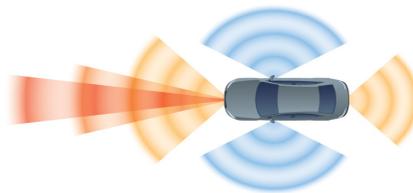
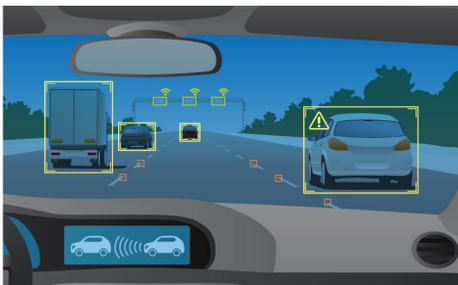


## RO4830™ High Frequency Laminates

RO4830™ thermoset laminates are well suited for price-sensitive millimeter wave applications, such as 76-81 GHz automotive radar sensors, and are a reliable, lower cost alternative to conventional PTFE-based laminates. RO4830 laminates have a slightly higher dielectric constant of 3.2 at 77GHz, versus PTFE-woven glass laminates. LoPro® reverse treated copper foil cladding contributes to RO4830 laminates' excellent insertion loss at 77GHZ of 2.2 db per inch.

Offered in dielectric thicknesses of 0.005" and 0.0094", RO4830 laminates are intended for the cap layer on FR-4 multi-layer board designs, which are commonly used for 76-81 GHz automotive radar sensor PCB applications. Flat woven e-glass and a filler with smaller and more uniform particle size contribute to good laser drilling performance. Containing the same advanced anti-oxidant package as RO4835™ laminates, RO4830 laminates are significantly more resistant to oxidation than other hydrocarbon based laminate materials (Based on studies conducted by Rogers Corporation). RO4830 laminates can be fabricated using standard epoxy/glass (FR-4) processes and are compatible with RO4400™ bond ply. These laminates have the UL-V0 flame retardant rating and are lead free solder process compatible.



### Features and Benefits:

#### RO4000® Series Thermoset Platform

- Reduced Overall Cost of PCB Manufacturing versus PTFE Laminate Options

#### Optimized filler, Resin & Glass Composite System

- Dielectric Constant at 77 GHz of 3.2

#### Reverse Treated Smooth LoPro® Copper Foil

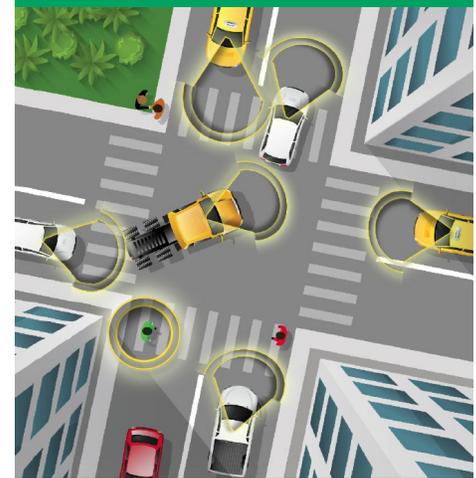
- Excellent Insertion Loss

#### Optimized Filler & Flat Glass

- Good Laser Drilling Performance
- Consistent Within Sheet Dielectric Constant

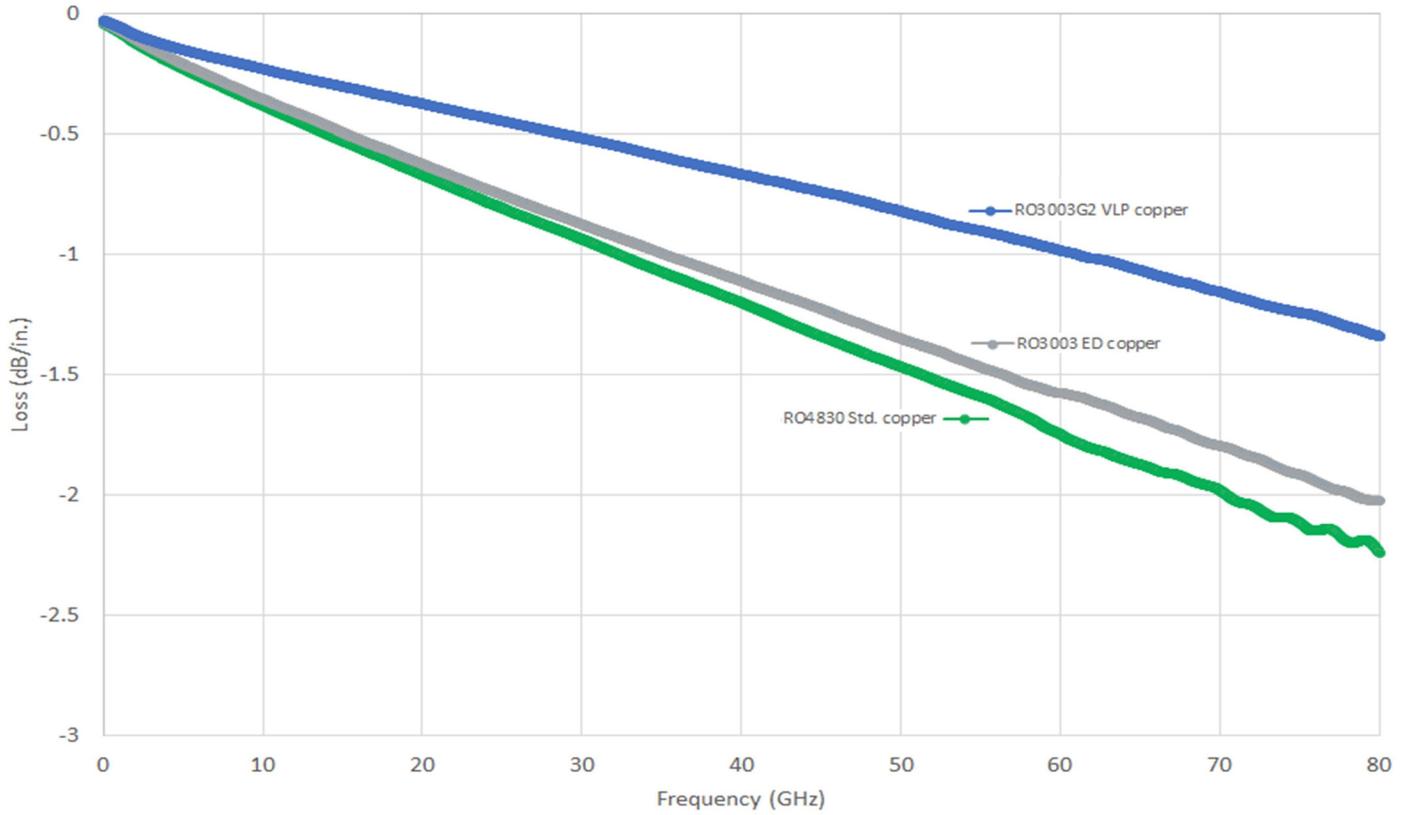
### Typical Applications:

- 76-81 GHz Automotive Radar Sensors

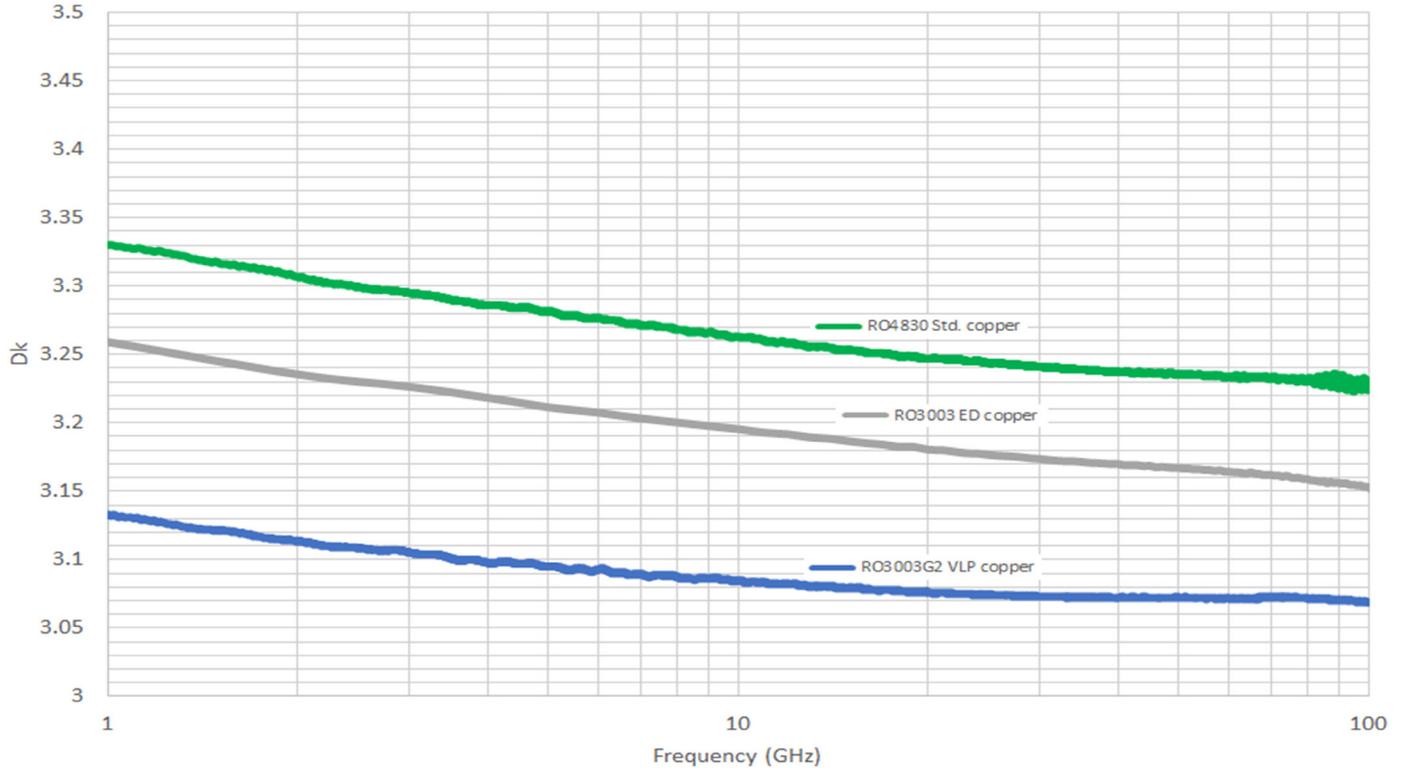


AEB City, AEB Vulnerable Road Users

Microstrip insertion loss, differential length method  
 using 5mil thick substrates of RO4830™, RO3003™ and RO3003G2™ laminates



Microstrip differential phase length method, Dk vs. Frequency  
 using 5mil thick substrates of RO4830™, RO3003™ and RO3003G2™ laminates



Property	Typical Values [1] RO4830 <sup>(TM)</sup>		Units	Condition	Test Method	
	Dielectric Thickness					
	0.005"	0.0095"				
[1] Dielectric Constant, $\epsilon_r$ , Design	3.24	3.24	-	77 GHz	microstrip differential phase length	
Transmission Line Loss	2.2	1.8	dB/in	77 GHz	microstrip differential phase length	
Dissipation Factor, $\tan \delta$	0.0033	0.0032	-	10 GHz	split-post dielectric resonator	
Thermal Coefficient of $\epsilon_r$ (z direction)	-30	-30	ppm/°C	-50°C to 150°C	IPC-TM-650 2.5.5.5	
Dielectric Strength	78.7	59.1	kV/mm	48 hrs @ 50°C	IPC-TM-650, 2.5.6.2	
	(2000)	(1500)	(V/mil)			
Water Absorption	0.15	0.13	%	D-48/50	ASTM D570	
Peel Strength after Thermal Stress	0.67	0.67	N/mm	18 micron reverse treated ED foil	IPC-TM-650 2.4.8	
	(3.8)	(3.8)	lbs/in			
Flammability Rating	V-0	V-0	-	C-48/23/50	UL94	
Dimensional Stability	MD	-1.8 (-1.8)	-1.5 (-1.5)	mm/m (mils/in)	4 hrs @ 105°C	IPC-TM-650 2.4.39A
	CMD	-1.8 (-1.8)	-1.6 (-1.6)			
Decomposition Temperature	408	412	°C	-	ASTM D3850	
Time to Delamination (T288)	>30	>30	minutes	with Cu	IPC-TM-650, 2.4.24.1	
Lead-Free Process Capable	YES	YES	-	-	-	
Thermal Conductivity (calculated)	0.45	0.47	W/mK	50°C	Through-plane calculation with series mixing rule	
CTE	x,y	23	21	ppm/°C	0 to 150C	IPC-TM-650 2.4.41
	z	110	83			

**NOTE:**

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

(1) The design Dk is an average number from several different tested lots of material and on the most common thickness/s. If more detailed information is required, please contact Rogers Corporation or refer to Rogers' technical papers in the Rogers Technology Support Hub available at <http://www.rogerscorp.com>.

**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.**

Surface Roughness	Surface Area Index	Average Nodule Size
0.9 $\mu\text{m}$ sq	2.0	0.2 $\mu\text{m}$

Standard Thicknesses	Standard Panel Sizes:	Standard Claddings
<b>RO4830 LoPro:</b> 0.005" (0.127mm) +/- 0.0060" 0.0094" (0.239mm) +/- 0.0010"	12 X 18" (305 X 457mm) 24" X 18" (610 X 457mm) 24" X 36" (610 X 915mm) 48" X 36" (1219 X 915mm)  *Additional panel sizes available	<b>LoPro Reverse Treated Electrodeposited Copper Foil</b> ½ oz (18 $\mu\text{m}$ ) TH/TH 1 oz (35 $\mu\text{m}$ ) T1/T1

\*Contact Customer Service or Sales Engineering to inquire about additional available product configurations

**The information in this data sheet is intended to assist 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 data sheet will be achieved by a user for a particular purpose. The user should determine the suitability of Rogers' circuit materials for each application.**

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