Details

See also Ticer website and brochures

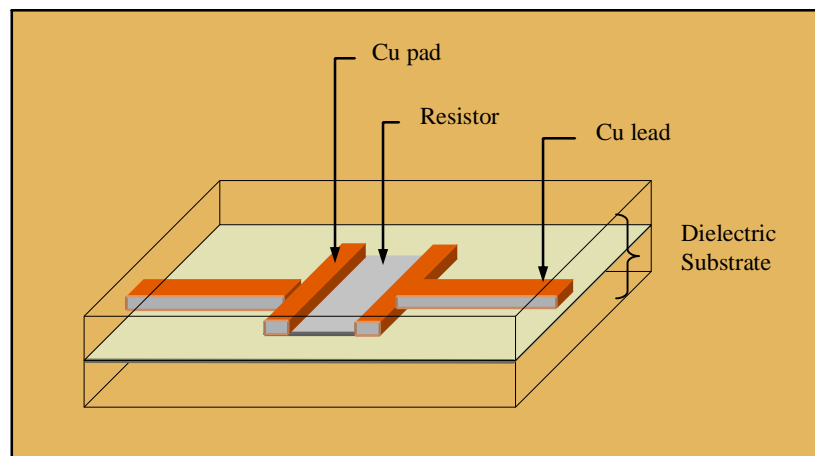


## Thin film Resistive layer (<math><1\mu\text{m}</math>)

- ▶ Vacuum metallized on matte interface
- ▶ Alloys: **Nickel Chromium, NiCrAlSi, and CrSiO**
- ▶ Excellent sheet resistance uniformity

## Base copper foil (std low profile)

- ▶ Grade 3 Copper Foil
- ▶ Surface optimized for isotropic sheet resistivity
- ▶ Yields resistors of tight tolerances <math><10\%</math>



**Results in → reliable embedded resistors**

# Ticer Resistor Foil Specification

Resistive Foil Specifications		
Resistor Material	NiCr	NiCrAlSi
Sheet Resistivity, ohms/sq	10, 25, 50, 100	25, 50, 100, 250
Material Tolerance %	+/- 5%	+/- 5%
Temp. Coefficient of resistance (max ppm/C)	110	-20
Base Copper Foil Thickness (microns)	12, 18, 35	12, 18, 35
Roll Width mm (inches)	1295 (51)	1295 (51)

# Ticer TCR Resistivity after PI Lamination

Cu completely etched and 12 samples with 4 point probe  
Average Resistivity in ohms/square

	100N18R+X		25N18R+S	
	TD	MD	TD	MD
<b>Resistivity</b>	<b>99.6</b>	<b>99.2</b>	<b>23.3</b>	<b>23.0</b>
<b>STDEV (ohm)</b>	<b>3.42</b>	<b>3.87</b>	<b>0.75</b>	<b>0.56</b>
<b>%STDEV</b>	<b>3.4%</b>	<b>3.9%</b>	<b>3.2%</b>	<b>2.4%</b>

Small resistivity change as expected, even with high PI lamination temperature.  
NiCr above. Confirmed for NiCrAlSi also.

Product Key:

Resistivity Ohms + N=NiCr (A = NCAS) + CU in um + Foil type (all is R+) + Adhesion promoter (S) or not (X)

# Etch Process Sequence of NiCr Resistive Layer

