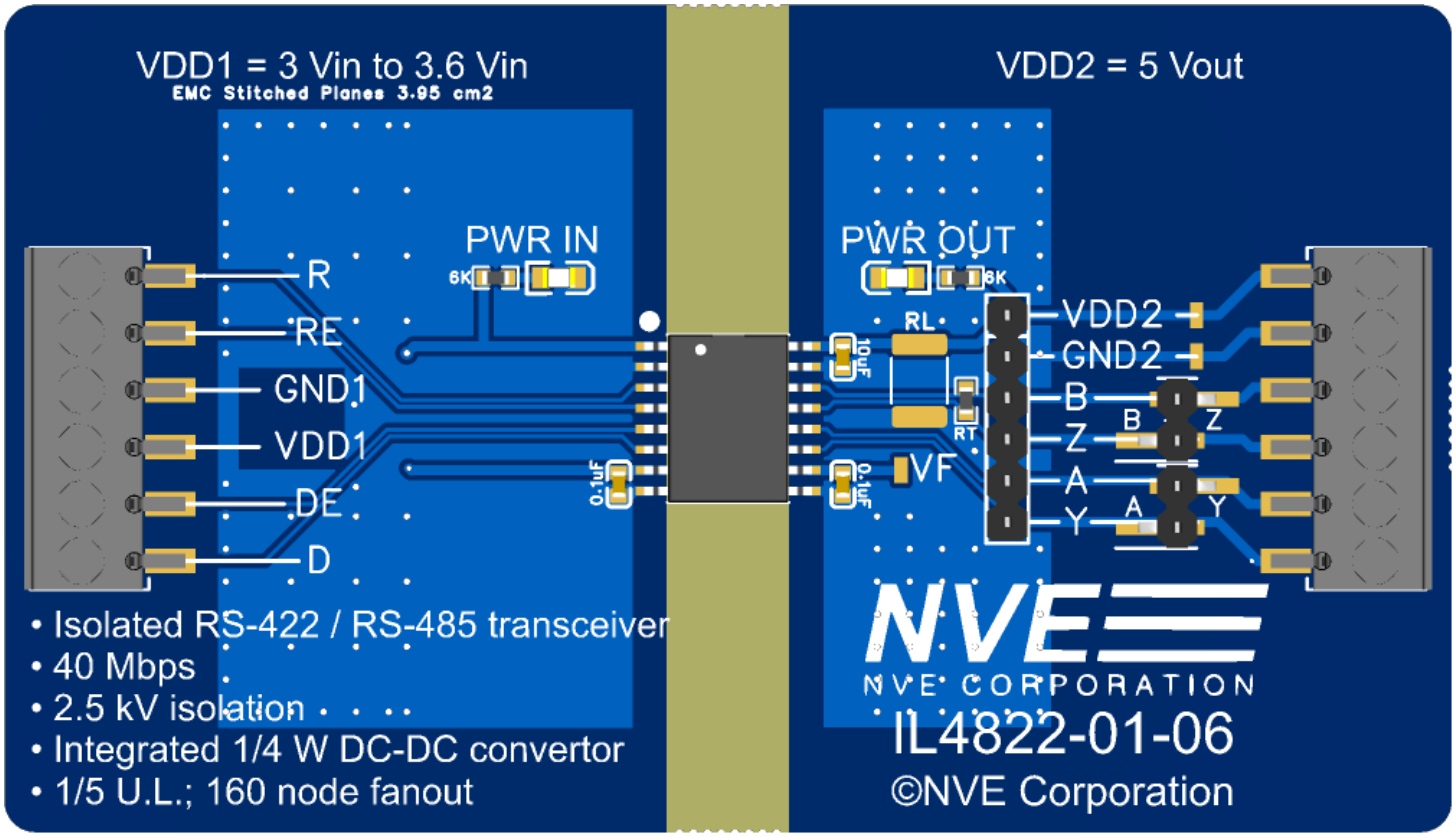
NVE CORPORATION

IL46xx / IL48xx
Isolated RS-422 / RS-485 Transceivers with Integrated DC-to-DC Convertor Evaluation Boards



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About These Evaluation Boards

These 2 x 3.5-inch (50 x 90 mm) boards contain your choice of an isolated transceiver with an integrated DC-to-DC convertor, recommended bypass capacitors, as well as screw terminals, test pads, and 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. If additional EMC mitigation is required, there are footprints for additional components, which can be populated to further mitigate any high-frequency emissions.

IL46xx / IL48xx isolated transceivers include integrated one-quarter watt DC-to-DC convertors that generate fully-isolated, independent bus supplies from a 3.3-volt controller-side supply. 3.3-volt (IL46xx) and 5-volt (IL48xx) bus supply versions are available. IL4x22 parts have “Y” and “Z” driver outputs available, as well as “A” and “B.” These parts can be used for full duplex, or configured for half duplex by connecting “Y” to “A” and “Z” to “B” externally. The IL4685 has internal half-duplex connections to reduce PCB complexity.

The integrated DC-to-DC convertors require no external regulation. Frequency hopping and shielding reduce EMI, and ferrite beads or other external components are generally not necessary for EMI mitigation.

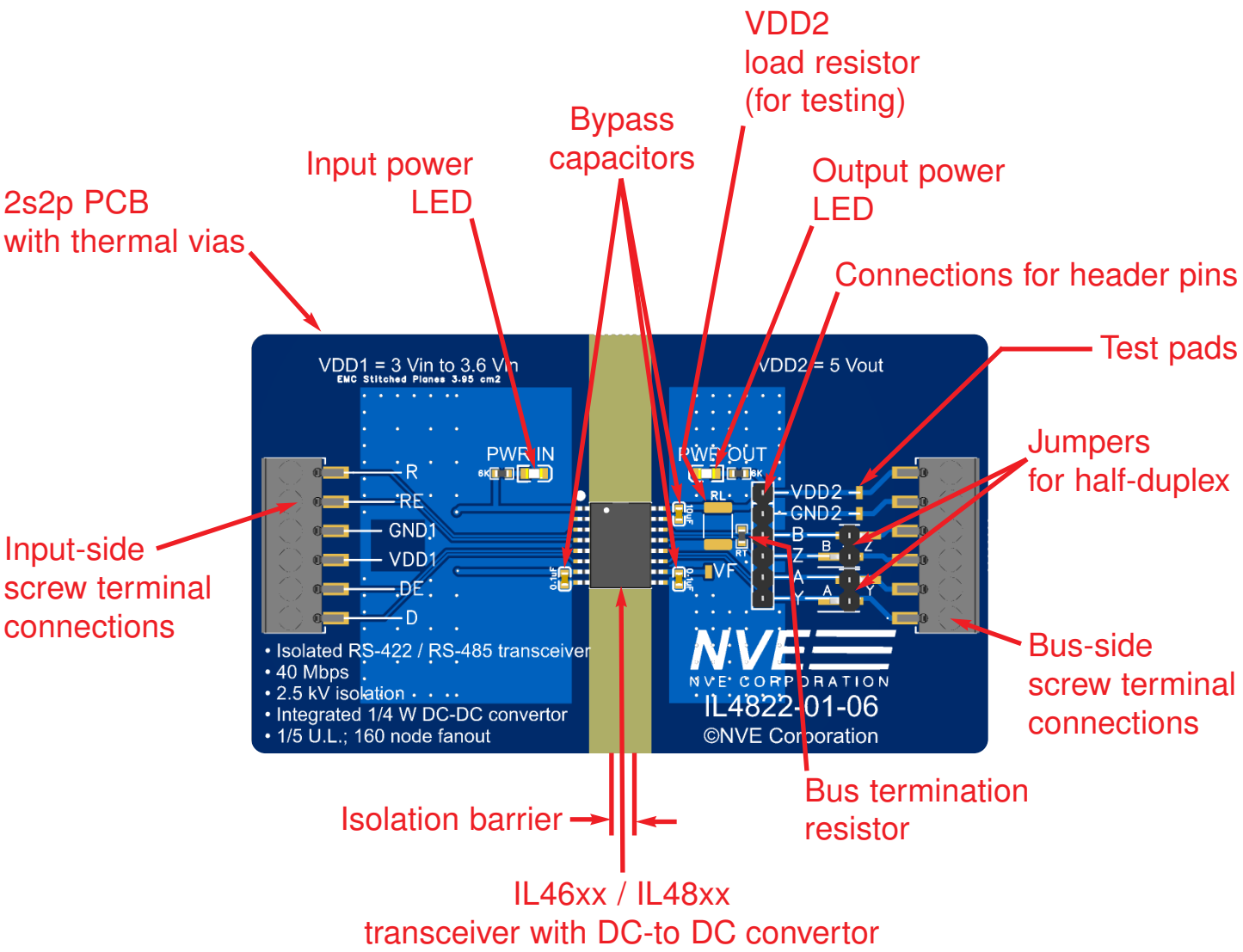
IL46xx / IL48xx Specification Highlights

- 40 Mbps RS-422 / RS-485 transceiver
- Integrated ¼ watt, DC-to-DC convertor
- 3.3 V or 5 V isolated bus supplies; both fully compatible and interoperable with 5 V buses
- 1/5 Unit Load; 160 node fanout
- 2500 V_{RMS} isolation
- Up to 16.5 kV bus ESD protection
- Overcurrent and thermal shutdown protection
- IEC 60747-17 (VDE 0884-17) certified; UL1577 registered; CE Mark
- EN 55032 CISPR 32 Class B compliant
- 0.3" True 8™ mm 16-pin SOIC package

Quick Start

- Connect V_{DD1} to a 3.3 V power supply.
- The two LEDs should indicate input and output power.
- The DC-to-DC convertor output can be checked for voltage, ripple, etc.
- Tie “DE” high and “RE” low to enable the RS-485 / RS-422 input and output data.
- Connect a square-wave signal to the “D” input with an amplitude of 2.4 to 3.3 V.
- Verify “Y” and “Z” (for IL4x22) or “A” and “B” (for IL4x85) outputs on an oscilloscope.

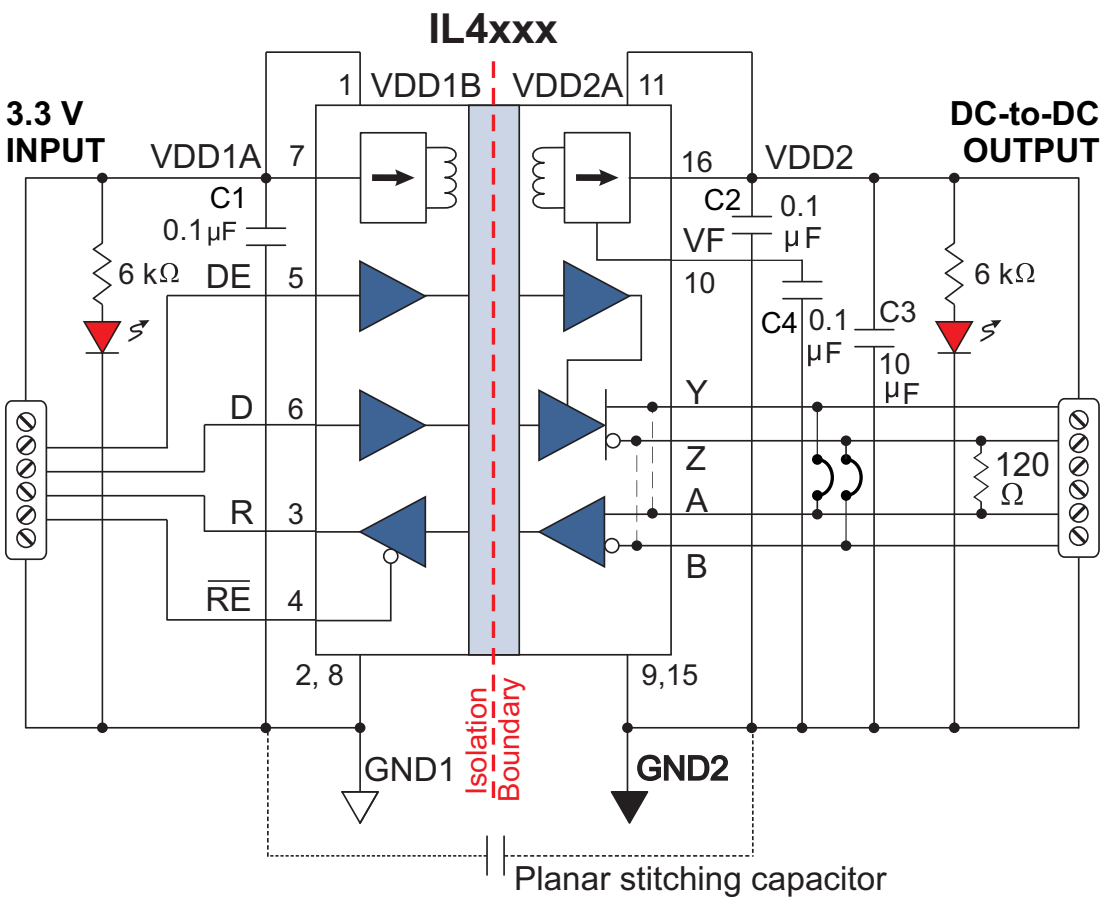
Evaluation Board Layout and Key Components

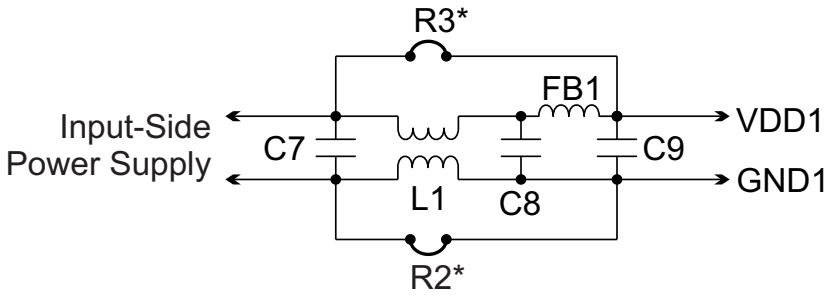


Part #	Bus Voltage	Half/Full Duplex
IL4622E	3.3 V	Full
IL4685E	3.3 V	Half
IL4822E	5 V	Full

Desig.	Part Number	Mfr.	Description
U1	IL4xxxE	NVE	Isolated Transceiver w/3.3V DC-DC Convertor
R1	RMCF0603JG120R	Stackpole	RES 120 OHM 5% 1/10W 0603
C1, C4	CL10B104KC8NNNC	Samsung	0.1 µF ±10% 100V Cer Cap X7R 0603
C3	CL10A106MA8NRNC	Samsung	10 µF ±20% 25V Cer Cap X5R 0603

Circuit Diagram



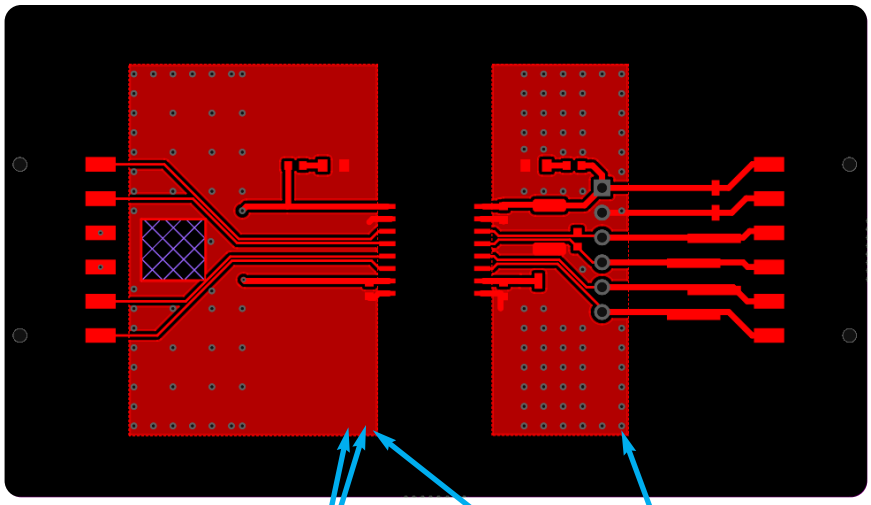


*Cut to use auxiliary EMC circuitry

IL4xxx Pinouts

Symbol	IL4x22E Pin	IL4685E Pin	Description
VDD1B	1	1	Transceiver controller-side power supply input (3.3 V nominal).
GND1	2, 8	2, 8	Input power supply ground (pin 2 is internally connected to pin 8).
R	3	3	Output data from bus.
RE	4	4	Read data enable. If RE is high, R = high impedance.
DE	5	5	Drive enable.
D	6	6	Data input to bus.
VDD1A	7	7	DC-to-DC convertor input voltage (3.3 V nominal).
GND2	9, 15	9, 15	Output Supply Ground (pin 9 is internally connected to pin 15).
VF	10	10	Filter capacitor.
VDD2A	N/C	11	DC-to-DC convertor output.
Y	11	N/C	Non-inverting bus driver.
Z	13	N/C	Inverting bus driver.
A	12	12	Non-inverting bus.
B	14	13	Inverting bus.
VDD2	16	16	Transceiver power supply input.

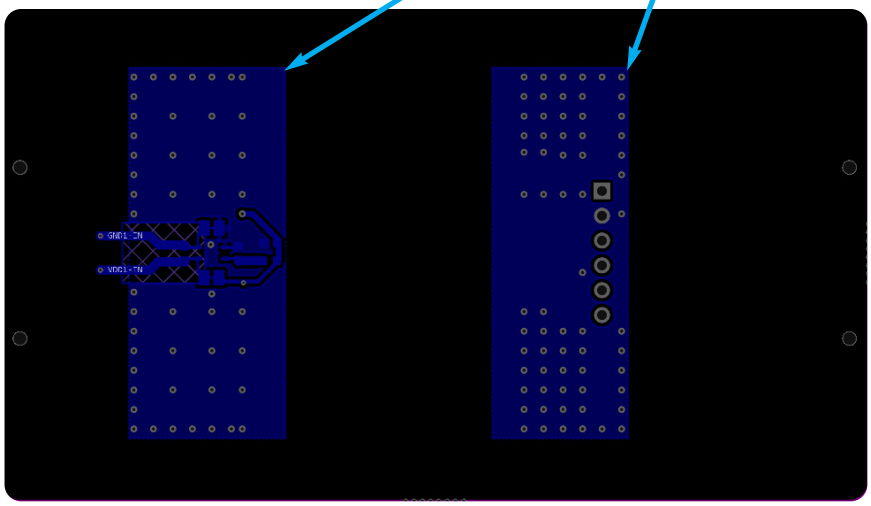
Evaluation Board Outer Layers



Top layer

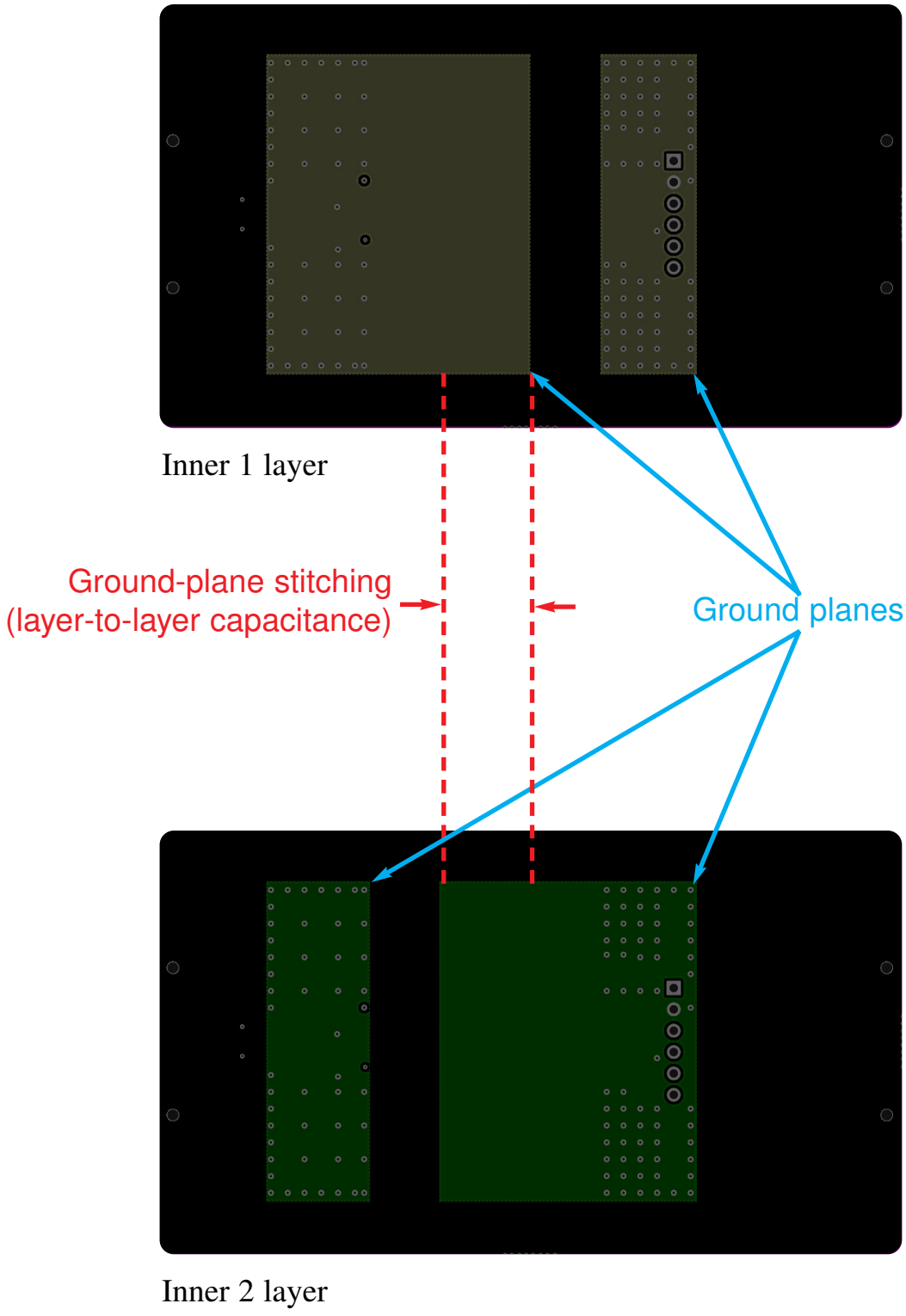
Thermal vias

Ground planes



Bottom layer

Evaluation Board Inner Layers



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