

Cust: <b>DDI - Milpitas</b>				Total Layers: <b>10</b>			
Part #: <b>NATIONAL SEMI 10 LAYERS</b>	Rev: <b>-</b>	Finished Thickness: <b>0.0620 +/- 0.0060</b>				Finished Over: <b>All</b>	
		Lam Thickness: <b>0.0580 +/- 0.0030</b>				Material Type: <b>NP 4000-6</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		.00400	2		100.00 $\Omega$	+/- 10%	100.04 $\Omega$	.01000	.00600		
1	SE-Coated Microstrip		.00550	2		50.00 $\Omega$	+/- 10%	50.50 $\Omega$				
3	DIF-Stripline Edg Cpld		.00400	2	4	100.00 $\Omega$	+/- 10%	99.84 $\Omega$	.00800	.00400		
3	SE-Stripline		.00600	2	4	50.00 $\Omega$	+/- 10%	49.74 $\Omega$				
6	DIF-Stripline Edg Cpld		.00400	7	5	100.00 $\Omega$	+/- 10%	99.84 $\Omega$	.00800	.00400		
6	SE-Stripline		.00600	7	5	50.00 $\Omega$	+/- 10%	49.74 $\Omega$				
8	DIF-Stripline Edg Cpld		.00400	9	7	100.00 $\Omega$	+/- 10%	99.84 $\Omega$	.00800	.00400		
8	SE-Stripline		.00600	9	7	50.00 $\Omega$	+/- 10%	49.74 $\Omega$				
10	DIF-Coated Microstrip Edg Cpld		.00400	9		100.00 $\Omega$	+/- 10%	100.04 $\Omega$	.01000	.00600		
10	SE-Coated Microstrip		.00550	9		50.00 $\Omega$	+/- 10%	50.50 $\Omega$				

<b>Controlled Impedance Notes:</b>

Lamination Stackup:			Thickness and Tolerances:		Base Material Rqmts:		Dk @ 1Ghz
L#/Type	Description:	Cu+:	Laminate/PrePreg:		Type:	Description:	
1 Sig	Foil ( H oz )	.00060					
	Pre-Preg ( 1 x 2113 )		.0036	+/- 0.0004		NP 4000-6	4.11
2 Pln	Core 0.0060 1/H	.00120	.0060			NP 4000-6	
3 Sig		.00060					4.1
	Pre-Preg ( 2 x 2113 )		.0070	+/- 0.0007		NP 4000-6	4.14
4 Pln	Core 0.0030 1/1	.00120	.0030			NP 4000-6	
5 Pln		.00120					4.35
	Pre-Preg ( 2 x 2113 )		.0070	+/- 0.0007		NP 4000-6	4.14
6 Sig	Core 0.0060 H/1	.00060	.0060			NP 4000-6	
7 Pln		.00120					4.1
	Pre-Preg ( 2 x 2113 )		.0070	+/- 0.0007		NP 4000-6	4.14
8 Sig	Core 0.0060 H/1	.00060	.0060			NP 4000-6	
9 Pln		.00120					4.1
	Pre-Preg ( 1 x 2113 )		.0036	+/- 0.0004		NP 4000-6	4.11
10 Sig	Foil ( H oz )	.00060					

Target Post-Lam Thickness: <b>0.0580 +/- 0.0030</b>	Stackup Notes:
Copper Oz Legend: H=1/2oz T=3/8oz Q=1/4oz E=1/8oz S=1/16oz	

**APPROVED STACKUP MUST BE INCLUDED WITH THE DATA PACKAGE PRIOR TO MANUFACTURING**

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Rev

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Finished Thickness: **0.0620 +/- 0.0060**Finished Over: **All**Lam Thickness: **0.0580 +/- 0.0030**Material Type: **NP 4000-6**

\* 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: \_\_\_\_\_