

Small Highly-Integrated Highly-Efficient Non-Isolated PoE Powered Device

DESCRIPTION

Demonstration circuit 2125 is a small, highly-integrated, non-isolated PoE Powered Device (PD) solution. It features a PD Interface Controller (LT[®]4275), which interfaces with a PoE Power Sourcing Equipment (PSE), an ideal diode bridge controller (LT4321), which minimizes bridge losses, and a DC/DC μ Module[®] regulator (LTM[®]8027).

The DC2125 is initially configured as a 38.7W LTPoE++[™] PD that is capable of providing 12V and 3A at the output. Users can configure the PD circuit to be an IEEE802.3

compliant Type 2 (25.5W, “at”) or Type 1 (13W, “af”) PD by changing the RCLASS and RCLASS++ resistors. See the LT4275 data sheet for further information. The output voltage of the LTM8027 can be easily configured for different output voltages as shown in the LTM8027 data sheet.

Gerber files for this circuit board are available. Call the LTC factory.

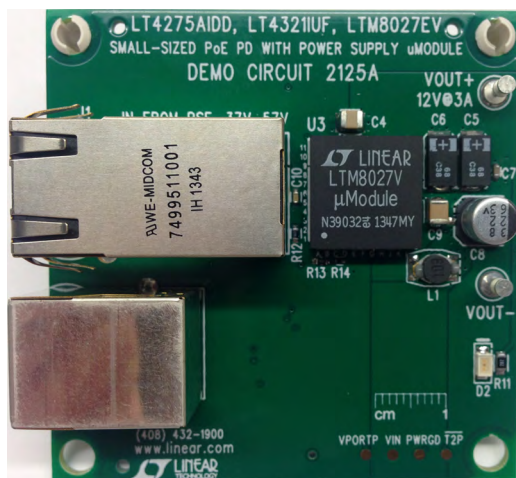
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PERFORMANCE SUMMARY

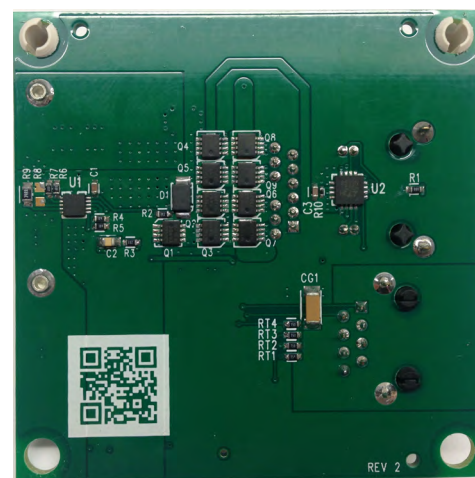
Specifications are at $T_A = 25^\circ\text{C}$

SYMBOL	CONDITIONS	UNITS
V_{PORT}	RJ-45 Port Voltage Range	37V to 57V
$I_{\text{OUT(MAX)}}$	Maximum Current from V_{OUT^+} to V_{OUT^-}	3A
V_{OUT}	Output Voltage	12V (typ)
$\Delta V_{\text{OUT(ripple)}}$	Output Voltage Ripple at $V_{\text{PORT}} = 50\text{V}$, $I_{\text{OUT}} = 3\text{A}$	58mVpp (typ)
$\Delta V_{\text{OUT(REG)}}$	Output Voltage Regulation, $I_{\text{OUT}} = 0\text{A}$ to 3A , V_{PORT}	$\pm 0.031\%$ (typ)
Efficiency	Maximum Efficiency, $V_{\text{PORT}} = 41\text{V}$, $I_{\text{OUT}} = 3\text{A}$	90% (typ)
f_{SW}	Switching Frequency	300kHz (typ)

BOARD PHOTOS

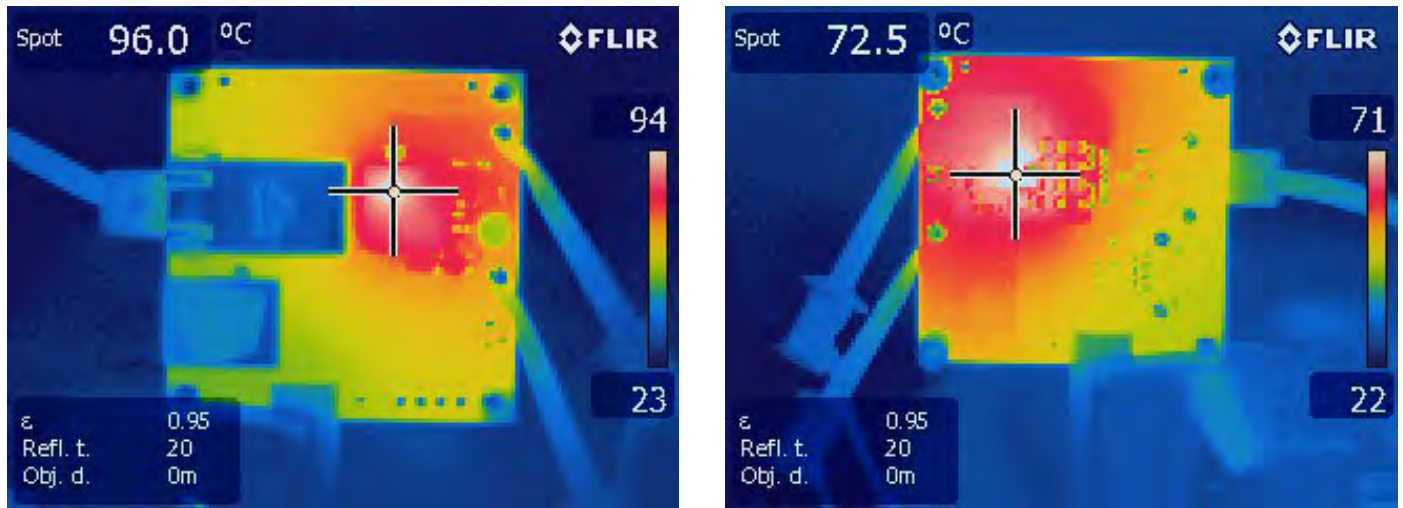


Top Side



Bottom Side

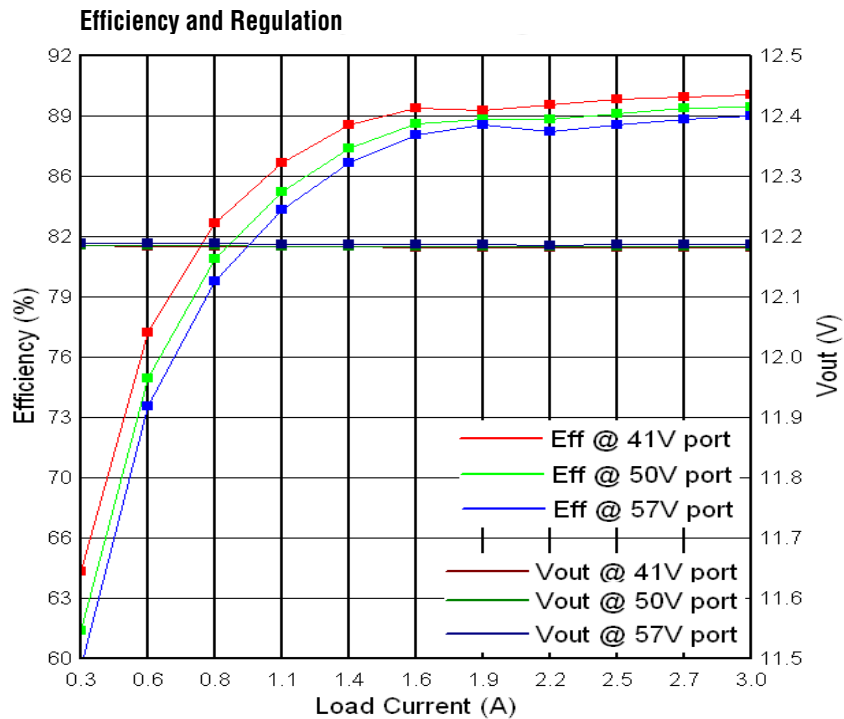
TYPICAL PERFORMANCE CHARACTERISTICS



Top Side

Bottom Side

Figure 1. Thermal Pictures – $V_{PORT} = 50V$, $I_{OUT} = 3A$



QUICK START PROCEDURE

NOTE: Handle the DC2125 printed circuit board by the edges.

1. Refer to Figure 2 below to evaluate the DC2125 while powering a 12V Load such as power resistors or an electronic load.
2. Connect the positive terminal of the 12V Load to the V_{OUT+} turret, E1. Connect the negative terminal of the 12V Load to the V_{OUT-} turret, E2. If using an electronic load, power it on and turn the load current down to 0A.
3. Check the power delivery capability of the LTPoE++ PSE to ensure it can power the PD and the 12V Load. Power-up the LTPoE++ PSE. NOTE: The DC1814A-A
4. Connect the output of the PSE to the input RJ45 connector, J1, of the DC2125 with a CAT5e or CAT6 Ethernet cable ≤ 100 meters in length.
5. After connection has been established, verify that the LED (D2) is lit. This indicates the PSE has successfully detected and powered the PD.
6. The 12V Load can now be adjusted to exercise the DC2125 over its full operating load range.

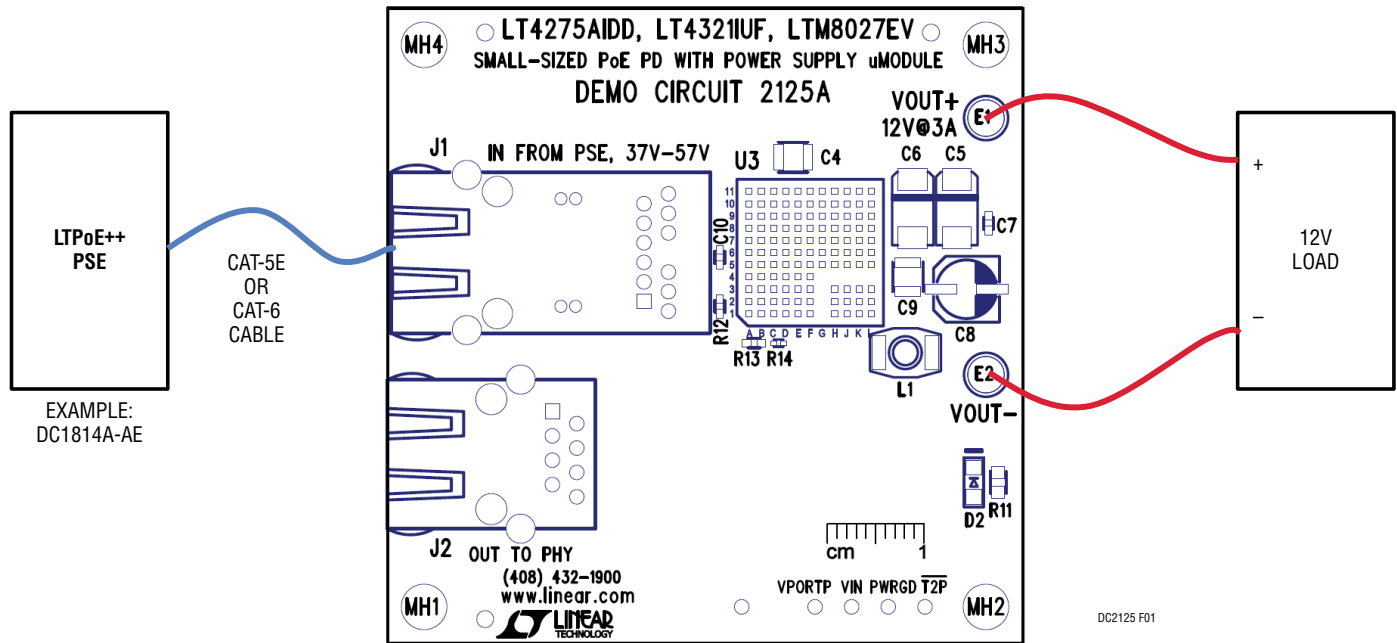


Figure 2. Setup Diagram for the DC2125 Using an LTPoE++ PSE and a Load

DEMO MANUAL DC2125

PARTS LIST

QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components			
2	C1, C3	CAP., X7S, 0.047µF 100V, 10%, 0603	TDK, C1608X7S2A473K
1	C2	CAP., X7R, 47nF 100V, 10%, 0805	AVX, 08051C473KAT2A
1	C4	CAP., X7R, 22µF 16V, 20%, 1210	AVX, 1210YC226MAT2A
2	C5, C6	CAP., TQC, 68µF 16V, 7343	PANASONIC, 16TQC68MYF
1	C7	CAP., X7R, 0.1µF 50V, 10%, 0603	MURATA, GRM188R71H104KA93D
1	C8	CAP., ALUMINUM, 22µF 63V,C-CE-BS-6.3X7.7	SUN ELECT., 63CE22BS
1	C9	CAP., X7R, 2.2µF 100V, 1210	AVX, 12101C225KAT2A
1	C10	CAP., X7R, 1500pF 100V, 5%, 0603	AVX, 06031C152JAT2A
1	D1	DIODE, 600W TRANSIENT VOLTAGE SUPPRESSOR, SOD128	NXP, PTVS58VP1UP
1	J1	CONN., MAGJACK 1PORT 1000BASE-T	WE, 7499511001
1	L1	IND, 10µH, DO1608C	COILCRAFT, DO1608C-103MLB
9	Q1-Q9	MOSFET, N-CH, LFPK33	NXP, PSMN075-100MSE
1	R2	RES., CHIP, 8.2Ω, 5%, 0603	VISHAY, CRCW06038R20JNEA
1	R3	RES., CHIP, 3.3k, 5%, 0603	VISHAY, CRCW06033K30JNEA
2	R4, R5	RES., CHIP, 100k, 5%, 0603	VISHAY, CRCW0603100KJNEA
1	R9	RES., CHIP, 34.8Ω, 1%, 0805	VISHAY, CRCW080534R8FKEA
1	R12	RES., CHIP, 56.2k, 1%, 0603	VISHAY, CRCW060356K2FKEA
1	R13	RES., CHIP, 49.9k, 1%, 0603	VISHAY, CRCW060349K9FKEA
1	U1	IC, LT4275AIDD#PBF, DFN10DD-3X3	LINEAR TECHNOLOGY CORPORATION, LT4275AIDD#PBF
1	U2	IC, LT4321IUF#PBF, QFN16UF-4X4	LINEAR TECHNOLOGY CORPORATION, LT4321IUF#PBF
1	U3	IC, µModule REGULATOR, LGA113-15X15X4.32	LINEAR TECHNOLOGY CORPORATION, LTM8027EV#PBF
Optional Circuit Components			
1	CG1	CAP., X7R, 1000pF, 2KV, 10% 1808	TDK, C4520X7R3D102K
1	D2	LED, GREEN	ROHM, SML-010FTT86L
1	J2	CONN., SS-7188S-A-NF	STEWART CONNECTOR, SS-7188S-A-NF
4	RT1-RT4	RES., CHIP, 75Ω, 5%, 0603	VISHAY, CRCW060375R0JNEA
3	R1, R6, R7	RES., CHIP, 0Ω, 5%, 0603	VISHAY, CRCW06030000Z0EA
0	R8	RES., 0805	OPT
1	R11	RES., CHIP, 2k, 5%, 0805	VISHAY, CRCW08052K00JNEA
2	R10, R14	RES., CHIP, 0Ω, 5%, 0402	VISHAY, CRCW04020000Z0ED
Hardware: For Demo Board Only			
2	E1, E2	TP, TURRET, 0.094"	MILL-MAX 2501-2-00-80-00-00-07-0
4	MH1-MH4	STANDOFF, NYLON, 0.5, 1/2"	KEYSTONE, 8833 (SNAP ON)

SCHEMATIC DIAGRAM

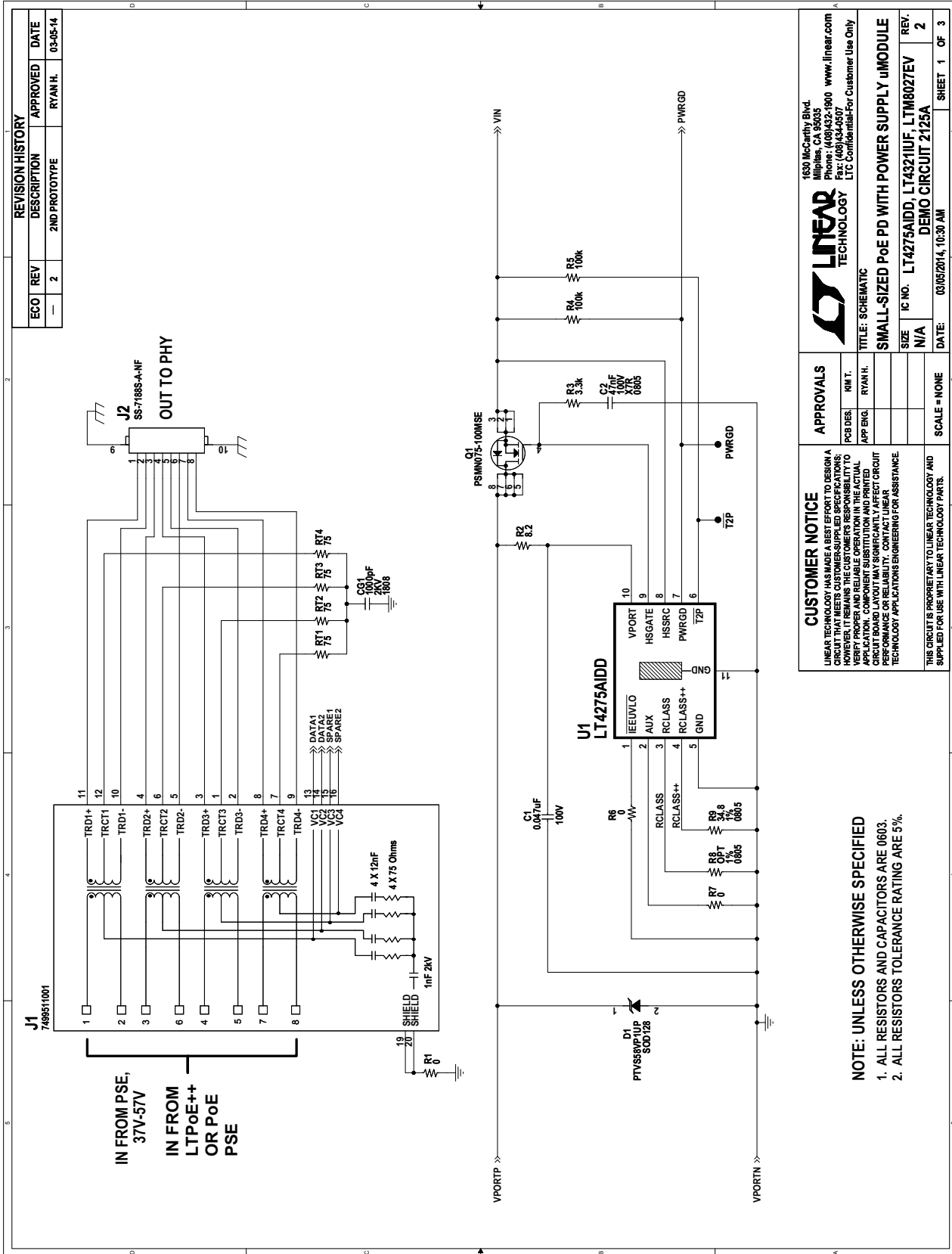


Figure 3. DC2125 Demo Circuit Schematic, Sheet 1

SCHEMATIC DIAGRAM

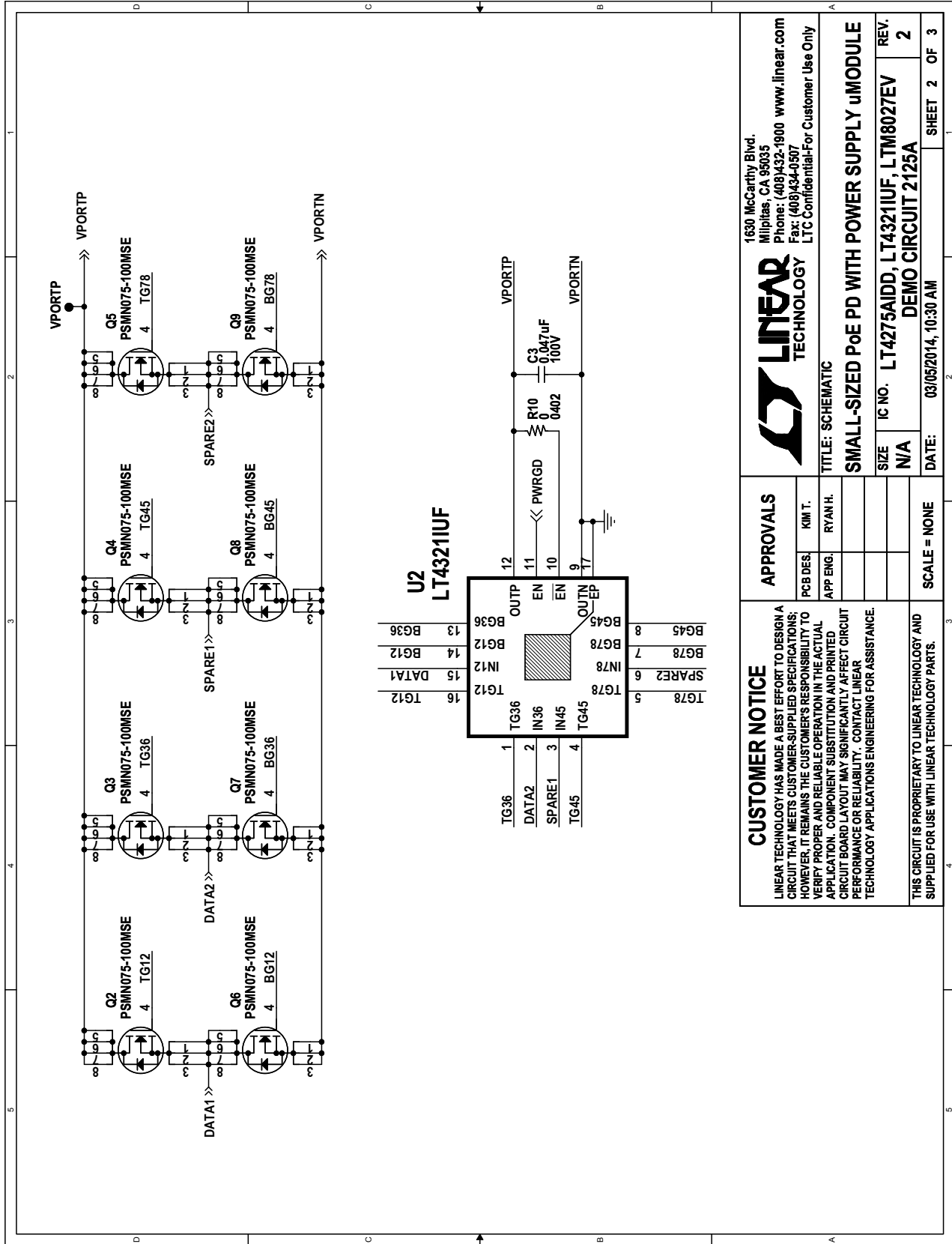
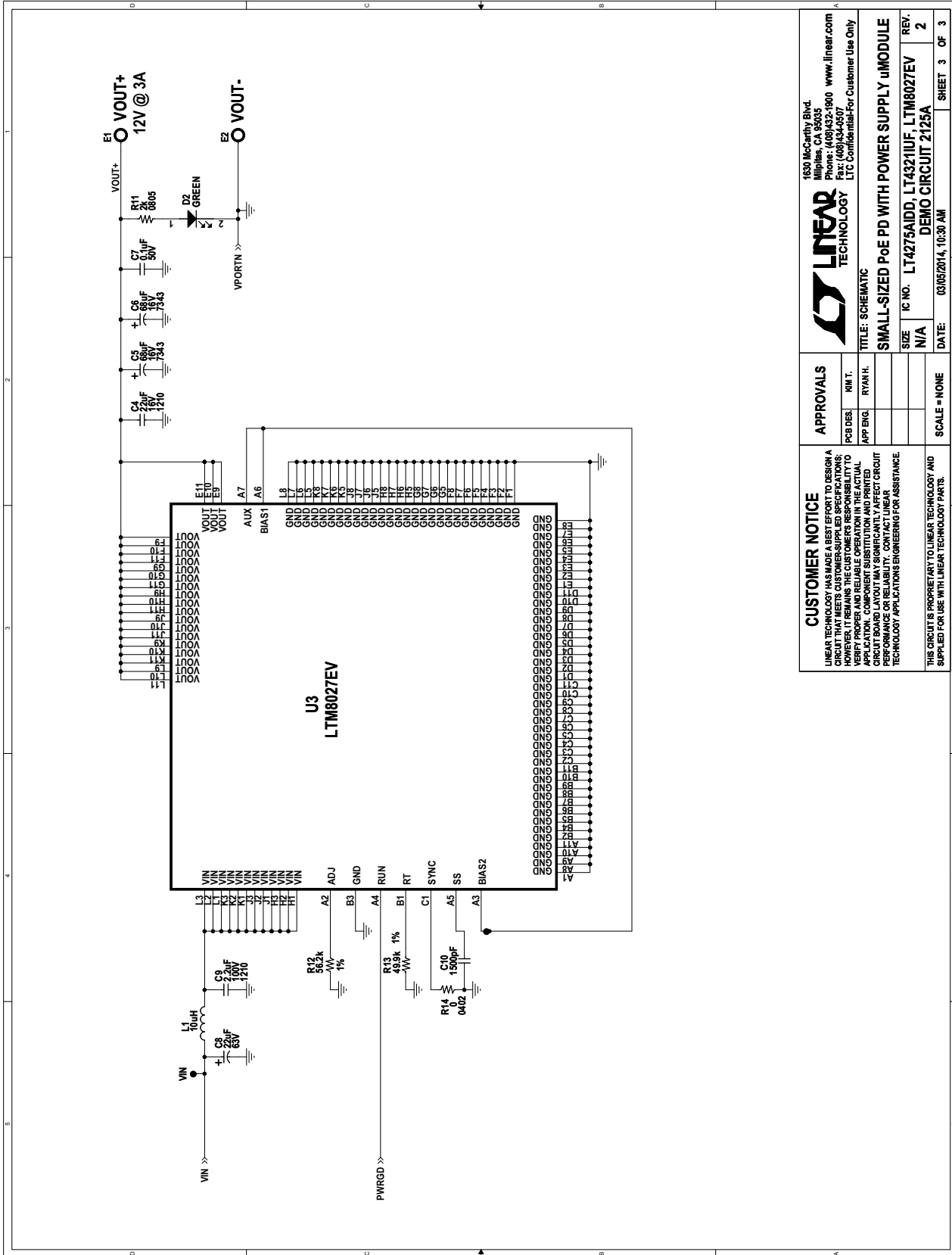


Figure 4. DC2125 Demo Circuit Schematic, Sheet 2

SCHEMATIC DIAGRAM



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	<p>SCALE = NONE</p>	<p>DATE: 03/05/2014, 10:30 AM</p>	<p>1630 McCarthy Blvd. Framingham, MA 01905 Tel: 508/875-9600 www.linear.com Fax: 508/875-4577 LTC Confidential-For Customer Use Only</p>
<p>IC NO. LTM8027EV</p>	<p>REV. 2</p>	<p>SMALL-SIZED PwE PD WITH POWER SUPPLY uMODULE</p>	<p>SHEET 3 OF 3</p>

Figure 5. DC2125 Demo Circuit Schematic, Sheet 3



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DEMO MANUAL DC2125

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