

300KHz 36V 5A Switching Current Boost DC/DC Converter**XL6008****Features**

- Wide 3.6V to 36V Input Voltage Range
- 1.25V reference adjustable version
- Fixed 300KHz Switching Frequency
- Maximum 5A Switching Current
- SW PIN Built in Over Voltage Protection
- Excellent line and load regulation
- EN PIN TTL shutdown capability
- Internal Optimize Power MOSFET
- High efficiency
- Built in Frequency Compensation
- Built in Thermal Shutdown Function
- Built in Current Limit Function
- Available in TO252-5L package

Applications

- Boost DC/DC Converter
- Car Adapter
- LED Lighting

General Description

The XL6008 regulator is fixed frequency PWM Boost (step-up) DC/DC converter, capable of driving 5A switching current with excellent line and load regulation. The regulator is simple to use because it includes internal frequency compensation and a fixed-frequency oscillator so that it requires a minimum number of external components to work.

The PWM control circuit is able to adjust the duty ratio linearly from 0 to 95%. An enable function, an over current protection function is built inside. An internal compensation block is built in to minimize external component count.

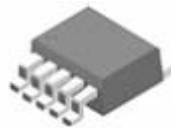


Figure1. Package Type of XL6008

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Pin Configurations

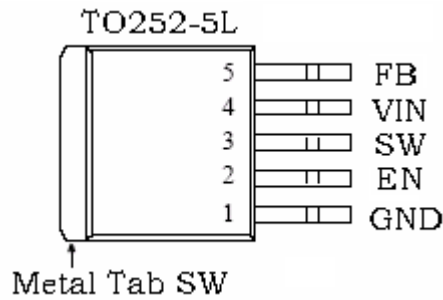


Figure2. Pin Configuration of XL6008 (Top View)

Table 1 Pin Description

Pin Number	Pin Name	Description
1	GND	Ground Pin.
2	EN	Enable Pin. Drive EN pin low to turn off the device, drive it high to turn it on. Floating is default high.
3	SW	Power Switch Output Pin (SW). Output is the switch node that supplies power to the output.
4	VIN	Supply Voltage Input Pin. XL6008 operates from a 3.6V to 36V DC voltage. Bypass Vin to GND with a suitably large capacitor to eliminate noise on the input.
5	FB	Feedback Pin (FB). The feedback threshold voltage is 1.25V.

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Function Block

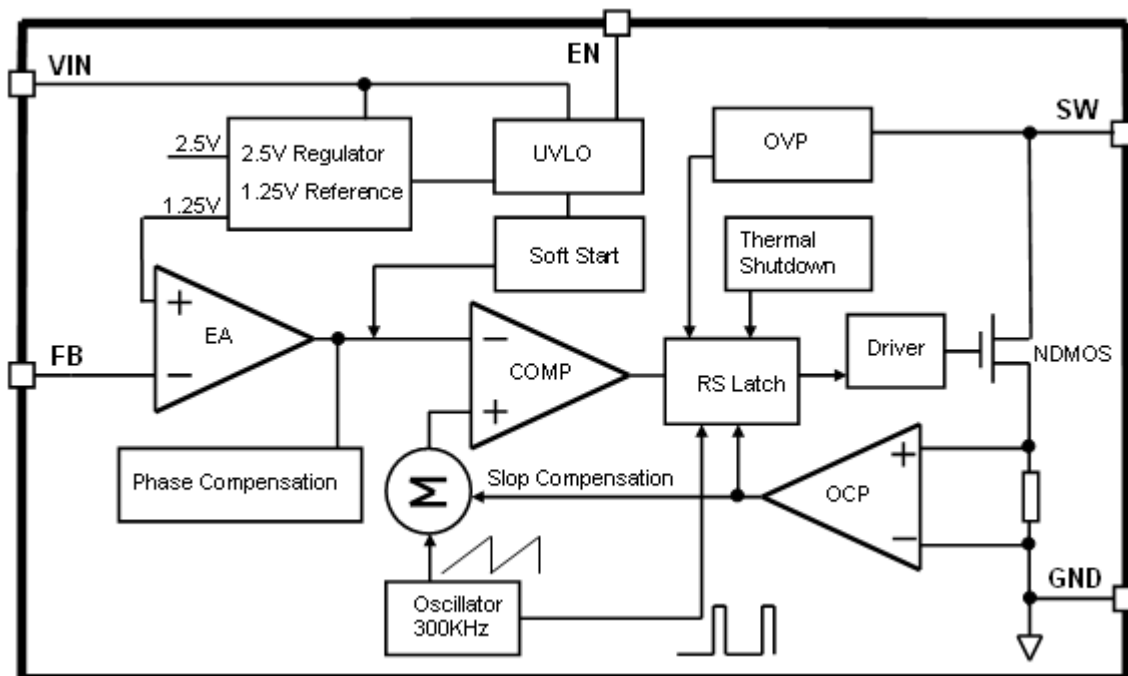


Figure3. Function Block Diagram of XL6008

Typical Application Circuit

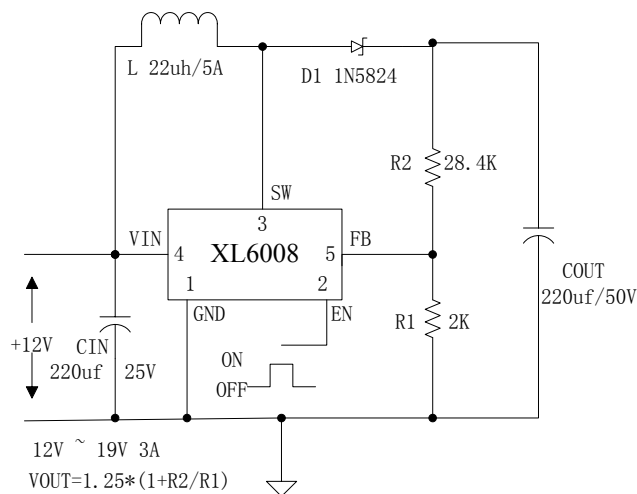


Figure4. XL6008 Typical Application Circuit

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Ordering Information

Package	Temperature Range	Part Number	Marking ID	Packing Type
		Lead Free	Lead Free	
		XL6008E1	XL6008E1	Tube
		XL6008TRE1	XL6008E1	Tape & Reel

XLSEMI Pb-free products, as designated with “E1” suffix in the par number, are RoHS compliant.

Absolute Maximum Ratings (Note1)

Parameter	Symbol	Value	Unit
Input Voltage	V _{in}	-0.3 to 40	V
Feedback Pin Voltage	V _{FB}	-0.3 to V _{in}	V
EN Pin Voltage	V _{EN}	-0.3 to V _{in}	V
Output Switch Pin Voltage	V _{Output}	-0.3 to V _{in}	V
Power Dissipation	P _D	Internally limited	mW
Thermal Resistance (SOP8) (Junction to Ambient, No Heatsink, Free Air)	R _{JA}	100	°C/W
Operating Junction Temperature	T _J	-40 to 125	°C
Storage Temperature	T _{STG}	-65 to 150	°C
Lead Temperature (Soldering, 10 sec)	T _{LEAD}	260	°C
ESD (HBM)		2000	V

Note1: Stresses greater than those listed under Maximum Ratings may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operation is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

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XL6008 Electrical Characteristics

$T_a = 25^\circ\text{C}$; unless otherwise specified.

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
<i>System parameters test circuit figure4</i>						
VFB	Feedback Voltage	$V_{in} = 3.6\text{V to }10\text{V}, V_{out}=12\text{V}$ $I_{load}=0.1\text{A to }0.5\text{A}$	1.225	1.25	1.275	V
Efficiency	η	$V_{in}=5\text{V}, V_{out}=12\text{V}$ $I_{out}=1.5\text{A}$	-	90	-	%

Electrical Characteristics (DC Parameters)

$V_{in} = 12\text{V}$, $GND=0\text{V}$, V_{in} & GND parallel connect a $220\mu\text{f}/50\text{V}$ capacitor; $I_{out}=0.5\text{A}$, $T_a = 25^\circ\text{C}$; the others floating unless otherwise specified.

Parameters	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Input operation voltage	V_{in}		3.6		36	V
Shutdown Supply Current	I_{STBY}	$V_{EN}=0\text{V}$		50	100	μA
Quiescent Supply Current	I_q	$V_{EN} = 2\text{V},$ $V_{FB} = V_{in}$		3	5	mA
Oscillator Frequency	F_{osc}		255	300	345	Khz
Switch Current Limit	I_L	$V_{FB} = 0$		5.5		A
EN Pin Threshold	V_{EN}	High (Regulator ON) Low (Regulator OFF)		1.4 0.8		V
EN Pin Input Leakage Current	I_H	$V_{EN} = 2\text{V (ON)}$		3	10	μA
	I_L	$V_{EN} = 0\text{V (OFF)}$		3	10	μA
Max. Duty Cycle	D_{MAX}	$V_{FB}=0\text{V}$		95		%

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Schottky Diode Selection Table

Current	Surface Mount	Through Hole	VR (The same as system maximum input voltage)				
			20V	30V	40V	50V	60V
1A		✓	1N5817	1N5818	1N5819		
		✓	1N5820	1N5821	1N5822		
3A		✓	MBR320	MBR330	MBR340	MBR350	MBR360
	✓		SK32	SK33	SK34	SK35	SK36
	✓			30WQ03	30WQ04	30WQ05	
		✓		31DQ03	31DQ04	31DQ05	
		✓	SR302	SR303	SR304	SR305	SR306
		✓	1N5823	1N5824	1N5825		
5A		✓	SR502	SR503	SR504	SR505	SR506
		✓	SB520	SB530	SB540	SB550	SB560
	✓			50WQ03	50WQ04	50WQ05	
		✓					

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Typical System Application for 12V ~ 19V 3A (Car Notebook Adapter)

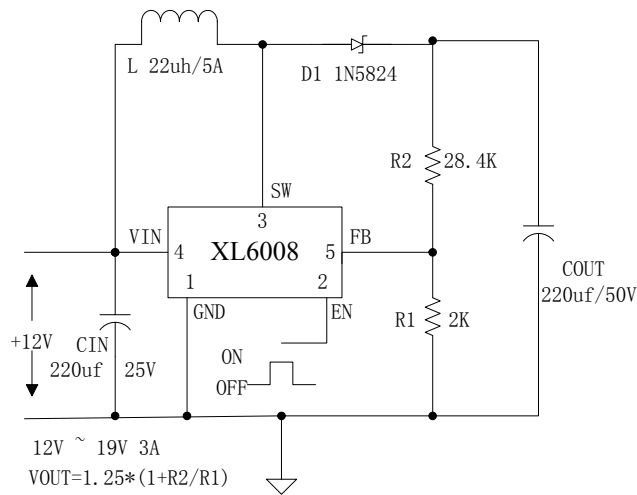


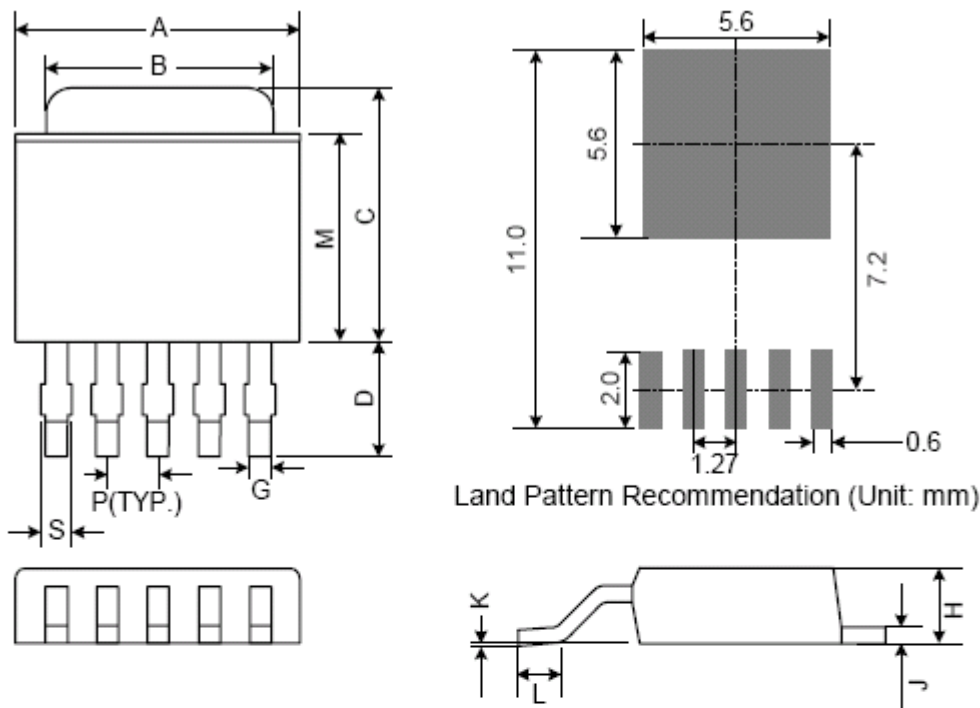
Figure5. XL6008 System Parameters Test Circuit (12V ~ 19V 3A)

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Package Information

TO252-5L



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	6.35	6.60	6.85	0.250	0.260	0.270
B	5.20	5.35	5.50	0.205	0.211	0.217
C	6.80	7.00	7.30	0.268	0.276	0.287
D	2.20	2.50	2.80	0.087	0.098	0.110
P	1.27 REF.			0.050 REF.		
S	0.50	0.65	0.80	0.020	0.026	0.031
G	0.40	0.50	0.63	0.016	0.020	0.025
H	2.20	2.30	2.40	0.087	0.091	0.094
J	0.45	0.52	0.58	0.018	0.020	0.023
K	0.00	0.08	0.15	0.000	0.003	0.006
L	0.90	1.20	1.63	0.035	0.047	0.064
M	5.40	5.80	6.20	0.213	0.228	0.244