



CAPABILITIES OVERVIEW

Unlock possibilities with our comprehensive technical expertise.

| | | | VALUES | | REMARKS |
|--|---|------------------------------|--------------------------------------|--|---|
| FEATURES | VARIABLES | STANDARD PRODUCTIBILITY | REDUCED PRODUCTIBILITY | | |
| FABRICATION DRAWING FEATURES - ALL PWB'S | | | | | |
| 1 | Base materials | | N/A | If present | Standard materials are rigid epoxy per IPC 4101/24/26/126 and polyimide per IPC 4101/40/41/42. Flex materials derive from Dupont Pyralux and Panasonic rf- 775. |
| 2 | Layer count flex, max | | 24 LYRS | 32 LYRS & higher | Total conductive layers |
| 3 | Layer count rigid, max | | 24 LYRS | 36 LYRS & higher | Total conductive layers |
| 4 | Base Copper (Cu) weight | | 1/2 - 1 oz | < 1/4 oz, > 4 oz | |
| 5 | Plated subs (e.g. blind or buried vias) | Sequential lamination cycles | 2 Squential cycles | 4 Squential cycles | |
| 6 | Non-plated subs (e.g. bonded but non-plated flex sub) | Lamination cycles | 2 | 4 | Lamination cycles |
| 7 | Longest dimension, max | | 34" | 80"+ | 22" x 34" Max standard product, 80 inch max long flex with no/reduced presence of plated through holes (pth) between ends. |
| 8 | Profile tolerance (rigid board) | | +/- .010" | +/- .005" | Up to 22" inches in length. |
| 8.5 | Profile tolerance (flex & rigid-flex) | | +/- .015" | +/- .010" | Up to 22" inches in length. |
| 9 | Overall thickness, max. | | 0.160" | 0.250" | |
| 10 | Thickness tolerance | | +/-10% | +/-5% | |
| 11 | Aspect ratio, max | | 8:1 | 10:1 and higher | Drill size: board thickness |
| 12 | Hole size (mechanical drill), min diameter (multilayer) | | 0.0135" | 0.009" | Drill size (before plating) |
| 13 | Laser microvias | Hole size, aspect ratio | .006" Hole / 0.012" Pad | < .004" > 1:1 .010" Pad or smaller | .5:1 aspect ratio strongly recommend for most robust microvia |
| 14 | Registration tolerance, Lyr/Lyr, max allowable | | 0.014" | 0.010" | |
| 15 | Hole full, min-max hole size | Hole size | 0.018" Hysol .015" Other fill mtals. | .008" - 0.010" | Finished hole size after plating |
| 16 | Non standard suface finish | Type, thickness | N/A | Ni> .001; Au> 200 Microinches (plated) | Standard finisihes - HASL, ENIG; ENIPIG; non-std white tin, immersion silver, hard/soft gold. |

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| 17 | Selective solder strip & fuse | | N/A | If present | Allowance for .010" exposed Cu or soldermask overlap |
| 18 | Controlled impedance - single ended | Tolerance | +/-10% | +/-5% | |
| 19 | Controlled impedance - differential | | +/-10% | +/-7% | |
| 20 | Feature location tolerance - drill to artwork | | 0.010" | 0.005" | Diameter true position |
| 21 | Plated hole size tolerance | | +/- .003" | +/- .002" | Up to .089" thickness |
| 22 | Etchback tolerance | | +/- .001" | +/- .0005" | |
| 23 | Dielectric - prepreg | | 0.005" | 0.0045" | To meet .0035" minimum dielectric |
| FABRICATION DRAWING FEATURES - FLEX PWB'S ONLY | | | | | |
| 24 | Bookbinder | | N/A | > .75" in height | Assumes no bonded flex layers (3 layers or above) |
| 25 | Crossing flex legs | | N/A | If present | (Plated holes overlapping other flex layers count as sequential laminations) |
| 26 | Double-sided cap core (1/2) construction | | N/A | If present | 1/0 strongly preferred all cases; 1/2 only w/ adhesiveless flex |
| 27 | Laser depth | | N/A | If present | |
| 28 | Mechanical drill - depth control and back drill | | (+/- .005") | | |
| 29 | Flexible profile dimensions | Lamination cycles | < +/- .010" | < +/- .006" | Steel rule dies are +/- .005" |
| ARTWORK (GERBER DATA) FEATURES - ALL PWB'S (UP TO 22" MAX LENGTH) | | | | | |
| 30 | Line/space, min. on 1/2 oz Copper Cu outer layers | | .004"/.006" | .003"/.006" | Nominal dim. before etch compensation (add+ .001"/ +.001" if subs are present) - outer layers |
| 31 | Line/space, min. on 1/2 oz Copper Cu | | .004"/.005" | .003"/.004" | Nominal dim. before etch compensation (add+ .001"/ +.001" if subs are present) |
| 32 | Line/space, min. on 1 oz Copper Cu | | .005"/.006" | .004"/.005" | Nominal dim. before etch compensation (add+ .001"/ +.001" if subs are present) |
| 33 | Line/space, min. on 2 oz Copper Cu | | .005"/.010" | .004"/.008" | Nominal dim. before etch compensation (add+ .001"/ +.001" if subs are present) |
| 34 | Pad size, min. - for MIL-SPEC annular ring (.005" external / .002" internal) | | Drill+ .020" | Drill+ .014" | .006" plating compensation; add .002" to pad diameter for each sequential lamination |
| 35 | Pad size, min. - for IPC annular ring (.002" external / .001" internal) | | Drill+ .016" | Drill + .012" | .006" plating compensation; add .002" to pad diameter for each sequential lamination |

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| 36 | Conductor to PTH min | | 0.010" | 0.008" | Applies to padless holes |
| 37 | Ground plane clearance, min | .010" Clearance | .006" Hole/ .012" Pad | 0.005" CLEARANCE | Clearance around pads (for 1/2 oz Cu/ .007" for 2 oz Cu) |
| 38 | Hole to part edge, min distance | Rigid-Flex | 0.050" Min. | 0.030" Min. | Add .020" to these minimum if bookbinder |
| 39 | Hole to part edge, min distance | | 0.050" | 0.025" | Edge of hole to edge of part |
| 40 | Film Artwork (A/w) feature to part edge, min distance | | 0.020" | 0.010" | Edge of feature to edge of part (refer to (28) for rigid-flex |
| 41 | Soldermask - min web Liquid Photo Image (LPI) | | 0.006" | 0.004" | |
| 42 | Soldermask - min web dryfilm | | 0.008" | 0.005" | |
| 43 | Soldermask - min clearance around features | | .005" per side | ∠ .0025" per side | Nominal dimension before etch compensation |
| ARTWORK (GERBER DATA) FEATURES - FLEX PWB'S ONLY | | | | | |
| 44 | Plated hole to Rigid/Flex interface, min distance | | ∠ .125" | ∠ .075" | Edge of hole to edge of rigid board |
| 45 | Covercoat clearance around pads, min. | | Adhesive thickness | clearance diameter ∠ .010" over pad diameter | For up to .003" adhesive; to allow for adhesive squeezeout & covercoat registration. |
| ARTWORK (GERBER DATA) FEATURES - SILVER EPOXY SHIELDING | | | | | |
| 46 | Shield tie opening in cover to access conductor below | | .060" dia. min multiple locations along GND conductor | .030" dia.min min. (3) locations at each end termination | (Min conductor width below shield tie is ∠.010" larger than shield tie diameter) |
| 47 | (Standard/ non 360 degrees) Silver epoxy edge to flex profile | | .060" silver epoxy edge to flex profile edge, min., per side (flex width to be .060" min. greater than silver epoxy width) | .040" silver epoxy edge to flex profile edge, min., per side (flex width to be .040" min. greater than silver epoxy width) | Silver epoxy to overlap conductors below by +.050" per side. Verify design approach for cables longer than 22". typical final requirement is .005" minimum spacing: silver epoxy to flex edge. |
| 48 | (Non- standard/ 360 degrees wrap) Silver epoxy edge to flex profile | | .080" silver epoxy edge to flex profile edge, min., per side (flex width to be .080" min. greater than silver epoxy width) | .050" silver epoxy edge to flex profile edge, min., per side (flex width to be .060" min. greater than silver epoxy width) | Silver epoxy to overlap conductors below by +.050" per side. Verify design approach for cables longer than 22". typical final requirement is .005" minimum spacing: silver epoxy to flex edge. |