Technology – Rigid Printed Circuits – Rev. 1.7

26.02.2010 – For latest information please visit www.leiton.de

Options and Characteristics	Online calculation	On explicit enquiry
Quantity	1 piece up to 4m² total area	from 1 pieces
Layer quanty	1 to 8 layers	Up to 18 layers
Material thickness (1- and 2-layers)	0.5mm, 0.8mm, 1.0mm, 1.2mm, 1.55mm, 2.0mm und 2.4mm	0,10mm* up to 3,0mm *see flexible printed circuits
Material thickness (4-, 6- and 8-layers)	1.55mm	0,2mm* bis 3,2mm *see flexible printed circuits
Copper thickness (1- and 2-layers)	35µm and 70µm	35µm, 70µm, 105µm, 140µm, 210µm, 280µm, 400µm
Copper thickness (4-, 6- and 8-layers)	35µm	12 up to 210µm
Material colours	beige / fawn	black, blue, white
Base material	FR4 Tg 130° C	different Rogers HF, Isola high-Tg (please ask for stock)
Maximum operating temperature	ca. 110° C	ca. 230° C (@Tg 260)
Minimum operating temperature	ca. -40° C	ca. -40° C
Silk print layers	none, top, bottom, double-side	none, top, bottom, double-side
Solder mask colours	green, white, black, blue, red and yellow	green, white, black, blue, red, yellow and transparent
Silk print colours	white	black, blue, yellow, red
Via-Filling (no copper lid)	possible	possible
Electrical test	possible (flying probe)	possible, also adapter
Plugging (with copper lid, e.g. for „via-in-pad“ technology)	not possible	possible
Peelable mask	none, top, bottom, double-side	none, top, bottom, double-side

Beveling	not possible	possible
Surface finish	HAL lead free, immersion tin, immersion gold, RoHS compliant (means one of the three surface finishs, chosen by LeitOn)	HAL lead free, immersion tin, immersion gold, OSP (ENTEK), immersion silver, HAL lead, RoHS compliant (means one of the three surface finishs, chosen by LeitOn)
Finger gold	not possible	possible
Long term tempering	not possible	possible
Maximum printed circuit board size 1 and 2 layers PCB	280x480mm²	1200x500mm²
Maximum printed circuit board size for multilayer PCBs	280x480mm²	600x500mm²
Minimum singulated circuit board size	3cm², kleiner kalkulierbar aber wird im Nutzen gefertigt.	>1cm² <3cm² auf Anfrage
Minimum circuit board size in v-cut panels	5x5mm²	<5x5mm² auf Anfrage
Minimum circuit board size in routing panels	10x10mm², bzw. 1cm²	<10x10mm² auf Anfrage
Minimum printed circuit board width	5mm	<5mm auf Anfrage
Lead time options 1 and 2 layers printed circuits	12 hours, 2WD, 3WD, 5WD, 8WD, 12WD, 15WD, 18WD, 25WD	In-day-service and over-night-service
Lead time options 4 to 8 layers multilayer printed circuits	2WD, 4WD, 6WD, 10WD, 12WD, 15WD, 18WD, 25WD	Over-night-service and 2WD
Lead time options 10 to 18 layers multilayer printed circuits	not possible	From 6WD
Routing	always	always
V-cut	possible	possible
Jump v-cut	not possible	possible

Punching	not possible	possible
Tap-hole drills	not possible	possible
Z-axis routing (milling)	not possible	possible
Multilayer special stack-ups	not possible	possible

Panel Production	**Online calculation**	**On explicit enquiry**
V-cut panels	possible	possible
Routing panels	possible	possible
Multi panels (more than 1 layout per panel)	not possible	possible
Panel setup (chosen by LeitOn)	possible	possible
Panel setup (according to drawing)	possible	possible

PTH drills (plated)	**Online calculation**	**On explicit enquiry**
Smallest drills 35µm (final diameter)	0,20mm, standard is 0,30mm	0,15mm
Smallest drills 70µm (final diameter)	0,30mm	0,20mm
Smallest drills 105µm (final diameter)	not possible	0,30mm
Smallest drills 140µm (final diameter)	not possible	0,30mm
Smallest drills 210µm (final diameter)	not possible	0,30mm
Smallest drills 280µm (final diameter)	not possible	0,40mm
Smallest drills 400µm (final diameter)	not possible	0,50mm
Smallest annular ring 35µm	0,15mm	0,10mm
Smallest annular ring 70µm	0,20mm	0,15mm
Smallest annular ring 105µm	not possible	0,20mm

Smallest annular ring 140µm	not possible	0,25mm
Smallest annular ring 210µm	not possible	0,30mm
Smallest annular ring 280µm	not possible	0,50mm
Smallest annular ring 400µm	not possible	1,00mm
Possible drill diamters	pp to 5,5mm in 0,05mm steps	Up to 5,5mm in 0,05mm steps
drills >5,5mm	Routed	routed
Smallest drill distance 0,20mm to 2,00mm hole size (drill edge to drill edge)	0,40mm	0,40mm
Smallest drill distance 2,05mm to 5,50mm hole size (drill edge to drill edge)	0,50mm	0,50mm
Intersecting drills	not possible, will be routed	0,7 to 2,0mm
Half-open PTH on PCB edge	not possible, will be routed	possible

NPTH drills (non-plated)	**Online calculation**	**On explicit enquiry**
Smallest drill (final diamter)	0,60mm	0,30mm
Possible drill sizes	0,60mm to 5,5mm in 0,05mm steps	0,30mm to 5,5mm in 0,05mm steps
Copper clearance/distance NPTH to copper	0,20mm	0,20mm
Drills >5,5mm	routed	routed
Minimum drill-to-edge distance	0,50mm	0,50mm
Smallest drill distance 0,20mm to 2,00mm hole size (drill edge to drill edge)	0,40mm	0,40mm
Smallest drill distance 2,05mm to 5,5mm hole size (drill edge to drill edge)	0,50mm	0,50mm

Intersecting drills	not possible, will be routed	0,7 bis 2,0mm
NPTH drills in copper area (without clearance)	not possible (will be cleared from copper by min. 0,2mm)	on explicit requirement only

Blind vias	**Online calculation**	**On explicit enquiry**
Smallest blind via (final diamter)	0,30mm to 0,50mm, depending on stack-up and required layer connection	0,30mm
Smallest aspect-ratio	1	1
Smallest annular ring	0,15mm	0,125mm

Buried vias	**Online calculation**	**On explicit enquiry**
Smallest buried via (final diameter)	not possible	0,20mm

Routing (non-plated)	**Online calculation**	**On explicit enquiry**
Inner routing	possible	possible
Smallest inner routing	0,70mm	0,70mm
Possible routing diameters	up to 2,0mm in 0,10mm steps	up to 2,0mm in 0,10mm steps
Smallest radius (inner corners) NPTH	0,35mm	0,35mm

Routing (plated)	**Online calculation**	**On explicit enquiry**
Inner routing	partly possible	possible
Smallest inner routing	0,60mm	0,60mm
Edge plating (outer edge)	not possible	possible

Special routing paths with plating (inner)	partly possible	possible
Available routing diameters PTH (final diameter)	up to 1,9mm in 0,10mm steps	up to 2,1mm in 0,10mm steps
Smallest radius (inner corner, final) PTH	0,30mm	0,30mm
Smallest annular ring	0,20mm	0,15mm

Copper layers (outer)	**Online calculation**	**On explicit enquiry**
Smallest trace 18µm	nicht möglich	0,09mm
Smallest trace 35µm	0,10mm; 0,125mm oder 0,15mm	0,10mm
Smallest trace 70µm	0,20mm	0,20mm
Smallest trace 105µm	not possible	0,40mm
Smallest trace 140µm	not possible	0,50mm
Smallest trace 210µm	not possible	0,70mm
Smallest trace 280µm	not possible	0,90mm
Smallest trace 400µm	not possible	1,20mm
Smallest trace-to-trace distance 18µm	not possible	0,09mm
Smallest trace-to-trace distance 35µm	0,10mm; 0,125mm or 0,15mm	0,10mm
Smallest trace-to-trace distance 70µm	0,20mm	0,20mm
Smallest trace-to-trace distance 105µm	not possible	0,40mm
Smallest trace-to-trace distance 140µm	not possible	0,50mm
Smallest trace-to-trace distance 210µm	not possible	0,60mm
Smallest trace-to-trace distance 280µm	not possible	0,70mm
Smallest trace-to-trace distance 400µm	not possible	0,80mm

Smallest drill pad	0,50mm @ 0,20mm drills, standard is 0,60mm	0,38mm
Smallest copper clearance to inner routing	0,30mm	0,25mm oder 0,0mm (metallisiert)
Smallest copper clearance to board edge (routing)	0,30mm	0,25mm oder 0,0mm (metallisiert)
Smallest copper clearance to board edge (v-cut)	0,50mm	0,40mm

Copper layers (inner) – multilayer	**Online calculation**	**On explicit enquiry**
Smallest trace 18µm	not possible	0,09mm
Smallest trace 35µm	0,10mm; 0,125mm or 0,15mm	0,10mm
Smallest trace 70µm	0,20mm	0,20mm
Smallest trace 105µm	not possible	0,40mm
Smallest trace-to-trace distance 18µm	not possible	0,09mm
Smallest trace-to-trace distance 35µm	0,10mm; 0,125mm or 0,15mm	0,10mm
Smallest trace-to-trace distance 70µm	not possible	0,20mm
Smallest trace-to-trace distance 105µm	not possible	0,40mm
Smallest drill-pad diamter	0,60mm	0,40mm
Smallest copper clearance to outer edges (routed)	0,30mm	0,25mm
Smallest copper clearance to inner edges (routed)	0,30mm	0,25mm
Smallest copper clearance to drills	0,30mm	0,25mm

Technology – Rigid Printed Circuits – Rev. 1.7

26.02.2010 – For latest information please visit www.leiton.de

Solder mask	Online calculation	On explicit enquiry
 Smallest solder mask web (straight)	0,12mm	0,10mm
 Smallest solder mask web (round)	0,075mm	0,05mm
 smallest solder maks size around copper	0,075mm	<0mm
Smallest text lines	0,25mm	0,25mm

Silk print	Online calculation	On explicit enquiry
Smallest lines	0,20mm	0,15mm
Smallest distance between lines	0,20mm	0,15mm
Minimum clearance to copper pads	0,20mm	0,15mm

Carbon print	Online calculation	On explicit enquiry
Smallest pad-to-pad distance	not possible	0,30mm

Tolerances, Values, Marks & Norms	Online calculation	On explicit enquiry
Max. offset drill centre to centre of reference	0,07mm	0,05mm
Max. offset soldermask / copper structures	0,12mm	0,075mm
Finished drill sizes PTH (up to 3mm)	-0/+0,20mm	-0/+0,10mm
Finished drill sizes PTH (>3mm)	-0,05/+0,20mm	-0/+0,10mm
Finished drill sizes NPTH (up to 6mm)	-0,05/+0,20mm	-0/+0,10mm
Finished drill sizes NPTH (>6mm)	-0,05/+0,20mm	-0/+0,10mm
Outline	+/-0,20mm	+/-0,10mm

Max. offset outline/copper structures	+/-0,15mm	+/-0,10mm
V-cut depth	+/-0,30mm	+/-0,20mm
Z-axis milling	not possible	+/-0,20mm
V-Cut position to copper structures	+/-0,25mm	+/-0,15mm
Etch tolerance copper thickness 18µm	not possible	+0/-0,02mm
Etch tolerance copper thickness 35µm	+0/-0,03mm	+0/-0,03mm
Etch tolerance copper thickness 70µm	+0/-0,05mm	+0/-0,05mm
Etch tolerance copper thickness 105µm	not possible	+0/-0,08mm
Etch tolerance copper thickness 140m	not possible	+0/-0,10mm
Etch tolerance copper thickness 210µm	not possible	+0/-0,12mm
Etch tolerance copper thickness 280µm	not possible	+0/-0,12mm
Etch tolerance copper thickness 400µm	not possible	+0/-0,25mm
Material thickness tolerances	<=1,0mm: +/-15% > 1,0mm: +/-10% 1,55mm: 1,6mm +/-10%	Differs, please enquire
Copper thickness tolerances	+20% / -10%	+/-10%
Immersion tin thickness	>= 0,7µm	>= 1,0µm
HAL lead free thickness	>= 8- bis 10µm, edges >0,5µm	>= 8- to 10µm, edges >0,5µm
HAL lead thickness	not possible	>= 8- to 10µm, edges >0,5µm
Immersion gold for soldering (nickel thickness)	2,5µm to 5µm	3µm to 6µm
Immersion gold for soldering (gold thickness)	0,05µm to 0,075 µm	0,07µm to 0,12 µm
Immersion gold for gold-wire bonding (nickel thickness)	not possible	3µm to 6µm
Immersion gold for gold-wire bonding (gold thickness)	not possible	0,4µm to 0,6µm

Immersion gold for aluminum-wire bonding (nickel thickness)	2,5µm to 5µm	3µm to 6µm
Immersion gold for aluminum-wire bonding (gold thickness)	0,05µm to 0,075 µm	0,07µm to 0,12 µm
Electrolytic connector gold - soft, bonding possible (nickel thickness)	not possible	4µm to 8µm
Electrolytic connector gold - soft, bonding possible (gold thickness)	not possible	0,3µm to 5µm
Electrolytic connector gold - hard, bonding NOT possible (nickel thickness)	not possible	4µm to 8µm
Electrolytic connector gold - hard, bonding NOT possible (gold thickness)	not possible	0,8µm to 5µm
Wet solder laquer thickness	>15µm	>15µm
Copper thickness in plated hole, traces 35µm	minimum 20µm	minimum 20µm
Copper thickness in plated hole, traces 70µm	minimum 20µm	minimum 20µm
Copper thickness in plated hole, traces 105µm to 210µm	not possible	minimum 25µm
Copper thickness in plated hole, traces 280µm to 400µm	not possible	minimum 30µm
Winding	max. 1%	max. 0,5%
Warping	max. 1%	max. 0,5%
Beveling angle	not possible	no spcification, please enquire
Base material RoHS-compliance	yes, always	yes, always
Surface finish RoHS-compiance	yes, always	always, unless "HAL lead" is explicitly required
IPC-norm	IPC-A-600G - class 2	IPC-A-600G - class 1, 2 or 3
UL-approval of printed circuits (UL number, logo, date code)	UL94V0 possible	UL94V0 possible
UL-approved base material	yes, always	possible

Insertion of date code	possible, please mention in enquiry	possible, please mention in enquiry
Insertion of supplier logo (LeitOn)	possible, please mention in enquiry	possible, please mention in enquiry
DIN EN ISO 9001 certification work preparation, CAM and order management over LeitOn	yes	yes
DIN EN ISO 9001 certification of printed circuit board production	no	possible
DIN EN ISO 14001 certification of printed circuit board production	no	possible
DIN EN ISO 16949 certification of printed circuit board production	no	possible