

Features

- VIN operation voltage 32V to 90V.
- VCC operation voltage 10V to 70V.
- 1.25V reference adjustable version.
- VIN UVLO is about 31V.
- Recommend output 1.25V to 18V.
- Fixed 150KHz switching frequency.
- Maximum 1A switching current.
- Recommend output power less than 8W.
- Excellent line and load regulation.
- Internal optimize 130V HV-NMOS.
- Built in frequency compensation.
- Built in output Short Protection function.
- Built in Soft-Start function.
- Built in Thermal Shutdown function.
- Built in Current Limit function.
- Available in TO252-5L package.

Applications

- EBIKE Controller Power Supply.
- High Voltage Buck Converter.
- Portable Electronic Equipment.

General Description

The XL7010 regulator is a wide input range, DC/DC converter which is capable of operation high input voltage up to 120V. The XL7010 built in N-channel power MOSFET and fixed frequency oscillator results in stable operation over a wide range of supply and output voltages.

The XL7010 regulator is special design for portable electronic equipment.



Figure1. Package Type of XL7010

Pin Configurations

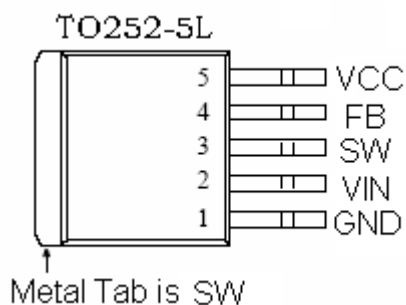


Figure2. Pin Configuration of XL7010 (Top View)

Table 1 Pin Description

Pin Number	Pin Name	Description
1	GND	Ground Pin.
2	VIN	Supply Voltage Input Pin. XL7010 VIN operates from a 32V to 90V DC voltage. Bypass Vin to GND with a suitably large capacitor to eliminate noise on the input.
3	SW	Power Switch Output Pin (SW). Output is the switch node that supplies power to the output. The metal tab is SW.
4	FB	Feedback Pin (FB). The feedback threshold voltage is 1.25V.
5	VCC	Supply Voltage Input Pin. XL7010 VCC operates from a 10V to 70V DC voltage.

150KHz 120V 1A Switching Current SEPIC DC/DC Converter XL7010

Function Block

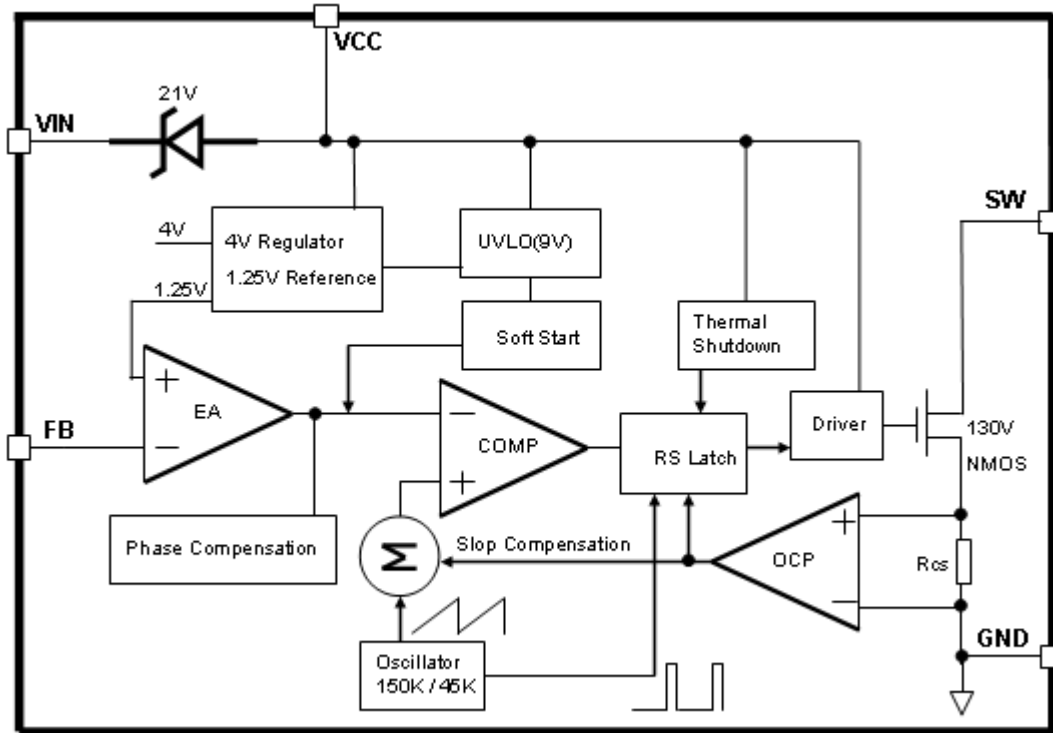


Figure3. Function Block Diagram of XL7010

Typical Application Circuit

The L1 & L2 either as independence inductor or as coaxial coil, Recommend as coaxial coil.

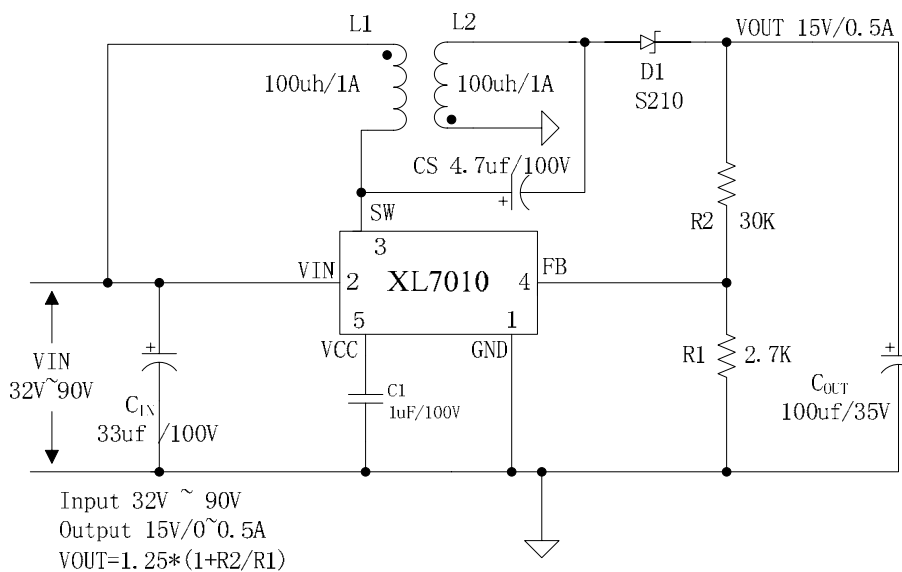


Figure4. XL7010 Typical Application Circuit

150KHz 120V 1A Switching Current SEPIC DC/DC Converter

XL7010

Ordering Information

Order Information	Marking ID	Package Type	Packing Type Supplied As
XL7010E1	XL7010E1	TO252-5L	2500 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	V_{in}	-0.3 to 93	V
SW Pin Voltage	V_{SW}	-0.3 to 130	V
Feedback Pin Voltage	V_{FB}	-0.3 to 70	V
Power Dissipation	P_D	1000	mW
Thermal Resistance (TO252-5L) (Junction to Ambient, No Heatsink, Free Air)	R_{JA}	50	°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)		>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.

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XL7010

XL7010 Electrical Characteristics

$T_a = 25$; unless otherwise specified.

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
<i>System parameters test circuit figure4</i>						
VFB	Feedback Voltage	$V_{in} = 36V \text{ to } 90V, V_{out}=15V$ $I_{load}=0.1A \text{ to } 0.5A$	1.213	1.25	1.287	V
Efficiency	η	$V_{in}=36V, V_{out}=15V$ $I_{out}=0.5A$	-	83	-	%
Efficiency	η	$V_{in}=48V, V_{out}=15V$ $I_{out}=0.5A$	-	83	-	%
Efficiency	η	$V_{in}=60V, V_{out}=15V$ $I_{out}=0.5A$	-	82	-	%
Efficiency	η	$V_{in}=72V, V_{out}=15V$ $I_{out}=0.5A$	-	81	-	%

Electrical Characteristics (DC Parameters test circuit figure4)

$V_{in} = 48V, GND=0V, V_{out}=15V, I_{out}=0.1A; T_a = 25$; the others floating unless otherwise specified.

Parameters	Symbol	Test Condition	Min.	Typ.	Max.	Unit
VIN operation voltage	V_{in}		32		90	V
VIN UVLO voltage	V_{in_uvlo}			31		V
Quiescent Supply Current	I_q	$V_{FB} = 2V$		4.5	6	mA
Oscillator Frequency	F_{osc}		120	150	180	KHz
Short Frequency	F_{short}	$V_{FB} < 0.6V$	36	45	54	KHz
Switch Current Limit	I_L	$V_{FB} = 0$		1		A
Output Power NMOS	R_{dson}	$V_{in}=48V,$ $I_{sw}=1A$		150	200	mohm
Max. Duty Cycle	D_{MAX}	$V_{FB}=0V$		90		%
Over Thermal Protection(OTP)	T_J			165		$^{\circ}C$
OTP hysteresis window	T_W			60		$^{\circ}C$

150KHz 120V 1A Switching Current SEPIC DC/DC Converter **XL7010**

[1] Typical application circuit (VIN=32V~90V, VOUT=15V, IOU=0~0.5A)

The L1 & L2 either as independence inductor or as coaxial coil, Recommend as coaxial coil.

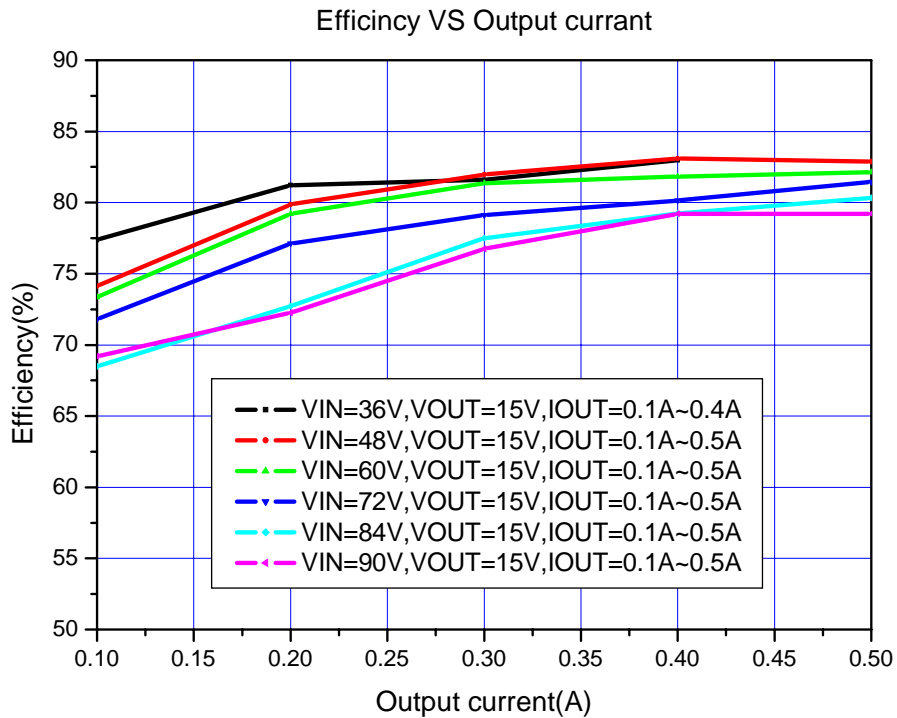
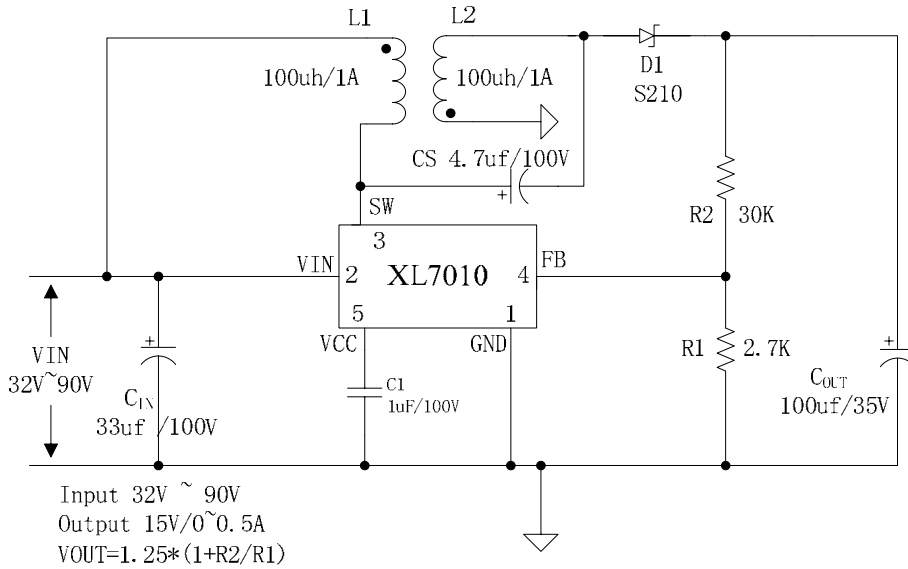
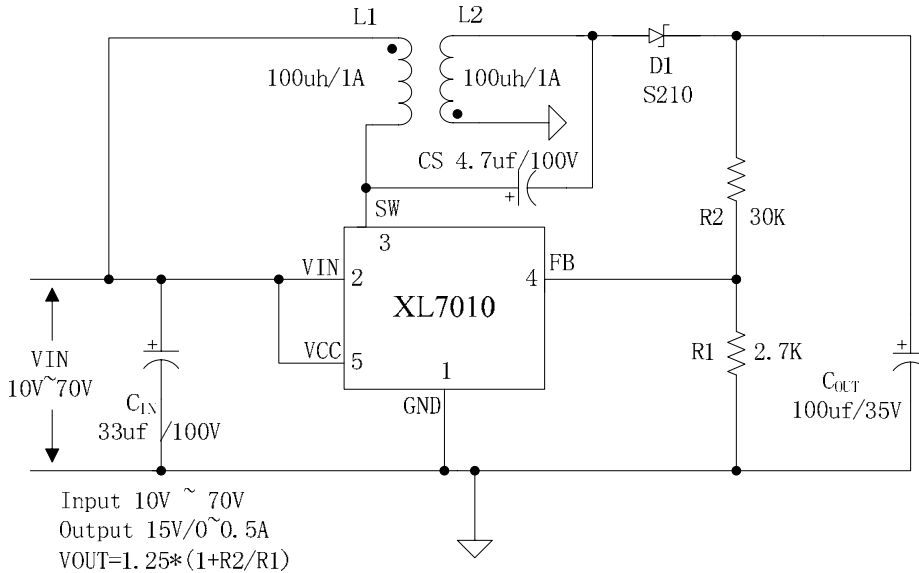


Figure5. XL7010 Typical System Application & efficiency curve

150KHz 120V 1A Switching Current SEPIC DC/DC Converter **XL7010**

[2] Typical application circuit (VIN=10V~70V, VOUT=15V, IOU=0~0.5A)

The L1 & L2 either as independence inductor or as coaxial coil, Recommend as coaxial coil.



Efficiency VS Output current

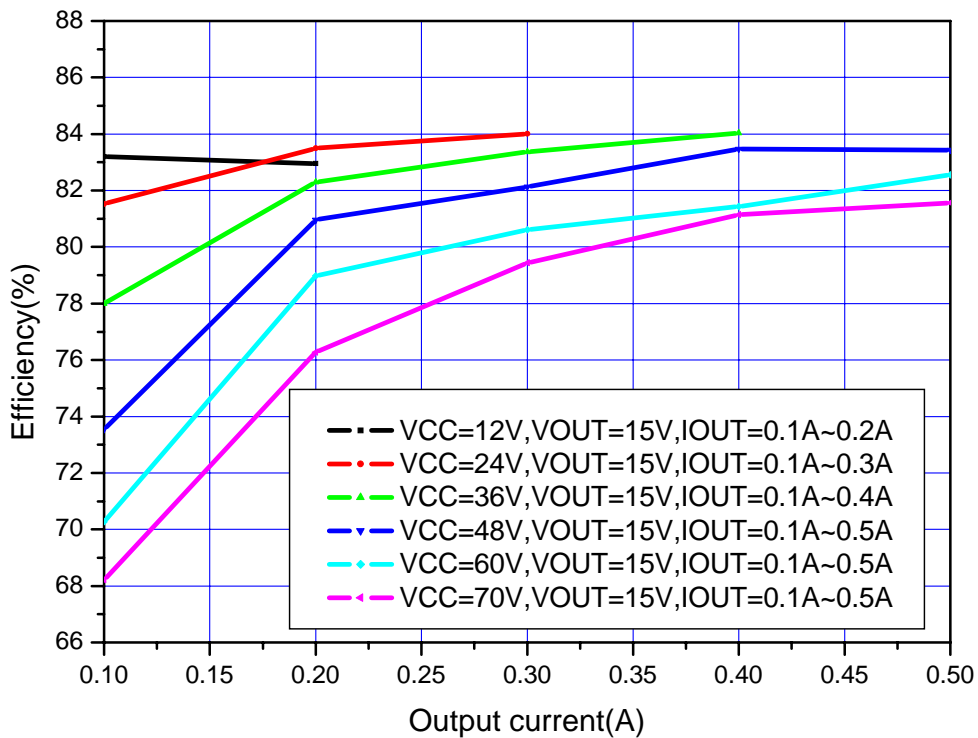


Figure6. XL7010 Typical System Application & efficiency curve

150KHz 120V 1A Switching Current SEPIC DC/DC Converter XL7010

[3] Typical application circuit (VIN=65V~120V, VOUT=15V, IOUT=0~0.5A)

The L1 & L2 either as independence inductor or as coaxial coil, Recommend as coaxial coil.

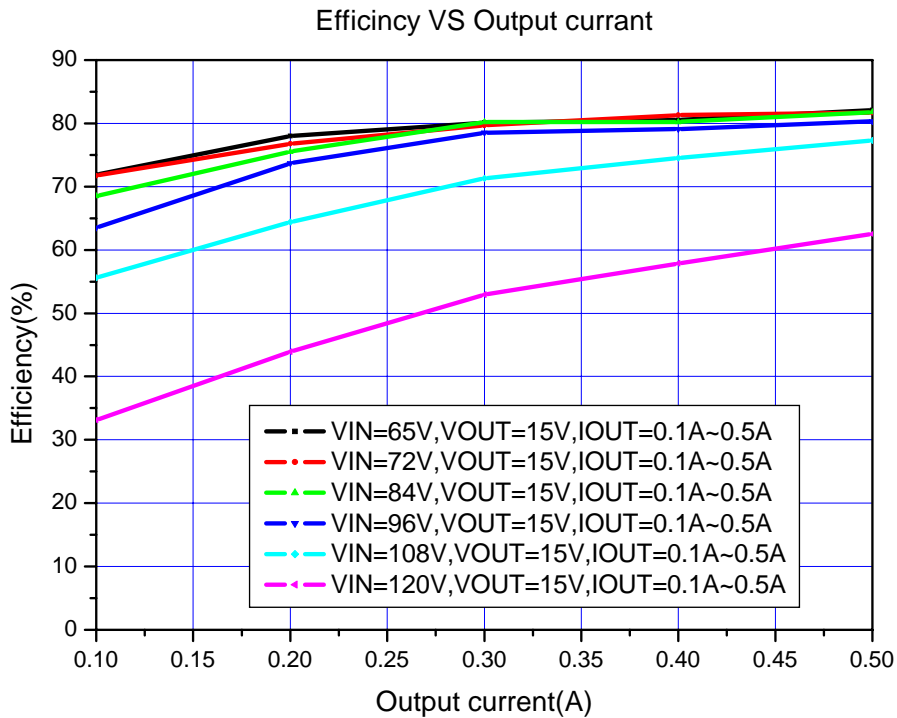
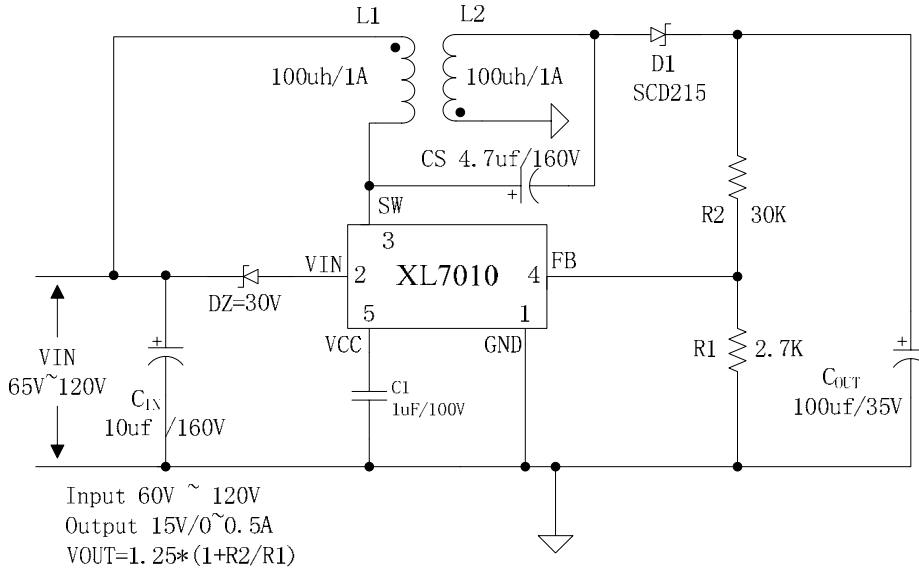


Figure7. XL7010 Typical System Application & efficiency curve

150KHz 120V 1A Switching Current SEPIC DC/DC Converter **XL7010**

[4] Typical application circuit (VIN=32V~90V, VOUT=5V, IOU=0~1A)

The L1 & L2 either as independence inductor or as coaxial coil, Recommend as coaxial coil.

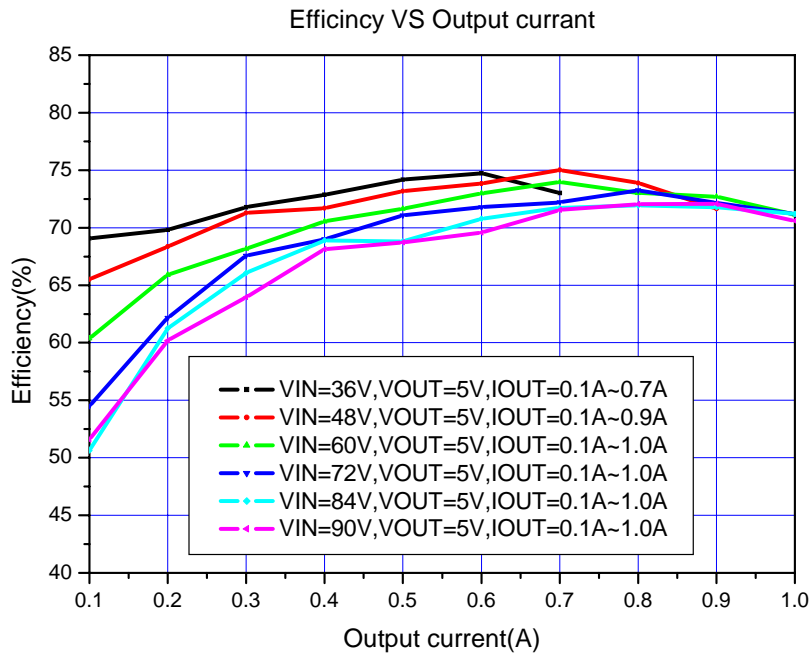
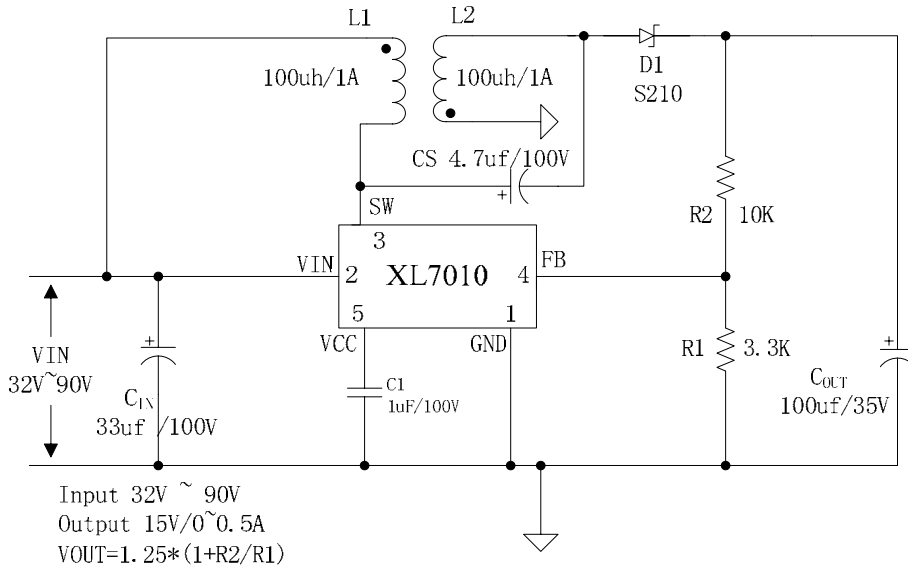


Figure8. XL7010 Typical System Application & efficiency curve

150KHz 120V 1A Switching Current SEPIC DC/DC Converter **XL7010**

[5] Typical application circuit (VIN=10V~70V, VOUT=5V, IOU=0~1A)

The L1 & L2 either as independence inductor or as coaxial coil, Recommend as coaxial coil.

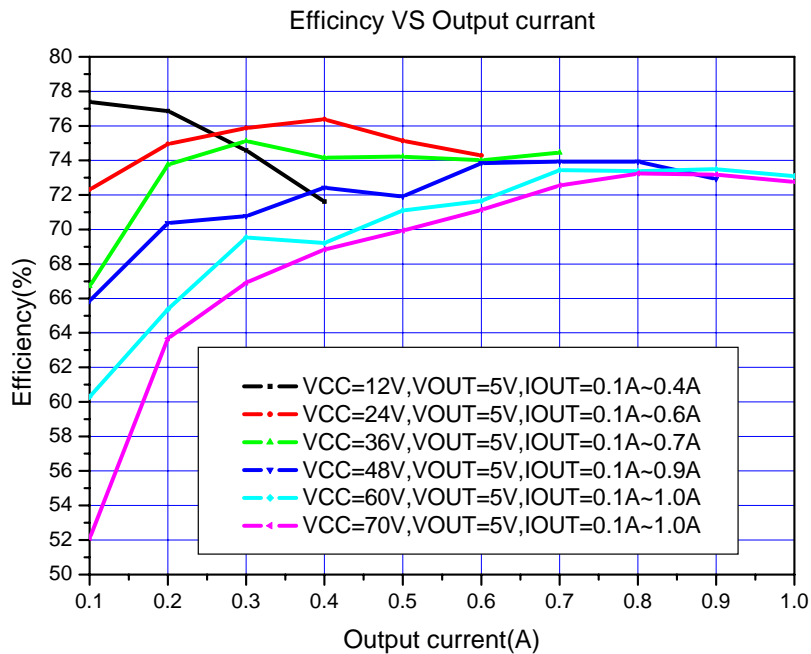
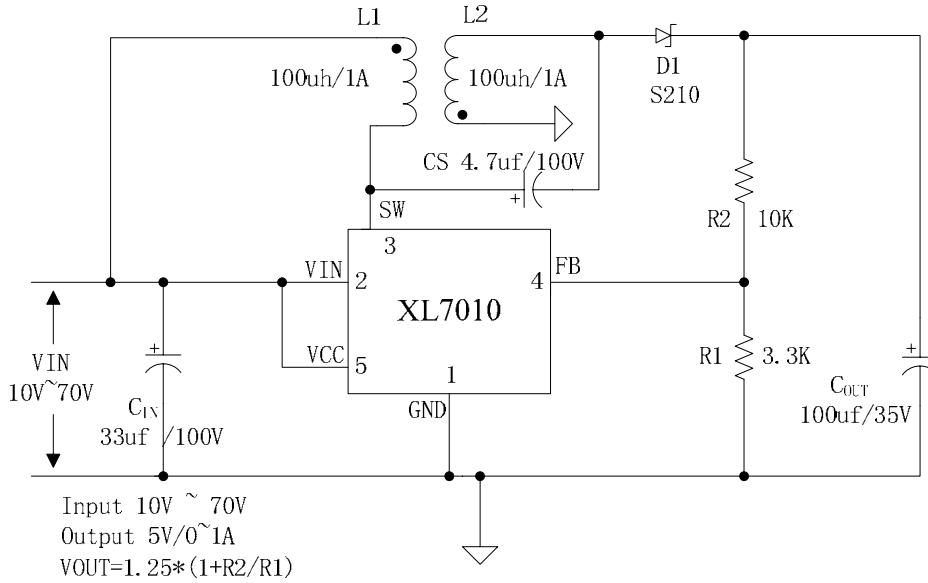


Figure9. XL7010 Typical System Application & efficiency curve

150KHz 120V 1A Switching Current SEPIC DC/DC Converter **XL7010**

[6] Typical application circuit (VIN=65V~120V, VOUT=5V, IOU=0~1A)

The L1 & L2 either as independence inductor or as coaxial coil, Recommend as coaxial coil.

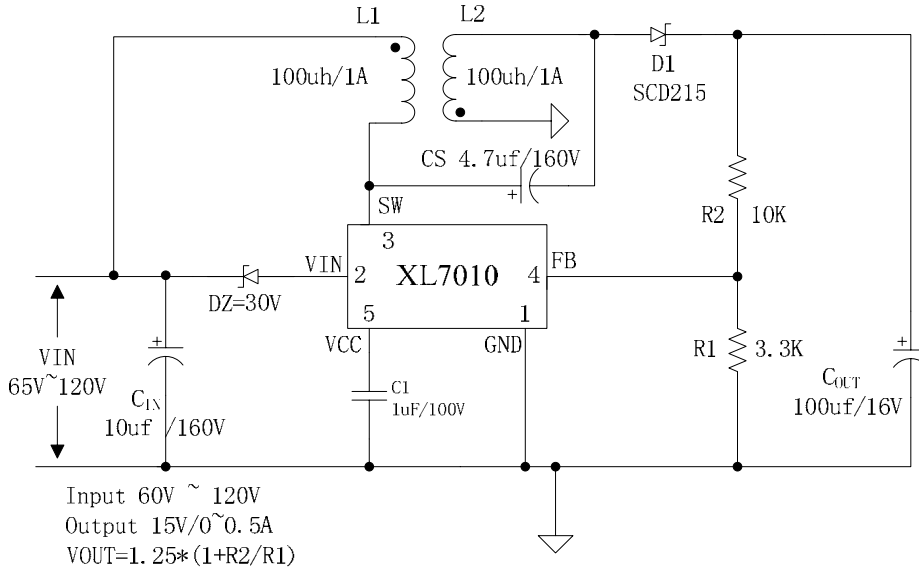
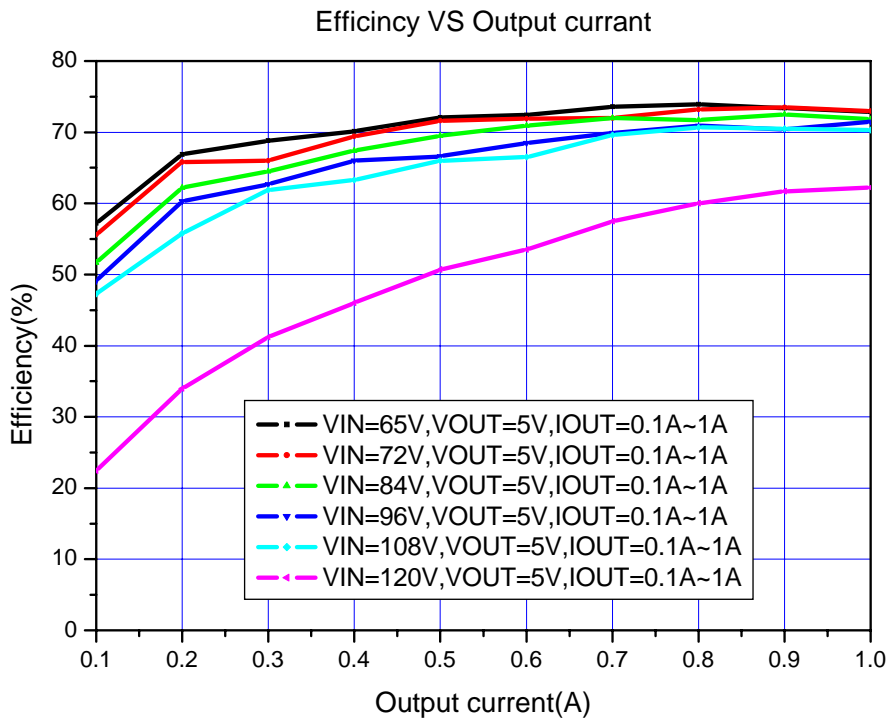
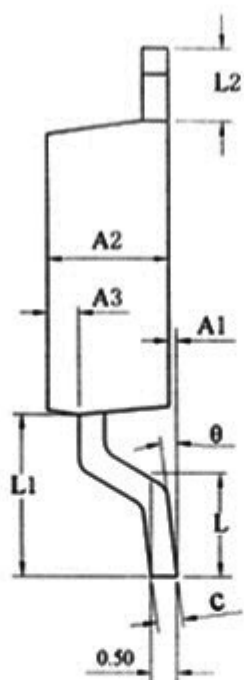
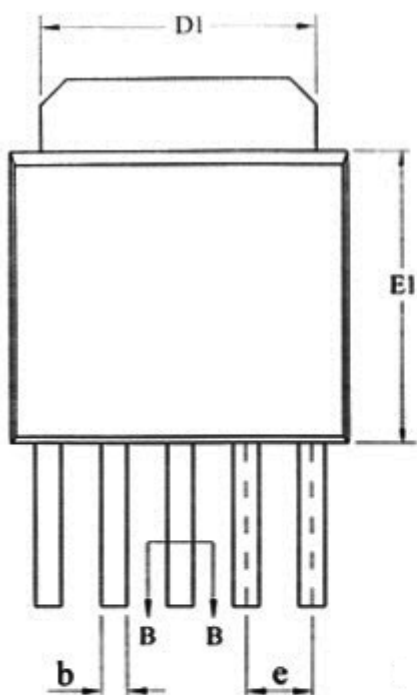


Figure10. XL7010 Typical System Application



Package Information

TO252-5L



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A1	0.05	0.15	0.25
A2	2.10	2.30	2.50
A3	0.50	0.60	0.70
b	0.46	—	0.60
b1	0.45	0.50	0.55
c	0.49	—	0.56
c1	0.48	0.50	0.52
D	6.30	6.50	6.70
D1	5.30REF		
E1	5.30	5.50	5.70
e	1.27BSC		
L	1.40	1.50	1.60
L1	3.00	3.10	3.30
L2	1.40BSC		
θ	0	—	8°

