Wireless Power Charging Solution for Receiver with RX-A coil

Evaluation Board Manual

IDTP9025A CSP RX-A EVALUATION KIT

Features

- IDTP9025A CSP Evaluation Design Module with 1mm RX-A coil
- 4-layer PCB with 1 oz. copper traces
- Fully assembled with test points and coil fixture
- I²C Connector
- LED status indicator
- 5W or lower output power RLIM potentiometer setting

Evaluation Kit Contents

- IDTP9025A V1.0 EVAL Evaluation board
- CD containing:
  - Reference layout Gerber Files
  - Reference layout Cadence Allegro board files
  - Electronic copy of IDTP9025A product datasheet
  - Electronic copy of IDTP9025A-EVAL manual

Description

The IDTP9025A "CSP" evaluation board serves to demonstrate the features and performance of the IDTP9025A Wireless Power Receiver solution for Mobile Device with RX-A Coil. The intuitive top-level layout and control simplifies the user experience to emphasize the impressive level of integration and abundance of useful features that this device offers.

The device is powered by a 1mm thick RX-A type receiver coil attached to a 2mm thick plastic fixture. The IDTP9025A is pre-programmed with a standard start-up program that is controlled by an internal state machine when the board is placed upon a WPC "Qi" type transmitter such as the IDTP9035A TX-A11 EVKIT.

The core layout is a 4-layer Cadence Allegro reference design that can be copied and integrated into a larger system design. The application area is enclosed in the white silkscreen to show the possible small PCB layout in an end system.

Evaluation Board

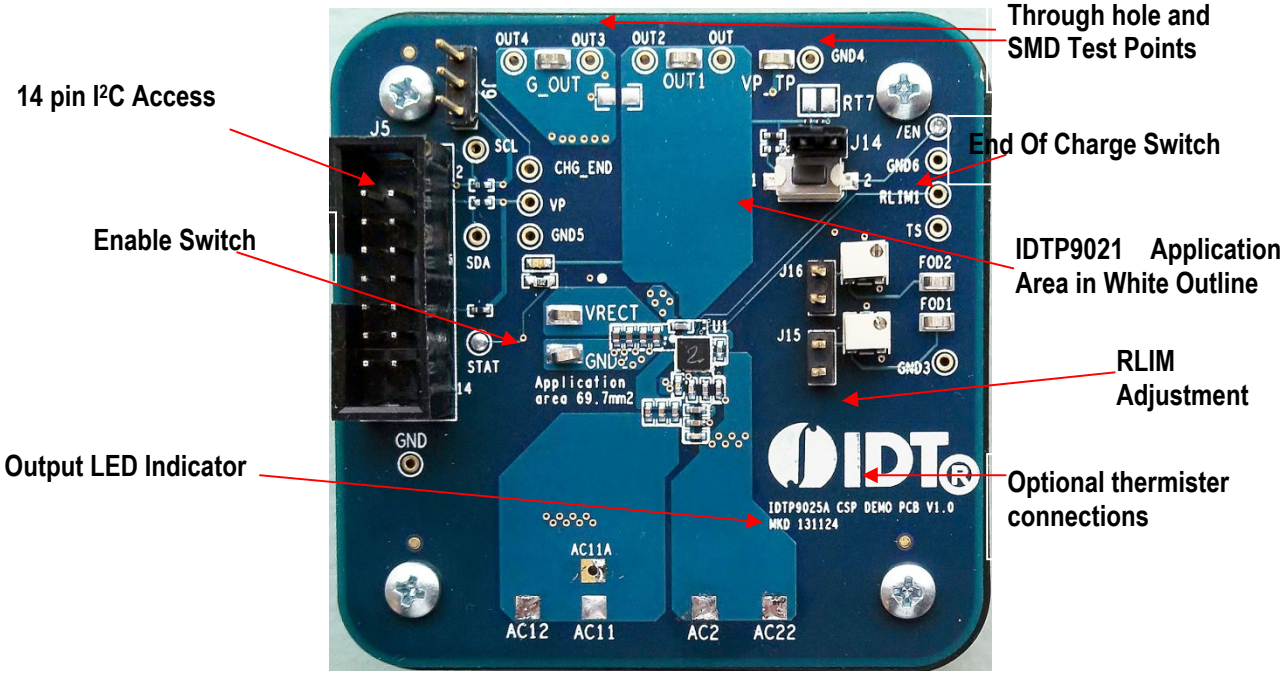

Figure 1. IDTP9025A V1.0 Eval Board Features

USAGE GUIDE

The IDTP9025A-EVAL demo board is designed to demonstrate the performance and functionality of the IDTP9025A wireless receiver in a lab bench test environment. In most cases, this board can be wired into an existing system for evaluation. For complex or electrically sensitive situations, it is recommended to use the reference layout to integrate this design into the final system to eliminate hardware limitations or signal degradation introduced by long leads.

With no computer interface, this evaluation board can function in its pre-programmed mode of operation using a WPC compatible TX transmitter such as the IDTP9035A EVKIT.

Quick-Start Guide

1. Place the IDT9025 RX board onto the TX coil of a WPC compatible “Qi” transmitter, note that the LED D0 (STAT) is turned “ON” when power is available at the “OUT” test point.
2. Connect up to a 1A load to the “OUT” test point and “GND_OUT” connectors.

SCHEMATIC

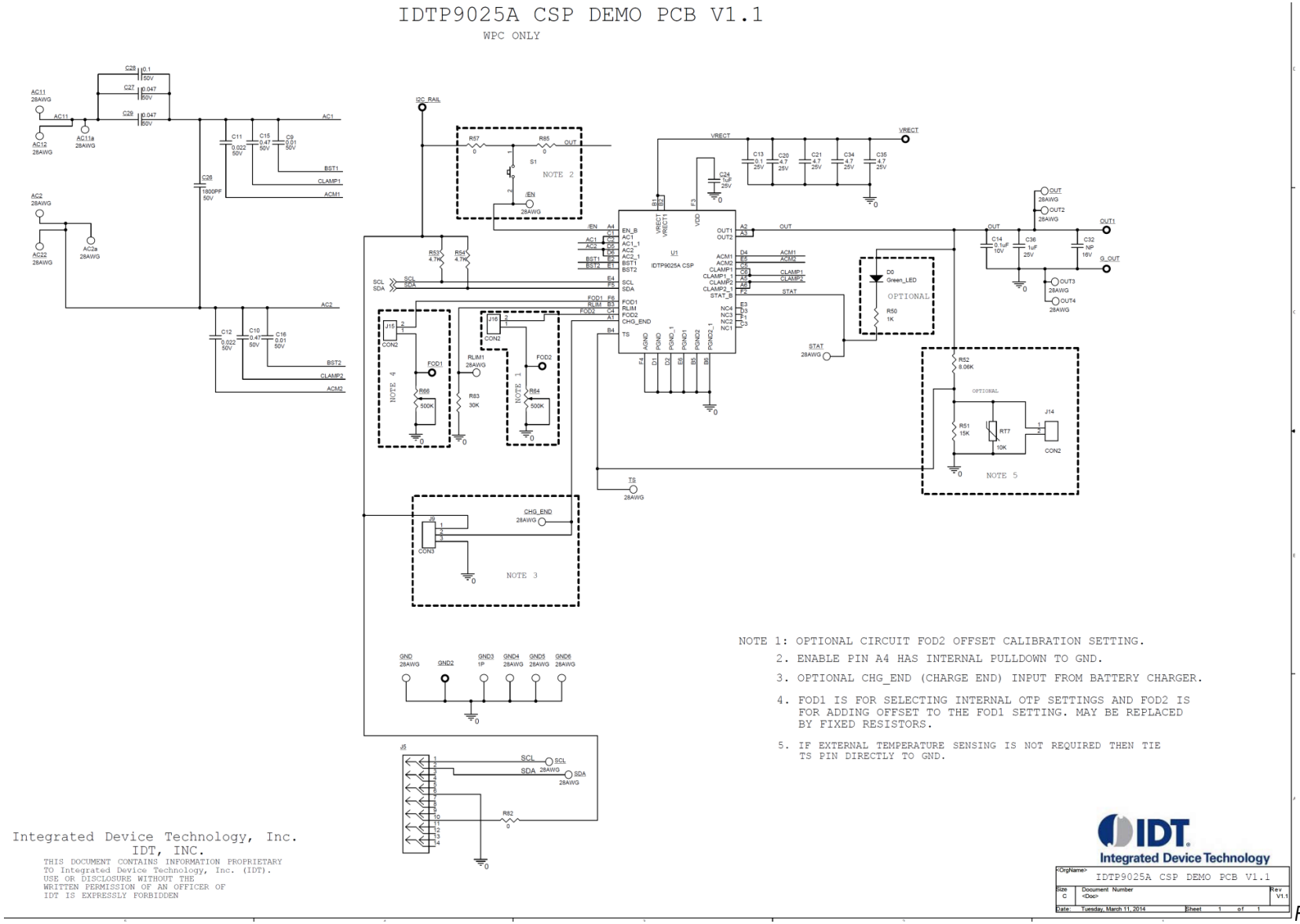

Figure 2. IDTP9025A V1.0 Eval Kit Board Schematic

Table 1. Bill of materials

Item	Quantity	Description	Reference	Manufacturer Part Number	MFG	PCB Footprint
1	23	28 GUAGE WIRE PAD (DO NOT PLACE)	RLIM1,OUT2,AC2a,AC2,OUT3,GND3,OUT4,GND4,GND5,GND6,AC11a,AC11,AC12,AC22,VP,TS,STAT,SDA,SCL,OUT,GND,CHG_END,/EN	NP		28AWG
2	2	CAP 0U010 MLC X7R 50V0 K 0402 0.56MM	C9,C16	04025C103KAT2A	AVX	402
3	2	CAP CER 0.47UF 50V 10% X5R 0402	C10,C15	UMK105ABJ474KV-F	Taiyo Yuden	402
4	2	CAP 0U022 MLC X7R 50V0 M 0402 0.55MM	C11,C12	CGA2B3X7R1H223M050BB	TDK	402
5	1	CAP CER 0.1UF 25V 20% JB 0201	C13	C0603JB1E104M030BB	TDK	201
6	2	CAP 1U000 MLC X5R 25V0 M 0402 0.55MM	C14,C24	TMK105BJ105MV-F	Taiyo Yuden	402
7	4	CAP 4U700 MLC X5R 25V0 M 0402 0.70MM	C20,C21,C34,C35	GRM155R61E475M	Murata	402
8	1	CAP 1800P MLC X7R 50V0 K 0402 0.56MM	C26	04025C182KAT2A	AVX	402
9	2	CAP 0U047 MLC X7R 50V0 K 0402 0.55MM[1]	C27,C29	C1005X7R1H473K050BB	TDK	402
10	1	CAP 0U100 MLC X7R 50V0 K 0402[1]	C28	C1005X7R1H104K	TDK	402
11	1	CAP CER 0.1UF 16V X7R 0805	C32	C0805C104K4RACTU	Murata	805
12	1	LED SMARTLED GREEN 570NM 0603	D0	LG L29K-G2J1-24-Z	OSRAM Opto Semiconductors Inc	led_0603
13	7	TEST POINT PC MINIATURE SMT	OUT1,FOD1,GND2,FOD2,VRECT,VP_TP,G_OUT	5015	Keystone Electronics	test_pt_sm_135x70
14	1	CON 014 M ST HDR PC NLK DRW 100 KEYED	J5	SBH11-PBPC-D07-ST-BK	Sullins Connector	P_014_2R
15	1	CONN HEADER VERT .100 3POS 30AU	J9	87220-3	TE Connectivity	JUMPER3PIN01IN
16	3	CONN HEADER VERT 2POS .100 TIN	J14,J15,J16	3-644456-2	TE Connectivity	Jumper2
17	1	Thermistors - NTC 10K OHM 1%	RT7	NTH-S027-XH103F050	Murata	thermistor_0603
18	1	RES 1K OHM 1/10W 5% 0603 SMD	R50	ERJ-3GEYJ102V	Panasonic Electronic Components	603
19	1	RES 15K0 0W05 J 0201 THKF 200PPM/C	R51	ERJ-3EKF1502V	Panasonic Electronic Components	201
20	1	RES 8K06 MF 0W05 F 0201 THKF 200PPM/C	R52	RN732BTTD8001B25	KOA Speer	201
21	2	RES 4.7K OHM 1/10W 5% 0402 SMD	R53,R54	ERJ-2GEJ472X	Panasonic Electronic Components	402
22	3	Carbon Film Resistor 0 OHM 1/16W 5% 0402 SMD	R57,R82,R85	ERJ-2GE0R00X	Panasonic Electronic Components	402
23	2	TRIMMER 500K OHM 0.25W PC PIN	R64,R66	3223W-1-504E	BOURNS	res_adj_smd_3p9x3p9
24	1	RES 30K OHM 1/20W 1% 0201 SMD	R83	ERJ-1GEF3002C	Panasonic Electronic Components	201
25	1	SWT 002 SPST NO PUSH 160G STR 025MM 0A05	S1	434 121 050 816	Wurth	SW-MOMENT_4341
26	1	WPC-Compliant 5 Watt Wireless Power Receiver IC	U1	IDTP9025A CSP	IDT	csp36p500x500

Note 1 - Recommended capacitor temperature/dielectric and voltage ratings. 50V capacitors are recommended for C9, C10, C11, C12, C15, C16, C26, C27, C28, C29. Furthermore, C0G/NPO-type capacitor values stay constant with voltage while X7R and X5R capacitor values derate over the working voltage range at 40% to over 80%. The decision to use lower voltage lower voltage rated capacitors or other type temperature/dielectric capacitors is left to the end user. Although 0402 package size X7R capacitors have been used successfully with the IDTP9025A, the temperature rise is 35°C and power dissipation is higher. Larger package size such as 0603 X7R capacitors reduce the temperature rise to 25°C.

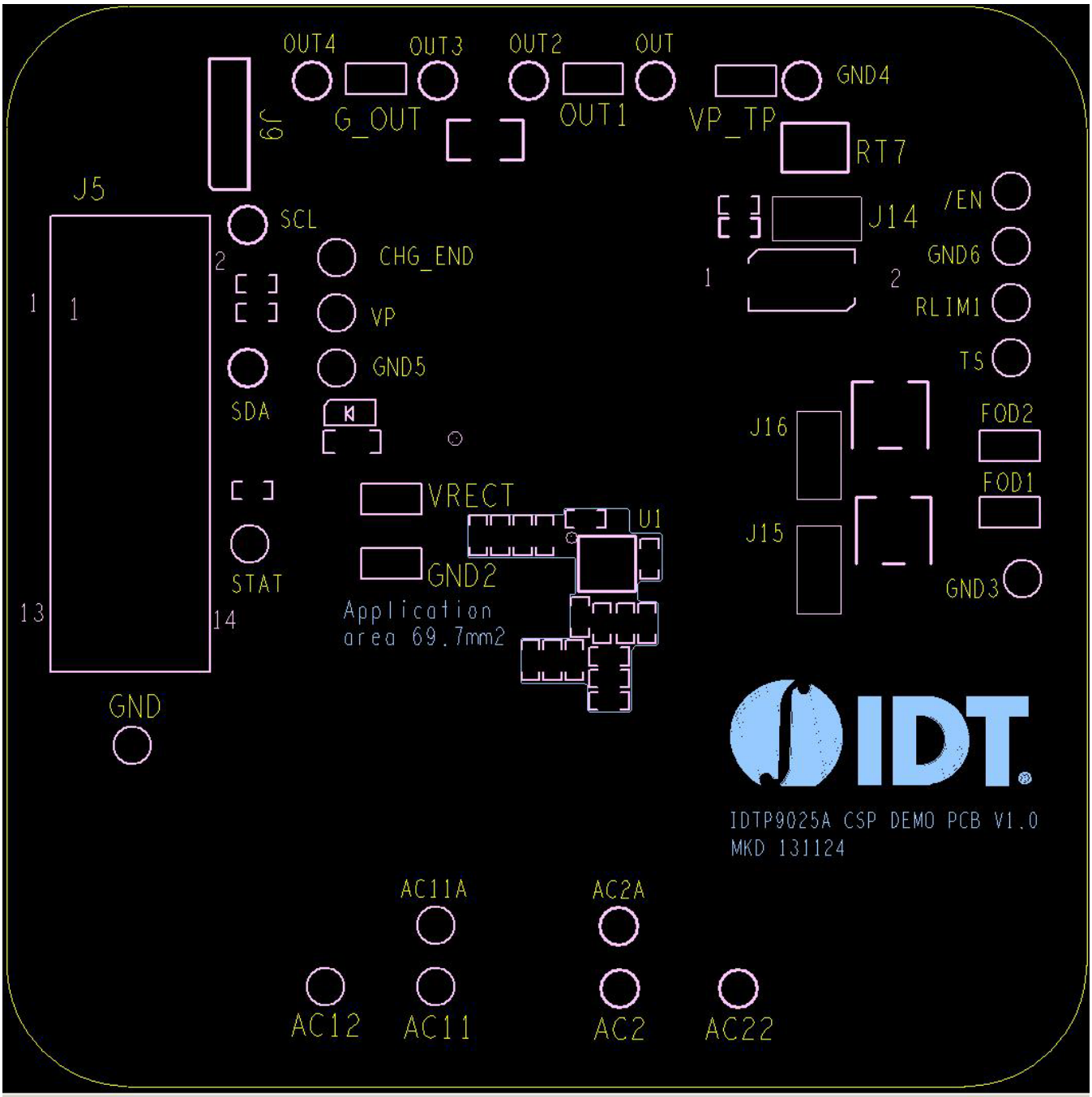

Figure 3. Top Silkscreen Layer

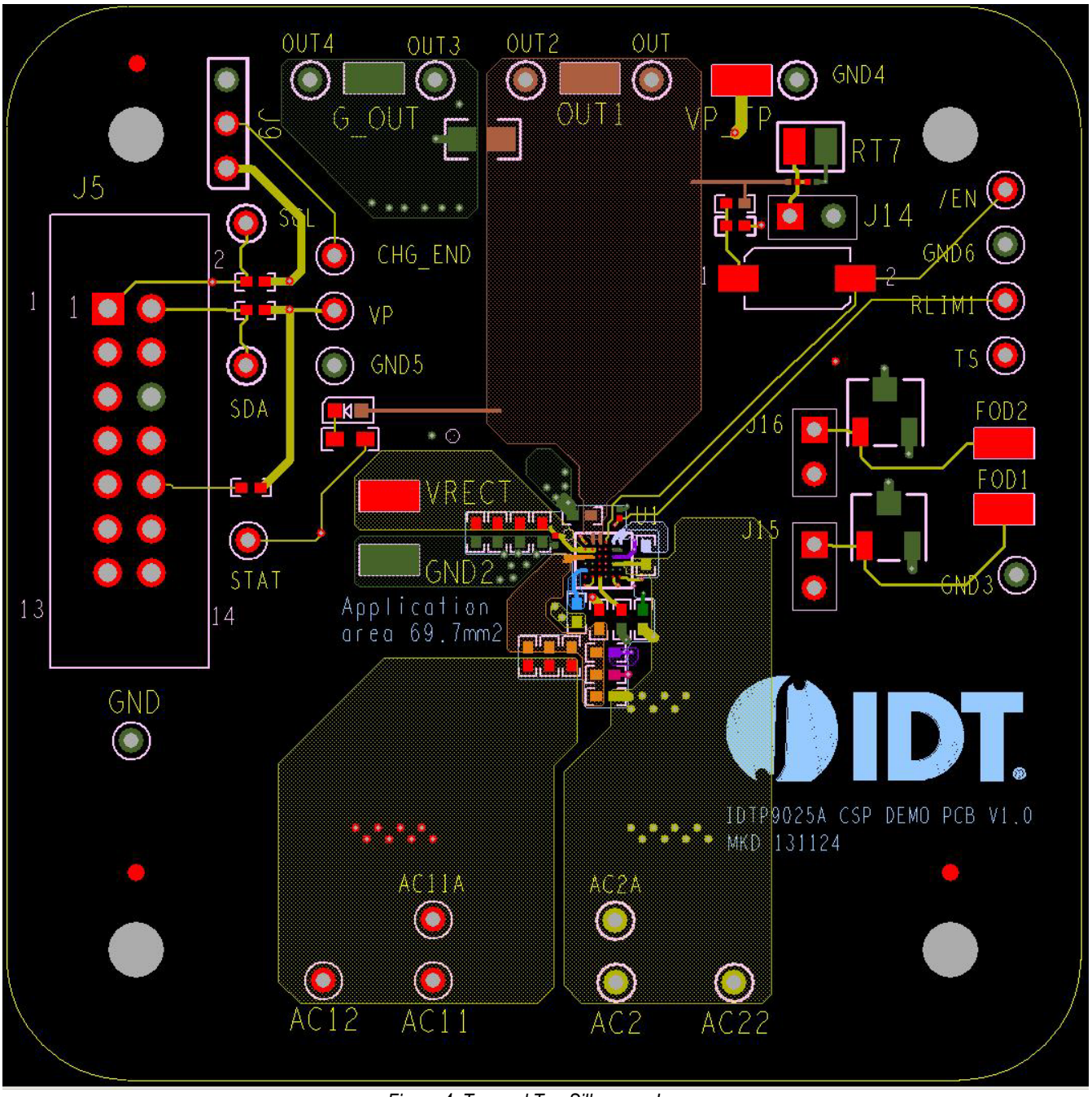

Figure 4. Top and Top Silkscreen Layer

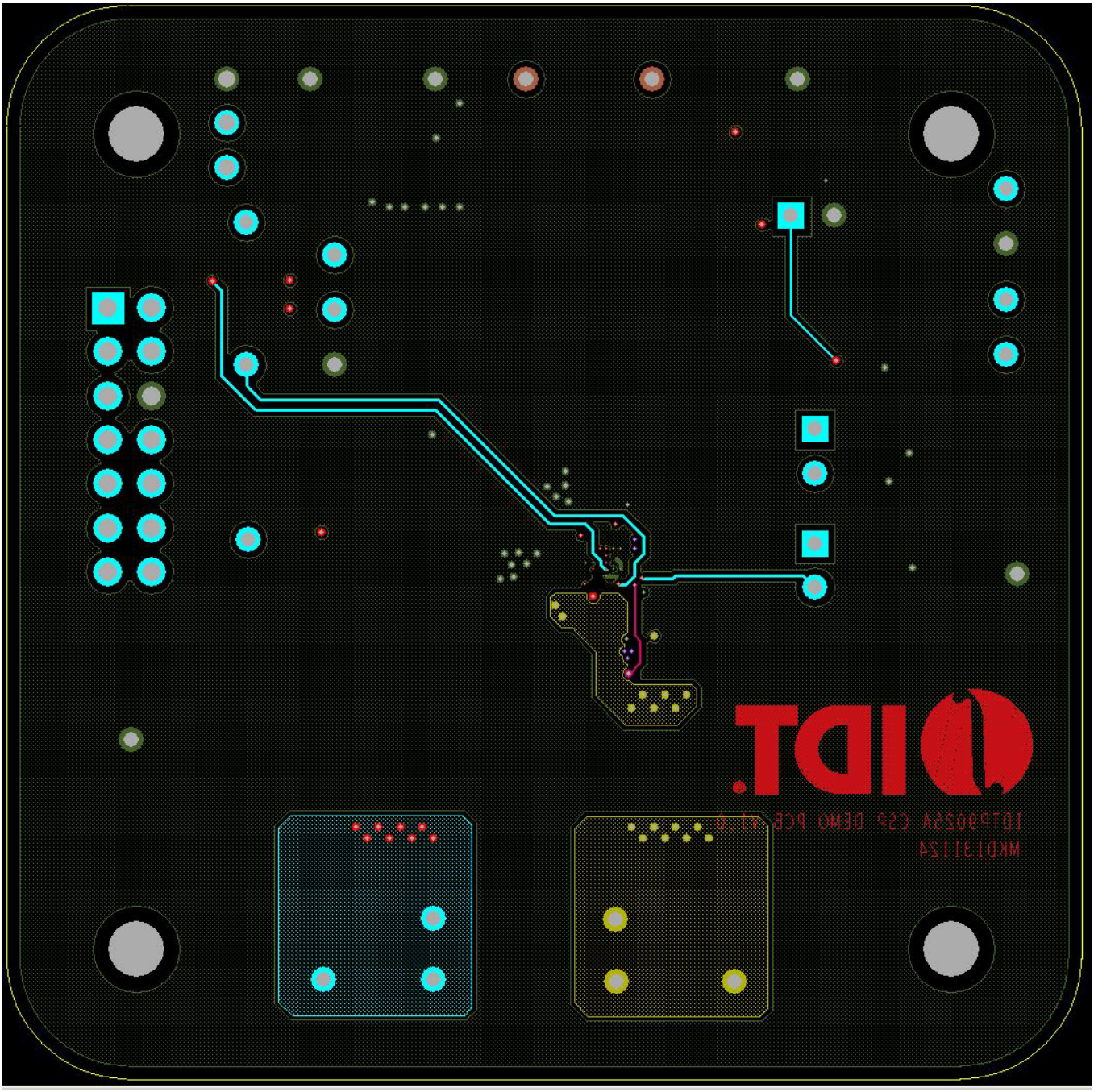

Figure 5. Bottom and Bottom Silkscreen Layer.

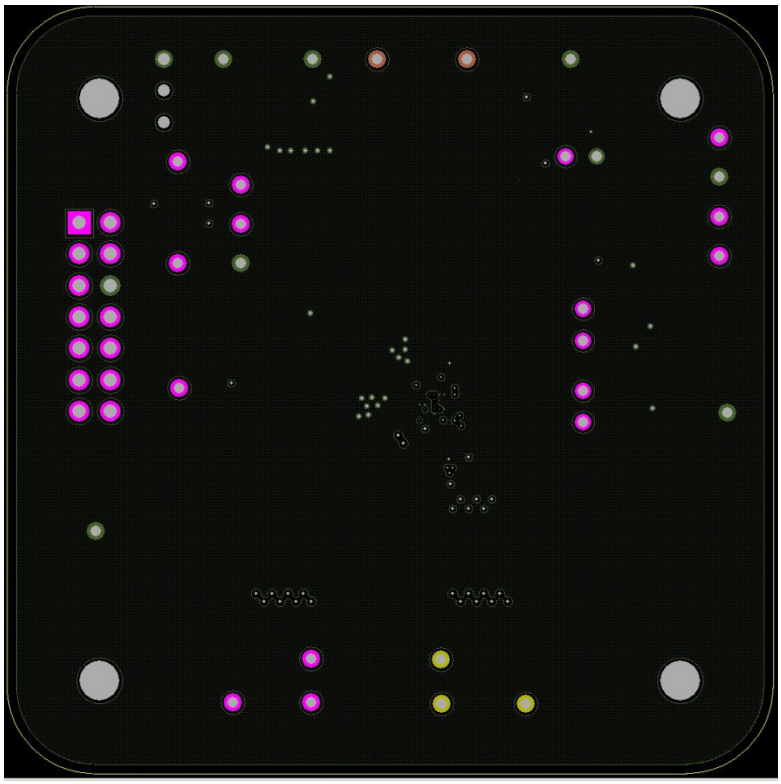

Figure 6. Mid 1 Layer

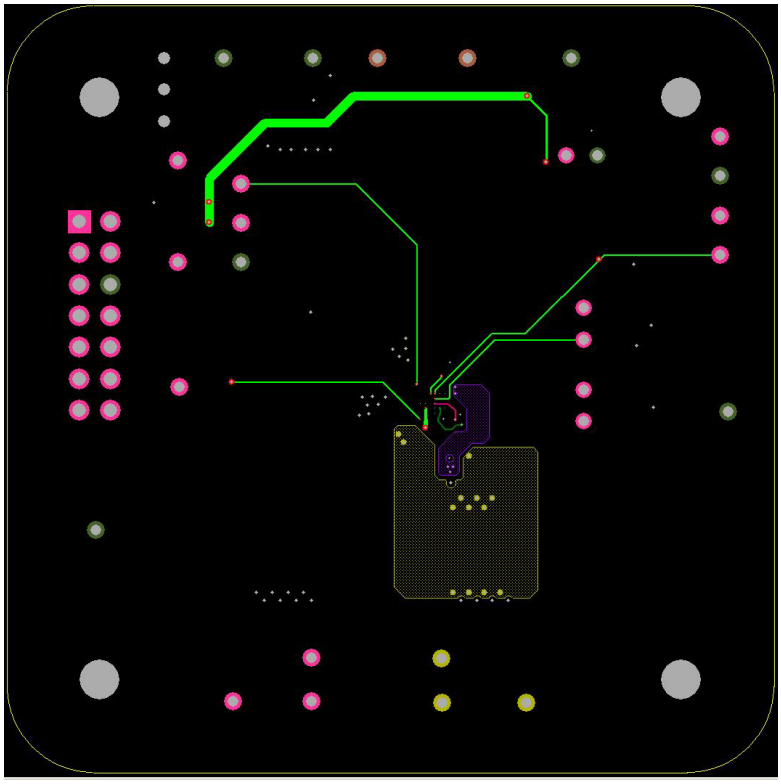

Figure 7. Mid 2 Layer

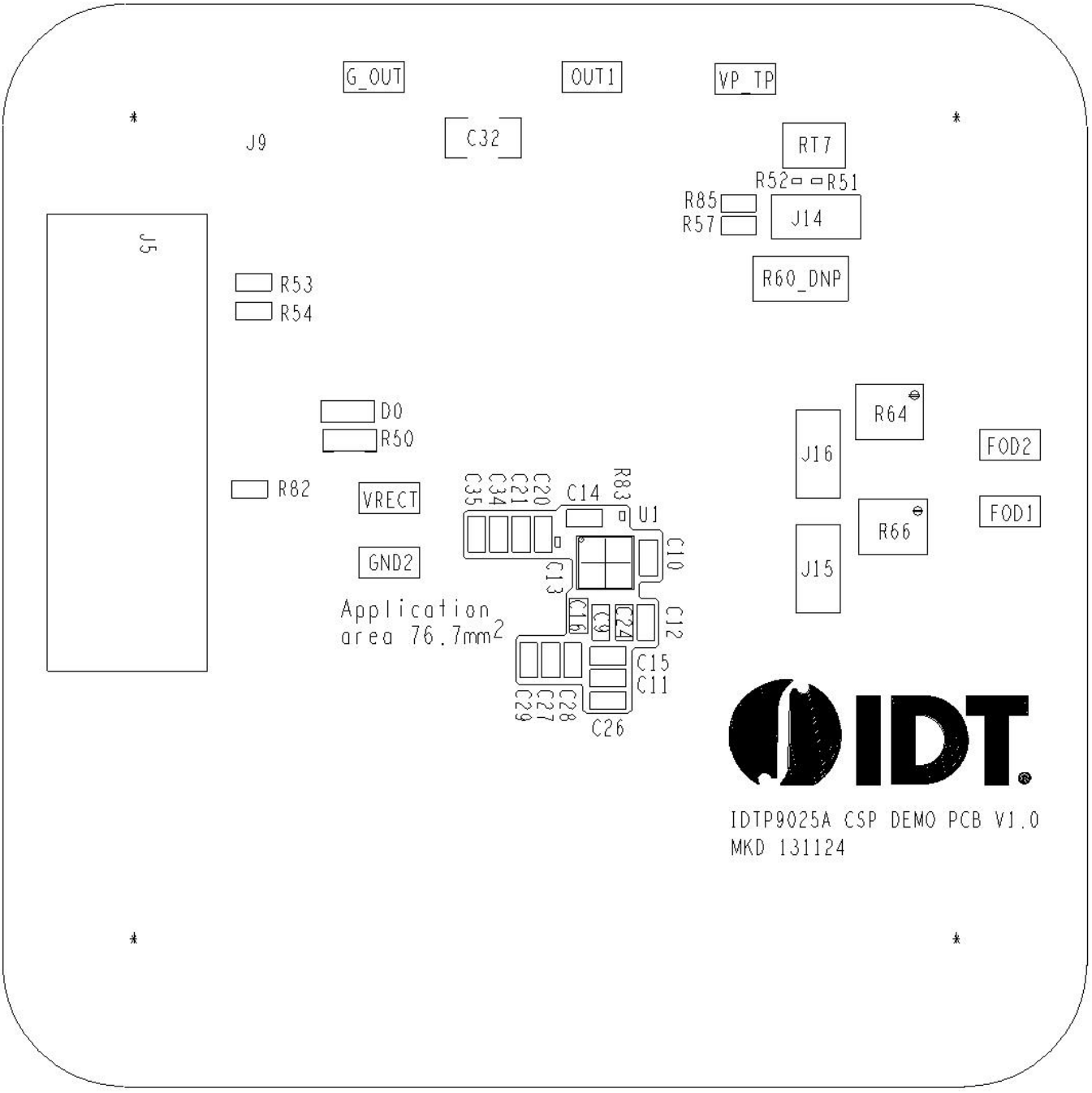

Figure 8. Assembly Drawing

ORDERING GUIDE

Table 3. Ordering Summary

PART NUMBER	MARKING	PRICE	AMBIENT TEMP. RANGE	SHIPPING CARRIER	QUANTITY
IDTP9025A-EVAL	V1.0	$149.00	0°C to +70°C	Box 8.6”x5.75”x3.75”	1

Revision History

January 28, 2014 Version 1.0 – Initial Release.

March 17, 2014 Version 1.1 – Added R53 and R54 to schematic.

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