

Features

- Wide input voltage: 6V-60V
- Up to 1A Output Current
- Switching Frequency 600kHz
- Low Typical 7.5μA Shutdown Current
- Stable with Low ESR Ceramic Output
- PFM in Light Load Condition
- 0.8V Voltage Reference with $\pm 1.5\%$ Accuracy
- Integrated 300mΩ High-Side MOSFET
- Cycle-by-cycle Current Limit Protection
- Peak Current Mode with Internal Compensation
- Thermal Shutdown
- Compact package: SOT23-6

Applications

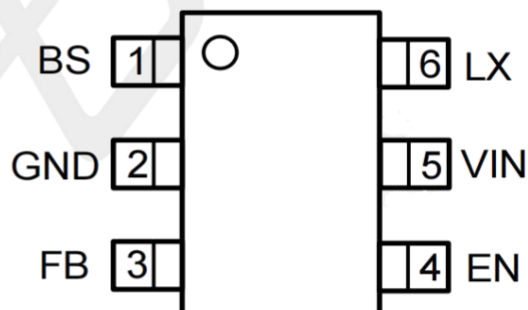
- IP CAM
- LCD TV
- Smart Home Applications
- Telecom and Datacom Systems
- Power over Ethernet Applications
- General 12V, 24V, 48V Power Bus Supply

General Description

The is wide input voltage of 6V to 60V, high efficiency current mode, asynchronous step-down DC/DC converter capable of delivering up to 1A current. adopts peak current control mode and has internal compensation to simplify application design. This also could minimize the external components in application with 600kHz switching frequency.

The is integrates 300mΩ high-side MOSFET and achieve high efficiency over the wide input voltage range. has advanced features include UVLO, Thermal Shutdown, soft start.

Pin out (top view)



Pin Configurations

Pin	Name	Function
1	BS	Bootstrap capacitor connection for high-side MOSFET driver. Connect a high quality 10nF capacitor from BS to LX.
2	GND	Ground
3	FB	Feedback input pin, connect to the feedback divider to set VOUT.
4	EN	Enable pin, with internal pull-up current source. Pull low to disable. Float or connect to VIN to enable.
5	VIN	Connect to power supply and bypass capacitors CIN. Path from VIN pin to high frequency bypass CIN and GND must be as short as possible.
6	LX	Switching output of the regulator. Internally connected to high-side power MOSFET. Connect to power inductor.

Absolute Maximum Ratings (Note1)

Parameter	Min	Max	Unit
Input Supply Voltage, EN	-0.3	65	V
BS to LX Voltage	-0.3	6	V
FB Voltage	-0.3	6	V
LX Voltage	-0.6	65	V
LX Voltages (<10ns transient)	-3	70	V
Storage Temperature Range	-65	150	°C
Junction Temperature (Note2)	-40	150	°C
Power Dissipation	--	0.6	W
Lead Temperature (Soldering, 10s)	--	260	°C

Note 1: Absolute Maximum Ratings are those values beyond which the life of a device may be impaired.

Note 2: T_J is calculated from the ambient temperature T_A and power dissipation P_D according to the following formula: $T_J = T_A + (P_D) \times \theta_{JA}$.

ESD Rating (Note4)

Items	Description	Value	Unit
V_{ESD_HBM}	Human Body Model for all pins	±2000	V
V_{ESD_CDM}	Charged Device Model for all pins	±500	V

JEDEC specification JS-001

Recommended Operating Conditions

Items	Description	Min	Max	Unit
Voltage Range	IN	6	60	V
T_J	Operating Junction Temperature	-40	125	°C
T_A	Operating Ambient Temperature	-40	85	°C

Thermal Resistance (Note3)

Items	Description	Value	Unit
θ_{JA}	Junction-to-ambient thermal resistance	100	°C/W
θ_{JC}	Junction-to-case(top) thermal resistance	58	°C/W

Note 3: EN external resistor divide requirement is described in below Enable and Disable section.

Note 4: Guaranteed by design.

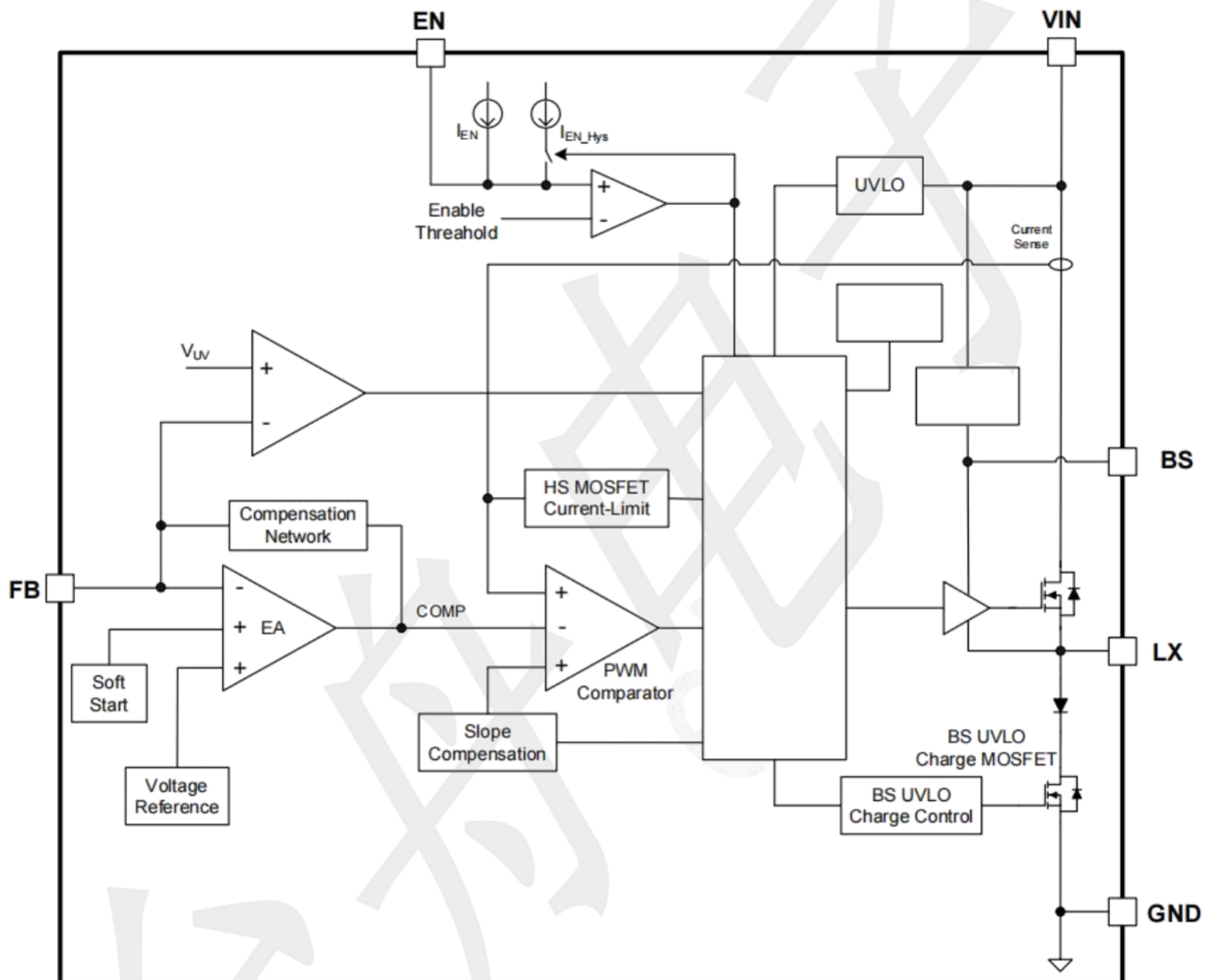
Electrical Characteristics

($V_{IN}=48V$, $V_{OUT}=5V$, $T_A = 25^{\circ}C$, unless otherwise noted.)

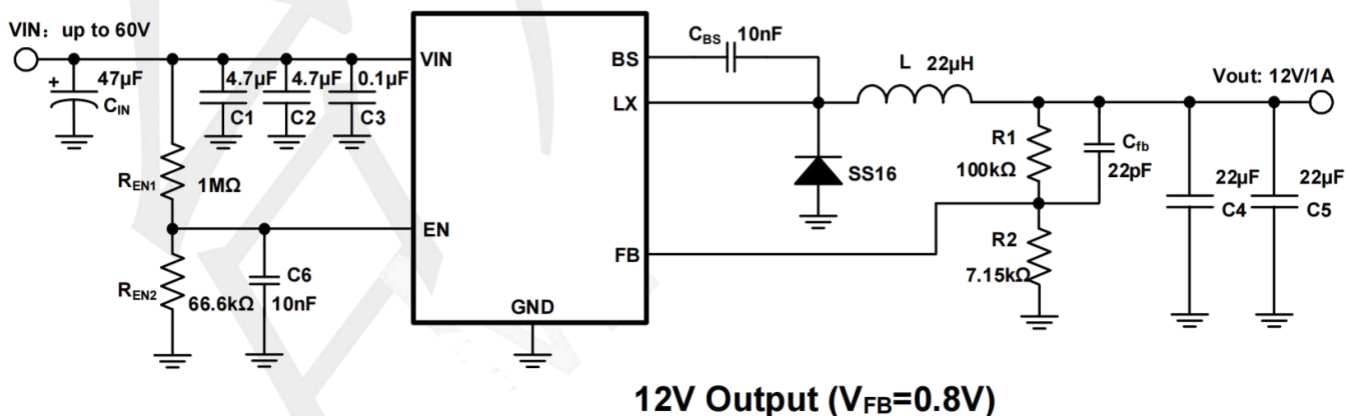
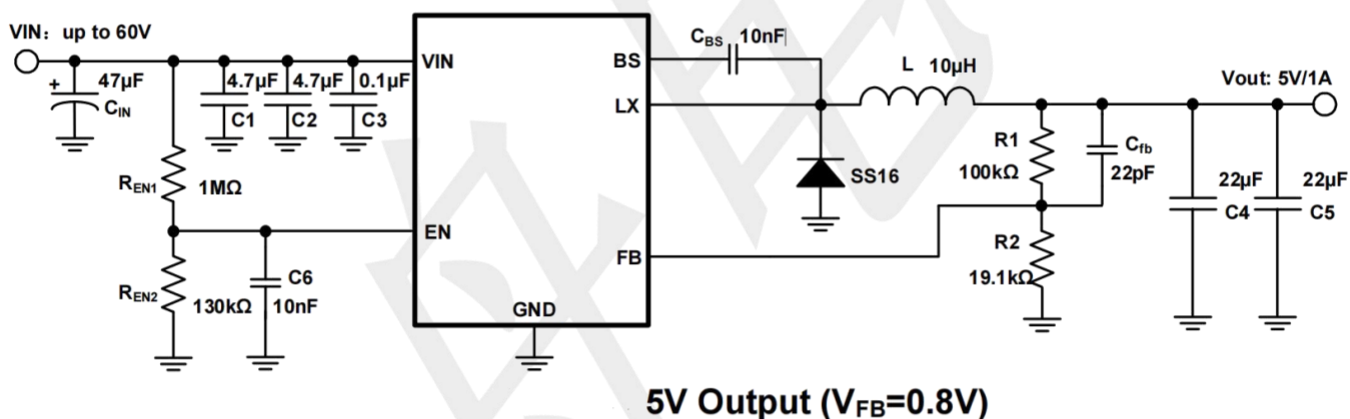
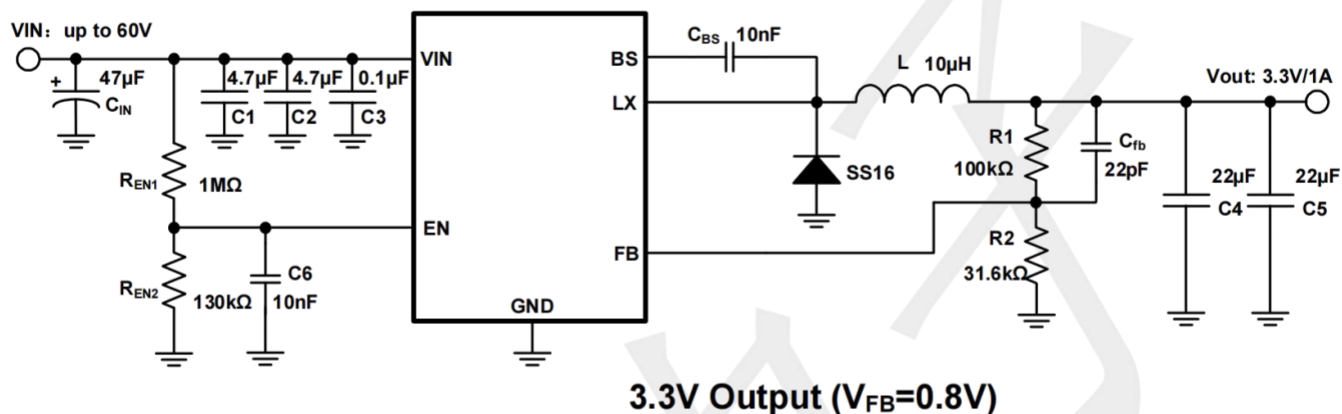
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Input Voltage Range	V_{IN}		6	--	60	V
Under Voltage Lockout	V_{UVLO}	V_{IN} rising	--	5.7	--	V
UVLO Hysteresis	V_{UVLO_HY}		--	0.18	--	V
Input Quiescent Current	I_Q	$V_{FB}=1V$, $V_{EN}=1.5V$	--	380	--	μA
Shutdown Current	I_{SD}	$V_{EN}=0V$	--	7.5	--	μA
Feedback Threshold Voltage	V_{FB}	$T_J = 25^{\circ}C$	0.788	0.8	0.812	V
FB Pin input current	I_{FB}		-50	--	50	nA
EN Rising Threshold from Standby Mode	V_{EN_R}		1.05	1.2	--	V
EN Shutdown Threshold	V_{EN_SD}		--	0.65	--	V
EN Pull-up Current Source	I_{EN}		--	1.2	--	μA
EN Pull-up Hysteresis Current Source	I_{EN_Hys}		--	3.5	--	μA
Soft start Time	t_{SS}		--	0.8	--	ms
Internal Cycle-by-cycle Current limit	I_{LIM}	$V_{IN}=48V$	--	2.4	--	A
LX leakage	I_{LX_LEAK}		--	--	1	μA
Switch On-Resistance (high side)	$R_{DS(on)H}$		--	300	--	m Ω
Switching Frequency	f_{SW}		--	600	--	kHz
Minimum Turn-on Time (Note 4)	t_{ON_MIN}		--	110	--	ns
Thermal Shutdown Threshold (Note 4)	T_{SDN}		--	160	--	$^{\circ}C$
Thermal Shutdown Hysteresis (Note 4)	T_{SDN_HY}		--	20	--	$^{\circ}C$

Note 4: Guaranteed by design.

BLOCK DIAGRAM



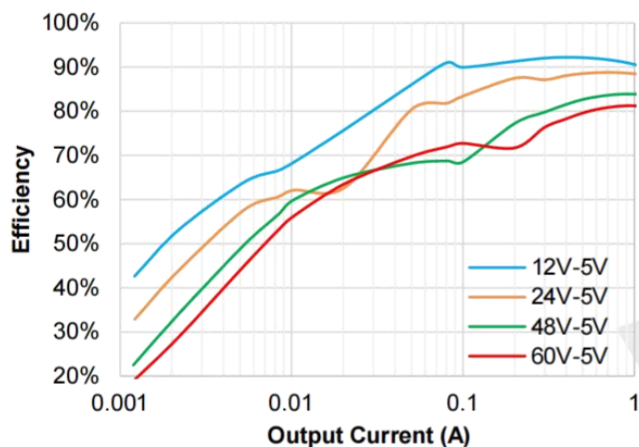
Typical Application Circuits



Typical Operating Characteristics

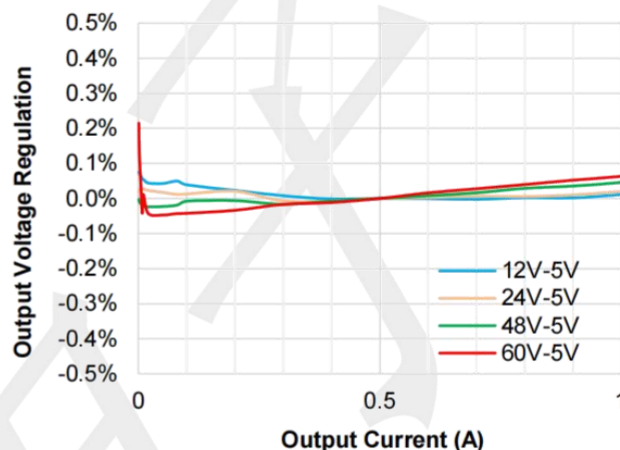
Efficiency

$V_{OUT}=5V$, $T_A=25^{\circ}C$



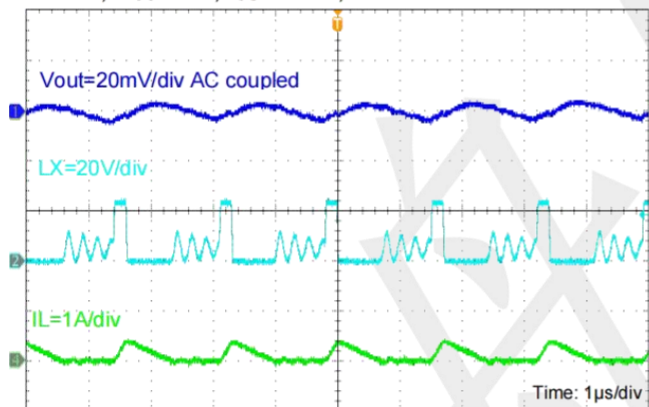
Load Regulation

$V_{OUT}=5V$, $T_A=25^{\circ}C$



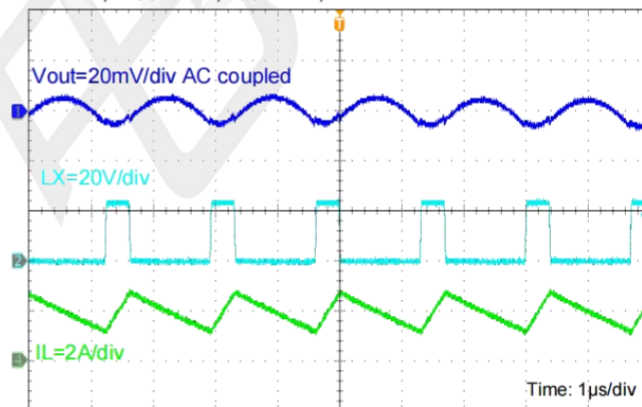
Steady State

$V_{in}=24V$, $V_{OUT}=5V$, $I_{OUT}=0.1A$, $T_A=25^{\circ}C$



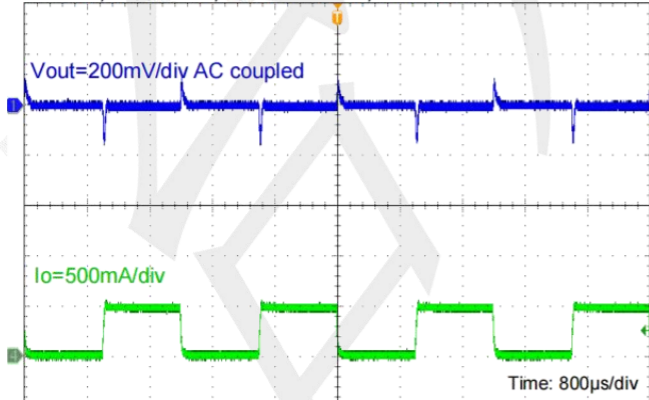
Steady State

$V_{in}=24V$, $V_{OUT}=5V$, $I_{OUT}=1A$, $T_A=25^{\circ}C$



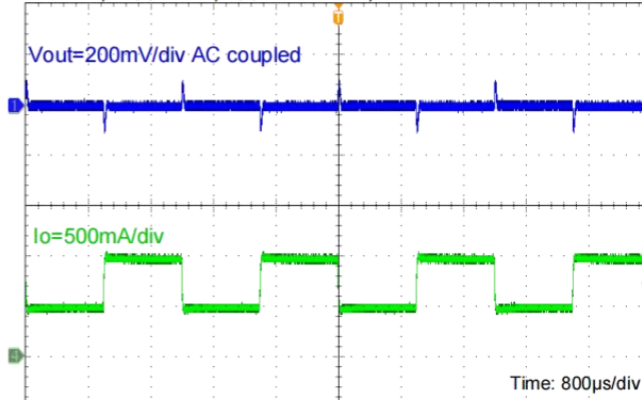
Load Transient

$V_{in}=24V$, $V_{OUT}=5V$, $I_{OUT}=0\sim0.5A$, $T_A=25^{\circ}C$



Load Transient

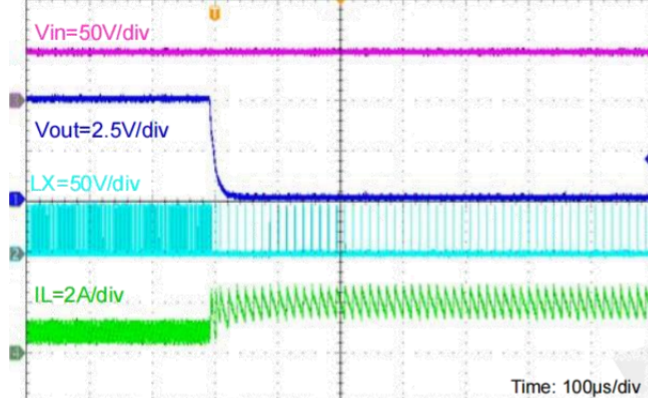
$V_{in}=24V$, $V_{OUT}=5V$, $I_{OUT}=0.5\sim1A$, $T_A=25^{\circ}C$



Typical Operating Characteristics

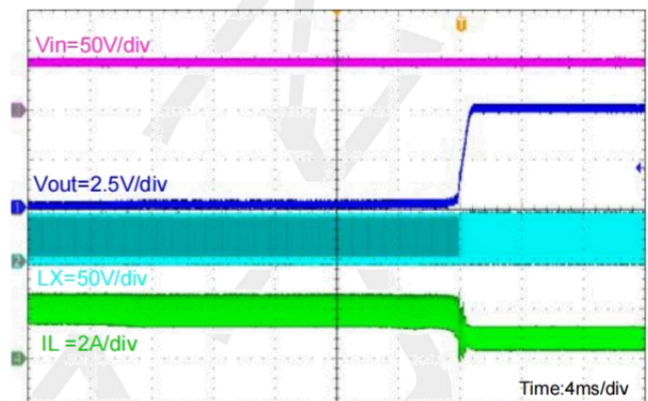
Output Short Entry

$V_{IN}=48V$, $V_{OUT}=5V$, $I_{OUT}=1A$ short Entry



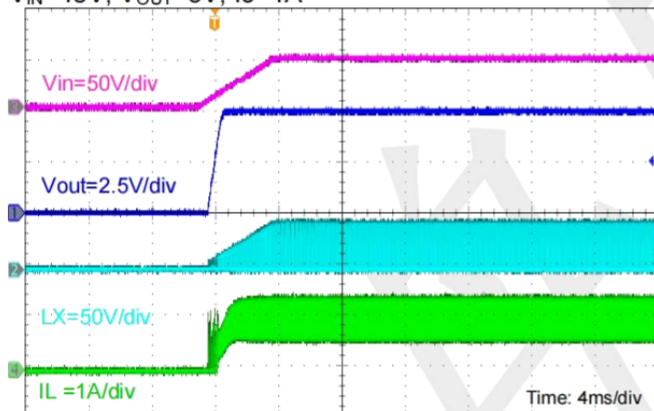
Output Short recovery

$V_{IN}=48V$, $V_{OUT}=5V$, $I_{OUT}=1A$ short recovery



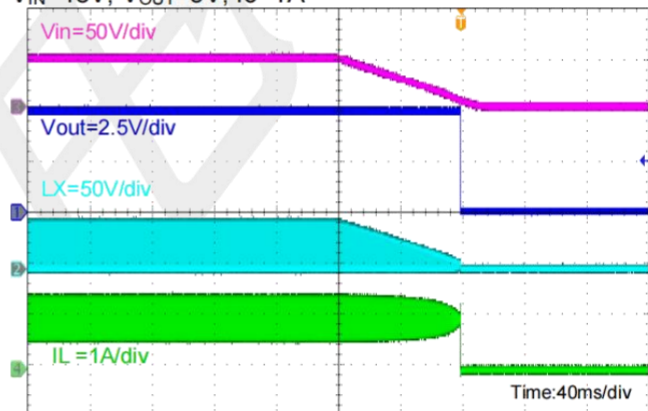
VIN Power On

$V_{IN}=48V$, $V_{OUT}=5V$, $I_O=1A$



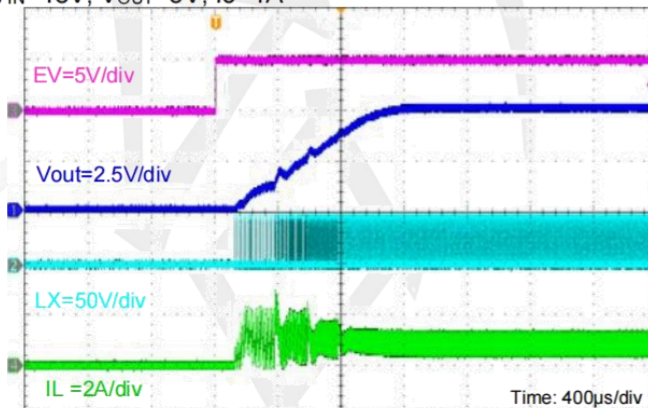
VIN Power OFF

$V_{IN}=48V$, $V_{OUT}=5V$, $I_O=1A$



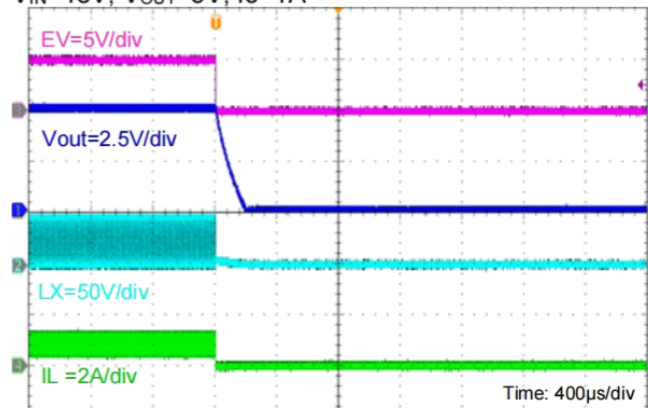
Power On by EN Signal

$V_{IN}=48V$, $V_{OUT}=5V$, $I_O=1A$



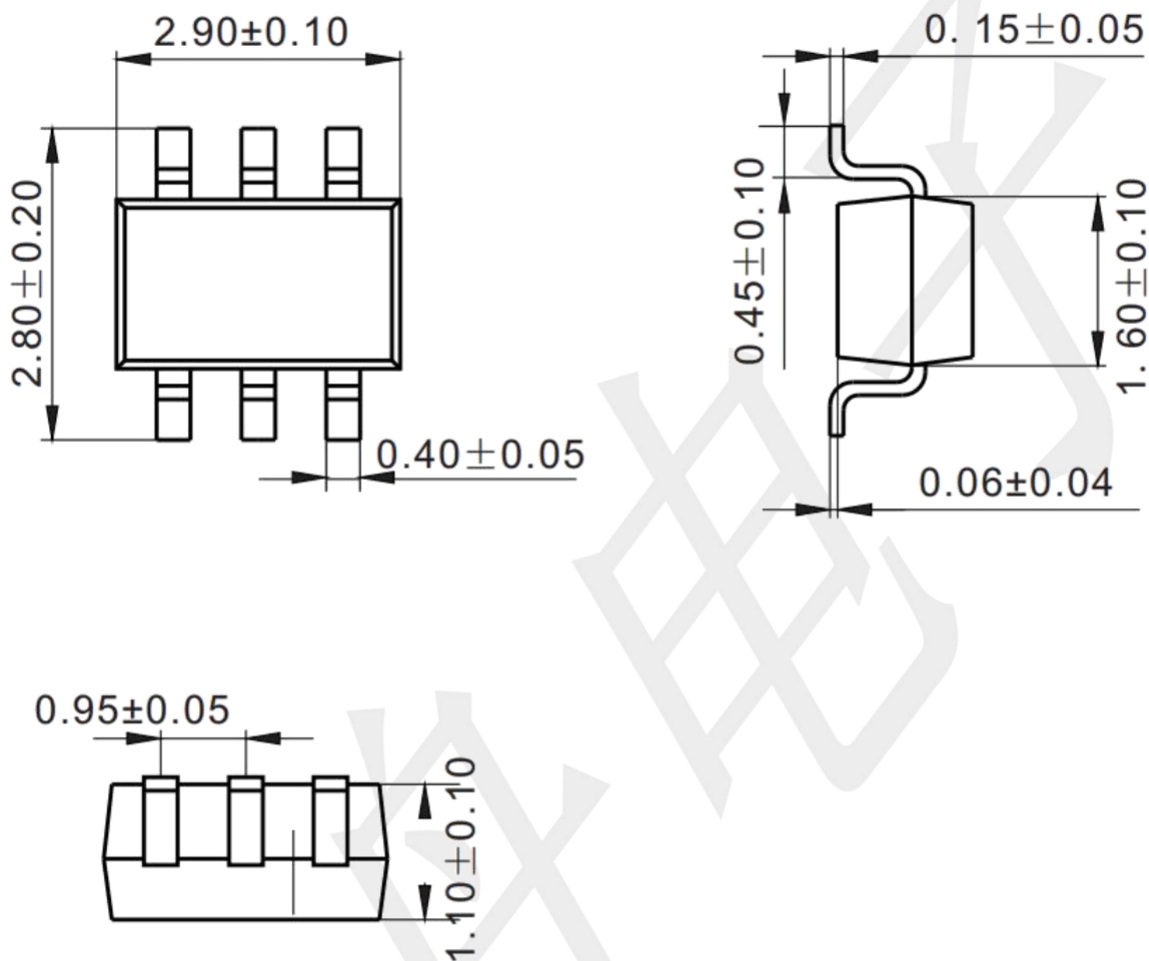
Power OFF by EN Signal

$V_{IN}=48V$, $V_{OUT}=5V$, $I_O=1A$



Package Outline Dimensions (unit: mm)

SOT23-6



Mounting Pad Layout (unit: mm)

