



LC2329

4A, 18V High Efficiency Synchronous Step-Down Converter

DESCRIPTION

The LC2329 is a wide input range, high-efficiency, DC-to-DC step-down switching regulator, capable of delivering up to 4A of output current. Current mode PWM control allows the use of small external components, such as ceramic input and output caps, as well as small inductors, while still providing low output ripples. On top of the integrated internal synchronous rectifier that eliminates external Schottky diode, LC2329 also employs a proprietary control scheme that switches the device into a power save mode during light load, thereby extending the range of high efficiency operation. Therefore, LC2329 is a much superior solution in comparison to other competitions in terms of efficiency and cost. Overall, LC2329 is a highly efficient and robust solution for DC-DC step-down applications that requires wide input ranges.

The LC2329 is available in ESOP8 package.

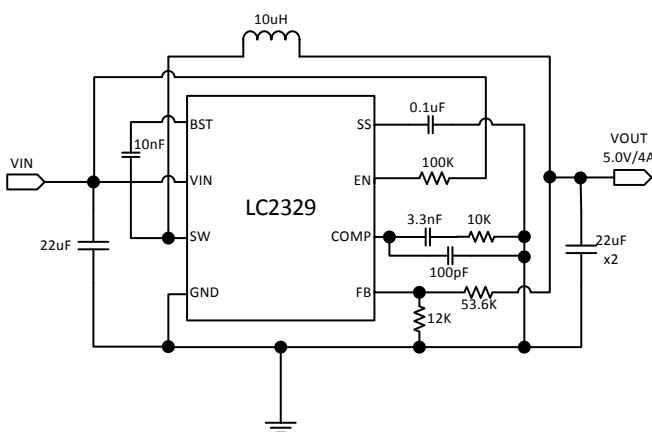
FEATURES

- Wide Input Operating Range from 4.5V to 18V
- High Efficiency: Up to 95% at Light Load
- Capable of Delivering 4A
- No external Schottky Diode Needed
- Inductor Short Circuit Protection
- Current Mode Control
- 0.923V Reference for Low Output Voltages
- Logic Control Shutdown
- Thermal Shutdown and UVLO
- Available inESOP8 Package

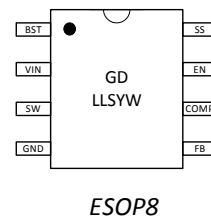
APPLICATIONS

- LCD TVs
- Notebook computers
- FPGA power supplies
- LED drivers

TYPICAL APPLICATION



MARK and PIN OUT



ORDERING INFORMATION

Mark Explanation	Ordering Information	
GD: Product Code	ESOP8 2500pcs/reel	LC2329CS8TR
LL: Lot No.		
S: Fab code		
YW: Date code		

PINOUT DESCRIPTION

PIN #	NAME	DESCRIPTION
1	BST	High side power transistor gate drive boost input.
2	VIN	Power input. Bypass with a 22uF ceramic capacitor to GND.
3	SW	Power switching node to connect inductor.
4	GND	Ground.
5	FB	Feedback input with reference voltage set to 0.923.
6	COMP	Compensation node. A serial RC connected to this pin is required to maintain the Buck converter control loop stable.
7	EN	Enable input. Set this pin to high level to enable the part, low level to disable.
8	SS	Soft-start node. Connecting a 0.1uF capacitor to ground make the Buck converter output rise smoothly.

ABSOLUTE MAXIMUM RATING

Parameter	Value
Input Voltage	-0.3V to 20V
SW.EN Voltage	-0.3V to VIN +0.3V
BST Voltage	-0.3V to SW+6V
FB Voltage	-0.3V to 6V
SW to ground current	Internally limited
Ambient Temperature(Ta)	-40°C - 85°C
Storage Temperature(Ts)	-55°C - 150°C

Note:

Exceed these limits to damage to the device. Exposure to absolute maximum rating conditions may affect device reliability.

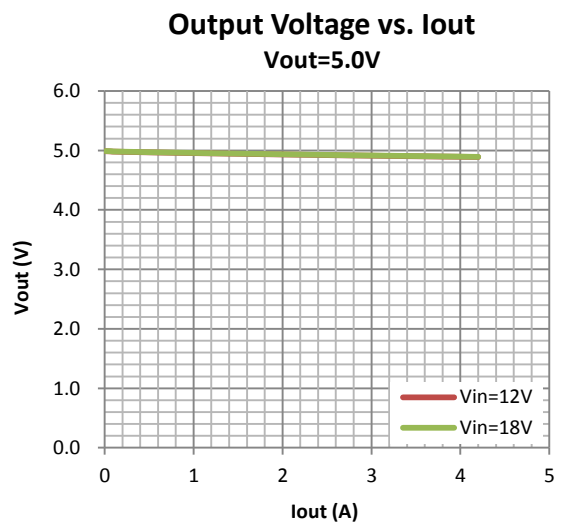
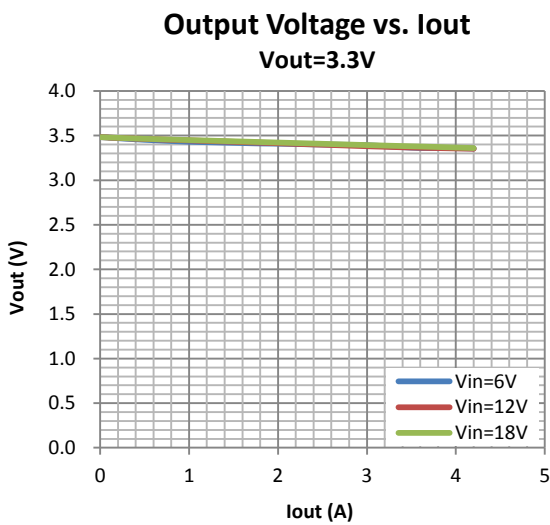
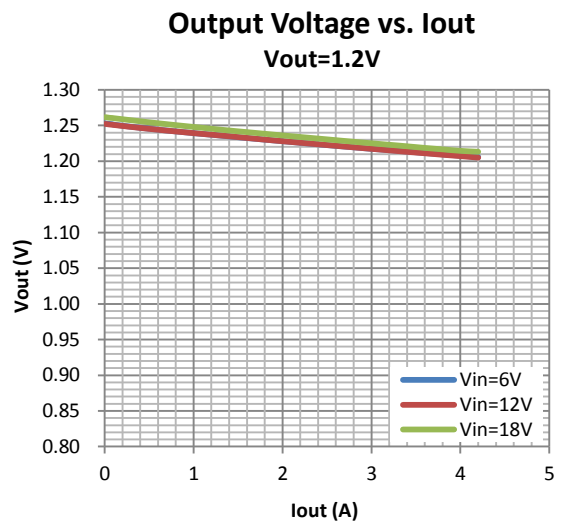
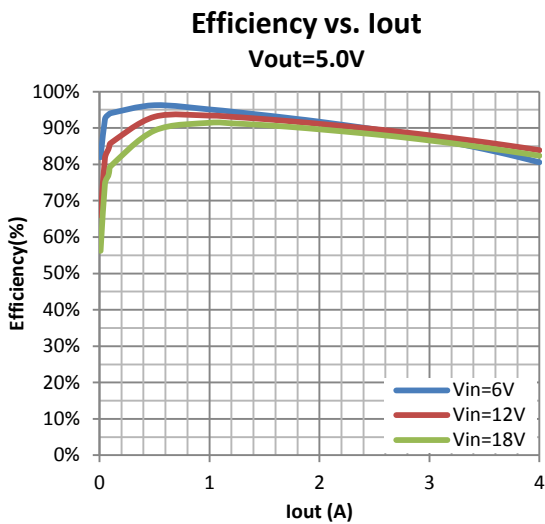
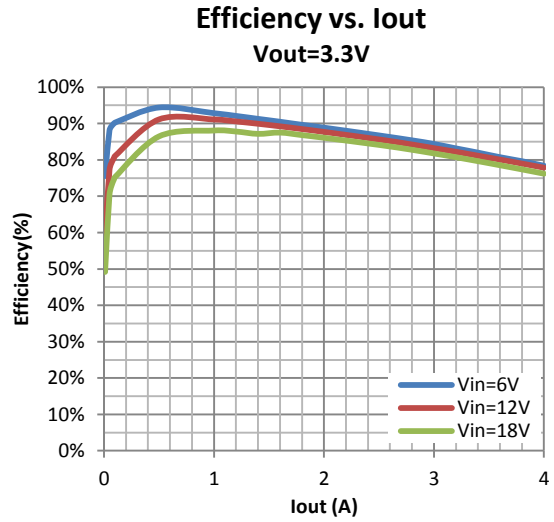
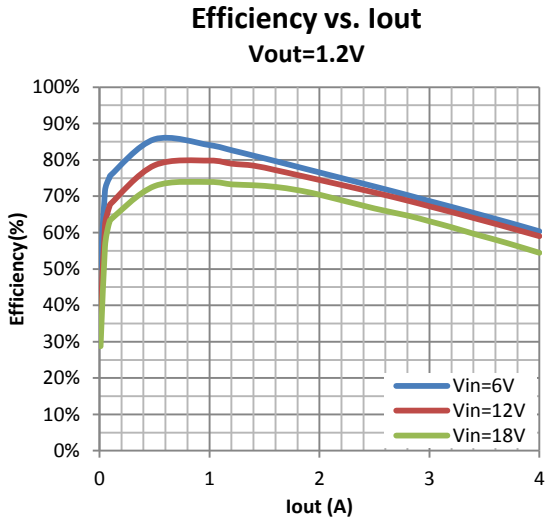
ELECTRICAL CHARACTERISTICS

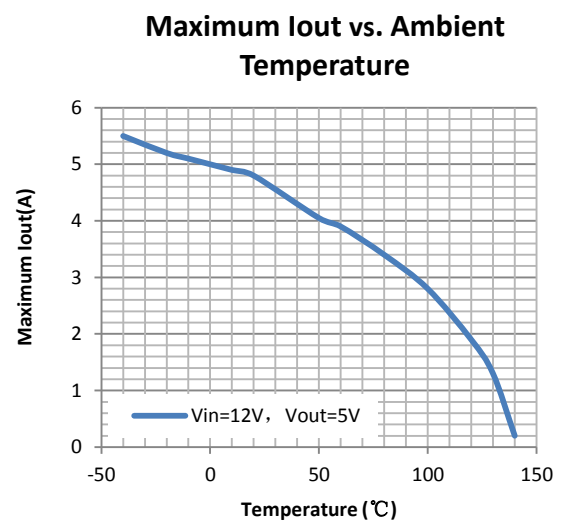
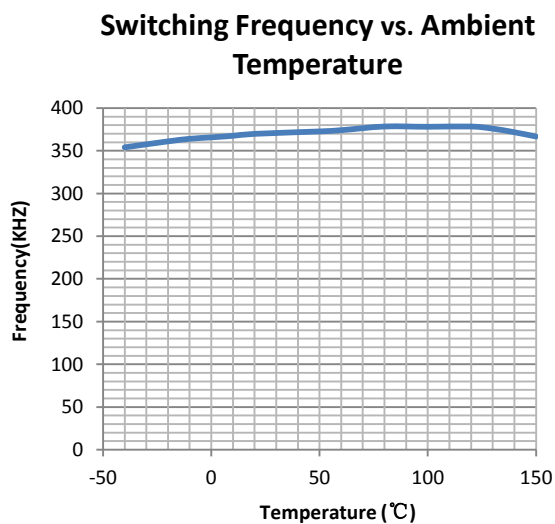
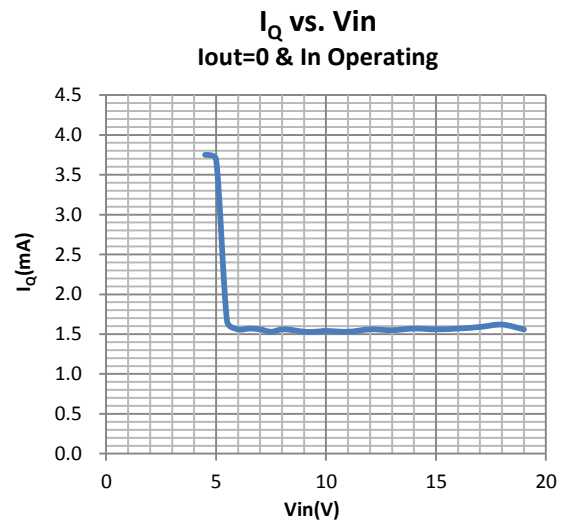
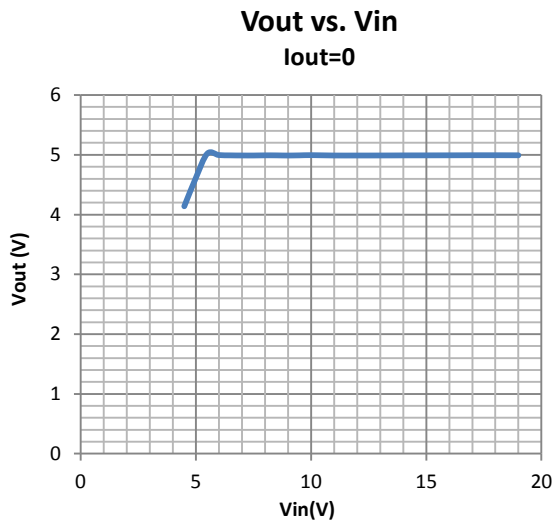
(Vin=5V, TA=25 °C, unless specified otherwise)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Vin	Input Voltage Range		4.2		18	V
VUVLO	Input UVLO	Rising. Hysteresis=140mV		3.55		V
Vref	Feedback Voltage		0.904	0.923	0.942	V
I _{fb}	Feedback Input current			0.01		uA
I _Q	Quiescent Current	Active, Vfb=1V, No Switching		1.6		mA
		Shutdown		6		uA
	Error Amp Trans conductance			800		uS
F _{sw}	Switching Frequency			340		KHz
R _{dsonP}	PMOS R _{dson}			90		mΩ
R _{dsonN}	NMOS R _{dson}			85		mΩ
I _{limit}	Peak Current Limit			6		A
I _{sw}	SW Leakage Current	VIN=12V, VSW=0 or 12V. EN=GND			10	uA
I _{EN}	EN Input Current				1	uA
V _{enh}	EN High Threshold		1.5			V
V _{enl}	EN Low Threshold				0.5	V
TSD	Over Temperature Protection	Hysteresis=40°C		150		°C

TYPICAL PERFORMANCE CHARACTERISTICS

($V_{in}=12V$, $V_{out}=3.3V$, $L=10\mu H$, $C_{in}=10\mu F$, $C_{out}=22\mu F$, $T_A=25^\circ C$, unless otherwise stated)





FUNCTIONAL DESCRIPTIONS

Loop Operation

The LC2329 is a wide input range, high-efficiency, DC-to-DC step-down switching regulator, capable of delivering up to 4A of output current, integrated with a 90/85mΩ synchronous MOSFET pair, eliminating the need for external diode. It uses a PWM current-mode control scheme. An error amplifier integrates error between the FB signal and the internal reference voltage. The output of the integrator is then compared to the sum of a current-sense signal and the slope compensation ramp. This operation generates a PWM signal that modulates the duty cycle of the power MOSFETs to achieve regulation for output voltage.

Current Limit

There is a cycle-by-cycle current limit on the high-side MOSFET of 6A(typ). When the current flowing out of SW exceeds this limit, the high-side MOSFET turns off and the synchronous rectifier turns on. Unlike the traditional method of current limiting by limiting the voltage at the compensation pin, which usually has large variation due to duty cycle variance, this type of peak current limiting scheme provides a relatively more accurate limit for output current, thereby lowering the requirements for system design.

Light Load Operation

Traditionally, a fixed constant frequency PWM DC-DC regulator always switches even when the output load is small. When energy is shuffling back and forth through the power MOSFETs, power is lost due to the finite R_{DS(ON)} of the MOSFETs and parasitic capacitances. At light load, this loss is prominent and efficiency is therefore very low. LC2329

employs a proprietary control scheme that improves efficiency in this situation by enabling the device into a power save mode during light load, thereby extending the range of high efficiency operation.

COMPONENT SELECTION

V_{OUT} (V)	C_{OUT} (μ F)	L (μ H)
8	22x2	22
5	22x2	15
3.3	22x2	10
2.5	22x2	6.8
1.8	22x2	4.7
1.2	22x2	3.3

PACKAGE OUTLINE

