



## L5100

## LINEAR INTEGRATED CIRCUIT

### WHITE LED STEP-UP CONVERTER

#### 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 0.22 $\mu$ F; 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

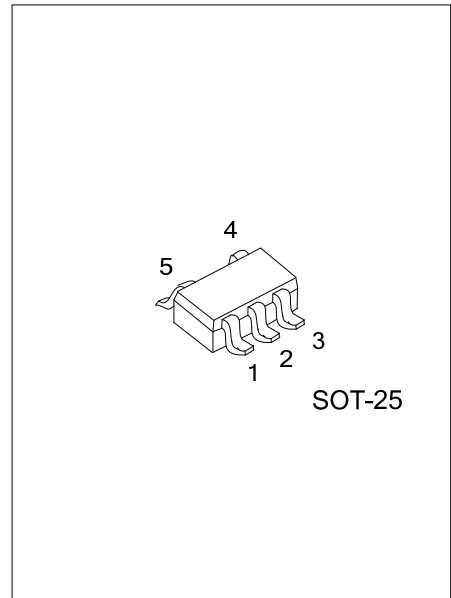
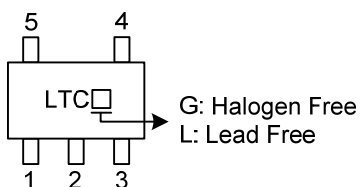
- \* Inherently Matched LED Current
- \* High Efficiency: 83% Typical
- \* Drives Up to Four LEDs from a 3.2V Supply
- \* Drives Up to Six LEDs from a 5V Supply
- \* 36V Rugged Bipolar Switch
- \* 1.2MHz Switching Frequency
- \* Uses Tiny 1mm Tall Inductors
- \* Output Capacitor can be Small to only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

#### ORDERING INFORMATION

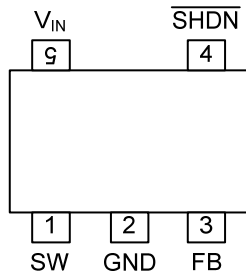
Ordering Number		Package	Packing
Lead Free	Halogen Free		
L5100L-AF5-R	L5100G-AF5-R	SOT-25	Tape Reel

<p>L5100L-AF5-R</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Lead Free</p>	<p>(1) R: Tape Reel</p> <p>(2) AF5: SOT-25</p> <p>(3) G: Halogen Free, L: Lead Free</p>
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#### MARKING



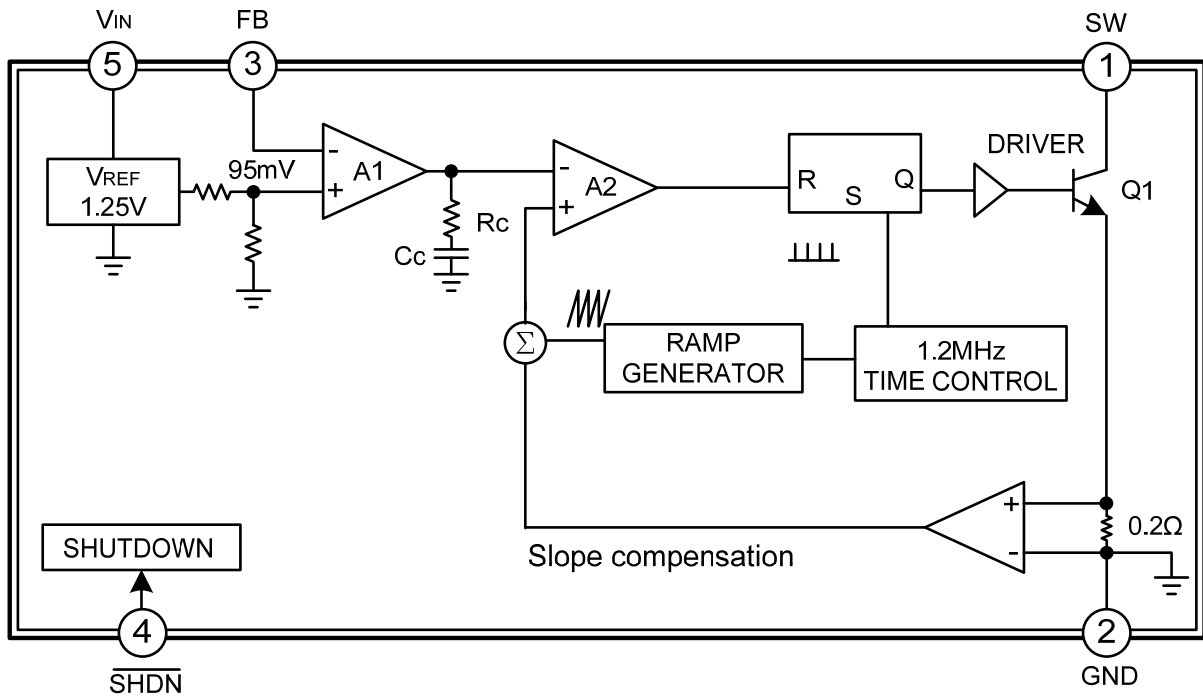
### ■ PIN CONFIGURATION



### ■ 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	SHDN	Shutdown. Connect to 1.5V or higher to enable device; 0.4V or less to disable device.
5	VIN	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	$V_{SHDN}$	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.

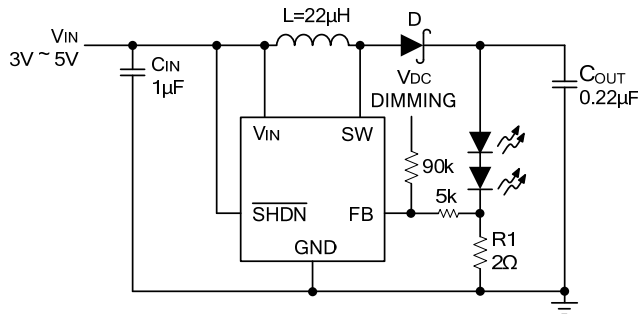
■ THERMAL DATA

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

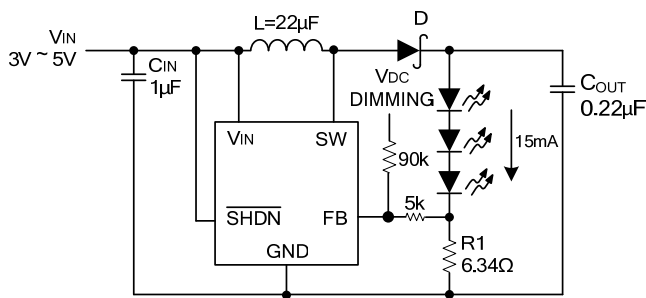
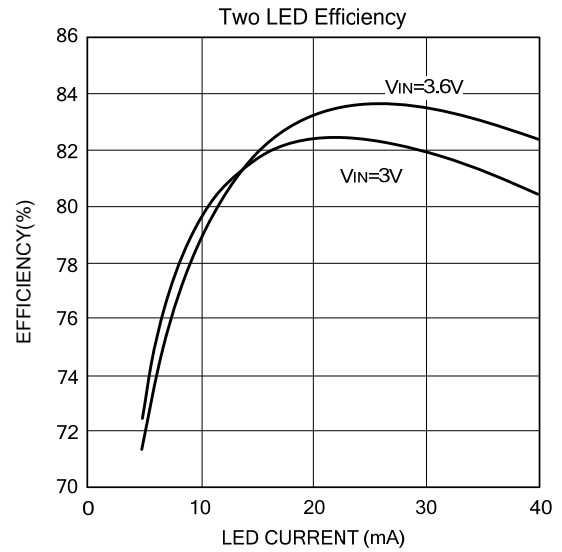
■ ELECTRICAL CHARACTERISTICS ( $T_A=25^\circ\text{C}$ ,  $V_{IN}=3\text{V}$ ,  $V_{SHDN}=3\text{V}$ , unless otherwise specified.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Operating Voltage	$V_{IN}$		2.5		12	V
Feedback Voltage	$V_{FB}$	$I_{SW}=100\text{mA}$ , Duty Cycle=66%	87	95	104	mV
Shutdown Voltage ON	$V_{ON}$		1.5			V
Shutdown Voltage OFF	$V_{OFF}$				0.3	V
Switch $V_{CESAT}$	$V_{CESAT(SW)}$	$I_{SW}=250\text{mA}$		360		mV
Switch Current Limit	$I_{SW}$			320		mA
Supply current	$I_{CC}$	$\overline{\text{SHDN}}=0\text{V}$		1.8	2.5	mA
				0.1	1.0	$\mu\text{A}$
Switch Leakage Current	$I_{SW(OFF)}$	$V_{SW}=5\text{V}$		0.01	5	$\mu\text{A}$
Shutdown Pin Bias Current	$I_{SHDN}$			60		$\mu\text{A}$
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		%

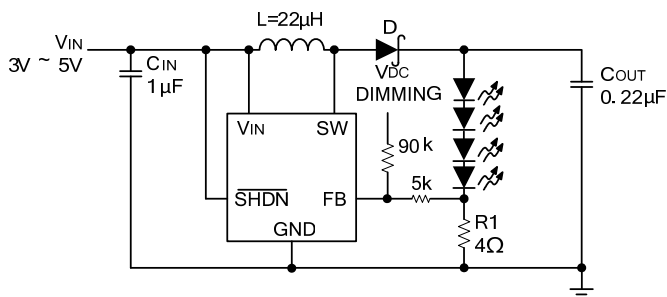
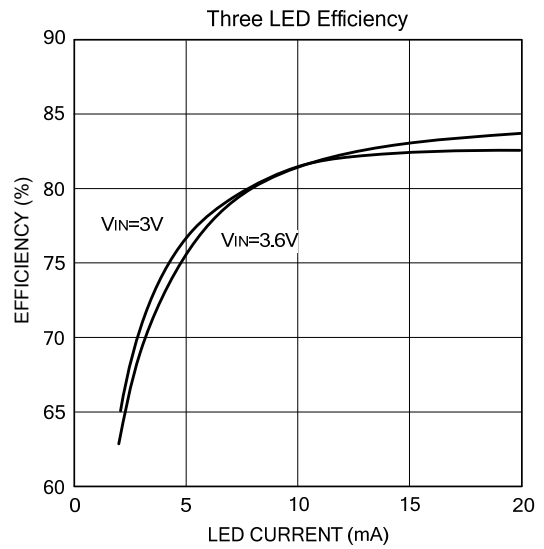
## TYPICAL APPLICATION CIRCUITS



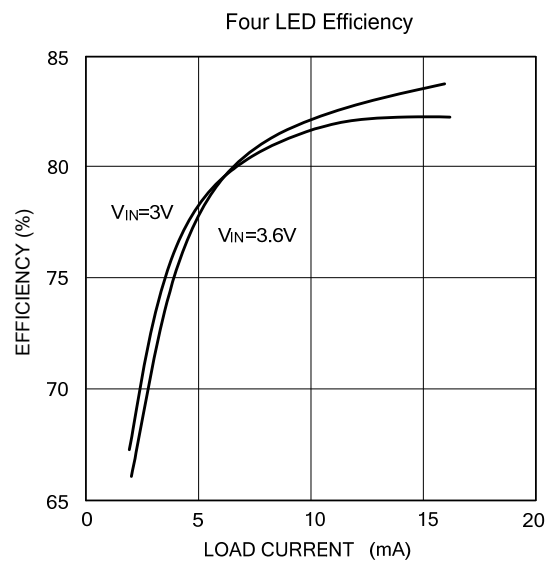
Li-Ion to Two White LEDs



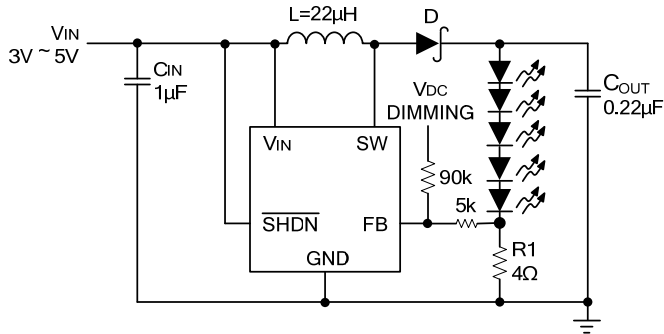
Li-Ion to Three White LEDs



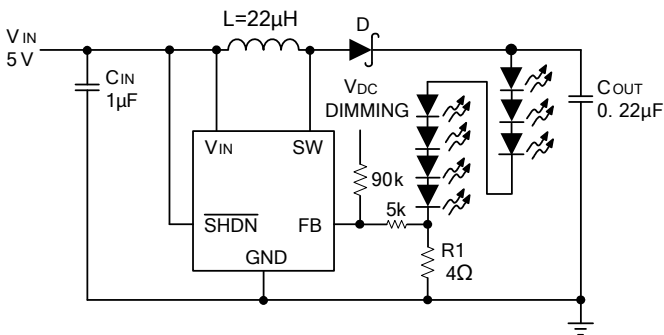
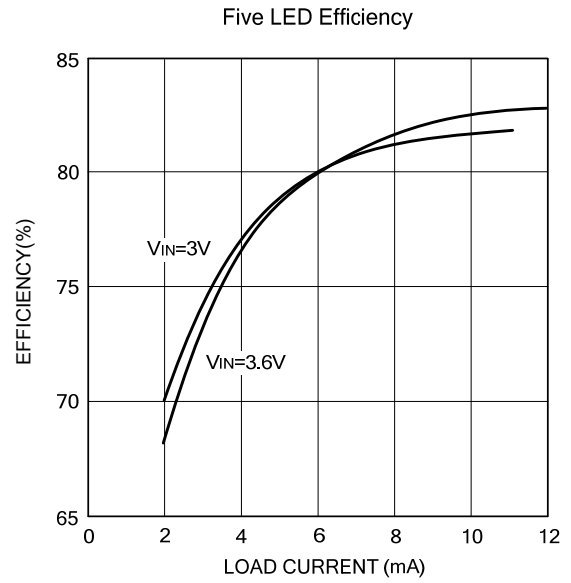
Li-Ion to Four White LEDs



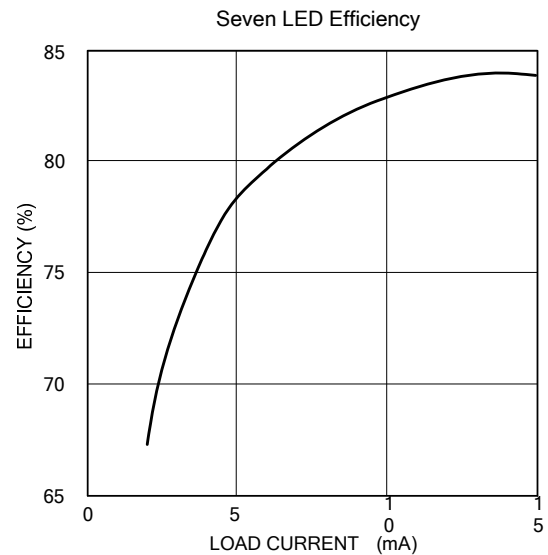
## TYPICAL APPLICATION CIRCUITS (Cont.)



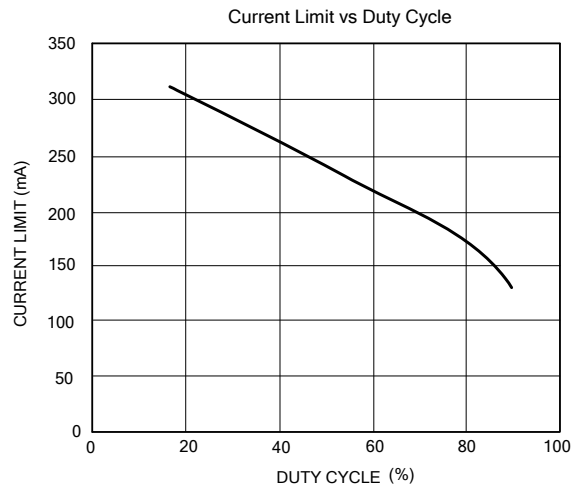
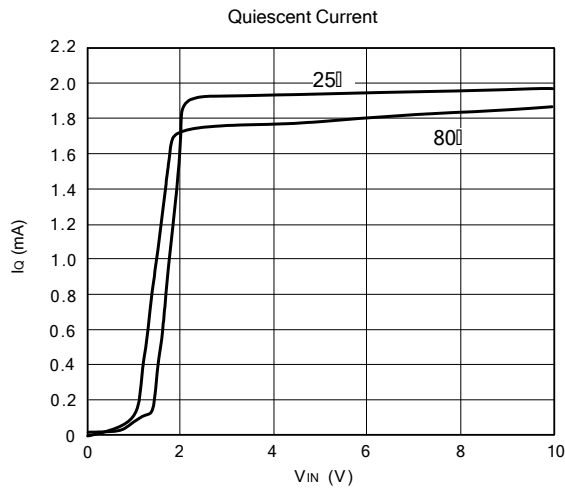
Li-Ion to Five White LEDs



5V to Seven White LEDs



### ■ TYPICAL CHARACTERISTICS



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

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