



Doublethin®

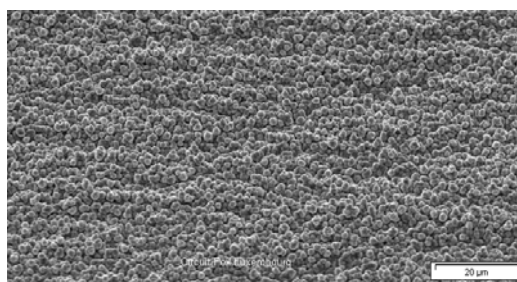
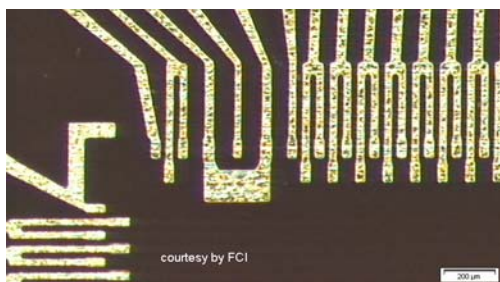
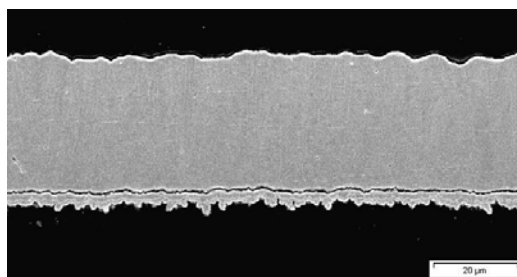
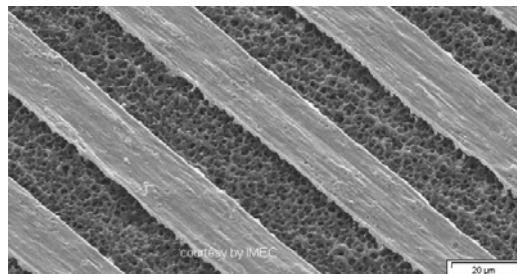
3 to 9 μm carrier supported (DTH-TW & DTH-TWS)

Technical Characteristics

Circuit Foil's **DOUBLETHIN®** products are designed for very fine line circuits and for μBGA and Chip Scale Packaging applications.

The ability to produce ultra fine line circuitry using conventional subtractive technology is primarily limited by etching capability. As line-to-track spacing fall, the ability to accurately replicate well defined line and pad features, rapidly degrades.

A solution to these limitations derives from semi-additive techniques using substrates clad with ultra thin 5 μm to 9 μm functional copper layers and conventional copper build-up followed by differential "flash etching". Ultra thin foils can also be directly laser drilled, providing a direct entry into high-end buried and blind via interconnectivity arena through sequential build-up techniques.



Typical average properties

Doublethin® portfolio												
MEASURED PARAMETERS		UNITS	PRODUCT GAUGE									
Functional Foil		μm	3	5	5	7	9	5	5	7	9	9
Carrier Foil			35	35	70	70	70	35	70	70	70	70
Profile Type			Fine Pitch				Very Low profile		Low Profile		Low profile	
Roughness profile			LP3				LP4		LP		LP	
average Rz (JIS)		μm	2.7 - 3.2				4.0 - 4.5		4.5 - 5.5		6.0 - 8.0	
Treatment Type			TW									TWS
Laminate Bond on FR-4 ^[1]	average	N/mm	± 1.4				± 1.7		± 1.8			
Laminate Bond on polyimide ^[1]	average	N/mm										± 1.2
Typical Substrates			Halogen free BT, FR-4, FR-5				FR-4, FR-5 Filled epoxy				Polyimides High Tg	
Typical applications			μBGA, BGA, COF Embedded chips				High density multilayers Fine line applications					

^[1] after galvanic reinforcement up to 35 μm

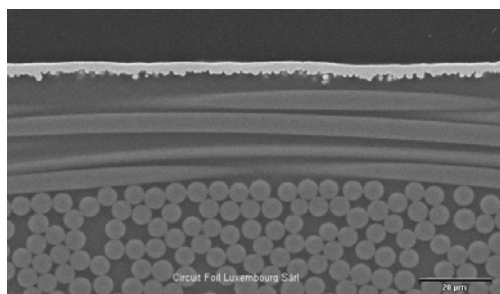
Advanced Product Features

The Peelable Cu Carrier Foil

An electrodeposited, in-house produced 35 μm (1 oz.) or 70 μm (2 oz.) carrier copper foil, with a precisely controlled shiny side surface onto which the functional surface of the ultra thin copper foil is replicated. The carrier foil protects the ultra thin functional copper from mechanical damage or contamination during sheeting and lamination. It remains in place on laminated cut panels during all PCB operations until photo imaging and can act as a drill entry material for conventional mechanical drilling. It is easily mechanically separated.

The Laminate Bond

After conventional copper electrolytic build-up to 35 μm , consistent high laminate bond strength of > 1.5 N/mm (> 8.5 lb./in.) on FR4 or > 1 N/mm (> 5.7 lb./in.) on BT/Epoxy substrates for μBGAs are obtained.

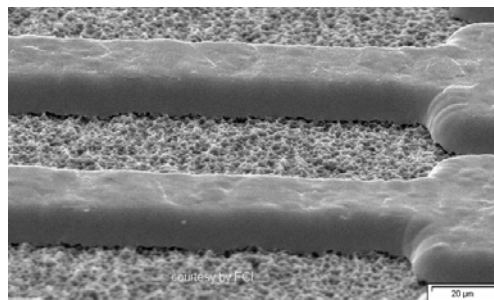


The Interface Release Layer

A proprietary process based on metallic Chromium, which provides the release mechanism between the functional and carrier foil. This organic-free layer totally remains on the carrier foil after peeling, leaving an ultra clean functional copper laminate surface ready for immediate photomechanical processing. The carrier release bond remains low and stable after thermal stress from lamination or post baking cycles until temperatures of preferably below 220 °C (428 °F).

The Ultra Thin Functional Layer

Very regular 3 μm , 5 μm , 7 μm , or 9 μm functional foils provide an ideal surface for fine line PCBs. The roughness Rz (JIS) of the treated side is typically below 3.5 μm for Fine Pitch version LP3.



- Precise thickness control ensures an ideal topography, perfect for high-density applications:
- **DOUBLETHIN**[®] copper foils are also available as RCC foils with high T_g resin systems (including a lead free version **LF**) as well as with halogen free **ECOFOIL** version.
- The product meets or exceeds all of the requirements of IPC-4562 when tested on typical epoxy and multifunctional prepregs, in accordance with IPC test methods, including high temperature peel strength, solder shock and accelerated ageing.

Notes

- Products can be supplied in both rolls and sheeted formats, including registration holes.
- Roll product is available in widths of 150 mm (~ 5.9") to 1360 mm (~ 53.5").
- Product is supplied on sturdy cardboard cores with an ID of ~ 80 mm (3 1/8"). Alternative core sizes and materials are available on request.
- Please visit our website (www.circuitfoil.com) for regular updates.

All of this Technical Information has been determined with due care and thoroughness. However, because the conditions of use and process and application technologies employed can substantially vary, the provided data and figures can only serve as non binding guidelines. They do not constitute a guarantee that the purchased item will possess certain attributes. For this reason, no liability whatsoever can be assumed for them. The buyer is obliged to check the suitability of all supplied products.

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