上海贝岭 SHANGHAI BELLING

BL8580/1

WLED Linear Driver For Li-Ion Battery Application

DESCRIPTION

The BL8580/1 is a CMOS based White/Blue LED driver with stand-alone capability. The driver is primarily designed for LED backlighting of LCD display powered by Li-ion battery With its high efficiency, low standby current and wide range of input supply voltage, the BL8580/1 is suitable for applications such as portable device display and keypad backlighting.

In portable application, three or four-channel LED solutions are popular. BL8580 has three LED channels with a SOT-23-6 package. BL8581 has four LED channels with a MSOP-8 package.

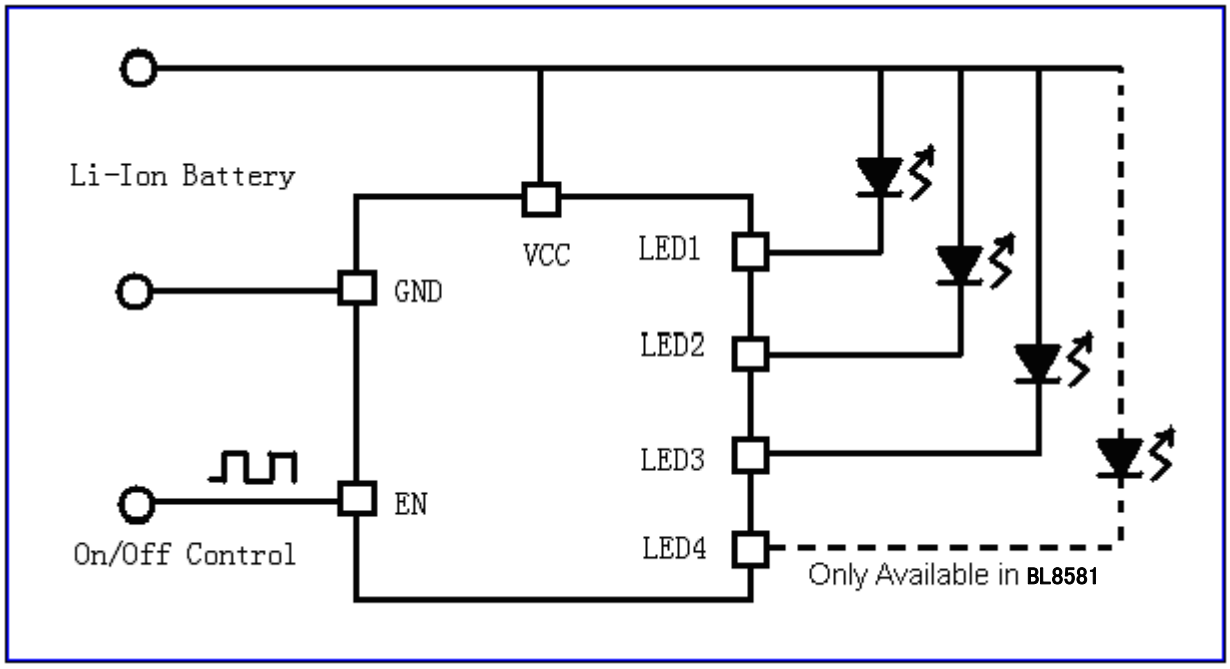
FEATURES

- No external component required
- PWM dimming control available
- Low noise and EMI
- LED sink current of 20mA
- Independent current sink circuit for each LED output
- Versatile supply voltage range
- Low standby current
- High accuracy current match on each channel

APPLICATIONS

- Small Size Color LCD Backlights Driver
- Mobile Phone, Portable DeviEN Keypad Backlights Driver

TYPICAL APPLICATION



ORDERING INFORMATION

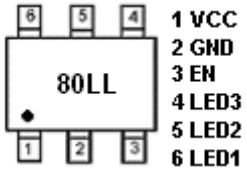
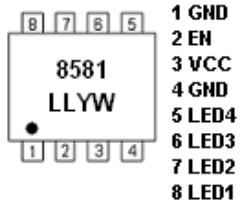
BL8580 [1][2][3]

Code	Description
[1]	Temperature&Rohs: C: -40~85°C ,Pb Free Rohs Std.
[2]	Package type: B6: SOT-23-6
[3]	Packing type: TR:Tape&Reel (Standard)

BL8581 [1][2][3]

Code	Description
[1]	Temperature&Rohs: C: -40~85°C, Pb Free Rohs Std.
[2]	Package type: E8: MSOP-8
[3]	Packing type: TR: Tape&Reel (Standard)

PIN CONFIGURATION

Product Classification		BL8580CB6TR
Marking		
80LL	80: Product Code	
	LL: LOT NO.	
Product Classification		BL8581CE8TR
Marking		
8581 LLYW	8581: Product Code	
	LL: Lot. No	
	YW: Date Code	

Y: The Year of manufacturing, "9" stands for year 2009, "0" stands for year 2010;
W: The week of manufacturing. "A" stands for week 1, "Z" stands for week 26, "$\overline{A}$" stands for week 27, "$\overline{Z}$" stands for week 52.

PIN DESCRIPTION

Name	Function Description
LED1-LEDn	RGB or WLED cathode connection pin
EN	Chip enable pin. High level activates the chip. Connect this pin to VCC if not used, do not leave this pin floating.
VCC	Power Supply
GND	Ground. In BL8581, for good LED current match, it is recommended to tie the two GND pins together by external copper.

ABSOLUTE MAXIMUM RATING

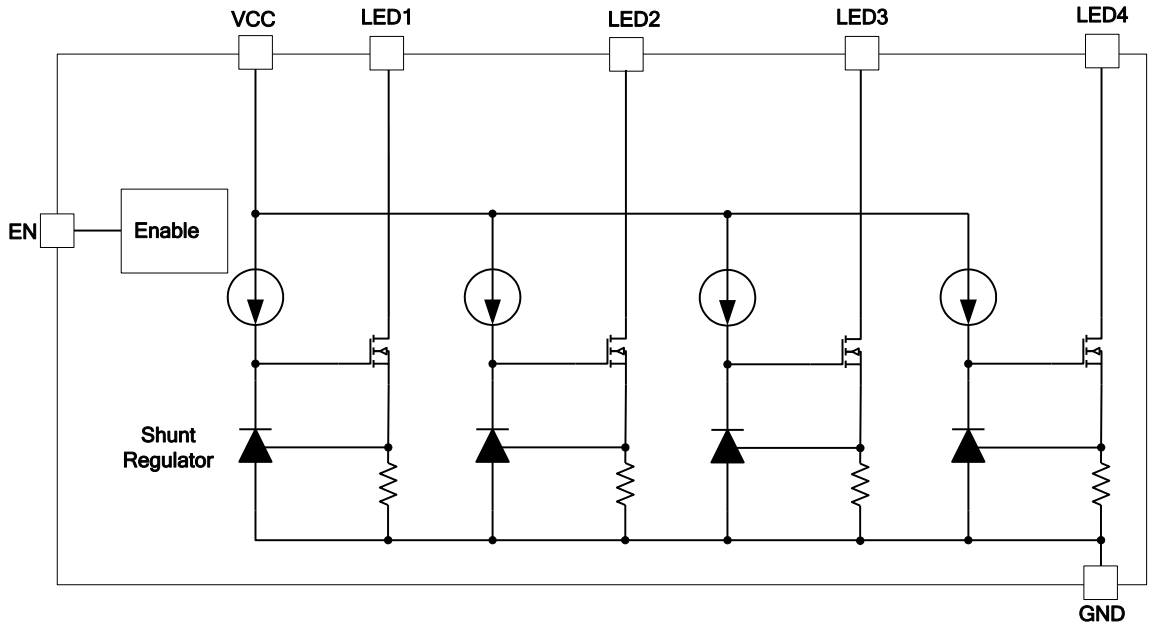
Supply voltage	–0.3V to 7V
Voltage of LEDn, EN pin	–0.3V to 7V
Maximum Junction Temperature	125°C
Operating Ambient Temperature Range	–40°C to 85°C
Storage Temperature Range	–40°C to 150°C
Lead Temperature (Soldering, 10 sec)	260°C

Note: Exceed these limits to damage to the device.
Exposure to absolute maximum rating conditions may affect device reliability.

RECOMMENDED OPERATING CONDITIONS

ITEMS	MIN	NOM	MAX	UNIT
Supply Voltage Range	2.7		6	V
Output sink current on each channel			25	mA
Operating Temperature	-25		85	℃

BLOCK DIAGRAM



(Note: Channel 4 is available only for BL8581)

ELECTRICAL CHARACTERISTICS

VCC=3.7V, T_a=25°C, No Load, Input: VEN=3.7V. (Unless otherwise noted)						
Symbols	Parameters	Conditions	ReferenEN Data			Unit
			MIN	TYP	MAX	
V_{IL}	EN Pin “Low” Logic				0.4	V
V_{IH}	EN Pin “High” Logic		1.7			V
I_{IL}	EN Pin “Low” Input Current		-1			μA
I_{IH}	EN Pin “High” Input Current				1	μA
V_{LEDL}	LEDn Dropout Voltage			100		mV
I_{LED}	LEDn Sink Current		18	20	22	mA
ΔI_{LEDn}	LEDn Sink Current Deviation				+/-3	%
I_Q	Quiescent Current			250	400	μA
I_{STBY}	Standby Supply Current	VEN=”0”		0.5		μA

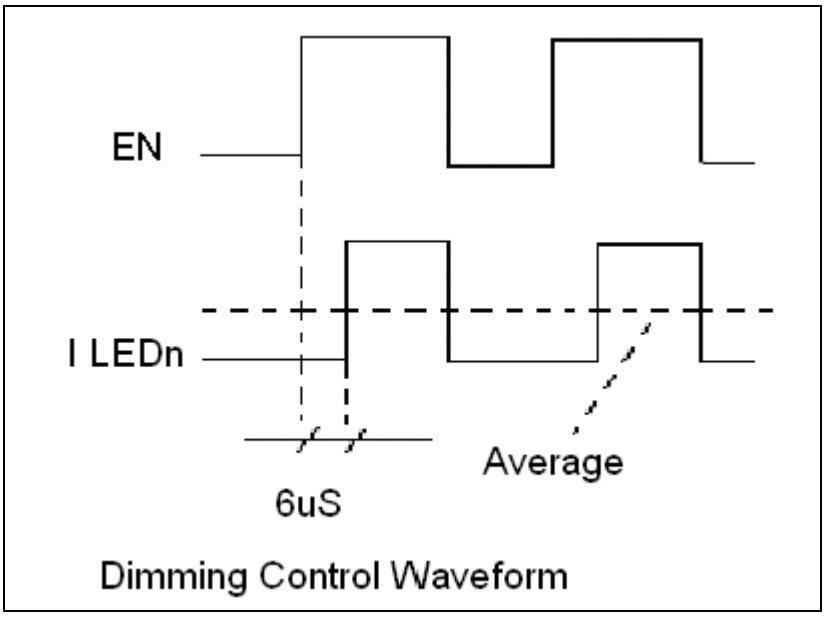
DETAILED DESCRIPTION

BL8580/1 works with a wide range of supply voltage, from 2.7V to 6V. The forward voltage of commercial white/blue LED is in the range of 2.9V to 3.5V at a current level of 20mA. Proper selection of the LED to match the supply voltage can fully utilize the Li-ion battery. For example, there is 1% ~ 3 % power left in the Li-ion battery when its voltage reaches 3.275V. So a LED with a forward voltage value of 3.2V can use up to 99% of the battery power under normal working condition. When the voltage of the battery drops below 3.2V, the current through the LED (hence the brightness) starts to decrease.

Due to its uniquely designed current regulator, BL8580/1 offer low output dropout and provide superior efficiency performance over standard Inductive boost type and capacitive charge pump type LED driver.

The EN pin controls the on/off state of the device. A high level state turns on the device and a low level turns off the device, results in the low off state current. This pin needs to be terminated since a floating level of the EN pin will cause the instability of the device.

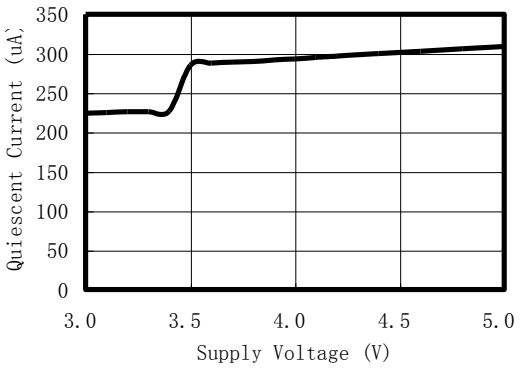
The sink current has a constant value of 20mA. The brightness of the LED can be adjusted by controlling the duty cycle of the BL8580/1's LEDn output. This can be accomplished by applying a PWM signal to the EN pin. In BL8580/1, the internal power on sequence presents a delay time of 6us from EN pin to LEDn pin. Hence, In order to normally modulate the output of LEDn in every cycle, the width of dimming signal applied EN pin have to be no less than 6us. For example, when a dimming signal of 20KHz is applied, the minimum range of dimming is about 12%, that is, the average output current on each channel is 2.4mA.



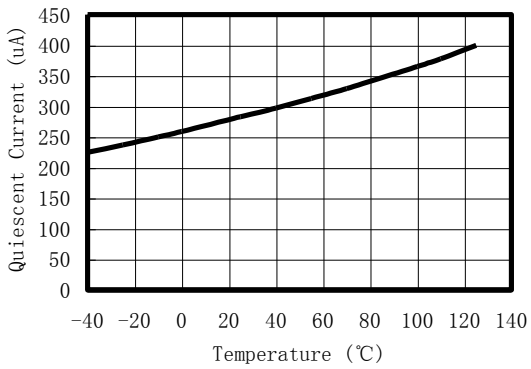
Dimming Control Waveform

TYPICAL PERFORMANEN CHARACTERISTICS

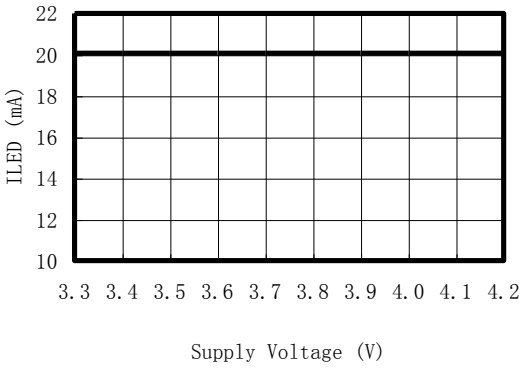
Quiescent Current vs Supply Current
(Ta=25℃)



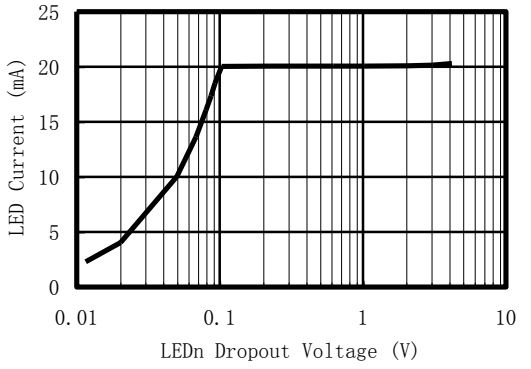
Quiescent Current vs Temperature
(VCC=3.7V)



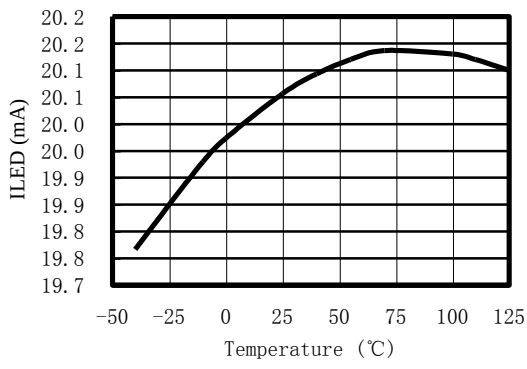
ILED vs Supply Voltage
(VCC=3.7V, VLEDn=3.2V)



ILED vs LEDn Dropout Voltage
(VCC=3.7V)



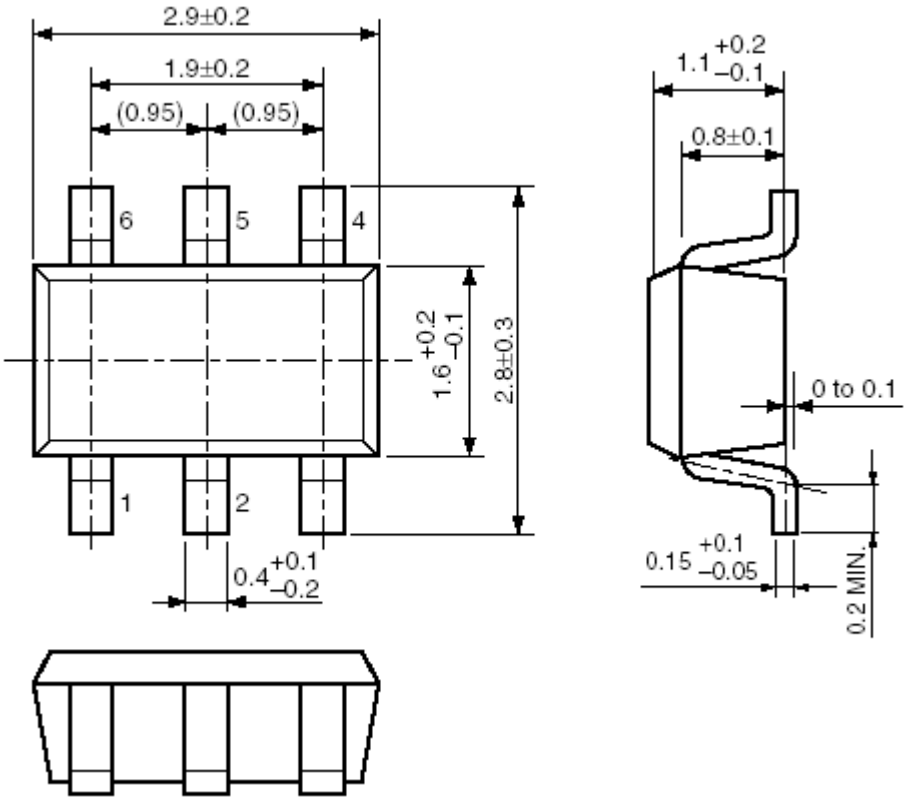
ILED vs Temperature
(VCC=3.7V)



PACKAGE LINE

Package	SOT-23-6	DeviENs per reel	3000Pcs	Unit	mm

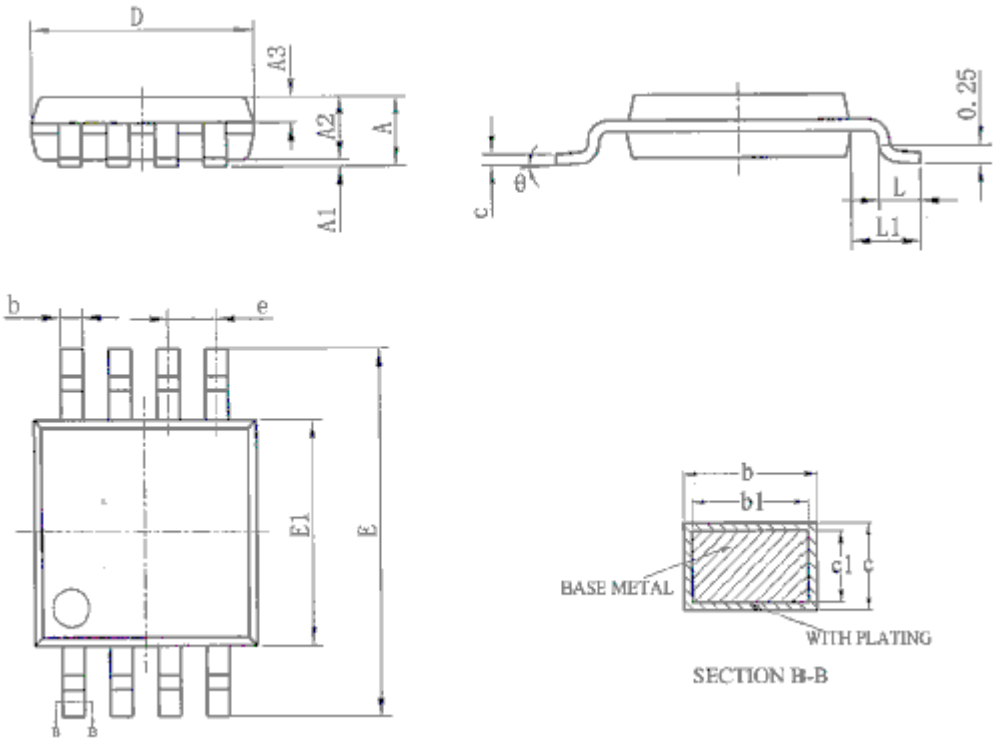
Package dimension：



PACKAGE LINE

Package	MSOP-8	Devices per reel	3000Pcs	Unit	mm

Package specification：



Symbol	Dimension (mm)			Symbol	Dimension (mm)		
	MIN	NOM	MAX		MIN	NOM	MAX
A	-	-	1.10	D	2.9	3.0	3.1
A1	0.05	-	0.15	E	4.7	4.9	5.1
A2	0.75	0.85	0.95	E1	2.9	3.0	3.1
A3	0.30	0.35	0.40	e	0.65BSC		
b	0.29	-	0.38	L	0.4	-	0.7
b1	0.28	0.30	0.33	L1	0.95BSC		
c	0.15	-	0.20	θ	0	-	8°
c1	0.14	0.152	0.16				