ICD PowerStack Suite – Overview

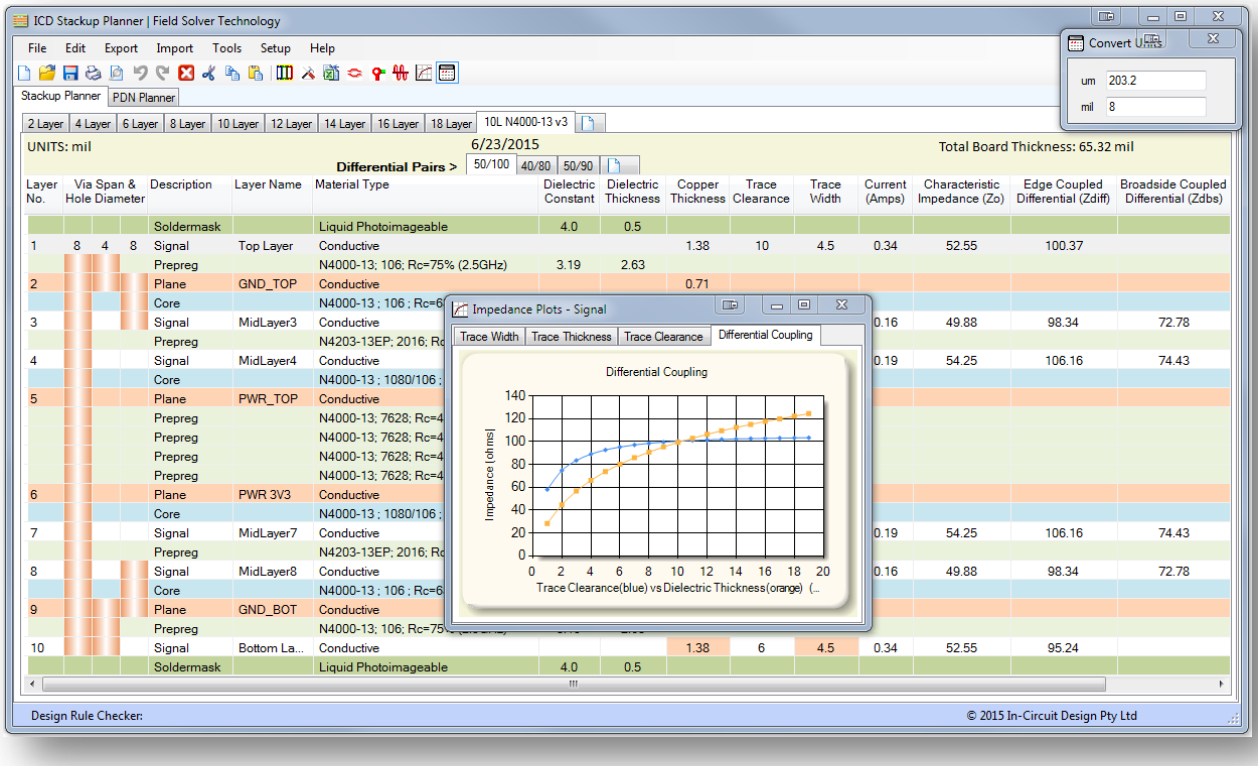
Overview

ICD provides a centralized, shared, Impedance Planning Environment that connects Materials, PDN Analysis, Stackup Planning, Signal Integrity, PCB Design and Fabrication consolidating the impedance control from schematic to fabrication. The impedance is planned pre-layout and flows through the design process to fabrication – achieving right first time design.

The Stackup Planner features a precision 2D Boundary Element Method (BEM) Field Solver providing Altium customers with the accuracy and simulation speed they need for high-speed PCB Design. Seamless integration with the Altium Layer Stack Manager, allows the transfer of substrate materials for the correct trace impedance and automatic creation of Design Rules for differential pairs and trace routing.

Impedance is the key factor that controls the stability of a design – it is the core issue of the signal integrity methodology. A properly planned PCB substrate can effectively reduce electromagnetic emissions, crosstalk and improve signal integrity providing a low inductance power distribution network. It can also improve the manufacturability of the product, reduce costs and increase product performance and reliability.

For Engineers and PCB Designers involved in high-speed design, the ICD Stackup Planner offers unprecedented simulation speed, ease of use and accuracy at an affordable price. The seamless integration with several ECAD tools provides customers with total confidence in impedance control and product reliability.



Key Benefits

- Unprecedented simulation speed, ease of use and accuracy at an affordable price
- Reduced time-to-market by identifying and eliminating issues early in the design process
- Dielectric materials library allows the simulation of the actual materials used by your fabricator

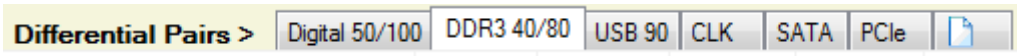
- Unique field solver computation of multiple differential pair definitions per layer
- Automatic creation of high-speed design rules in Altium Designer
- Heads-up Impedance Plots project the variables for the target impedance

Features

- 2D Boundary Element Method (BEM) Field Solver Precision
- Characteristic impedance for Microstrip traces, Embedded Microstrip (with solder mask coating), Symmetric Striplines, and dual Asymmetric Striplines
- Differential Impedance for edge coupling on the same signal layer, and broadside coupling, on an adjacent signal layer
- Multiple Differential Pairs—solve impedance for multiple differential technologies on the same substrate
- Trace Current calculation
- Customizable Dielectric Materials Library with over 16,700 rigid-flex materials up to 100GHz
- Nine default, quick-start stackup configurations for fast deployment
- Via span definition for PTH and buildup Microvia; blind and buried vias
- Bi-directional interfaces to Altium Designer, PADS, HyperLynx and export to Allegro, Excel and Zmetrix TDR. Plus IPC-2581B import/export to Allegro & OrCAD 16.6, Zuken CR-8000/5000
- Excel fabrication drawing export

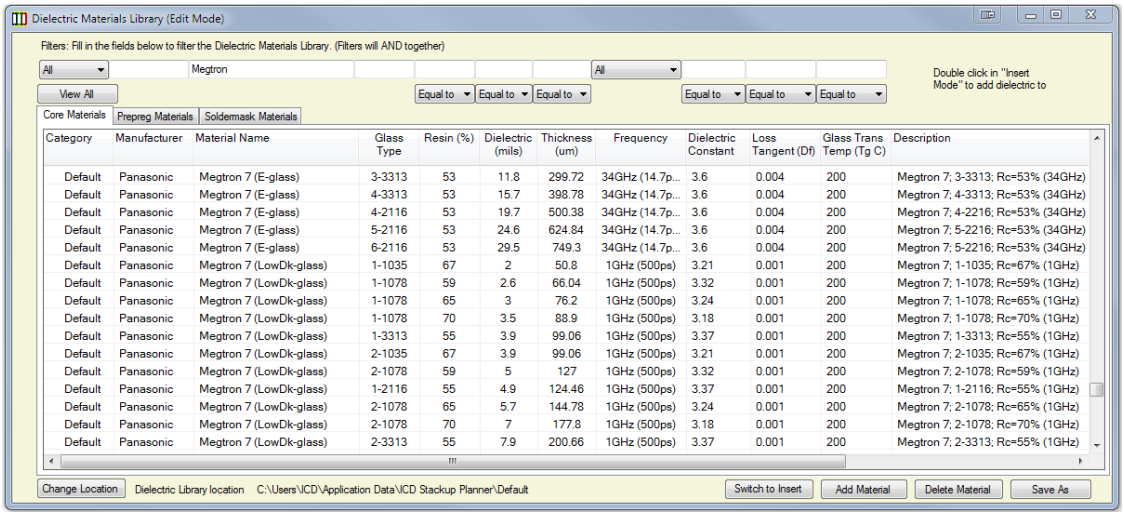
Multiple Differential Pair Definitions

The ICD Stackup Planner is the first stackup planning product to enable field solver computation of multiple differential pair definitions per layer. This allows you to incorporate differential DDR clocks, SATA, USB, and PCIe sharing the same layers — a stackup planning and documentation tool that can accommodate your differential impedance planning process right out of the box.

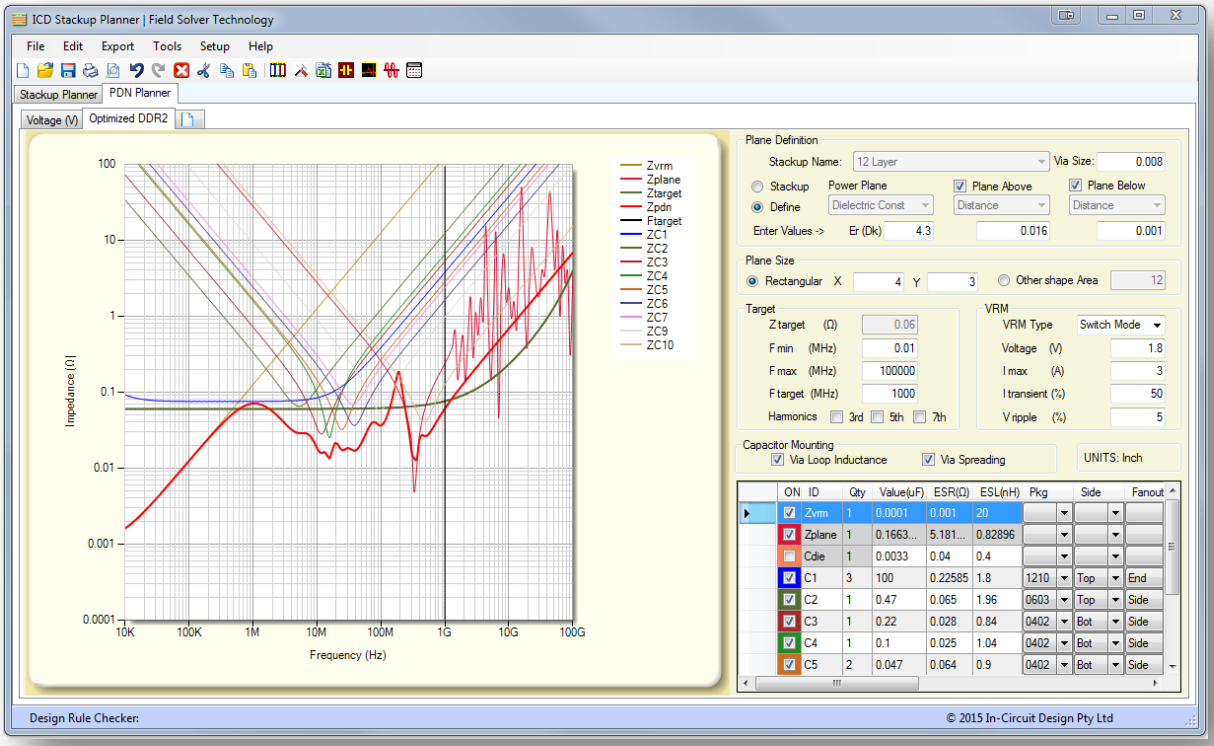


Dielectric Materials Library

The Stackup Planner includes a customizable Dielectric Materials Library, taking the accuracy one more step toward the actual, fabricated circuit board configuration – increasing accuracy by up to 5% compared to virtual material simulation. This library is arguably the most comprehensive list of materials ever compiled. With over 16,700 materials from 1MHz up to 100Ghz materials for RF and Microwave applications plus support for rigid-flex materials and embedded resistor and planar capacitor applications.



Analyze multiple power supplies to maintain low AC impedance, over the entire frequency range, dramatically improving product performance and reliability



Overview

AC Power Distribution Network (PDN) analysis is often overlooked during the design process. Poor PDN design can result in unusual, intermittent, signal integrity issues. These include high crosstalk and excessive emission of electromagnetic radiation, degrading performance and reliability of the product.

The ICD PDN Planner allows the analysis of an unlimited number of power supply configurations simultaneously. A typical high speed, multilayer PCB has five or six individual power supplies that all serve a different purpose, and must be regulated to maintain power integrity during high current switching up to the maximum frequency. With a frequency range up to 100 GHz, the PDN Planner analyzes the AC impedance of each on-board PDN, including capacitor selection, and simulates plane resonance peaks giving a concise graphical view of the entire network.

Key Benefits

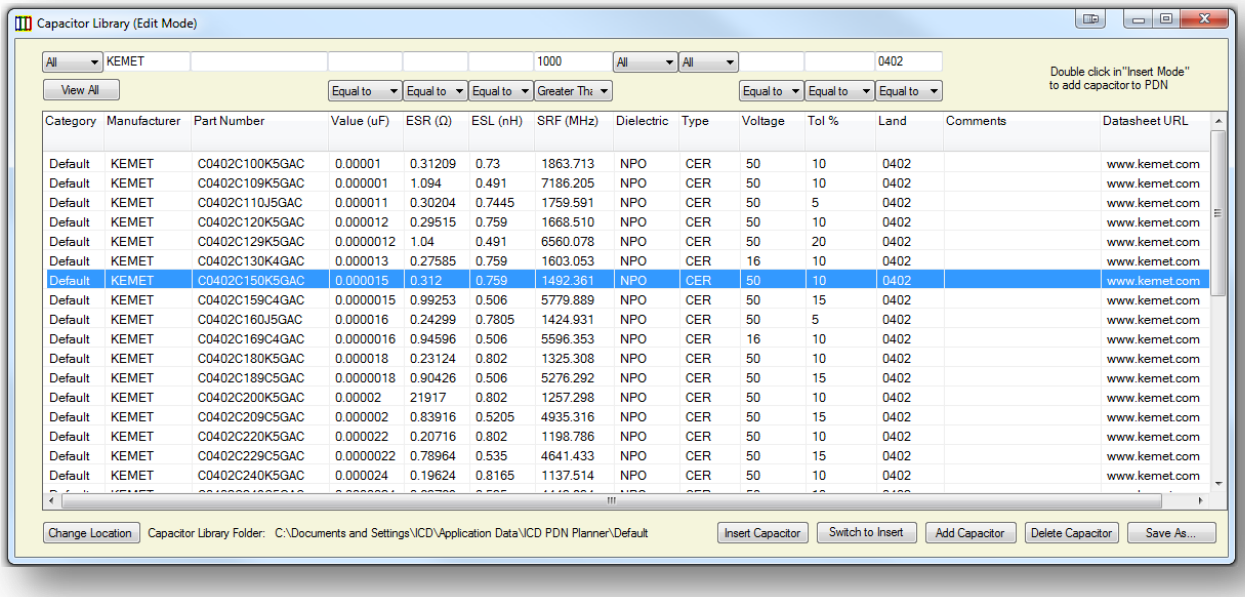
- Gives high confidence in the performance and reliability of the product
- Meets the performance target at the lowest cost of production
- Identifies and eliminates issues early in the design cycle – saving costly re-spins
- Performs complex analysis with minimal input of data
- Quick, intuitive and easy to use

Features

- **Fast**—AC Analysis of an unlimited number of power supply configurations simultaneously
- **Accurate**—over 5,250 part Capacitor Library data – based on manufacturer's SPICE models
- **Ease of use**—quick, intuitive, and easy to learn – performs complex analysis with minimal input of data and does not require power integrity expertise – ideal tool for PCB Designers
- **Practical**—insert specific capacitor characteristics to simulate the effect of decoupling and bulk bypass capacitors. Takes VRM properties, plane resonance, capacitor mounting and via loop and spreading inductance into account
- **Exports** – Bill of Materials (BOM) to Excel
- **Affordable**—only a fraction of the cost of competitive tools
- **Integration**—integrated with Altium Designer via the ICD Stackup Planner

Comprehensive Capacitor Library

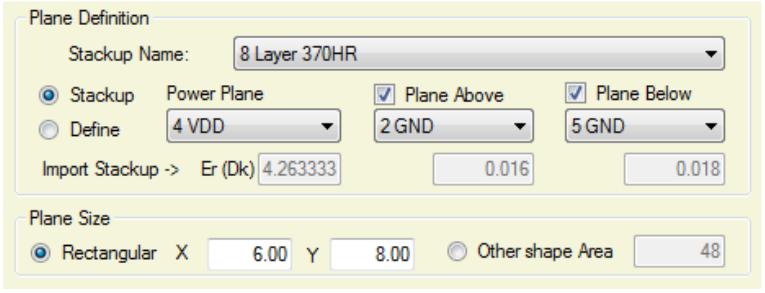
A comprehensive Capacitor Library, derived from SPICE models, with over 5,250 readily available SMD capacitors from AVX, Kemet, Murata and TDK are included—listing Value, ESR, ESL, SRF, Voltage, Tolerance, Dielectric Material and SMD Package Type—and ready for insertion into PDN Planner. These libraries are extracted from the manufacturers SPICE models to ensure accuracy.



Category	Manufacturer	Part Number	Value (uF)	ESR (Ω)	ESL (nH)	SRF (MHz)	Dielectric	Type	Voltage	Tol %	Land	Comments	Datasheet URL
Default	KEMET	C0402C100K5GAC	0.00001	0.31209	0.73	1863.713	NPO	CER	50	10	0402		www.kemet.com
Default	KEMET	C0402C109K5GAC	0.000001	1.094	0.491	7186.205	NPO	CER	50	10	0402		www.kemet.com
Default	KEMET	C0402C110J5GAC	0.000011	0.30204	0.7445	1759.591	NPO	CER	50	5	0402		www.kemet.com
Default	KEMET	C0402C120K5GAC	0.000012	0.29515	0.759	1668.510	NPO	CER	50	10	0402		www.kemet.com
Default	KEMET	C0402C129K5GAC	0.0000012	1.04	0.491	6560.078	NPO	CER	50	20	0402		www.kemet.com
Default	KEMET	C0402C130K4GAC	0.000013	0.27585	0.759	1603.053	NPO	CER	16	10	0402		www.kemet.com
Default	KEMET	C0402C150K5GAC	0.000015	0.312	0.759	1492.361	NPO	CER	50	10	0402		www.kemet.com
Default	KEMET	C0402C159C4GAC	0.0000015	0.99253	0.506	5779.889	NPO	CER	50	15	0402		www.kemet.com
Default	KEMET	C0402C160J5GAC	0.000016	0.24299	0.7805	1424.931	NPO	CER	50	5	0402		www.kemet.com
Default	KEMET	C0402C169C4GAC	0.0000016	0.94596	0.506	5596.353	NPO	CER	16	10	0402		www.kemet.com
Default	KEMET	C0402C180K5GAC	0.000018	0.23124	0.802	1325.308	NPO	CER	50	10	0402		www.kemet.com
Default	KEMET	C0402C189C5GAC	0.0000018	0.90426	0.506	5276.292	NPO	CER	50	15	0402		www.kemet.com
Default	KEMET	C0402C200K5GAC	0.00002	21917	0.802	1257.298	NPO	CER	50	10	0402		www.kemet.com
Default	KEMET	C0402C209C5GAC	0.000002	0.83916	0.5205	4935.316	NPO	CER	50	15	0402		www.kemet.com
Default	KEMET	C0402C220K5GAC	0.000022	0.20716	0.802	1198.786	NPO	CER	50	10	0402		www.kemet.com
Default	KEMET	C0402C229C5GAC	0.0000022	0.78964	0.535	4641.433	NPO	CER	50	15	0402		www.kemet.com
Default	KEMET	C0402C240K5GAC	0.000024	0.19624	0.8165	1137.514	NPO	CER	50	10	0402		www.kemet.com

The Capacitor library features Boolean search capabilities to enable quick selection of components based on any field. A company's preferred capacitor inventory can be added by entering specific models and saving them to a network library allowing access by colleagues.

Plane Definition



The board stackup can be setup in the ICD Stackup Planner first, allowing the PDN Planner to extract the plane data and locations from the stackup.