

DRV421 Evaluation Module

This module is to evaluate the DRV421 magnetic sensing IC together with a user supplied magnetic core in a closed-loop sensor topology.

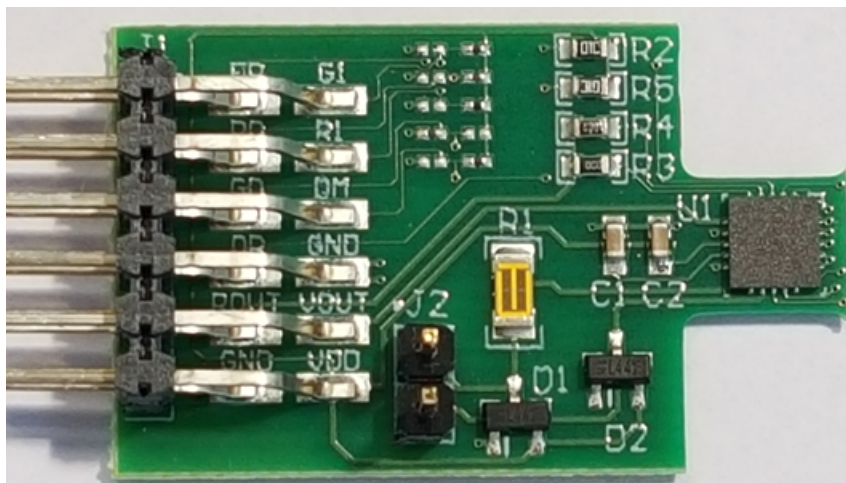


Figure 1. DRV421 EVM

1 EVM Overview

The evaluation module (EVM) allows:

- to build a closed-loop current sensing module consisting of a magnetic core with compensation coil
- direct connection of the compensation coil with an inductance from 100 mH to 2H (>300 mH recommended for optimal performance)
- to configure open-loop gain setting to account for different system parameters (core inductance, series resistance) to ensure loop stability
- to configure the reference voltage
- to explore the degauss function
- to read the Error (ER) and Over-Range (OR) signal

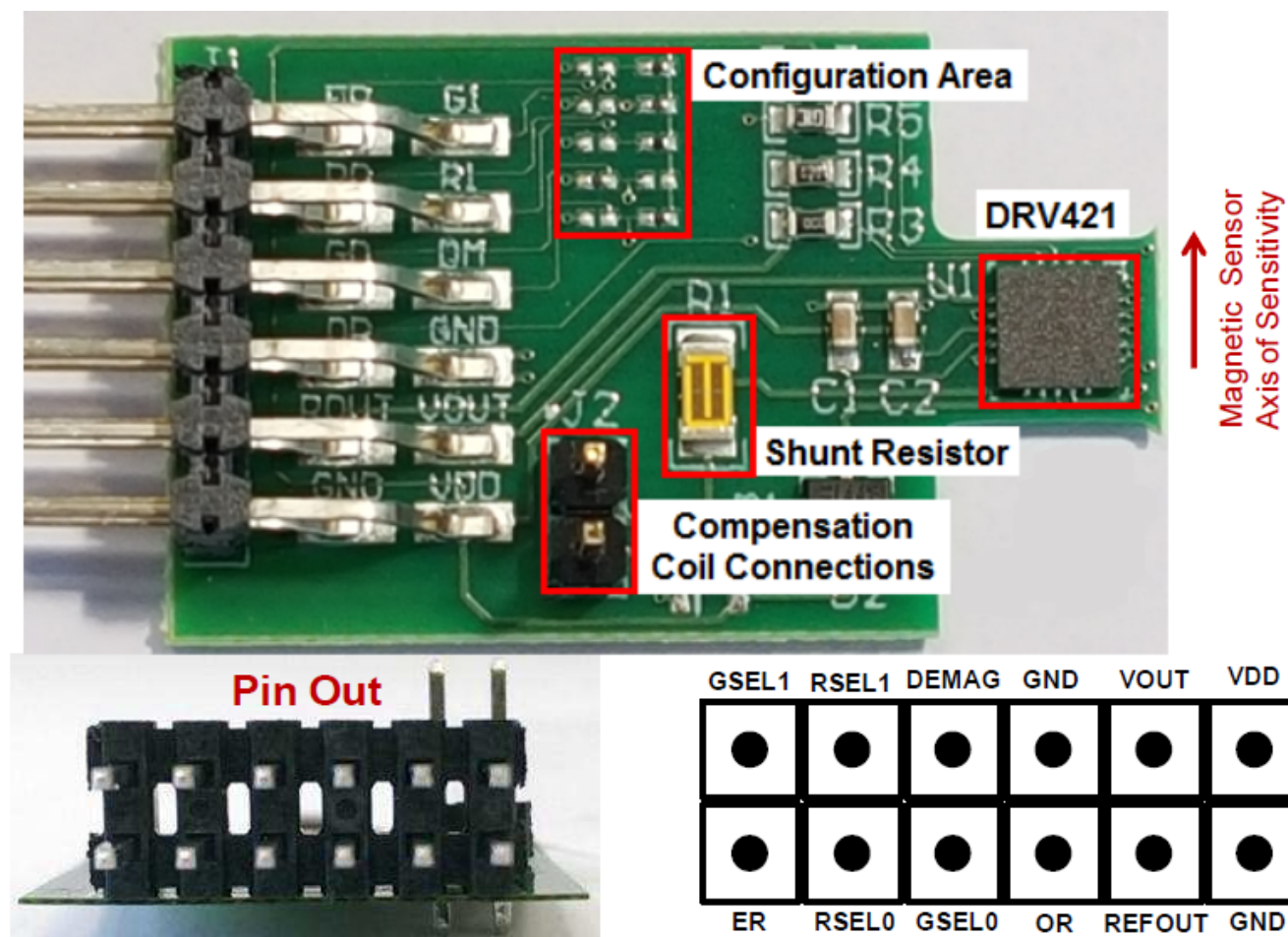


Figure 2. Board Layout

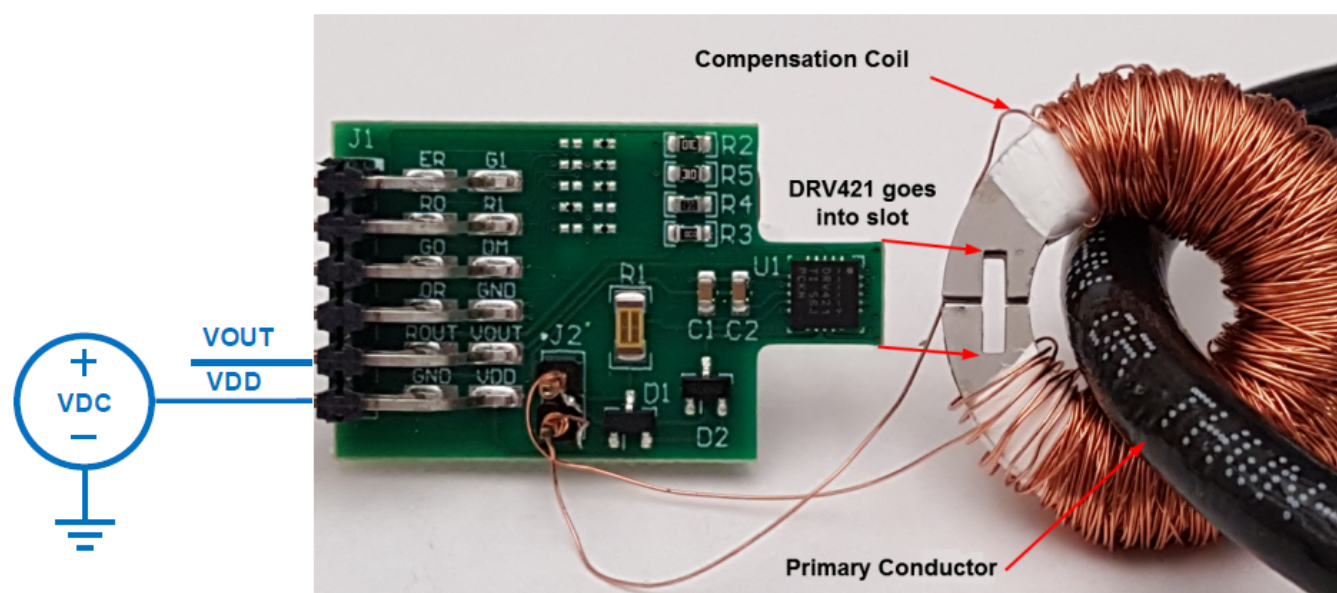
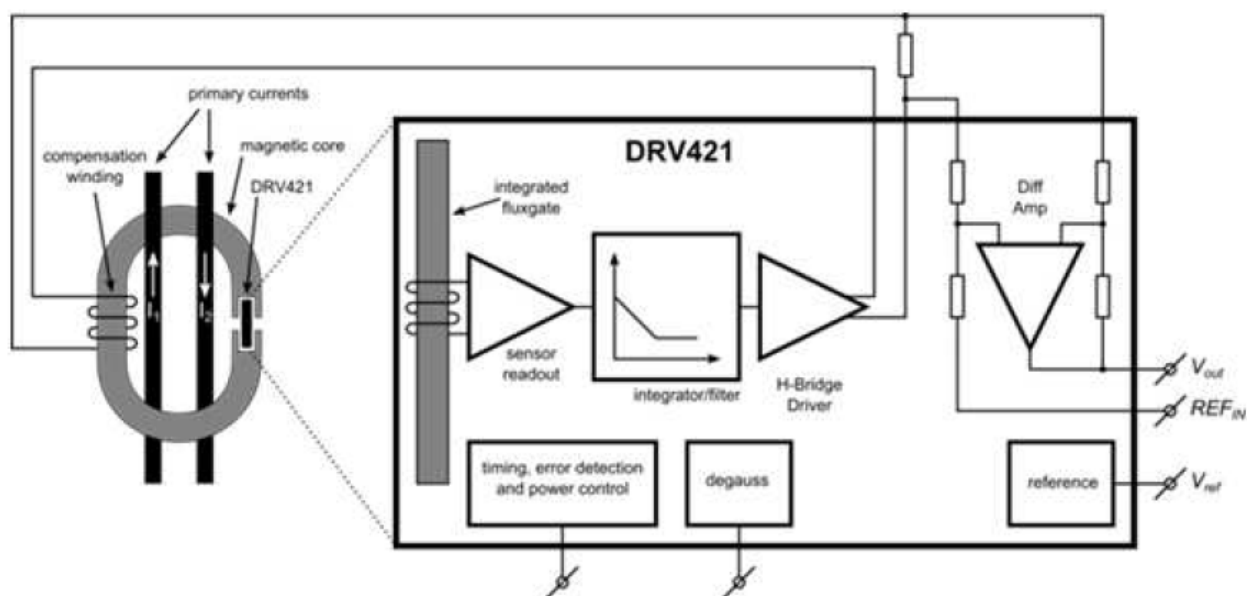


Figure 3. Evaluation Setup

The DRV421EVM is designed to fit into a slot cut into the magnetic core as shown in [Figure 3](#). The primary current to be measured is passed through the core and the output voltage from the DRV421 is based on the turns ratio of the primary winding to secondary winding multiplied by the sense resistor on the DRV421EVM and the internal gain of the differential amplifier. The DRV421EVM also features a degauss function, which is enabled at power up by default. The degauss time is approximately 500 ms.

2 Board Configuration / Pin Description

Table 1. Pin Configuration

PIN	DESCRIPTION	SETTINGS / PIN CONFIGURATION	VALUE	UNIT
VDD	Supply Voltage		3 to 5.5	V
GND	Supply Ground			–
VOUT	Differential Amplifier Output Voltage	$R_{SHUNT} = R1 = 10 \text{ Ohms}$, Diff. Amp. Gain = 4	$REFOUT \pm 4 \times V_{SHUNT}$	V
REFOUT	Reference Voltage Output	See RSELx below	50	% of VDD
REFIN	Reference Voltage Input	Connected to REFOUT	50	% of VDD
GSEL0 / GSEL1	AC Open-Loop Gain select at 1.9kHz	GSEL[1:0]='00'	10	V/mT
		GSEL[1:0]='01'	12.6	V/mT
		GSEL[1:0]='10' (default)	31.6	V/mT
		GSEL[1:0]='11'	100	V/mT
RSEL0 / RSEL1	Reference voltage output (REFOUT) select	RSEL[1:0]='00'	2.5	V
		RSEL[1:0]='01'	1.65	V
		RSEL[1:0]='1x' (default)	50	% of VDD
DEMAG	Core Demagnetization	DEMAG = 0	disabled	–
		DEMAG = 1 (default)	enabled	–
ER	ERROR Flag, open drain output	10kOhm pull-up resistor installed (R2)	active low	–
OR	Over-Range Flag, open drain output	10kOhm pull-up resistor installed (R5)	active low	–

3 Bill of Material and EVM Schematic

Table 2 contains a complete bill of materials for the DRV421EVM. The schematic diagram is shown in Figure 4.

Table 2. List of Material

ITEM	QTY	DESIGNATORS	DESCRIPTION	MANUFACTURER	MFG. PART NUMBER	DISTRIBUTOR	DIST. PART NUMBER
1	1	NA	Printed Wiring Board	Texas Instruments	DRV421EVM-CB		
2	2	C1, C2	1uF, 0603, Ceramic, X7R, 10V, 10%	Kemet	C0603C105K8RACTU	Digi-Key	399-11133-1-ND
3	2	D1, D2	BAT54S, Dual Schottkey	Vishay	BAT54S-E3-08	Digi-Key	BAT54S-E3-08CT-ND
4	1	R1	10 ohm, 1206, 0.1%, 1W Resistor	Vishay	PHP01206E10R0BST5	Digi-Key	PHP10.0ACT-ND
5	2	R2, R5	10K ohm, 0603, 5%, .1W Resistor	Yageo America	RC0603JR-0710KL	Digi-Key	311-10KGRCT-ND
6	1	R3	0 ohm, 0603, 5%, .1W Resistor	Yageo America	RC0603JR-070RL	Digi-Key	311-0.0GRCT-ND
7	1	R4	43 ohm, 0603, 5%, .1W Resistor	Yageo America	RC0603JR-0743RL	Digi-Key	311-43GRCT-ND
8	1	J1	6-pin, dual row verticle mount male header	Samtec	TSM-106-01-T-DH-K		
9	1	U1	Magnetic Sensor IC, 4x4 QFN, 20-pin	Texas Instruments	DRV421		
10	5	R6, R9, R10, R12, R14	10K ohm, 0402, 1/16W	Yageo America	RC0402JR-0710KL	Digi-Key	311-10KJRCT-ND
11	0	R7, R9, R11, R13, R15	Not Installed				

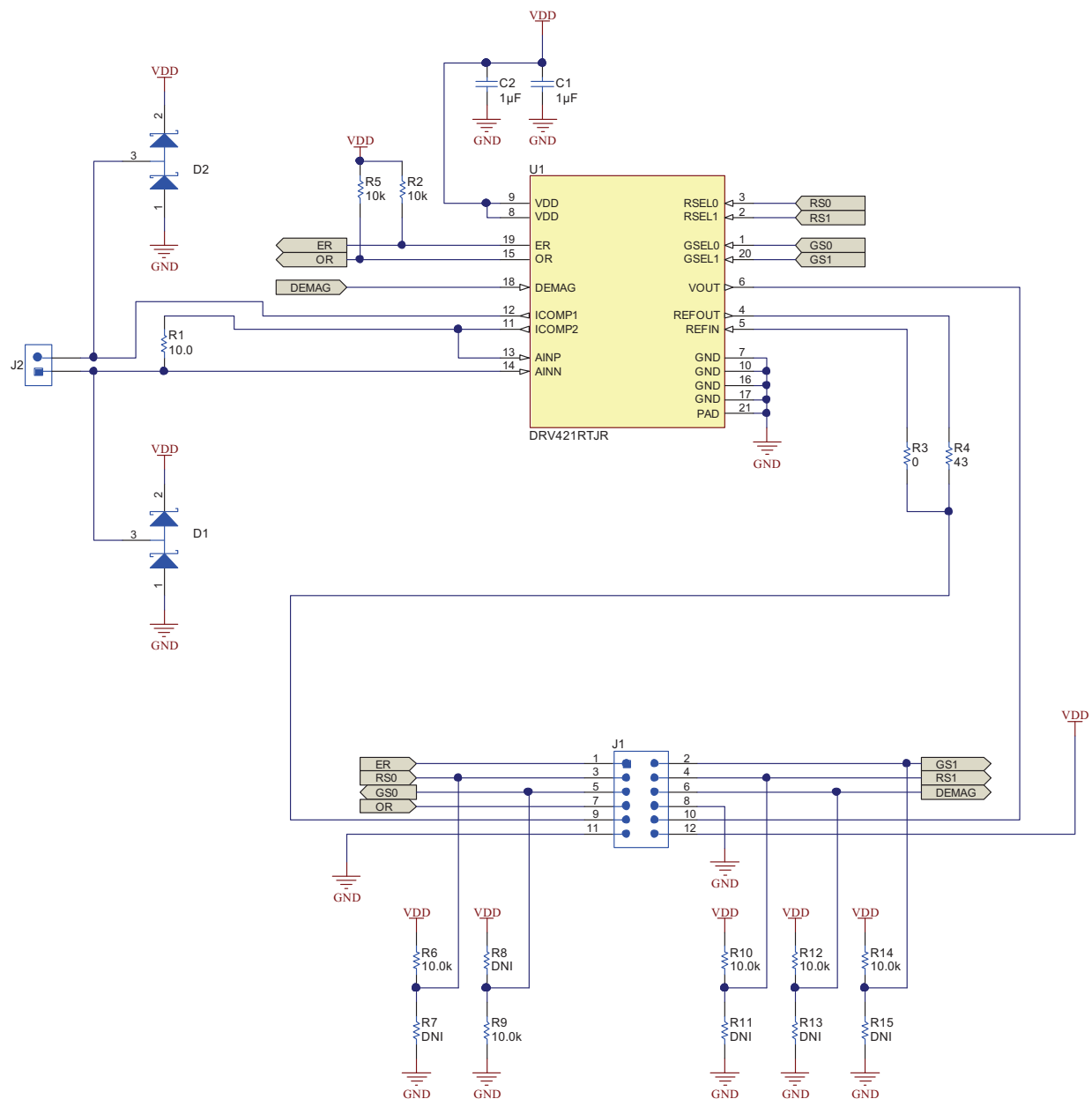


Figure 4. DRV421EVM Schematic

Revision History

Changes from Original (May 2015) to A Revision	Page
• Changed Figure 1	1
• Changed Figure 2	2
• Changed Figure 3	3
• Changed text in the last paragraph of Section 1	3
• Changed Table 2 line item 10 From W1 - W5 To: R6, R9, R10, R12, R14.	5
• Changed Table 2 added line item 11 (R7, R9, R11, R13, R15)	5
• Changed Figure 4	6

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

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- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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3.2.1 For EVMs issued with an Industry Canada Certificate of Conformance to RSS-210

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