180KHz 60V 5A Switching Current Boost DC/DC Converter XL6019

Features

- Wide 5V to 40V Input Voltage Range
- Positive or Negative Output Voltage Programming with a Single Feedback Pin
- Current Mode Control Provides Excellent Transient Response
- 1.25V reference adjustable version
- Fixed 180KHz 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 up to 94%
- Built in Frequency Compensation
- Built in Soft-Start Function
- Built in Thermal Shutdown Function
- Built in Current Limit Function
- Available in TO263-5L package

Applications

- EPC / Notebook Car Adapter
- Automotive and Industrial Boost / Buck-Boost / Inverting Converters
- Portable Electronic Equipment

General Description

The XL6019 regulator is a wide input range, current mode, DC/DC converter which is capable of generating either positive or negative output voltages. It can be configured as either a boost, flyback, SEPIC or inverting converter. The XL6019 built in N-channel power MOSFET and fixed frequency oscillator, current-mode architecture results in stable operation over a wide range of supply and output voltages.

The XL6019 regulator is special design for portable electronic equipment applications.

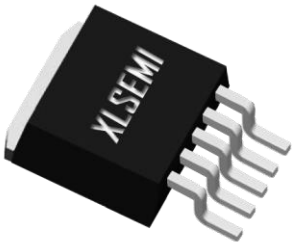


Figure1. Package Type of XL6019

Pin Configurations

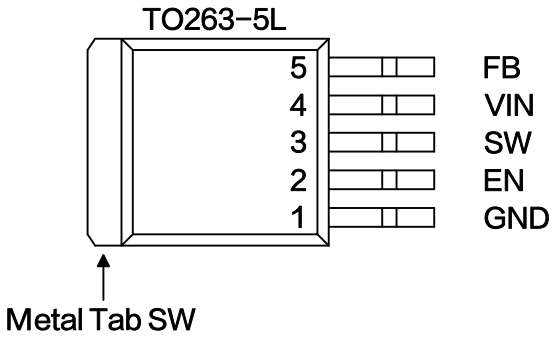


Figure2. Pin Configuration of XL6019 (Top View)

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).
4	VIN	Supply Voltage Input Pin. XL6019 operates from a 5V to 40V DC voltage. Bypass Vin to GND with a suitably large capacitor to eliminate noise on the input.
5	FB	Feedback Pin (FB). Through an external resistor divider network, FB senses the output voltage and regulates it. The feedback threshold voltage is 1.25V.

Function Block

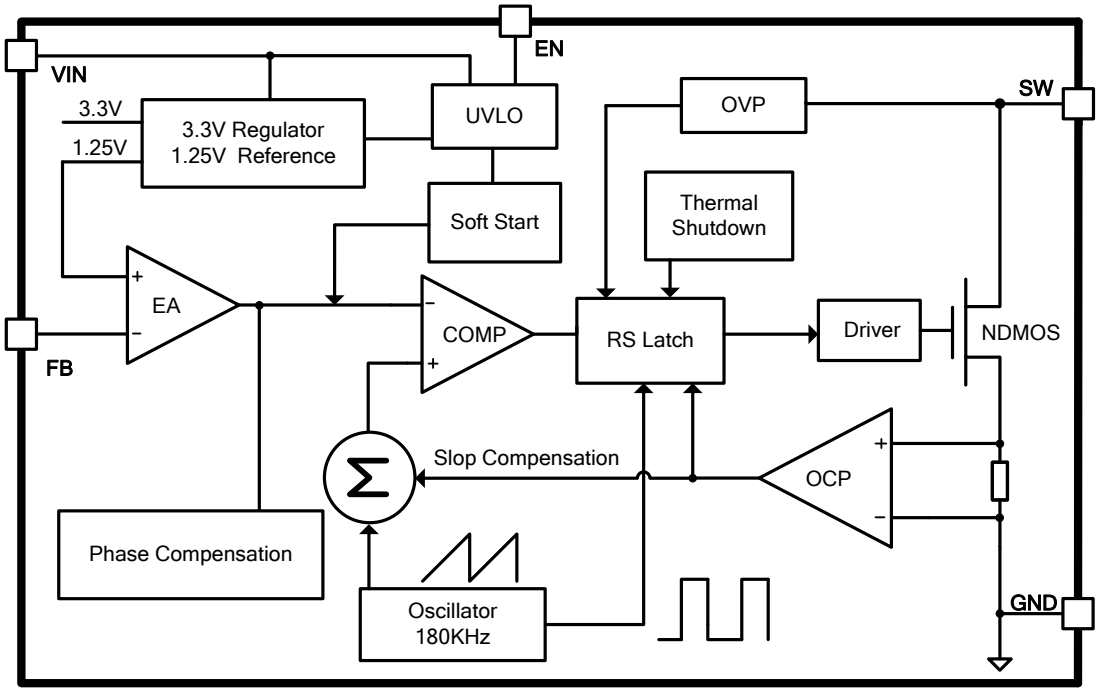


Figure3. Function Block Diagram of XL6019

Typical Application Circuit

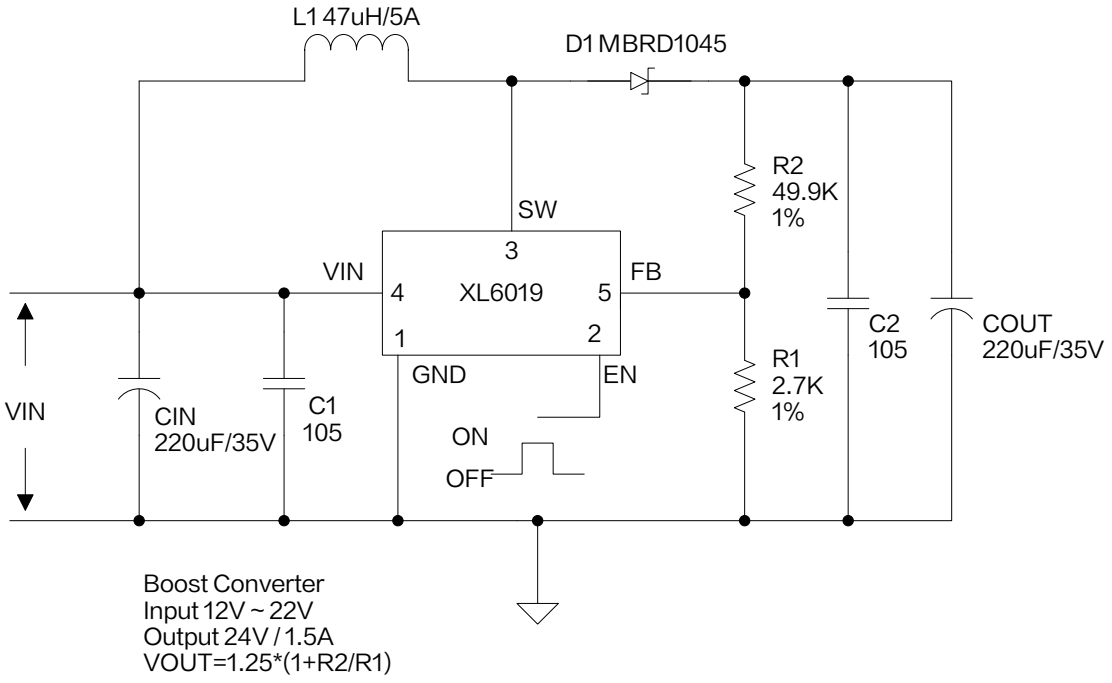


Figure4. XL6019 Typical Application Circuit (Boost Converter)

Ordering Information

Order Information	Marking ID	Package Type	Packing Type Supplied As
XL6019E1	XL6019E1	TO263-5L	800 Units on 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	Vin	-0.3 to 45	V
Feedback Pin Voltage	V_{FB}	-0.3 to Vin	V
EN Pin Voltage	V_{EN}	-0.3 to Vin	V
Output Switch Pin Voltage	V_{SW}	-0.3 to 60	V
Power Dissipation	P_D	Internally limited	mW
Thermal Resistance (TO263-5L) (Junction to Ambient, No Heatsink, Free Air)	R_{JA}	30	°C/W
Maximum Junction Temperature	T_J	-40 to 150	°C
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.

XL6019 Electrical Characteristics

T_a = 25℃;unless otherwise specified.

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
System parameters test circuit figure4						
VFB	Feedback Voltage	Vin = 12V to20V, Vout=24V Iload=0.1A to 1A	1.213	1.25	1.287	V
η	Efficiency	Vin=12V ,Vout=24V Iout=1A	–	93	–	%

Electrical Characteristics (DC Parameters)

Vin = 12V, GND=0V, Vin & GND parallel connect a 100uf/50V capacitor; Iout=0.5A, T_a = 25℃; the others floating unless otherwise specified.

Parameters	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Input operation voltage	Vin		5		40	V
Shutdown Supply Current	I_S	V_{EN}=0V		70	100	uA
Quiescent Supply Current	I_q	V_{EN} =2V, V_{FB} =Vin		2.5	5	mA
Oscillator Frequency	Fosc		144	180	253	KHz
SW OVP	V_{SW}	V_{FB} =0V		60		V
Switch Current Limit	I_L	V_{FB} =0V		5		A
Output Power NMOS	Rdson	Vin=12V, I_{SW}=5A		110	120	mohm
EN Pin Threshold	V_{EN}	High (Regulator ON)		1.4		V
		Low (Regulator OFF)		0.8		V
EN Pin Input Leakage Current	I_H	V_{EN} =2V (ON)		3	10	uA
	I_L	V_{EN} =0V (OFF)		3	10	uA
Max. Duty Cycle	D_{MAX}	V_{FB}=0V		90		%

Typical System Application (Recommend output current safe work range)

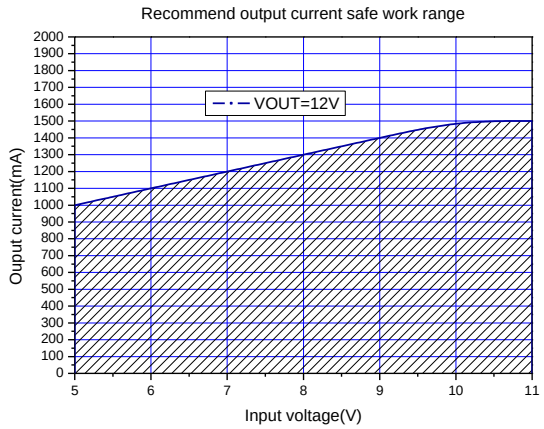


Figure5.Max output current (VOUT=12V)

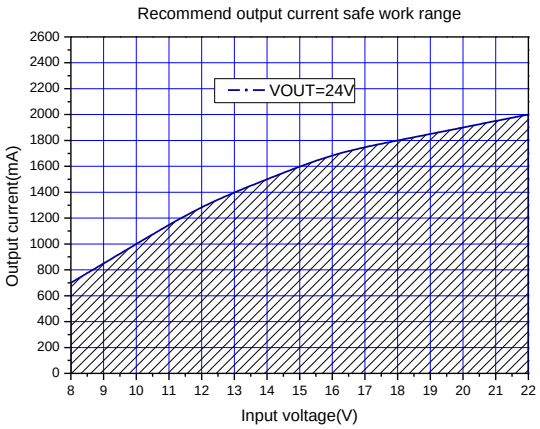


Figure6.Max output current (VOUT=24V)

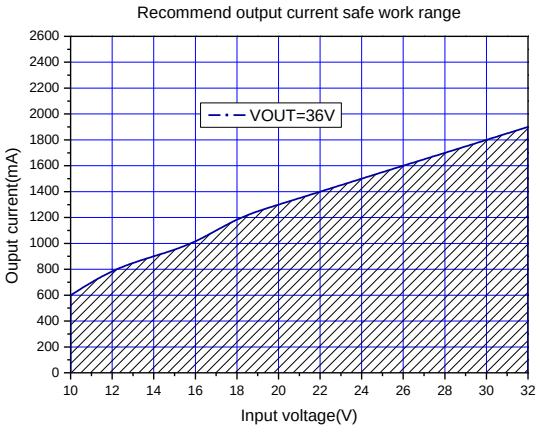


Figure7.Max output current (VOUT=36V)

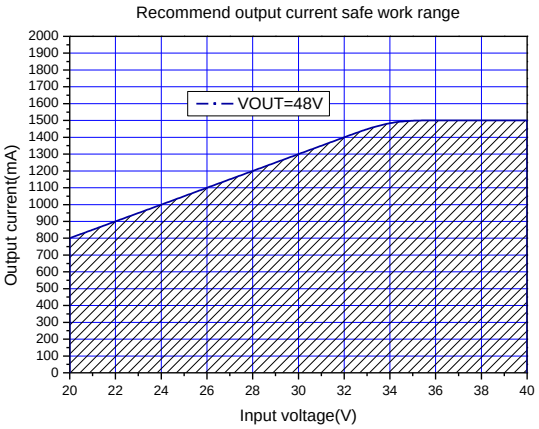


Figure8.Max output current(VOUT=48V)

Typical System Application(VIN=12V,VOUT=24V)

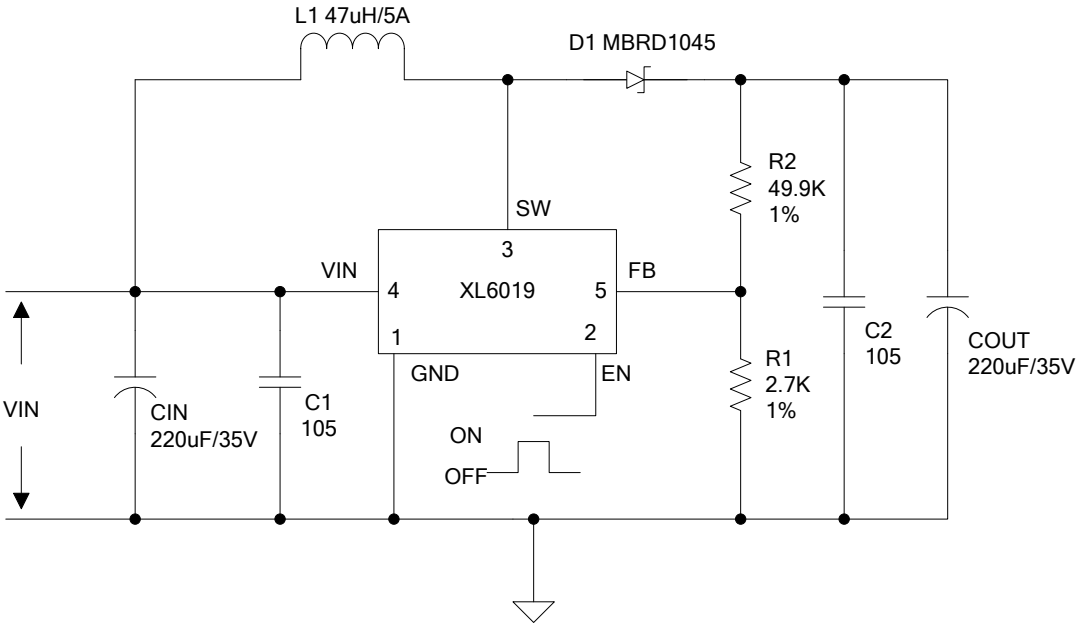


Figure9. XL6019 Typical System Application (VIN=12V,VOUT=24V)

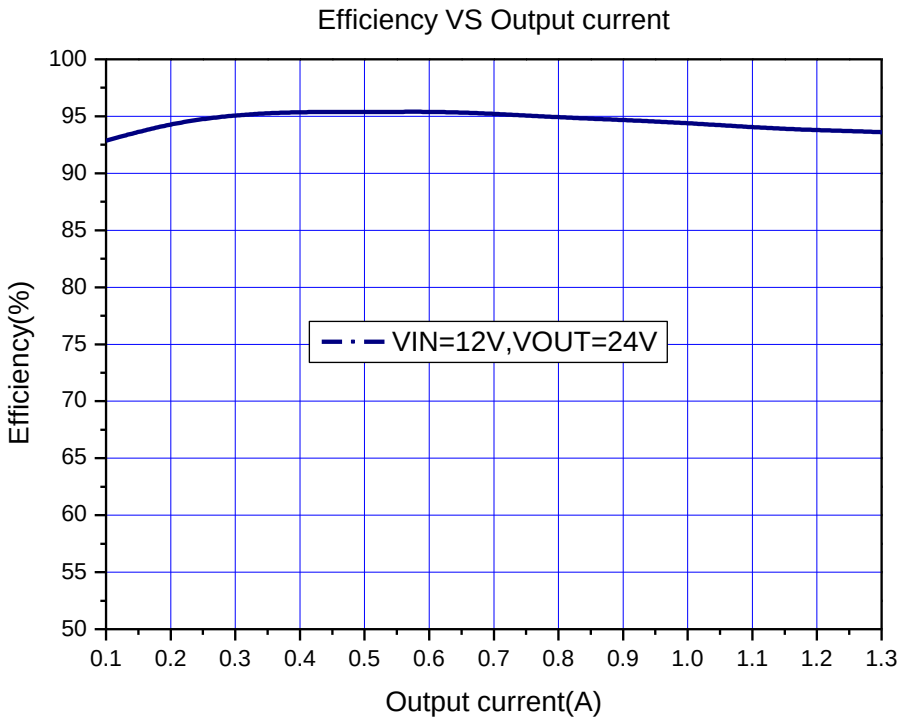


Figure10. XL6019 System Efficiency Curve (VIN=12V, VOUT=24V)

Typical System Application(VIN=5V,VOUT=12V)

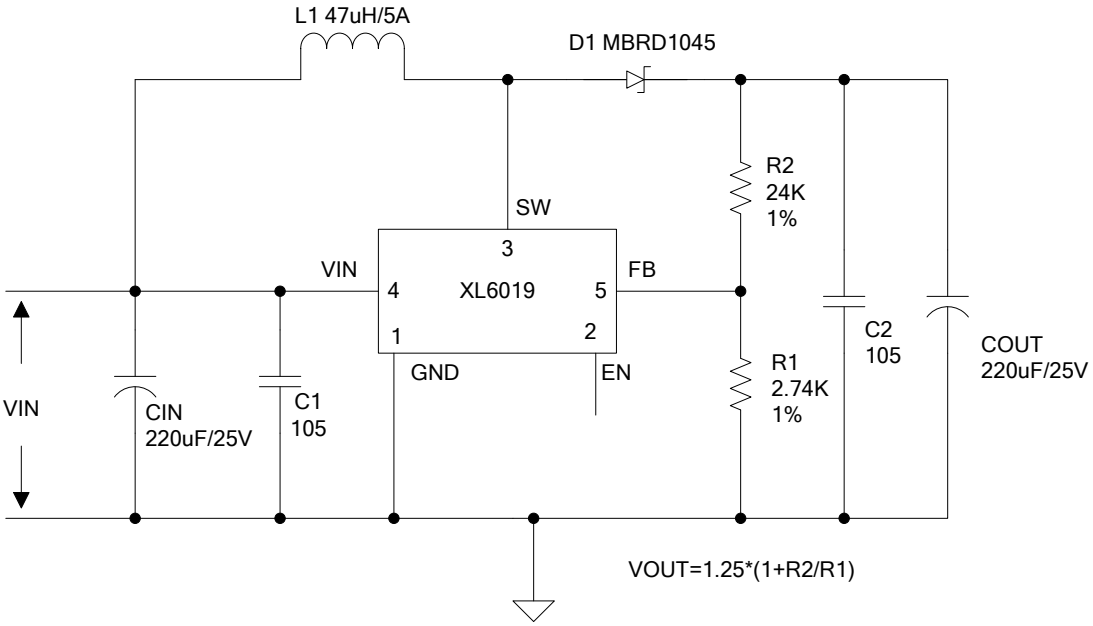


Figure11. XL6019 Typical System Application (VIN=5V,VOUT=12V)

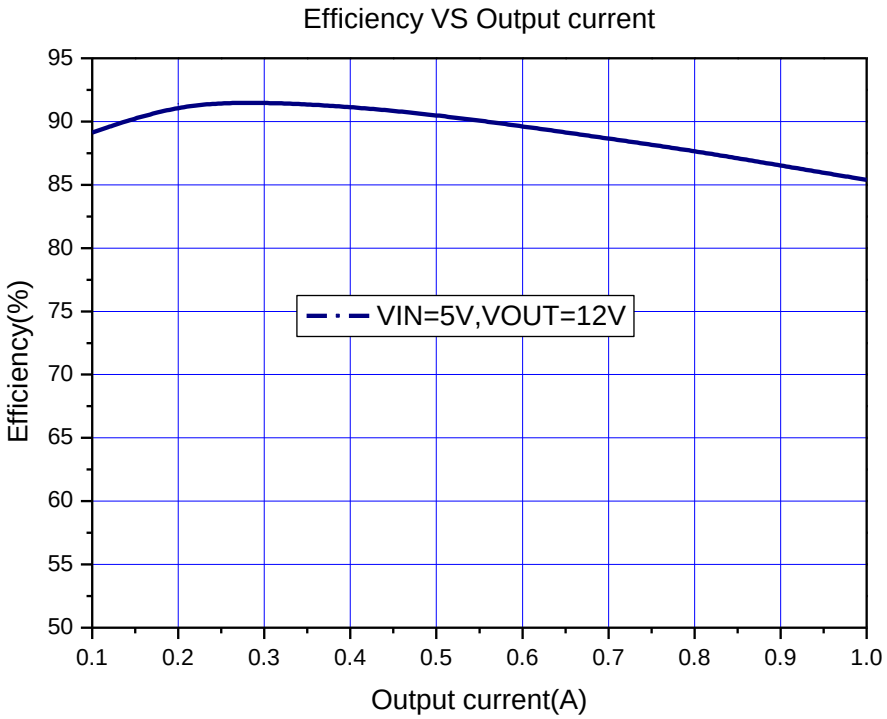


Figure12. XL6019 System Efficiency Curve (VIN=5V, VOUT=12V)

Typical System Application(VIN=10~32V,VOUT=36V)

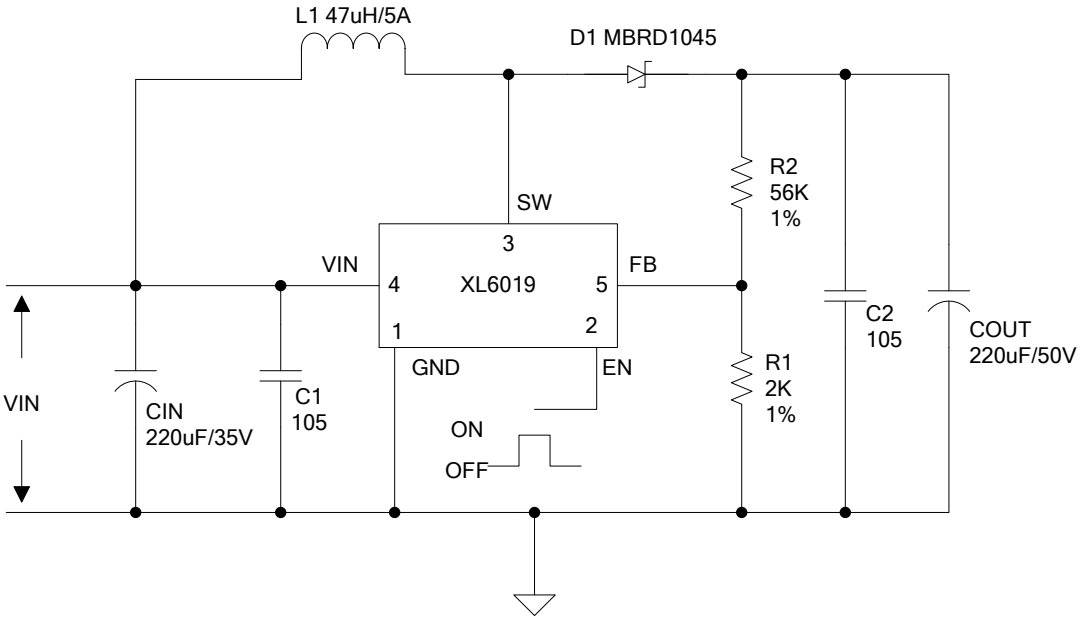


Figure13. XL6019 Typical System Application (VIN=10~32V,VOUT=36V)

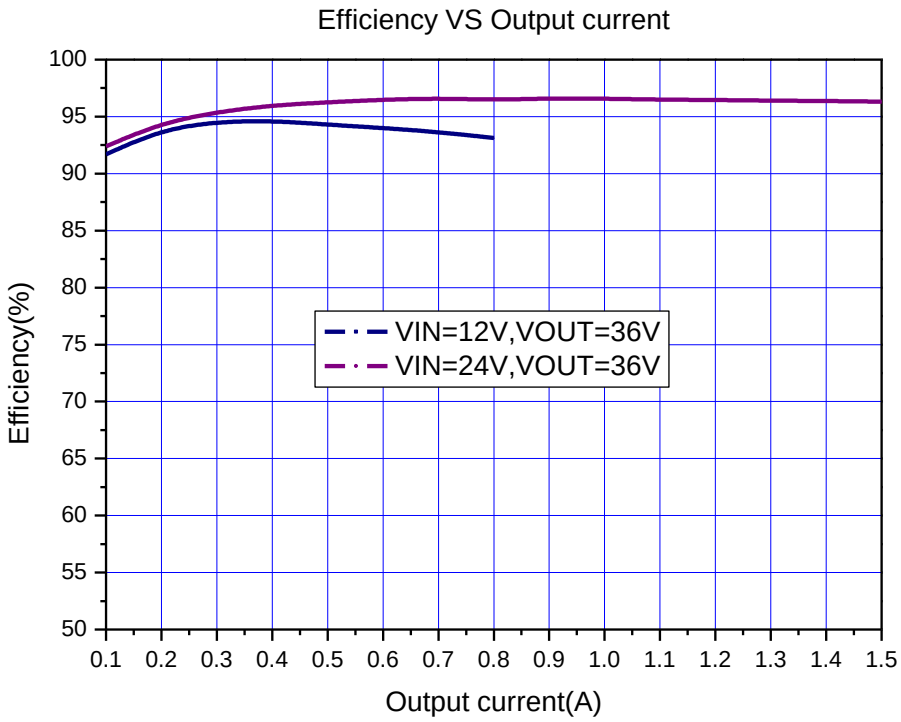


Figure14. XL6019 System Efficiency Curve (VIN=10~32V, VOUT=36V)

Typical System Application(VIN=20~40V,VOUT=48V)

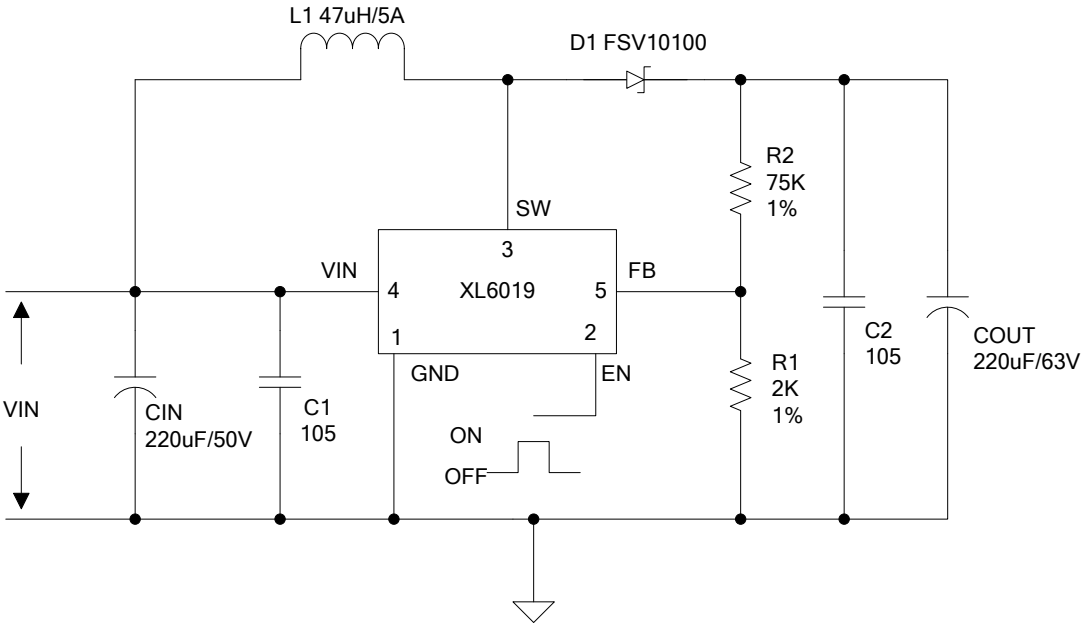


Figure15. XL6019 Typical System Application (VIN=20~40V,VOUT=48V)

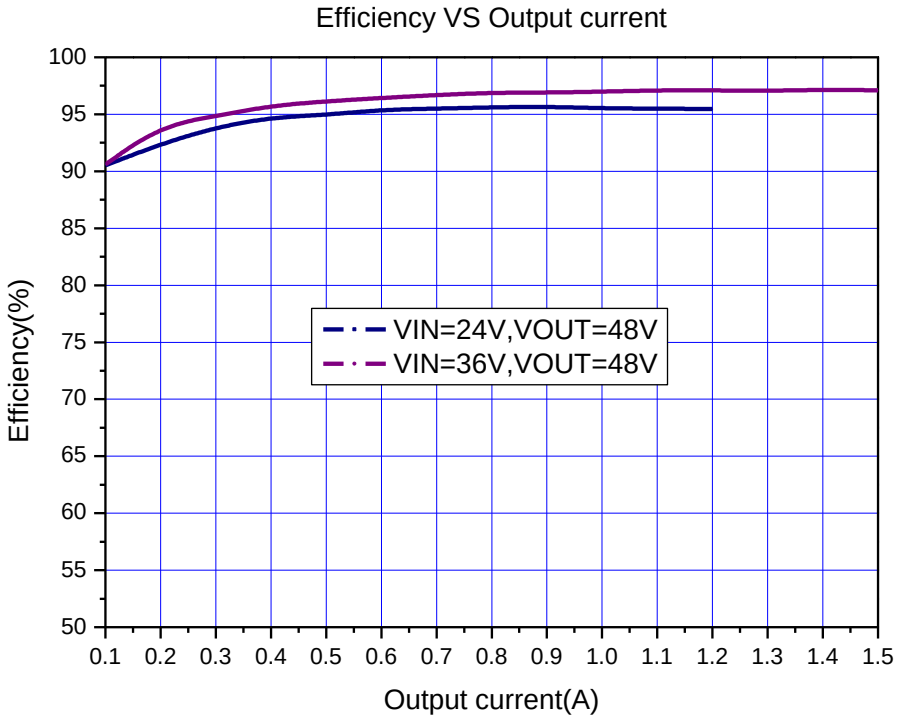


Figure16. XL6019 System Efficiency Curve (VIN=20~40V, VOUT=48V)

Typical System Application – SEPIC(VIN=10~30V,VOUT=12V)

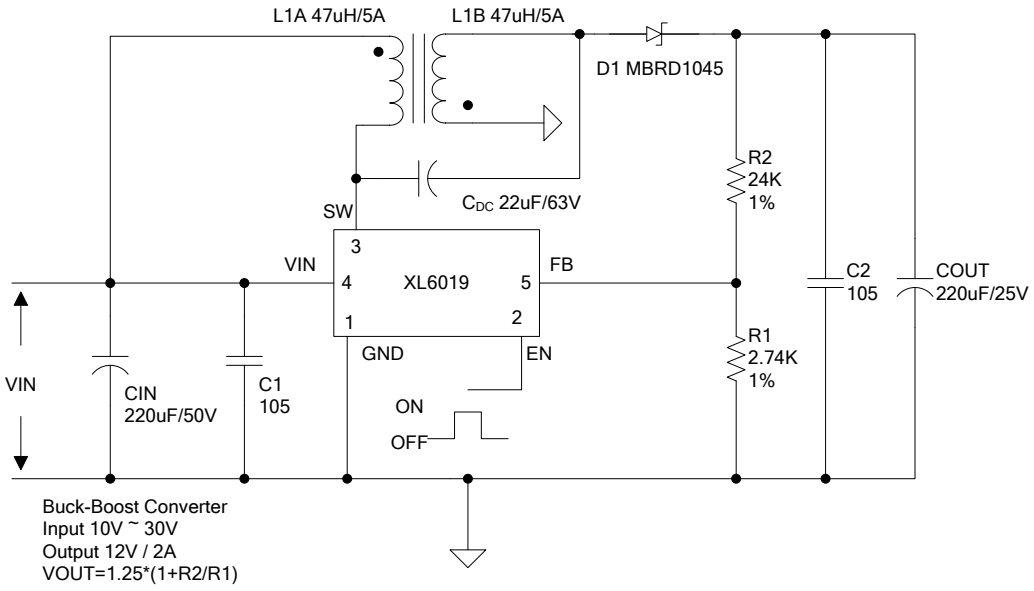


Figure17. XL6019 Typical System Application (VIN=10~30V,VOUT=12V)

Typical System Application for Inverting Converter–SEPIC Inverting Topology (VIN=10~30V,VOUT=±12V)

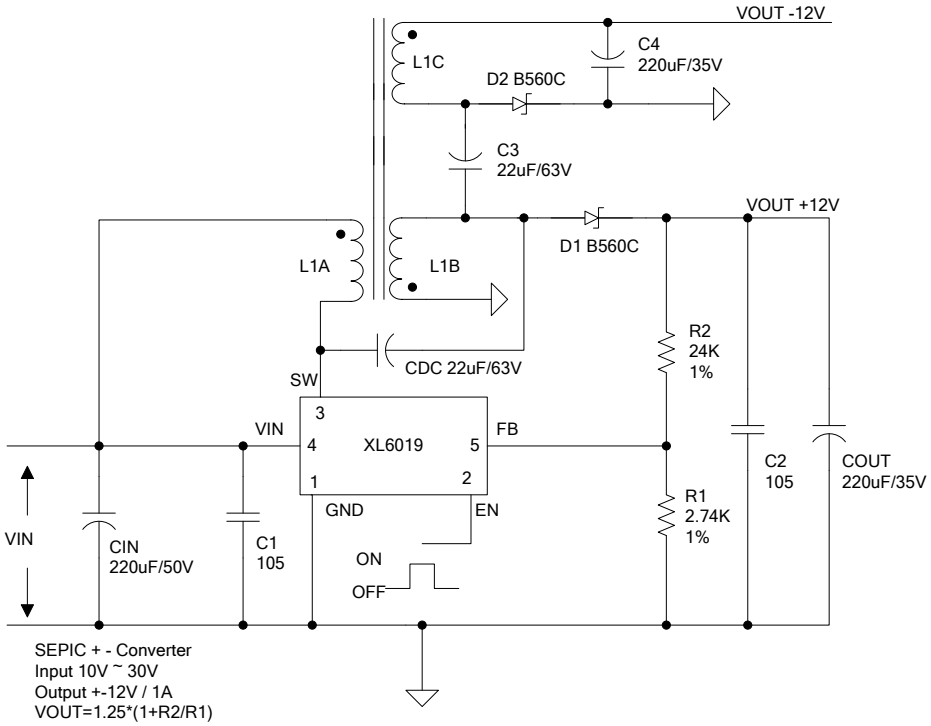


Figure18. XL6019 Typical System Application (VIN=10~30V,VOUT=±12V)

High Power Application Circuit

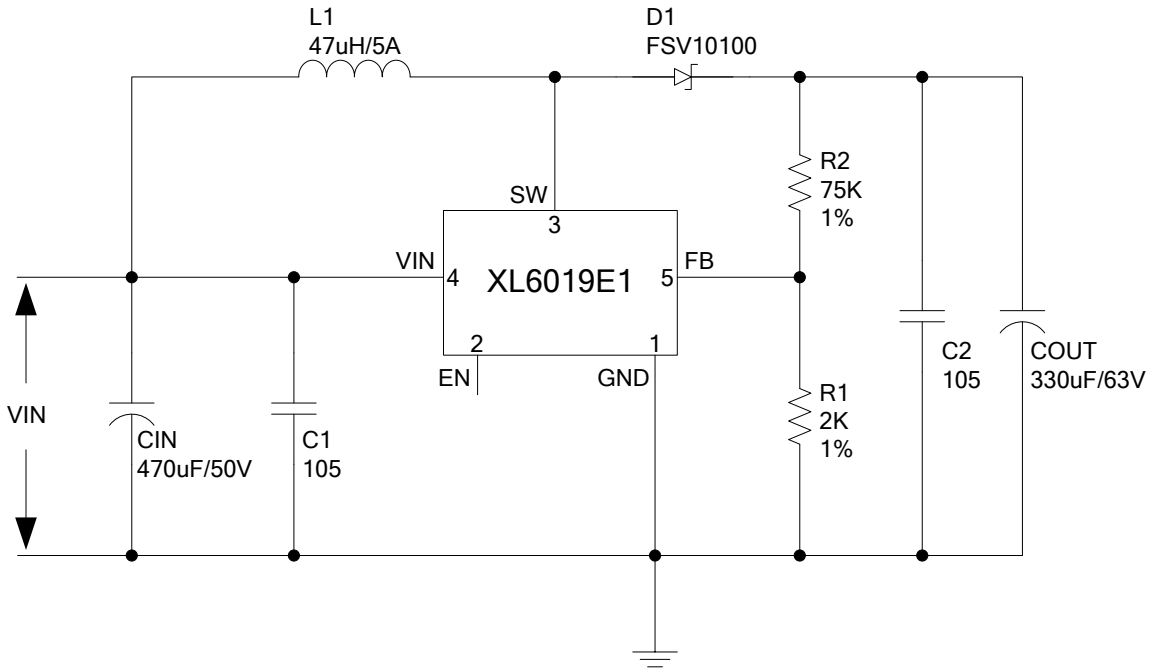
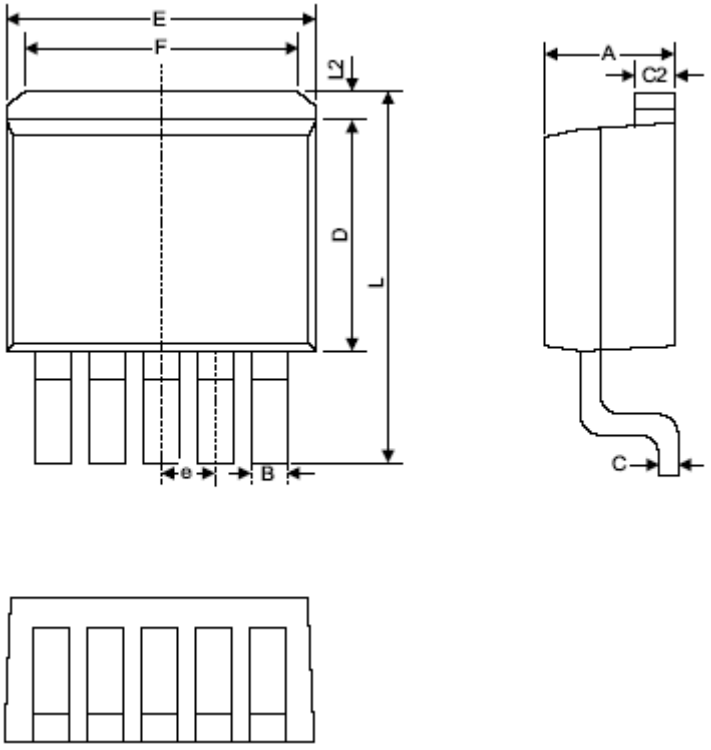


Figure19. XL6019 High Power Application Circuit (VIN=36V,VOUT=48V,IOUT=2.1A)

Package Information

TO263-5L Mechanical Dimensions



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.440	4.570	4.650	0.175	0.180	0.183
B	0.710	0.870	0.970	0.028	0.034	0.038
C	0.360	0.380	0.640	0.014	0.015	0.025
C2	1.255	1.270	1.285	0.049	0.050	0.051
D	8.390	8.640	8.890	0.330	0.340	0.350
E	9.960	10.160	10.360	0.392	0.400	0.408
e	1.550	1.700	1.850	0.061	0.067	0.073
F	6.360	6.860	7.360	0.250	0.270	0.290
L	13.950	14.350	14.750	0.549	0.565	0.581
L2	1.120	1.270	1.420	0.044	0.050	0.056

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