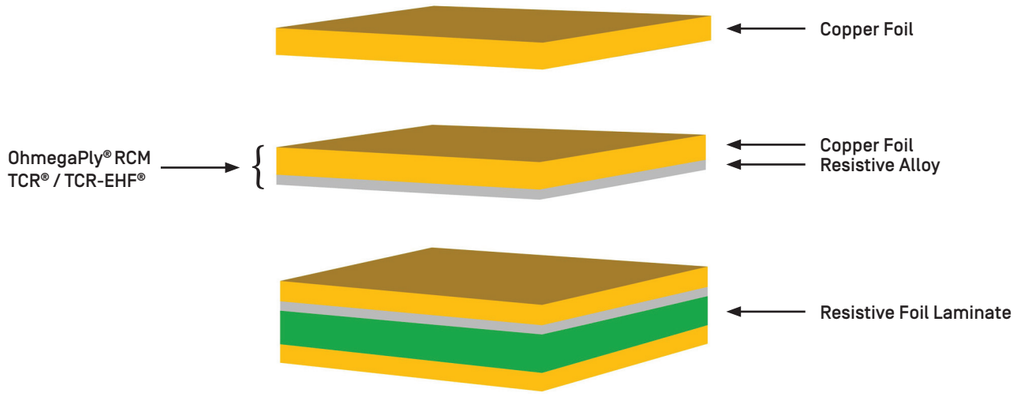
OhmegaTicer

Product Selection Guide

ohmegaticer.com

Resistive Foil Manufacturing

Ohmega Ticer Resistive Foils are manufactured in wide web, roll to roll format. OhmegaPly® is a Nickel Phosphorous [NiP] metal alloy that is electrodeposited on to copper foil. TCR® and TCR-EHF® utilize a vacuum-deposited Nickel Chromium [NiCr] alloy. The thin film metal alloy/copper foil combination is called RCM [Resistor-Conductor Material]. The RCM is laminated to a dielectric material, like any other copper foil, and subtractively processed by printed circuit fabricators to produce copper circuitry and planar resistors.



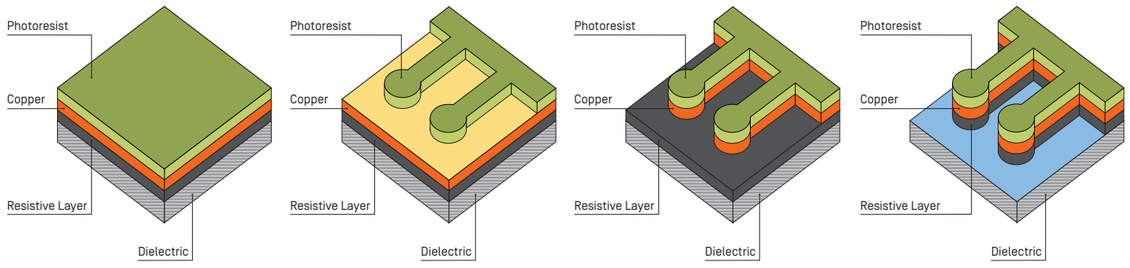
Resistive Foil Processing

Step 1: Apply Photoresist to Laminate

Step 2: Print Image, Develop off Photoresist

Step 3: First Etch to Define Copper Circuitry & Resistor Width

Step 4: Second Etch to Eliminate Resistive Alloy, if Applicable

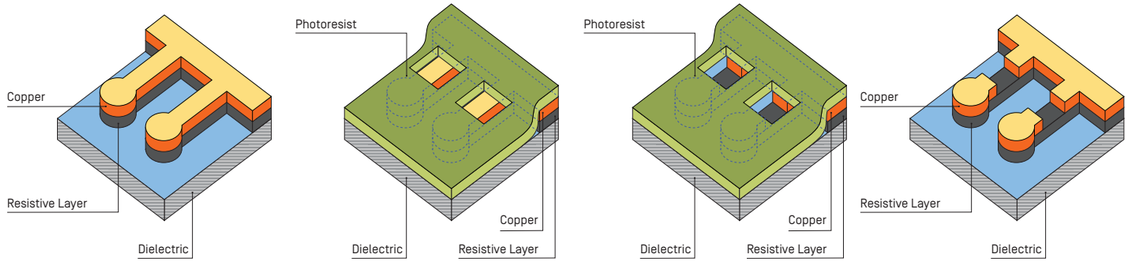


Step 5: Strip Photoresist

Step 6: Apply Photoresist, Print Resistor Image, Develop off Photoresist

Step 7: Third Etch to Define Resistor Length

Step 8: Strip Photoresist



RCM Properties

OHMEGAPLY® RCM TECHNICAL SPECIFICATIONS									
Sheet Resistivity	10 Ω/□	25 Ω/□	40 Ω/□	50 Ω/□	100 Ω/□	250 Ω/□	377 Ω/□	Unit	Remark and Condition
Material Tolerance	+/-5	+/-5	+/-5	+/-5	+/-5	+/-10	+/-15	%	Sheet Resistivity
Resistance Temperature Characteristic [RTC]	20	50	75	75	100	100	150	PPM/°C	MIL-STD-202-304 -55°C to 125°C
Maximum Power	875	500	450	425	350	300	250	W/in^2	Improvements can be achieved with changes in resistor design and PCB stack-up. Please contact for more information.
ESD*	8000	3500	2500	1900	1100	800	500	V	Values shown for 20 mil x 10 mil [LxW] resistors. Significant improvement can be achieved with changes in resistor design and PCB stack-up. Please contact for more information.
Short Time Overload	0	0	0	0	0	0	0	ΔR%	MIL-R-10509 Method 4.6.6 2.5 x rated power, 5 sec
Load Life Cycling Test	<0.3[1]	<5	--	<5	<5	<0.5[1]	<5	ΔR%	MIL-STD-202-108I 70C, 1.5 hours On/Off Cycle, 10000 hours; [1] Result after 1000 hours
Current Noise Index	< -16	< -15	< -15	< -15	< -15	< -15	< -15	dB	MIL-STD-202-308
Humidity Test	0.5	1.0	1.0	1.0	1.5	2.5	3.0	ΔR%	MIL-STD-202-103A 40°C, 95% RH, 240 hours
Thermal Shock	0.1	0.1	0.5	0.5	0.5	1.5	1.75	ΔR%	MIL-STD-202-107B -65°C to 125°C, < 5 min transition, 25 cycles
Hot Oil	--	0.1	--	0.3	0.5	0.75	1.0	ΔR%	IPC-TM-650 METHOD 2.4.6 260°C, T_0 = 20°C
Solder Float	0.2	0.5	0.8	0.8	1.0	0.5	0.7	ΔR%	MIL-STD-202-210D 260°C, 20 sec
Capacitance	~0.0	~1.0	~1.0	~1.0	~1.0	~1.0	--	pF	Extracted at 5Hz
Inductance	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	--	nH	Extracted at 5Hz

TICER TCR® RCM TECHNICAL SPECIFICATIONS								
Sheet Resistivity	25 Ω/□ NiCr	50 Ω/□ NiCr	100 Ω/□ NiCr	100 Ω/□ NCAS	250 Ω/□ NCAS	1000 Ω/□ CrSiO	Unit	Remark and Condition
Material Tolerance**	+/-5	+/-5	+/-5	+/-5	+/-5	+/-5	%	Sheet Resistivity as tested on FR4 with TOC Foil
Resistance Temperature Characteristic [RTC]	<110	<110	<110	-20	-20	-300	PPM/°C	MIL-STD-202-304 -55°C to 125°C
Maximum Power	250	200	150	150	75	250	W / in^2	40°C
Humidity Test	-	-	0.5	-	-	0.4	ΔR%	MIL-STD-202-103B 40°C, 95% RH, 240 hours
Thermal Cycling	-	-	-2.80%	-	-	3.7	ΔR%	MIL-STD-883 Method 1010.7 Condition C -65°C to 150°C, 500 cycles
Solder Float	-	-	-2.2	-	-	3.1	ΔR%	MIL-STD-202-210A 260°C, 20 sec

* ESD survival levels estimated on ANSI/ESDA/JEDEC JS-001-2012 Human Body Model – Component Level standard. Direct discharge across resistor elements constructed with minimal complexity. Please contact for more details.

**The average sheet resistance is +/- 5% of nominal. The Coefficient of Variation (COV) is < 5%.

OhmegaPly and Ticer TCR RCM® are RoHS and REACH SVHC Compliant

OhmegaPly and Ticer TCR RCM® and or OhmegaPly® Laminate is exported from the United States in accordance with the Export Administration regulations. Diversion contrary to United States law is prohibited.

RoHS & REACH COMPLIANT

RCM Product Matrix

COPPER TYPE	SHEET RESISTIVITY [OHMMS PER SQUARE]							
	10	25	40	50	100	250	377	1000
PT GRADE - OHMEGA								
1/2 oz [18 micron]	0.5A10PT	0.5A25PT	0.5A40PT	0.5A50PT	0.5A100PT	0.5A250PT	0.5A377PT	-
1 oz [35 micron]	-	-	-	1A50PT	1A100PT	-	-	-
TOC GRADE - OHMEGA								
1/3 oz [12 micron]	12M10TOC	12M25TOC	-	12M50TOC	12M100TOC	-	-	-
1/2 oz [18 micron]	0.5A10TOC	0.5A25TOC	0.5A40TOC	0.5A50TOC	0.5A100TOC	0.5A250TOC	-	-
1 oz [35 micron]	-	-	-	1A50TOC	1A100TOC	-	-	-
TOC GRADE - TICER								
1/2 oz [18 micron]	-	25N18P9X	-	50N18P9X	100N18P9X 100A18P9X	250A18P9X	-	1K018P9X
1 oz [35 micron]	-	25N35P9X	-	50N35P9X	100N35P9X	-	-	-
VSP GRADE - TICER								
1/2 oz [18 micron]	-	25N18P8X	-	50N18P8X	100N18P8X	-	-	-

If you don't see the material you are interested in listed, please contact us to discuss potential copper foil and ohms/square options.

Quallified foils and ohms/square options may vary by copper clad laminate partners.

- PT grade copper foil is used for general applications on FR4, Polyimide, Halogen-Free, Lead-Free, and filled dielectrics. The matte side surface roughness is 6.4 Rz microns.
- TOC grade copper foil is lower profile copper used on PTFE substrates for high frequency applications and for fine line etching. The matte side surface roughness is 5.1 Rz microns.
- TCR-EHF® utilizes VSP grade copper foil with matte side surface roughness of 2.0 µm Rz. Typical applications are designed with PPO substrates for high-speed digital and mm-Wave frequencies. The Coefficient of Variation (COV) is typically higher than TCR since variations of the copper profile have a more significant impact on resistivity.