

Technology - Rigid Flexible Printed Circuits

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Options and characteristics - rigid-flexible printed circuits	Online calculation/Standard	On explicit enquiry
Quantities	1 piece to max. 0,4m ² total area	1 piece to mass production
Layer count (total)	2-, 4- and 6-layers	up to 12 layers
Layer count (flexible)	2-, 4- und 6-Lagen	up to 4 layer
Flex layer position	outer	outer and inner
Material thickness	1,2 / 1,6 / 2,0mm	0,5 bis 3,2mm
Kupferdicke (Basis)	35µm	35 / 70µm
Material color	beige / red-brown (polyimide)	beige / red-brown (polyimide)
Base material type	FR4 with polyimide and epoxy adhesive	FR4 with polyimide and epoxy adhesive
Maximum operating temperature	ca. 120° C	ca. 120° C
Copper type	no selection	ED- or RA-copper
Silk print layers	none, top, bottom, double-sided	none, top, bottom, double-sided
Solder mask colors	green	yellow, green, white, red, blue, black
Cover-layer	yellow polyimide	yellow, black or white polyimide
Combination of cover-layer and solder mask	possible	possible
Sil print color	white	white, black, blue, yellow, green, red
Via-filler (no copper-lid)	possible by cover-layer	possible by cover-layer
Stiffener	possible	variety of thicknesses, FR4 or polyimide, standard ZIF/LIF connectors 0,30mm +/-0,05mm
3M-adhesive	not possible	possible
Electrical test	possible	not possible
Plugging (with copper-lid, e.g. for "via-in-pad")	not possible	possible with inner-flex-layers
Peelable mask	not possible	possible
Beveling	not possible	possible (rigid area)
Surface finish	immersion gold ENIG	immersion gold ENIG or ENEPIG
Connector gold	not possible	possible
Long term baking	not possible	possible
Maximum PCB size 2-layer	235x370mm ²	depends on specifications, please enquire

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Maximum PCB size 4- and 6-layer	235x370mm ²	depends on specifications, please enquire
Lead time options 2-layer	10WD, 15WD, 20WD	<10WD
Lead time options 4- and 6-layer	10WD, 15WD, 20WD	<10WD
Routing	included	included
V-cut	not possible	possible, in rigid area
Jump v-cut	not possible	possible, in rigid area
Punching	not possible	not possible
Counter-sink drills	not possible	possible
Special multilayer stack-ups	not possible	possible

Panelization - rigid-flexible printed circuits	Online calculation/Standard	On explicit enquiry
V-cut-panel	not possible	possible
V-cut-punching-panel	not possible	not possible
Multy-panel (more than 1 layout)	not possible	possible
Panelization (chosen by Leiton)	possible	possible
Panelization (according to drawing, prepared by Leiton)	possible	possible

PTH-Drills (plated) - rigid-flexible printed circuits	Online calculation	On explicit enquiry
Smallest drill	0,30mm	0,20mm
Smallest annular ring	0,15mm	0,10mm
Drill sizes	up to 5,5mm in 0,05mm steps	up to 5,5mm in 0,05mm steps
Drills >5,5mm	routing	routing
Min. hole distance 0,2mm to 2,0mm drill diameter	0,50mm	0,40mm
Min. hole distance 2,05mm to 5,5mm drill diameter	0,60mm	0,50mm
Min. distance PTH-drill to flexible layer	1,00mm	0,80mm
Intersecting drills	not possible	not possible
Half-open PTH	not possible	not possible
PTH in flexible area	not possible	possible

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NPTH-Drills (non-plated) - rigid-flexible printed circuits	Online calculation	On explicit enquiry
Smallest drill	0,30mm	0,20mm
Drill sizes	0,30mm to 5,5mm in 0,05mm steps	0,20mm to 5,5mm in 0,05mm steps
Distance to copper areas	0,25mm	0,20mm
Drills >5,5mm	routing	routing
Min. distance to outline	0,60mm	0,50mm
Min. hole distance 0,2mm to 2,0mm drill diameter	0,50mm	0,40mm
Min. hole distance 2,05mm to 5,5mm drill diameter	0,60mm	0,50mm
Intersecting drills	not possible	nicht möglich
NPTH in copper areas	not possible(0,2mm clearance will be applied)	on explicit enquiry

Blind vias - rigid-flexible printed circuits	Online calculation	On explicit enquiry
Smallest blind via (final)	not possible	0,10mm
Smallest aspect-ratio	not possible	1:1
Smallest annular ring	not possible	0,15mm

Buried vias - rigid-flexible printed circuits	Online calculation	On explicit enquiry
Smallest buried via	not possible	0,10mm

Slots (non-plated) - rigid-flexible printed circuits	Online calculation	On explicit enquiry
Inner routing / slots (NPTH)	possible	possible
Smallest routing / slots (NPTH)	from 1,0mm up	from 0,6mm up
Smallest routing radious (NPTH)	0,5mm	0,3mm

Slots (plated) - rigid-flexible printed circuits	Online calculation	On explicit enquiry
Plated slots (PTH)	not possible	possible
Smallest plated slot	not possible	from 0,7mm
Plated outline	not possible	not possible
Special slot shapes, plated (inner)	not possible	possible

Technology - Rigid Flexible Printed Circuits

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Smallest radius, plated	not possible	0,3mm
Smallest annular ring	not possible	0,15mm

Copper layers (outer) - rigid-flexible printed circuits	Online calculation	On explicit enquiry
Smallest trace width 35µm	0,15mm	0,10mm
Smallest trace width 70µm	not possible	0,20mm
Smallest trace distance 35µm	0,15mm	0,10mm
Smallest trace distance 70µm	not possible	0,20mm
Smallest drill-pad	0,60mm	0,50mm
Smallest clearance to inner slots	0,25mm	0,20mm or 0,0mm (plated)
Smallest clearance to outline	0,25mm	0,20mm or 0,0mm (plated)

Copper layers (outer) - rigid-flexible printed circuits	Online calculation	On explicit enquiry
Smallest trace width 35µm	not possible	0,10mm
Smallest trace width 70µm	not possible	0,20mm
Smallest trace distance 35µm	not possible	0,10mm
Smallest trace distance 70µm	not possible	0,20mm
Smallest drill-pad	not possible	0,40mm
Smallest clearance to inner outline	not possible	0,30mm
Smallest clearance to inner slots	not possible	0,35mm
Smallest clearance to inner drills	not possible	0,30mm

Solder mask - rigid-flexible printed circuits	Online calculation	On explicit enquiry
Smallest solder mask bridge (straight)	 0,10mm	0,08mm
Smallest solder mask bridge (round)	 0,05mm	0,05mm
Smallest clearance	 0,05mm	<0mm
Smallest text size	0,25mm	0,25mm

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Cover-layer (punched / drilled / lasered) - rigid-flexible printed circuits	Online calculation	On explicit enquiry
Smallest rectangular pad	5x5mm	2x2mm
Smallest web bridge (rectangular)	 5,0mm	2,0mm
Smallest web bridge (round)	 3,0mm	1,0mm
Smallest clearance	 0,2mm	<0mm
Smallest text size	not possible	not possible
Silk print - rigid-flexible printed circuits	Online calculation	On explicit enquiry
Smallest text size	0,20mm	0,15mm
Smallest text distance	0,20mm	0,15mm
Minimum clearance to pads	0,20mm	0,15mm
Carbon print - rigid-flexible printed circuits	Online calculation	On explicit enquiry
Minimum pad distance	not possible	0,50mm
Tolerances, values, markings & standards - rigid-flexible printed circuits	Online calculation	On explicit enquiry
Max. deviation between centre of drill and target	0,10mm	0,075mm
Max. offset solder mask to copper	0,20mm	0,10mm
Drill diameter PTH (<=3mm)	-0,05/+0,10mm	-0/+0,10mm
Drill diameter PTH (>3mm)	-0,05/+0,10mm	-0/+0,10mm
Drill diameter NPTH (<=6mm)	-0,05/+0,10mm	-0/+0,10mm
Drill diameter NPTH (>6mm)	-0,05/+0,10mm	-0/+0,10mm
Outline	+/-0,30mm	+/-0,10mm
Max. offset copper to outline	+/-0,30mm	+/-0,10mm
V-cut depth	not possible	+/-0,20mm
Max. offset v-cut to copper	not possible	+/-0,20mm
Etching tolerance (trace width) 35µm	+0/-0,03mm	+0/-0,03mm

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Etching tolerance (trace width) 70µm	not possible	+0/-0,04mm
Material thickness tolerance	+/-15%	varies, please enquire
Copper thickness tolerance	+/-15%	+/-10%
Immersion tin thickness	not possible	not possible
HAL lead-free thickness	not possible	not possible
Immersion gold, ENIG (nickel thickness)	2,5µm to 5µm	2,5µm to 5µm
Immersion gold, ENIG (gold thickness)	0,025µm to 0,075µm	0,05µm to 0,075µm
Immersion gold, ENEPIG (nickel thickness)	not possible	2,5µm to 5µm
Immersion gold, ENEPIG (gold thickness)	not possible	0,025µm to 0,05µm
Elect. gold - soft, bonding (nickel thickness)	not possible	not possible
Elect. gold - soft, bonding (gold thickness)	not possible	not possible
Elect. connector gold - hard, no bonding (nickel thickness)	not possible	4µm to 8µm
Elect. connector gold - hard, no bonding (gold thickness)	not possible	0,8µm to 1,2µm
Solder mask thickness	ca. 10µm	>15µm
Cover-layer thickness	25,4µm	ab 12,5µm
Thickness of adhesive polyimide-basefilm to copper (epoxy)	25,4µm	ab 12,5µm
Thickness of adhesive polyimide-cover-layer to copper (epoxy)	25,4µm	ab 12,5µm
Copper wall 35µm	min. 18µm	min. 20µm
Copper wall 70µm	not possible	min. 20µm
Connector tolerance with stiffener (total width)	not possible	+/-0,10mm
Connector tolerance with stiffener (pad to outline)	not possible	+/-0,10mm
Beveling angle	not possible	45° / 60°
Base material RoHS-compliant	yes, always	yes, always
Surface finish RoHS-compliant	yes, always	yes, always
IPC-standard	class 2	IPC-6013 - class 1, 2 or 3
UL-approval of RFPCB (UL-number, logo, date code)	not possible	not possible
UL-approval of base materials	possible	possible
Adding date code (WW/YY)	possible, please mention in comments	possible, please mention in comments
Adding company logo (Leiton)	possible, please mention in comments	possible, please mention in comments

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DIN EN ISO 9001 certification of Leiton GmbH	yes	yes
DIN EN ISO 14001 certification of Leiton GmbH	no	possible
DIN EN ISO 16949 certification	no	possible