# UNISONIC TECHNOLOGIES CO., LTD

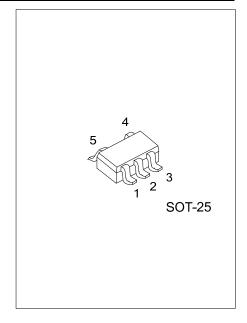
# L5100

#### LINEAR INTEGRATED CIRCUIT

# WHITE LED STEP-UP CONVERTER

#### **DESCRIPTION**

The UTC L5100 is a STEP-UP DC/DC Converter and for driving white LEDs with a constant current. It can drive several LEDs in series by a Li-lon 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.

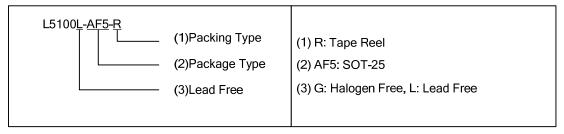


#### **FEATURES**

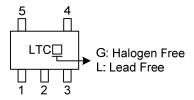
- \* Inherently Matched LED Current
- \* High Efficiency: 83% Typical
- \* Drives Up to Four LEDs from a 3.2V Supply
- \* Drives Up to Six LEDs from a 5V Supply
- \* 36V Rugged Bipolar Switch
- \* 1.2MHz Switching Frequency
- \* Uses Tiny 1mm Tall Inductors
- \* Output Capacitor can be Small to only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

#### **■ ORDERING INFORMATION**

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

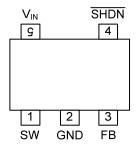


#### **MARKING**



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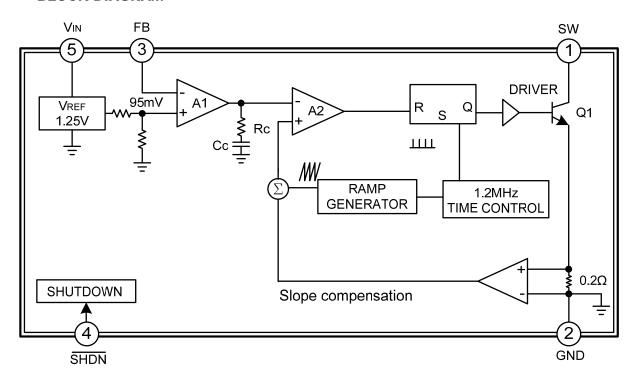
## **■ PIN CONFIGURATION**



## **■ 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	$V_{IN}$	Input Supply Pin. Must be locally bypassed.

#### ■ BLOCK DIAGRAM



#### **■ ABSOLUTE MAXIMUM RATINGS**

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V <sub>IN</sub>	12	V
Switch Voltage	V <sub>SW</sub>	36	V
Feedback Voltage	$V_{FB}$	12	V
Shutdown Voltage	VSHDN	12	V
Junction Temperature	TJ	+125	°C
Operating Junction Temperature	TJ	-40~+85	°C
Storage Temperature Range	T <sub>STG</sub>	-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.

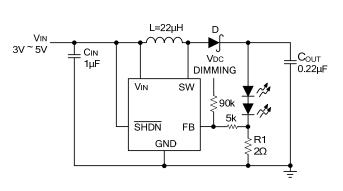
#### **■ THERMAL DATA**

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

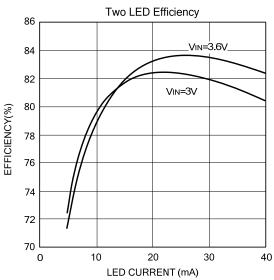
## ■ **ELECTRICAL CHARACTERISTICS** (T<sub>A</sub>=25°C, V<sub>IN</sub>=3V, VSHDN =3V, unless otherwise specified.)

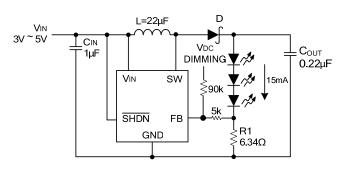
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Operating Voltage	$V_{IN}$		2.5		12	V
Feedback Voltage	$V_{FB}$	I <sub>SW</sub> =100mA, Duty Cycle=66%	87	95	104	mV
Shutdown Voltage ON	$V_{ON}$		1.5			V
Shutdown Voltage OFF	$V_{OFF}$				0.3	V
Switch V <sub>CESAT</sub>	$V_{CESAT(SW)}$	I <sub>SW</sub> =250mA		360		mV
Switch Current Limit	I <sub>SW</sub>			320		mA
Supply current	I <sub>cc</sub>	SHDN =0V		1.8	2.5	mA
				0.1	1.0	μΑ
Switch Leakage Current	I <sub>SW(OFF)</sub>	V <sub>SW</sub> =5V		0.01	5	μΑ
Shutdown Pin Bias Current	ISHDN			60		μΑ
Feedback Pin Bias Current	$I_FB$		10	45	100	nA
Switching Frequency	f <sub>OSC</sub>		8.0	1.2	1.6	MHz
Maximum Duty Cycle	DC		85	90		%

#### **■ TYPICAL APPLICATION CIRCUITS**

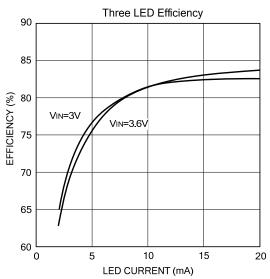


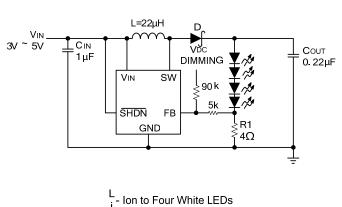
Li-Ion to Two White LEDs





Li-lon to Three White LEDs





Four LED Efficiency

85

80

V<sub>IN</sub>=3V

V<sub>IN</sub>=3.6V

70

65

0

5

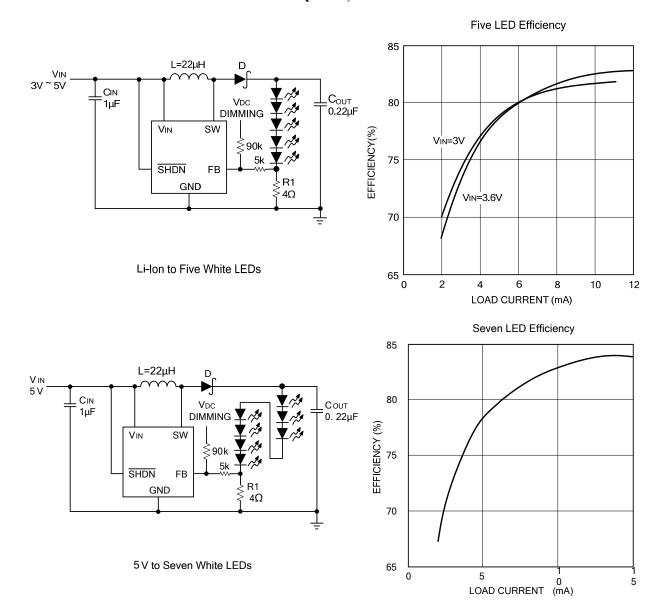
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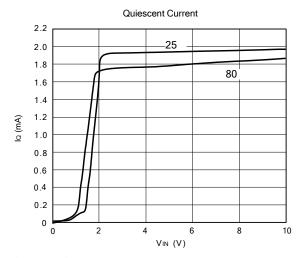
20

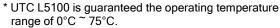
LOAD CURRENT (mA)

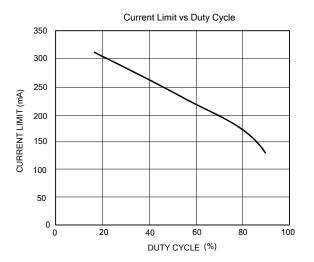
# **■ TYPICAL APPLICATION CIRCUITS (Cont.)**



#### **■ TYPICAL CHARACTERISTICS**







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