BCT3258

8 Channel Constant Current LED Driver

Low Dropout Current Sink

General Description

The BCT3258 is a high performance constant current white LED driver. The BCT3258 uses an internal resistor to set the bias current for 8 LEDs, which are matched to 3%. The BCT3258's advantages over ballast resistors include much lower bias variation with supply voltage variation, significantly lower dropout voltage, and in some applications, significantly improved efficiency. The BCT3258 requires only a 50mV dropout voltage at a 20mA load on each output to match the LED brightness.

Users can easily configure the LED current from 1.25mA to 20mA by a serial pulse interface. The dimming of white LEDs current can be achieved by applying a pulse signal to the EN pin. There are totally 16 steps of current could be set by users. Internal soft start circuitry effectively reduces the in-rush current while both start-up and mode transition.

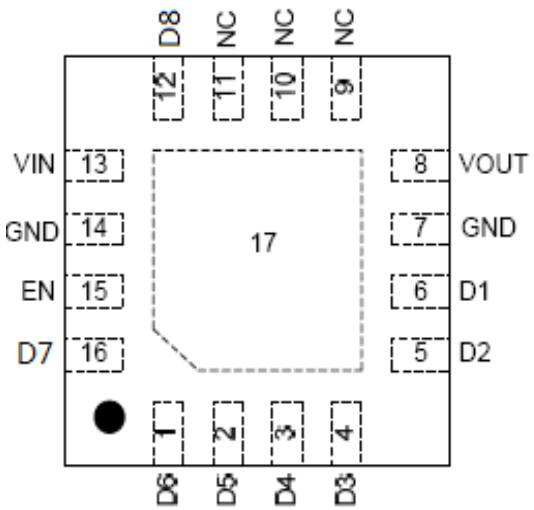
Features

- ♦ Low 50mV Dropout at 20mA
- ♦ 20mA full scale current
- ♦ <3% LED Current Matching (TYP)
- ♦ One Wire interface for 16-Step Brightness Control
- ♦ 2.7V to 5.5V Supply Voltage Range
- ♦ Thermal Shutdown Protection
- ♦ Low Input Noise and EMI
- ♦ RoHS Compliant and 100% Lead (Pb)-Free, QFN-16L Package

Applications

Cell Phones
PDAs
Digital Cameras, Camcorders
Portable Instrumentation
Battery Powered Equipment

Pin Configurations (Top View)



DFN3x3-16L Package

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Ordering Information

PART	PIN-PACKAGE	Temp-Range	Top Mark	Supplied as:
BCT3258EGE-TR	QFN3x3-16L	-40°C to +85°C	3258	3000units/Tape & Reel

Functional Pin Description

Pin	Name	Function
1	D6	LED Pin6, leave it NC if unused.
2	D5	LED Pin5, leave it NC if unused.
3	D4	LED Pin4, leave it NC if unused.
4	D3	LED Pin3, leave it NC if unused.
5	D2	LED Pin2, leave it NC if unused.
6	D1	LED Pin1, leave it NC if unused.
12	D8	LED Pin8, leave it NC if unused.
16	D7	LED Pin7, leave it NC if unused.
7	GND	Ground
8	Vout	Vout Pin, connect to VIN internally
13	VIN	Input voltage
15	EN	Chip Enable (Active High), and Brightness control interface
9,10,11,14,17	NC	No connect

Typical Application Circuit

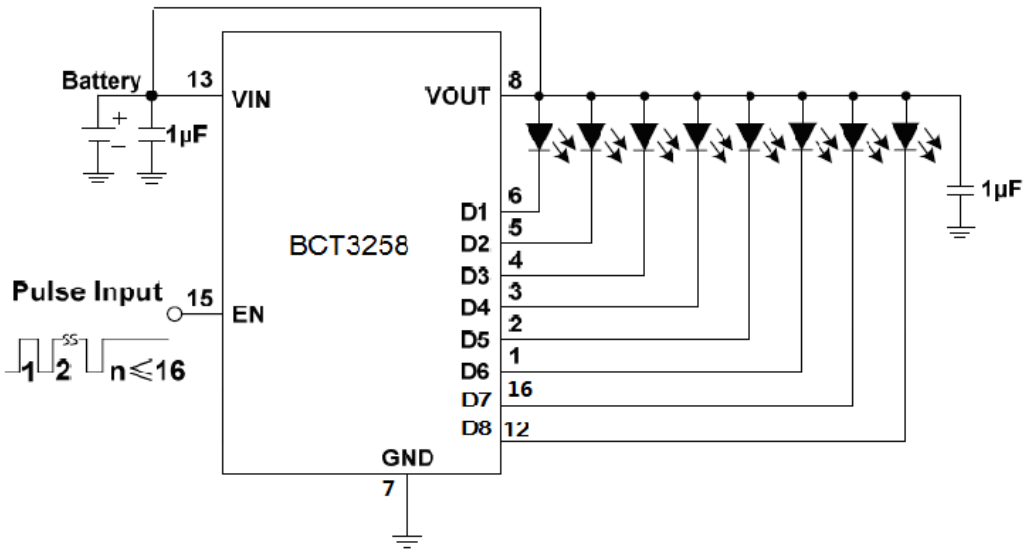

Figure 1: Application Circuit .

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ABSOLUTE MAXIMUM RATINGS

VIN to GND.....-0.3V to 6V
All Other Pins to GND .....-0.3V to (VCC + 0.3V)
Continuous Current (D1- D8)…….... ±30mA
Continuous Power Dissipation (TA = +70°C)
16-Pin QFN (derate 15.6mW/°C above +70°C) 1.25W
Operating Temperature Range .....-40°C to +85°C
Storage Temperature Range.....-65°C to +150°C
Junction Temperature.....+150°C
Lead Temperature (soldering, 10s)...+300°C

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS

(VIN = 2.7V to 5.5V, TA = TMIN to TMAX, unless otherwise noted. Typical values are at VIN = 3.3V, TA = +25°C.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
POWER SUPPLY						
Supply Voltage Range	VIN		2.7		5.5	V
Supply Current	IVIN	EN= high, D_ floating		150	200	uA
Shut Down Current	ISHUT	EN= low			1	uA
Analog Outputs (D1-D8)						
Drop Out Voltage	VDROP	ID_ = 20mA, VD_ - GND		50	75	mV
Current Accuracy	ID_	Current Sinck mode	19	20	21	mA
Current Matching Between Channels	△ID_	Max(△ID_) /Iavg		1.5	3	%
Logic Inputs (EN)						
Input-Logic High	VIH				1.6	V
Input-Logic Low	VIL		0.4			V
Input Leakage Current	IIN	V(EN) = 0 or VIN			±1	uA
IC junction thermal shutdown threshold	TJ-TH			155		°C

Note : Devices are 100% tested at TA = +25°C. Limits across the full temperature range are guaranteed by design and correlation.

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Functional Block Diagram

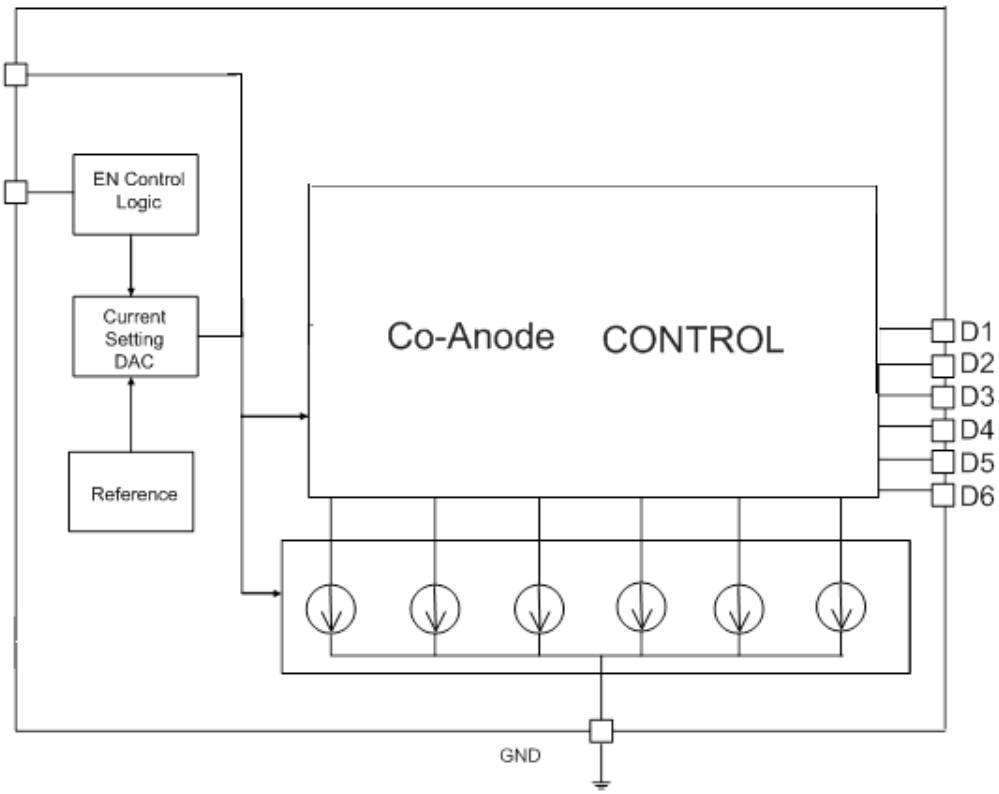

Figure 2: Functional Block Diagram

Functional Description

The BCT3258 is a six-channel current sink driver, offering ultra-high efficiency for driving parallel LEDs. The BCT3258 enters current sink mode and can support to drive 8 parallel Co-Anode LEDs. Also users can easily configure the LED current from 1.25mA to 20mA by a serial pulse input pin15. The number of falling edges are detected internally and decoded as illustrated in Table 1.There are totally 16 steps of current value could be set by users. When the EN pin is held low for 3ms or more, the BCT3258 enters the shutdown mode and draw “zero” current from VIN.

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Number of Pulse Falling Edge	I_DX (mA)	Number of Pulse Falling Edge	I_DX (mA)
0	20	8	10
1	18.75	9	8.75
2	17.5	10	7.5
3	16.25	11	6.25
4	15	12	5
5	13.75	13	3.75
6	12.5	14	2.5
7	11.25	15	1.25

Table 1: Current Setting

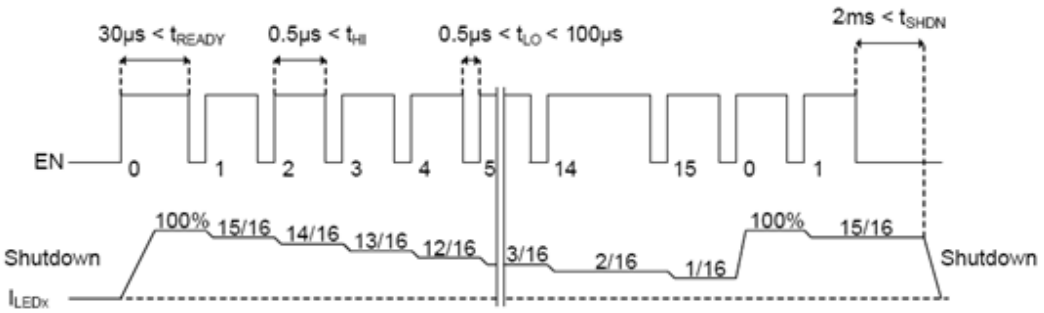
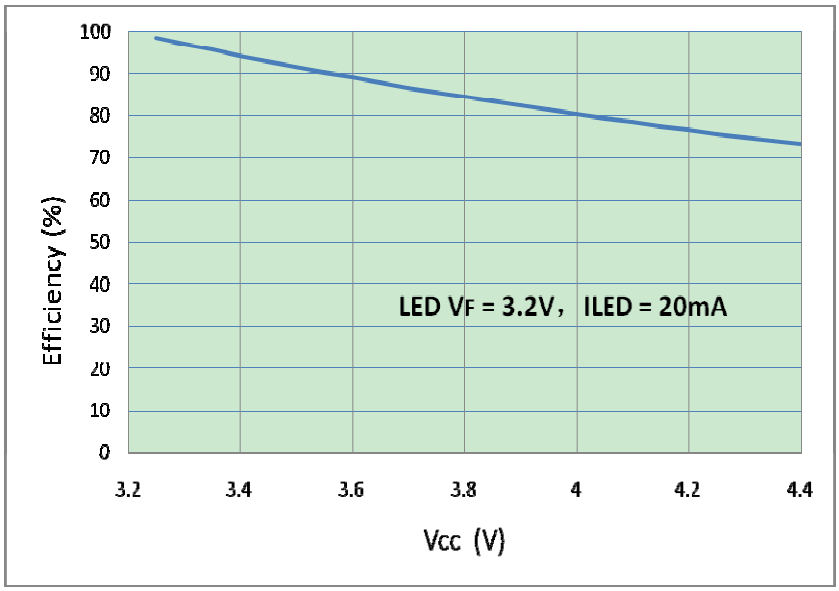


Figure 3: Brightness Control by Pulse Dimming

Efficiency vs Supply Voltage



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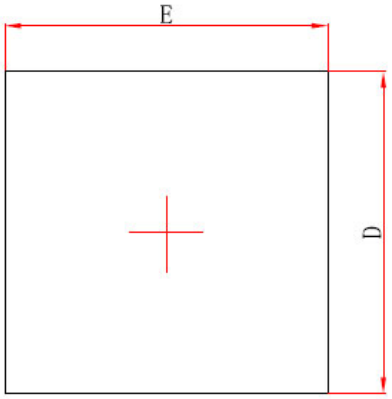
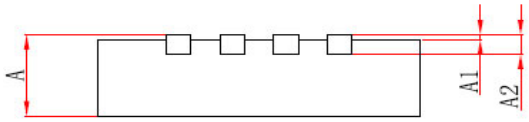
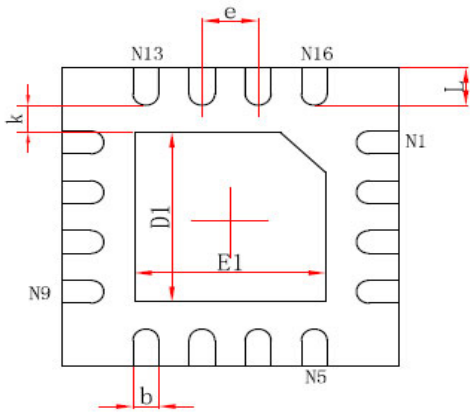
Packaging Mechanical: 16-Pin TQFN



Top View



Side View



Bottom View

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700/0.800	0.800/0.900	0.028/0.031	0.031/0.035
A1	0.000	0.050	0.000	0.002
A2	0.153	0.253	0.006	0.010
D	2.900	3.100	0.114	0.122
E	2.900	3.100	0.114	0.122
D1	1.600	1.800	0.063	0.071
E1	1.600	1.800	0.063	0.071
k	0.200MIN.		0.008MIN.	
b	0.180	0.300	0.007	0.012
e	0.500TYP.		0.500TYP.	
L	0.300	0.500	0.012	0.020