

Tiny Package, High Efficiency, Constant Current LED Driver

General Description

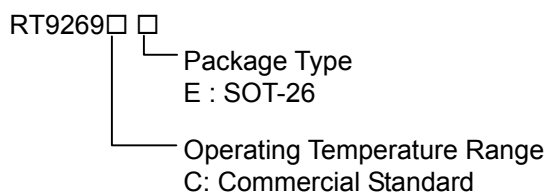
The RT9269 is a compact, high efficient LED driver with high flexibility of application configurations in charge pump mode or in boost rectifier mode, delivering Tens of mA constant output current for driving 1~4 white LED's.

The 0.25V low reference voltage minimized the power loss across the current-setting resistor.

The wide applicable VDD range makes RT9269 suitable for 1 to 4 battery cell applications as well as being supplied with 2.5/3.3/5/6V system powers. The 500kHz high switching rate minimized the size of external components. Besides, the 17µA low quiescent current together with high efficiency maintains long battery lifetime.

The output current is set with 1 external resistor. And the chip enable (CE) pin can be used for tuning the LED brightness by controlling the ON/OFF duty with external clock. RT9269 is provided in SOT-26 package.

Ordering Information



Marking Information

For marking information, contact our sales representative directly or through a RichTek distributor located in your area, otherwise visit our website for detail.

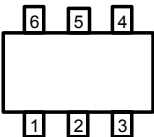
Features

- 0.25V Low Reference Voltage
- 17µA Quiescent (Switch-off) Supply Current
- Zero Shutdown Mode Supply Current
- 85% Efficiency
- 500kHz Fixed Switching Rate
- Tuning LED brightness with CE pin ON/OFF Duty
- Small SOT-26 Package

Applications

- LED Module
- Hand Held Panel
- Compact Back Light Module
- Small Battery Charger
- Constant Current Source

Pin Configurations

Part Number	Pin Configurations
RT9269CE (Plastic SOT-26)	<p>TOP VIEW</p>  <ol style="list-style-type: none"> 1. CE 2. EXT 3. GND 4. LX 5. VDD 6. FB

Typical Application Circuit

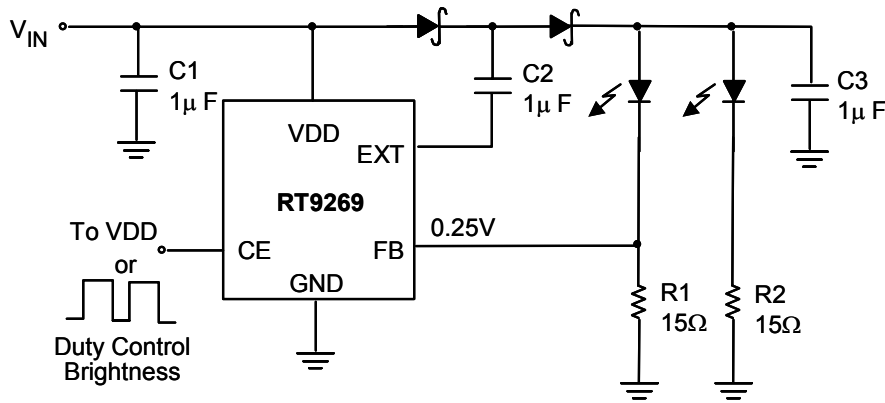


Fig. 1 RT9269 drives single or parallel LED's in charge pump configuration

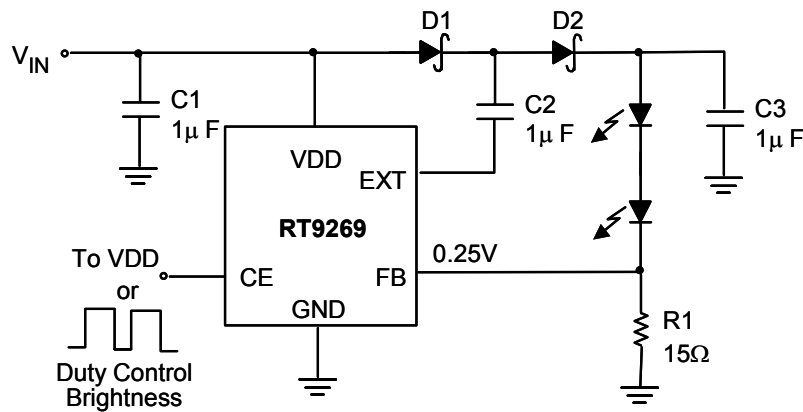


Fig. 2 RT9269 drives 2 series connected LED's in charge pump configuration

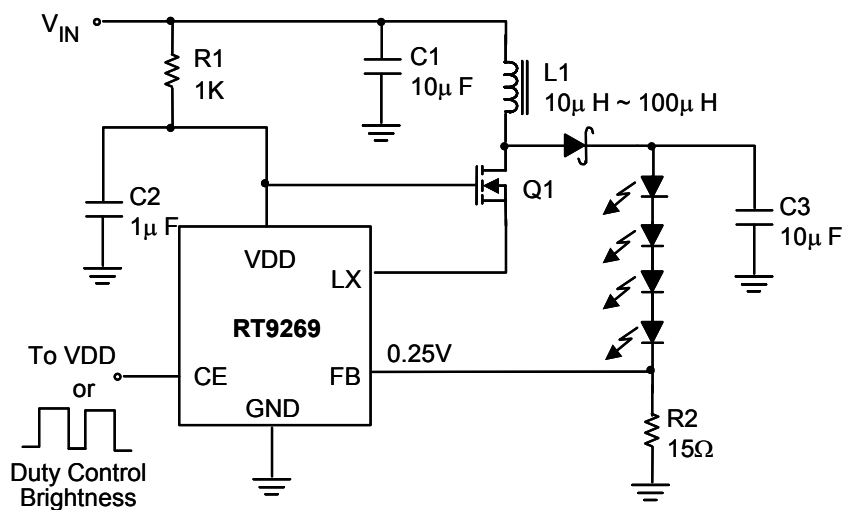


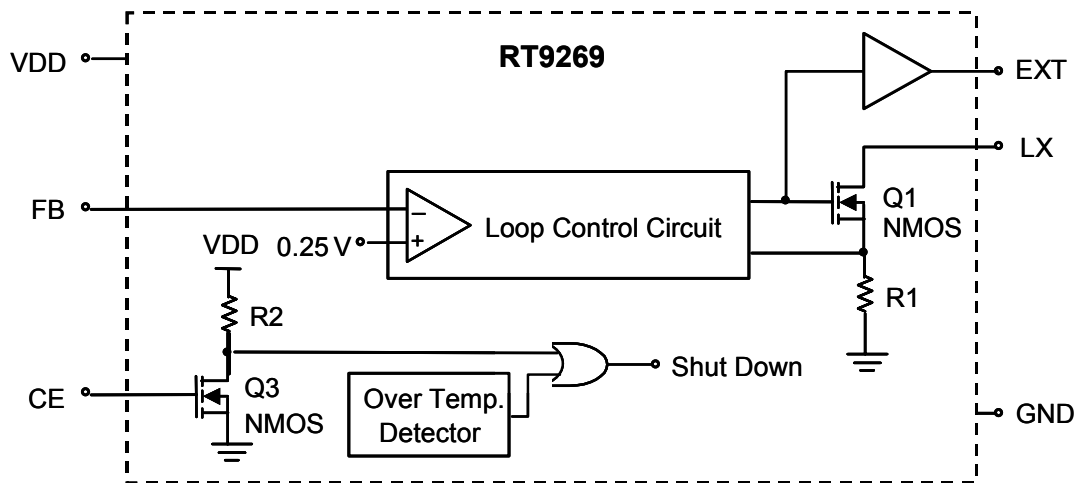
Fig. 3 RT9269 drives 2~4 series connected LED's in boost rectifier configuration

Note: NICHIA NSCW100 is used for RT9269 LED parts.

Pin Description

Pin No.	Pin Name	Pin Function
1	CE	Chip enable RT9269 gets into shutdown mode when CE pin set to low.
2	EXT	Output pin for configuring charge pump or driving external NMOS
3	GND	Ground
4	LX	Pin for switching
5	VDD	Input positive power pin of RT9269
6	FB	Feedback input pin Internal reference voltage for the error amplifier is 0.25V.

Function Block Diagram



Absolute Maximum Ratings

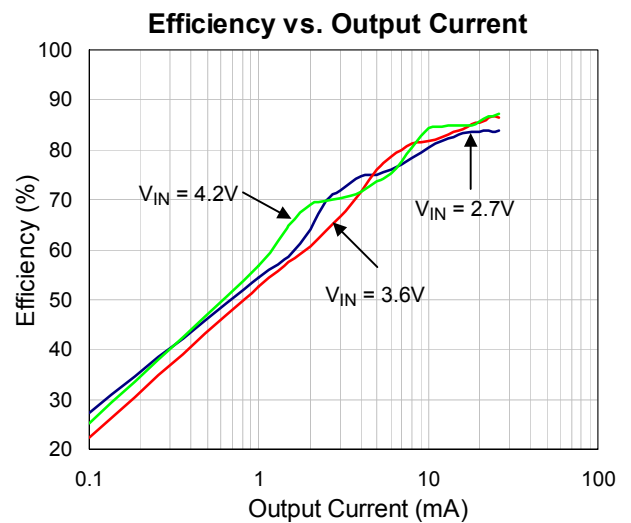
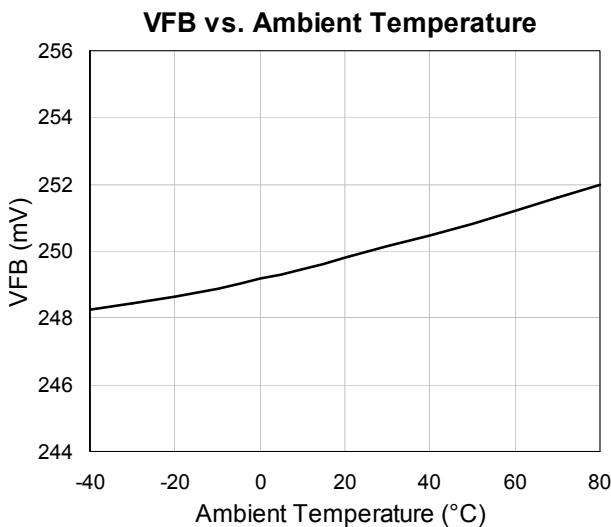
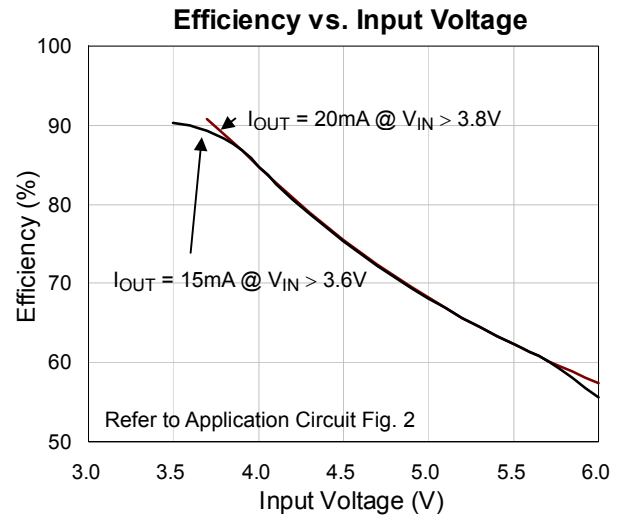
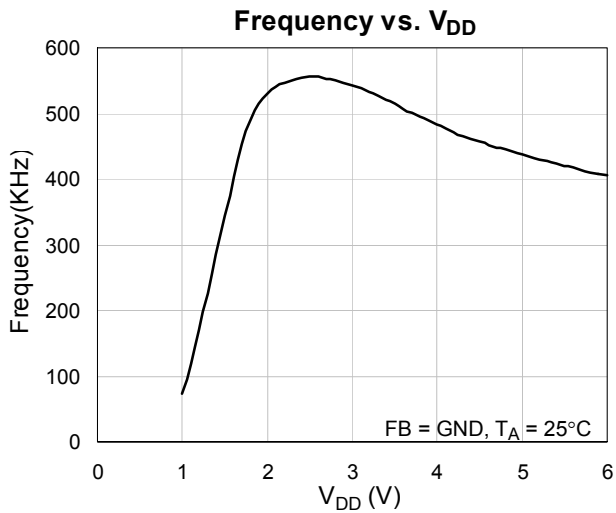
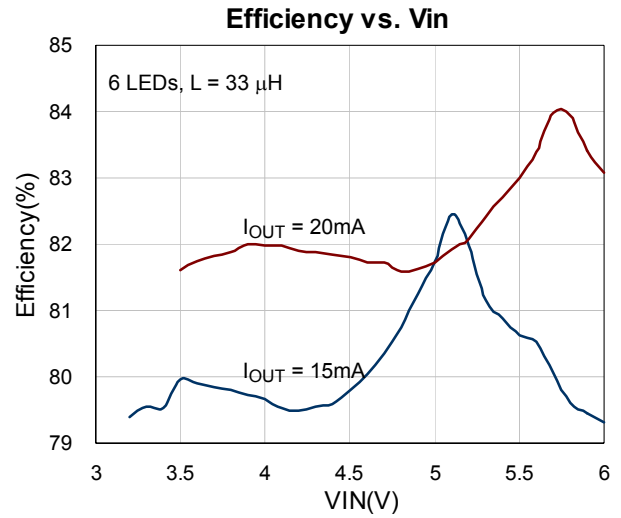
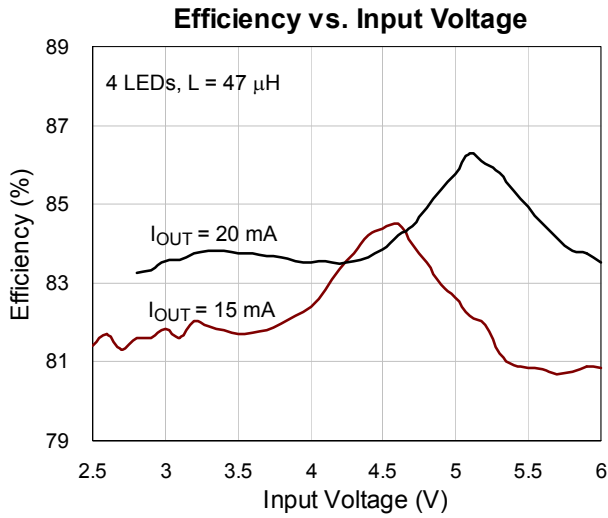
- Supply Voltage – 0.3V to 7V
- LX Pin Switch Voltage – 0.3V to (V_{DD} + 0.8V)
- Other I/O Pin Voltages – 0.3V to (V_{DD} + 0.3V)
- LX Pin Switch Current 2.5A
- EXT Pin Driver Current 200mA
- Power Dissipation, P_D @ T_A = 25°C
 SOT-26 0.25W
- Package Thermal Resistance
 SOT-26, θ_{JA} 250°C/W
- Operating Junction Temperature 125°C
- Storage Temperature Range – 65°C ~ +150°C

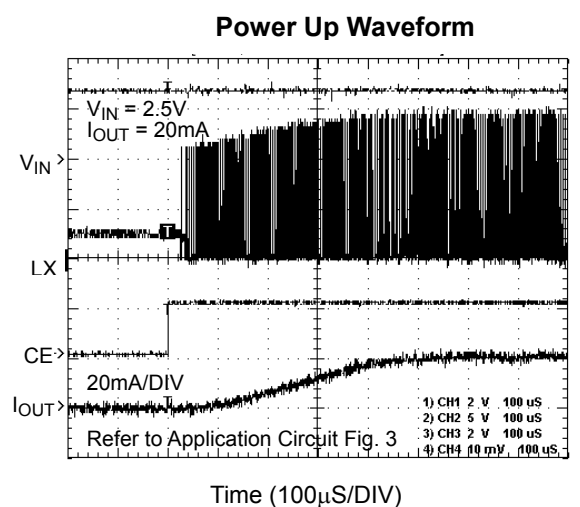
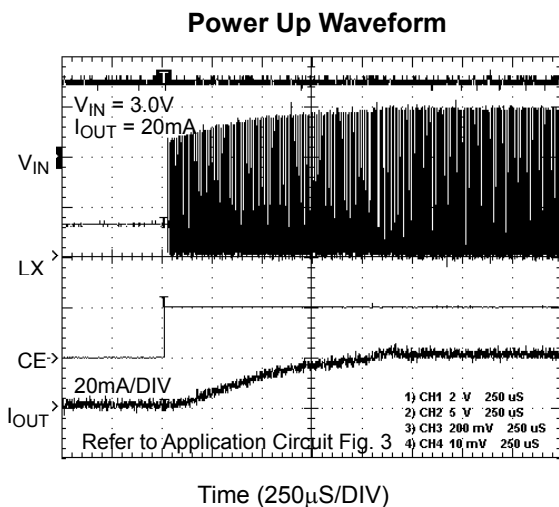
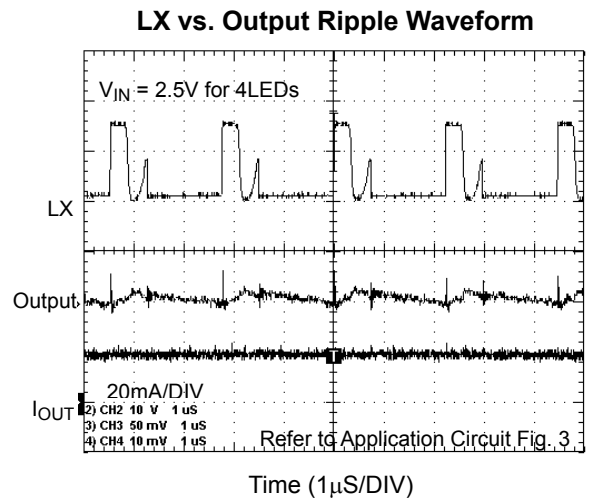
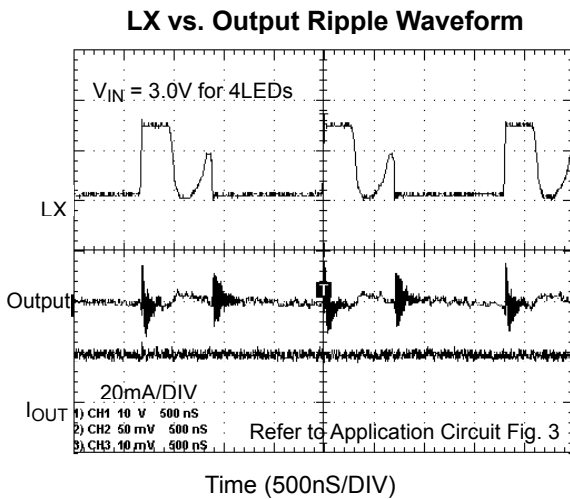
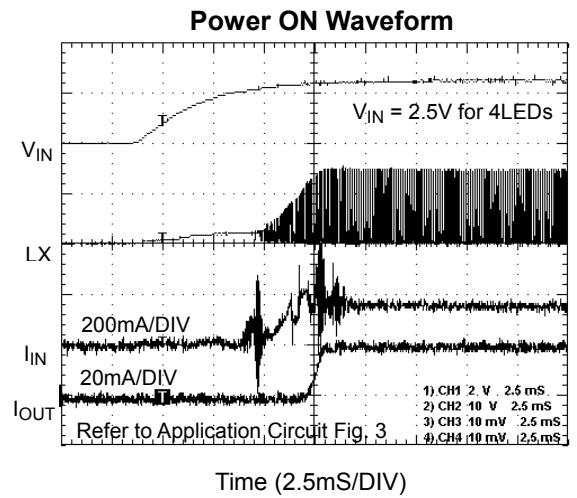
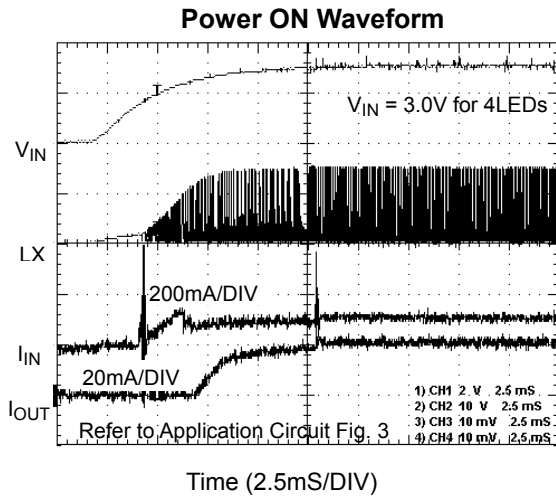
Electrical Characteristics

(V_{IN} = 3.3V, V_{DD} set to 5V, Load Current = 0, T_A = 25°C, unless otherwise specified)

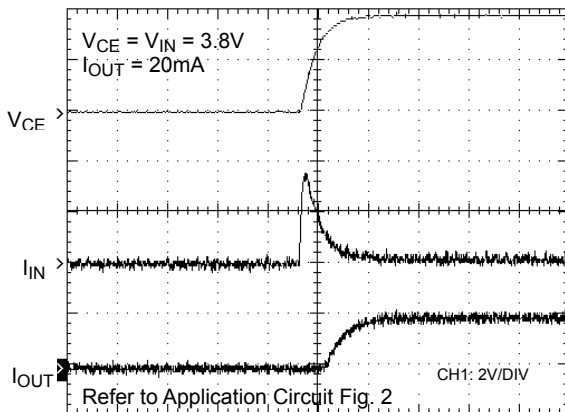
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Start-UP Voltage	V _{ST}	I _L = 1mA	--	0.98	1.05	V
Operating V _{DD} Range	V _{DD}	V _{DD} pin voltage	2	--	6.5	V
No Load Current I (V _{IN})	I _{NO LOAD}	V _{IN} = 3.3V, V _{OUT} = 5V	--	30	--	μA
Switch-off Current I (V _{DD})	I _{SWITCH OFF}	V _{IN} = 6V	--	17	--	μA
Shutdown Current I (V _{IN})	I _{OFF}	CE Pin = 0V, V _{IN} = 6V	--	0.1	1	μA
Feedback Reference Voltage	V _{REF}	Close Loop, V _{DD} = 5V		0.25		V
Switching Rate	F _S	V _{DD} = 5V	--	500	--	kHz
Maximum Duty	D _{MAX}	V _{DD} = 5V	--	75	--	%
LX ON Resistance		V _{DD} = 5V	--	0.4	--	Ω
Current Limit Setting	I _{LIMIT}	V _{DD} = 5V	--	500	--	mA
EXT ON Resistance to V _{DD}		V _{DD} = 5V	--	5	--	Ω
EXT ON Resistance to GND		V _{DD} = 5V	--	5	--	Ω
CE Pin Trip Level		V _{DD} = 5V	0.4	0.8	1.2	V
Temperature Stability for V _{REF}	T _S		--	50	--	ppm/°C
Thermal Shutdown	T _{SD}		--	165	--	°C
Thermal Shutdown Hysterises	ΔT _{SD}		--	10	--	°C

Typical Operating Characteristics



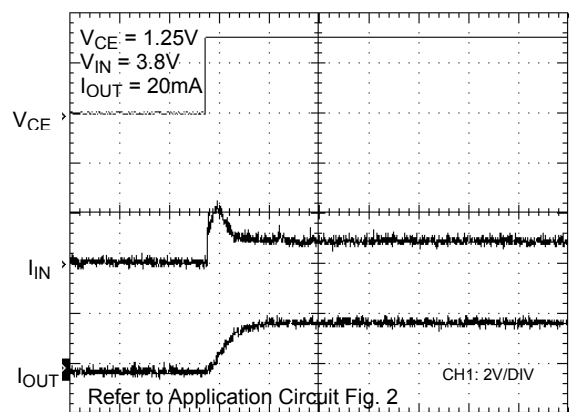


Power On Waveform



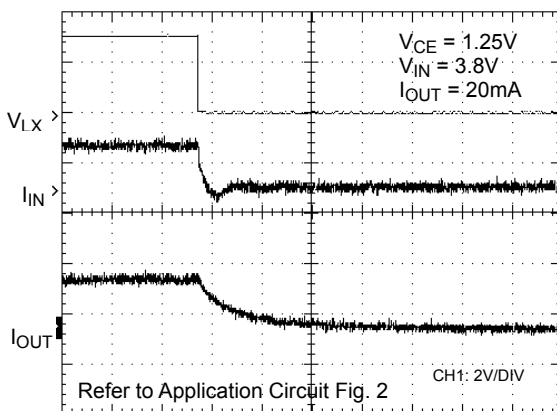
Time (10mS/DIV)

Power Up Waveform



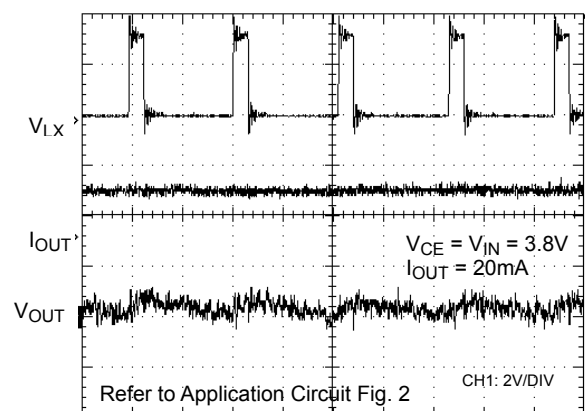
Time (500 μ S/DIV)

Shutdown Waveform



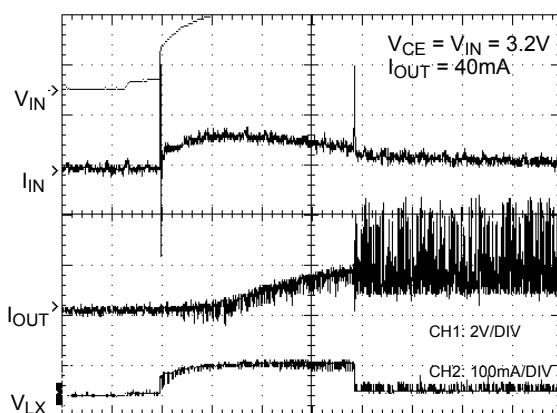
Time (500 μ S/DIV)

LX vs. Ripple Waveform



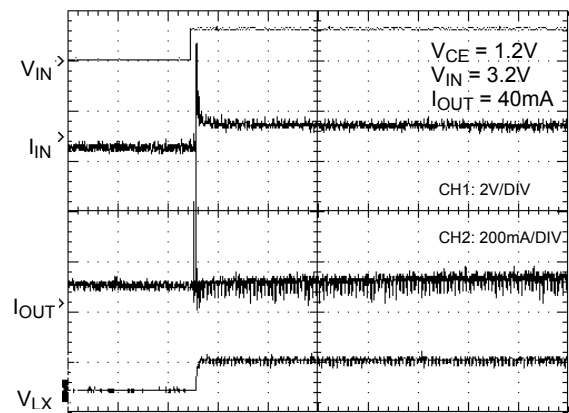
Time (1 μ S/DIV)

Power On Waveform



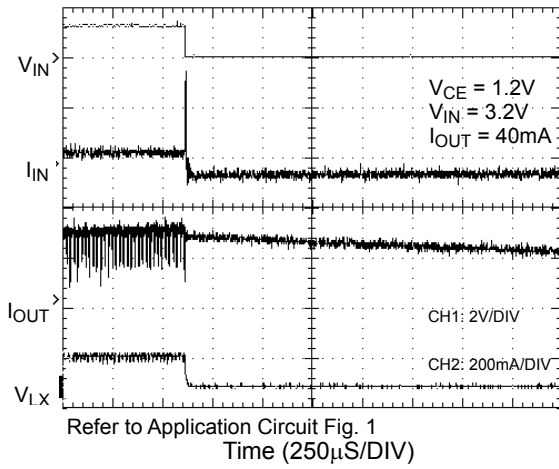
Time (5mS/DIV)

Power Up Waveform

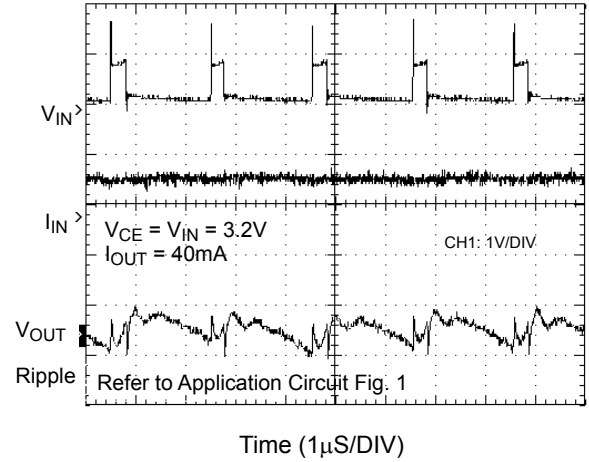


Time (250 μ S/DIV)

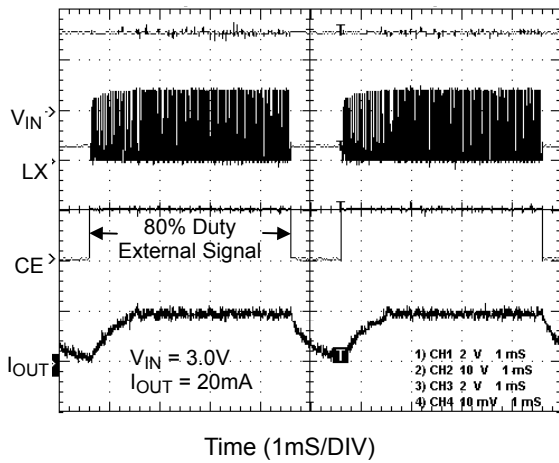
Shutdown Waveform



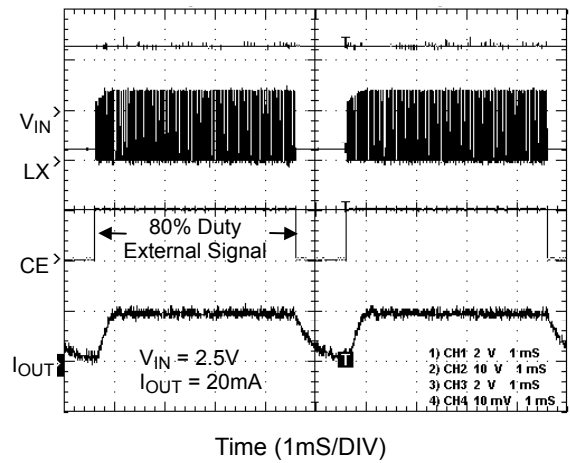
LX vs. Output Ripple Waveform



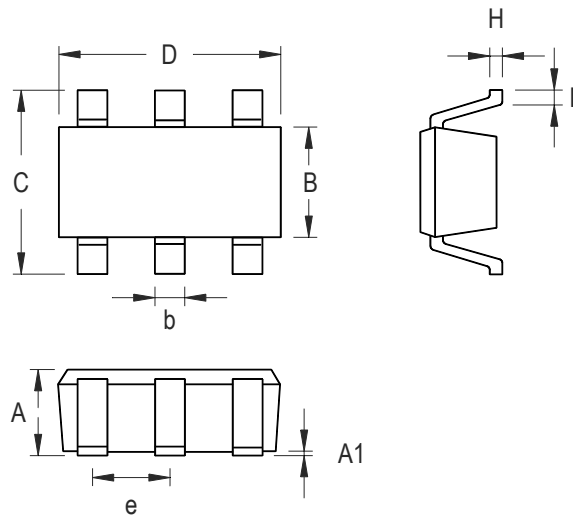
Brightness Control



Brightness Control



Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.889	1.295	0.035	0.051
A1	--	0.152	--	0.006
B	1.397	1.803	0.055	0.071
b	0.356	0.559	0.014	0.022
C	2.591	2.997	0.102	0.118
D	2.692	3.099	0.106	0.122
e	0.838	1.041	0.033	0.041
H	0.102	0.254	0.004	0.010
L	0.356	0.610	0.014	0.024

SOT- 26 Surface Mount Package

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