0.5A 150KHz 100V Buck DC to DC Converter XL7016

Features

- Operation Voltage from 12V to 90V
- Maximum Duty Cycle up to 100%
- Minimum Drop Out 0.5V
- Adjust VOUT from 1.25V to VIN - 2V
- Max. IOUT=0.5A at VOUT=5V
- Max. IOUT=0.3A at VOUT=12V or 15V
- Max. output power less than 5W
- Fixed 150KHz Switching Frequency
- Internal Optimize HV Power MOSFET
- High efficiency up to 85%
- Excellent line and load regulation
- Built in output short Protection Function
- Built in current limit function
- SOP8-EP (Exposed PAD) package

General Description

The XL7016 is a 150KHz fixed frequency PWM buck (step-down) DC/DC converter, capable of driving a 0.5A load with high efficiency, low ripple and excellent line and load regulation. Requiring a minimum number of external components, the regulator is simple to use and include internal frequency compensation and a fixed-frequency oscillator.

The PWM control circuit is able to adjust the duty ratio linearly from 0 to 100%.

Applications

- Ebike Controller Power Supply
- Telecom / Networking Equipment

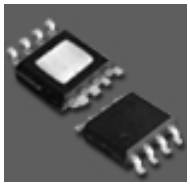


Figure1. Package Type of XL7016

Pin Configurations

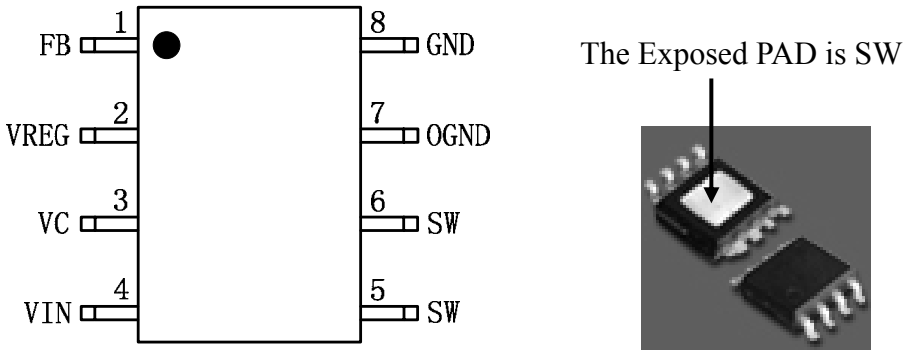


Figure2. Pin Configuration of XL7016 (Top View)

Table 1 Pin Description

Pin Number	Pin Name	Description
1	FB	Feedback Pin (FB). Through an external resistor divider network, Feedback senses the output voltage and regulates it. The feedback threshold voltage is 1.25V.
2	VREG	Supply Voltage Input Pin. A 10 µF ceramic decoupling capacitor is required. An external voltage between 7V and 9V can be applied to this pin to reduce internal power dissipation.
3	VC	Internal Voltage Regulator Bypass Capacity. In typical system application, The VC pin connect a 1uF capacitor to VIN.
4	VIN	Supply Voltage Input Pin. XL7016 operates from 12V to 90V DC voltage. Bypass Vin to GND with a suitably large capacitor to eliminate noise on the input.
5,6	SW	Power Switch Output Pin (SW). Output is the switch node that supplies power to the output. The exposed PAD is SW.
7	OGND	Output Ground Pin.
8	GND	Ground Pin. Care must be taken in layout. This pin should be placed outside of the Schottky Diode to output capacitor ground path to prevent switching current spikes from inducing voltage noise into XL7016.

Function Block

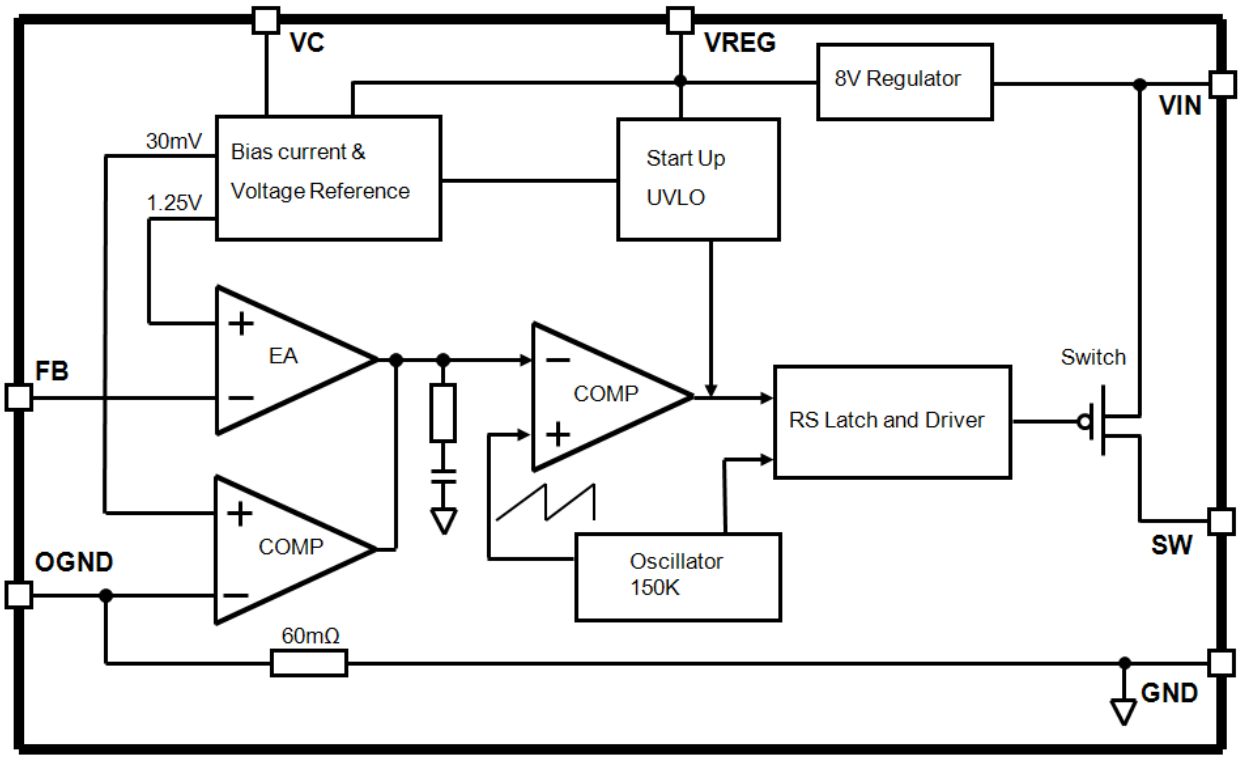


Figure3. Function Block Diagram of XL7016

Typical Application Circuit

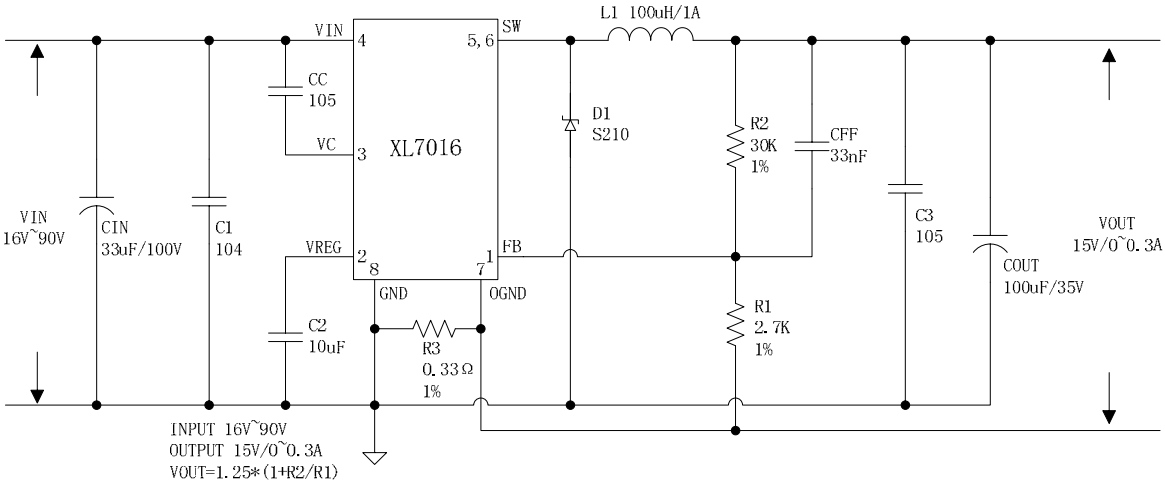


Figure4. XL7016 Typical Application Circuit

Ordering Information

Order Information	Marking ID	Package Type	Packing Type Supplied As
XL7016	XL7016	SOP8-EP	2500 Units on Tape & Reel

Absolute Maximum Ratings（Note1）

Parameter	Symbol	Value	Unit
VIN Pin Voltage	Vin	-0.3 to 100	V
FB Pin Voltage	V_{FB}	-0.3 to Vin	V
SW Pin Voltage	V_{SW}	-0.3 to Vin	V
Power Dissipation	P_D	Internally limited	mW
Thermal Resistance (SOP8-EP) (Junction to Ambient, No Heatsink, Free Air)	R_{JA}	60	ºC/W
Maximum Junction Temperature	T_J	-40 to 150	ºC
Operating Junction Temperature	T_J	-40 to 125	ºC
Storage Temperature	T_{STG}	-65 to 150	ºC
Lead Temperature (Soldering, 10 sec)	T_{LEAD}	260	ºC
ESD (HBM)		>3000	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.

XL7016 Electrical Characteristics

T_a = 25℃;unless otherwise specified.

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
System parameters test circuit figure4						
VFB	FB Voltage	Vin =20V to 90V Iload=0.1A to 0.3A	1.225	1.25	1.275	V
ŋ	Efficiency	Vin=24V ,Vout=15V Iout=0.3A	-	93	-	%
ŋ	Efficiency	Vin=36V ,Vout=15V Iout=0.3A	-	88	-	%
ŋ	Efficiency	Vin=48V ,Vout=15V Iout=0.3A	-	85	-	%
ŋ	Efficiency	Vin=60V ,Vout=15V Iout=0.3A	-	80	-	%

Electrical Characteristics (DC Parameters)

Vin = 48V, GND=0V, Vin & GND parallel connect a 33uf/100V capacitor; Iout=0.2A, T_a = 25℃; the others floating unless otherwise specified.

Parameters	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Input operation voltage	Vin		12		90	V
VIN UVLO	Vin_uvlo			10	11	V
VREG voltage	Vreg			8		V
Quiescent Supply Current	I_q	V_{FB} =2V		3	5	mA
Oscillator Frequency	Fosc		120	150	180	KHz
Switch Current Limit	I_L	V_{FB}=0, R3=0.33Ω		0.6		A
Output Power PMOS	Rdson	Vin=48V, I_{SW}=0.3A		180	210	mohm
Max. Duty Cycle	D_{MAX}	V_{FB}=0V		100		%

Typical System Application (VOUT=15V,IOUT=0~0.3A)

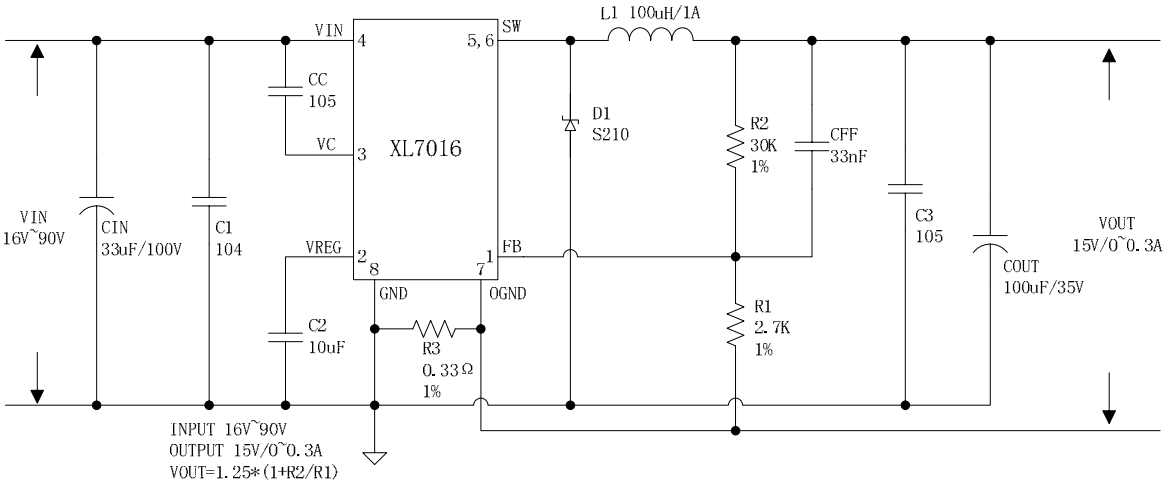


Figure5. XL7016 System Application (VIN=16V~90V, VOUT=15V, IOUT=0~0.3A)

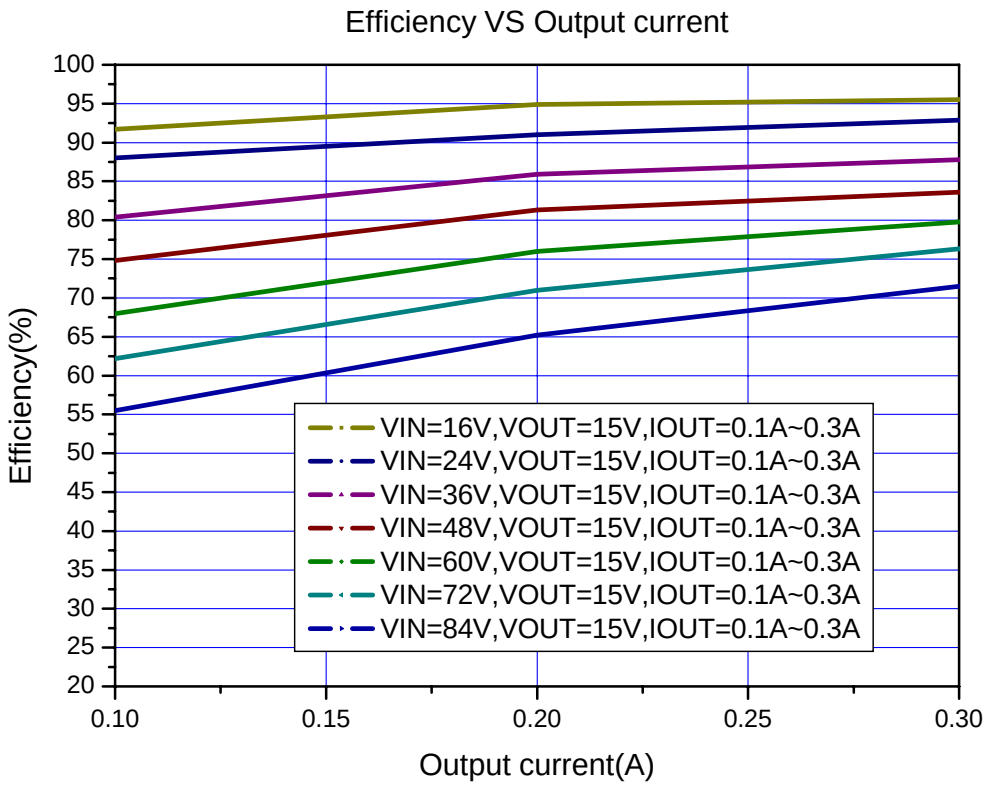


Figure6. XL7016 System Application (Efficiency VS Output Current)

Typical System Application (VOUT=5V,IOUT=0~0.5A)

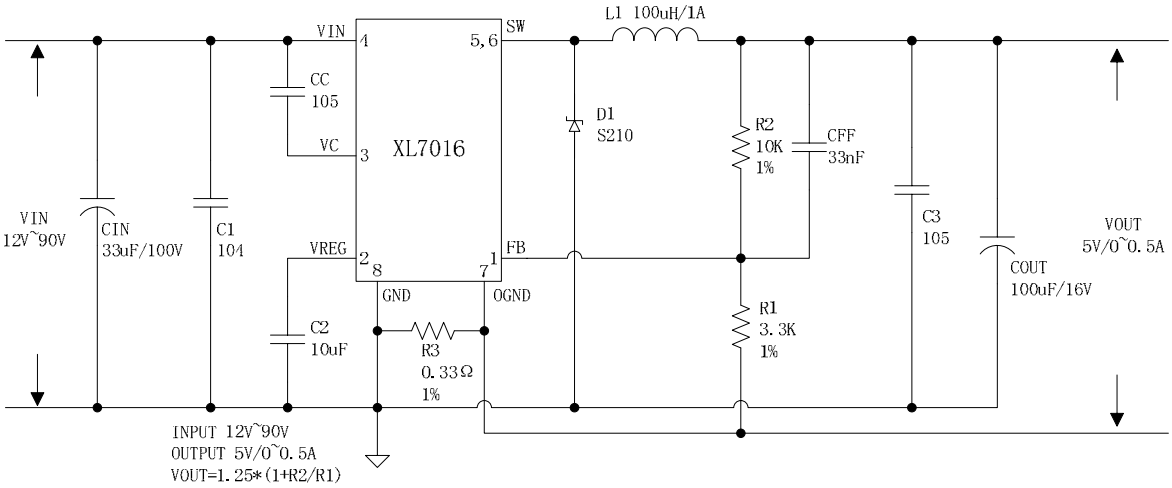


Figure7. XL7016 System Application (VIN=12V~90V, VOUT=5V, IOUT=0~0.5A)

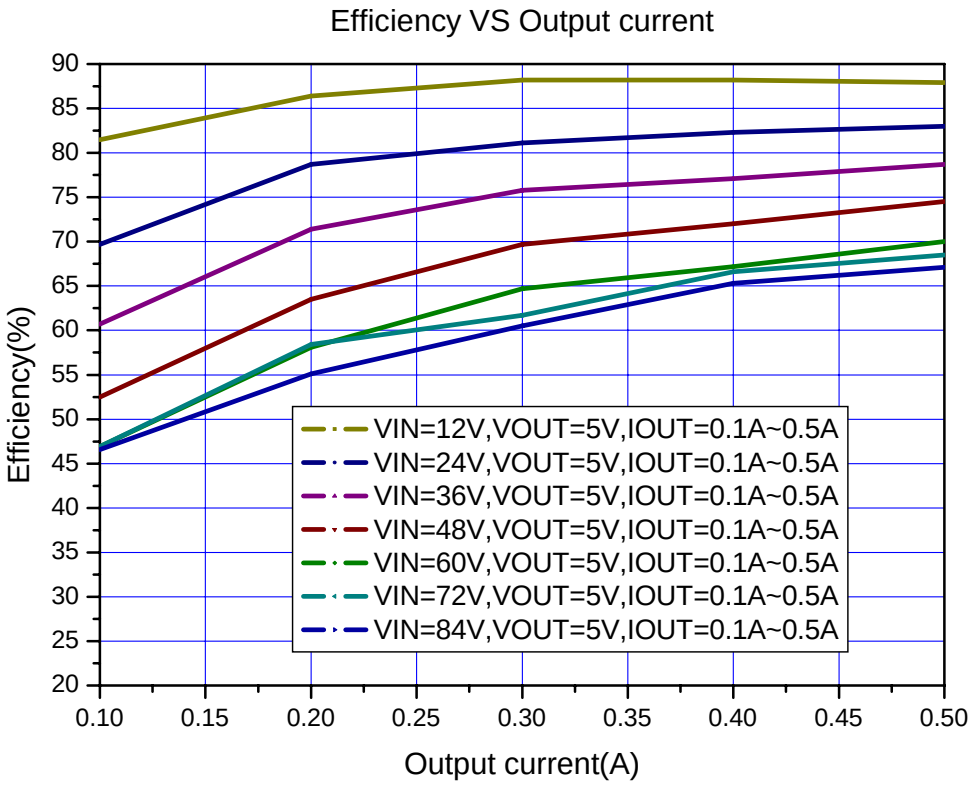
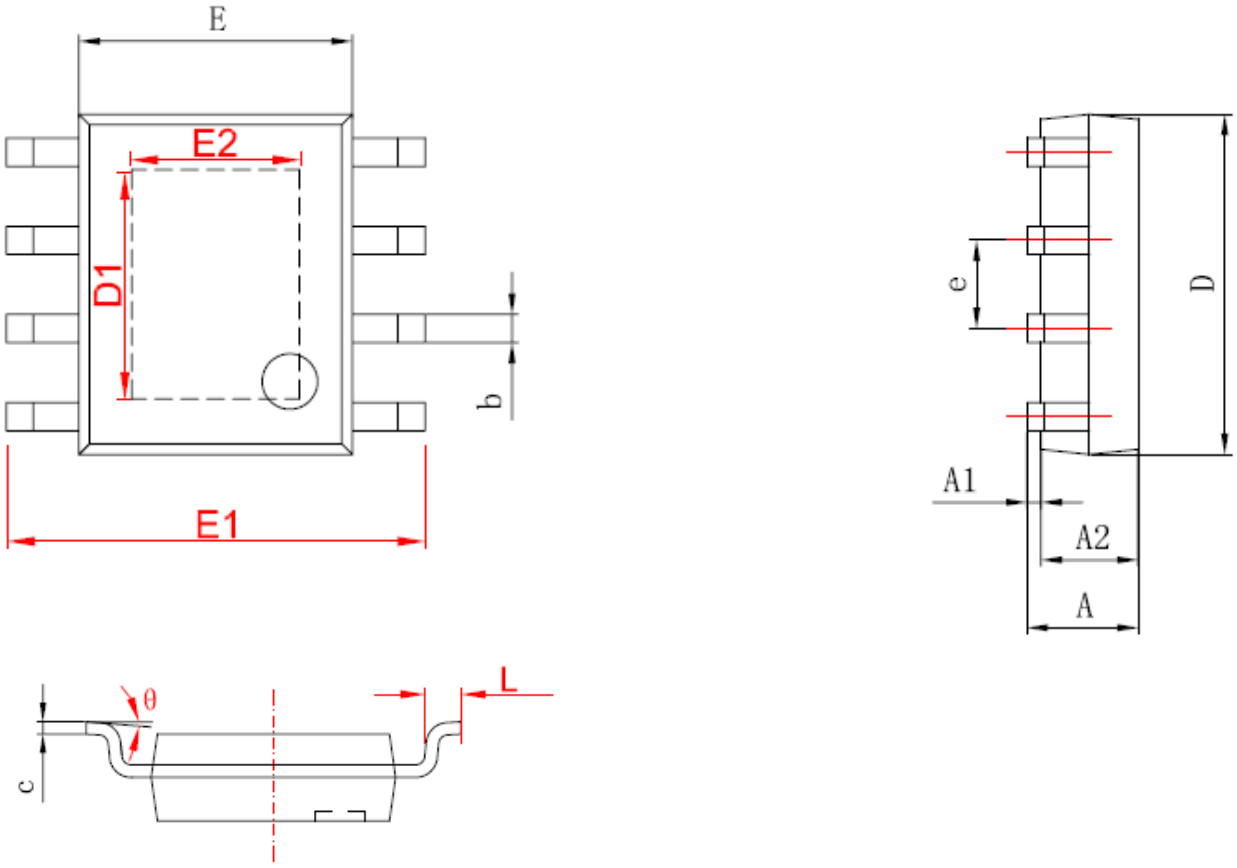


Figure8. XL7016 System Application (Efficiency VS Output Current)

Package Information

Package Information (SOP8-EP)



字符	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.050	0.150	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
D1	3.202	3.402	0.126	0.134
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
E2	2.313	2.513	0.091	0.099
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

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