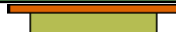


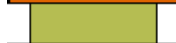


Cust: <b>DDI - Milpitas</b>				Total Layers: <b>4</b>			
Part #: <b>NATIONAL 551013034-002</b>	Rev <b>A</b>	Finished Thickness: <b>0.0580 +/- 0.00600</b>			Finished Over: <b>All</b>		
		Lam Thickness: <b>0.0530 +/- 0.0030</b>			Material Type: <b>Isola 408</b>		

Impedance Requirements:	Orig Line	Fin. Line	Ref Pln	2nd Ref Pln	Targeted Desired Impedance	Impedance Tolerance	Actual Calculated Impedance	Diff Line Centers	Diff Line Space	Original Coplanar Spacing	Finished Coplanar Spacing
L# Impedance Type											
1 DIF-Coated Microstrip Edg Cpld		.01900	2		100.00 $\Omega$	+/- 10%	100.20 $\Omega$	.02800	0.00900		
1 SE-Coated Microstrip		.03950	2		50.00 $\Omega$	+/- 10%	50.16 $\Omega$				
1 SE-Coated Microstrip	.02000	.01800	2		75.00 $\Omega$	+/- 10%	74.70 $\Omega$				

<b>Controlled Impedance Notes:</b>

Lamination Stackup:		Thickness and Tolerances:		Base Material Rqmts:		Dk @ 1Ghz
L#/Type	Description:	Cu+:	Laminate/PrePreg:	Type:	Description:	
1 Mix	 Core 0.0200 H/1	.00060	.0200		Isola 408	
2 Pln	 Pre-Preg ( 2 x 2116 )	.00120	.0095 +/- 0.0009		Isola 408	3.7
3 Pln	 Core 0.0200 1/H	.00120	.0200		Isola 408	
4 Mix		.00060				3.7

Target Post-Lam Thickness: <b>0.0530 +/- 0.0030</b>	<b>Stackup Notes:</b>
Copper Oz Legend: H=1/2oz T=3/8oz Q=1/4oz E=1/8oz S=1/16oz	

**PLEASE RETURN APPROVED STACK-UP TO DDI WITH DATA SET PRIOR TO MANUFACTURING**

\* The Controlled Impedance Stackup and tables were calculated utilizing ApsimRLGC from Applied Simulation Technology  
 \* Impedance value tolerances shall be +/- 10% or customer required tolerance.

Designed Artwork Spacing Requirements: (Based On Starting Copper Weight)

External Layers:

- \* 1/4 oz. Copper = .003 Min.
- \* 3/8 oz. Copper = .0035 Min.
- \* 1/2 oz. Copper = .004 Min.
- \* 1 oz. Copper = .005 Min.
- \* 2 oz. Copper = .007 Min.

Internal Layers:

- \* 3/8 oz. Copper = .00325 Min.
- \* 1/2 oz. Copper = .0035 Min.
- \* 1 oz. Copper = .004 Min.
- \* 2 oz. Copper = .006 Min.

Note: Min. spacing outside of the parameters above will require DDI's engineering approval.

Finished Copper Thickness On External Layers:

Conductor thickness calculated in RLGC includes base copper and additional copper plating (assuming hole plating requirement is .001 min.) - Finished surface conductor thickness is as follows:

- \* 1/4 oz. Base Copper + Copper Plating = .0016
- \* 3/8 oz. Base Copper + Copper Plating = .0017
- \* 1/2 oz. Base Copper + Copper Plating = .0019
- \* 1 oz. Base Copper + Copper Plating = .0024
- \* 2 oz. Base Copper + Copper Plating = .0036

Note: Soldermask thickness over the conductor calculated on RLGC is .8 mils.

\* If written authorization is required, please sign below and Fax back to (408) 956-2072

Approved By: \_\_\_\_\_ Date: \_\_\_\_\_