EV1525-0800-25A
EVALUATION BOARD
USER GUIDE

Rev 1.2, May 21, 2025

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Introduction

This user guide describes the evaluation board provided for the FS1525 µPOL™ product.

The board generates an output voltage (V_{OUT}) of 0.8V* for loads of 0–25A from an input voltage (PV_{IN}) of 12V.

Specifications

- Input voltage (PV_{IN}) = +12V
- Output voltage (V_{OUT}) = +0.8V
- Output load (I_O) = 0–25A
- Switching frequency (F_{SW}) = 625 kHz
- Output capacitance (C_O) = 10x47µF (MLCC)
- Input capacitance (C_{IN}) = 4x22µF (MLCC)
- Dimensions (width x length x thickness) = 102mm x 89mm x 1.6mm

Connections

Name	Identifier	Description
PV_{IN}	J1	Input voltage (+12V)
PGnd	J2	Ground for input voltage
V_{OUT}	J3,J20	Output voltage (+0.8V)
PGnd	J4,J21	Ground for output voltage
V_{IN}	V_{IN}	LDO input voltage
V_{CC}	V_{CC}	Internal supply (V_{CC}) – output of an LDO regulator
PGnd	PGnd	Power ground
En	En	Enable
PGood	PGood	Power Good
SCL	J5	I2C/PMBUS clock line
SDA	J5	I2C/PMBUS data line
ALERT	ALERT	SMBALERT#
SYNC	J6	External sync signal
Load	J8	Used to connect load: 20-pin Intel Mini Slammer connector
Output transient ripple voltage	J12	Used for measurement: 50Ω ultra-miniature coaxial connector

The board is configured for a single input supply. An internal low drop-out regulator generates the internal supply (V_{CC}) from V_{IN}. The Enable (En) input is connected to PV_{IN} through a resistor divider, so that no external Enable signal is needed.

Operation

To use the evaluation board:

1. Connect a well-regulated +12V input supply to PV_{IN} (J1) and Gnd (J2).
2. Connect a load of 0–25A to V_{OUT} (J3,J20) and Gnd (J4,J21).

NOTE – Output Voltages from 0.6V to 1.8V can be obtained by changing the values of Resistor Divider Components. Refer Page 7.

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Description

The evaluation board consists of a 6-layer PCB made from FR4 glass-reinforced epoxy laminate material. All layers use 2oz copper.

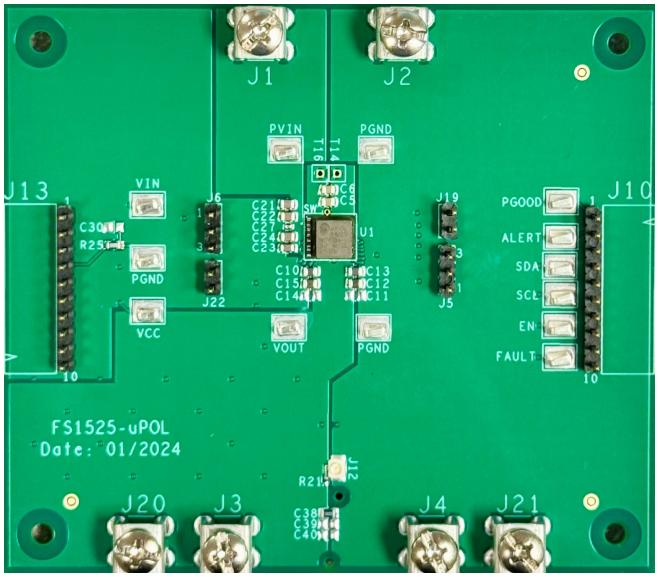

Figure 1 ***View of board (top)***

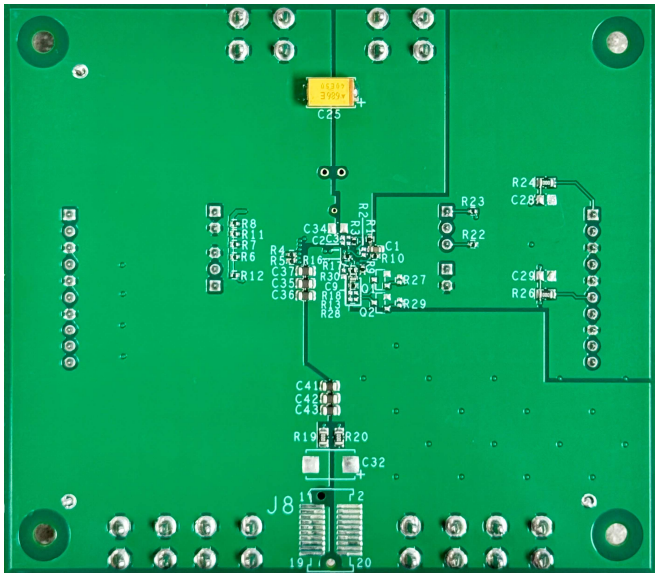

Figure 2 ***View of board (bottom)***

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Figure 3 to Figure 6 show the layout of the board layers and Figure 7 shows the schematic of the electric circuit.

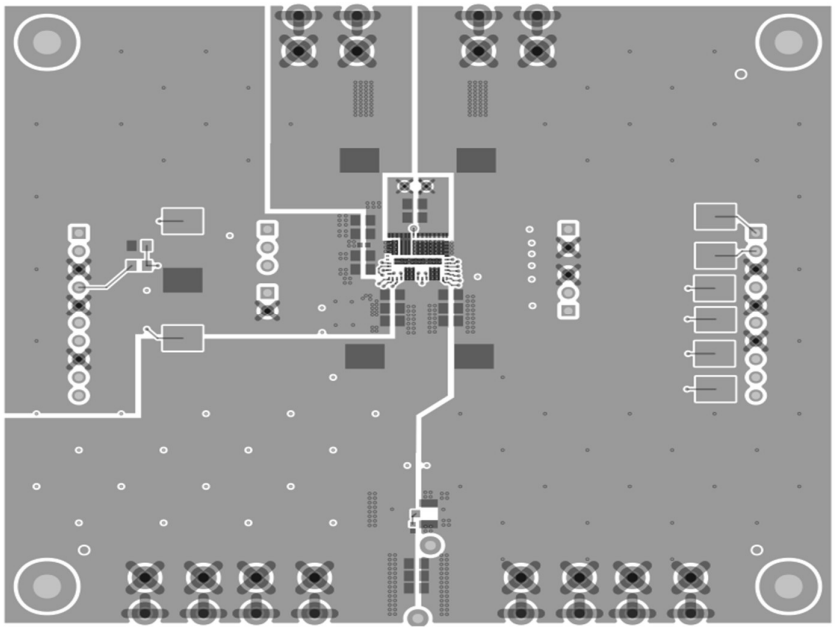

Figure 3 Board layout – layer 1

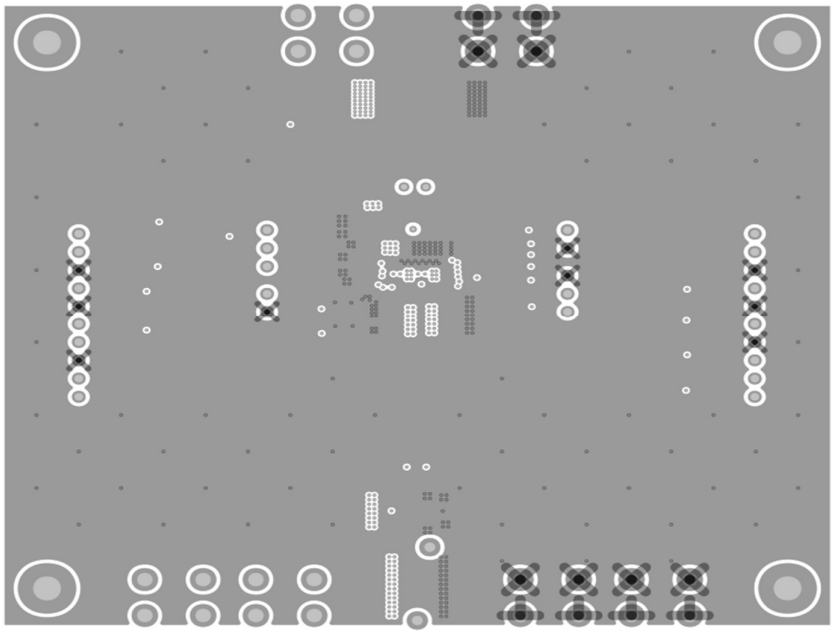

Figure 4 Board layout – GROUND (layer 2, layer 3, layer 4)

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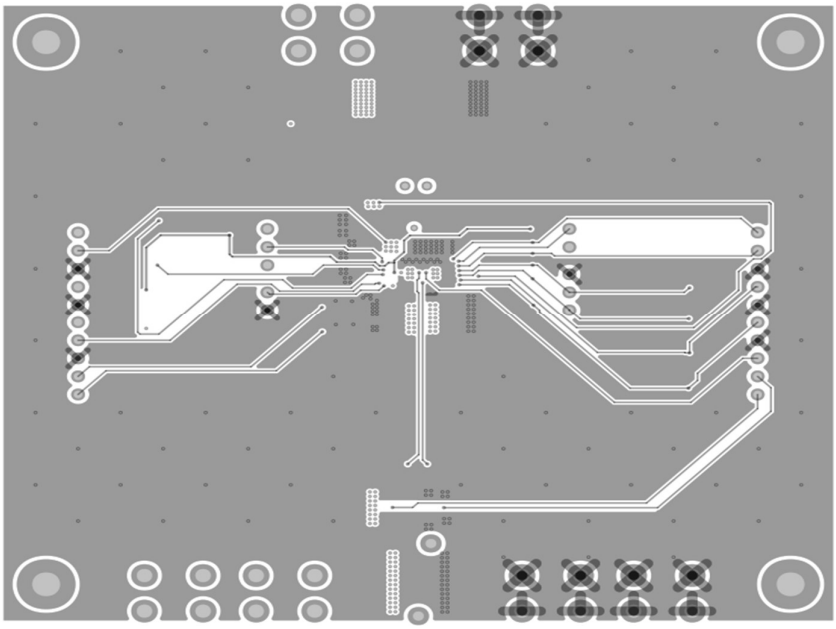

Figure 5 ***Board layout – layer 5***

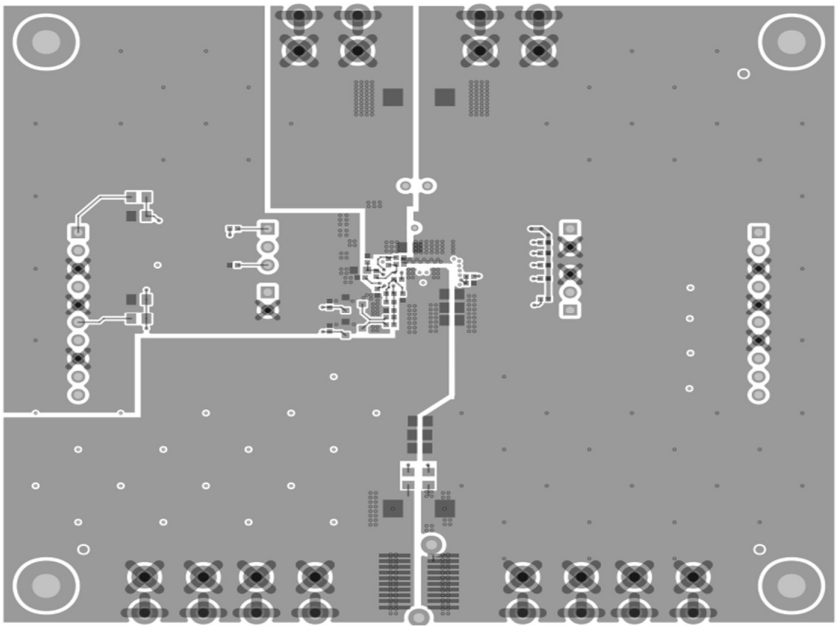

Figure 6 ***Board layout – layer 6***

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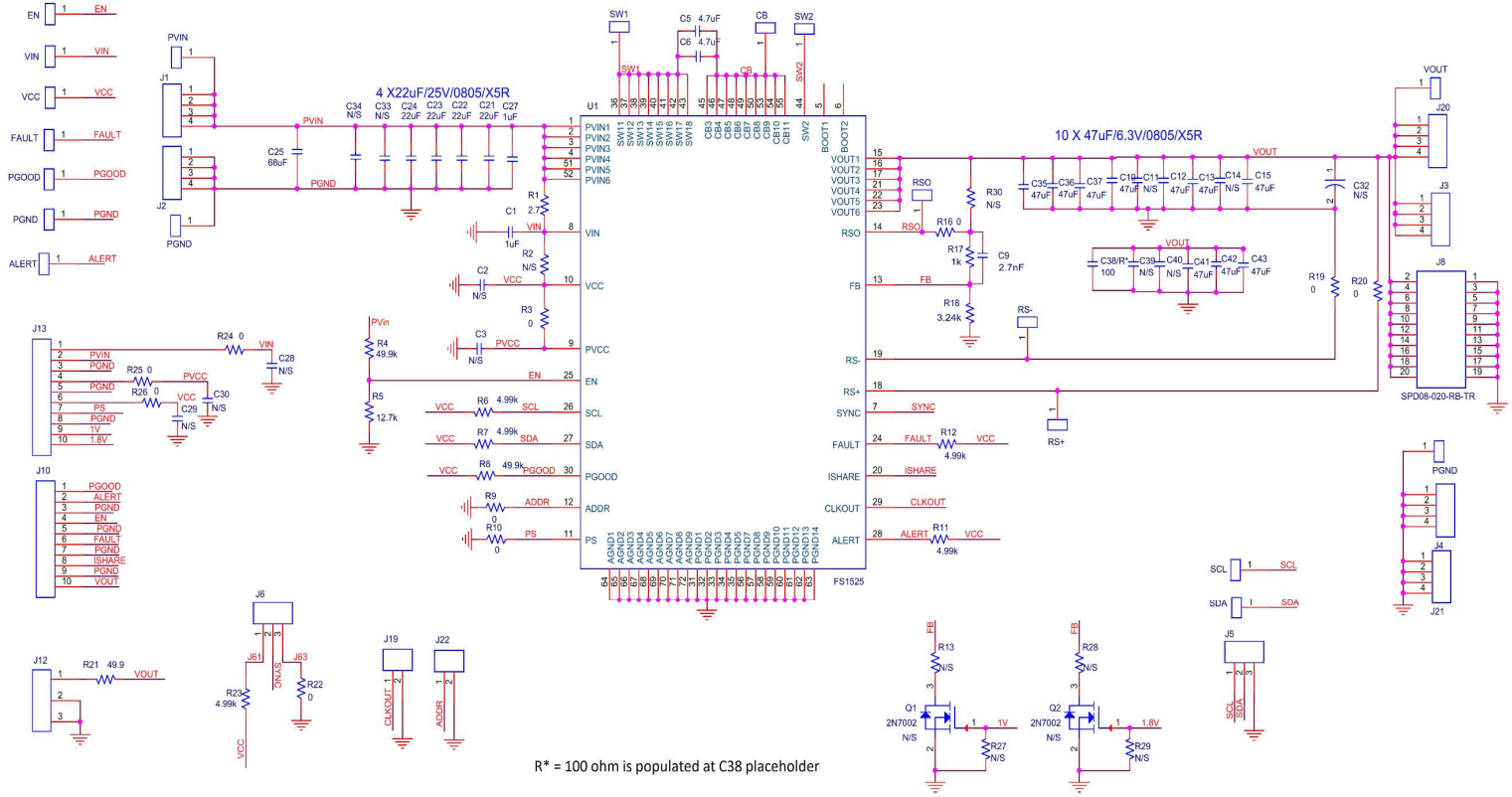

Figure 7 Schematic

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V_{OUT} (V)	R_{TOP}/R_{BOTTOM}	V_{OUT} (V)	R_{TOP}/R_{BOTTOM}
0.65	0.0617	1	0.6494
0.7	0.1468	1.05	0.7299
0.72	0.1779	1.1	0.8065
0.8	0.3086	1.2	0.9804
0.85	0.3922	1.25	1.0741
0.9	0.4762	1.5	1.4684
0.95	0.5618	1.8	1.9569

Table 1 Resistor Divider Ratio for Different Output Voltages.

NOTE – Modify R18 (RBOTTOM) for different VOUT as per the included table. R17 (RTOP) = 1 kΩ, C9 = 2700pF is recommended. For VOUT =0.6V; R17 = 0Ω, C9 = DNP.

R10 = 0Ω for 0.6V = VOUT ≤ 0.9V; for 0.9V < VOUT < 1.2V, R10 = 8.66k; and R10 = 7.87k for VOUT ≥ 1.2V

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Quantity	Part Reference	Description	Manufacturer	Part Number
1	C1	1uF/0603/25V/X7R	TDK or Equivalent	C1608X7R1E105K080AB
1	C27	1uF/0402/25V/X7R	TDK or Equivalent	GRM155R71E104KE14D
2	C5,C6	4.7uF/0805/16V/X7R	TDK or Equivalent	GRM21BR71C475KE51
1	C9	2.7nF/0402/50V/X7R	TDK or Equivalent	CC0402KRX7R7BB272
10	C10,C12,C13,C15,C35,C36, C37,C41,C42,C43	47uF/0805/6.3V/X5R	TDK or Equivalent	C2012X5R0J476M125AC
4	C21,C22,C23,C24	22uF/0805/25V/X5R	TDK or Equivalent	GRM21BR61E226ME44K
1	C25	68uF, 25V,poscap	AVX Corporation	GRM21BR60G107ME11L
6	J1,J2,J3,J4,J21,J20	Input, Output Terminals	KEYSTONE	7796
13	VIN,PGND,VCC,PVIN,PGND ,PGND,VOUT,PGOOD,ALER T,SDA,SCL,EN,FAULT	Test Point	KEYSTONE	5018
2	J5,J6	CON3	AMPHENOL	68000-103HLF
1	J8 (Optional)	CON	3M	SPD08-020-RB-TR
3	J10,J11	CON10	AMPHENOL	68000-110HLF
1	J12	U.FL-R-SMT(01)	HIROSE ELECTRIC	U.FL-R-SMT(01)
2	J19,J22	CON2	AMPHENOL	68000-102HLF
1	R1	2.7/0402		RMCF0402FT2R70
4	R3,R9,R10, R16,R22	0/0402		ERJ-2GE0R00X
5	R20,R19,R24,R25,R26	0/0805		
2	R4,R8	49.9k/0402		RMCF0402FT49K9
1	R5	12.7k/0402		RMCF0402FT12K7
5	R6,R7,R11,R12,R23	4.99k/0402		ERJ-2RKF4991X
1	R17	1k/0402		RMCF0402FT1K00
1	R18	3.24k/0402		RMCF0402FT3K24
1	R21	49.9/0402		RMCF0402FT49R9
1	U1	FS1525	TDK	

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Typical performance

Figure 8 to Figure 21 show typical operating waveforms for the evaluation board, while Figure 22 and Figure 23 show thermal images of the board in operation. In all cases, the board is operating at room temperature with no airflow; PV_{IN} is 12V, V_{OUT} is 0.8V and I_O is 0–25A.

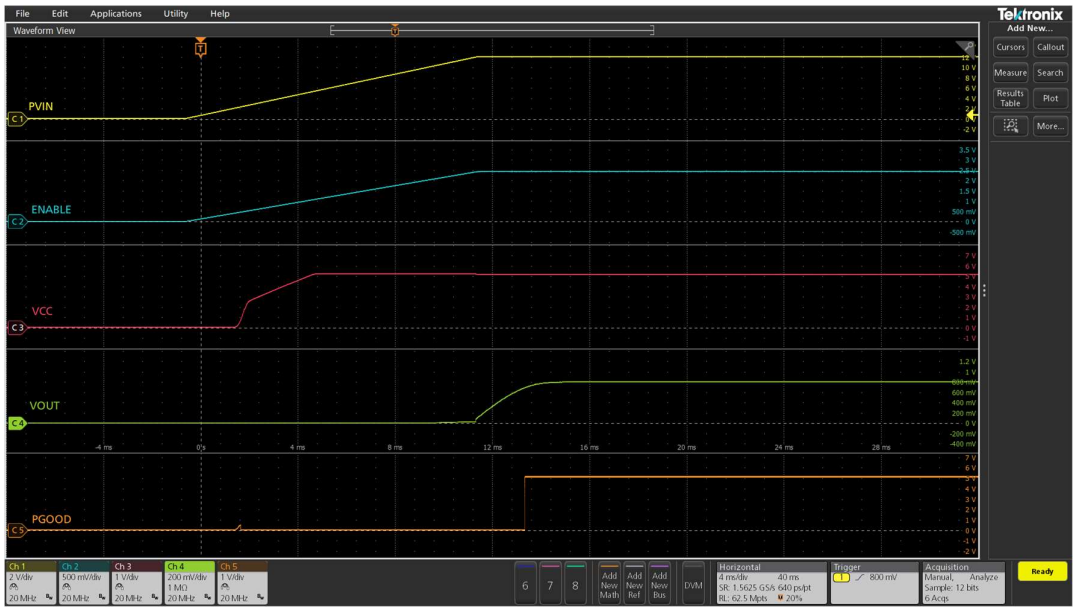

Figure 8 Startup with no load (Ch1:PV_{IN}, Ch2: Enable, Ch3: V_{CC}, Ch4: V_{OUT}, Ch5: PGood)

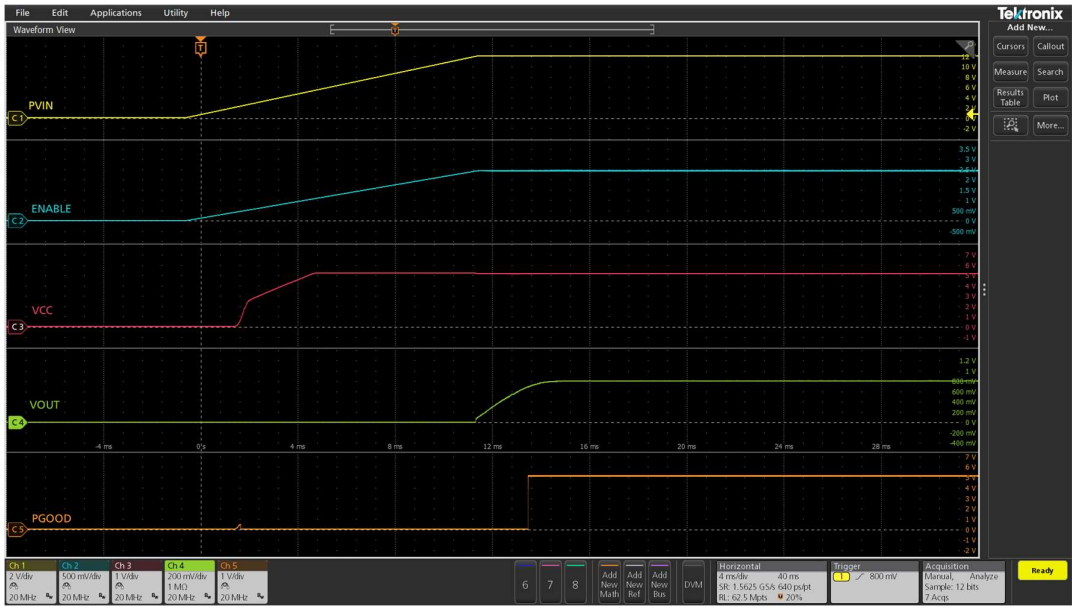

Figure 9 Startup with 25A load (Ch1:PV_{IN}, Ch2: Enable, Ch3: V_{CC}, Ch4: V_{OUT}, Ch5: PGood)

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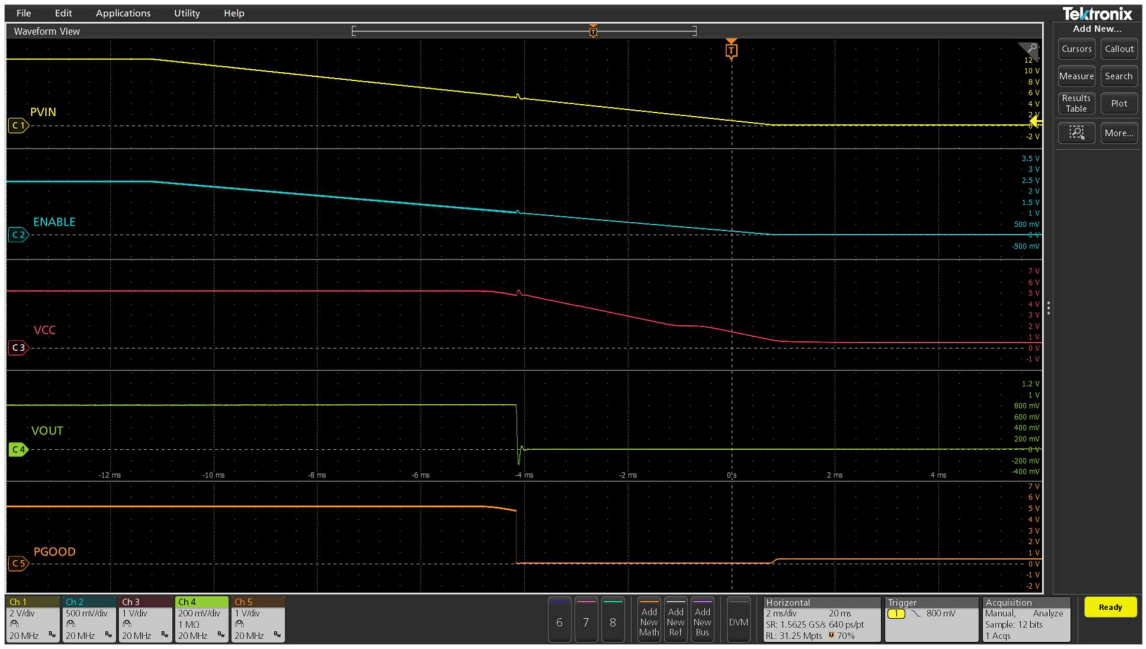

Figure 10 Shutdown with Enable de-assertion at 25A load (Ch1:PV_{IN}, Ch2: Enable, Ch3: V_{CC}, Ch4: V_{OUT}, Ch5: PGood)

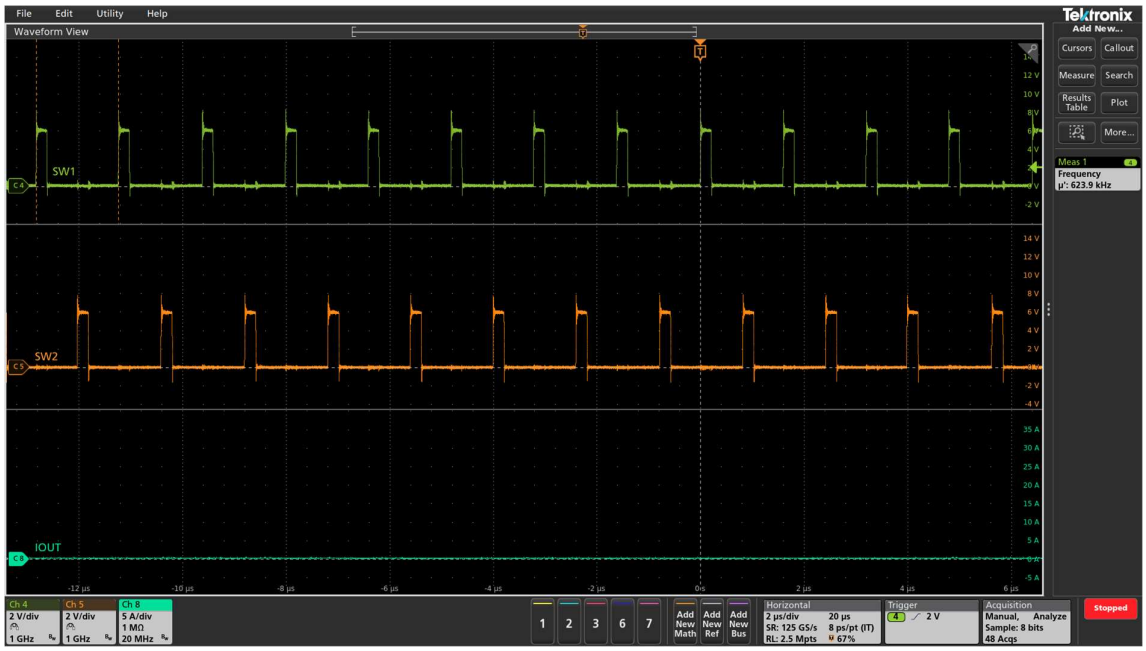

Figure 11 Switch node waveforms at no load

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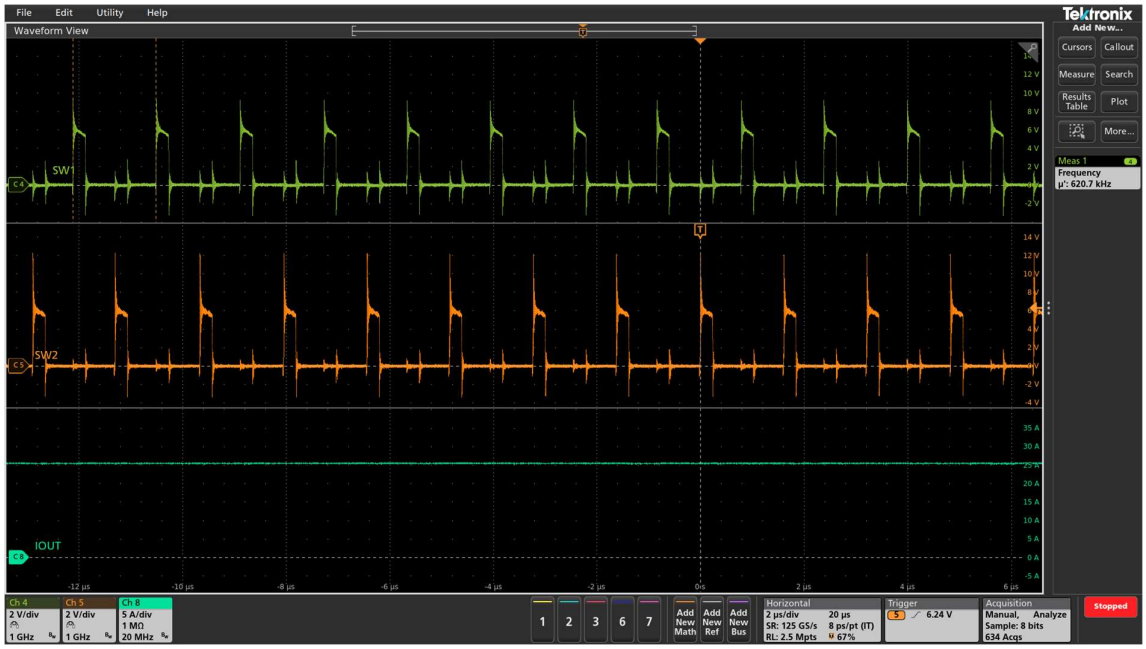

Figure 12 Switch node waveforms at 25A

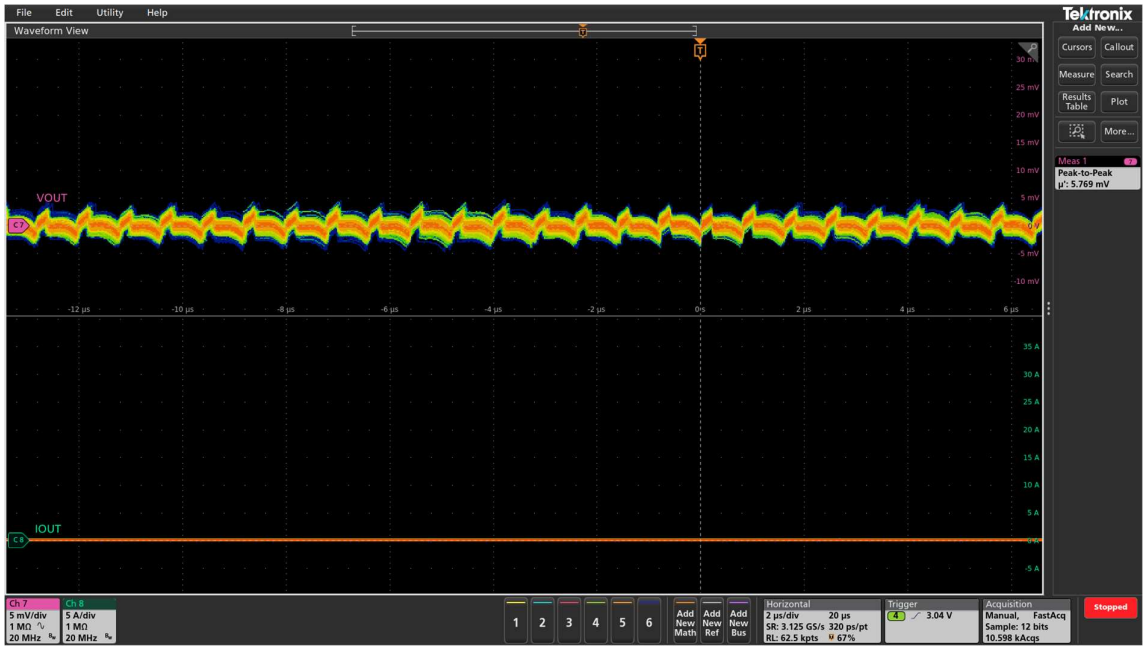

Figure 13 V_O ripple at 0A (Ch7: V_{OUT}, Ch8: I_O), peak-peak V_O ripple = 5.8 mV

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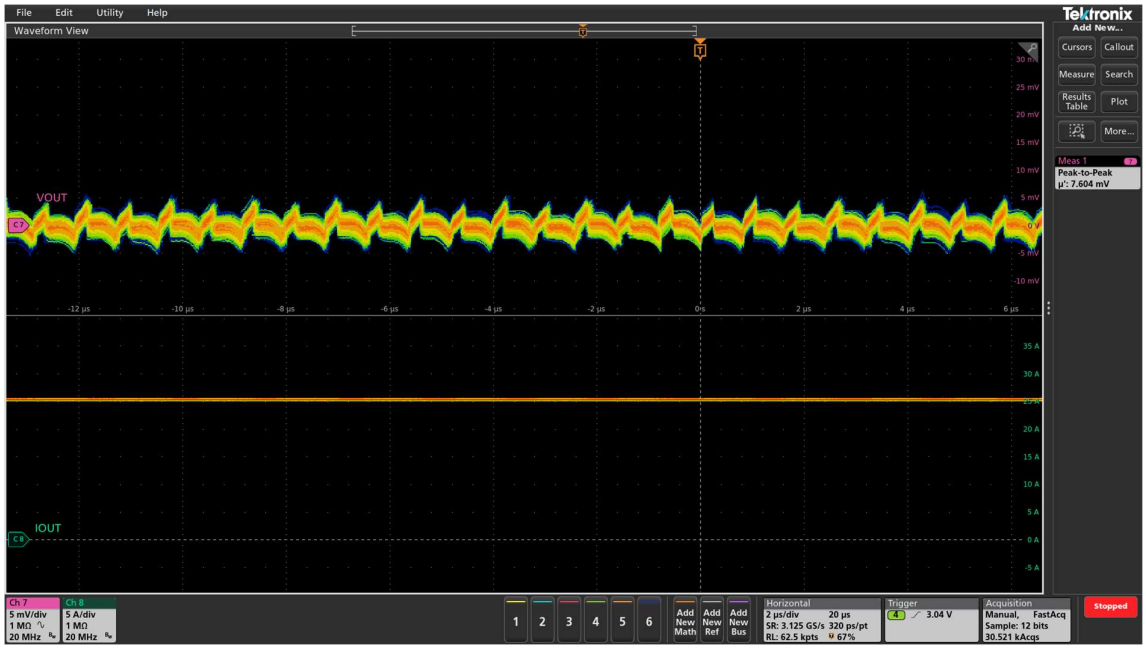

Figure 14 V_O ripple at 25A (Ch7: V_{OUT}, Ch8: I_O), peak-peak V_O ripple = 7.6 mV

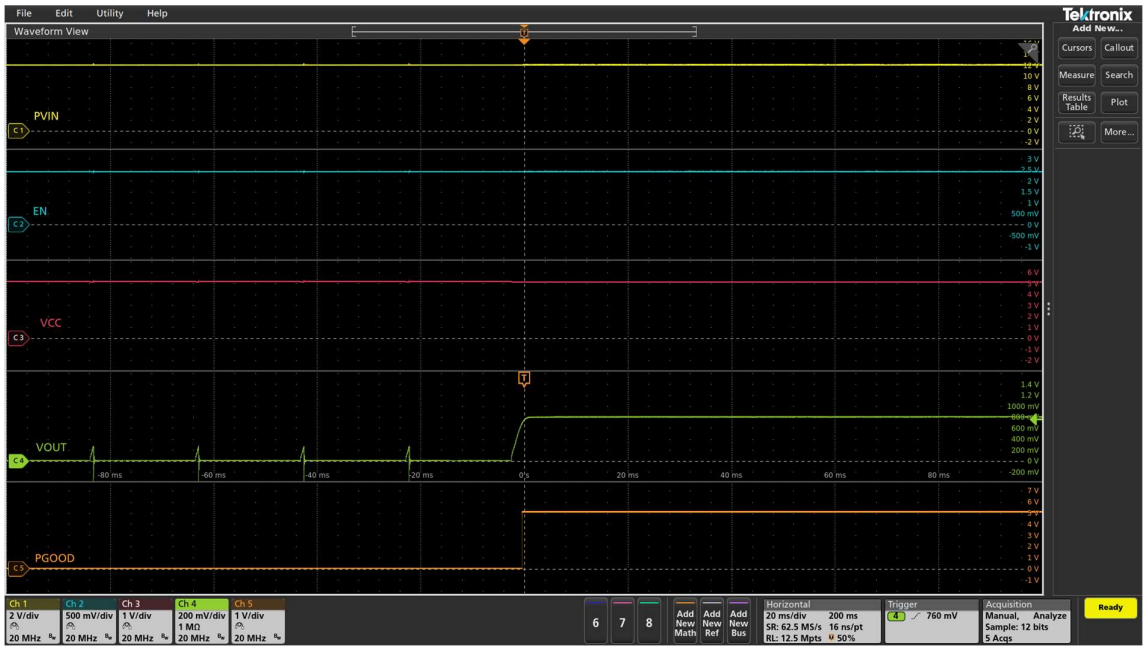

Figure 15 OCP Recovery to 25A (Ch1:PV_{IN}, Ch2: Enable, Ch3: V_{CC}, Ch4: V_{OUT}, Ch5: PGood)

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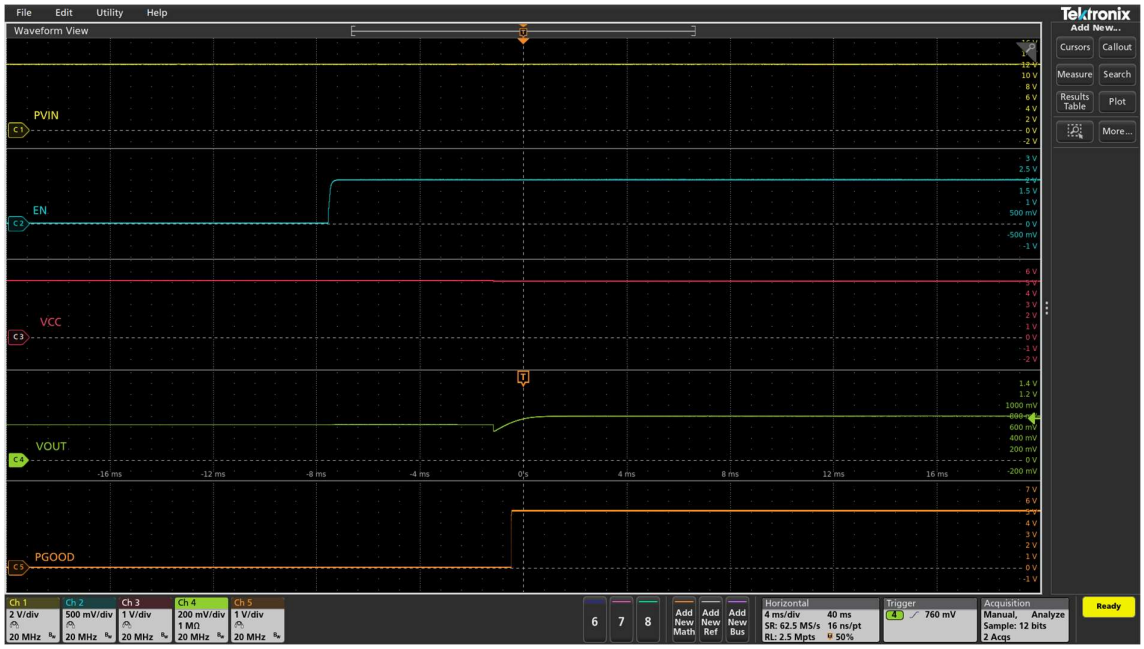

Figure 16 Startup into 80% Prebias (Ch1:PV_{IN}, Ch2: Enable, Ch3: V_{CC}, Ch4: V_{OUT}, Ch5: PGood)

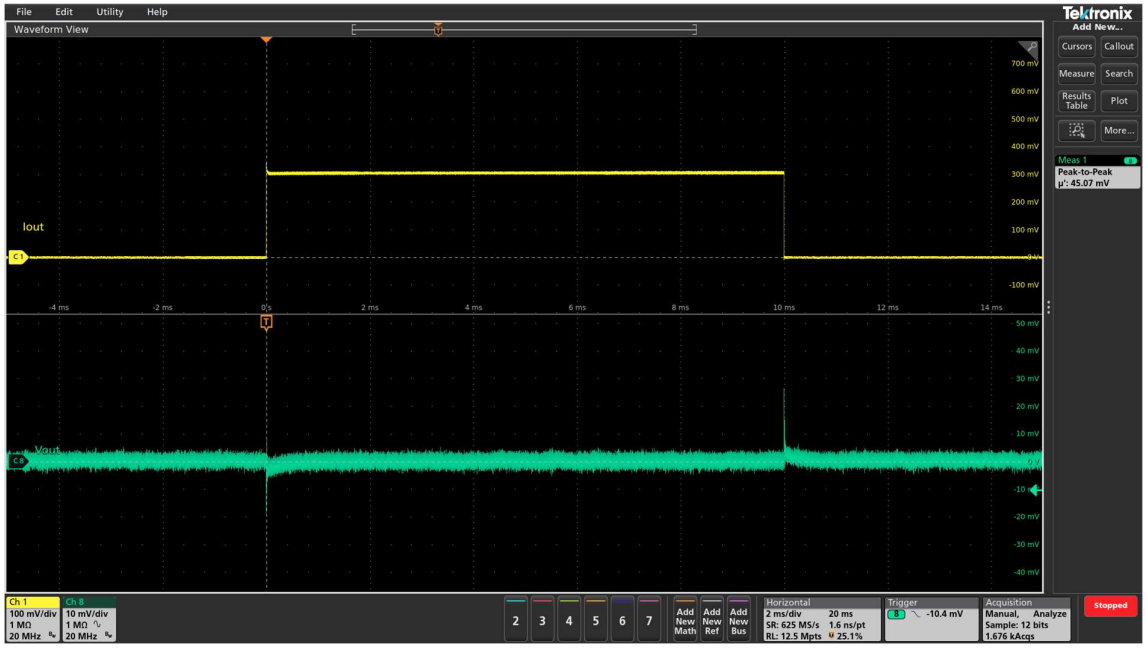

Figure 17 Transient response 10A to 16A (Ch1: I_{OUT}, Ch8: V_{OUT}), peak-peak deviation = 45mV, load slew rate = 4A/µs

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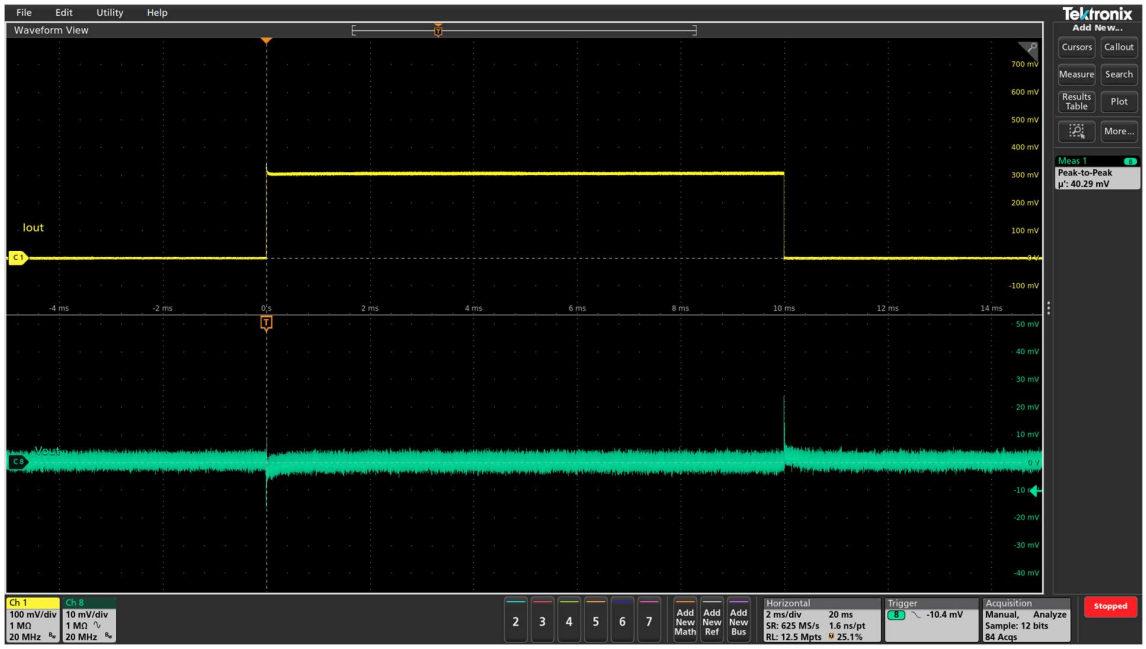

Figure 18 Transient response 19A to 25A (Ch1: I_{OUT}, Ch8: V_{OUT}), peak-peak deviation = 40.3mV, load slew rate = 4A/µs

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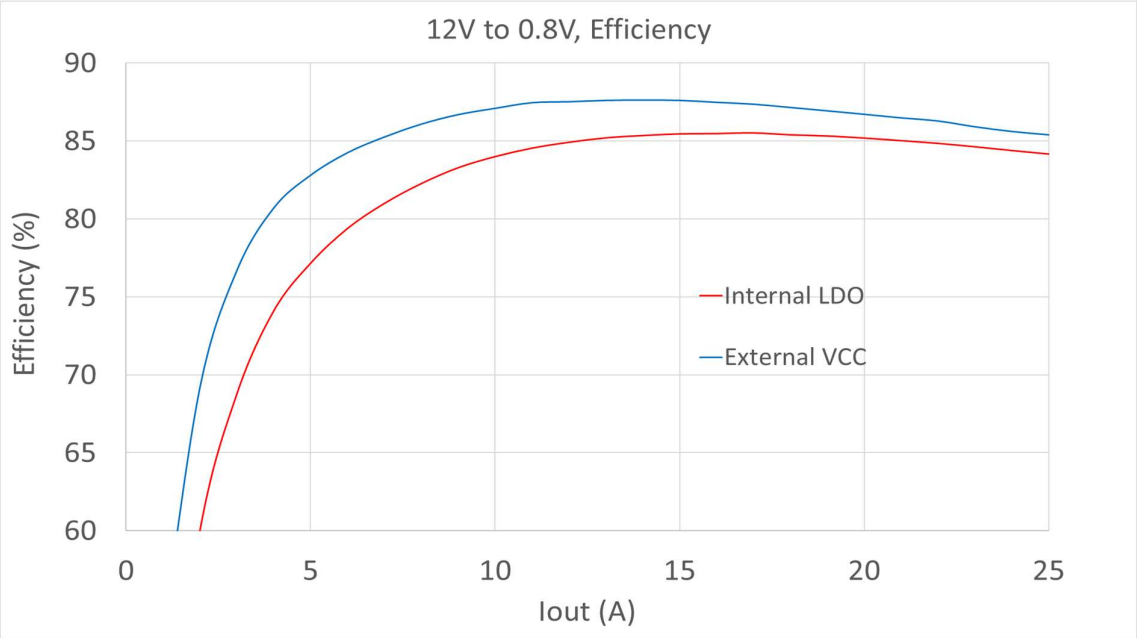

Figure 19 Efficiency

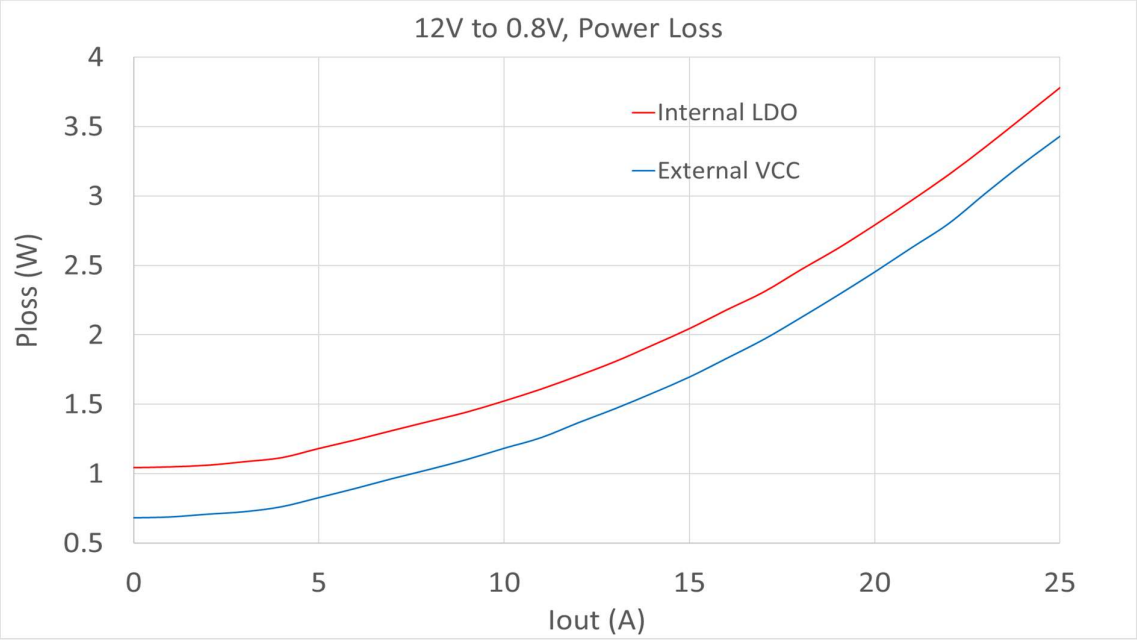

Figure 20 Power loss

NOTE – For External Vcc Connection, Remove R1, Install R2 = 0 ohm & C2, C3 = 2.2µF (10V 0402)

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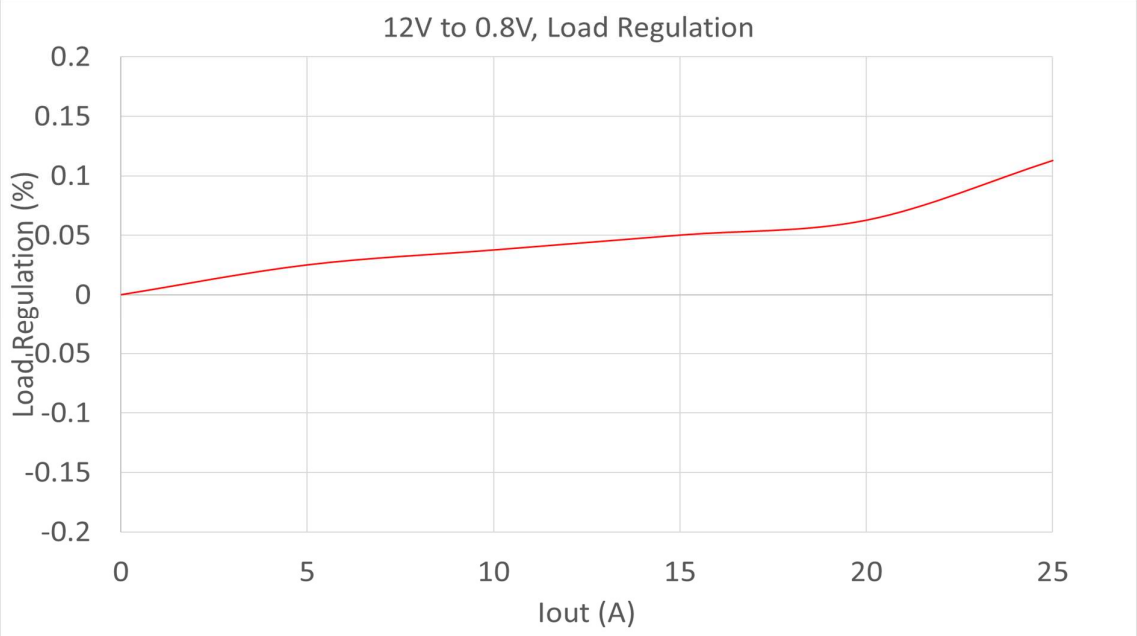

Figure 21 Load regulation (I_{O} = 0–25A)

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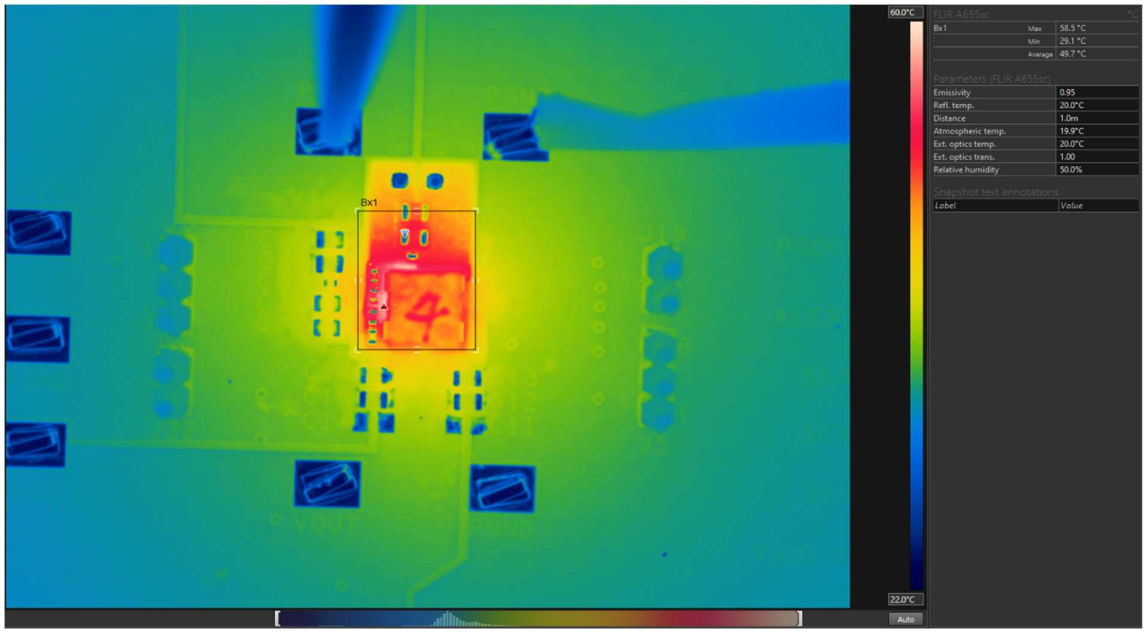

Figure 22 Thermal image at PV_{IN} = 12V, V_{OUT} = 0.8V, I_O = 25A, room temperature, no airflow, using Internal LDO, FS1525 maximum temperature rise = 36.5°C

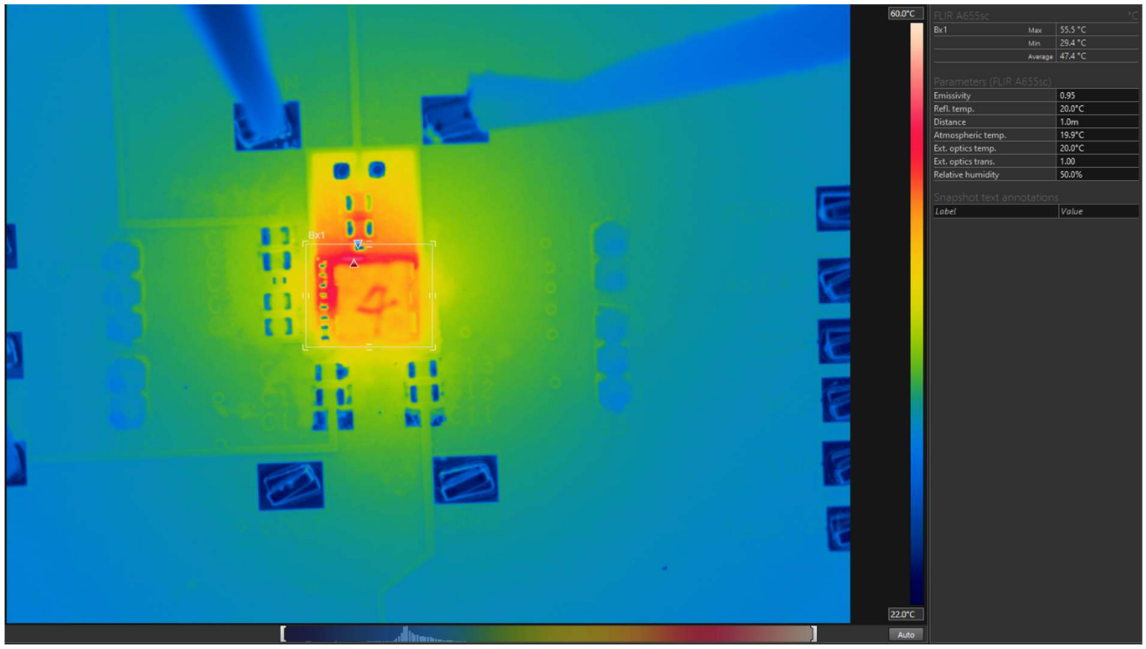

Figure 23 Thermal image at PV_{IN} = 12V, V_{OUT} = 0.8V, I_O = 25A, room temperature, no airflow, using External Vcc (5V), FS1525 maximum temperature rise = 33.5°C*

***NOTE – For External Vcc Connection, Remove R1, Install R2 = 0 ohm & C2, C3 = 2.2µF (10V 0402)**

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3. Medical equipment
4. Power-generation control equipment
5. Atomic energy related equipment
6. Seabed equipment
7. Transportation control equipment
8. Public Information-processing equipment
9. Military equipment
10. Electric heating apparatus, burning equipment
11. Disaster prevention/crime prevention equipment
12. Safety equipment
13. Other applications that are not considered general-purpose applications

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