

High-Efficiency , 29V White LED Driver with Dimming Control

Description

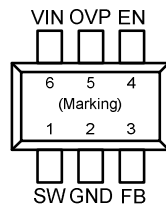
The EA 9755 is a step -up DC /DC converter specifically designed for driving WLEDs with a constant current . The EA9755 can drive up 8 white LEDs in series from a Lithium Ion battery . Series connection of LEDs provides identical LED current for uniform brightness and minimizes the number of traces to the LEDs . The EA9755 uses current mode , fixed frequency of approximately 1.3MHz architecture to regulate the LED current through an external current sense resistor . The low feedback voltage of 195mV can minimize power dissipation.

Other features include current limit protection, thermal shutdown protection, under-voltage lockout (UVLO), and over-voltage function, which can shut off the device if output voltage reaches above 29V.

The EA9755 is available in space saving SOT-23-6, TSOT-23-6 packages.

Pin Assignments

S6 Package (SOT-23-6)



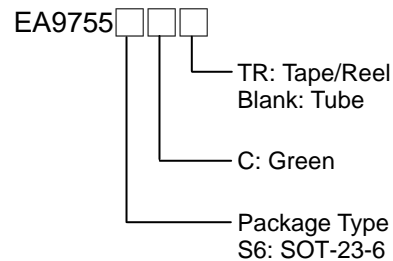
Features

- Wide Range for PWM Dimming, Ranging from 100Hz to 50kHz
- High Efficiency: 87%
- Drives up to 8 WLEDs
- Fast 1.3MHz Switching Frequency
- Low 195mV Feedback Voltage
- Over Voltage Protection
- 1% Min. Dimming Duty at 20kHz
- Low Profile SOT-23-6 Packages
- RoHS Compliant

Applications

- Cellular Phone
- Digital Camera
- LCD Panel Backlight
- GPS Receiver
- PDA, Handheld Computer

Ordering Information



SOT-23-6 Marking

Part Number	Product Code
EA9755S6CTR	FG4

Typical Application Circuit

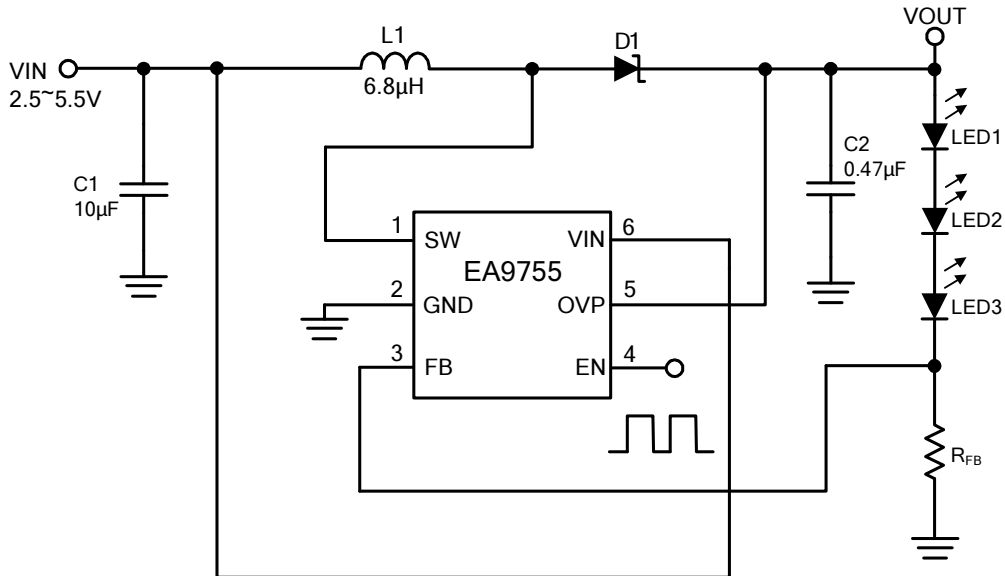


Figure 2. Typical Application Circuit of EA9755

Functional Pin Description

Pin Name	Pin No. (SOT-23-6)	Pin Function
SW	1	Switch Node Pin. Connect inductor/diode here. Minimize trace area at this node to reduce EMI.
GND	2	Ground Pin. Connect directly to local ground plane.
FB	3	Feedback Pin. Reference voltage is 195mV. Connect cathode of the lowest LED and resistor here. Calculate resistor value according to the formula: $R_{FB} = V_{FB} / I_{LED}$
EN	4	Enable and dimming control 1. Enable: Logic high enables the device; logic low forces the device into shutdown mode. 2. Digital dimming control: apply external 100Hz to 50kHz PWM pulse signal with amplitude greater than 1.5V.
OVP	5	Over Voltage Input. OVP measures the output voltage for open circuit protection. Connect OVP to the output at the top of the LED string.
VIN	6	Input Supply Pin. Must be locally bypassed.

Block Diagram

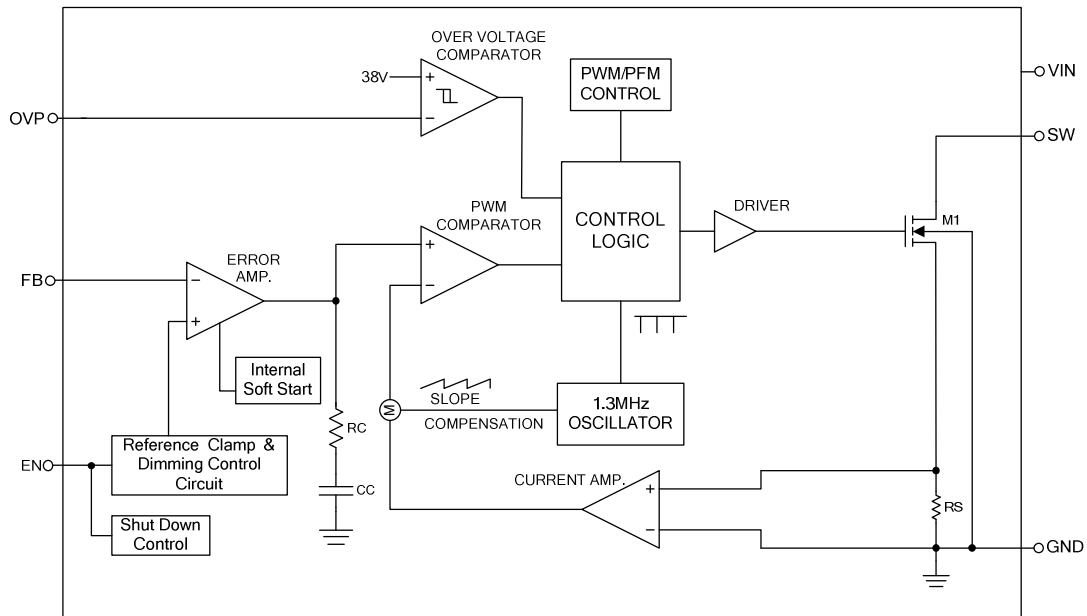


Figure 3. Block Diagram of EA9755

Absolute Maximum Ratings

- VIN ----- +6V
- SW Voltage ----- +33V
- FB Voltage ----- +6V
- EN Voltage ----- +6V
- Maximum Junction Temperature (T_J) ----- +150°C
- Power Dissipation @ $T_A=25^\circ\text{C}$, (P_D)
 - SOT-23-6 ----- + 0.40W
- Package Thermal Resistance, (θ_{JA})
 - SOT-23-6 ----- +250°C/W
- Storage Temperature Range (T_S) ----- -65°C to +150°C
- Lead Temperature (Soldering, 10 sec.) (T_{LEAD}) ----- +260°C

Note 1 : Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device.

Recommended Operating Conditions

- Input Voltage (V_{IN}) ----- +2.5 to +5.5V
- Operating Temperature Range ----- -40°C to +85°C

Electrical Characteristics

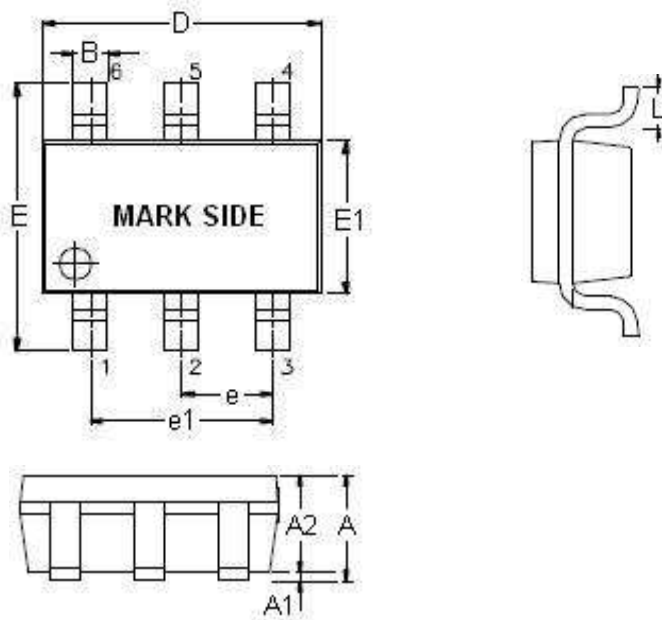
($V_{IN}=V_{EN}=5V$, $T_A=+25^{\circ}C$, unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Operating Input Voltage	V_{IN}		2.5		5.5	V
Operation Current	I_{SD}	$V_{EN}=0V$		4	8	μA
	I_Q	$V_{FB}=0.2V$		430	550	μA
Switching Frequency	f_{SW}		1.0	1.3	1.5	MHz
Maximum Duty Cycle	Duty	$V_{FB}=0V$	92			%
Under Voltage Lockout						
VIN Under Voltage Lockout	UVLO	V_{IN} Rising		2.25	2.45	V
Under Voltage Lockout Hysteresis				92		mV
Open Lamp Shutdown Threshold	V_{OV}	V_{OUT} Rising	28	29		V
Enable						
EN OFF Threshold		V_{EN} Falling			0.4	V
EN ON Threshold		V_{EN} Rising	1.4			V
Dimming On Time	T_{ON}	$V_{IN}=5V$	1			μs
Feedback						
FB Voltage	V_{FB}	$V_{EN}=1.5V$	185	195	205	mV
FB Input Bias Current	I_{FB}	$V_{FB}=0.1V$		-300		nA
Output Switch						
SW ON-Resistance (Note 2)	R_{ON}			0.25		Ω
SW Current Limit (Note 2)	I_{LM}			2		A
Thermal Shutdown (Note 2)	T_{SD}			150		$^{\circ}C$

Note 2 : The specification is guaranteed by design, not production test.

Outline Information

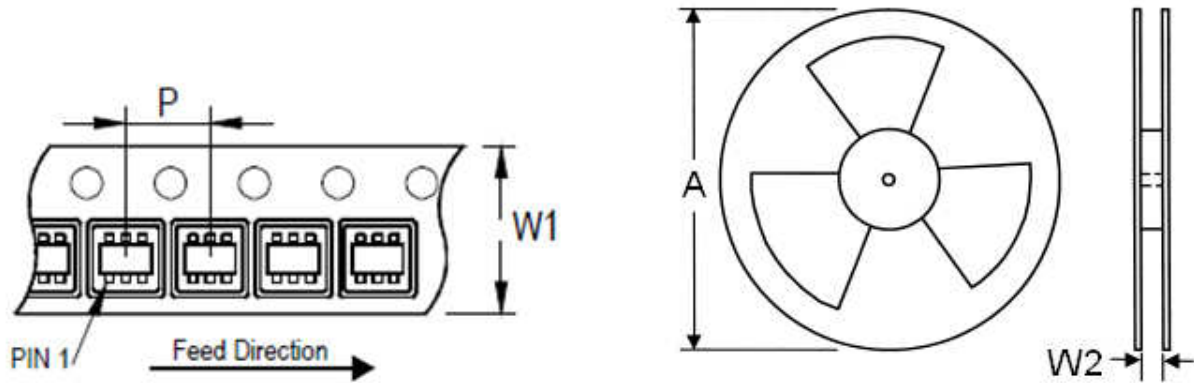
SOT-23-6 Package (Unit: mm)



SYMBOLS UNIT	DIMENSION IN MILLIMETER	
	MIN	MAX
A	0.90	1.45
A1	0.00	0.15
A2	0.90	1.30
B	0.30	0.50
D	2.80	3.00
E	2.60	3.00
E1	1.50	1.70
e	0.90	1.00
e1	1.80	2.00
L	0.30	0.60

Note : Followed From JEDEC MO-178-C.

Carrier Dimensions



Tape Size (W1) mm	Pocket Pitch (P) mm	Reel Size (A)		Reel Width (W2) mm	Empty Cavity Length mm	Units per Reel
		in	mm			
8	4	7	180	8.4	300~1000	3,000