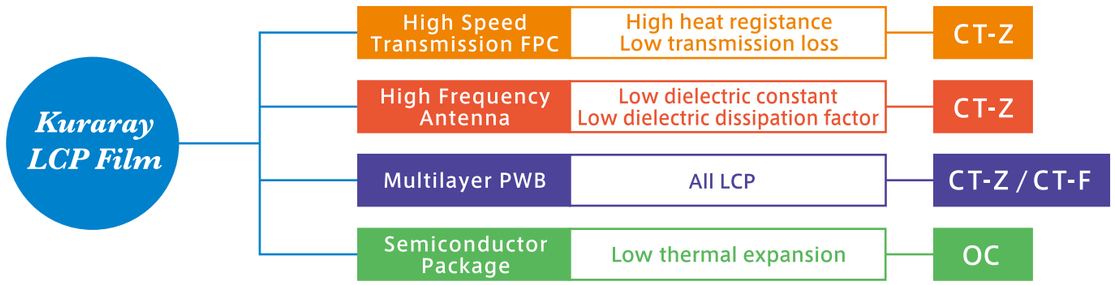
Applications and Recommended Grades



Lineup of Kuraray LCP Film Grades vs. Characteristics

Items	Unit	Method	Grade		
			OC	CT-F	CT-Z
Tensile Strength	MPa	ASTM D882	360	240	330
Elongation	%		35	40	50
Young's Modulus	GPa		3	2	3
Tear Strength	kgf	JIS C2318	12	9	18
CTE	ppm/℃	TMA Method	5	18	18
Melting Point	℃	DSC Method	310	280	335※
Solder Resistance Temp. (Float)	℃	JIS C5013	305	260	350
Solder Resistance Temp. (Hand Soldering)	℃	Kuraray Method	315	260	380
Retardancy		UL94	VTM-0(50μm)		
Dielectric Constant		TRIPLATE Line Resonator (25GHz)	2.9		
Dielectric Dissipation Factor			0.0022		
Water Absorption	%	25℃24h Water Immersion	0.04		
Dimensional Change to Humidity	ppm/%RH	20℃	1		
		60℃	4		

※The melting peak of crystals in DSC is broad　Thickness : 50μm　Kuraray Data

Product Specifications

Grade		OC			CT-F			CT-Z				
Thickness		25μm	50μm	100μm	25μm	50μm	100μm	25μm	50μm	75μm	100μm	175μm
Standard Length	80m											○
	190m			○			○				○	
	380m	○	○		○	○		○	○	○		
	1000m								○			
Width		Standard 515mm　530mm										

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Kuraray LCP Film

Kuraray LCP film has been developed using its proprietary film-forming technology. This film is provided with optimum high frequency properties for high-speed transmission circuits and high-frequency electronic devices along with low water absorption, excellent heat resistance and non-halogen flame retardant characteristics.

Basic Characteristics of Kuraray LCP Film

● High Frequency Properties : ε=2.9、tanδ=0.0022@25GHz
● Water Absorption : 0.04%　● Flame retardancy : UL94 VTM-0

kuraray

Kuraray LCP Film

New-grade Film

NEW

New Type
Excellent Heat
Resistance & Peel Strength

CT-Z

CT-Z is Kuraray's new-grade LCP film that has the highest level of heat resistance and mechanical properties among commercially available LCP films, yet it maintains excellent high frequency properties and other characteristics.

Strong Points

- The highest level of heat resistance and mechanical properties among commercially available LCP films.
- Enables hand soldering and repair using a high-temperature soldering iron.
- Improved peel strength with low profile copper foils.
- Best suited for use as insulating material (core material) for multilayer PWB.

	Hand Soldering Resistance	Peel Strength with RA Copper Foil
New Grade CT-Z	380℃	1.0 kN/m
Previous Grade	315℃	0.7 kN/m
Other Company's Material	310℃	0.4 kN/m

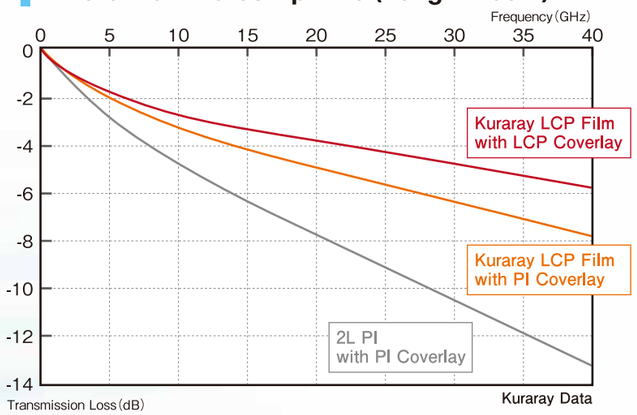
Kuraray Data

Advantages

- Very small signal transmission loss.
- No influence of humidity.

CCL were prepared from 50 micron thickness material and RA copper foil. Transmission loss data were measured after treatment under 60℃/90%RH conditions.

Differential Microstrip Line (Length 10cm)



Kuraray Data

Characteristic comparison

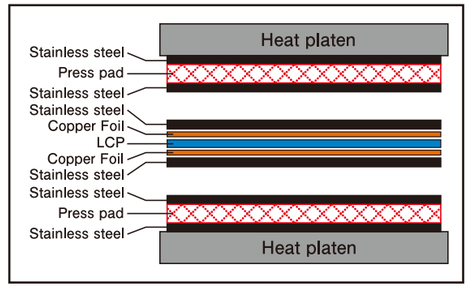
Items	Condition	Unit	Kuraray LCP Film CT-Z-50μm	Polyimide Film-50μm	Remarks
Dielectric Constant	TRIPLATE Line Resonator (25GHz)		2.9	—	The lowest dielectric constant and dielectric dissipation factor among PWB materials.
Dielectric Dissipation Factor			0.0022		
Dielectric Constant	Balanced-Type Circular Disk Resonator Method (10GHz)		2.9	3.2	
Dielectric Dissipation Factor			0.002	0.004	
Transmission Loss (RA Copper Foil)	S21,40GHz	dB/10cm	-5.9	-13.3	The lowest transmission loss among flexible PWB materials.
Water Absorption	25℃,24h	%	0.04	2.9	Superior dimensional stability due to very low water absorption.
Dimensional Stability to Humidity	60℃	$\times 10^{-6}$/%RH	4	10	

Kuraray Data

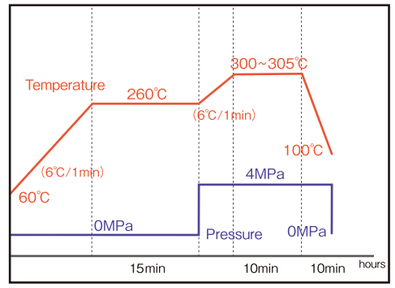
Copper Clad Laminate (Example of Laminate Condition)

CT-Z film demonstrates excellent adhesion properties with low profile copper foils and is ideal as insulation materials for high frequency applications.

Example of procedure for preparing double sided copper clad laminates



Materials assembly for lamination



Laminate condition

Copper clad laminates can be manufactured by thermal lamination.

Examples of copper clad laminates of CT-Z film with low profile copper foils

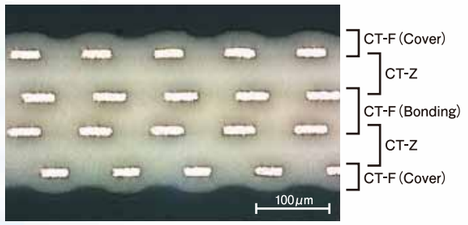
Items	Unit	Copper Foil / CT-Z-50μm / Copper Foil		Remarks
Copper Foil	—	RA Copper Foil	ED Copper Foil	—
Copper Foil Thickness	μm	18	18	Maker Data
Copper Foils Roughness Rz	μm	0.8	1.5	Surface Roughness Meter
Solder Resistance Temp. (Hand Soldering)	℃	380	380	Kuraray Method
Solder Resistance Temp. (Float)	℃	350	350	JIS Method、60sec
Peel Strength	KN/m	>0.8	>0.8	JIS Method、90°
Dimensional Stability after etched 150℃ 30min	%	<±0.05 <±0.05	<±0.05 <±0.05	JIS Method

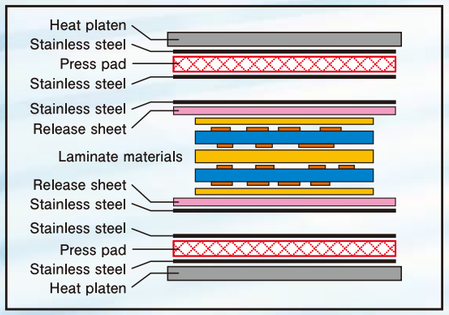
Kuraray Data

All LCP multilayer PWB (Example of Laminate Condition)

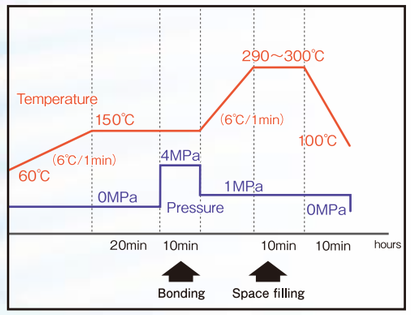
All-LCP multilayer PWBs can be manufactured by the combination of new CT-Z film and low melting CT-F film.
The melting point temperature difference between CT-Z film and CT-F film is as wide as 55℃, which contributes to widen margin of lamination conditions.

Example of all-LCP multilayer PWB





Materials assembly for lamination



Cover/Multilayer laminate condition