Blank Copper Laminate

MASTER REFERENCE OF ALL "PULSAR" PRODUCTS:

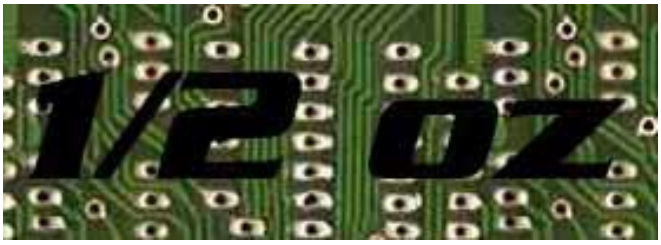
PCB "Fab-In-A-Box"	182-1027-ND	
- TTS Transfer Paper	182-1003-ND	
- GreenTRF film	182-1021-ND	
- WhiteTRF film	182-1022-ND	
- PCB (Single Sided)	182-1017-ND	(Shown Here)
- PCB (Double Sided)	182-1018-ND	(Shown Here)
DecalPRO®	182-1026-ND	
"Combo" (both kits)	182-1028-ND	
GBC® Laminator ("TIA")	182-1029-ND	

One of the most important factors for being able to make a circuit board with very fine traces is knowing before you start, how much copper is on my board!

Undercutting of your traces during long etch times is what destroys fine traces. The longer the etch, the more the undercutting - it's a straight line proportional problem. So, the lower the amount of copper, the finer your traces can be. As an example, all commercially produced boards that have incredibly fine traces (on the order of .002" to .004" widths) actually start off using copper laminate with 1/8oz copper. The etch time is very fast which doesn't give the etchant enough time to work sideways under the etch resist (ie undercutting). The board is then plated-up to 1oz (or 2oz for MilSpec) before being sent back to the customer.

For our purposes here, "plating up" is totally impractical due to the complexity of additive plating, so the next best thing is to have the copper reduced to a reasonable level which in our case is 1/2oz copper. You still have plenty of "resolderability" without traces being damaged and decent current carrying capability with the big advantages being that you can image down to .008" (and even .006" if you are very "clean" in the board's preparation) and the board is very easy to cut using a paper cutter since it's .032" thick vs. .064" thick. The trade-off from using a lesser amount of copper is reduced current carrying capability. Most users are low voltage, low current so this isn't a problem, however, if you require high current traces, all you need to do is slightly widen your traces. Our website has a chart to give you the required trace width for amount of current to be carryied.

The "weight" of a copper laminate board by the way comes from the technique of pouring 1 "Troy" ounce of liquid copper into a 12" x 12" pan and letting it "flatten out". There is no prescribed "thickness" of the actual laminated copper per-se.



Laminate Specs:

Material Characteristics: Difunctional FR-4/G10 rigid laminates are manufactured from the same high reliable epoxy resin and woven glass fabrics used for multilayers, copper clad one or both sides.

Underwriters Laboratories:

All materials meet UL-94VO

General Information:

MIL-P-13949G Type Designation	GF
U.L. Designation – ANSI Grade	FR-4
U.L. File Number	E38534
Flammability Rating	94V-0
Maximum Operating Temperature	130^{0}C
Copper Weight	1/2 oz.

Peel Strength:

As received	10 lbs/in, min
After Thermal Stress (550^{0}F, 20 sec)	10 lbs/in, min
After Processing Solutions	9 lbs/in, min
At Elevated Temperature	8 lbs/in, min

Difunctional FR-4/G-10 Properties:

Flexural Strength Lengthwise	90 KSI, min
Permittivity, 1MHZ	4.7 max
Loss Tangent, 1MHZ	.015, max
Water Absorption	.15, max
ARC Resistance	120 sec, min
Volume Resistivity (Cond F)	1.0 x 10^8, min
Surface Resistivity (Cond. F)	1.0 x 10^7, min
Volume Resistivity E-24/125	5 x 10^5, min
Surface Resistivity E-24/125	1 x 10^5, min
Chemical Resistance	1.5%
Standard Tolerance	+/- .0050
Class 3 Tolerance	+/- .0035

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