

ILDC1xx-01 Isolated DC-to-DC Converter Evaluation Boards



Board Numbers:

ILDC11V-01
ILDC11-01
ILDC12V-01
ILDC12-01
ILDC13V-01
ILDC13-01

Getting Started

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.

About These Boards

These 1.75 by 1.75 inch (45 by 45 mm) boards have an ILDC1xx DC-to-DC convertor plus the three recommended external bypass capacitors as well as LEDs to show the DC-to-DC convertor is operating. Screw terminals provide easy connections.

About ILDCxx DC-to-DC convertors

The ILDCxx family are ultraminiature one-quarter watt isolated DC-to-DC convertors. Frequency hopping and shielding reduce EMI, and ferrite beads are 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.

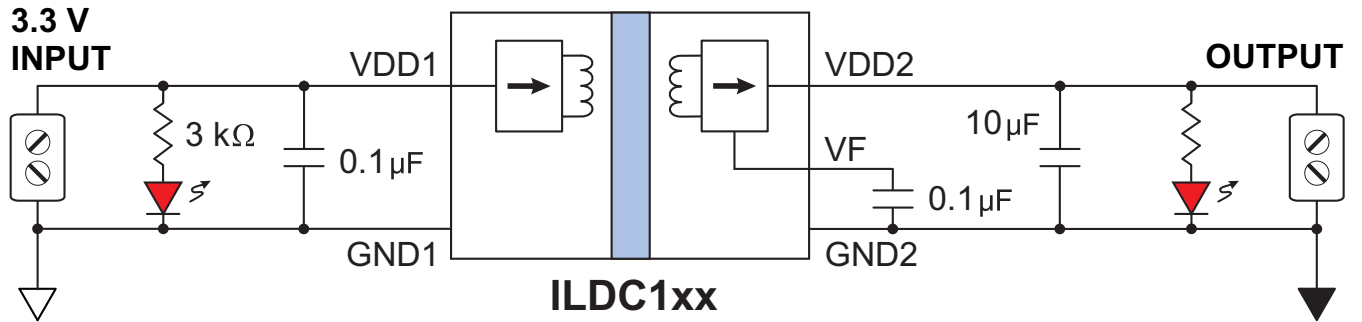
ILDC1xx Specification Highlights

- SOIC16 or ultraminiature 3 mm x 5.5 mm DFN packages
- 3.3 V input; 3.3, 5, or 6 V output versions
- Quarter watt output power
- Fully-regulated output
- Short-circuit protection
- Low EMI without ferrite beads
- 2.5 kV (DFN) or 4 kV (SOIC) isolation
- Full -40 °C to 125 °C temperature range

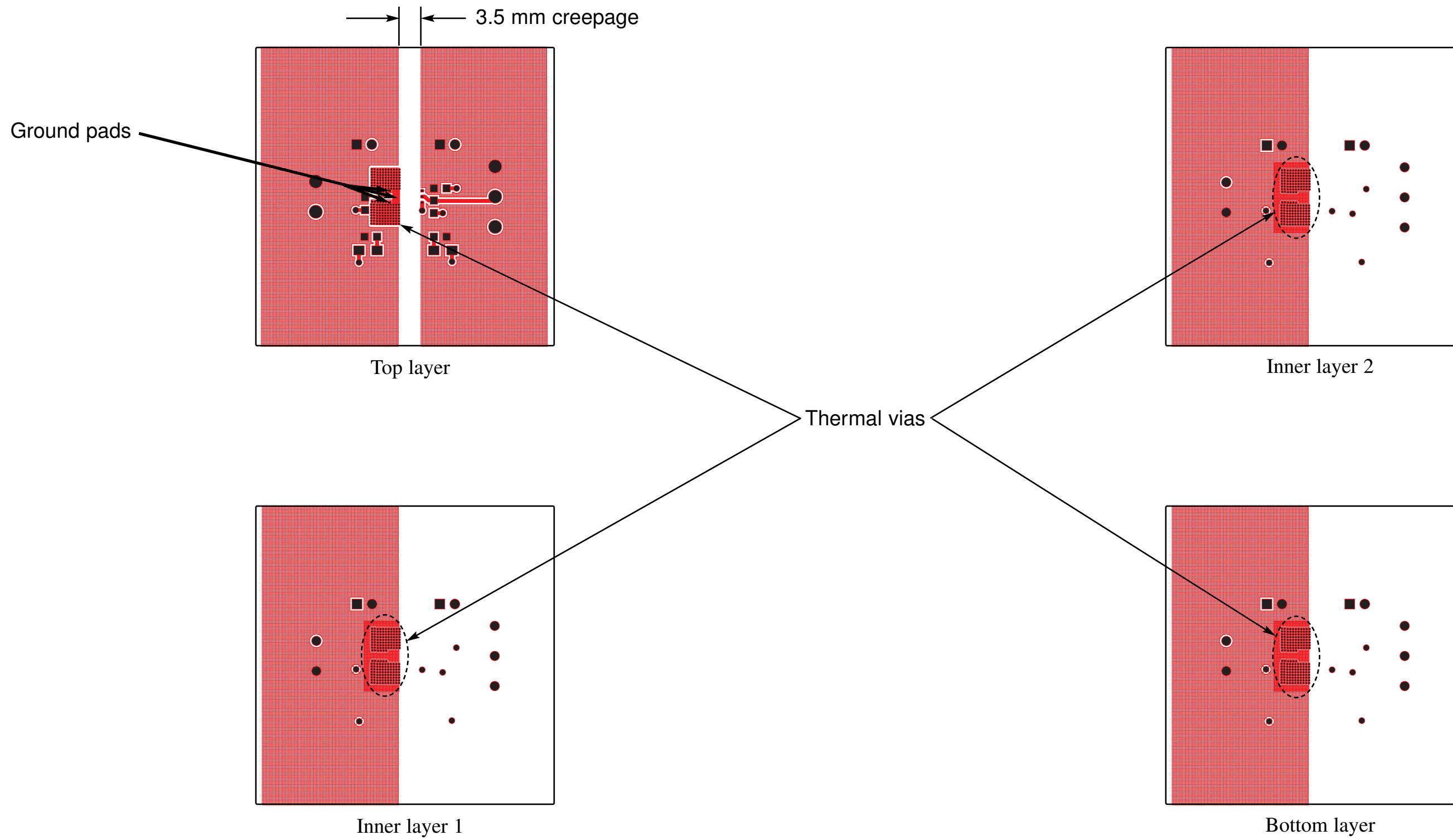
Selector Guide

Eval Board Part Number	DC-to-DC Convertor Part Number	DC-to-DC Convertor Package	Input Voltage	Output Voltage	Isolation Voltage
ILDC11V-01	ILDC11VE	SOIC16W	3.3 V	3.3 V	4 kV
ILDC11-01	ILDC11-15E	DFN6			2.5 kV
ILDC12V-01	ILDC12VE	SOIC16W	3.3 V	5 V	4 kV
ILDC12-01	ILDC12-15E	DFN6			2.5 kV
ILDC13V-01	ILDC13VE	SOIC16W	3.3 V	6 V	4 kV
ILDC13-01	ILDC13-15E	DFN6			2.5 kV

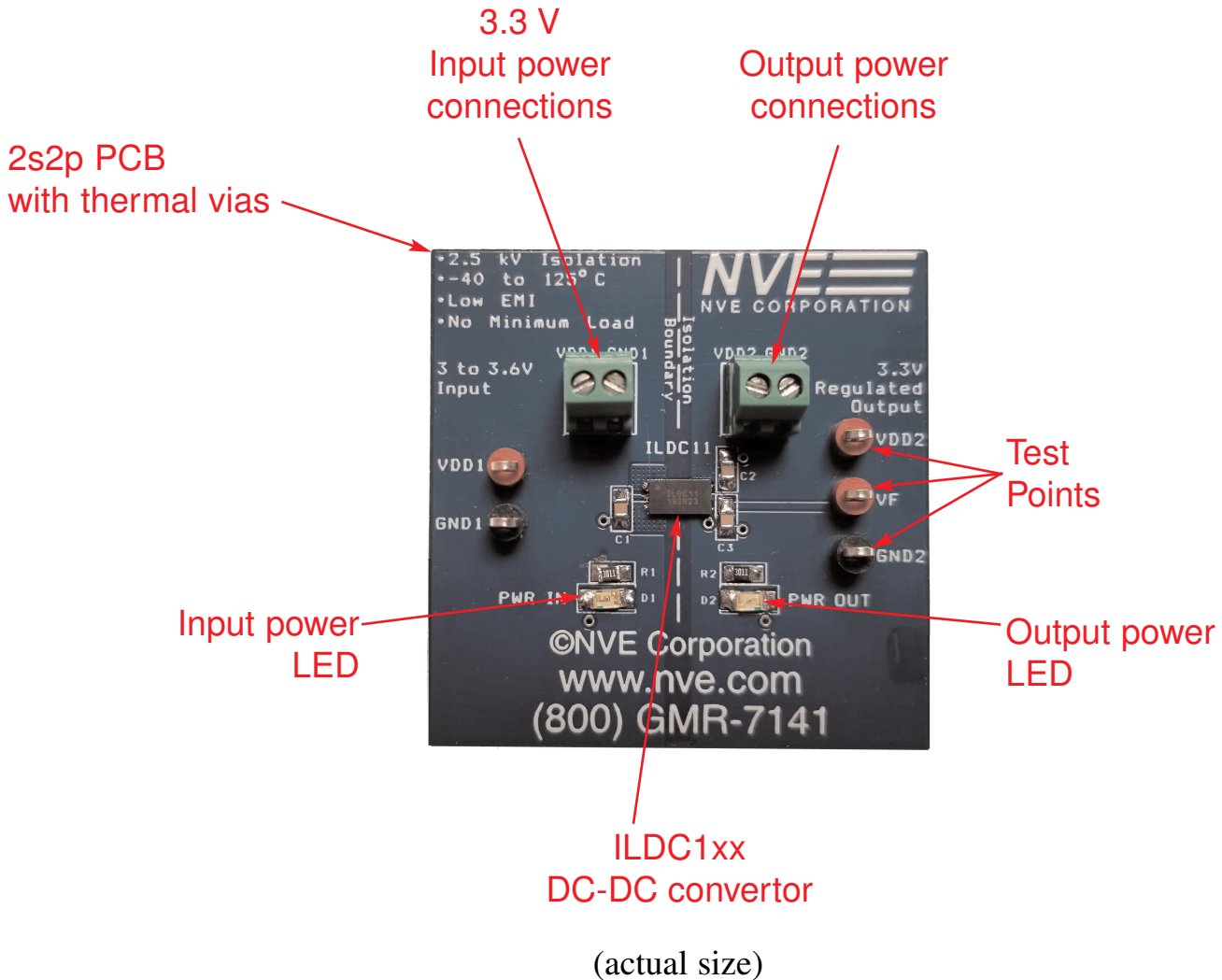
Circuit Diagram



Evaluation Board Layers

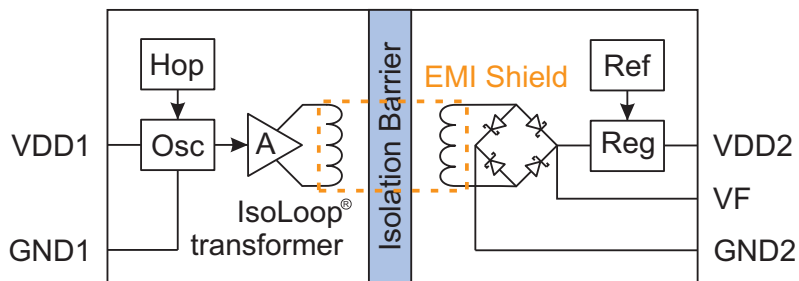


Evaluation Board Layout



Reference	Manufacturer	Part Number	Description
U1	NVE Corporation	ILD1xx	DC-DC Convertor
D1, D2	Kingbright	APT3216LSECK/J3-PRV	LED RED CLEAR CHIP 2SMD
R1, R2	TE Connectivity Passive	CRG0805F3K0	RES SMD 3K OHM 1% 1/8W 0805
C1, C3	Samsung Electro-Mech	CL21B104MBCNNNC	CAP CER 0.1UF 50V X7R 0805
C2	Taiyo Yuden	LMK212AB7106MG-T	CAP CER 10UF 16V X7R 0805
J1, J2	TE Connectivity	282834-2	TERM BLK 2P SIDE ENT 2.54MM PCB
J3-7	Keystone Electronics	500x	PC TEST POINT C COMPACT

Operation and Application Information



ILDC1xx detailed block diagram.

ILDC1xx Operation

A 113 MHz oscillator drives a high-frequency power amplifier, which in turn drives an IsoLoop® microtransformer primary. Frequency hopping reduces EMI peak amplitudes, and embedded magnetic shielding further reduces radiated EMI.

A unique ceramic/polymer composite barrier provides full isolation with virtually unlimited barrier life. On the other side of the isolation barrier, the transformer secondary output is filtered, rectified, and regulated by a low-EMI low drop-out regulator with a precision bandgap voltage reference.

No Temperature Derating

A double sided, double buried power plane (“2s2p”) PCB, like the one in this evaluation board, optimizes thermal performance, allowing full power up to 125 °C operating temperature with no derating. Thermal vias are used on the input side between the buried power planes and the board surfaces. Both input-side ground pads (pads 1 and 3) and the leadframe pad are grounded to cool the leadframe.

At the full output current with the recommended PCB, the ILDCxx dissipates approximately one watt; the resultant junction temperature rise is 46 °C, so at 125 °C ambient the junction temperature is less than the 175 °C maximum junction temperature. A simple double-sided PCB can be used with some derating.

Maintaining Creepage

Power planes should be spaced to avoid compromising creepage, and board pads should not extend past the part pads to avoid compromising creepage.

Low Parts Count

The only external parts required are a 0.1 µF ceramic capacitor placed close to the VDD1 supply pad, a 10 µF ceramic capacitor for the VDD2 pad, and a 0.1 µF capacitor on the VF pad.

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