DuPont™ CooLam™ LX

THERMAL SUBSTRATES FOR METAL CORE PRINTED CIRCUIT BOARDS

Technical Data Sheet

Description

DuPont™ CooLam™ LX thermal substrates for metal core printed circuit boards (MCPCBs) are ideal for applications requiring very low thermal impedance and good electrical performance. It is a composite of metal foil, proprietary polyimide dielectric filled with thermally conductive inorganic fillers bonded to a metal base.

This material system is designed for today's demanding thermal applications requiring very low thermal impedance, very high operating temperature, excellent long term reliability, and electrical isolation. Typical applications include LED high bay lighting and outdoor LED lighting.

Specifications

- Very low thermal impedance
- Excellent reliability performance
- Excellent durability and stability at high temperature
- Uniform thermal, mechanical and electrical properties under environmental stress
- UL 94 recognition: V-0
- Halogen free
- Lead free solder compatibility
- RoHS compliant

Typical physical and electrical properties along with application test methods are shown in **Table 2**.

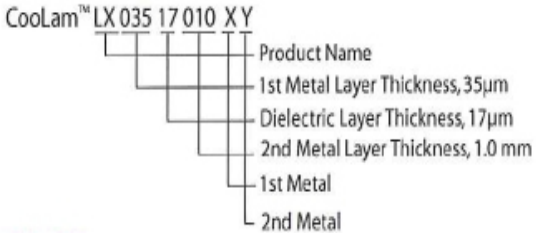
Constructions

Standard CooLam™ LX constructions are listed in **Table 1**. Filled polyimide dielectric thickness is 0.71 mil and 0.87 mil (17 µm and 22 µm), rolled annealed (RA) copper foil weights of 1 and 2 oz./ft² (35 µm and 70 µm) and aluminum thicknesses of 0.040 in. and 0.063 in. (1.0 mm and 1.6 mm). Other constructions may be available upon request depending on specific requirements for dielectric and thermal performance.

Table 1
DuPont™ CooLam™ LX Product Offerings

Product Codes	Copper µm (oz./ft²)	Dielectric µm (mil)	Aluminum mm (in.)
LX03517010	35 (1)	17 (0.71)	1.0 (0.040)
LX07017010	70 (2)	17 (0.71)	1.0 (0.040)
LX03517016	35 (1)	17 (0.71)	1.6 (0.063)
LX07017016	70 (2)	17 (0.71)	1.6 (0.063)
LX03522010	35 (1)	22 (0.87)	1.0 (0.040)
LX07022010	70 (2)	22 (0.87)	1.0 (0.040)
LX03522016	35 (1)	22 (0.87)	1.6 (0.063)
LX07022016	70 (2)	22 (0.87)	1.6 (0.063)

Product Code Description



MCPCBs Design

DuPont will work with OEM MCPCB designs to qualify and specify CooLam™ LX. For board designers, please consult our "Design Guide".

Fabrication

DuPont has established fabricators to produce cost effective, high quality MCPCBs. CooLam™ LX thermal substrates are fully compatible with most printed circuit board fabrication processes. Please contact us for the latest list of CooLam™ fabricators.

Storage Conditions

CooLam™ LX should be stored in the original package at temperatures of 4-29°C (40-85°F) and below 70% relative humidity. The products do not require refrigeration and should not be frozen. The material should be kept clean and well protected from physical damage.

Safe Handling

Although DuPont is not aware of anyone developing contact dermatitis when using CooLam™ LX products, some individuals may be more sensitive than others. Anyone handling CooLam™ LX should wash their hands with soap before eating, smoking or using restroom facilities. Gloves, finger cots, and finger pads should be changed daily. As with all parts, sharp metal edges present a potential hazard during handling. All personnel involved in handling CooLam™ LX products should use suitable hand protection to minimize cuts.

CooLam™ LX is fully cured when delivered. However, fabrication areas should be well ventilated with fresh air supply to avoid build-up from trace quantities of residual solvent (typical of polyimides) that may volatilize during assembly.

When drilling or routing parts with CooLam™ LX, provide adequate vacuum around the drill head to minimize worker exposure to dust.

Coolam™ LX does not contain polybrominated biphenyls (PBBs) or polybrominated biphenyloxides (PBBOs).

Table 2
Typical Properties of DuPont™ CooLam™ LX Products

Properties	Typical Values at 23°C (73°F)		Test Method
Electrical	**LX03517016RA**	**LX07022016RA**	
Breakdown voltage kVolts (DC)	2.5	4.0	100V/sec ramp rate
Sustain Voltage kVolts (DC)	>1	>3	100V/sec ramp rate, 60 sec hold
Dielectric Strength, kVolts/mm (kVolts/mil)	170 (4.3)	197 (5.0)	ASTM D-149
Dielectric Constant, 1 MHz	5.5		ASTM D-150
Dissipation Factor, 1 MHz	0.003		ASTM D-257
Volume Resistivity, megohm-cm	10^9		ASTM D-257
Surface Resistivity, megohm	10^6		ASTM D-257
Mechanical, 1 oz (35µm) copper			
Adhesion to Cu (peel strength) as fabricated N/mm (lb/in) after solder N/mm (lb/in)	2.5 (14) 2.5 (14)		IPC TM 650, 2.4.9
Thermal			
Thermal Impedance[1], °C-in²/Watt/°C-cm²/Watt	0.038 / 0.025	0.045 / 0.29	Calculated
Thermal Conductivity, W/m-K, dielectric	0.80		ASTM D-5470
UL			
Maximum Operating Temperature (MOT)	130°C		

(1) thermal impedance = thickness/thermal conductivity

Typical Metal Properties

Type	CTE, ppm/°C	Thermal Conductivity, W/mK
Copper	18	390
Aluminum 5052	24	140

For details, please kindly contact with our distributor:

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