

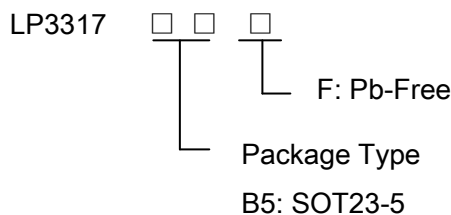


1MHz,30V/1.5A High Performance, Boost Converter

General Description

The LP3317 is a current mode boost DC-DC converter. Its PWM circuitry with built-in 1.5A current power MOSFET makes this converter highly power efficiently. The LP3317 implements a constant frequency 1MHz PWM control scheme. The high frequency PWM operation also saves board space by reducing external component sizes. The LP3317 features automatic shifting to pulse frequency modulation mode at light loads. Highly integration and internal compensation network minimizes as 6 external component counts. Optimized operation frequency can meet the requirement of small LC filters value and low operation current with high efficiency. The LP3317 includes under-voltage lockout, current limiting, and thermal overload protection to prevent damage in the event of an output overload. The LP3317 is available in a small 5-pin SOT23-5 package.

Order Information



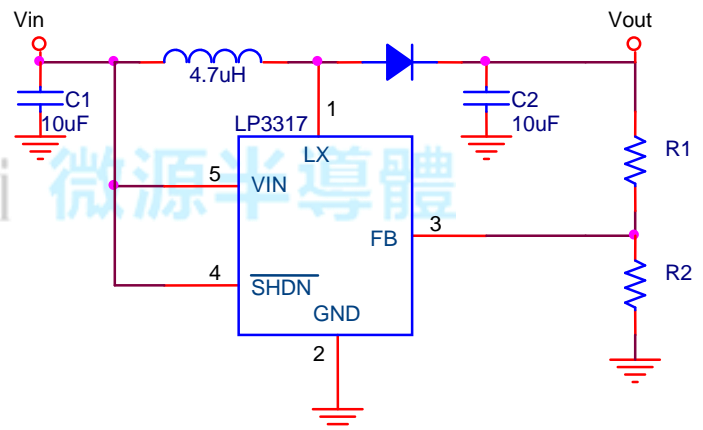
Applications

- ✧ Panel Bais Voltage supply
- ✧ OLED Backlight driver
- ✧ Notebook Computers
- ✧ Portable Applications
- ✧ MID/PTV

Features

- ◆ High Efficiency: 90%
- ◆ 1MHzFixed-Frequency PWM Operation
- ◆ Maximum Output Voltage up to 30V
- ◆ Guaranteed 13V/200mA Output with 5V input
- ◆ Operating Range : 2.2V to 5.5V
- ◆ Shutdown Supply Current:<1uA
- ◆ Available in SOT23-5 Package
- ◆ Minimize the External Component
- ◆ RoHS Compliant and 100% Lead (Pb)-Free

Typical Application Circuit



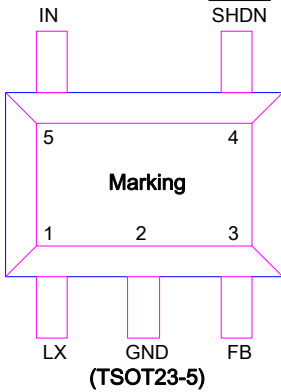
Marking information

Device	Marking	Package	Shipping
LP3317		SOT23-5	3K/REEL

Y: Year code. W: Weeks code. X: Series number code.



Functional Pin Description

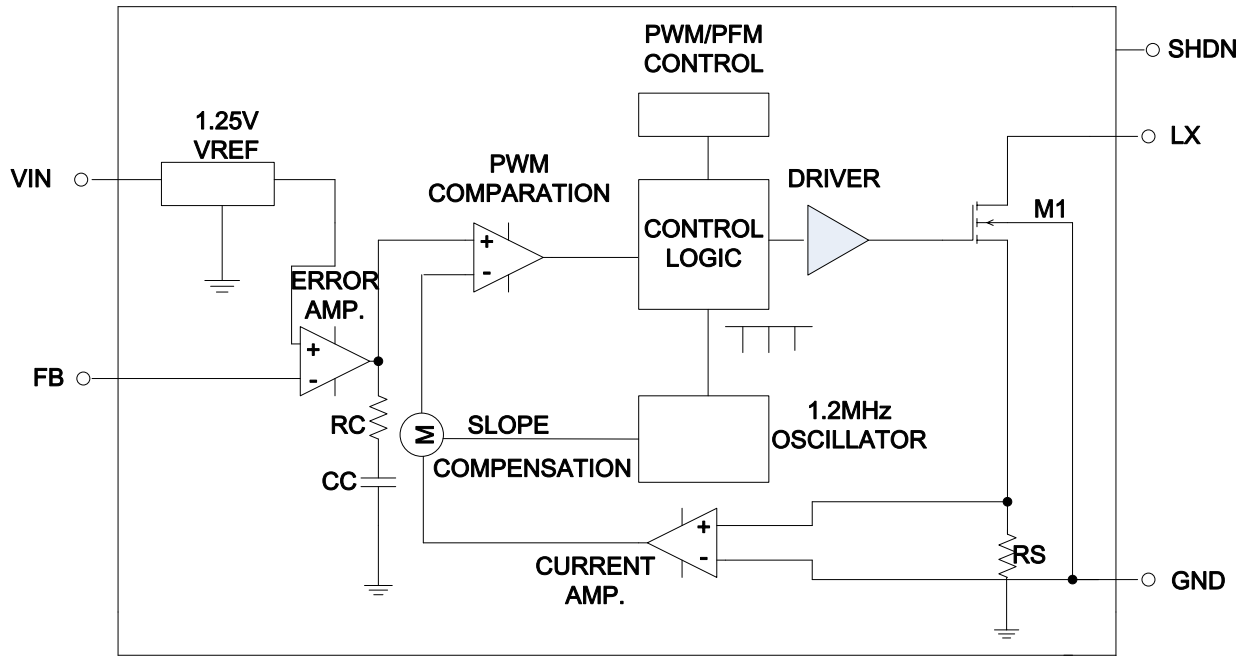
Package Type	Pin Configurations
SOT23-5	 <p style="text-align: center;">(TSOT23-5)</p>

Pin Description

Pin	Name	Description
1	LX	Switch Pin. Connect this Pin to inductor and catch diode. Minimize the track area to reduce EMI.
2	GND	Ground Pin
3	FB	Feedback Reference Voltage Pin. Series connect a resistor between Vout and ground as a voltage sense.
4	/SHDN	Chip Enable (Active High). Voltage sensing input to trigger the function of over voltage protection. Note that this pin is high impedance. There should be a pull low 100kΩ resistor connected to GND when the control signal is floating.
5	VIN	Supply Input Voltage Pin. Bypass 10uF capacitor to GND to reduce the input noise.



Function Block Diagram



Absolute Maximum Ratings

- ◇ Supply Input Voltage ----- -0.3V to 6.5V
- ◇ LX Input Voltage ----- -0.3V to 36V
- ◇ The Other Pins ----- -0.3V to 5.5V
- ◇ Power Dissipation, PD @ TA = 25°C TSOT-23-5 ----- 0.45W
- ◇ SOT23-5, θ_{JA} ----- 250°C/W
- ◇ Lead Temperature (Soldering, 10 sec.) ----- 260°C
- ◇ Operation Temperature Range ----- -40°C to 85°C
- ◇ Storage Temperature Range ----- -65°C to 150°C

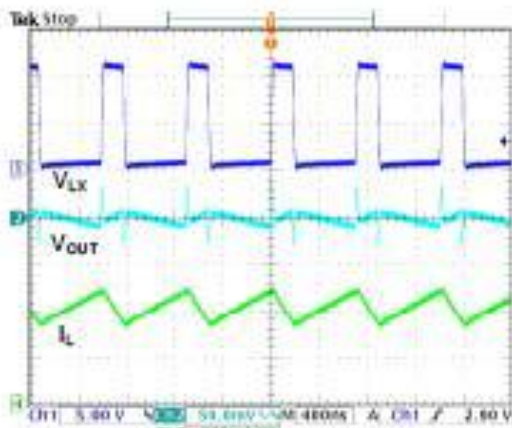
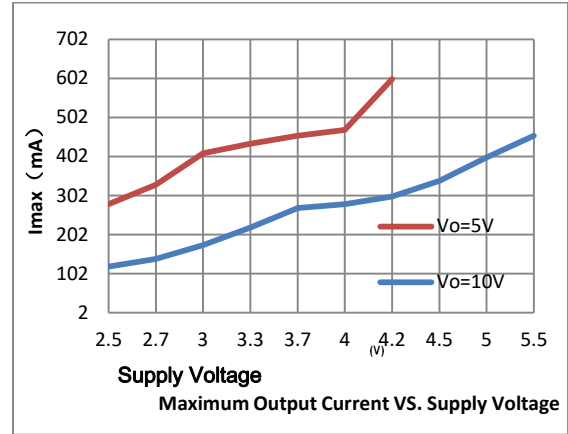
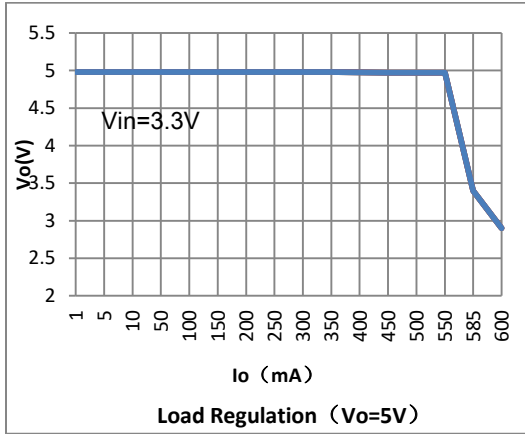


Electrical Characteristics

Parameter	Symbol	Test Condition	Min	Typ.	Max	Units
System Supply Input						
Operation voltage Range	VDD		2.2		6	V
Under Voltage Lock Out	VDD		1.5	1.8	2.1	V
Supply Current	IDD	FB=1.3V		430	550	uA
Shut Down Current	IDD	VEN=0V		0.1	1	uA
Line Regulation		VIN : 3.0~4.3V		0.2		%
Oscillator						
Operation Frequency	FOSC			1.2		MHz
Maximum Duty Cycle			93			%
Feedback Voltage	LP3317		1.21	1.23	1.25	V
MOSFET						
On Resistance of MOSFET	RDS(ON)			0.4		Ω
SW Current Limit	ILM			1.5		A
Protection						
Shut Down Voltage	VEN				0.4	V
Enable on Voltage	VEN		1.4			V
Thermal Shutdown Temperature	T _{SD}			150		°C

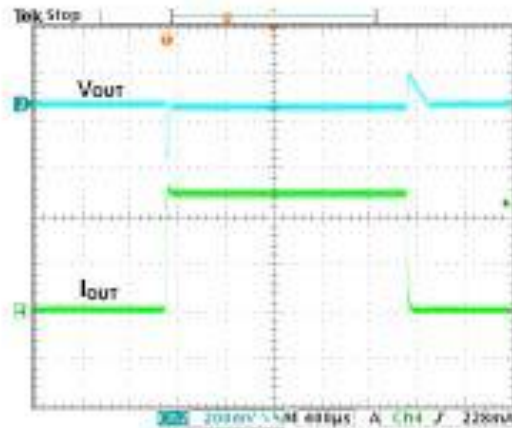


Typical Operating Characteristics



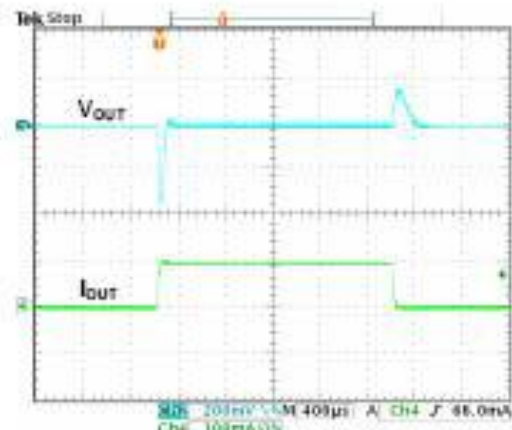
V_{IN}=3.3V, V_O=10V, I_O=100mA, L1=10μH

Figure 18. Operation Waveform



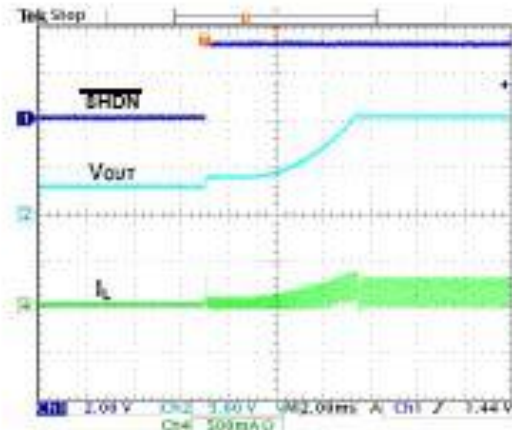
V_{IN}=3.6V, V_O=5V, I_O=5 to 250mA, CFF=220pF

Figure 19. Load Step Response



V_{IN}=3.3V, V_O=10V, I_O=5 to 250mA, CFF=220pF

Figure 20. Load Step Response



V_{IN}=3.3V, V_{OUT}=10V, I_O=50mA, C88=33nF

Figure 21. Start-Up from Shutdown



Applications Information

Inductor Selection

The recommended value of inductor for 30V applications are 4.7 to 22 μ H. Small size and better efficiency are the major concerns for portable device, such as LP3317 used for mobile phone. The inductor should have low core loss at 1MHz and low DCR for better efficiency. To avoid inductor saturation current rating should be considered.

Constant Output Voltage Control

The output voltage of the LP3317 can be adjusted by the divider circuit on the FB pin. Typical FB voltage is 1250mV. The output voltage can be calculated by the following Equations.

$$V_{out}=(R1+R2)/R2*V_{FB}$$

Power Sequence

In order to assure the normal soft start function for suppressing the inrush current, the input voltage should be ready before EN pulls high.

Current Limiting

The current flow through inductor as charging period is detected by a current sensing circuit. As the value comes across the current limiting threshold, the N-MOSFET will be turned off so that the inductor will be forced to leave charging stage and enter discharging stage. Therefore, the inductor current will not increase over the current limiting threshold.

UVLO/OTP

The input voltage is lower than a specified value, the chip will enter protection mode to prevent abnormal function. As the die temperature is higher than 150°C, the chip also will enter protection mode.

The power MOSFET will be turned off during protection mode to prevent abnormal operation.

Thermal Considerations

For continuous operation, do not exceed absolute maximum operation junction temperature. The maximum power dissipation depends on the thermal resistance of IC package, PCB layout, the rate of surroundings airflow and temperature difference between junction and ambient. The maximum power dissipation can be calculated by following formula:

$$P_D=(T_J-T_A)/\theta_{JA}$$

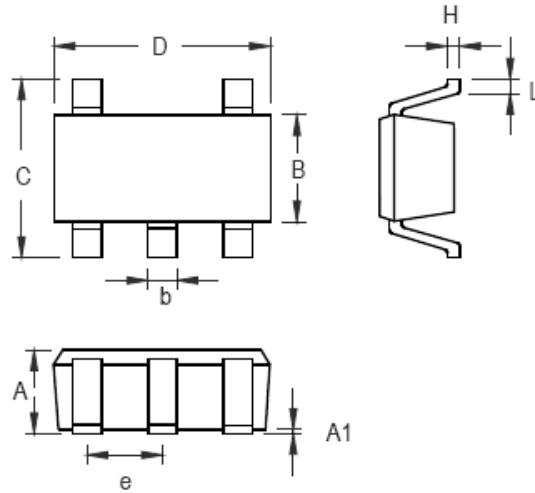
Layout Consideration

For best performance of the LP3317, the following guidelines must be strictly followed.

- Input and Output capacitors should be placed close to the IC and connected to ground plane to reduce noise coupling.
- Keep the main current traces as possible as short and wide.
- LX node of DC-DC converter is with high frequency voltage swing. It should be kept at a small area.
- Place the feedback components as close as possible to the IC and keep away from the noisy devices.



Packaging Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.889	1.295	0.035	0.051
A1	0.000	0.152	0.000	0.006
B	1.397	1.803	0.055	0.071
b	0.356	0.559	0.014	0.022
C	2.591	2.997	0.102	0.118
D	2.692	3.099	0.106	0.122
e	0.838	1.041	0.033	0.041
H	0.080	0.254	0.003	0.010
L	0.300	0.610	0.012	0.024

SOT-23-5 Surface Mount Package

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