



## L4120

Preliminary

CMOS IC

### 40V/1.2A INTEGRATED POWER LED DRIVER

#### DESCRIPTION

The UTC **L4120** is a continuous conduction mode inductive step-down converter, designed for driving single or multiple series connected LEDs. Using a few external components.

The UTC **L3080** has a build-in power switch, based on different input voltage, The UTC **L4120** can drive several 1W or 3W LEDs. The device has the function of thermal shutdown protection and LED short-circuit/open-circuit protection.

#### FEATURES

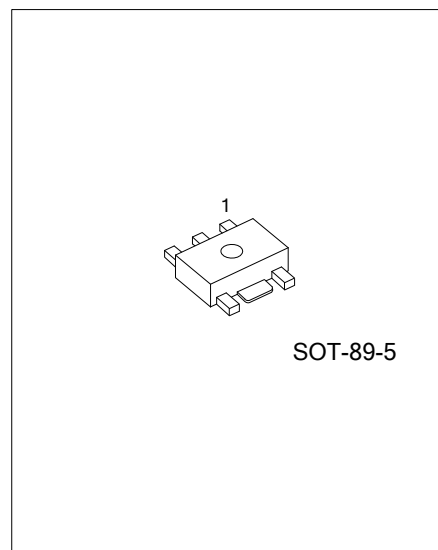
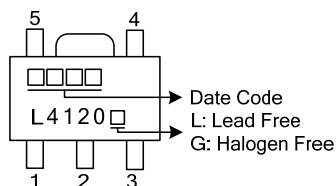
- \* Up to 1.2A output current
- \* High efficiency (up to 97%)
- \* Wide input voltage range: 5V~30V
- \* Typical  $\pm 5\%$  output current accuracy
- \* Single DIM pin on/off and brightness control using DC voltage or PWM signal
- \* Internal thermal shutdown protection.
- \* Adjustable Constant LED Current

#### ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
L4120L-AB5-R	L4120G-AB5-R	SOT-89-5	Tape Reel

<p>L4120L-AB5-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) AB5: SOT-89-5</p> <p>(3) L: Lead Free, G: Halogen Free</p>
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#### MARKING



PIN NO.	PIN NAME	DESCRIPTION
1	LX	Switch pin
2	GND	Ground
3	ADJ	Multi-function On/Off and brightness control pin
4	I <sub>SENSE</sub>	Current sense input
5	V <sub>IN</sub>	Input voltage

The diagram illustrates the control system for a buck converter. The input voltage  $V_{IN}$  is connected to pin 5, and the sense current  $I_{SENSE}$  is connected to pin 4. The output voltage is  $V_{OUT}$  (pin 1) and the output current is  $I_{OUT}$  (pin 2). The control system includes a feedback loop with a resistor divider (pins 1 and 2) connected to a non-inverting input of a comparator. The comparator's other input is connected to the sense current  $I_{SENSE}$  (pin 4). The comparator's output is connected to a driver (pin 3) which drives the gate of the MOSFET M1. The MOSFET M1 is connected to the output inductor Lx (pin 1) and the output capacitor Cx (pin 2). The output voltage  $V_{OUT}$  is also connected to the feedback loop (pin 1). The control system also includes a current setting block (pin 3) and a protection block (pin 2).

# ■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	$V_{IN}$	-0.3~+40	V
$I_{SENSE}$ Voltage	$V_{IN} \geq 5V$	$V_{IN} + 0.3 \sim V_{IN} - 5$	V
	$V_{IN} < 5V$	$V_{IN} + 0.3 \sim -0.3$	V
LX Output Voltage	$V_{LX}$	-0.3~+40	V
Adjust Pin Input Voltage	$V_{ADJ}$	-0.3~+6	V
Switch Output Current	$I_{LX}$	1.5	A
Power Dissipation	$P_{TOT}$	0.5	W
Operating Temperature	$T_{OP}$	-40~105	°C
Storage Temperature	$T_{STG}$	-55~150	°C
Junction Temperature	$T_J$	150	°C
Junction to Ambient	$\theta_{JA}$	180	°C/W

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

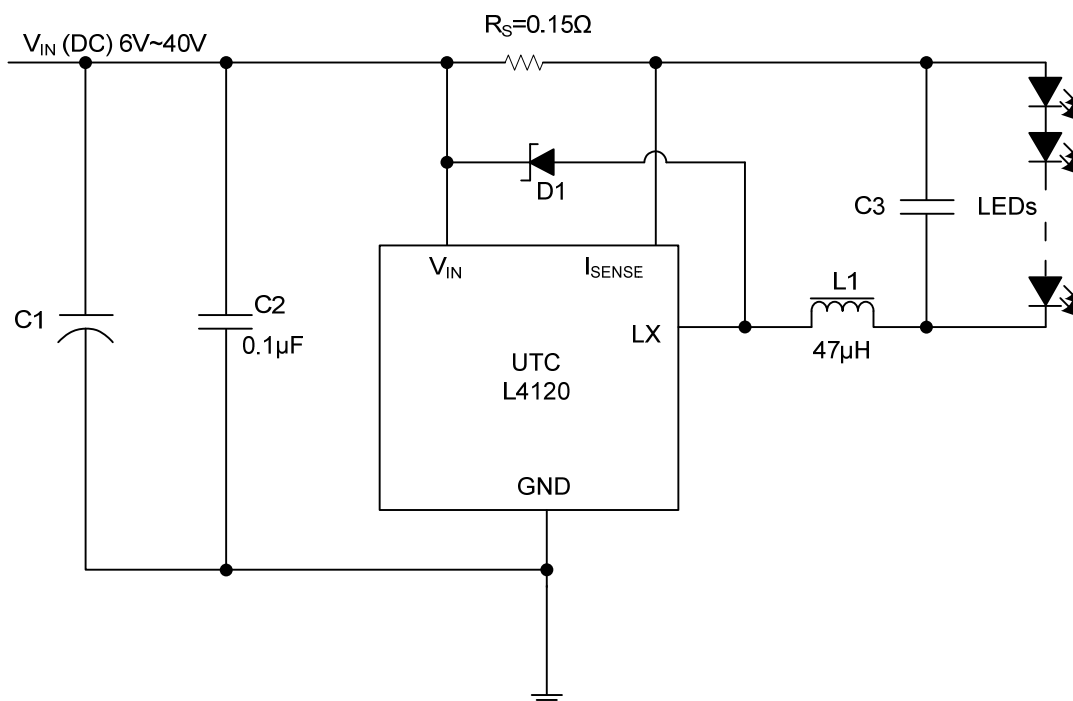
Absolute maximum ratings are stress ratings only and functional device operation is not implied.

# ■ ELECTRICAL CHARACTERISTICS ( $V_{IN}=12V$ , $T_{AMB}=25^{\circ}C$ unless otherwise stated) (Note 1)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Voltage	$V_{IN}$		6		40	V
Quiescent Supply Current with Output Off	$I_{INQoff}$	ADJ Pin Grounded			400	$\mu A$
Quiescent Supply Current with Output Switching	$I_{INQon}$	ADJ Pin Floating			1000	$\mu A$
Mean Current Sense Threshold Voltage	$V_{SENSE}$			115		mV
Sense Threshold Hysteresis	$V_{SENSEHYS}$			$\pm 15$		%
External Control Voltage Range On ADJ Pin for DC Brightness Control	$V_{ADJ}$		0.3		1.2	V
DC Voltage On ADJ Pin to Switch Chip from Active (On) State to Quiescent (Off) State	$V_{ADJoff}$	$V_{ADJ}$ Falling	0.15	0.2	0.25	V
DC Voltage On ADJ Pin to Switch Chip from Quiescent (Off) State to Active (On) State	$V_{ADJon}$	$V_{ADJ}$ Rising	0.2	0.25	0.3	V
Resistance Between ADJ Pin and $V_{REF}$	$R_{ADJ}$			500		K $\Omega$
Continuous LX Switch Current	$I_{LXmean}$			1.2		A
LX Switch "On" Resistance	$R_{LX}$			0.4		$\Omega$
LX Switch Leakage Current	$I_{LX(leak)}$				1	$\mu A$
Minimum Switch "ON" Time	$T_{ONmin}$	LX Switch "ON"		200		ns
Minimum Switch "OFF" Time	$T_{OFFmin}$	LX Switch "OFF"		200		ns
Typical Dimming Ratio	$D_{dim}$	$F=100Hz$ , $V_{IN}=15V$ , 1LED, $L=27\mu H$		1200:1		
Recommended Maximum Operating Frequency	$f_{LXmax}$				1	MHz
Recommended Duty Cycle Range of Output Switch at $f_{LXmax}$	$D_{LX}$		0.3	0.7	0.9	
Internal Comparator Propagation Delay	$T_{PD}$			50		ns
Thermal Shutdown Temperature	$T_{SD}$			150		°C
Thermal Shutdown Hysteresis	$T_{SD-HYS}$			20		°C

Note: Production testing of the chip is performed at 25°C. Functional operation of the chip and parameters specified are guaranteed by design, characterization and process control in other temperature.

■ TYPICAL APPLICATION CIRCUIT



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