

### Features

- Operation Voltage: 2.5V~25V
- Output Voltage: 3V~32V
- Shutdown Current: 3uA
- Fixed 1.2MHz Switching Frequency
- 600mA Constant Output Current Capability
- Built in High Frequency Power Transistor
- Built in Schottky Diode
- High Efficiency up to 87%
- Excellent line and load regulation
- EN PIN TTL ON/OFF capability
- Boost or SEPIC Topologies
- Built in Output Overvoltage protection function
- Built in thermal shutdown function
- Device HBM ESD Classification Level Class3A
- Available in DFN3X3-8 package

### General Description

XL6109 is a built in high frequency power transistor and Schottky diode Boost DC/DC converter, fixed 1.2MHz frequency PWM, can support input operating voltage range of 2.5V~25V, built in frequency compensation circuitry allows the use of small external components at a price suitable for lowering the cost of the entire power supply system and reduce the printed circuit board space.

The output voltage is adjustable by external divider resistors, and the low feedback voltage of 410mV reduces the power consumption of the external sampling resistors, the EN pin supports TTL ON/OFF, and the built in output overvoltage protection and thermal shutdown protection. Suitable for very low quiescent current and ultra-small size applications.

### Applications

- Panel Power Supply
- GPS Receiver
- DSL modem
- Wearable portable electronic devices

### Typical application schematic

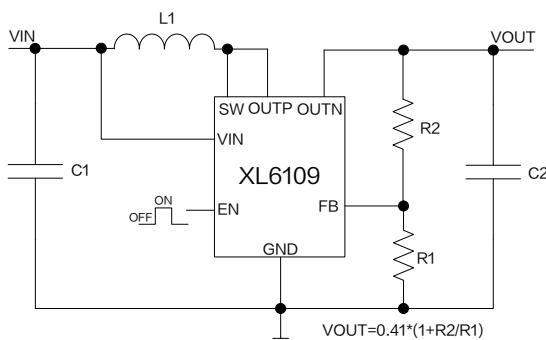
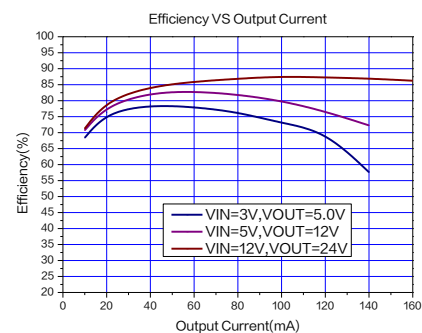


Figure1. XL6109 Typical application schematic and efficiency curve



600mA 1.2MHz 36V Built in SBD Boost DC/DC Converter

XL6109

## Pin Configurations

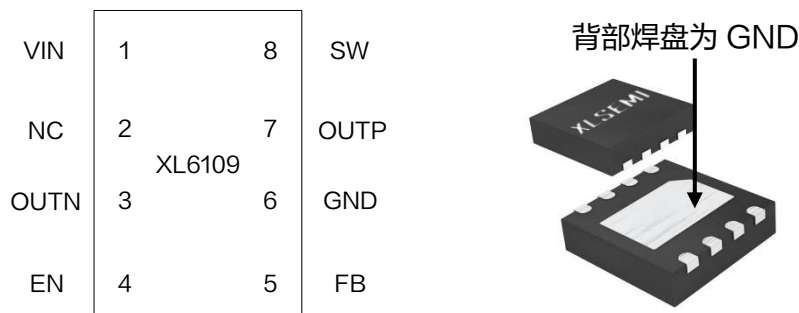


Figure2. Pin Configuration of XL6109

Table 1. Pin Description

Pin Number	Pin Name	Description
1	VIN	Supply Voltage Input Pin. XL6109 operates from 2.5V to 25V DC voltage. Bypass Vin to GND with a suitably large capacitor to eliminate noise on the input.
2	NC	No Connected.
3	OUTN	Output Pin. Internal Schottky diode cathode Pin.
4	EN	Enable Pin. Drive EN pin high to turn on the device, drive it low to turn it off. Floating is default high.
5	FB	Feedback Pin. Through an external resistor divider network, FB senses the output voltage and regulates it. The feedback threshold voltage is 410mV.
6	GND	Ground Pin.
7	OUTP	Internal Schottky diode anode Pin.
8	SW	Power Switch Pin.

## Ordering Information

Order Information	Marking ID	Package Type	Eco Plan	Packing Type Supplied As
XL6109	XL6109	DFN3X3-8	RoHS & HF	5000 Units on Reel

### Function Block

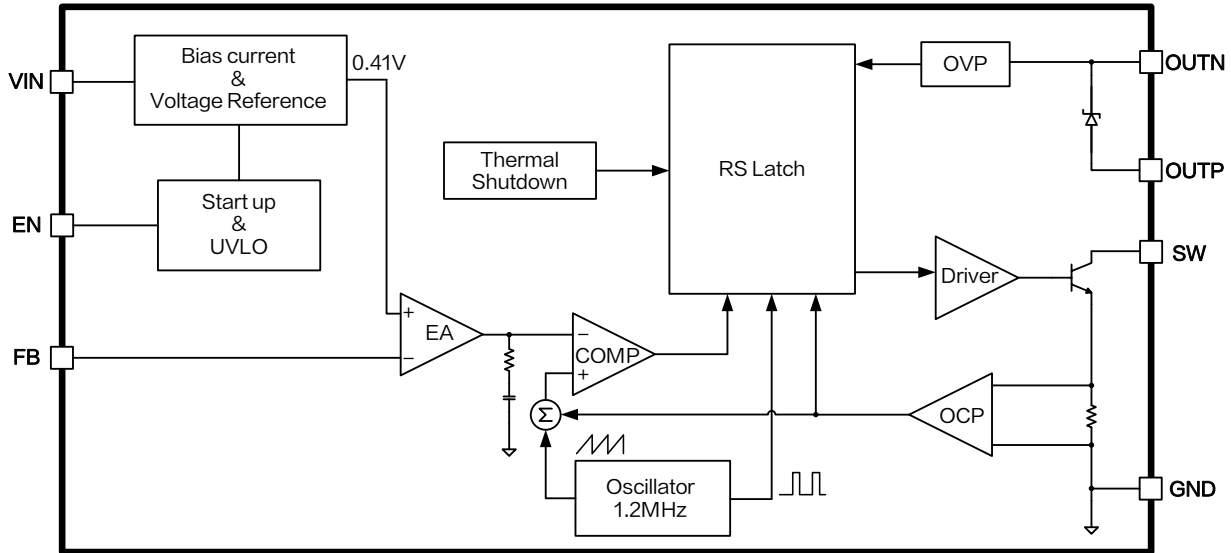


Figure3. Function Block Diagram of XL6109

### Absolute Maximum Ratings ( Note1 )

Parameter	Symbol	Value	Unit
Input Voltage	$V_{IN}$	-0.3~32	V
EN Pin Voltage	$V_{EN}$	-0.3~ $V_{IN}$	V
Feedback Pin Voltage	$V_{FB}$	-0.3~ $V_{IN}$	V
Switch Pin Voltage	$V_{SW}$	-0.3~40	V
OUTN Pin Voltage	$V_{OUTN}$	-0.3~40	V
Power Dissipation	$P_D$	250	mW
Thermal Resistance (DFN3X3-8) (Junction to Ambient, No Heatsink, Free Air)	$R_{JA}$	55	°C/W
Maximum Junction Temperature	$T_J$	-40~150	°C
Operating Junction Temperature	$T_J$	-40~125	°C
Storage Temperature	$T_{STG}$	-65~150	°C
Lead Temperature (Soldering, 10 sec)	$T_{LEAD}$	260	°C
ESD (HBM)		>4000	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.

600mA 1.2MHz 36V Built in SBD Boost DC/DC Converter

XL6109

## XL6109 Electrical Characteristics

T<sub>A</sub> = 25°C; system parameters test circuit figure5, unless otherwise specified.

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
V <sub>FB</sub>	Feedback Voltage	V <sub>IN</sub> =5V, V <sub>OUT</sub> =12V I <sub>OUT</sub> =30mA	401.8	410	418.2	mV
η	Efficiency	V <sub>IN</sub> =5V, V <sub>OUT</sub> =12V I <sub>OUT</sub> =50mA	-	82.6	-	%
η	Efficiency	V <sub>IN</sub> =12V, V <sub>OUT</sub> =24V I <sub>OUT</sub> =0.1A	-	87.6	-	%

## Electrical Characteristics (DC Parameters)

T<sub>A</sub>=25°C, V<sub>IN</sub>=3V; system parameters test circuit figure4, unless otherwise specified.

Parameters	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Input operation voltage	V <sub>IN</sub>		2.5		25	V
Shutdown Supply Current	I <sub>S</sub>	V <sub>EN</sub> =0V OUTN flowing		3		uA
Quiescent Supply Current	I <sub>Q</sub>	V <sub>FB</sub> =2V		2.3		mA
Oscillator Frequency	F <sub>OSC</sub>		0.96	1.20	1.44	MHz
Switch Current Limit	I <sub>L</sub>	V <sub>FB</sub> =0V		650		mA
Switch V <sub>CE</sub> Saturation Voltage	V <sub>SAT</sub>	I <sub>SW</sub> =300mA		0.3		V
Schottky Forward Drop	V <sub>F</sub>	I <sub>F</sub> =300mA		0.8		V
EN Pin Threshold	V <sub>EN,H</sub>	High(ON)	2.0			V
	V <sub>EN,L</sub>	Low(OFF)			0.5	
Max. Duty Cycle	D <sub>MAX</sub>	V <sub>FB</sub> =0V		90		%
Over Voltage Protection	V <sub>OUT</sub>	V <sub>FB</sub> =0V		36		V
Thermal Shutdown Temperature	T <sub>SD</sub>			150		°C

## 600mA 1.2MHz 36V Built in SBD Boost DC/DC Converter

## XL6109

### Typical System Application–Single Li Battery Boost Driver Circuit ( $V_{OUT}=5.0V$ )

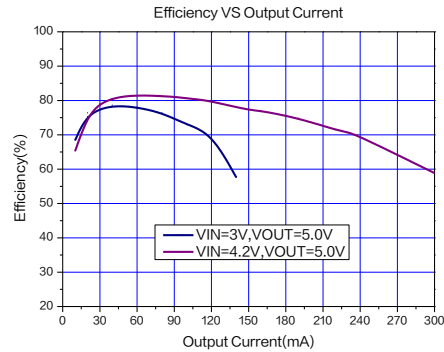
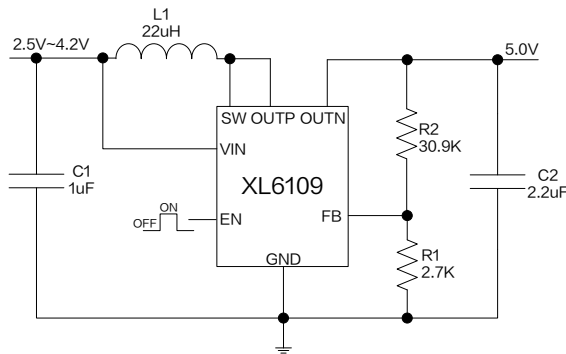


Figure4. XL6109 System Application and efficiency curve ( $V_{OUT}=5.0V$ )

Table 2. Figure4 Typical System Application Schematic Boom

Qty	Ref Des	Description	Mfg Part Number	Mfg
1	L1	22uH,1A,Inductor,3*3	YHNR3015-220M	YJYCOIN
1	C1	1uF,50V,Ceramic,X7R,0603	0603B105K500NT	Fenghua
1	C2	2.2uF,50V,Ceramic,X7R,0805	0805X225K500NT	Fenghua
1	R1	2.7KΩ,1%,1/16W,Thick Film,0603	RS-03K2701FT	Fenghua
1	R2	30.9KΩ,1%,1/16W,Thick Film,0603	RS-03K3092FT	Fenghua

### Typical System Application–Two Li Batteries Boost Driver Circuit ( $V_{OUT}=12V$ )

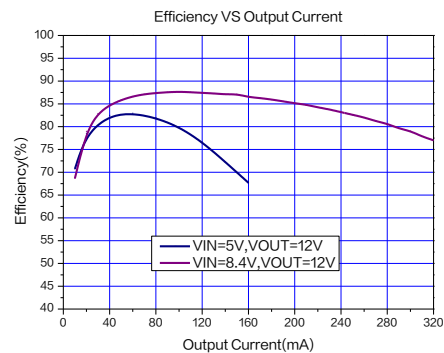
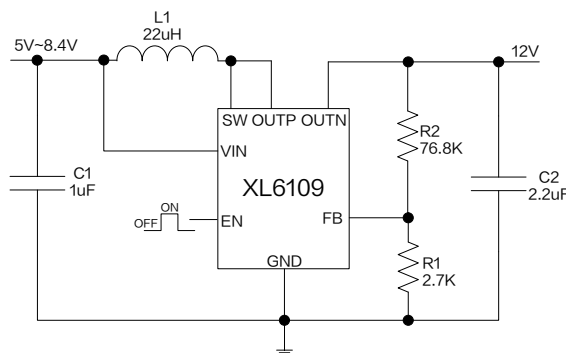


Figure5. XL6109 System Application and efficiency curve ( $V_{OUT}=12V$ )

Table 3. Figure5 Typical System Application Schematic Boom

Qty	Ref Des	Description	Mfg Part Number	Mfg
1	L1	22uH,1A,Inductor,3*3	YHNR3015-220M	YJYCOIN
1	C1	1uF,50V,Ceramic,X7R,0603	0603B105K500NT	Fenghua
1	C2	2.2uF,50V,Ceramic,X7R,0805	0805X225K500NT	Fenghua
1	R1	2.7KΩ,1%,1/16W,Thick Film,0603	RS-03K2701FT	Fenghua
1	R2	76.8KΩ,1%,1/16W,Thick Film,0603	RS-03K7682FT	Fenghua

## 600mA 1.2MHz 36V Built in SBD Boost DC/DC Converter

## XL6109

### Typical System Application– SEPIC Topology Circuit ( $V_{IN}=2.5V\sim 15V, V_{OUT}=5.0V$ )

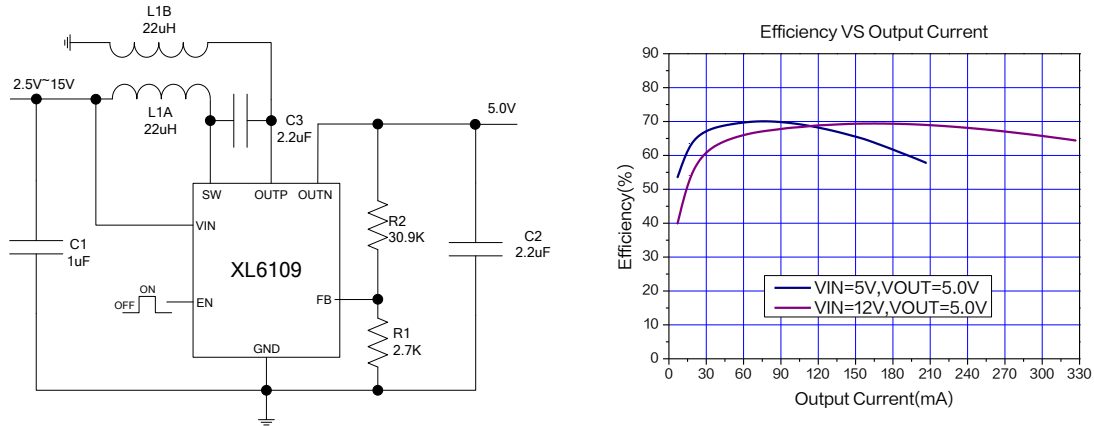


Figure6. XL6109 System Application and efficiency curve ( $V_{IN}=2.5V\sim 15V, V_{OUT}=5.0V$ )

Table 4. Figure6 Typical System Application Schematic Boom

Qty	Ref Des	Description	Mfg Part Number	Mfg
2	L1A,L1B	22uH,1A,Inductor,3*3	YHNR3015-220M	YJYCOIN
1	C1	1uF,50V,Ceramic,X7R,0603	0603B105K500NT	Fenghua
2	C2,C3	2.2uF,50V,Ceramic,X7R,0805	0805X225K500NT	Fenghua
1	R1	2.7K $\Omega$ ,1%,1/16W,Thick Film,0603	RS-03K2701FT	Fenghua
1	R2	30.9K $\Omega$ ,1%,1/16W,Thick Film,0603	RS-03K3092FT	Fenghua

### Typical System Application– SEPIC Topology Circuit ( $V_{IN}=2.5V\sim 15V, V_{OUT}=12V$ )

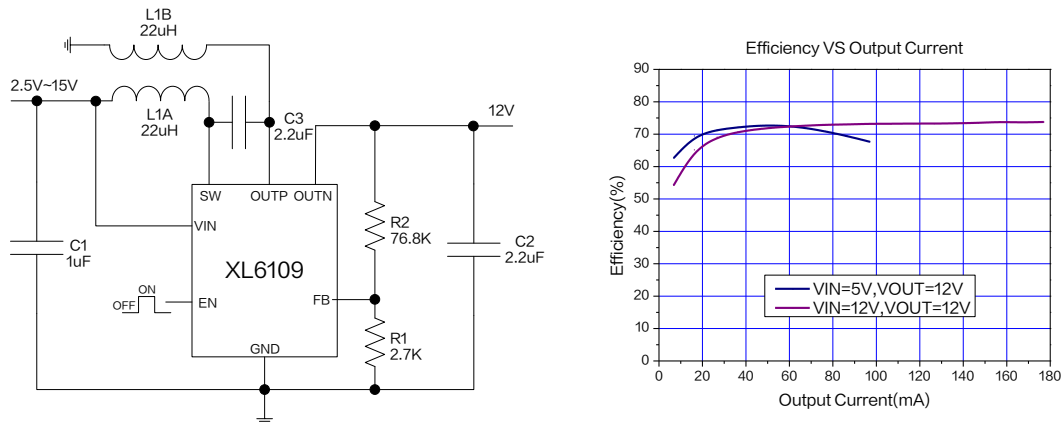
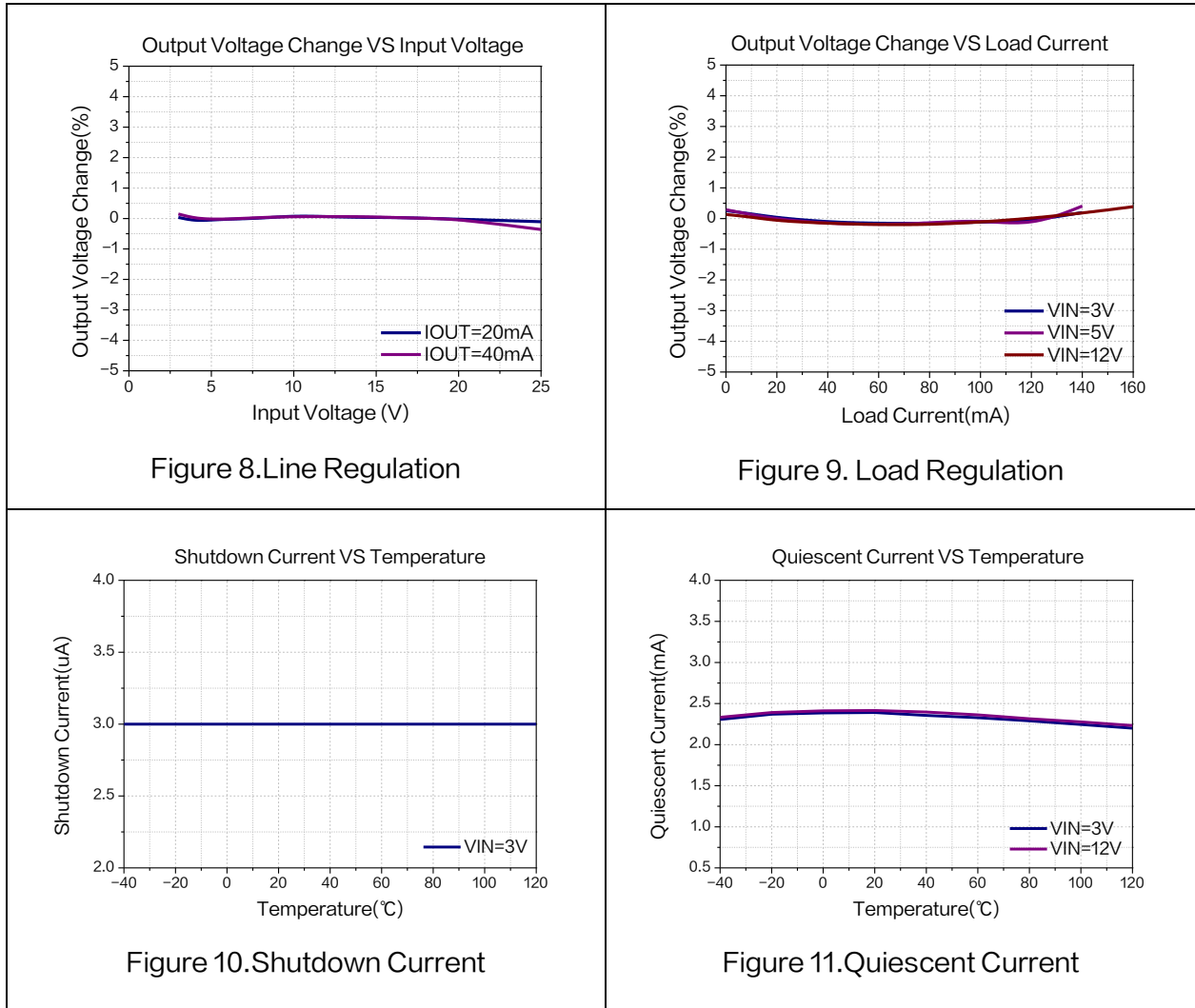


Figure7. XL6109 System Application and efficiency curve( $V_{IN}=2.5V\sim 15V, V_{OUT}=12V$ )

Table 5. Figure7 Typical System Application Schematic Boom

Qty	Ref Des	Description	Mfg Part Number	Mfg
2	L1A,L1B	22uH,1A,Inductor,3*3	YHNR3015-220M	YJYCOIN
1	C1	1uF,50V,Ceramic,X7R,0603	0603B105K500NT	Fenghua
2	C2,C3	2.2uF,50V,Ceramic,X7R,0805	0805X225K500NT	Fenghua
1	R1	2.7K $\Omega$ ,1%,1/16W,Thick Film,0603	RS-03K2701FT	Fenghua
1	R2	76.8K $\Omega$ ,1%,1/16W,Thick Film,0603	RS-03K7682FT	Fenghua

### Typical Characteristics



## 600mA 1.2MHz 36V Built in SBD Boost DC/DC Converter

XL6109

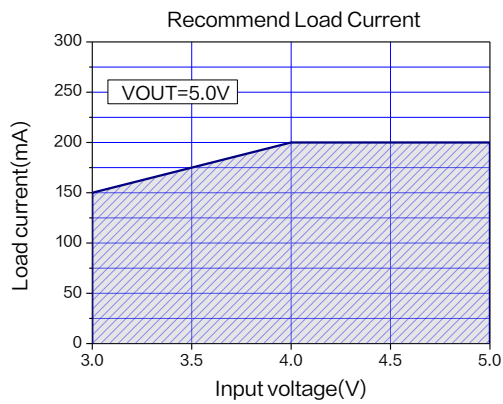


Figure 12. Max Output Current  
(V<sub>OUT</sub>=5.0V, T<sub>A</sub>=25°C)

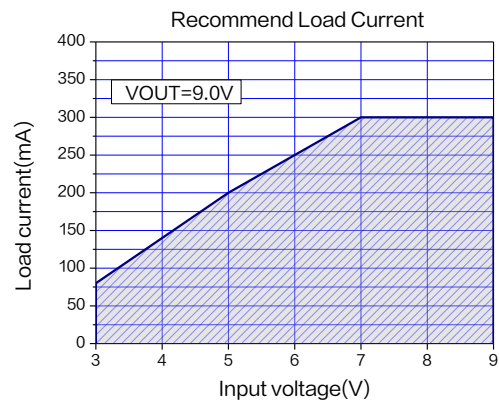


Figure 13. Max Output Current  
(V<sub>OUT</sub>=9.0V, T<sub>A</sub>=25°C)

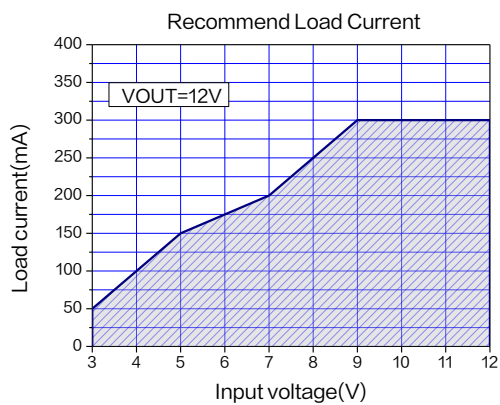


Figure 14. Max Output Current  
(V<sub>OUT</sub>=12V, T<sub>A</sub>=25°C)

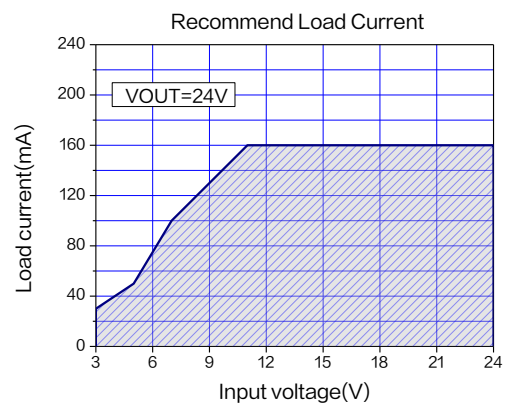


Figure 15. Max Output Current  
(V<sub>OUT</sub>=24V, T<sub>A</sub>=25°C)

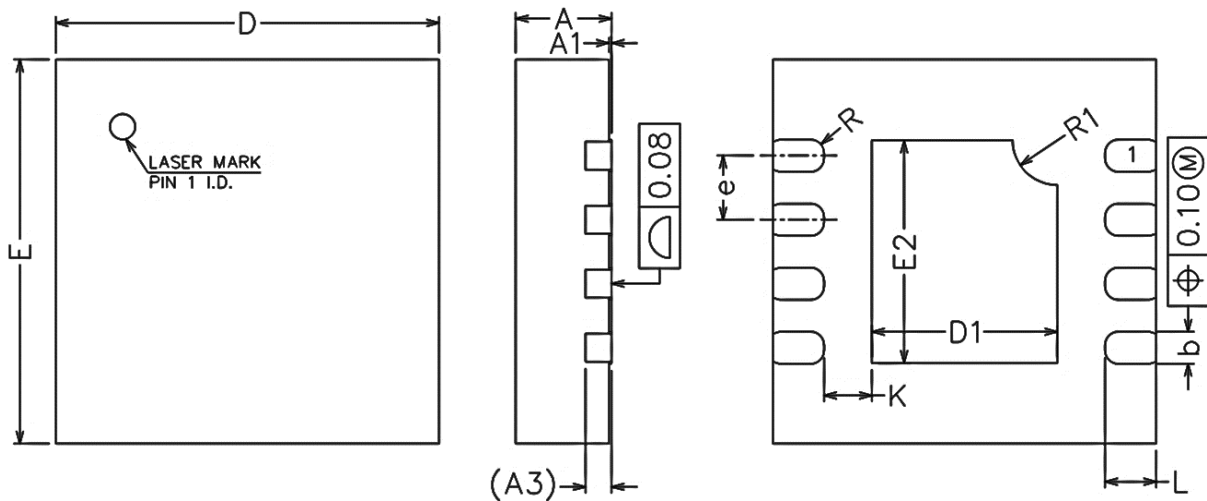


600mA 1.2MHz 36V Built in SBD Boost DC/DC Converter

XL6109

## Package Information

DFN3X3-8



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	0.700	0.750	0.800	0.027	0.030	0.032
A1	0.000	0.020	0.050	0.000	0.001	0.002
A3	0.203 REF.			0.008 REF.		
b	0.200	0.250	0.300	0.007	0.010	0.012
D	2.900	3.000	3.100	0.114	0.118	0.122
E	2.900	3.000	3.100	0.114	0.118	0.122
D2	1.350	1.450	1.550	0.053	0.057	0.061
E2	1.640	1.740	1.840	0.064	0.068	0.072
e	0.400	0.500	0.600	0.016	0.020	0.024
K	0.275	0.375	0.475	0.011	0.015	0.019
L	0.300	0.400	0.500	0.012	0.016	0.020
R	0.100 REF.			0.004 REF.		
R1	0.350 REF.			0.014 REF.		

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