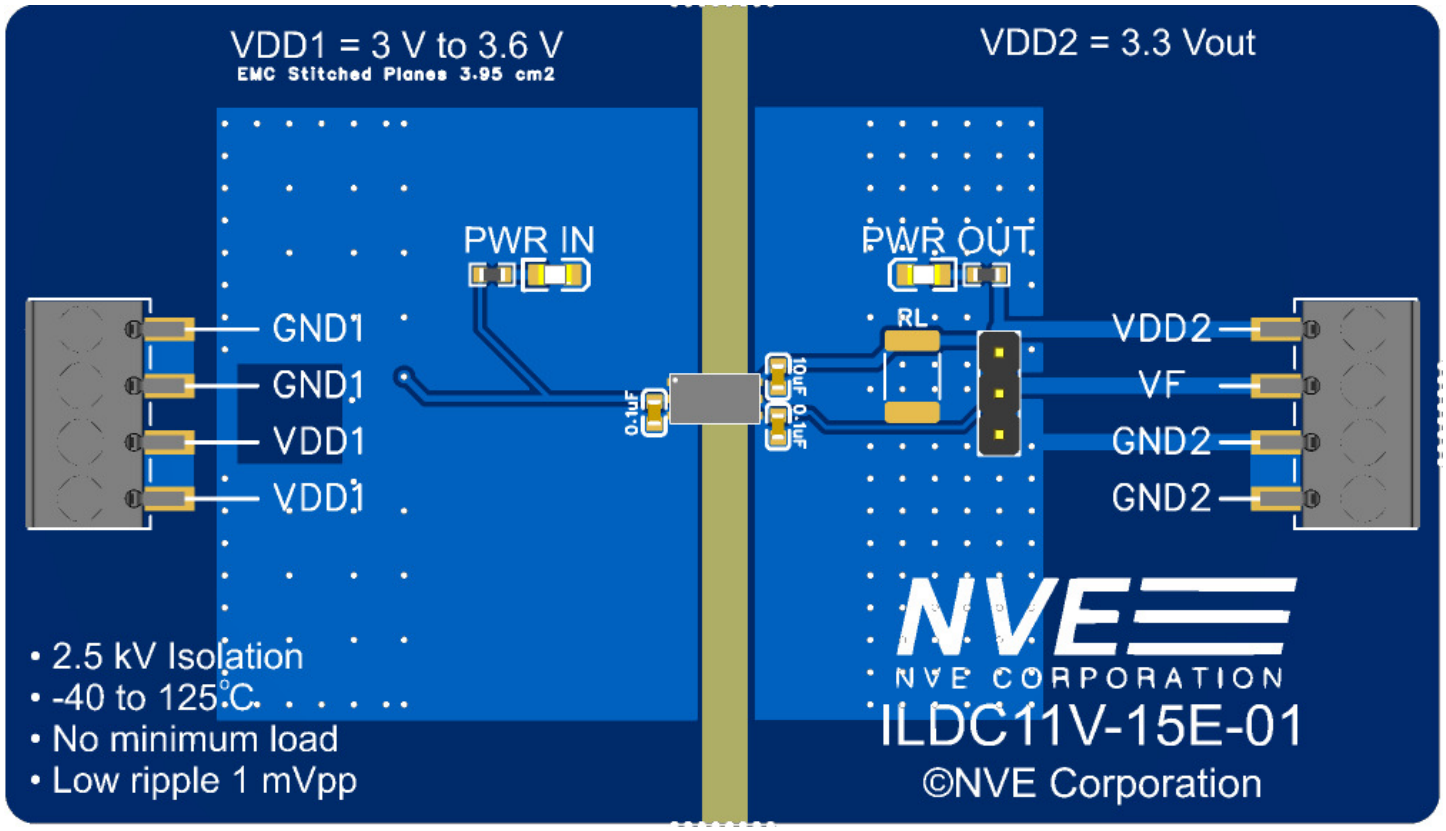
NVE CORPORATION

IsoLoop® ILDC1x
Ultraminiature Isolated DC-DC Convertor Evaluation Boards



About These Evaluation Boards

These 2 x 3.5-inch (50 x 90 mm) boards contain your choice of ILDC1x-Series DC-to-DC convertor, bypass capacitors as recommended, as well as test pads, screw terminals, provisions for header pins. LEDs that show the DC-to-DC convertor is operating.

The boards follow best practices including 2s2p with thermal vias for optimal thermal performance, and stitched ground planes to provide CISPR 32-compliant EMC mitigation with no external components. The boards have provisions for external components if additional EMC mitigation is desired.

The ILDC1x-Series are ultraminiature one-quarter watt DC-to-DC convertors that generate fully-isolated, independent outputs from a 3.3-volt supply. 3.3, 5, and 6-volt output versions are available. No additional regulation is required and there is no minimum load. Frequency hopping and shielding reduce EMI, and ferrite beads or other external components are generally not necessary for EMI mitigation.

A high-temperature process allows up to 175 °C junction temperature for full power up to 125 °C operating temperature with no derating. Integrated short-circuit protection avoids excessive power dissipation.

ILDC1x-Series Specification Highlights

- SOIC16 or ultraminiature 3 x 5.5 mm DFN6 (the world's smallest DC-to-DC convertor)
- 3.3 V input to 3.3 V, 5 V, or 6 V output
- Quarter watt output power
- Fully-regulated output
- Low ripple
- Short-circuit protection
- No minimum load
- EN 55032 CISPR 32 Class B fully compliant with no external components
- EU Declaration of Conformity (CE mark)
- 1 kV or 2.5 kV isolation versions (DFN6) and 6 kV isolation (SOIC16)
- Full -40 °C to 125 °C operating temperature

Quick Start

- Connect V_{DD1} to a 3.3 V power supply.
- The two LEDs should indicate input and output power.
- The output can be checked for voltage, ripple, stability, short-circuit protection, etc.

Schematics

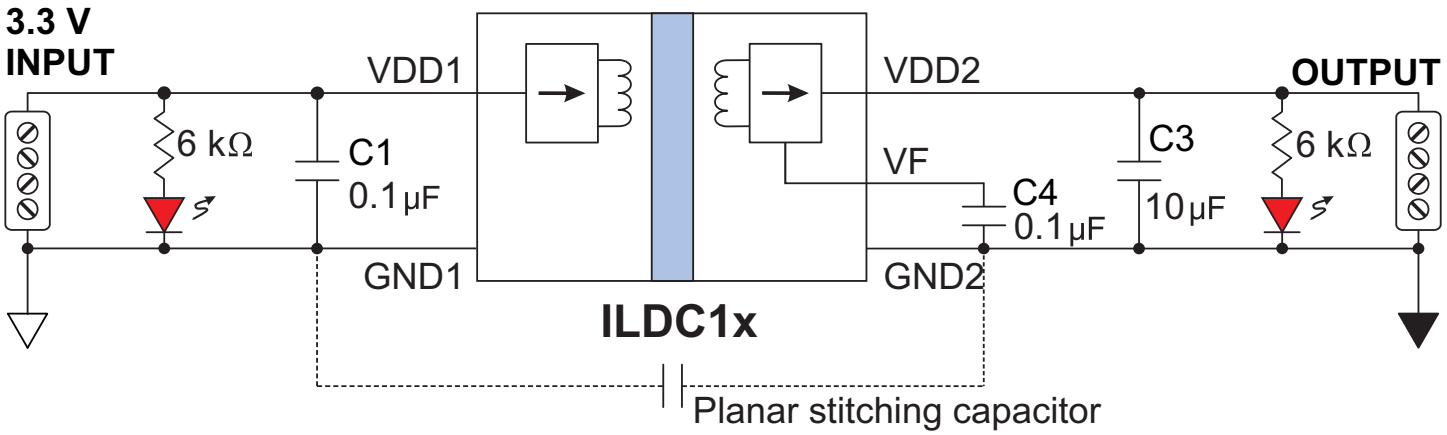


Fig. 1. Evaluation Board Circuit (top of board)

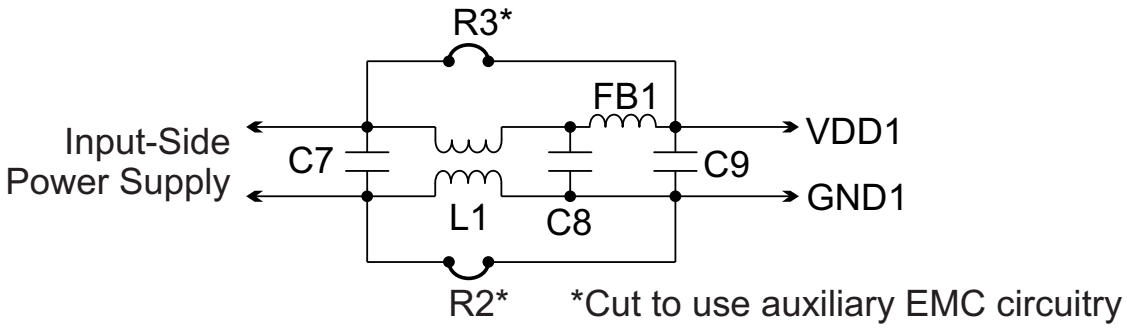


Fig. 2. Optional EMI Mitigation (bottom of board)

Root Part #	Output Voltage
ILDC11	3.3
ILDC12	5
ILDC13	6

Package Suffix	Package	Isolation Rating
ILDC1x-15	3 x 5.5 mm DFN6	1000 V
ILDC1xV-15	3 x 5.5 mm DFN6	2500 V
ILDC1xV	0.3" SOIC16	6000 V

Symbol	ILDC1x-15 Pad	ILDC1xVE Pin	Description
VDD1	2	1	Input Supply (bypass with a 0.1 µF capacitor).
GND1	1,3	2,8	Input-Side Ground.
GND2	4	9	Output-Side Ground.
VDD2	6	16	Output Supply (bypass with a 10 µF / 6.3 V capacitor).
VF	5	12	Filter Capacitor (connect to a 0.1 µF / 16 V external capacitor).

Tables 1a, 1b, and 1c. Voltages, Packages, and Pinouts

Application Information

Low Parts Count
Only three external components are required: a 0.1 µF capacitor placed close to the VDD1 supply pad, a 10 µF bypass capacitor for the VDD2 pin, and a 0.1 µF filter capacitor on VF.

Thermal Management
The evaluation boards are double sided, double buried power plane ("2s2p") with thermal vias to optimize thermal performance. Both input-side ground pins, plus the leadframe pad for the DFN version, are grounded to cool the leadframe. At the full output current with the recommended PCB, the parts dissipate approximately one watt. The boards allow full power up to 125 °C operating temperature with no derating. A simple double-sided PCB can be used with some temperature derating.

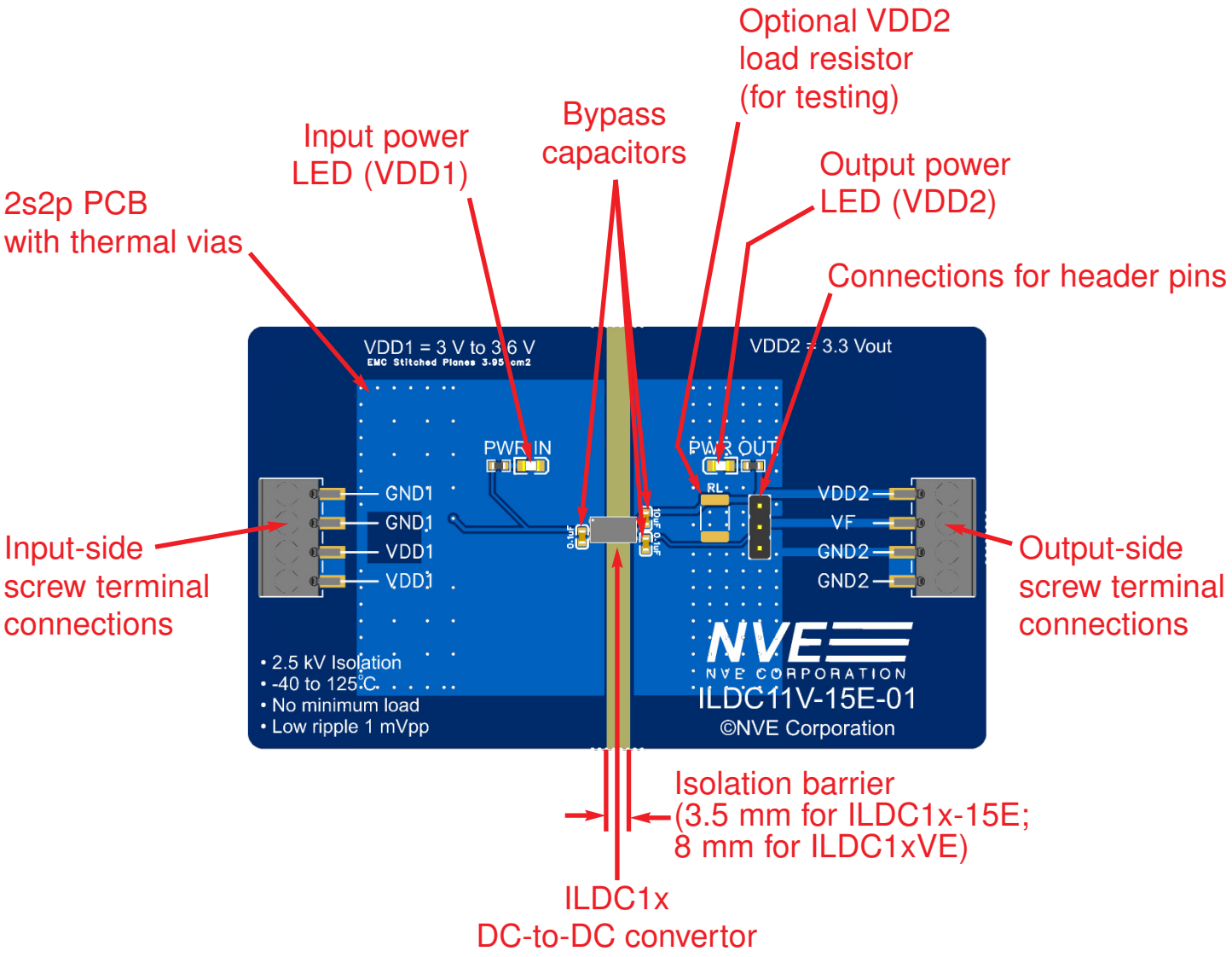
Maintaining Creepage
SOIC parts have eight millimeters of clearance between isolated pins and the DFN version has 3.5 mm clearance between isolated pads. Creepage distances are often critical in isolated circuits. Therefore power planes should be spaced to avoid compromising creepage, and board pads should not extend past the part pads to avoid compromising creepage.

EMC Mitigation
These evaluation boards have passed EN 55032 CISPR 32 Class B with no external EMC mitigation components. Stitched inner-layer ground planes (see p. 7) provide the only EMC mitigation.

If additional EMC mitigation is required, there are footprints for an RF choke, a ferrite bead, and additional capacitors on the bottom of the board. Cuttable traces normally bypass this circuitry. There are pads for an optional external stitching capacitor on the top of the board. These pads can be removed if board creepage is critical. Additional bypass capacitors C2 and C6 on the top of the board can be populated to further mitigate any high-frequency emissions.

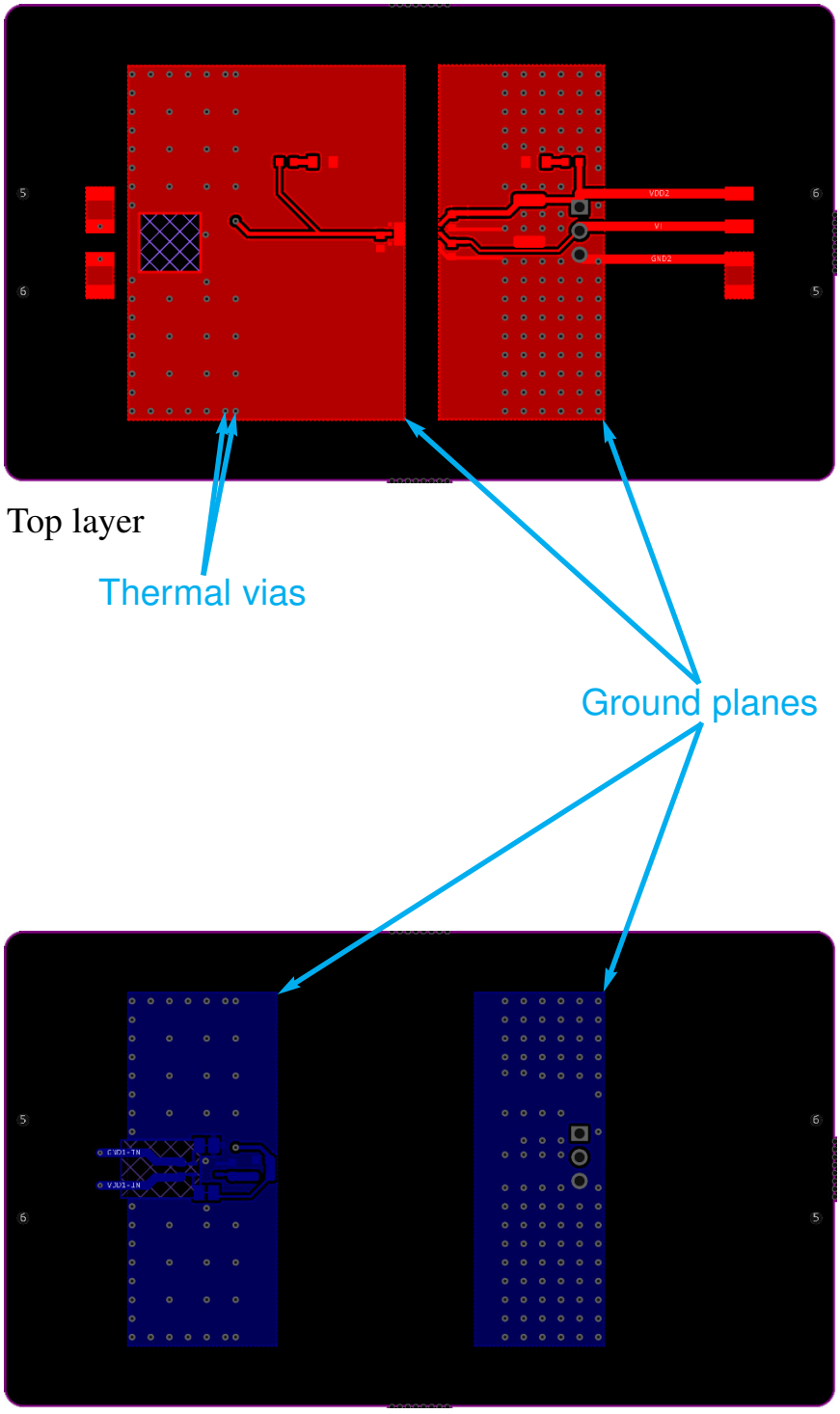
For more information on EMC mitigation, see: https://www.nve.com/Downloads/ab29.pdf

Evaluation Board Layout and Key Components

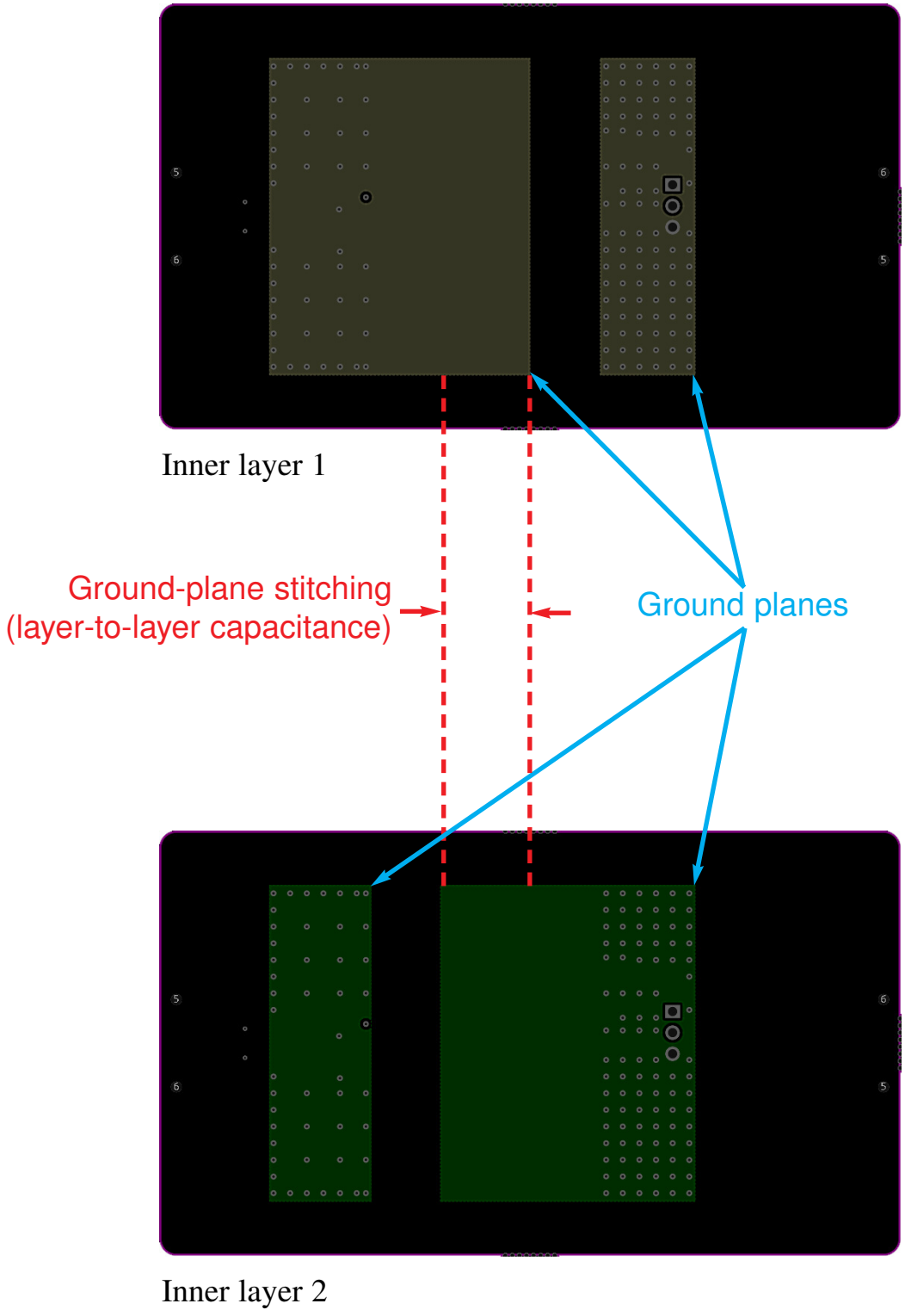


Desig.	Part Number	Mfr.	Description
U1	ILDC1x	NVE	Ultramini Isolated 1/4W 3.3Vin DC-DC Conv
C1, C4	CL10B104KB8NNWC	Samsung	0.1 µF 0603 -55 to 125 deg C Capacitor
C3	GRT188D70J106ME13D	Murata	10µF 0603 -55 to 125 deg C Capacitor

Evaluation Board Outer Layers



Evaluation Board Inner Layers



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NVE Corporation
11409 Valley View Road
Eden Prairie, MN 55344-3617

ISB-DS-001-ILDC-01

April 2024