

Step-Up DC/DC Converter Series White LED Backlight Driver

General Description

The AP3127B Series is a fixed frequency, constant current step-up DC/DC converter ideal for driving LEDs used in backlighting applications on cellular phones, PDAs and digital cameras etc. Output voltage of up to 23V can be derived, and from a 3.2V input six white LED's can be driven in series or alternatively, using a 2.5V input, a network of two parallel legs with three in each may be driven.

Luminance of the LED's is controlled by changing the duty cycle of a PWM signal applied to the CE pin.

In addition, an internal MOSFET with an $R_{ds(on)}$ of 0.8Ω is used. Allow profile and small board area solution can be achieved using a chip coil and an ultra small ceramic output capacitor (CL) of $0.22\mu F$.

Applications

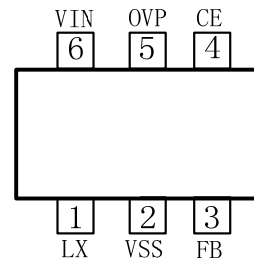
- For White LED Drivers
- Mobil phones, PHS
- PDAs, GPSs
- Digital still cameras

Features

- Input voltage range : 2.5V-6V
- Output voltage range : up to 23V externally set-up reference voltage 0.25V
- Oscillation frequency : 1.0MHz
- On resistance : 0.8Ω
- Efficiency : 88%(When driving 3 white LEDs in series $V_{in}=3.6V$ $I_{LED}=20mA$)
- Control : PWM control
- Stand-by Current : $I_{STB}=1.0\mu A$
- Load capacitor : $0.22\mu F$, ceramic
- Lx limit Current : 1.0A

Package

S0T-23-6L



Typical Application Circuit

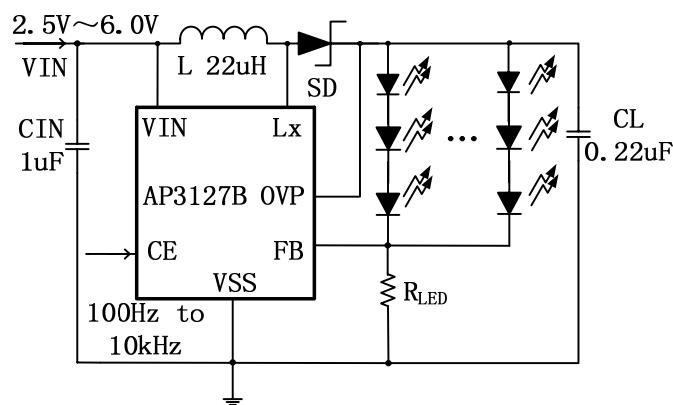


Figure 1. Basic Application Circuit with AP3127B

Pin Description

Pin No.	Pin Name	Pin Function
1	LX	Switch
2	VSS	Ground
3	FB	Voltage Feedback
4	CE	Chip Enable
5	OVP	Over voltage protect
6	VIN	Power Input

Functional Block Diagram

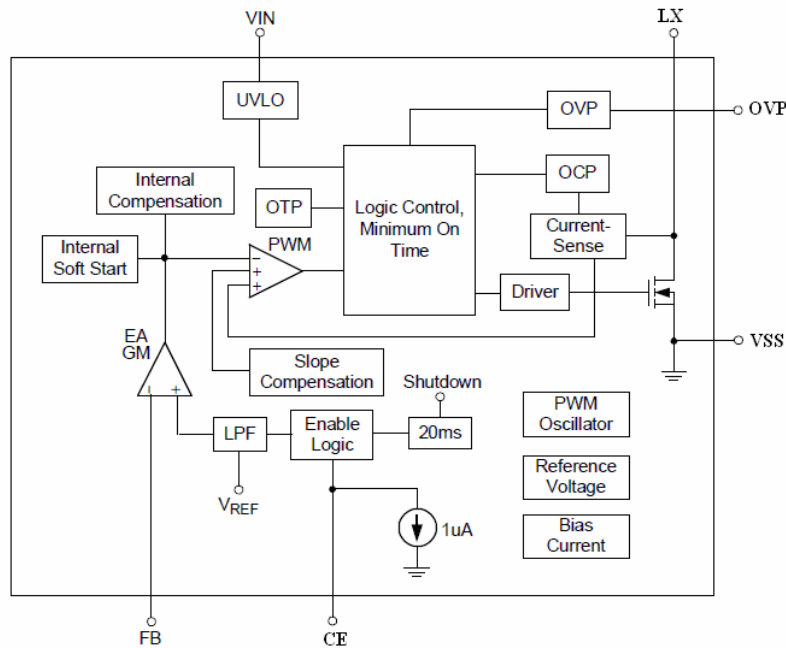


Figure 2. AP3127B Block Diagram

Absolute Maximum Ratings

VIN Pin Voltage.....	V _{ss} -0.3~V _{ss} +7V
OUT Pin Voltage.....	V _{ss} -0.3~V _{ss} +28V
LX Pin Voltage.....	V _{ss} -0.3~V _{ss} +28V
FB Pin Voltage.....	V _{ss} -0.3~V _{ss} +7V
CE Pin Voltage.....	V _{ss} -0.3~V _{ss} +7V
OVP Pin Voltage.....	V _{ss} -0.3~V _{ss} +28V
LX Pin Current.....	1300mA
Power Dissipation.....	250mW
Operating Temperature range.....	-40~+85°C
Storage Temperature range.....	-55~+125°C
Lead Temperature (Soldering, 10s).....	260°C

Caution The absolute maximum ratings are rated values exceeding which the product could suffer physical damage. These values must therefore not be exceeded under any conditions.

Electrical Characteristics

(Ta=25°C, except specify)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Circuits
FB Control Voltage	VFB	-	0.235	0.25	0.265	V	1
Output Voltage range	VOUT	-	VIN		23		
Lx Operating Voltage range	VLX				23		
Operating Voltage range	VIN		2.5		6		
Stand-by Current	ISTB	VCE=0V、VLX=5V		1		uA	3
Supply Current 1	IDD1			550		uA	2
Supply Current 2	IDD2	VIN=VLX、 VFB=0.4V		400			3
Oscillation Frequency	FOSC		0.8	1.0	1.2	MHz	2
Maximum Duty Cycle	MAXDY	VCONT=0.4V	86	92	98	%	2
Efficiency	EFFI	VIN=3.6V; RLED=12.5Ω		88		%	1
Current Limit	ILIM	VIN=3.6		1.0		A	4
LX Overvoltage Limit	LXOVL		23	25	27	V	2
LX On Resistance		VIN=3.6V、 VLX=0.4V		0.8		Ω	2
LX Leak Current	ILXL			0	1	uA	3
CE 'H' Voltage	VCEH		1.4			V	2
CE 'L' Voltage	VCEL				0.5	V	2
CE 'H' Current	ICEH	VIN=VLX、 VFB=0.4V		1		uA	3

CE 'L' Current	ICEL	VIN=VLX、 VFB=0.4V		1		uA	3
FB 'H' Current	IFBH	VIN=VLX、 VFB=0.4V			0.1	uA	3
FB 'L' Current	IFBL	VIN=VLX、 VFB=0.4V			-0.1	uA	3

Test Circuits

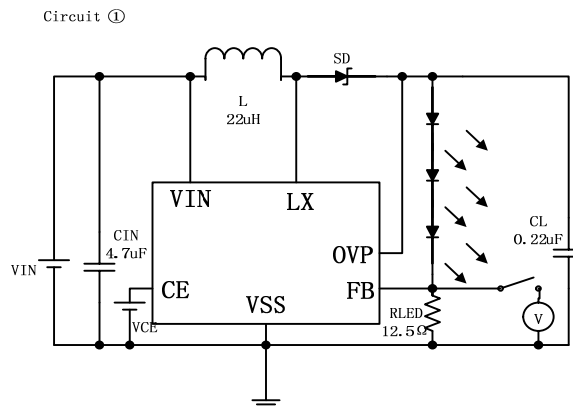


Figure 3

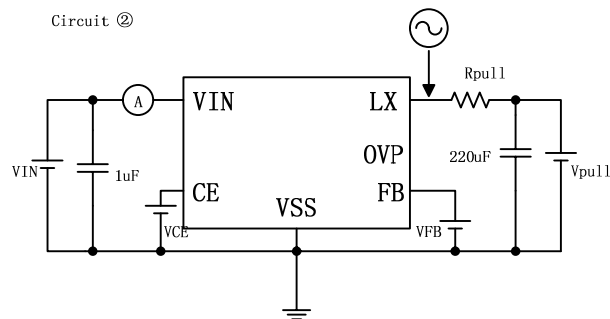


Figure 4

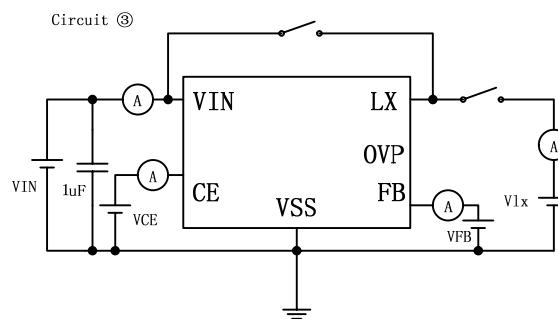


Figure 5

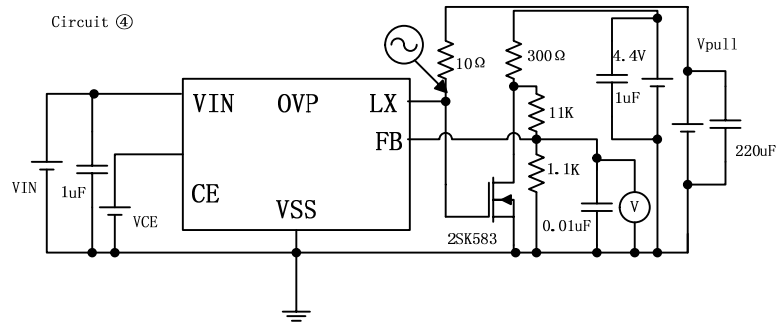
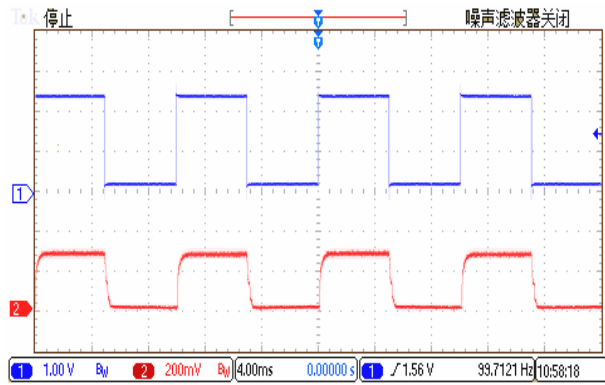


Figure 6

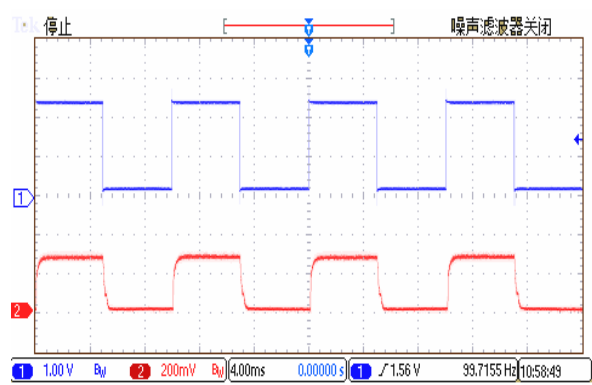
Typical Performance Characteristics

CH1=CE, CH2=FB

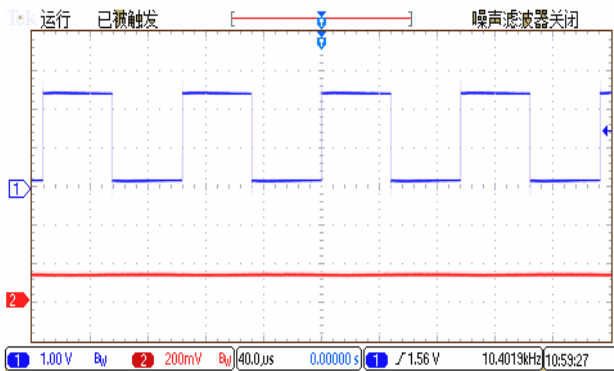
100Hz, 4 series LED, ILED=20mA



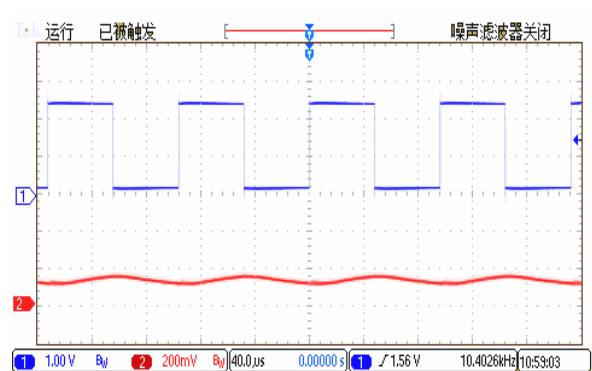
100Hz, 6 series LED, ILED=20mA



10KHz, 4 series LED, ILED=20mA



10KHz, 6 series LED, ILED=20mA



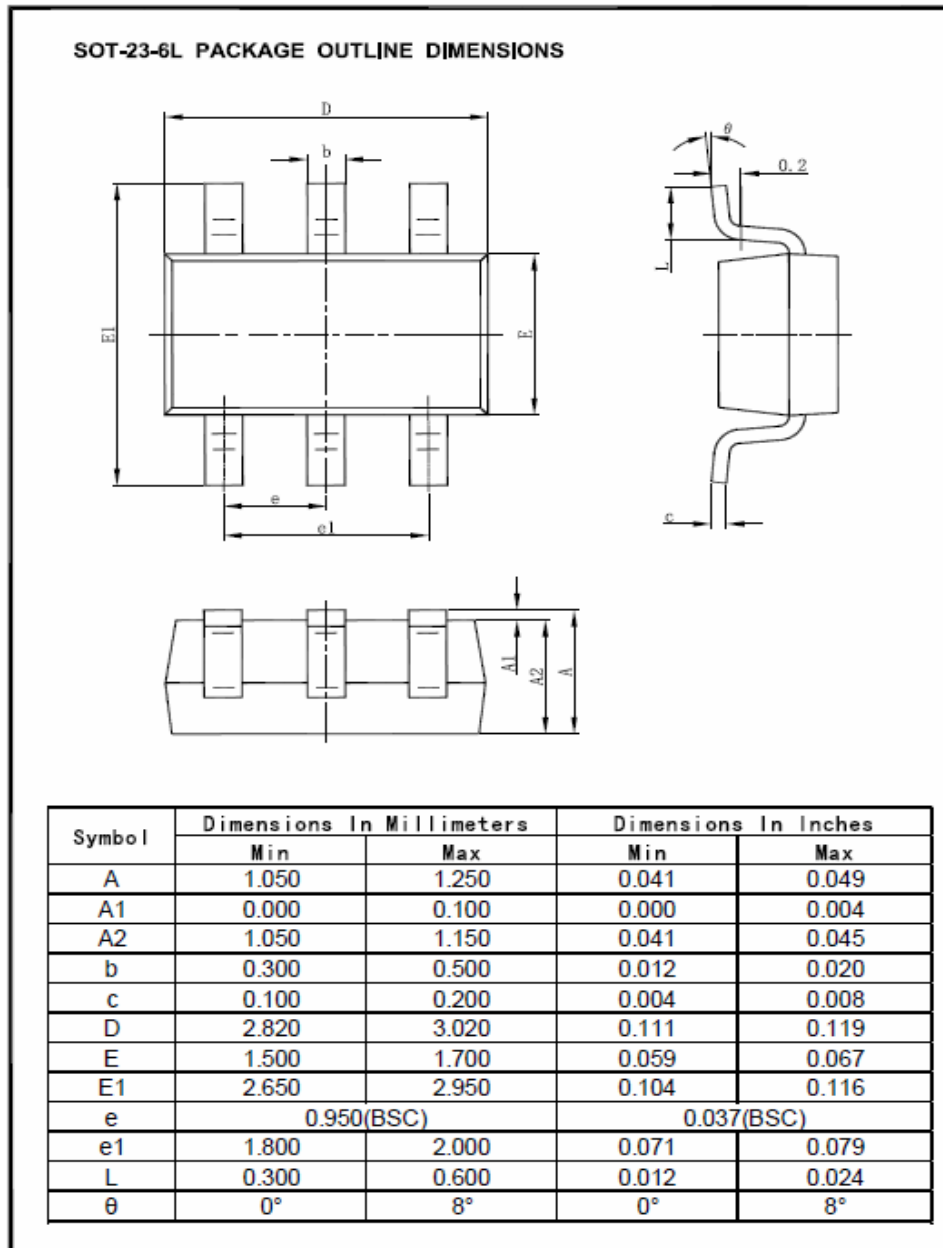
Ordering Information

Part Number	Mark	Package
AP3127B025MR	OBXYP ¹	SOT-23-6L

1.XY=date code

P=Package factory

Packaging Information



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