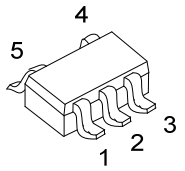
WHITE LED STEP-UP CONVERTER



SOT-25

■ DESCRIPTION

The UTC **L5100** is a STEP-UP DC/DC Converter and designed for driving white LEDs with a constant current. It can drive several LEDs in series by a Li-Ion cell. UTC **L5100** switches at a high frequency 1.2MHz, so it can allow the use of tiny external components. The output capacitor can be as small as 0.22μF; saving space and cost compare with alternative other solutions. The low 95mV feedback voltage minimizes power loss in the current setting resistor can have better efficiency.

■ FEATURES

* Inherently Matched LED Current
* High Efficiency: 83% Typical
* Drives Up to Four LEDs from a 3.2V Supply
* Drives Up to Six LEDs from a 5V Supply
* 36V Rugged Bipolar Switch
* 1.2MHz Switching Frequency
* Uses Tiny 1mm Tall Inductors
* Output Capacitor can be Small to only 0.22μF

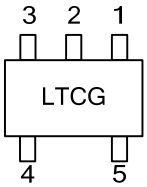
■ ORDERING INFORMATION

Ordering Number	Package	Packing
L5100G-AF5-R	SOT-25	Tape Reel

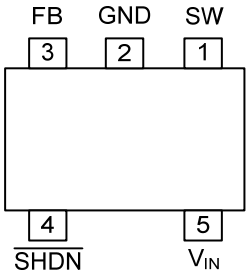
L5100G-AF5-R

(1)Packing Type	(1) R: Tape Reel
(2)Package Type	(2) AF5: SOT-25
(3)Halogen Free	(3) G: Halogen Free

■ MARKING



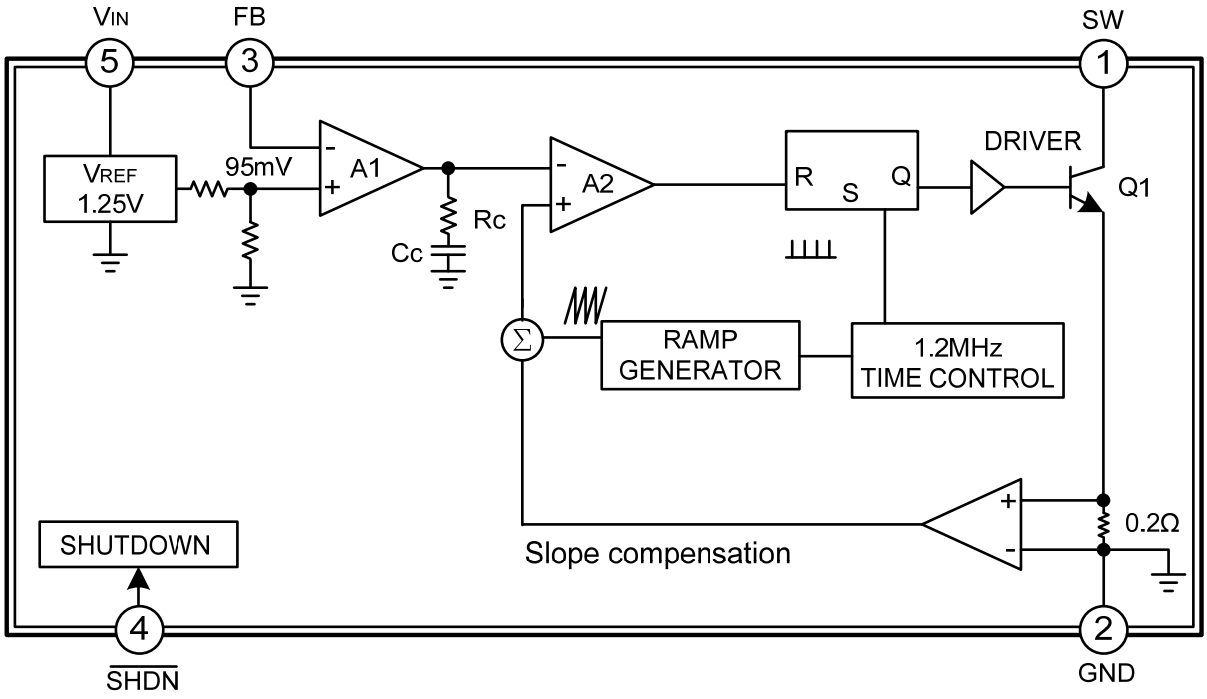
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	SW	Switch. Connect inductor/diode here. Minimize trace area at this pin to reduce EMI.
2	GND	Ground. Connect directly to local ground plane.
3	FB	Feedback. Reference voltage is 95mV. Connect cathode of lowest LED and resistor here. Calculate resistor value according to the formula: R_{FB} = 95mV/I_{LED}
4	$\overline{SHDN}$	Shutdown. Connect to 1.5V or higher to enable device; 0.4V or less to disable device.
5	V_{IN}	Input Supply Pin. Must be locally bypassed.

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	12	V
Switch Voltage	V_{SW}	36	V
Feedback Voltage	V_{FB}	12	V
Shutdown Voltage	$V_{\overline{SHDN}}$	12	V
Junction Temperature	T_J	+125	°C
Operating Junction Temperature	T_J	-40~+85	°C
Storage Temperature Range	T_{STG}	-65~+150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

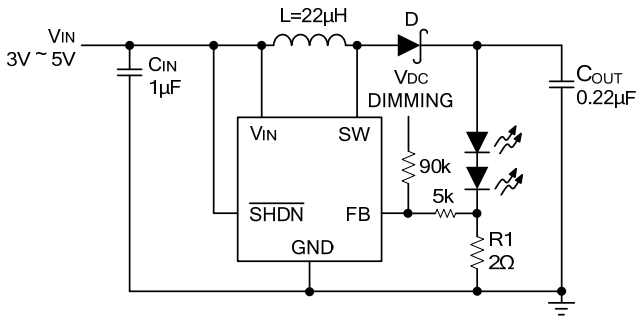
■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient (in free air)	θ_{JA}	256	°C/W

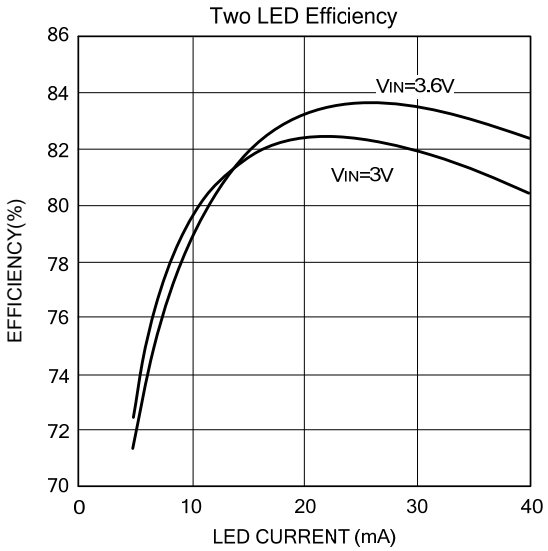
■ ELECTRICAL CHARACTERISTICS (Ta=25°C, V_{IN}=3V, $V_{\overline{SHDN}}$=3V, unless otherwise specified.)

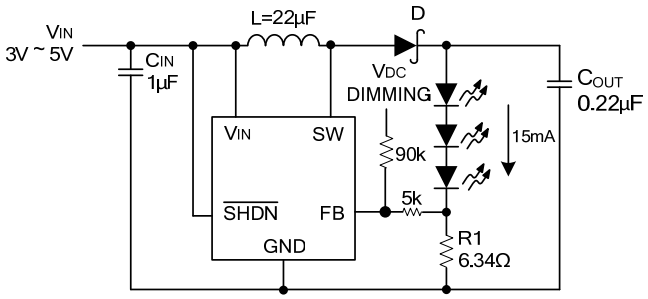
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Operating Voltage	V_{IN}		2.5		12	V
Feedback Voltage	V_{FB}	I_{SW}=100mA, Duty Cycle=66%	87	95	104	mV
Shutdown Voltage ON	V_{ON}		1.5			V
Shutdown Voltage OFF	V_{OFF}				0.3	V
Switch V_{CESAT}	$V_{CESAT(SW)}$	I_{SW}=250mA		360		mV
Switch Current Limit	I_{SW}			320		mA
Supply current	I_{CC}	$\overline{SHDN}$=0V		1.8	2.5	mA
				0.1	1.0	μA
Switch Leakage Current	$I_{SW(OFF)}$	V_{SW}=5V		0.01	5	μA
Shutdown Pin Bias Current	$I_{\overline{SHDN}}$			60		μA
Feedback Pin Bias Current	I_{FB}		10	45	100	nA
Switching Frequency	f_{OSC}		0.8	1.2	1.6	MHz
Maximum Duty Cycle	DC		85	90		%

■ TYPICAL APPLICATION CIRCUITS

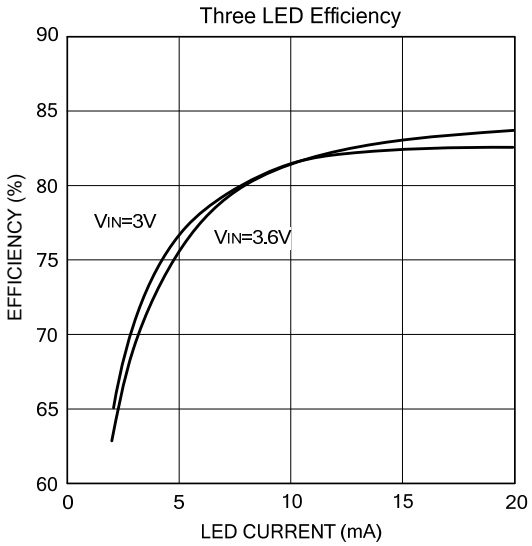


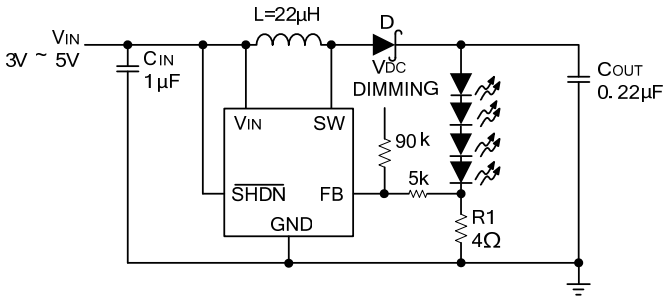
Li-Ion to Two White LEDs



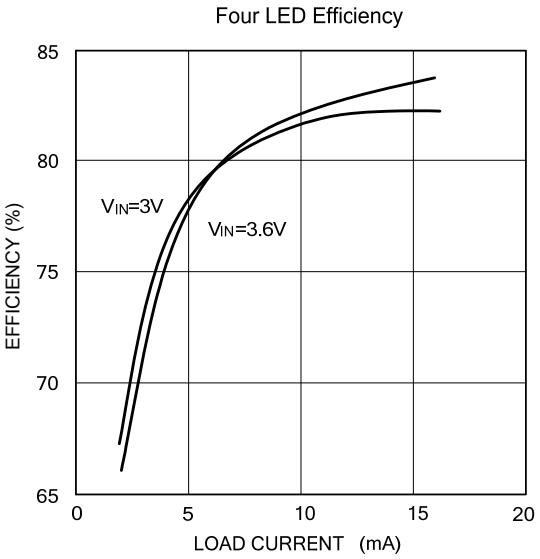


Li-Ion to Three White LEDs

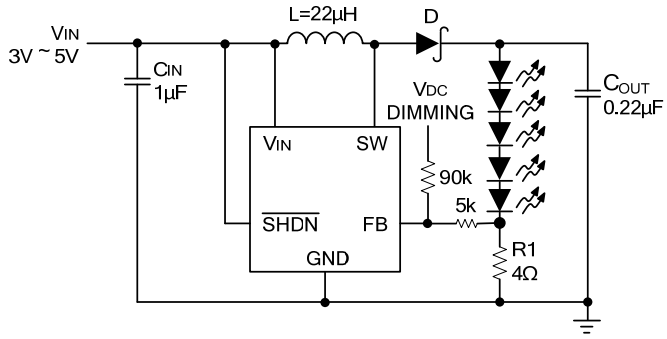




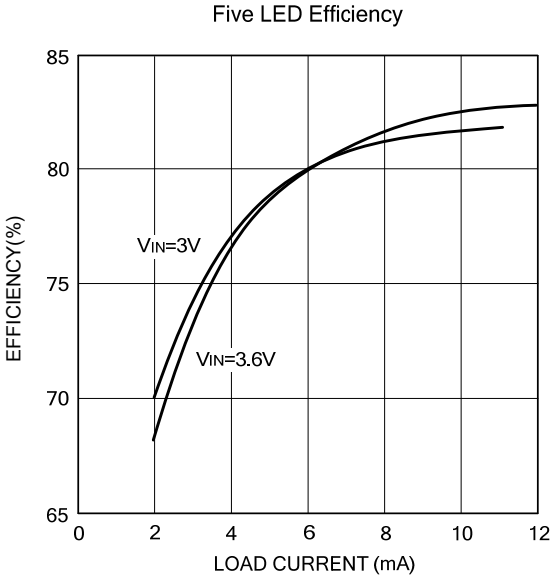
L_i- Ion to Four White LEDs

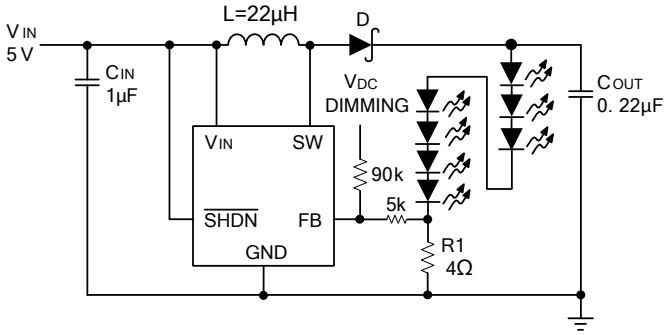


■ TYPICAL APPLICATION CIRCUITS (Cont.)

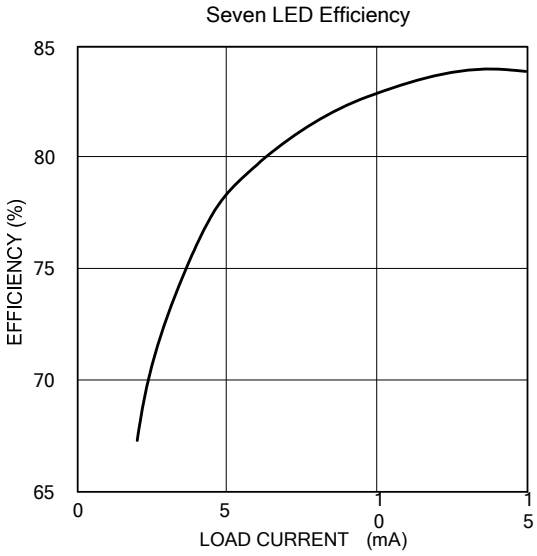


Li-Ion to Five White LEDs



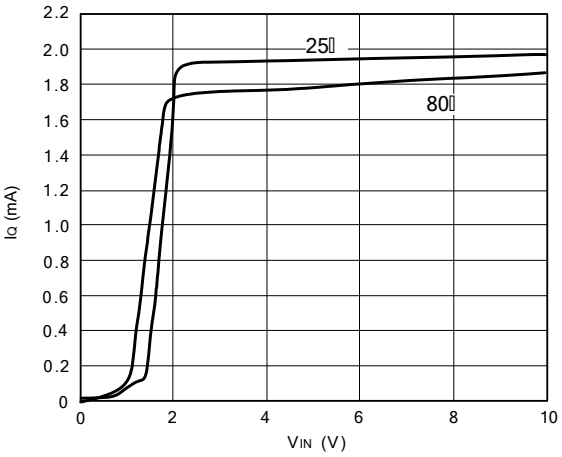


5 V to Seven White LEDs

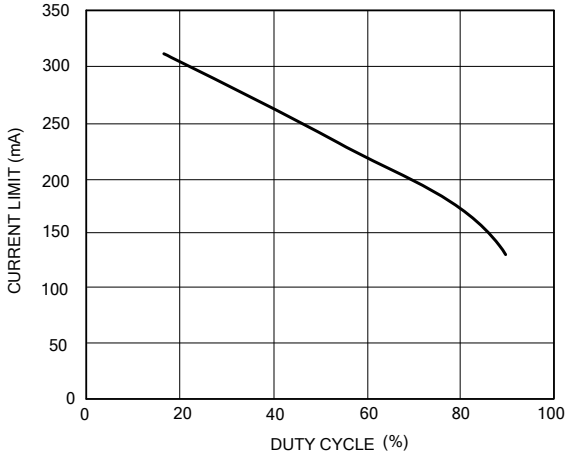


■ TYPICAL CHARACTERISTICS

Quiescent Current



Current Limit vs Duty Cycle



* UTC L5100 is guaranteed the operating temperature range of 0°C ~ 75°C.