

Step-up DC/DC Converter —Backlight Driver

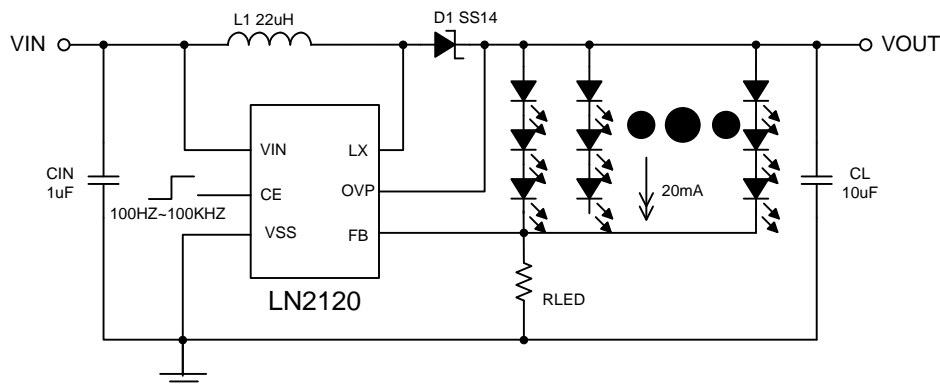
General Description

The LN2120 Series is a fixed frequency, constant current step-up DC/DC converter ideal for driving LEDs used in high-definition screen backlight LED driver etc. The highest output voltage is 24V, the input voltage of 3.6V can drive 3 series, 17 in parallel, a total of 51 LED. The internal circuit integrated overvoltage protection circuit and temperature protection circuit, and the brightness of the leds can be controlled with a PWM signal. The internal circuit integrates a large pipes of 0.2 ohms.

Applications

- HD screen LED driver

Typical Application Circuit



The application of single section lithium electricity power supply, N represents the number of parallel LED paths.

Caution The value of the resistance named RLED: $R_{LED} = V_{FB} / (I_{LED} * n)$; V_{FB} is the voltage of the FB pin;

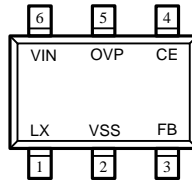
I_{LED} is the current of LED and equal to 20mA usually. N is the number of leds in the circuit in parallel.

Ordering Information

LN2120 ①②③④⑤⑥-⑦

Item	Symbol	Function
①	B	Denotes Lx Over-voltage Limit: Yes Denotes Oscillation Frequency:1.2MHZ
②③④	020	Denotes FB Voltage ②=0 ③=2 ④=0 0.20V
⑤	M	Denotes Package Type : SOT23-6L
⑥	R	Embossed Tape :Standard Feed
	L	Embossed Tape :Reverse Feed
⑦	G	Green epoxy molding compound

Functional Pin Description

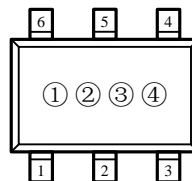


SOT23-6L
(TOP VIEW)

Pin Number	Pin Name	Function
1	LX	SWITCH
2	VSS	Ground
3	FB	Voltage Feedback
4	CE	Chip Enable
5	OVP	Over voltage protect
6	VIN	Power Input

Marking Rule

- SOT23-6L



SOT23-6L
(TOP VIEW)

- ① 表示产品系列

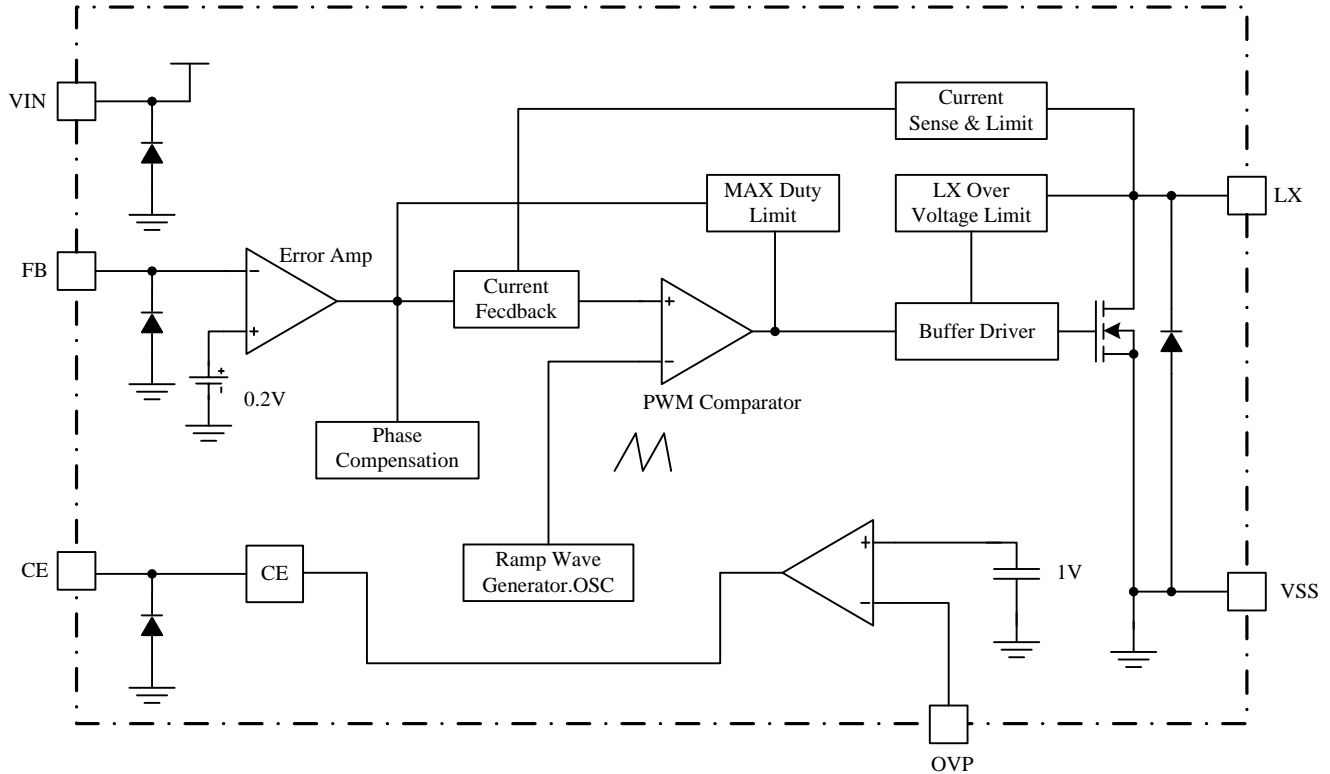
Symbol	Part Number
Y	LN2120****M*

- ② ③ Represents the voltage of FB pin and the type of regulator

Symbol	Vfb (mV)
H0	200mV

- ④ Represents the assembly lot No.

0-9, A-Z; 0-9, A-Z mirror writing, repeated (G, I, J, O, Q, W exception)

Function Block Diagram

Absolute Maximum Ratings

项目	符号	绝对最大额定值	单位	
VIN Pin Voltage	VIN	$V_{SS}-0.3 \sim V_{SS}+7$	V	
LX Pin Voltage	VLX	$V_{SS}-0.3 \sim V_{SS}+26$		
FB Pin Voltage	Vfb	$V_{SS}-0.3 \sim V_{SS}+7$		
CE Pin Voltage	Vce	$V_{SS}-0.3 \sim V_{SS}+7$		
LX Pin Current	ILX	2500	mA	
OVP Pin Voltage	Vovp	$V_{SS}-0.3 \sim V_{SS}+26$	V	
Power Dissipation	PD	SOT23-6L	250	mW
Operating Temperature range	Topr		-40 ~ +85	°C
Storage Temperature range	Tstg		-55 ~ +125	

Caution: Absolute maximum rating refers to cannot exceed the rating in all conditions. One thousand more than the rating, can cause degradation products and other physical damage.

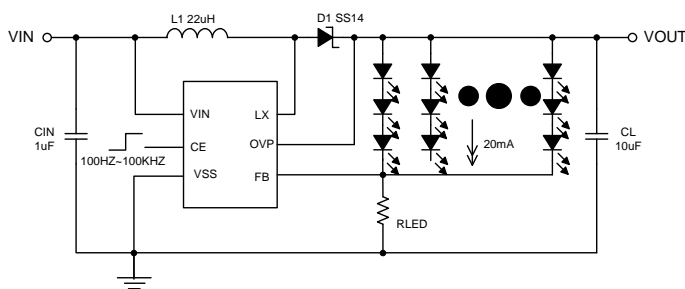
Electrical Characteristics (Ta=25°C)

(TA=25°C unless otherwise noted)

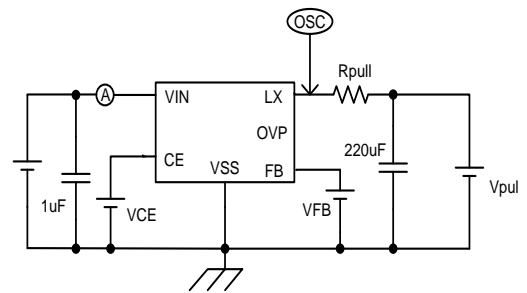
Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Circuits
FB Control Voltage(*1)	VFB	-	0.19	0.20	0.21	V	1
Operating Voltage range	VIN	-	2.5	-	6.0		
Stand-by Current	ISTB	VCE=0V, VLX=5V	-	-	1	μA	3
Supply Current 1	IDD1	-	-	800	-	μA	2
Supply Current 2	IDD2	VIN=VLX, VFB=0.4V	-	250	-		3
Oscillation Frequency	FOSC	-	1.0	1.2	1.4	MHz	2
Maximum Duty Cycle	MAXDTY	VCONT=0.4V	86	92	98	%	2
Efficiency	EFFI	VIN=3.6V; RLED=20Ω	-	88	-	%	1
Current Limit	ILIM	VIN=3.6	-	2500	-	mA	4
OVP Overvoltage Limit	OVPOVL	-	-	24	-	V	2
LX On Resistance	-	VIN=3.6V, VLX=0.4V	-	0.2	-	Ω	2
LX Leak Current	ILXL	-	-	0	1	μA	3
CE 'H' Voltage	VCEH	-	1	-	-	V	2
CE 'L' Voltage	VCEL	-	-	-	0.6	V	2
CE 'H' Current	ICEH	The same as IDD2	-	-	0.1	μA	3
CE 'L' Current	ICEL	The same as ISTB	-	-	-0.1	μA	3
FB 'H' Current	ICEH	The same as IDD2	-	-	0.1	μA	3
FB 'L' Current	ICEL	The same as ISTB	-	-	-0.1	μA	3

(*1) Vfbt may take between 0.01V-1.49V certain value, now a major center value 0.01V, 0.2V,0.23V,0.25V

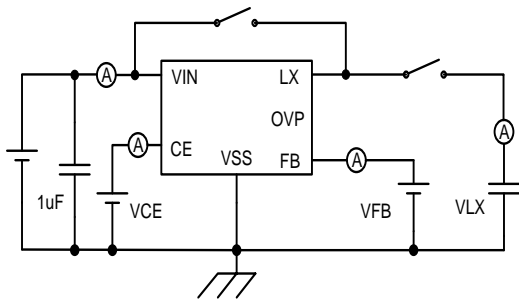
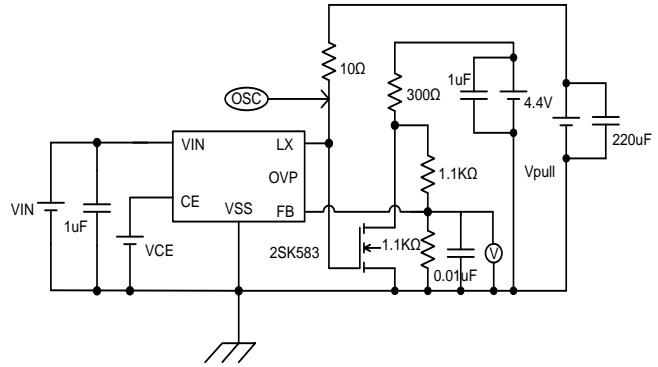
Test Circuits



Circuit 1



Circuit 2

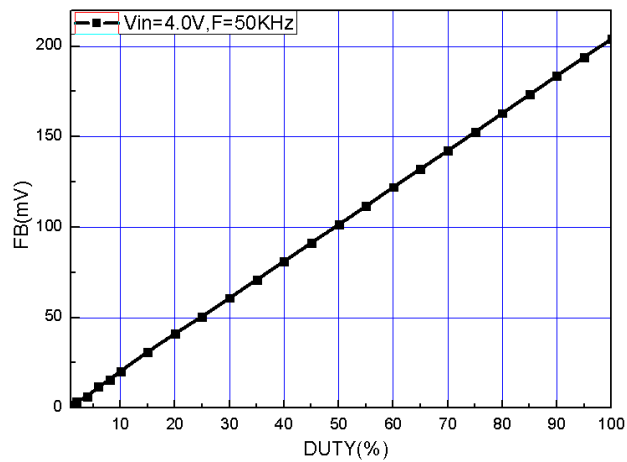

Circuit 3

Circuit 4

Caution: The value of the resistance named RLED: $R_{LED} = V_{FB} / (I_{LED} * n)$; V_{FB} is the voltage of the FB pin; I_{LED} is the current of LED and equal to 20mA usually. n is the number of leds in the circuit in parallel.

Typical Performance Characteristics

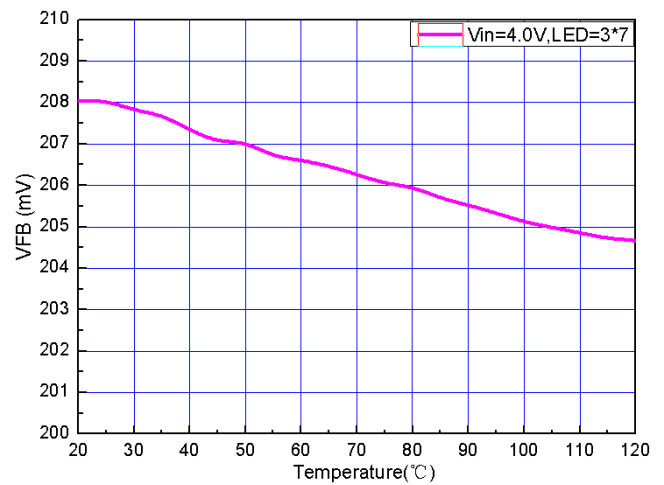
1、FB dimming characteristic curve

$V_{IN} = 3.6$ 、LED: 3*17;

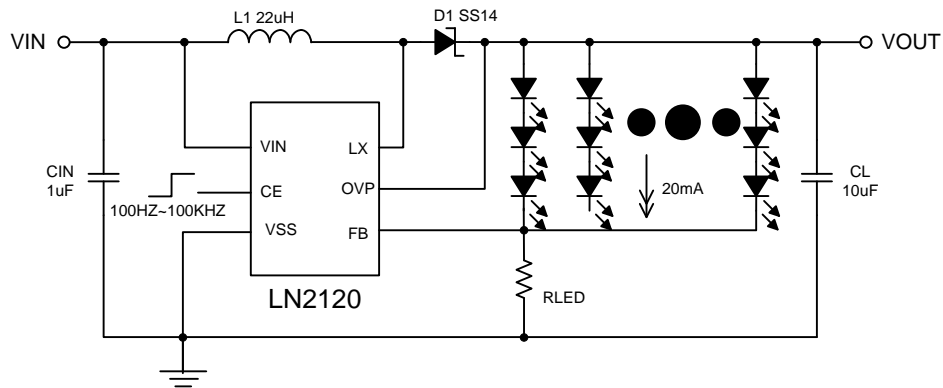


2、VFB VS Temperature

$V_{IN} = 4.0V$ ，LED=3*7;



■ Application information



- **Setting the Input Capacitor and the Output Capacitor**

Input capacitors (C1) are recommended to use more than 1µF, and output capacitors are recommended to use more than 10µF which can ensure the stability of the system.

- **RLED calculation**

$R_{LED} = V_{FB} / (I_{LED} * n)$, V_{FB} is the output voltage of FB terminal, each $I_{LED} = 20\text{mA}$, n represents the number of parallel LED paths.

- **PCB Layout**

In order to get better use effect, the main points for attention of PCB layout are as follows:

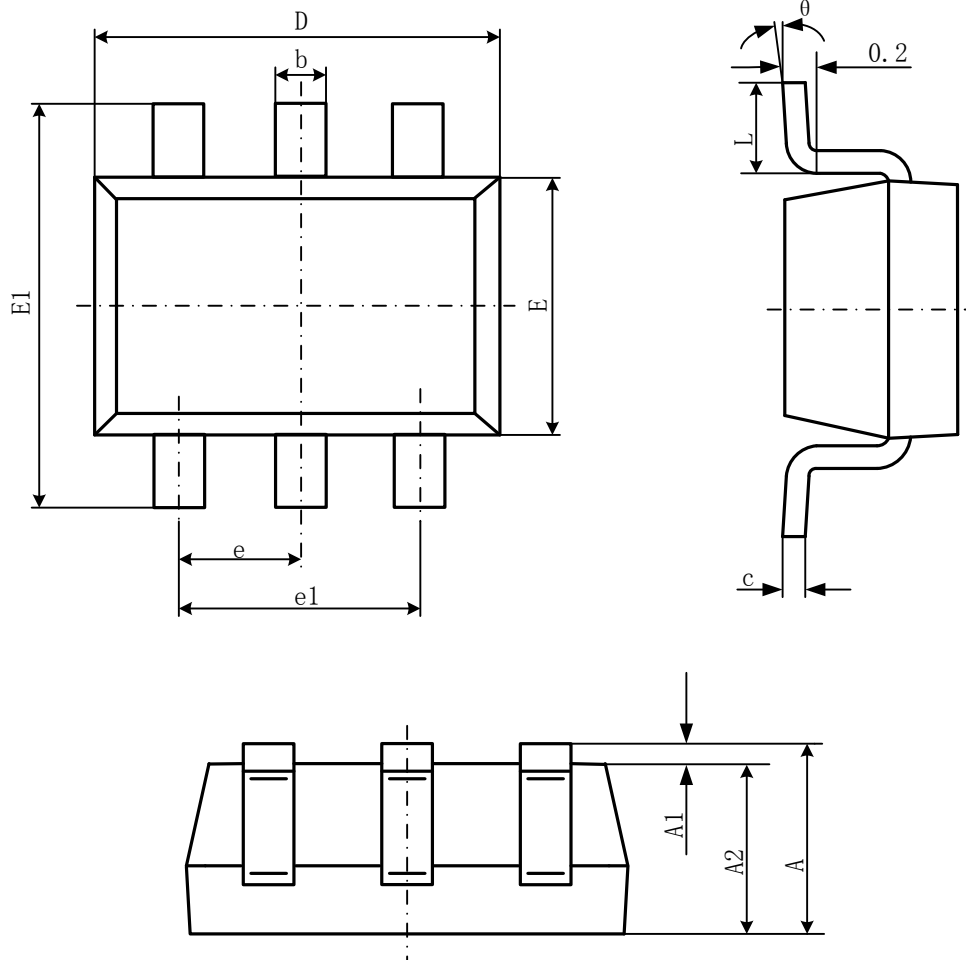
The input and output capacitors are as close as possible to the chip pins.

Inductance wiring reduces series resistance.

Use multilayer board wiring as far as possible to reduce the resistance of ground wire.

Package Information

- SOT23-6L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
Z	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°