

# RO4400™ Series Bondply

## Data Sheet

### RO4450B™ RO4450F™ and RO4460G2™ Bondply

RO4000® dielectric materials have long been used in combination with FR-4 cores and bondplys as a means to achieve a performance upgrade of standard FR-4 multi-layer designs. RO4003C™, RO4350B™, RO4360G2™, RO4835™, and RO4000 LoPro™ glass reinforced hydrocarbon/ceramic laminates have been used in layers where operating frequency, dielectric constant, or high-speed signal requirements dictate the need for high performance materials. FR-4 cores and bondply are still commonly used to inexpensively form less critical signal layers.

The RO4400™ bondply family is comprised of three grades based on the RO4000 series core materials, and are compatible in multi-layer constructions with RO4003C, RO4350B, RO4360G2, RO4835 or RO4000 LoPro laminates. A high postcure Tg makes RO4400 series bondply an excellent choice for multi-layers requiring sequential laminations as fully cured RO4400 bondplys are capable of handling multiple lamination cycles. In addition, FR-4 compatible bond requirements permit RO4400 bondply and low flow FR-4 bondply to be combined into non-homogeneous multi-layer constructions using a single bond cycle.

RO4450F™ bondply has demonstrated improvement in lateral flow capability over RO4450B™, and is becoming the first choice for new designs or as a replacement in designs that have difficult fill requirements. RO4460G2™ bondply provides designers with a 6.15 Dk bonding layer that, just as the other RO4400 bonding materials, exhibits excellent Dk control while maintaining a low z axis expansion for plated through hole reliability.

Each of the three grades of bondplys are recognized by Underwriter Laboratories with the UL-94 flame rating, and are compatible with lead-free processes.



Data Sheet

**FEATURE:**

CAF resistant

**Typical Values**
**RO4400 Series Bondply**

PROPERTY	TYPICAL VALUES [1]				DIRECTION	UNITS	CONDITION	TEST METHOD
	RO4450B	RO4450F	RO4460G2					
Thickness	3.6 (0.091)	4 (0.101)	4 (0.101)	4 (0.101)	Z	mils (mm)	-	-
Dielectric Constant, $\epsilon_r$	3.30 ± 0.05	3.54 ± 0.05	3.52 ± 0.05	6.15 ± 0.15	Z	-	10GHz - 23°C	IPC-TM-650 2.5.5.5
Dissipation Factor, $\tan \delta$	0.004	0.004	0.004	0.004	Z	-	10GHz-23°C	IPC-TM-650 2.5.5.5
Dielectric Strength	1000	1000	1000	1000	Z	V/mil	23°C/50% RH	IPC-TM-650 2.5.6.2
Volume Resistivity	9.26 X 10 <sup>7</sup>	9.26 X 10 <sup>7</sup>	8.93 X 10 <sup>8</sup>	9.1 X 10 <sup>8</sup>	-	MΩ•cm	23°C/50% RH	IPC-TM-650 2.5.17.1
Surface Resistivity	3.82 X 10 <sup>7</sup>	3.82 X 10 <sup>7</sup>	1.03 X 10 <sup>7</sup>	1.5 X 10 <sup>8</sup>	X,Y	MΩ	23°C/50% RH	IPC-TM-650 2.5.17.1
Thermal Conductivity	0.60	0.60	0.65	0.67	Z	W/m/K	80°C	ASTM C518
Moisture Absorption	0.10	0.10	0.09	0.13	-	%	48 hrs immersion 0.060" sample temperature 50°C	ASTM D570
Tg	>280	>280	>280	170	-	°C TMA	-60°C - 300°C @ 10°C/min	IPC-TM-650 2.4.24.3
Td	390	390	390	405	-	°C TGA		ASTM D3850
Density	1.80	1.86	1.83	2.22	-	gm/cm <sup>3</sup>	23°C	ASTM D792
Copper Adhesion	4.0 (0.70)	4.9 (0.86)	4.0 (0.70)	5.0 (1.04)	Z	pli (N/mm)	½ oz. EDC After Solder Float	IPC-TM-650 2.4.8
Coefficient of Thermal Expansion	19 17 60	19 17 50	19 17 50	15 18 43	X Y Z	ppm/°C	-55 to 280°C	IPC-TM-650 2.4.41
Color	White	White	White	White	-	-	-	-
Flammability	V-0	V-0	V-0	V-0				UL94
Lead-Free Process Compatible	Yes	Yes	Yes	Yes				

**Notes:**

[1]Typical values are a representation of an average value for the population of the property.

For specification values contact Rogers Corporation.

Rogers UL file number is E102763B.

STANDARD THICKNESS:	STANDARD SIZE:
RO4450B 0.0036" (0.091mm), 0.004", (0.101mm) RO4450F 0.0040" (0.101mm) RO4460G2 0.0040" (0.101mm)	24X18" Sheets (610mm X 457mm) Contact Customer Service for other available sizes.

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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.

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Revised 1349 011618 Publication #92-150