

RIC70849 evaluation board

0.8 V/40 A, Single phase buck converter with radiation hardened GaN HEMTs

RIC70849EVAL1 is an evaluation board for the RIC70849, a radiation hardened (rad hard) single-phase buck controller with integrated gate drivers optimized for GaN HEMTs in harsh radiation environments. The evaluation board is designed with IR HiRel's rad hard 100 V GaN HEMT, IG1NT052N10R, and is ideal for measurements in various configurations and modifications.

The board is engineered for parallel operation, allowing the user to connect a second IG1NT052N10R GaN HEMT at the low- and high-side of the half-bridge of the buck converter, leading to lower conduction losses, higher efficiency, and better thermal performance. RIC70849EVAL1 supports optional on-board and external dynamic load circuits to simplify tests for high slew rate transients. The output is configured to regulate 0.8 V/40 A to meet requirements of space grade FPGAs, such as AMD Versal XQRV2302.

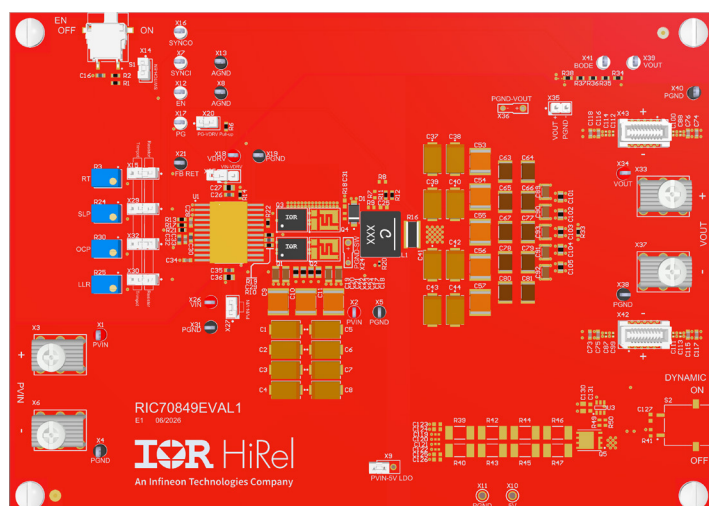
The board provides accurate, high bandwidth measurement of important power stage pulse width modulated (PWM) signals from RIC70849. The current sensing of the board can be configured as a resistor in series with the inductor or direct current resistance (DCR) current sensing, using the equivalent series resistance (ESR) of the inductor to measure the inductor current. This eliminates the current sense resistor, allowing for higher efficiency. RIC70849EVAL1 supports an adjustable output voltage and a wide range of output capacitance values. The board enables optional potentiometers for easy adjustment of pin-strap programmed parameters, such as:

- Load line regulation (LLR)
- Overcurrent limit (OCP)
- Slope compensation (SLP)
- Switching frequency (RT)

RIC70849EVAL1 provides an evaluation platform for DC-DC power converters for point-of-load (PoL) applications, including space grade FPGA core rails.

Key features

- Simple connections to power source, load, and measurement probes
- Wide range of inductor size and output capacitance values
- Optional potentiometers for easy adjustment of: LLR, OCP, SLP, and RT
- Parallel operation of GaN HEMT at low- and high-side of the half-bridge for better thermal performance
- Efficient DCR current sensing



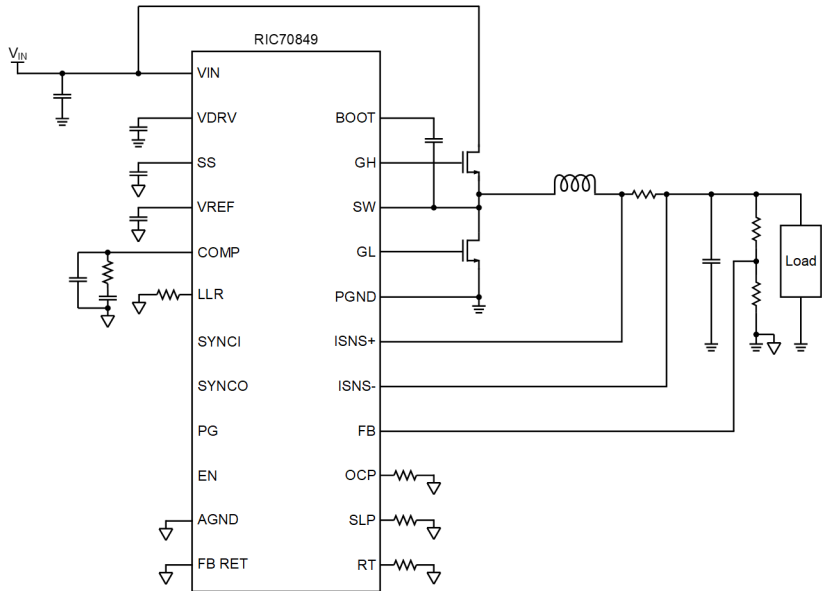
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Block Diagram

A simplified schematic of RIC70849EVAL1



Part Information

Orderable part number	Package type	Device level	Total ionizing dose level
5962R2320602VXA	24-lead flatpack	Level V ¹	100 krad(Si)
RIC70849F	24-lead flatpack	COTS ²	
RIC70849EVAL1	Evaluation board		

¹ Per MIL-PRF-38535 (DLA certification pending)

² Intended for engineering evaluation only, devices are only electrically tested at 25°C and for hermeticity



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