

Advanced Circuit Materials

Data Sheet
RF1.3000

ULTRALAM® 3000

Liquid Crystalline Polymer Circuit Material

Double-Clad Laminates



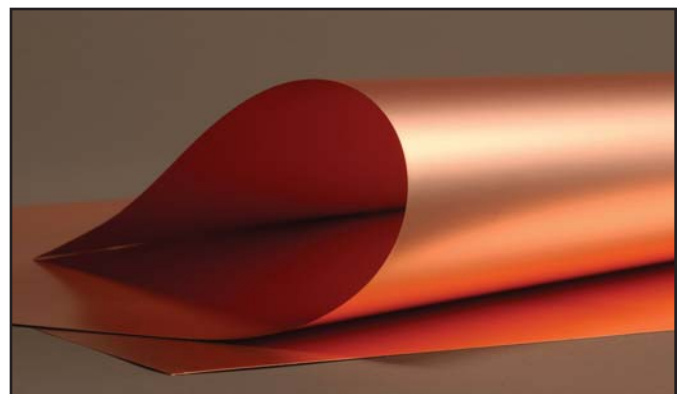
Features:	Benefits:
Excellent high frequency properties	<ul style="list-style-type: none"> Stable electrical properties for tightly controlled impedance matching Excellent thickness uniformity for maximum signal integrity Allows use of thinner dielectric layer with minimal signal distortion
Good dimensional stability Low modulus	<ul style="list-style-type: none"> Bends easily for flex and conformal applications Offers design flexibility and maximizes circuit density requirements
Extremely low moisture absorption	<ul style="list-style-type: none"> Reduces bake times Maintains stable electrical, mechanical and dimensional properties in humid environments
Flame resistant	<ul style="list-style-type: none"> Halogen-free. Meets WEEE. UL94VTM/0 – meets requirement for consumer products

Typical Applications:	
<ul style="list-style-type: none"> High speed switches and routers 	<ul style="list-style-type: none"> Hybrid substrates
<ul style="list-style-type: none"> Chip packaging 	<ul style="list-style-type: none"> Handheld and RF devices
<ul style="list-style-type: none"> MEM's 	<ul style="list-style-type: none"> Base station antennas
<ul style="list-style-type: none"> Military satellites and radar sensors 	

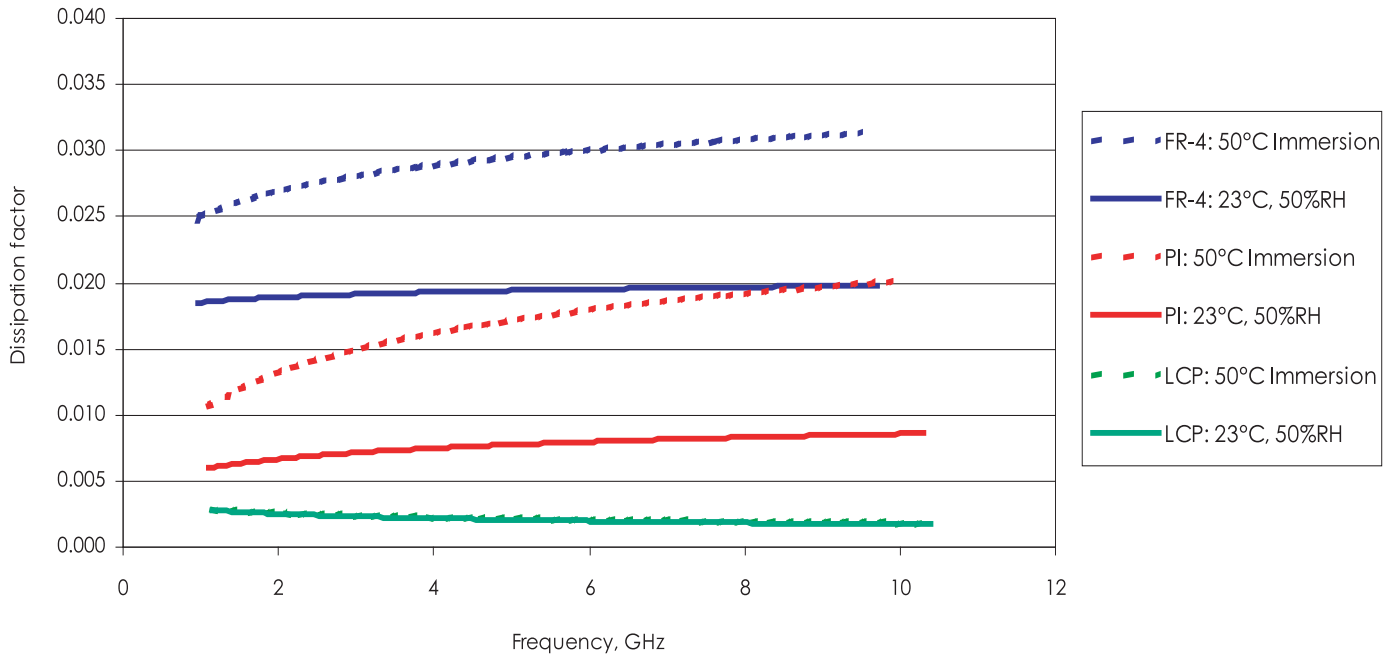
ULTRALAM® 3850 laminate circuit materials from Rogers Corporation, utilize highly temperature resistant liquid crystalline polymer (LCP) as the dielectric film. These products were developed specifically for single layer and multilayer substrate constructions. These adhesiveless laminates are well suited for high speed and high frequency applications in telecommunication network equipment, high-speed computer data links and other high performance applications.

ULTRALAM 3850 circuit materials are characterized by low and stable dielectric constant and dielectric loss, which are key requirements for high frequency, high-speed products. ULTRALAM 3850 is offered as a double copper clad laminate. offered in panels. It can be used, for multilayer constructions with ULTRALAM 3908 bonding film.

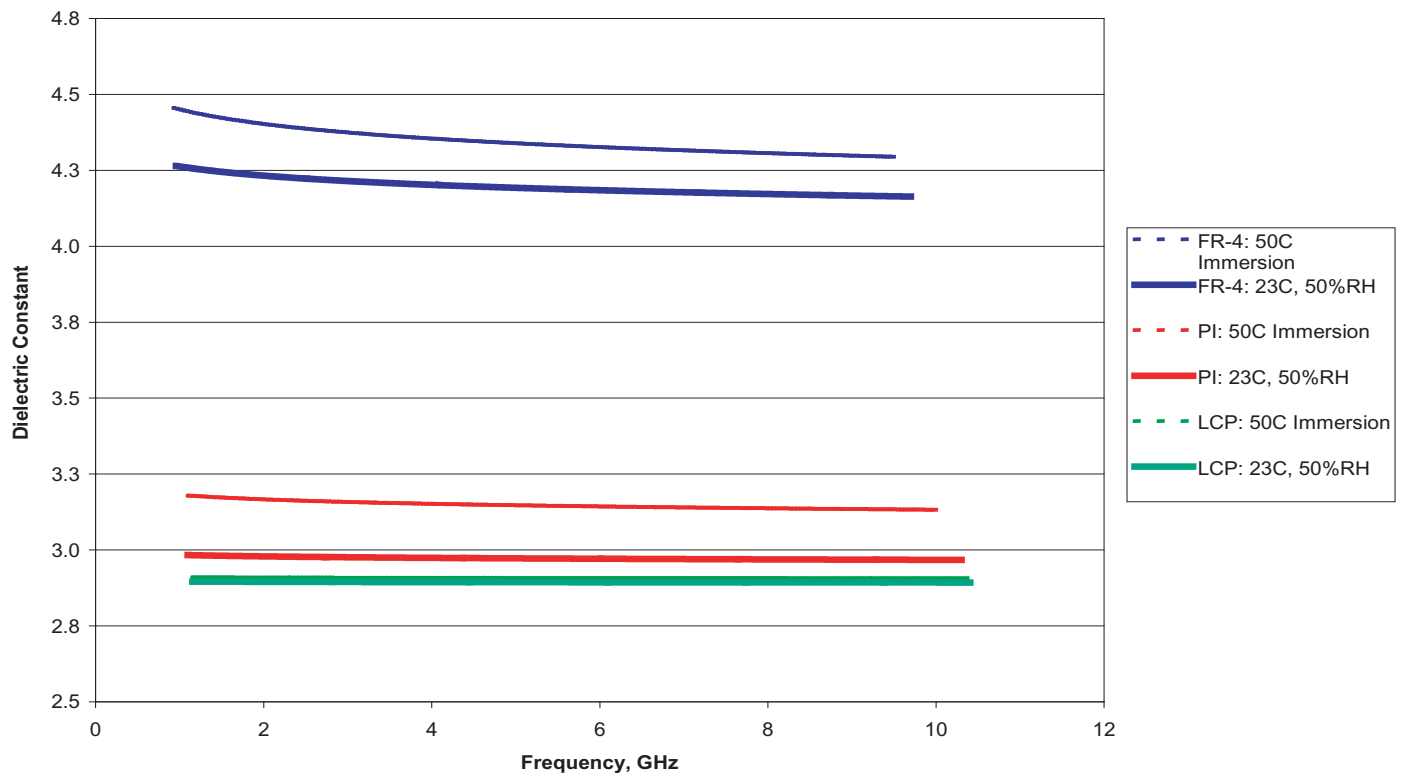
ULTRALAM 3000 laminate UL file number is E122972.



Dissipation Factor Variation: LCP, All Polyimide, and FR-4 laminates



Dielectric Constant Variation: LCP, All Polyimide, and FR-4 laminates



Data obtained from cast all polyimide and high Tg FR-4 laminate materials.

The information contained in this datasheet is intended to assist you in designing with Rogers' liquid crystalline polymer 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 datasheet will be achieved by a user for a particular purpose. The user is responsible for determining the suitability of Rogers' liquid crystalline polymer circuit materials for each application.

Typical Values

ULTRALAM® 3000 Laminates

Property	Typical Value	Unit	Test Conditions
	ULTRALAM® 3850		
Mechanical Properties			
Dimensional Stability	MD	-0.06	%
	CMD	-0.03	
Peel Strength	0.95 (8.52)	N/mm (lbs/in)	IPC 2.4.8 (1/2 oz. ED foil)
Initiation Tear Strength, min	1.4 (3.1)	Kg (lbs)	IPC 2.4.16
Tensile Strength	200 (29)	MPa (Kpsi)	IPC 2.4.16
Tensile Modulus	2255 (327)	MPa (Kpsi)	IPC 2.4.19
Density	1.4	gm/cm ³ , Typical	
Thermal Properties			
Coefficient of Thermal Expansion, CTE (30°C to 150°C)	X	17	ppm/°C
	Y	17	
	Z	150	
Solder Float, Method B (288°C)	PASS		IPC 2.4.13
Melting Temperature	315	°C (Typical)	DSC
Relative Thermal Index - RTI	mechanical	190	°C
	electrical	240	
Thermal Conductivity	0.2	W/m/°K	ASTM C518
Thermal Coefficient of ϵ_r , -50°C to 150°C	(+)24	ppm/°C	IPC 2.5.5.5, 8 GHz
Electrical Properties			
Dielectric Constant, 10 GHz, 23°C	2.9		IPC 2.5.5.5.1
Dissipation Factor, 10 GHz, 23°C	0.0025		IPC 2.5.5.5.1
Surface Resistivity	1X10 ¹⁰	MOhm	IPC 2.5.17
Volume Resistivity	1X10 ¹²	MOhm cm	IPC 2.5.17
Dielectric Breakdown Strength	1378 (3500)	KV/cm (V/mil)	ASTM-D-149
Environmental Properties			
Chemical Resistance	98.7	%	IPC 2.3.4.2
Water Absorption (23°C, 24 hrs)	0.04	%	IPC 2.6.2
Coefficient of Hygroscopic Expansion, CHE (60°C)	4	ppm/%RH	60°C
Flammability	VTM-0		UL-94

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

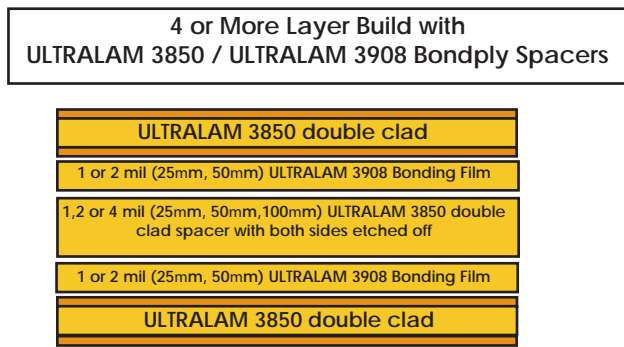
STANDARD THICKNESS	STANDARD SIZE	STANDARD COPPER CLADDING
ULTRALAM 3850: 0.001" (25µm) 0.002" (50µm) 0.004" (100µm)	ULTRALAM 3850: 18" X 12" (457mm X 305mm) panel 18" X 24" (457mm X 610mm) panel Custom sizes available upon request	ULTRALAM 3850: ½ oz. (18µm) Copper Type: Very low profile ED copper per IPC 4562 3.4.5 (<Rz 5.1 mm). Other claddings available.

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ULTRALAM® 3850 circuit materials can be used in combination with ULTRALAM 3908 bonding films to create truly adhesiveless all-LCP multi-layer circuit constructions:



ULTRALAM® 3908 bondply should never be stacked together in a design in order to increase the bondply thickness. In designs where a bondply spacing greater than 0.002" (.0508mm) is required, it is recommended to use the following multi-layer bondply approach to achieve the desired dielectric thickness.



ULTRALAM® 3000 circuit materials can also be combined with RO4450B™ prepreg, R/flex CRYSTAL® 7200 adhesive, SPEEDBOARD® C prepreg, or other types of epoxy, acrylic, cyanate ester, or PTFE resin systems to enhance the properties of a multi-layer design as needed

CONTACT INFORMATION:

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Korea:	Rogers Korea Inc.	Tel: 82-31-716-6112	Fax: 82-31-716-6208
Singapore:	Rogers Technologies Singapore Inc.	Tel: 65-747-3521	Fax: 65-747-7425
China:	Rogers (Shanghai) International Trading Co., Ltd	Tel: 86-21-63916088	Fax: 86-21-63915060

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ULTRALAM® 3908介质粘结片

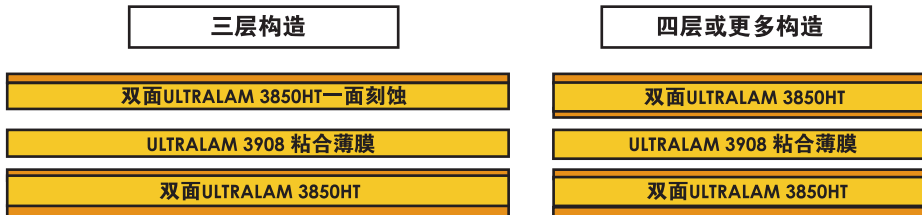
ULTRALAM 3000系列

液晶聚合物电路材料

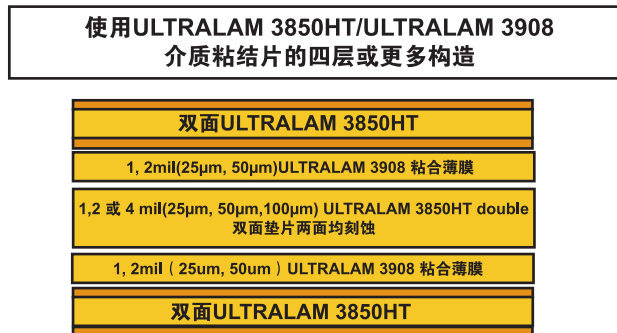
罗杰斯公司的ULTRALAM® 3908介质粘结片可用作铜层和介质层间的粘合介质（粘合层）。该产品是为多层板介质结构而特殊设计的。这种无胶薄膜片非常适合于通信网络设备及电脑数据传输线路中的高速高频应用和其他高性能的应用。

ULTRALAM 3908介质粘结片具有高速高频电路要求的低且稳定的介电常数。该产品能和ULTRALAM 3850HT双面层压板等罗杰斯ULTRALAM 3000家族系列LCP电路材料应用于多层电路结构中。

ULTRALAM 3850HT电路材料与ULTRALAM 3908粘合薄膜相结合可以实现完全无胶的全LCP多层电路结构。



在设计中不能通过连续堆叠ULTRALAM 3908介质粘结片的方式来增加粘结片厚度。在设计中，粘结片的间隙要大于0.002”(0.0508mm)，建议使用下图的多层粘结片方法来实现预期的介质厚度。



ULTRALAM 3000电路材料能和RO4450B™半固化片、R/flex CRYSTAL® 7200粘合剂及环氧树脂、丙烯酸、氰酸酯及PTFE等各种树脂体系共同应用以实现多层设计所需的特性。

数据资料表

特征和优势

卓越的电气特性：

- 稳定介电常数，减小信号层串扰
- 更薄的粘合层，减小信号损耗

低模量：

- 柔性应用，易于弯曲
- 设计多样性和减小占用空间

超低的吸水率：

- 维持稳定的电气、机械和尺寸稳定

阻燃性：

- 无卤
- 满足客户UL94VTM/0要求

一些典型应用：

所有LCP柔性连接：

- 高速开关和路由器
- 背板间
- 数据传输线路
- 板间

混合介质层：

- 手持和RF设备

特性指标	典型值 (ULTRALAM 3908)	单位	测试方法
机械特性			
尺寸稳定度	MD: <0.1 CMD: <0.1	%	IPC 2.2.4 method A
初始撕裂强度	1.4 (3.1)	Kg (lbs)	IPC 2.4.16
拉伸强度	216 (31)	MPa (Kpsi)	IPC 2.4.19
拉伸模量	2450 (355)	MPa (Kpsi)	IPC 2.4.19
厚度差异	<±10	%	ASTM-D374
热特性			
热膨胀系数, CTE (30°D to 150°C)	X:17 Y:17 Z:150	ppm/°C	IPC 2.4.41.3
浮锡, 方式B (288°C)	通过		IPC 2.4.13
热导率@ 50°C	0.20	W/m°K	ASTM D5470
熔解温度	280	°C	DSC
相对热指数 (RTI)			
	机械	190	°C
	电气	240	°C
电气特性			
介电常数(10 GHz, 23°C)	2.9		IPC 2.5.5.5.1
损耗因子(10 GHz, 23°C)	0.0025		IPC 2.5.5.5.1
表面电阻	1.2 X 10 ¹²	Mega Ohms	IPC 2.5.17
体电阻	2.6 X 10 ¹⁴	Mega Ohms-cm	IPC 2.5.17
介质击穿强度	118 (3000)	KV/cm (V/mil)	ASTM-D-149
环境特性			
耐化学性	98.7	%	IPC 2.3.4.2
吸水性(23°C, 24 hrs)	0.04	%	IPC 2.6.2
湿膨胀系数 CHE (60°C)	4	ppm/%RH	60°C
阻燃性	VTM-O		UL-94

标准厚度	标准面积	存储/保质期
0.001", 0.002" (25 µm, 50 µm)	18" X 12" (457mm X 305mm) 18" X 24" (457mm X 610mm) 最大至 20.48" (520mm X 150m) 如有需要可以提供大尺寸的板	无特殊存储要求 无保质期限制

本数据资料表中所包含的信息旨在帮助您采用罗杰斯的液晶聚合物电路材料进行设计。无意且不构成任何明示的或隐含的担保，包括对商品适销性、适用于特别目的等任何担保，亦不保证用户可在特定用途中达到本数据资料表中显示的结果。用户应负责确定罗杰斯线路板材料在每种应用中的适用性。

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