



EV1703-3300-A EVALUATION BOARD USER GUIDE



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Introduction

This user guide describes the evaluation board provided for the FS1703 μ POL™ product.

The board generates an output voltage (V_{OUT}) of 3.3V for loads of 0–3A from an input voltage (PV_{IN}) of 5V.

Specifications

- Input voltage (PV_{IN}) = +5V
- Output voltage (V_{OUT}) = +3.3V
- Output load (I_O) = 0–3A
- Switching frequency (F_{SW}) = 580 kHz
- Output capacitance (C_O) = 3x22 μ F (MLCC)
- Input capacitance (C_{IN}) = 2x22 μ F (MLCC)
- Dimensions (width x length x thickness) = 63 x 84 x 1.5mm

Connections

Name	Identifier	Description
PV_{IN}	J1	Input voltage (+5V)
GND	J2	Ground for input voltage
V_{OUT}	J8	Output voltage (+3.3V)
GND	J7	Ground for output voltage
V_{CC}	TP2	Internal supply (V_{CC}) – output of an LDO regulator
GND	TP3	Ground for internal supply
En	TP11	Enable
PG	TP12	Power Good

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

Operation

To use the evaluation board:

1. Connect a well-regulated +5V input supply to PV_{IN} (J1) and GND (J2).
2. Connect a load of 0–3A to V_{OUT} (J8) and GND (J7).

Description

The evaluation board consists of a 4-layer PCB made from FR4 glass-reinforced epoxy laminate material. All layers use 2oz copper (equating to a thickness of 0.0694mm). The major power components, including the FS1703, are mounted on the top side of the board.

Part reference	Quantity	Type	Description
FS1703 μ POL	1	–	Main IC
C10, C21	2	22 μ F	0805, 16V, X5R
C12	1	0.1 μ F	0402, 16V, X7R
C13	1	68 μ F	25V
C14, C15, C16	3	22 μ F	0805, 6.3V, X5R
C26	1	1 μ F	0603, 25V, X5R
J1	1	Red	Banana connector
J2, J7	2	Black	Banana connector
J8	1	Green	Banana connector
J10, J11	2	–	3-pin header
R1	1	2.7 Ω	10%, 1/8W, 0805 case size
R3, R7	2	49.9k Ω	10%, 1/8W, 0805 case size
R2, R4, R9	3	0 Ω	0805 case size
C28, C29	2	0 Ω (Note 1)	0402 case size
R6	1	24.9k Ω	10%, 1/8W, 0805 case size
VIN, PG, EN, VCC, SW_NC15, VOUT, PVIN, GNDs	10	–	Test points

Note 1: 0ohm is placed on capacitor footprint to ground NC pin.

Figure 1 shows the layout of the board and Figure 2 shows a schematic of the electrical circuit.

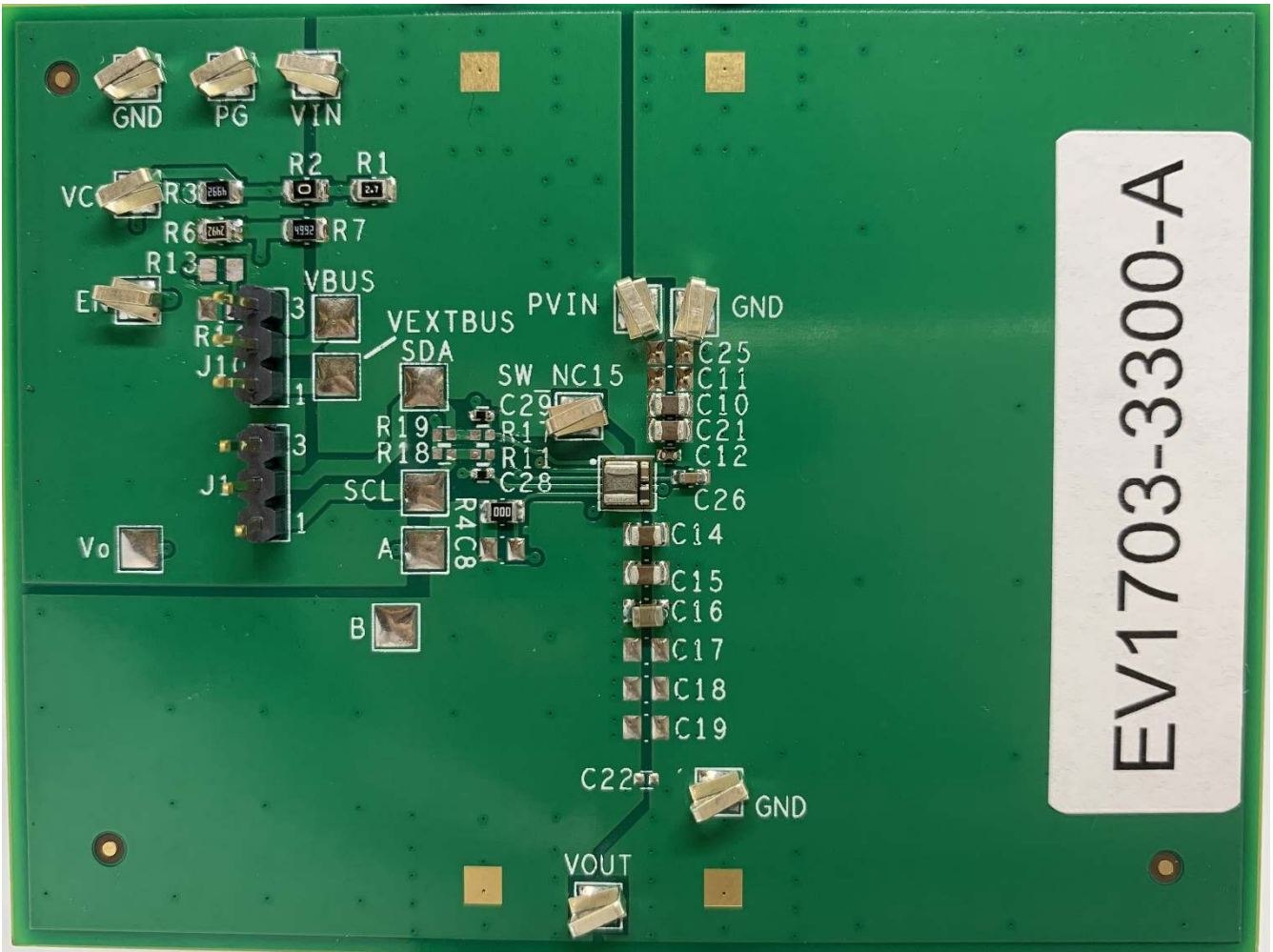


Figure 1 Board layout

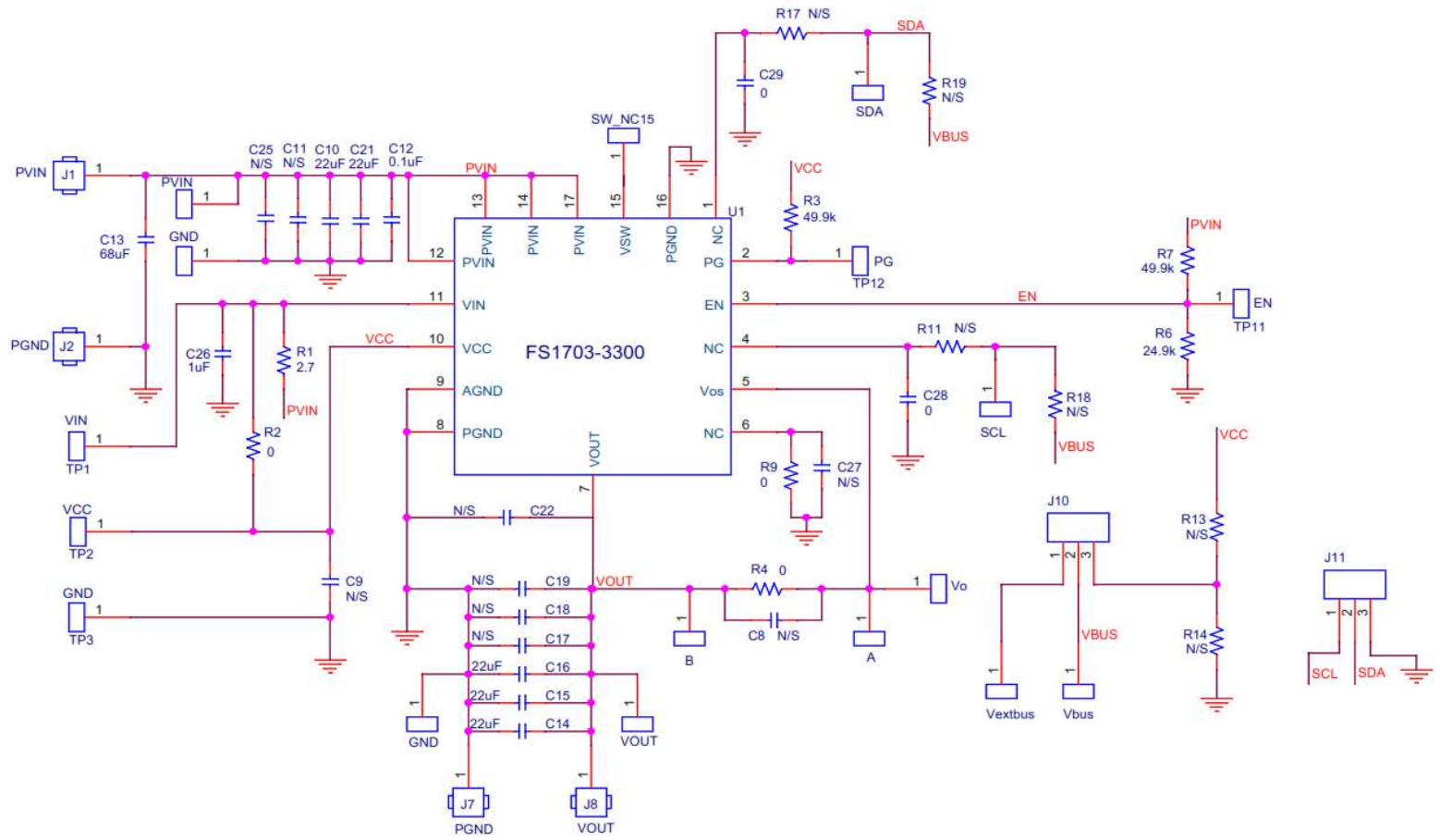


Figure 2 Schematic

Typical performance

Figure 3 to Figure 14 show typical operating waveforms for the evaluation board, while Figure 15 shows a thermal image of the board in operation. In all cases, the board is operating at room temperature with no airflow; PV_{IN} is 5V, V_{OUT} is 3.3V and I_O is 0–3A.

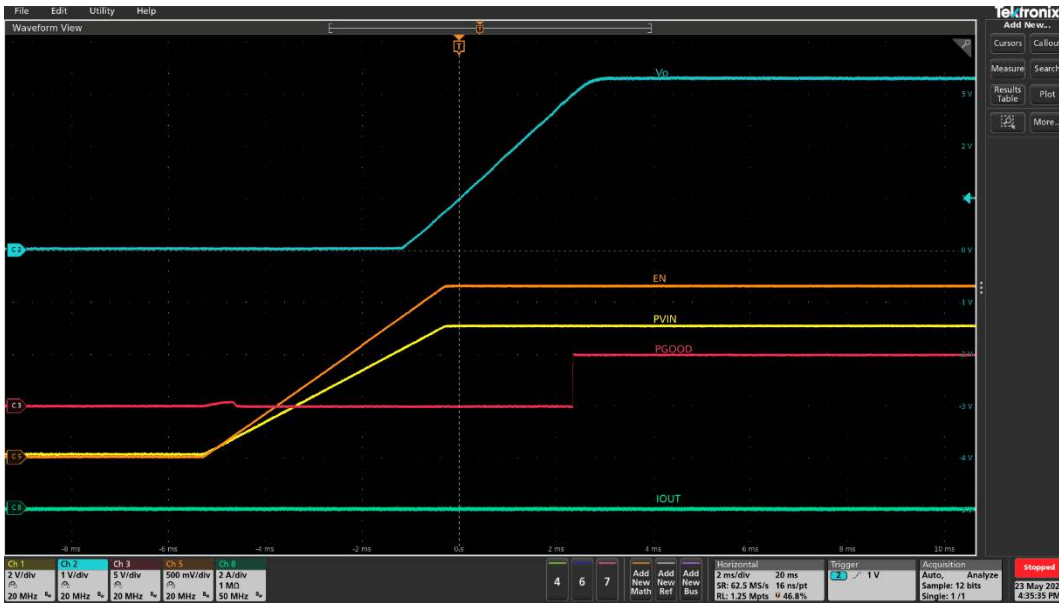


Figure 3 Startup with no load (Ch1: PV_{IN} , Ch2: V_{OUT} , Ch3: PG, Ch5: Enable, Ch8: I_{OUT})

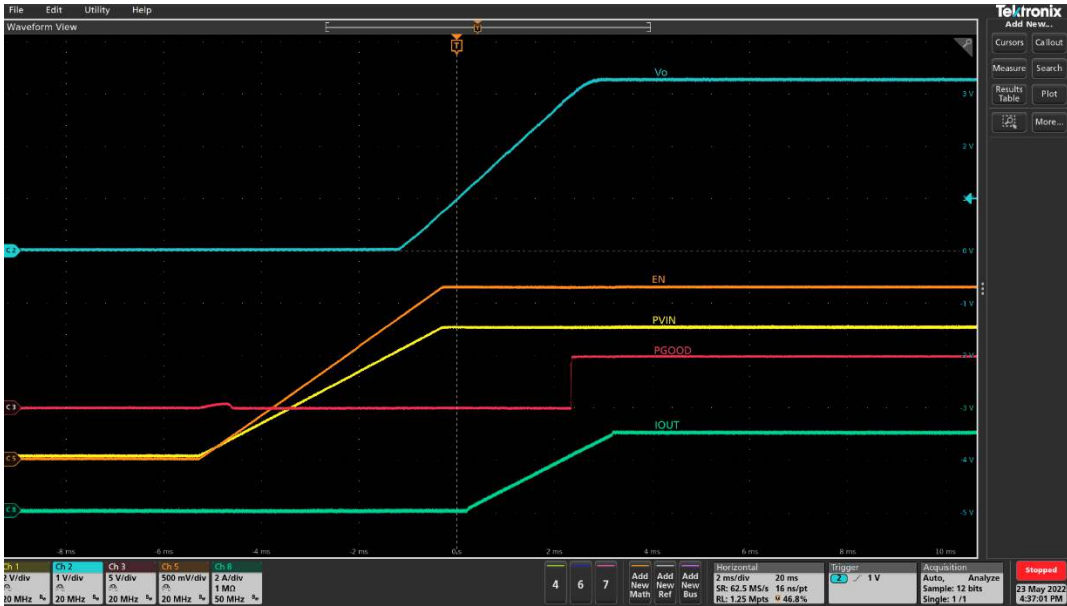


Figure 4 Startup with 3A load (Ch1: PV_{IN}, Ch2: V_{OUT}, Ch3: PG, Ch5: Enable, Ch8: I_{OUT})

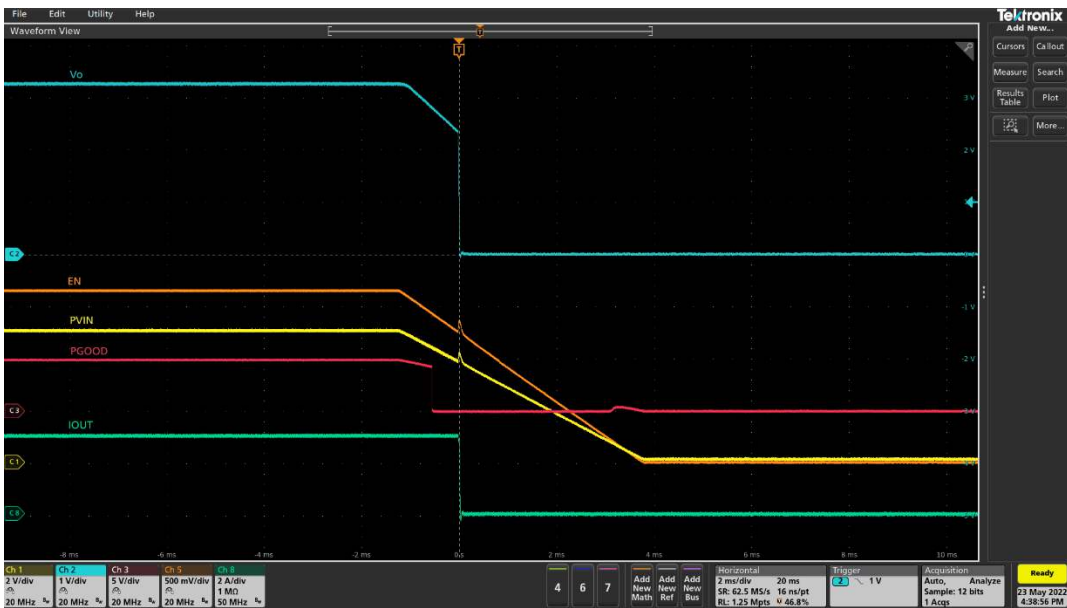


Figure 5 Shutdown with VCC UVLO at 3A load (Ch1: PV_{IN}, Ch2: V_{OUT}, Ch3: PG, Ch5: Enable, Ch8: I_{OUT})

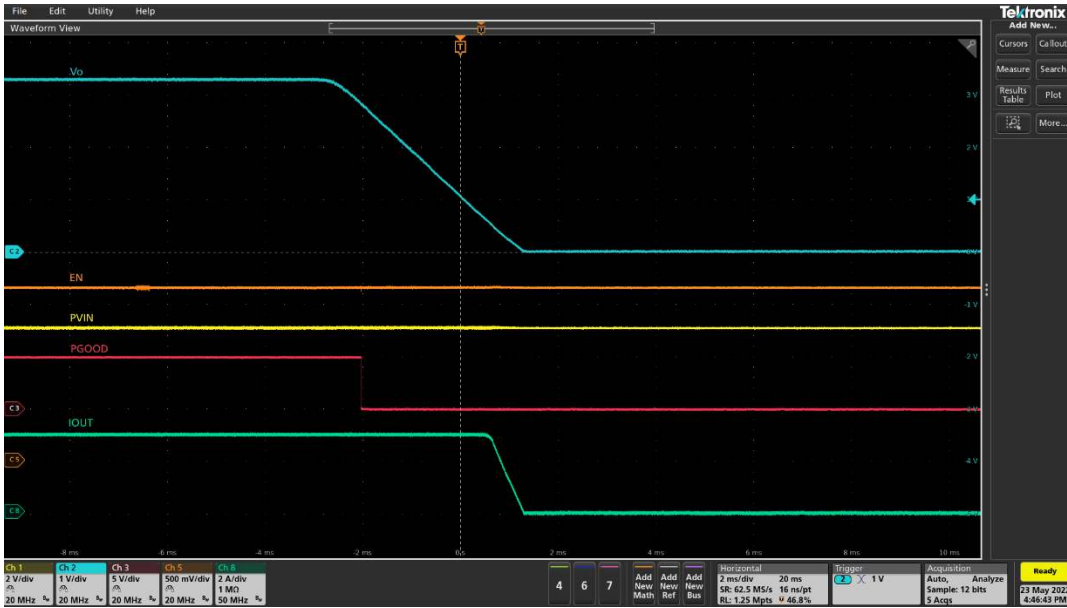


Figure 6 Soft turn off at 3A (Ch1: PV_{IN}, Ch2: V_{OUT}, Ch3: PG, Ch5: Enable, Ch8: I_{OUT})

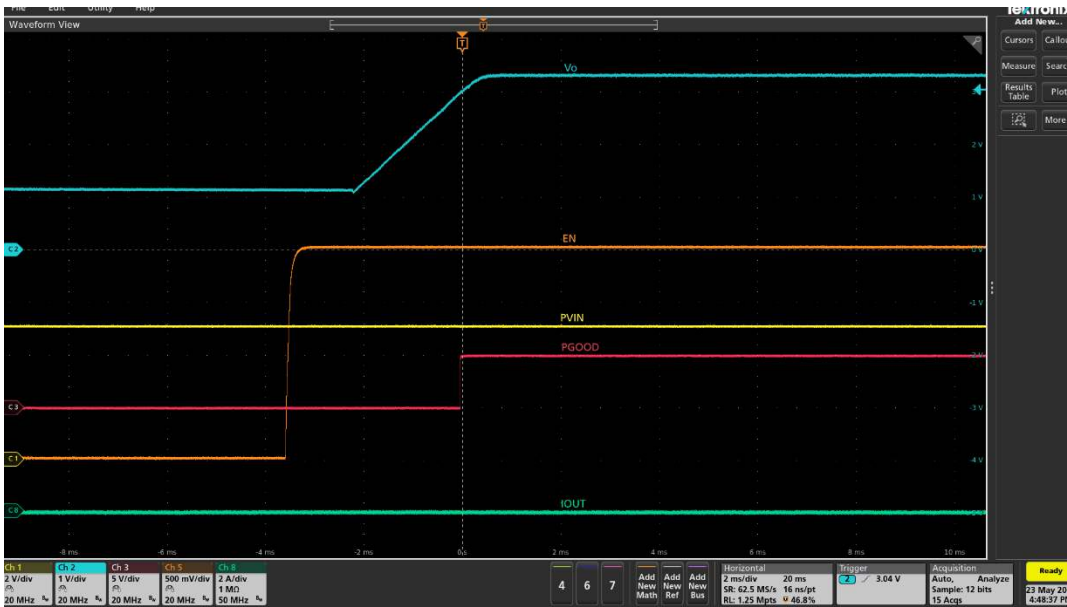


Figure 7 Startup into pre-bias (Ch1: PV_{IN}, Ch2: V_{OUT}, Ch3: PG, Ch5: Enable, Ch8: I_{OUT})

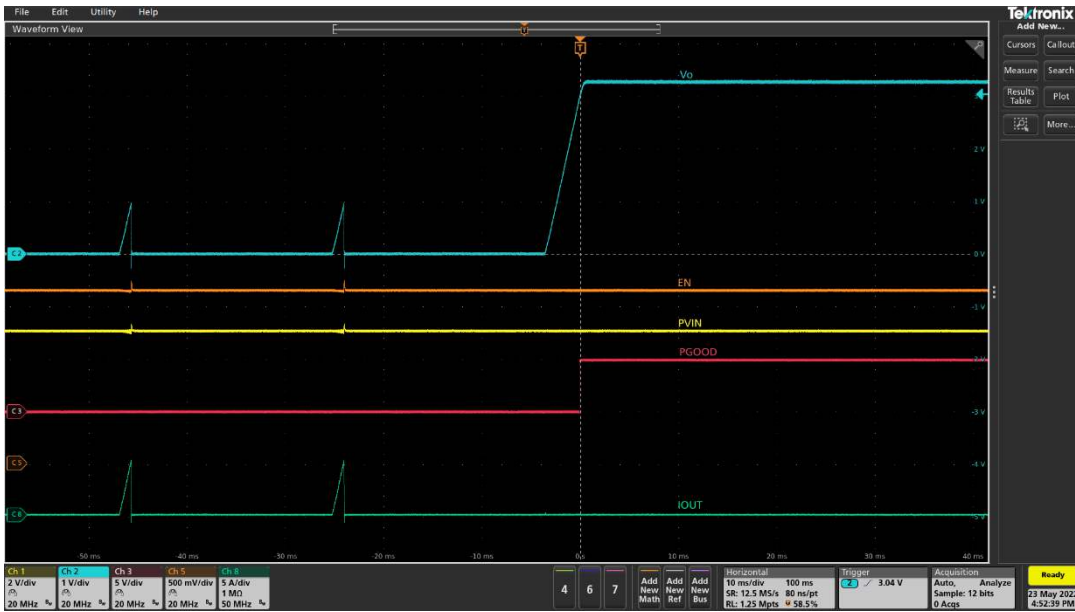


Figure 8 Over-current protection and auto-recover to 3A
 (Ch1: PV_{IN} , Ch2: V_{OUT} , Ch3: PG, Ch5: Enable, Ch8: I_{OUT})

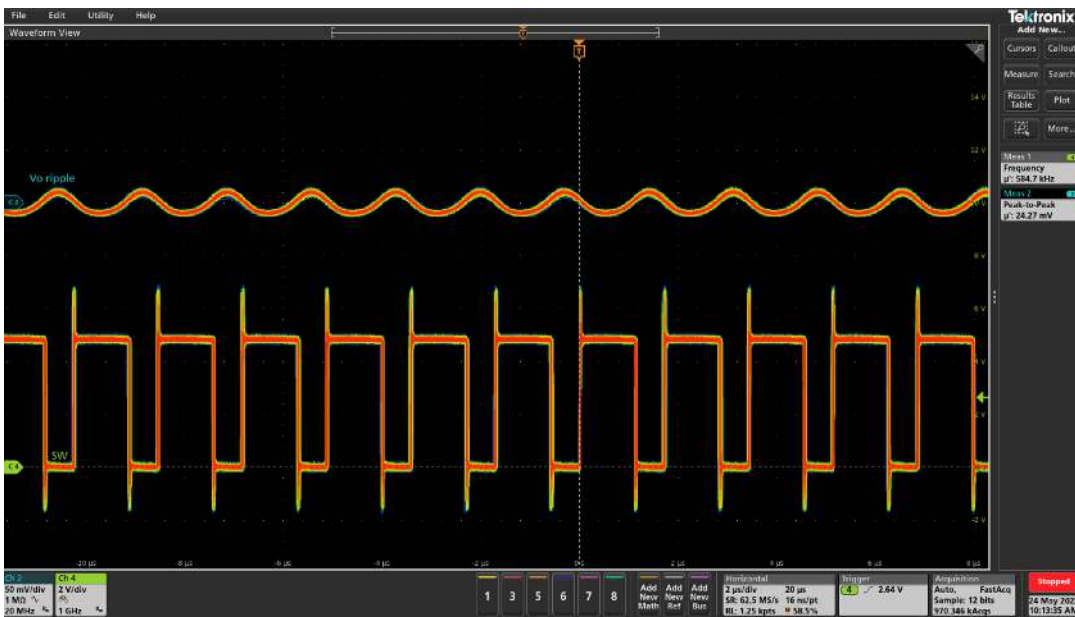


Figure 9 Sw and V_{OUT} ripple at 0A (Ch2: V_{OUT} Ripple, Ch4: Sw)

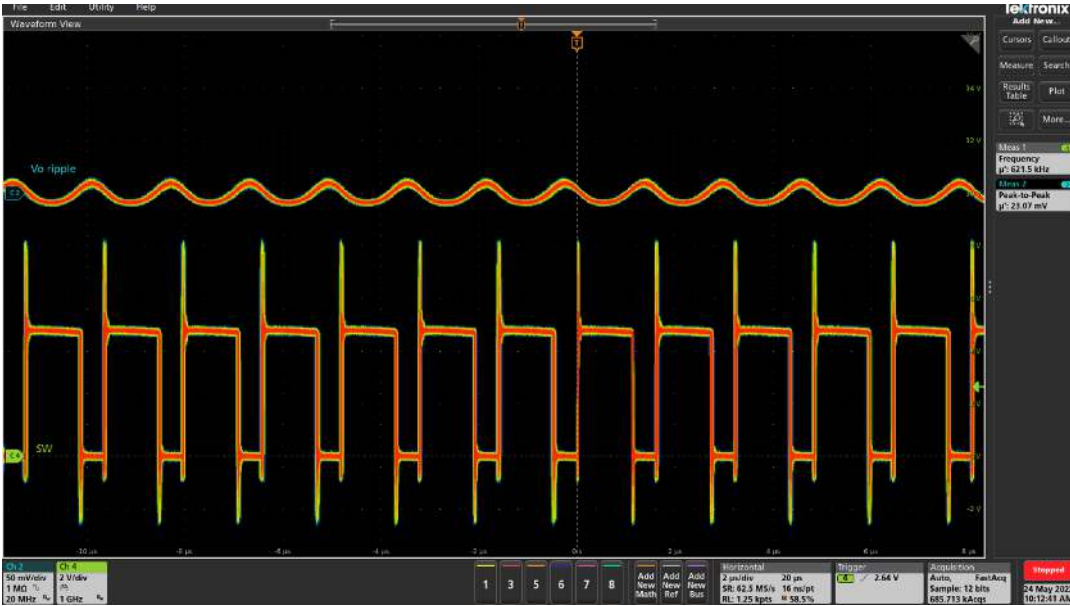


Figure 10 *Sw and V_{OUT} ripple at 3A (Ch2: V_{OUT} Ripple, Ch4: Sw)*

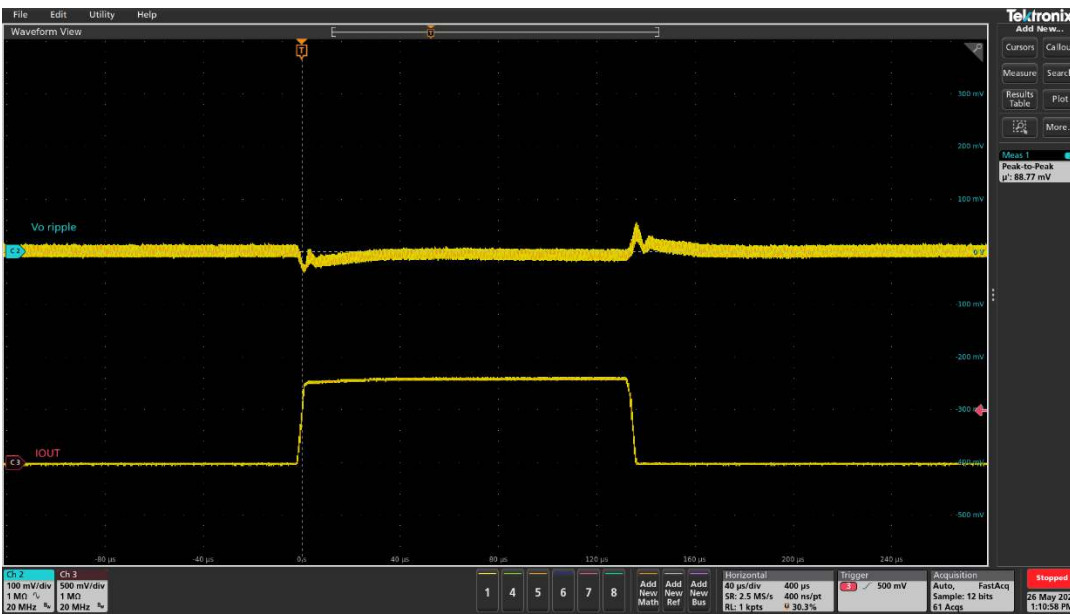


Figure 11 *Transient response 0A to 1.5A (Ch2: V_{OUT} ripple, Ch3: I_{OUT}), peak-peak deviation = 89mV*

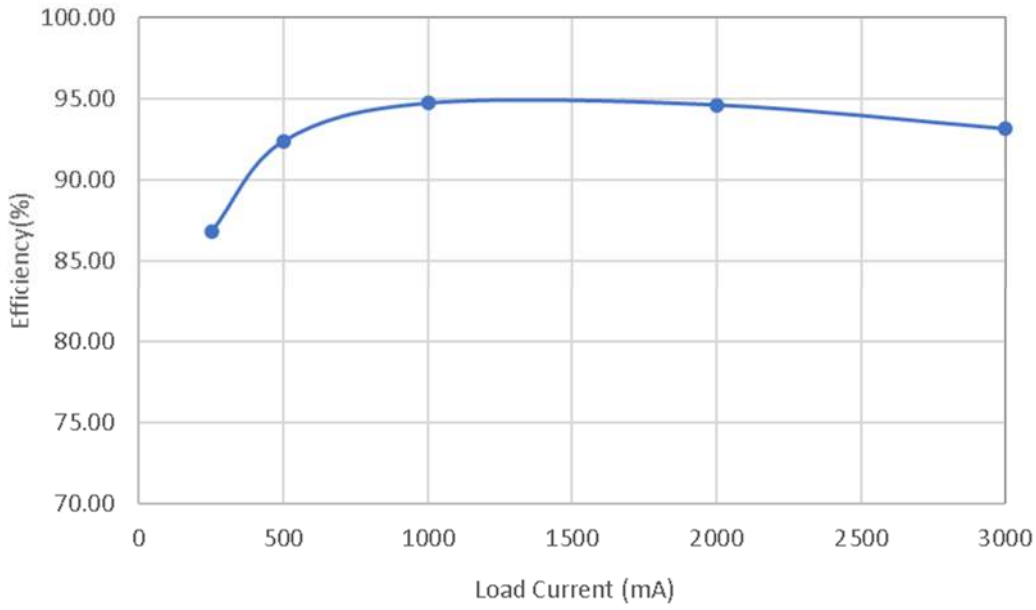


Figure 12 *Efficiency*

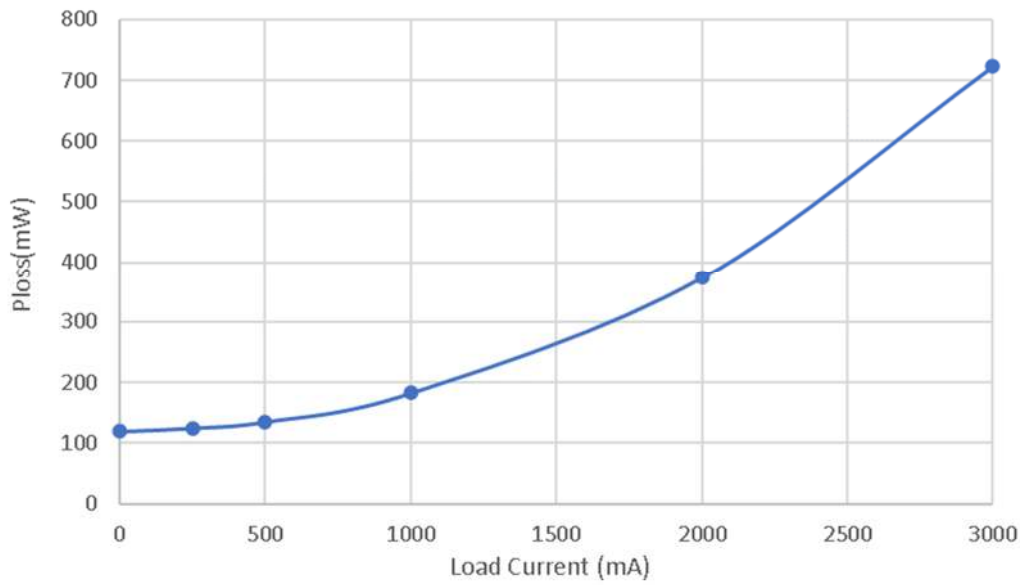


Figure 13 *Power loss*

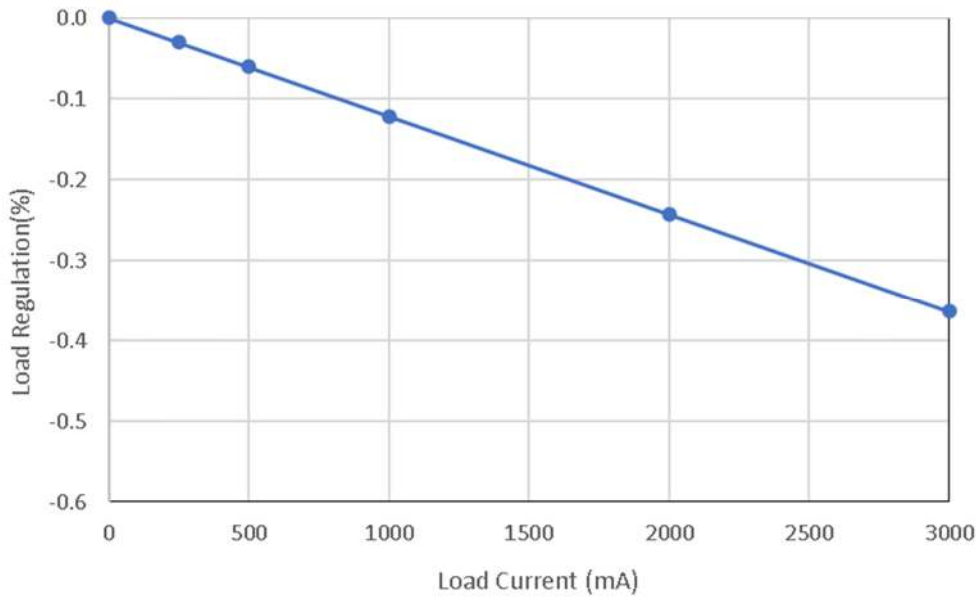


Figure 14 Load regulation ($I_{OUT} = 0-3A$)

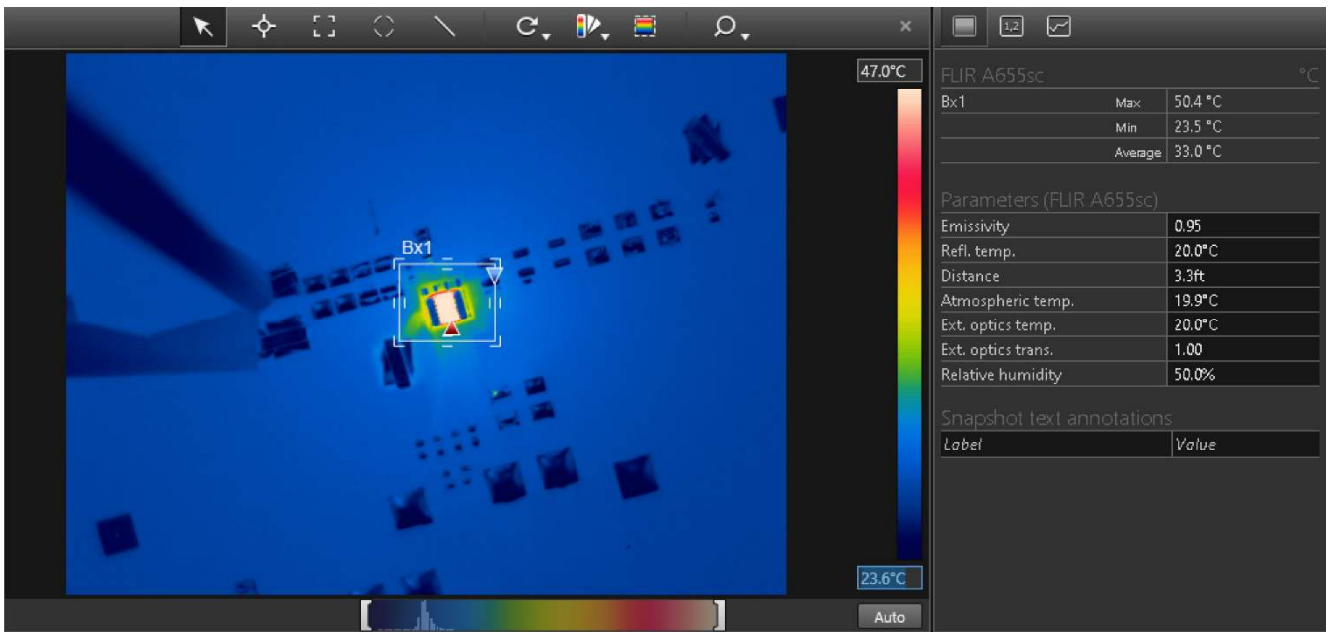


Figure 15 Thermal image ($P_{VIN}=5V, I_{OUT}=3A$) – maximum temperature rise = 30°C

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4. Power-generation control equipment
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6. Seabed equipment
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9. Military equipment
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13. Other applications that are not considered general-purpose applications

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