

RO4000® Laminates with Ticer™ TCR® Thin Film Resistor Foils

RO4000® Series High Frequency Circuit Materials are glass-reinforced hydrocarbon and ceramic (not PTFE) laminates designed for performance sensitive, high volume commercial applications.

RO4000 laminates are designed to offer superior high frequency performance and low-cost circuit fabrication. The result is a low loss material which can be fabricated using standard epoxy/glass (FR-4) processes.

RO4003C™, RO4350B™, RO4360G2™, and RO4835™ laminates are available clad with the Ticer TCR Thin Film resistor foils. Ticer TCR clad RO4000 laminates are available in 0.5oz (18µm) thick foil with resistor values of 25, 50, and 100 Ω/sq⁽¹⁾. 1oz (35µm) thick copper foils are available as special order.

TICER™ product brochures, resistor calculator and process guidelines can be found at: <http://www.ticertechnologies.com/technical-literature>.

Features:

- Glass-reinforced Hydrocarbon and ceramic dielectric
- Volume manufacturing process
- Excellent high-frequency performance
- Low Z-Axis expansion, excellent dimensional stability
- Integrated thin film resistor benefit
- CAF resistant

Typical Applications:

- Global communication system
- High reliability and complex multi-layer circuits
- Wireless communication devices

Property	Typical Value ⁽⁴⁾		Direction	Units	Condition	Test Method ⁽³⁾
	RO4003C	RO4350B				
Dielectric Constant, ϵ_r (Process specification)	3.38±0.05	3.48±0.05 ⁽²⁾	Z	-	10 GHz/23°C	IPC-TM-650 2.5.5.5 Clamped Stripline
Dielectric Constant, ϵ_r (Design specification)	3.55	3.66	Z	-	FSR / 23°C	IPE-TM-650 2.5.5.6 FSR
Dissipation Factor tan, δ	0.0027 0.0021	0.0037 0.0031	Z	-	10GHz/23°C 2.5 GHz/23°C	IPC-TM-650, 2.5.5.5
Copper Peel Strength	0.70 (4.0)	0.61 (3.5)	-	N/mm (pli)	After Solder Float, ½ oz TCR foil	IPC-TM-650, 2.4.8
Flammability	N/A	V-0	-	-	-	UL 94

(1) These values are the manufacturer's stated nominal resistance value. Rogers makes no guarantee to these values as variations are observed. Rogers advises customers run design first-articles to determine offset values.

(2) RO4350B 4 mil laminates have a process Dk of 3.33 ± 0.05 and are in conformance with IPC-4103A/240. All other RO4350B laminate thicknesses are /11 and /240 compliant.

(3) Clamped stripline method can potentially lower the actual dielectric constant due to the presence of air gap. Dielectric constant in practice may be higher than the values listed.

(4) Typical values are a representation of an average value for the population of the property. For specification values, contact Rogers Corporation.

Prolonged exposure in an oxidative environment may cause changes to the dielectric properties of hydrocarbon based materials. The rate of change increases at higher temperatures and is highly dependent on the circuit design. Although Rogers' high frequency materials have been used successfully in innumerable applications and reports of oxidation resulting in performance problems are extremely rare, Rogers recommends that the customer evaluate each material and design combination to determine fitness for use over the entire life of the end product.

Standard Thickness	Standard Panel Size
RO4003C: 0.008" (0.20mm), 0.012" (0.30mm), 0.016" (0.41mm), 0.020" (0.51mm), 0.032" (0.81mm), 0.060" (1.52mm)	12" X 18" (305 X 457 mm) 24" X 18" (610 X 457 mm) Additional panel sizes may be available upon request.
RO4350B & RO4835: 0.0066" (0.17mm), 0.010" (0.25mm), 0.020" (0.51mm), 0.030" (0.76mm), 0.060" (1.52mm)	
RO4360G2 0.008" (0.20mm), 0.016" (0.41mm), 0.020" (0.51mm), 0.024" (0.61mm), 0.032" (0.81mm), 0.060" (1.52mm)	

The information contained in this document is intended to assist in you in designing with Rogers' circuit materials. It is not intended to and does not create any warranties, express or implied, including any warranty of merchantability or fitness for a particular purpose or that the results shown on this document will be achieved by a user for a particular purpose. The user is responsible for determining the suitability of Rogers' circuit materials for each application.

TCR is a registered trademark owned by Nippon Mining & Metals Co., Ltd., Tokyo, Japan. Ticer Technologies is a licensee of the technology and trademark of TCR. TCR is manufactured under license from Nippon Mining & Metals Co., Ltd.

The Rogers' logo, RO4000, RO4003C, RO4360G2, RO4835 and RO4350B are trademarks of Rogers Corporation or one of its subsidiaries.

©2019 Rogers Corporation, Printed in USA. All rights reserved. Revised 1450 090519 Publication: #92-134