

Valor NPI for Manufacturers





The Need for NPI Solutions

Reducing, High levels of scrap during the manufacturing process
Increasing yields during the manufacturing process
Eliminate issue, Not meeting product delivery schedules
Solving, Product reliability problems
Eliminate the Pre-tooling data preparation times too long
Customers require DFM and feedback services

NPI Solutions



Valor NPI in the Manufacturing Flow NPI Best Practices



Valor NPI input Data



- Intelligent data input
- Automatic data type recognition
- Multiple EDA systems supported
- Rule and template driven BOM import

Valor NPI Product Modeling Interface

Com

File A



- Data attribute assignment interface
- Easily define component attributes
- Direct access to component classification and design preparation rules to quickly enable comprehensive analysis

Centralized attribute management activities resulting in a more effective NPI process

		CAD Package	
Component Classific	ation		
Show Library 🔲 Show	Non Active	Approve All	
Package Name	Package	Design Preparation Ru	ile Set
VMN2_ROHM_REV	chip	(C)	
TCM1210_B		Rule Set : DFx Prepar	ation v1
FILTER_TDK_8PIN		Description : Prepare	data for Analysis
LGA_PTSLP71_A		Rules	
BGA_36_05_1_A		Set SMD Pads by Moun	t Type
K0805HD_1	chip	Set Fiducials by Geo	metry
EMD2_1_C		Set Testpoints by Ge	Comptry
BGA_CSP_4_05_3_A		Set Mounting Holes by	y Geometry
DE2812C_1_A		Set Components to Co	mp Ignore
BGA440_ANJA		Select All Components	Testnoint & No Tex
		Select 0201 Component	ts
		Select 0402 Component	ta
		Copper Shape, No T	
		Create	Duplicate
		Move Up	Move Down
		Delete	Run Rule

Comprehensive DFM Analysis

Number of DFM Checks						
Assembly	367					
Fabrication	283					
Flex/Rigid-Flex	120					
Microvia	45					
Panel	38					
Substrate	87					
Grand Total	940					

Plus: Netlist Validation BOM Validation Approved Vendor List (AVL) Validation



- Enables "virtual" prototype build
- Only way to assure quality solder joints
- Identify issues that cannot be found using CAD libraries

Valor Parts Library

- Over 35 million manufacturing part numbers
- 2 ½ D component data plus pin contact areas
- Created using ISO 9001 process



Valor Parts Library

- Solderability can only be assessed using Valor NPI with the Valor Parts Library
- EDA libraries do not contain the pin contact area
- Measures heel, toe and sides for sufficient surface for soldering



Assembly Analysis

- Identify potential placement issues before you order parts
- Value-added service to your customers for early engagement



Component clearance requirements vary by type, orientation and placement machine



Toeprint too close to conveyed edge can be damaged by SMT gripper



Tall components too close to adjacent components make it difficult to access the short component for repair



Misplaced reference designator causes confusion at test, repair and for manually placed components

- DFM enables you to optimize the design for volume manufacturing first time through
- An issue can pass DRC but still impact yield, cost or reliability

Close spacing over an extended length affects yield and therefore costs







Manufacturing BOM Review

- Assures there are no refdes or quantity mismatches
- Validates sufficient solder joints for selected and qualified parts



Insufficient heel distance will lead to a weak solder joint



Insufficient toe distance and even the ratio of heel/toe affect the quality of a solder joint



Side solder fillets are also a factor in the quality of a solder joint



Actual component body (red) covers mounting hole that CAD package (purple) didn't detect





Alternate Parts Analysis

Components may have the same electrical properties but different body dimensions and pin contact areas



Composite component body created for Assembly DFM

Alternate Parts Analysis

- Confirms that no matter which qualified parts are actually sourced there will be no manufacturing issues
- Validates footprints for all qualified parts in Approved Vendor List



Fabrication Analysis

- If you offer turnkey services you are responsible for the bareboard
- Identifies common fabrication issues that can cause scrap or extra costs



Slivers can cause repeat defects due to photo-resist flaking



Starved thermals prevent proper heat containment, affecting quality of via solder connection



Manufacturing process tolerances can cause a same net short, potentially affecting circuit behavior



Circuits close to a pad must be fully covered by mask to avoid solder bridging during the assembly process

Flex and Rigid-flex Analysis

- Flex and rigid-flex circuits have their own manufacturing requirements
- Unique checks are required to identify potential issues



Conductors should be perpendicular across the entire bend area



Plated holes too close to a stiffener can lead to cracks in the barrel



Rigid area copper close to interface area can cause copper to crack



Silver mask must remain clear of exposed copper to avoid EMI issues

DFM Report Generating

Assessment- Area	Checklist	Action	Model	Range	Category	Measurement	Layer	LocationX	LocationY	Image
Etch	demo_fabrication	Signal Layer Checks (demo_sig_Outer)	demo_sig_Outer	*:stub = -1 -2 -3	Stubs	9.843 x 8.213mil	_art001.pho-	1.373846	1.555118	
Etch	demo_fabrication	Signal Layer Checks (demo_sig_Outer)	demo_sig_Outer	*:sliver = 3 4 5	Slivers	0.601mil	_art001.pho-	0.97903	1.6071189	
Etch	demo_fabrication	Signal Layer Checks (demo_sig_Outer)	demo_sig_Outer	*:wide_trace_narrow_pad = -1 -2 -3	Wide Trace Narrow Pad	7.874mil	_art001.pho-	1.6200787	1.3395672	H
Etch	demo_fabrication	Signal Layer Checks (demo_sig_Outer)	demo_sig_Outer	*:short_sliver = 3 4 5	Short Slivers	0.134mil	_art001.pho-	0.9832007	1.2299132	
Etch	demo_fabrication	Signal Layer Checks (demo_sig_Outer)	demo_sig_Outer	*:self_spacing = 3 4 5	Same Net Spacing	0.134mil	_art001.pho-	0.9832007	1.227362	
Etch	demo_fabrication	Power/Ground Checks (demo_pg_Inner)	demo_pg_Inner	*:sliver = 2.5 3 3.5	Slivers	1.044mil	_art003.pho-	0.2005962	0.9737875	
Etch	demo_assembly	Padstack Analysis (demo_padstack)	demo_padstack	*:trace_width_ratio;* = 4 2 1.5	Trace Width Ratio	6.667	_art001.pho-	1.3779528	1.515748	
Solder	valor_fabrication	Solder Mask Checks (STD)	STD	*:ar_smd = 2.55 3 3.45	SMD annular Ring	0mil	_sm001021.pho-	1.1240255	0.2204477	

- Easily collect all DFM issues in a single report
- Output as html or xml

Job: product_model Step: step

Description

This report is generated as part of a vLab exercise.

Job Description vLab design rev A

Top View



- Quickly and easily create panels optimized for both assembly and fabrication
- Automatically optimizes any shape PCB
- Considers panel size, rail widths, margins, moat width, number of boards and component overhang
- Actions include pattern filling, addition of tooling holes, fiducials, bad board marks, targets, text, barcode, breaktabs, v-score lines and rout
- Calculates exact material utilization to identify cost impact

Panel Design and Optimization



- PCBs are now automatically optimized within an assembly array regardless of shape
- Can have a substantial impact on material costs savings

V9.7 18" x 24" Panel 2 PCBs/Array 6 Arrays/Panel 18.7% Material Utilization

V9.8

18" x 24" Panel
2 PCBs/Array
10 Arrays/Panel
31.5% Material
Utilization

Panel Design and Optimization



Assembly Panel Analysis

- Identifies manufacturing issues with the assembly panel configuration
- Looks at fabrication and assembly related processes



Components too close to conveyed edge can be damaged during assembly



Placement of components on adjacent PCBs cannot be done with this assembly panel design



Components protruding from edge of PCB can obscure panel fiducials



Breakaway tabs too close to SMD pad can result in damage to solder joint

Manufacturing Product Model

Validated, integrated, intelligent, complete model sent as data



Product Summary section -> Attribute	Value	Units				0.01	
Board Requirements				-			
Board Thickness	0.089200	Inch jits					
Additional Requirements							
Board Outline Tolerance Plus	5.000000	Mil					
Board Outline Tolerance Minus	5.000000	Mil					
Board Thickness Tol Plus	3.000000	Mil	28				
Board Thickness Tol Minus	3.000000	Mil					
Board Thickness Type	over mask on plate	d copper		Quantity	Manafacturer	Manufacturer Part	Ref Des
Bottom Legend Color	white	a coppe.	39M5, 15	1	ROHM	MCR18ERTF103	83.3
Bottom Legend Color	white		2HMS, 151 2HMS, 151	1	ROHM	MCR18ERTF103	R14
Bottom Soldermask Color	yellow		2HMS, 1N	1	ROHM	MCR18CRTF103	816
Flammability Rating Standard	UL94V-0		>HMS, 1%	1	ROHM	MCR18ERTF103	R18
General PCB Standard	IPC 6012A		26MS, 19 26MS, 19	1	ROHM	MCR18ERTF103 MCR18ERTF103	R20
Glass Transition Temperature (To)	110 000000		HMS, 1N	1	ROHM	MCR18ERTF103	R23
Lessed Cides	Dette		3HM5, 1%	1	ROHM	MCR18CRTF103	84
Legend Sides	Both		5, 15	1	ROHM	MCR18ERTF103	R33
PCB Acceptability Standard			5, 1%	1	ROHM	MCR18ERTF103	R34
Peelable Mask Side			15, 1%	1	ROHM	MCR18ERTF512	810
Plated Edge							
Plated Slots		-					
Qualification and Performance St		-					
Soldermask Sides							
Top Legend Color							
Top Soldermask Color							
Ruling IPC Spec (Class 1, 2, 3							

All CAM systems sold in past 10 yrs. support ODB++

Value Proposition



SIEMENS

Ingenuity for life

Reduced time to production
Fewer major manufacturing problems
Higher yields and product reliability
Reduced product delivery time



