

**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

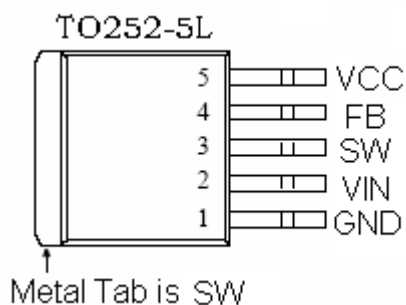


Figure2. Pin Configuration of XL7010 (Top View)

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**

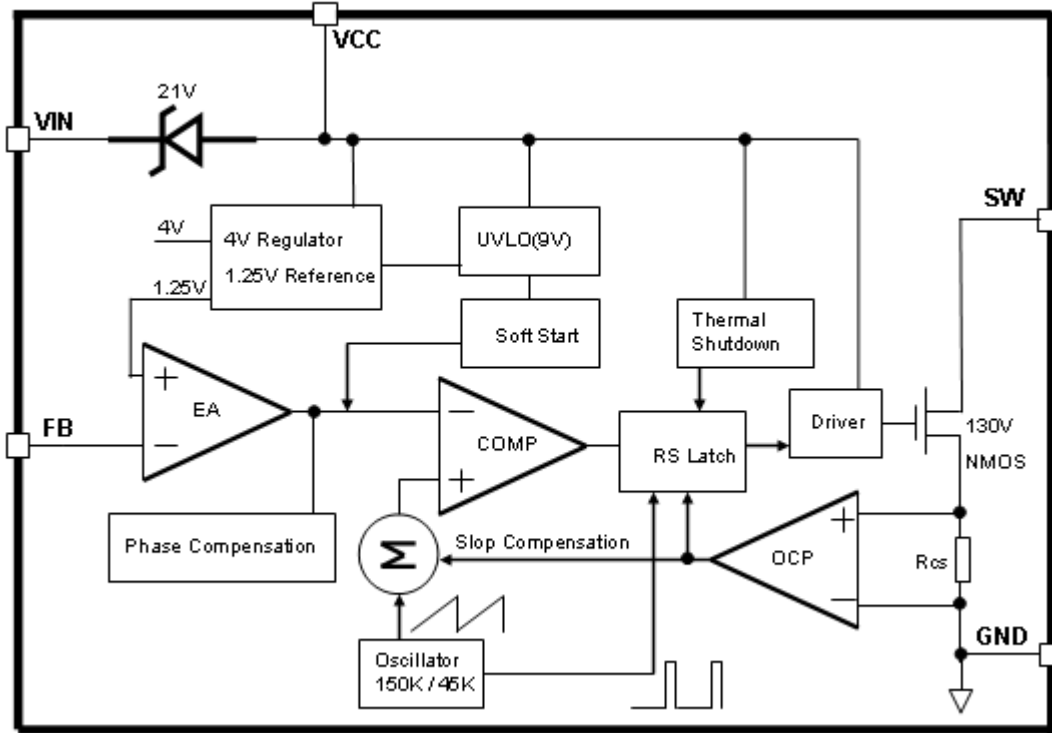


Figure3. Function Block Diagram of XL7010

**Typical Application Circuit**

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

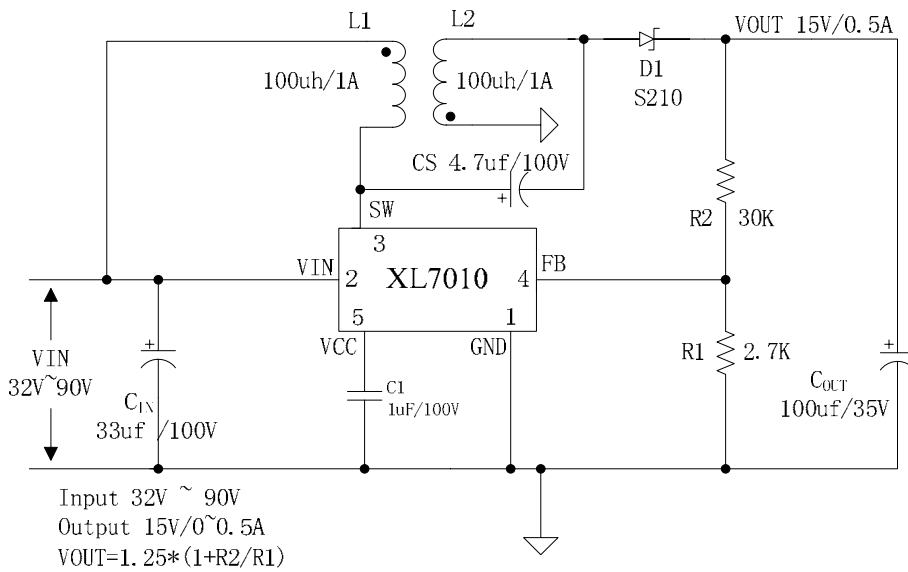


Figure4. XL7010 Typical Application Circuit

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.

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

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	$\eta$	$V_{in}=36V, V_{out}=15V$ $I_{out}=0.5A$	-	83	-	%
Efficiency	$\eta$	$V_{in}=48V, V_{out}=15V$ $I_{out}=0.5A$	-	83	-	%
Efficiency	$\eta$	$V_{in}=60V, V_{out}=15V$ $I_{out}=0.5A$	-	82	-	%
Efficiency	$\eta$	$V_{in}=72V, V_{out}=15V$ $I_{out}=0.5A$	-	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.

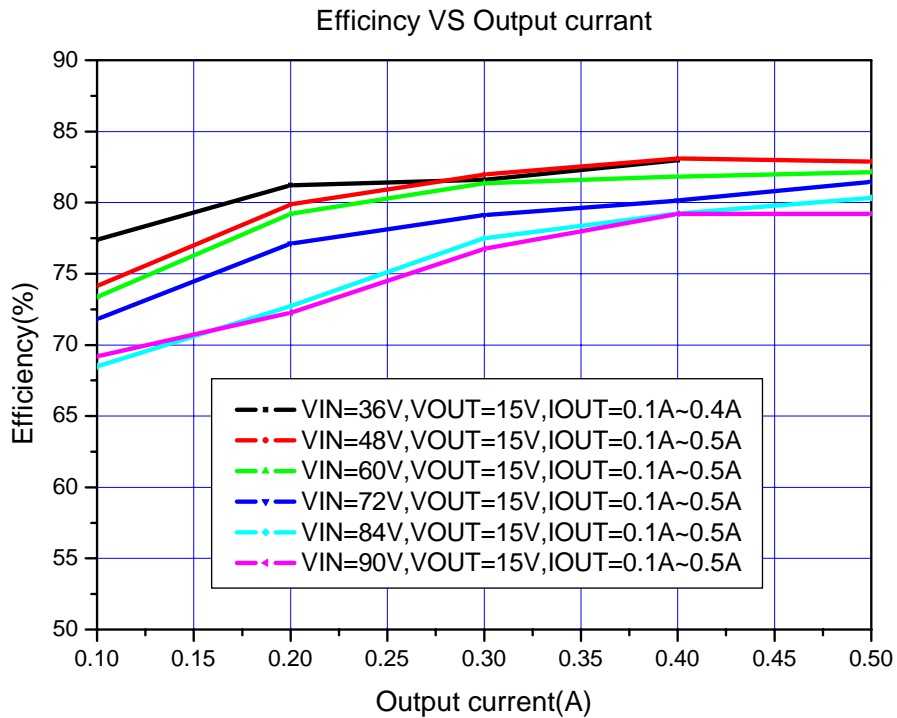
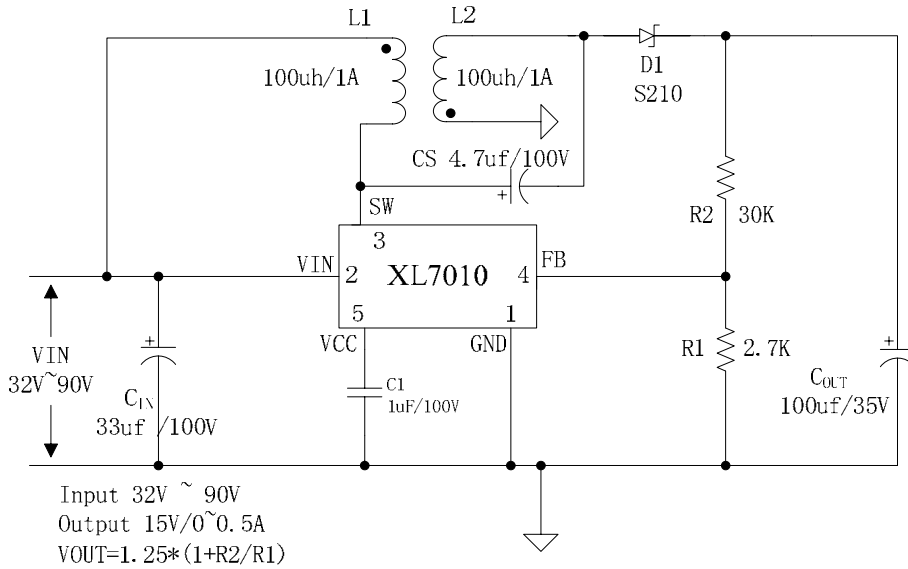
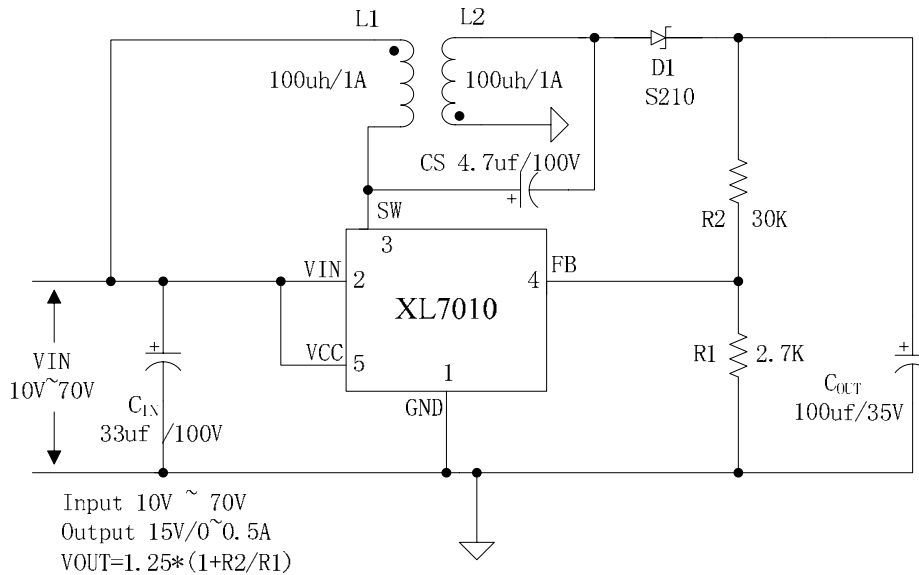


Figure5. XL7010 Typical System Application & efficiency curve

### [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

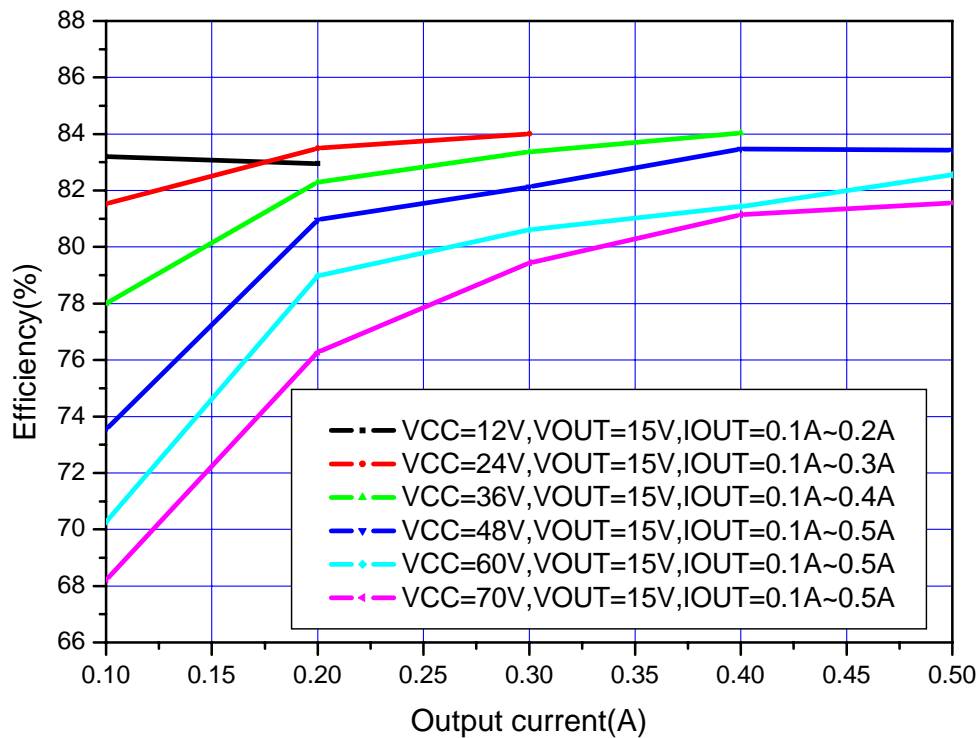


Figure6. XL7010 Typical System Application & efficiency curve

**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.

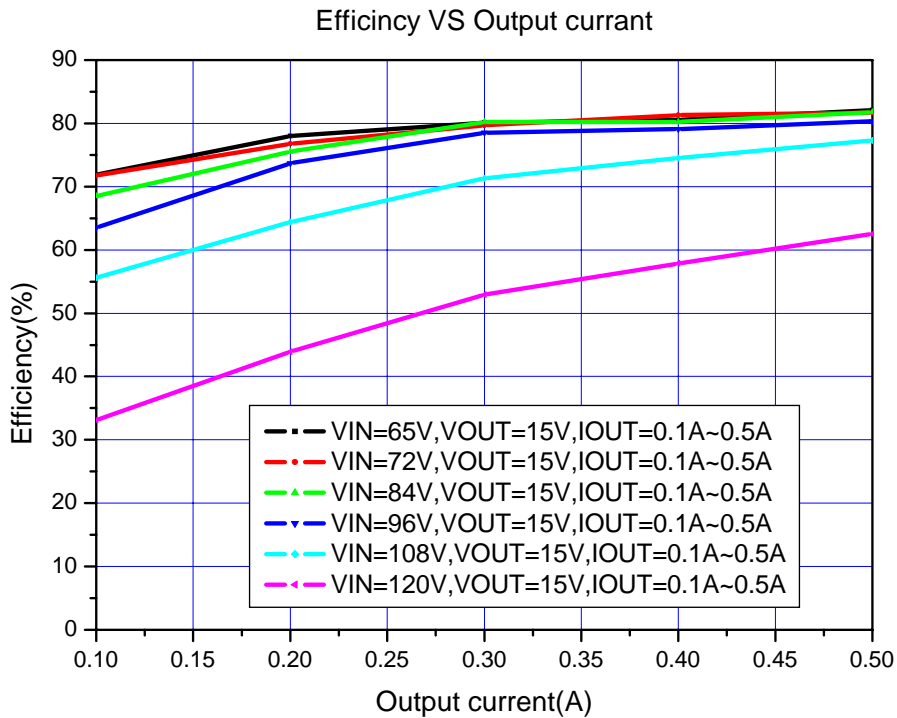
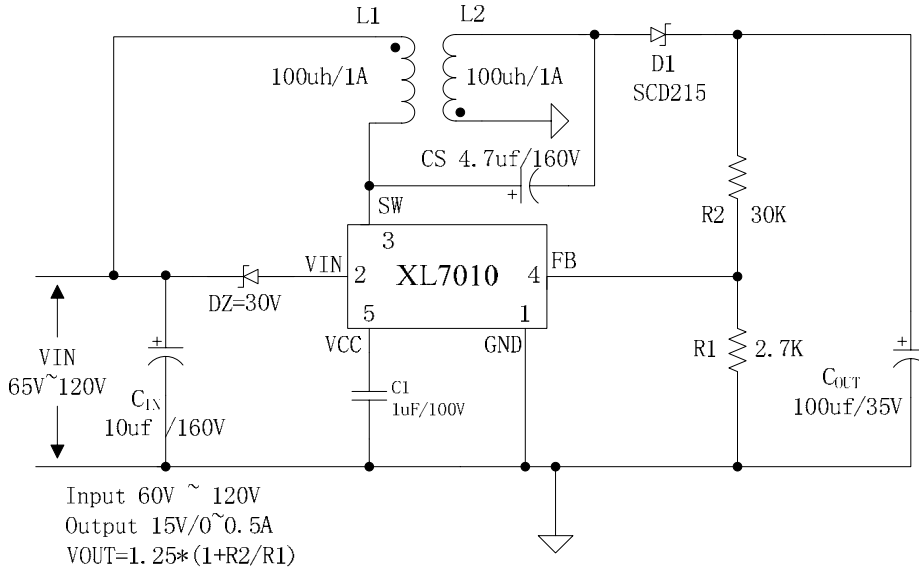


Figure7. XL7010 Typical System Application & efficiency curve



**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.

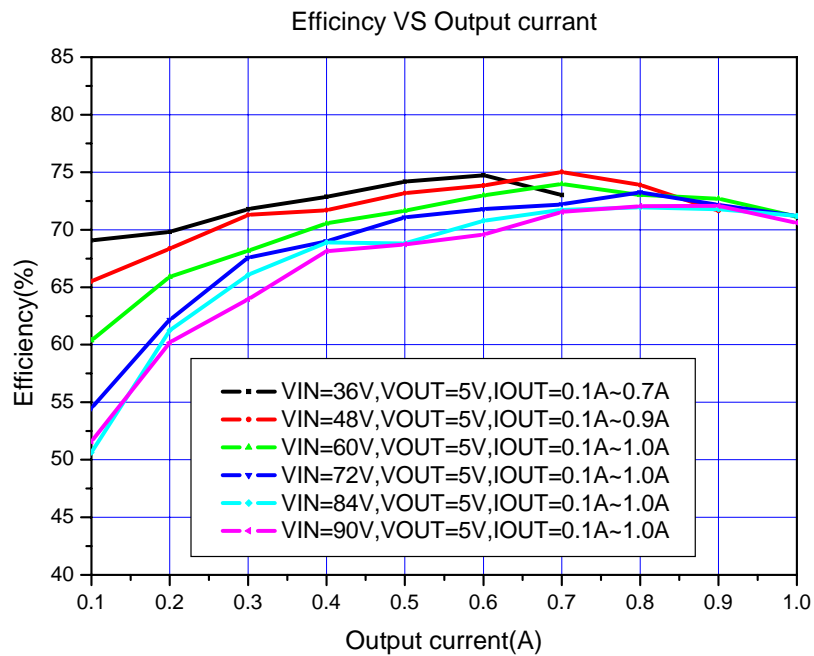
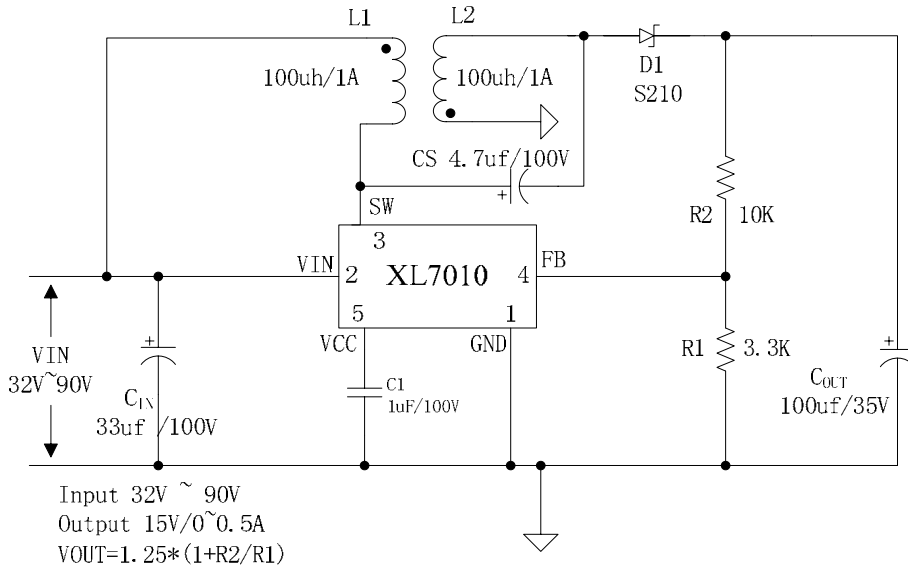


Figure8. XL7010 Typical System Application & efficiency curve

**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.

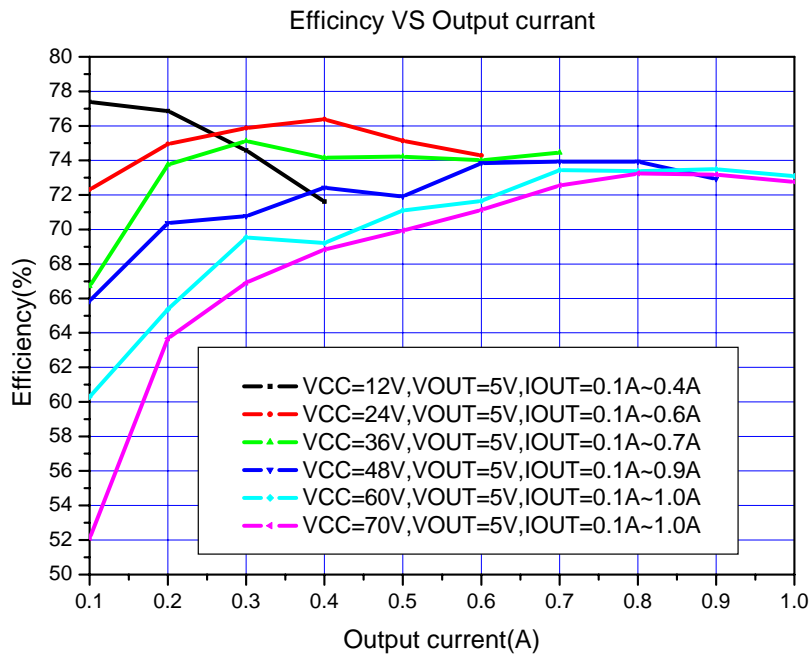
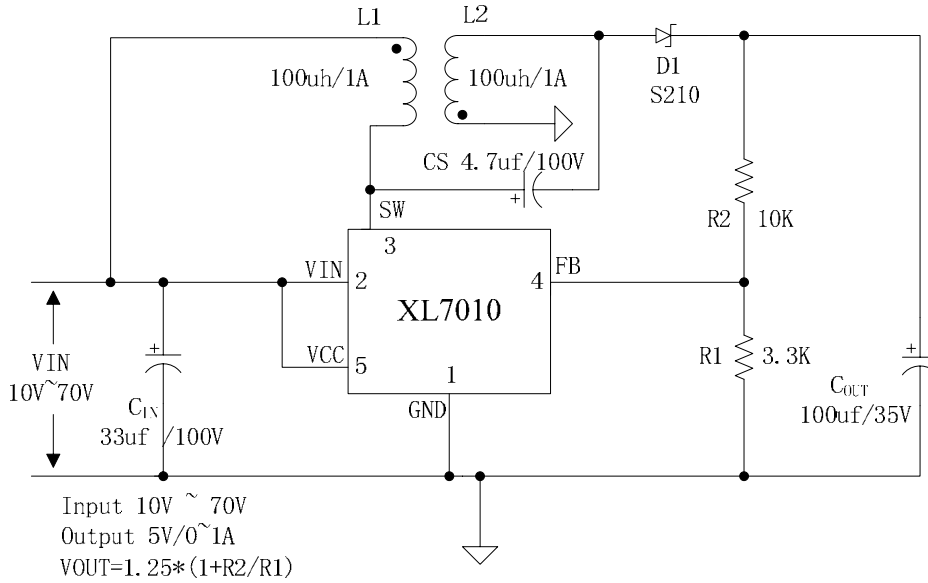


Figure9. XL7010 Typical System Application & efficiency curve

**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.

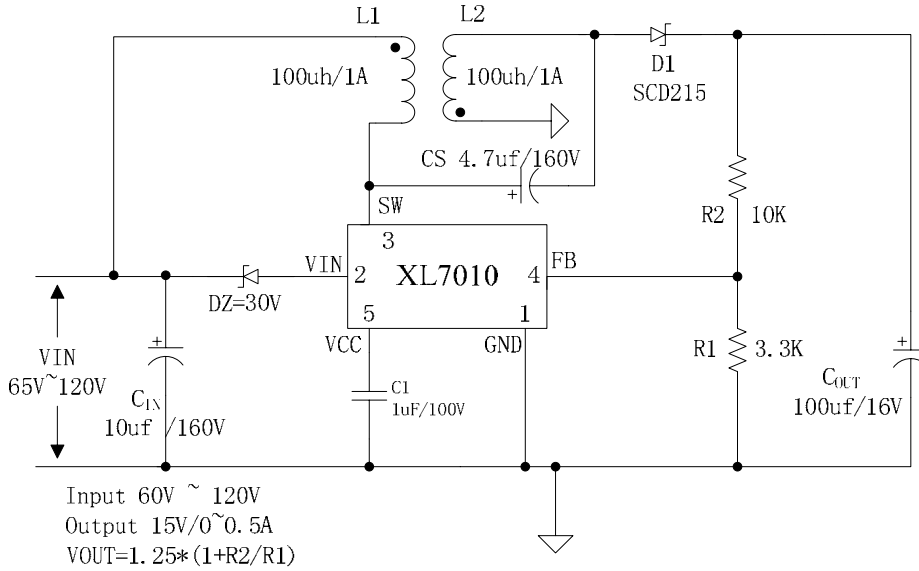
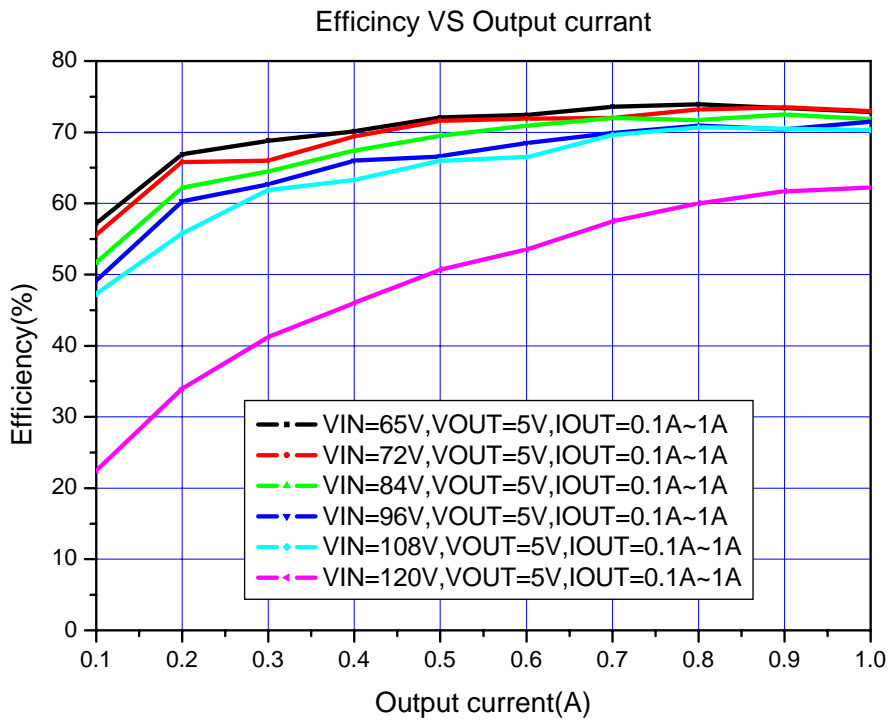
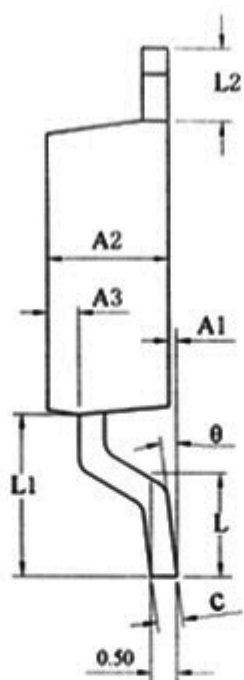
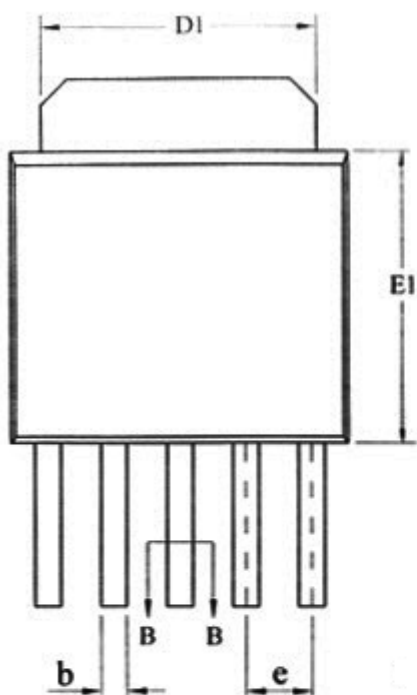


Figure10. XL7010 Typical System Application



## 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		
$\theta$	0	—	8°

