上海贝岭 SHANGHAI BELLING

BL8582

Single-Wire Dimming, 3-Channels WLED Linear Drive

DESCRIPTION

The BL8582 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 BL8582 is suitable for applications such as portable device display and keypad backlighting. It can realize dimming control through EN pin. Inner the device, there is a 4-bit counter, so the LED current can be set at 16 levels with 1/15 Imax step. BL8582 has three LED channels with a SOT-23-6 package.

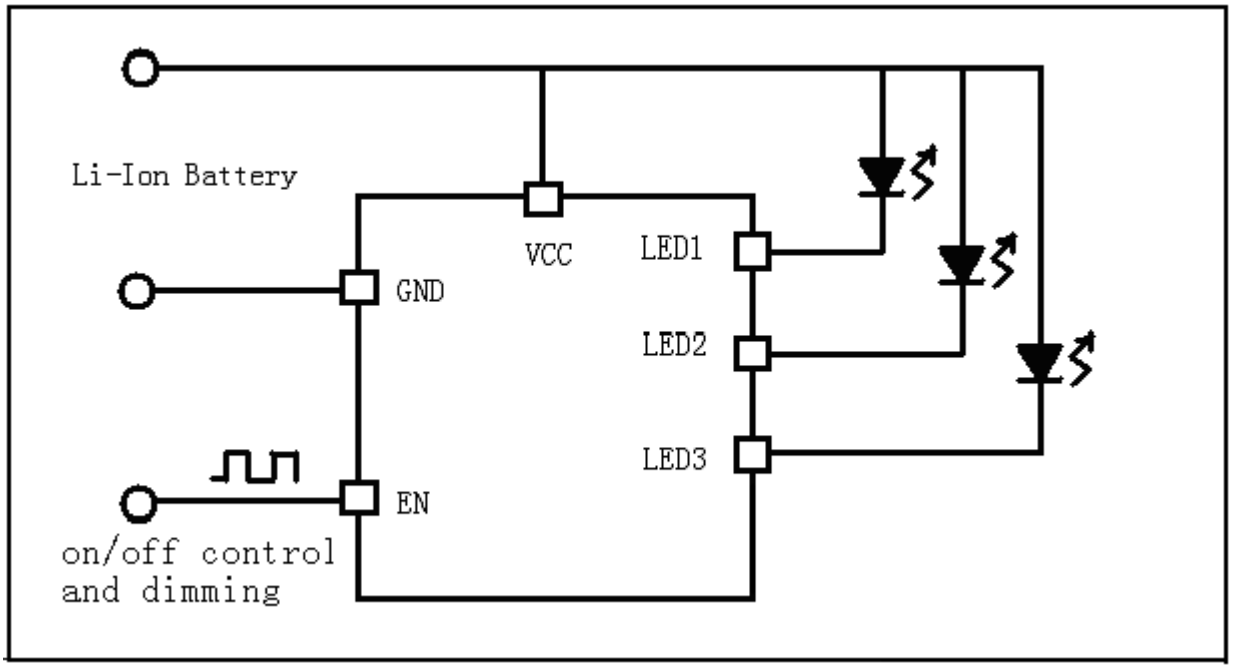
FEATURES

- 2.7 to 5.5V input range
- Single-wire dimming control with linear 16-steps.
- PWM dimming control
- LED sink current of max. 20mA
- Independent current sink circuit for each LED output
- 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

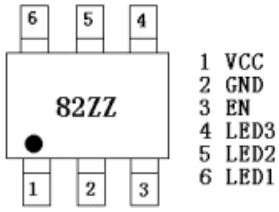


ORDERING INFORMATION

BL8582 [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)

PIN CONFIGURATION

Product Classification		BL8582CB6TR
Marking		
82ZZ	82: Product Code	
	ZZ: Date Code	

PIN DESCRIPTION

Name	Function Description
LED1-LED3	RGB or WLED cathode connection pin
EN	Chip enable and dimming control.
VCC	Power Supply
GND	Ground.

ABSOLUTE MAXIMUM RATING

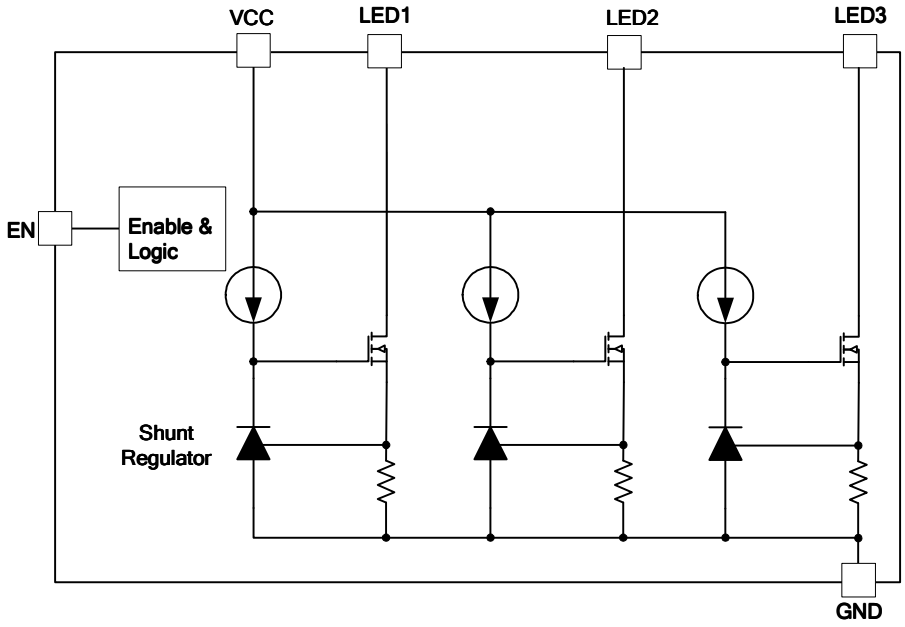
Supply voltage	–0.3V to 7V
Voltage of LEDn, EN pin	–0.3V to 7V
Maximum Junction Temperature	125°C
Operating Ambient Temperature Range	–40°C to 85°C
Storage Temperature Range	–40°C to 150°C
Lead Temperature (Soldering, 10 sec)	260°C

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

RECOMMENDED OPERATING CONDITIONS

Items	MIN	NOM	MAX	Unit
Supply Voltage Range	2.7		5.5	V
Output sink current on each channel			25	mA
Operating Temperature	-25		85	℃

BLOCK DIAGRAM



ELECTRICAL CHARACTERISTICS

VCC=3.7V, T_a=25°C, No Load, Input: VEN=3.7V. (Unless otherwise noted)						
Symbols	**Parameters**	**Conditions**	**MIN**	**TYP**	**MAX**	**Unit**
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
T_D	PWM dimming control delay time			20		µS
T_{LAT}	Latch off time before transient to the new current level (see figure 2)			20		µS
T_{PULSE}	The positive and negative width	EN dimming control	4		20	µS
V_{LEDL}	LEDn Dropout Voltage			100		mV
I_{LED}	LEDn Sink Current		18	20	22	mA
ΔI_{LEDn}	LEDn Sink Current Deviation		-3		3	%
I_Q	Quiescent Current			250	400	µA
I_{STBY}	Standby Supply Current	VEN=”0”		0.5		µA

DETAILED DESCRIPTION

BL8582 works with a wide range of supply voltage, from 2.7V to 5.5V. 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.

Startup sequence

BL8582 starts to work only when VCC powered on and the EN pin became high after a delay, the delay time is at least 4us. EN pin is not allowed to connect to VCC directly or keep it floating.

PWM dimming control

If the frequency of the PWM signal to the EN pin is less than 5KHz, the average LED current is proportional to the duty cycle of the PWM signal, and the EN works as a simple on/off control. A high level turns on and a low shuts down the LEDs. There is a delay time between the input PWM signal and the output LED current waveform, as shown in Fig.1, the T_D is about 20uS.

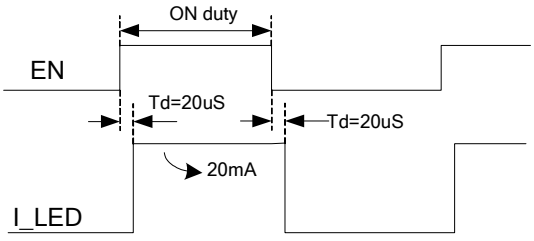


Fig. 1 PWM Dimming Control

EN dimming control

The LEDs' brightness can also be controlled by the pulses applied to the EN pin, Refer to the Fig. 2. Inside the device there is a 4-bit counter connecting to the EN pin. The LED current can be programmed up to 16 levels depends on the number of rise edges of the input waveform. A high level input ("1") with pulse width wider than 20uS is regarded as a signal to stop the build-in counter. The time between two wide high levels (more than 20uS) is a counting period. When some rise edges occur between two high level pulses of 20us, the equation as shown below can calculate the active pulse number, called Code_No.

$$Code\_No = Mod(N,16),$$

In the equation, N is the number of rise edges of the input waveform and mod function returns the remainder of N divided by 16. For example, if N=0, 16, or other integral multiple of 16, the mod function returns a value of 0, if N=1, 17 or other integral multiple of 16 plus 1, the mod function returns a value of 1, and so on.

The relationship between LEDs' brightness and the Code_No is listed as the following table.

Code No	I_{SET}/20mA	Code No	I_{SET}/20mA
0	0	8	8/15
1	1	9	7/15
2	14/15	10	6/15
3	13/15	11	5/15
4	12/15	12	4/15
5	11/15	13	3/15
6	10/15	14	2/15
7	9/15	15	1/15

The frequency of the input pulse should be lower than 100KHz, and the width of the high level and low level larger than 4uS to prevent false trigger.

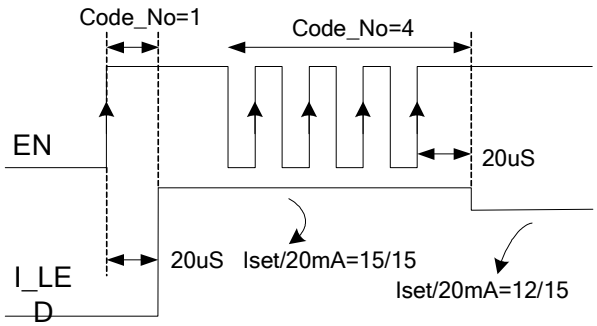
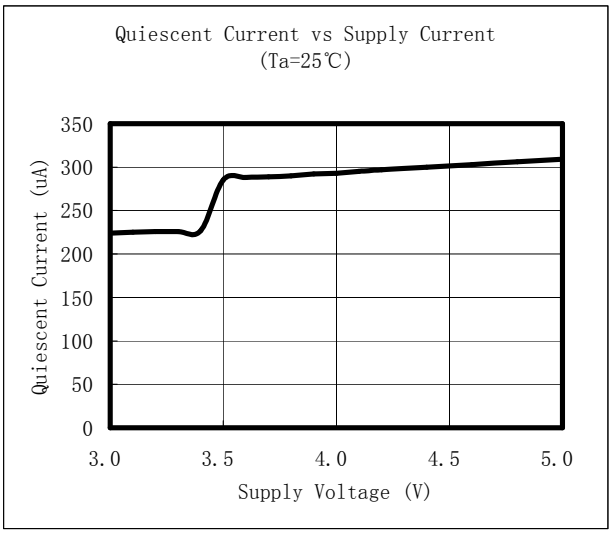
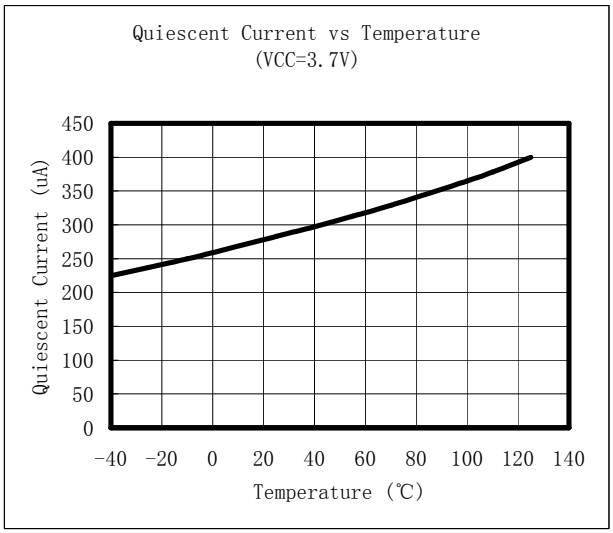
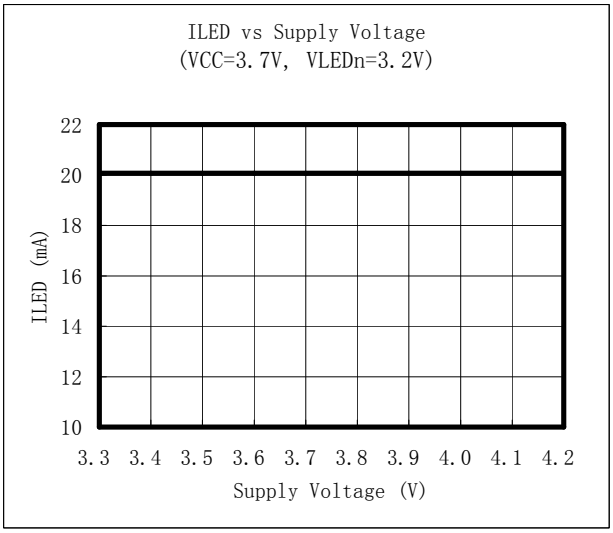


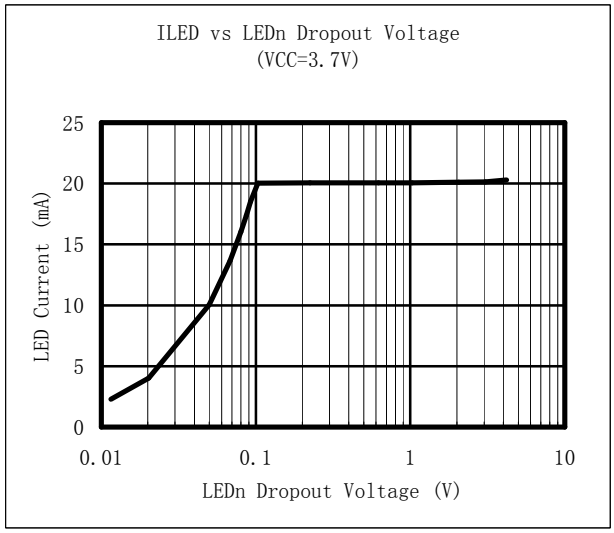
Fig. 2 Linear current Dimming Control

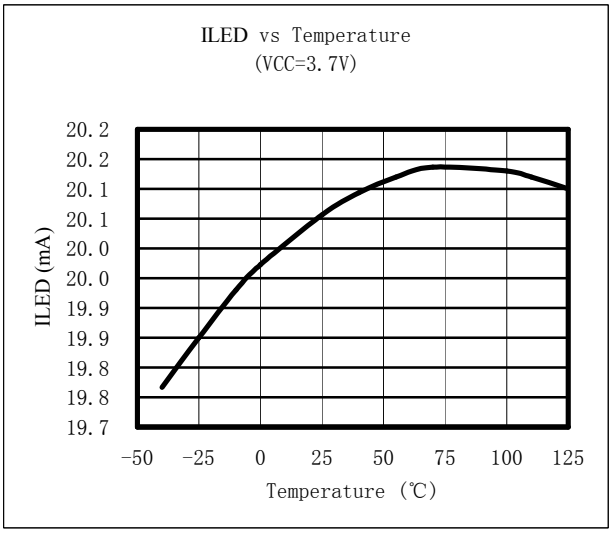
TYPICAL PERFORMANEN CHARACTERISTICS

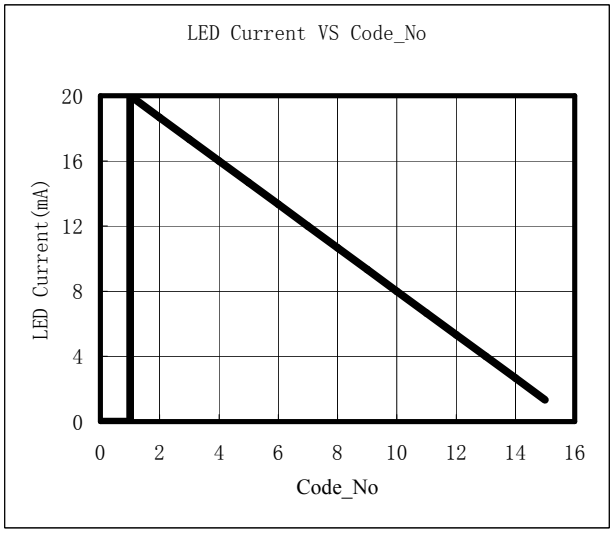












PACKAGE LINE

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

Package dimension：