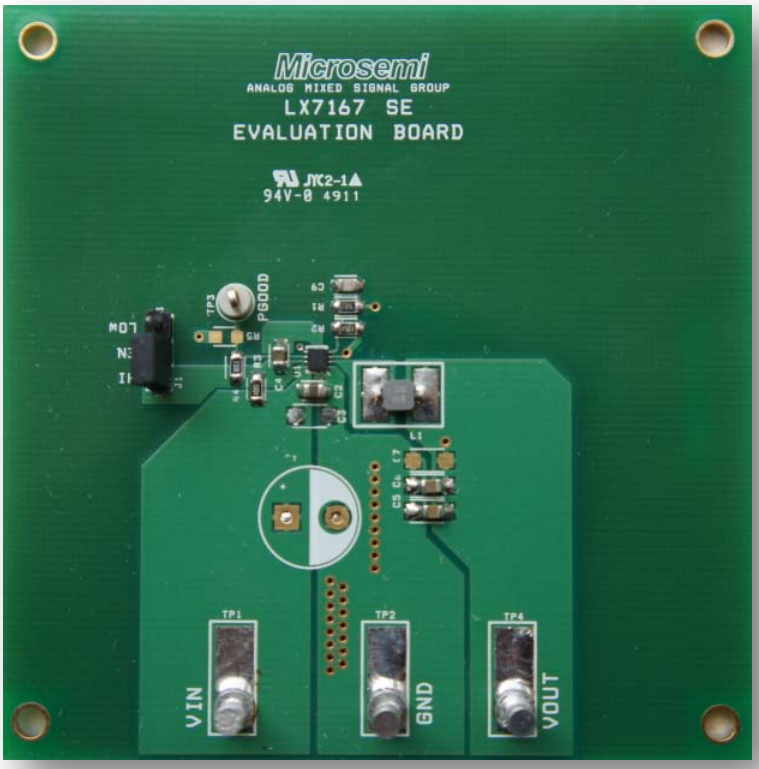
LX7167 EVALUATION BOARD USER GUIDE



LX7167 2.4 Amp Step Down Converter

Rev. 1.0, 2013-05-15

Microsemi
Analog Mixed Signal Group
One Enterprise Aliso Viejo, CA 92656 USA (800) 713-4113, (949) 380-6100

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Introduction to Product

LX7167 is a step-down PWM Switching regulator IC with integrated high side P-CH and low side N-CH MOSFETs. The IC operates using a hysteretic control topology, with a full load operating frequency of 3MHz switching frequency, allowing small output filter components while maintaining excellent dynamic load response.

The operational input voltage range of LX7167 is from 3V to 5.5V. The device has a Power Save Mode (PSM) that automatically transitions between PWM and PSM mode depending on the load current. This allows the converter's efficiency to remain high when load current drops. There is a Power Good function to indicate the status of the IC.

In the shutdown mode, the IC's current consumption is reduced to less than 1μA and the output capacitor is discharged.

Other features of the part are: a) cycle-by-cycle current limit followed by HICCUP mode which reduces the overall power dissipation of the internal MOSFETs, b) thermal protection and internal digital soft start.

The LX7167 is available in a DFN 2x2mm 8L exposed pad package.

Key Features

- 2.4A Step-down Regulator
- Operational Input Supply Voltage Range: 3V-5.5V
- Integrated PMOS and NMOS
- Load Current from zero to 2.4A
- 3MHz Switching Frequency
- SKIP pulse to improve light load efficiency
- Input UVLO and OV Protection
- Enable Pin
- Power Good
- Internal Soft-start
- Cycle-by-Cycle Over Current Protection
- Hiccup Mode Operation Under FB UVLO
- RoHS Compliant for Pb Free

Applications

- HDD
- Set-Top Box
- LCD TV's
- Notebook/Netbook
- Routers
- Video Cards
- PC Peripherals
- PoE Powered Devices

Part Specific Information

IC Part Number	Description
LX7167CLD	DFN 2x2mm 8L Exposed Pad

Evaluation Board Part Number	Description
LX7167EVB	Evaluation PCB for LX7167

Setting the Output Voltage

The evaluation board comes configured with VOUT ≈ 0.9V. To adjust the output voltage the values of resistors R1 and R2 must be changed using the formula below gives the value of VOUT.

$$VOUT = \mathrm{V_{REF}} \times \left(1 + \frac{\mathrm{R1}}{\mathrm{R2}}\right), \mathrm{V_{REF}}\ \text{is 0.6V.}$$

Schematic of Evaluation Board

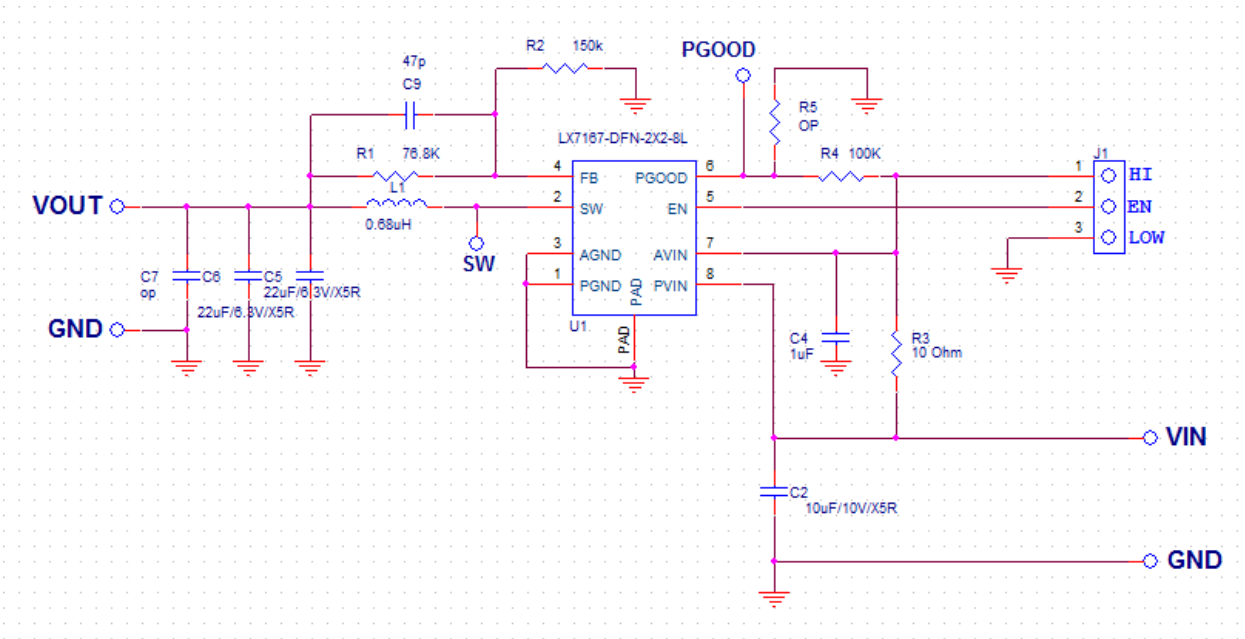


Figure 1 Schematic of Evaluation Board

Layout of Evaluation Board

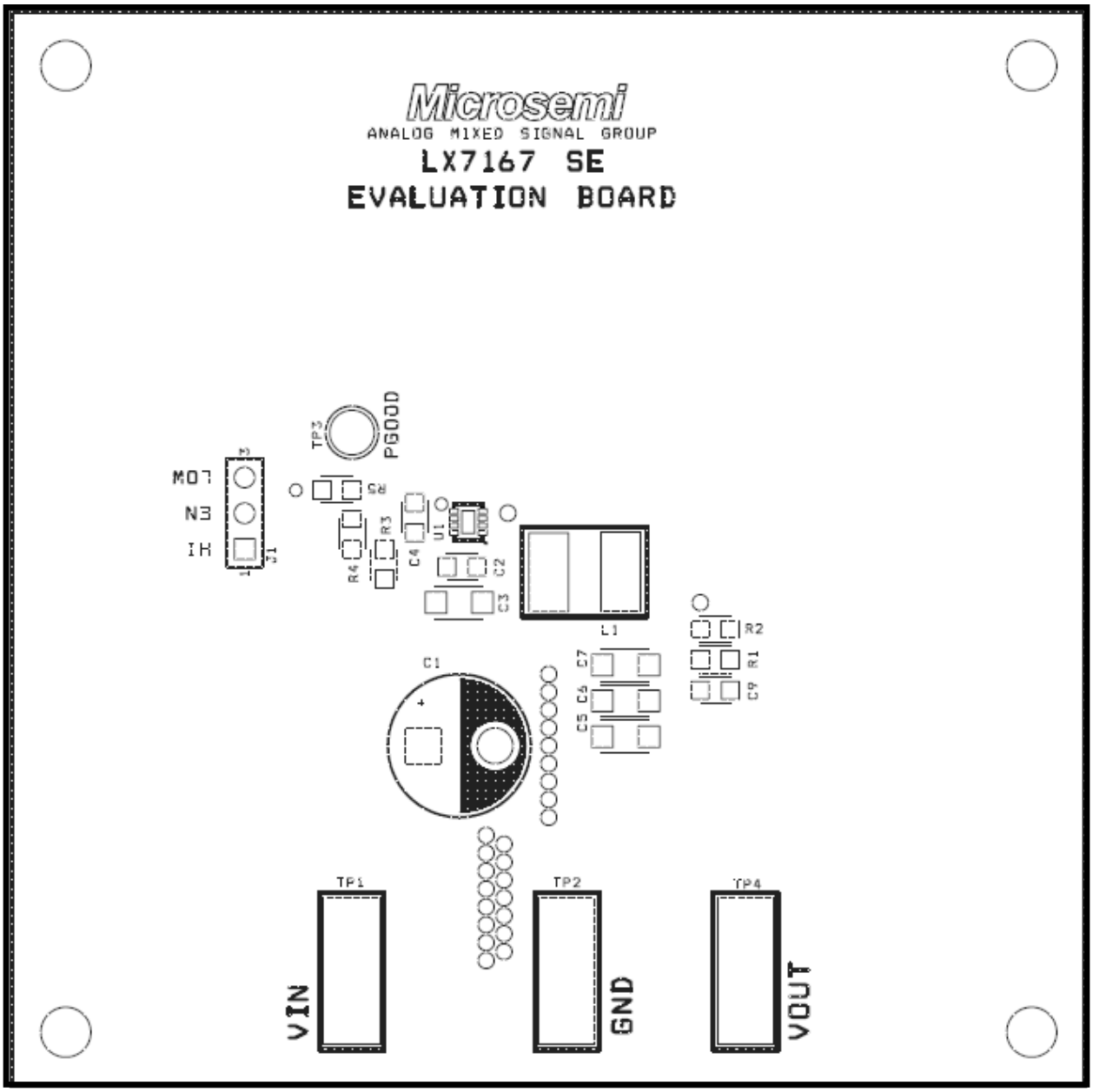


Figure 2 Top Silkscreen

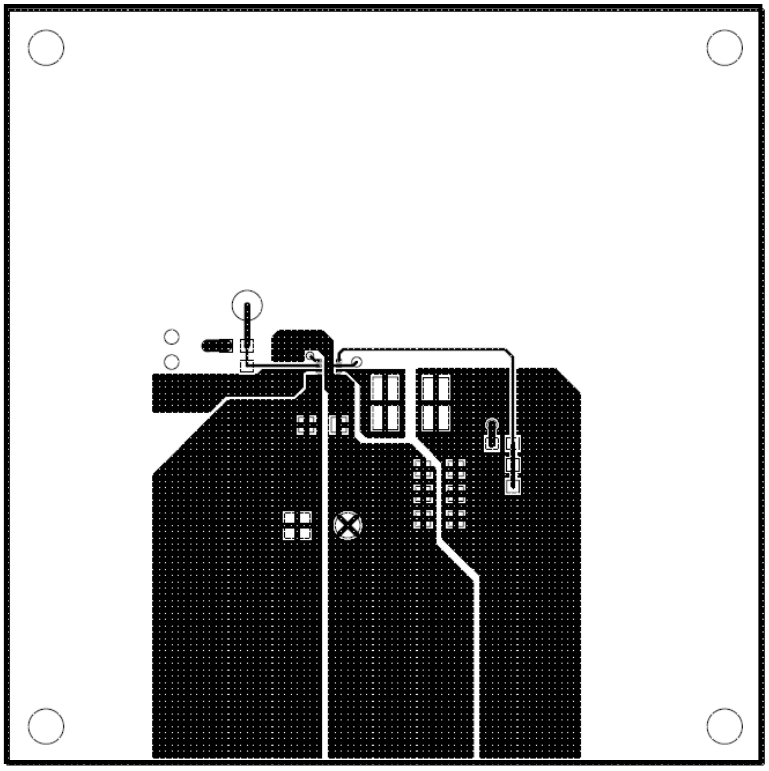


Figure 3 Top Layer

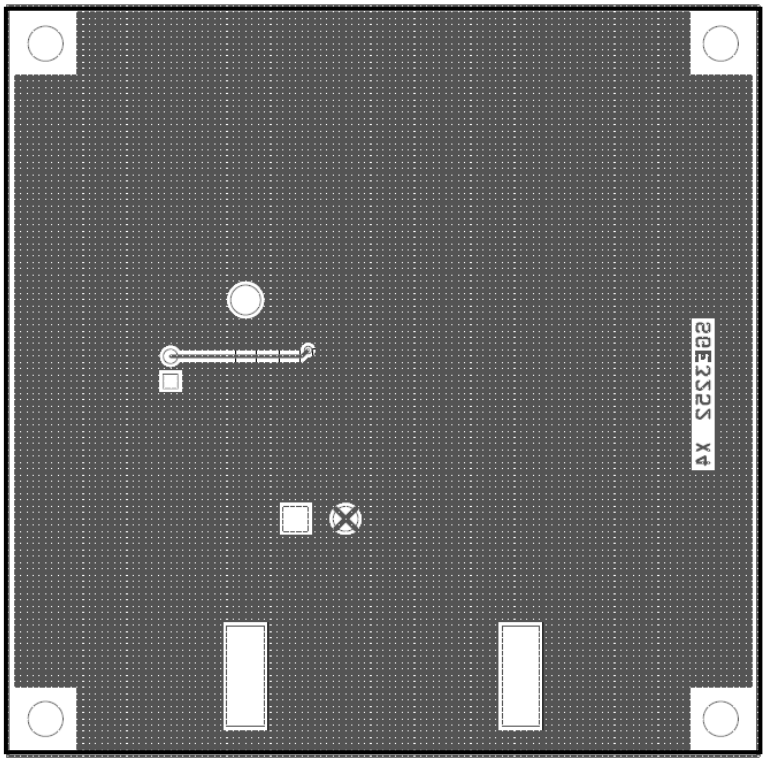


Figure 4 Bottom Layer

Bill of Material

MISCELLANEOUS COMPONENTS			
Item	Part Description	Reference	Qty
1	Microsemi IC – LX7167	U1	1
2	Test Point	SW, PGOOD	2
3	Terminal	VIN, VOUT, GND, GND,	4
4	Jumper	J1	1

CAPACITORS			
Item	Part Description	Reference	Qty
5	10µF/10V/X5R	C2	1
6	1µF	C4	1
7	22µF/6.3V/X5R	C5, C6	2
8	47pF	C9	1

RESISTORS			
Item	Part Description	Reference	Qty
9	76.8kΩ	R1	1
10	150kΩ	R2	1
11	10Ω	R3	1
12	100kΩ	R4	1

INDUCTOR			
Item	Part Description	Reference	Qty
13	0.68µH	L1	1

Recommended Operating Condition

Description	Symbol	Min	Max	Unit
Input Voltage	V_{IN}	3	5.5	V
Output Current	I_{OUT}	0	2.4	A
Operating Ambient Temperature	T_A	-10	85	°C
Enable Chip	EN	1		V
Shut Down Chip	EN	Pull to GND	Pull to GND	

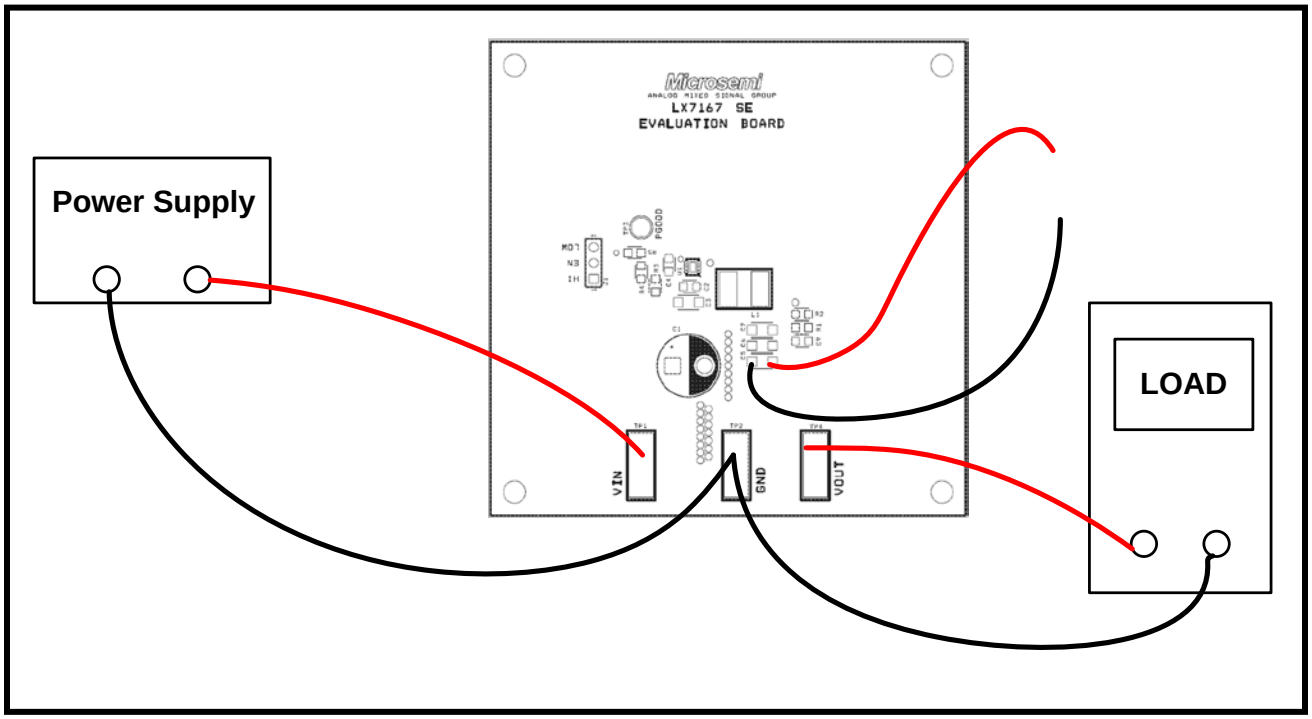


Figure 5 Power Supply and Load Connection

Efficiency

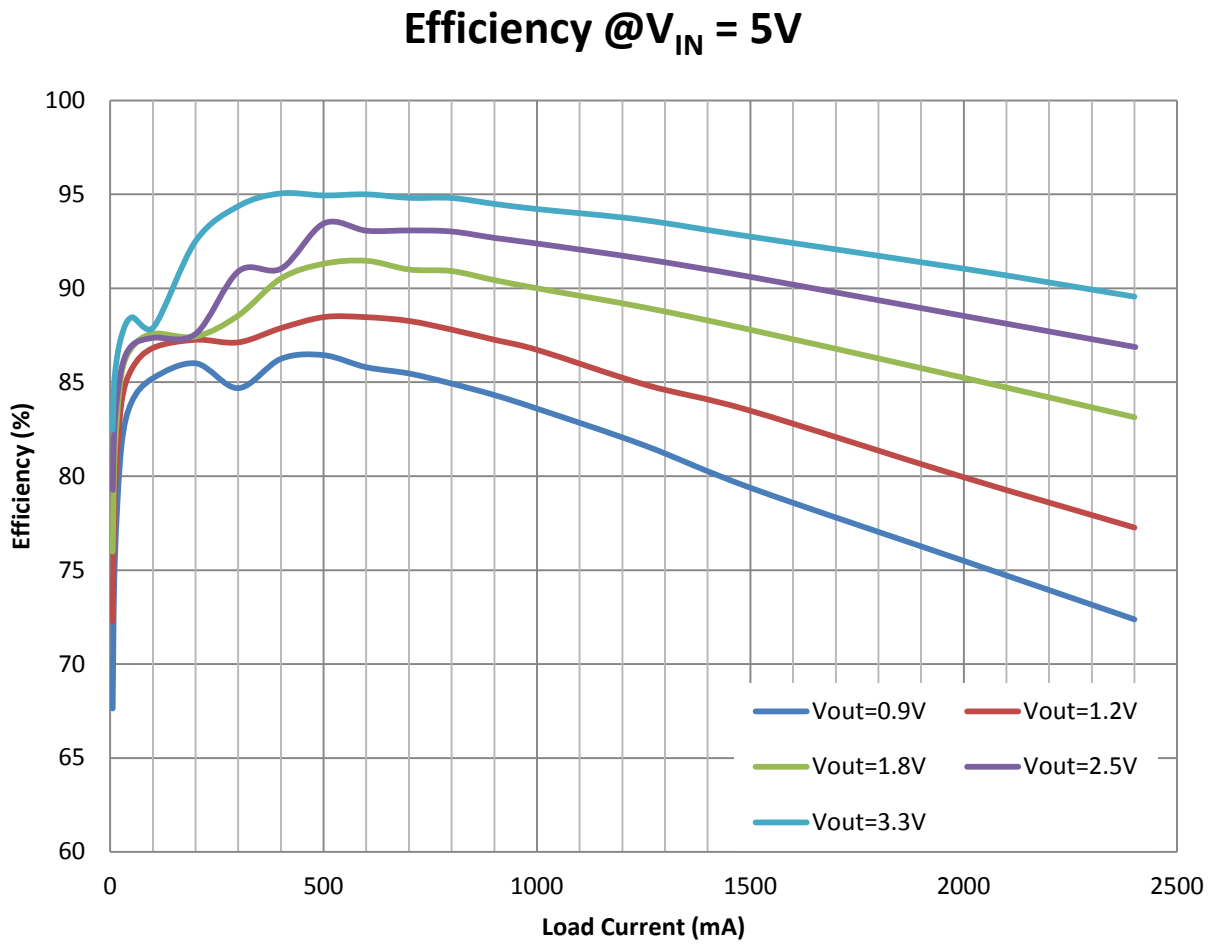
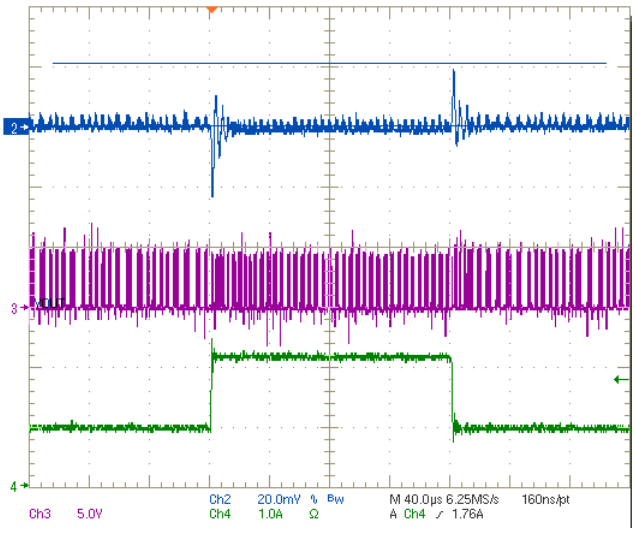


Figure 6 V_{IN} = 5V Efficiency Plot of LX7167

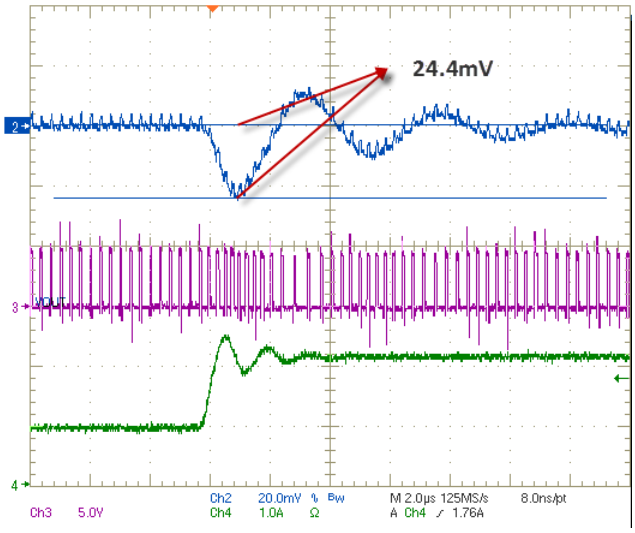
Transient Response

V_{IN} = 5V, Load Current = 1A to 2.2A



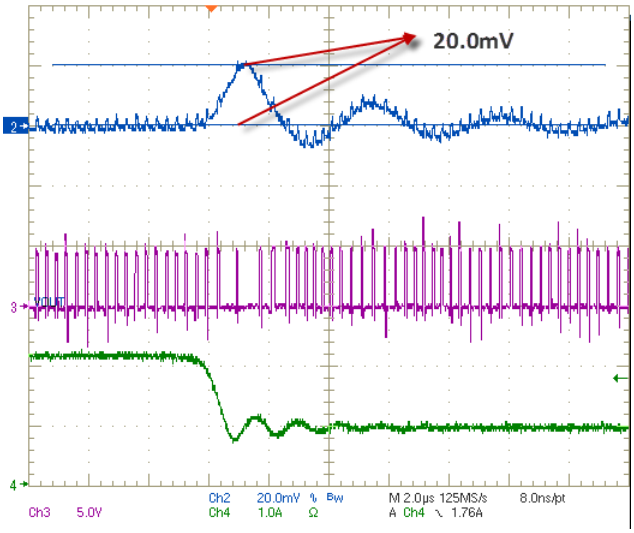
Ch2: V_{OUT} Ch3: SW Ch4: Inductor current

Figure 7 Transient Response



Ch2: V_{OUT} Ch3: SW Ch4: Inductor current

Figure 8 Transient Response Rising Edge

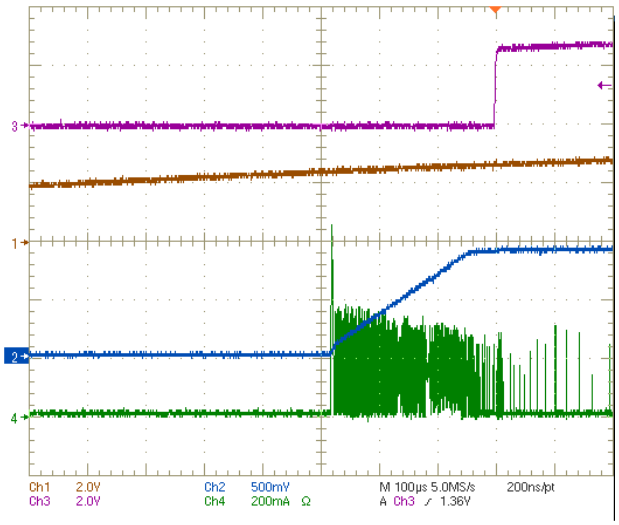


Ch2: V_{OUT} Ch3: SW Ch4: Inductor current

Figure 9 Transient Response Falling Edge

Start up

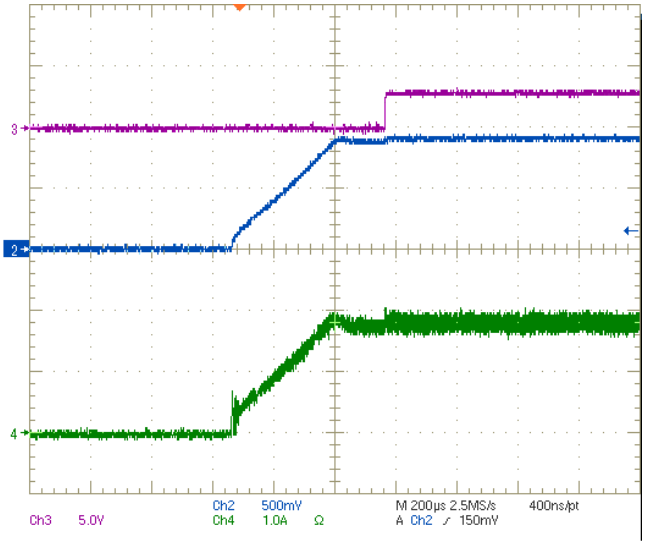
Start up with no load, V_{IN} = 5V



Ch1: V_{IN} Ch2: V_{OUT} Ch3: PGOOD Ch4: Inductor Current

Figure 10 Start up with no load

Start up with 1.8A resistive load, V_{IN} = 3V, EN from low to high



Ch2: V_{OUT} Ch3: PGOOD Ch4: Inductor Current

Figure 11 Start up with 1.8A resistive load, V_{IN} = 3V, EN from low to high