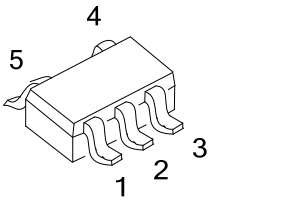
L3060

CMOS IC

30V/500mA HIGH DIMMING RATIO LED CONSTANT CURRENT DRIVER



SOT-25

■ DESCRIPTION

The UTC **L3060** is a continuous conduction mode inductive step-down converter, designed for driving single or multiple series connected LEDs efficiently from a voltage source higher than the total LEDs chain voltage. The device provides an externally adjustable output current of up to 500mA for a single LED. A dedicated DIM pin accepts either a DC voltage (0.5V~2.5V) dimming or a wide range of pulsed dimming. Applying a voltage of 0.3V or lower to the DIM pin turns the output off and switches the device into a low current standby state.

The UTC **L3060** has a build-in power switch, based on different input voltage, UTC **L3060** can drive several 1W or 2W LEDs.

■ FEATURES

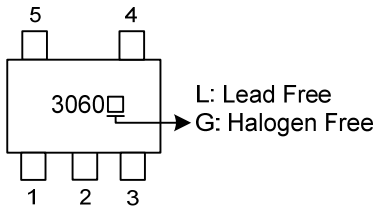
* 5V~30V input voltage range
* Simple low parts count
* Typical ±3% output current accuracy
* Up to 500mA output current
* Single DIM pin on/off and brightness control using DC voltage or PWM signal
* High efficiency up to 97%
* Adjustable constant LED current
* Protection features:
  LED open-circuit protection
  LED short-circuit protection
  Internal thermal shutdown protection.

■ ORDERING INFORMATION

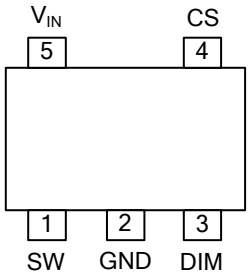
Ordering Number		Package	Packing
Lead Free	Halogen Free		
L3060L-AF5-R	L3060G-AF5-R	SOT-25	Tape Reel

L3060G-AF5-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) AF5: SOT-25 (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



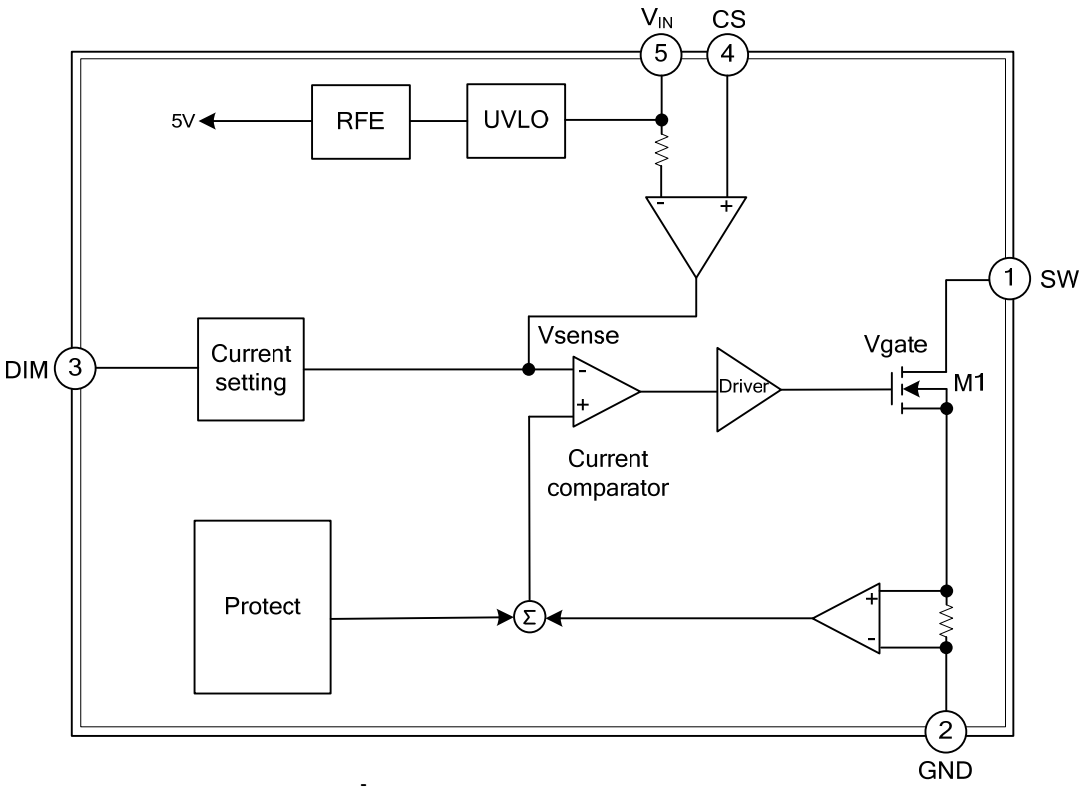
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	SW	Switch output.
2	GND	Signal and power ground.
3	DIM	Enable switch, analog and PWM dimming input.
4	CS	Current sense input, sampling resistor connected between CS and VIN
5	V_{IN}	Input supply pin. Must be locally bypassed.

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{IN}	-0.3~40	V
Drain Voltage of the Internal Power Switch	S_W	-0.3~40	V
Current Sense Input (Respect to V_{IN})	C_S	+0.3~(-6.0)	V
Logic Level Dimming Input	D_{IM}	-0.3~6	V
Switch Output Current	I_{SW}	0.6	A
Power Dissipation	P_D	0.2	W
ESD Susceptibility (Note 2)	ESD	2	KV
Operation Junction Temperature Range	T_J	-40~150	°C
Storage Temperature	T_{STG}	-55~150	°C

Notes: 1. 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.
2. Human body model, 100pF capacitor discharged through a 1.5kΩ resistor.

■ RECOMMENDED OPERATING RANGE

PARAMETER	SYMBOL	RATINGS	UNIT
V_{DD} Supply Voltage	V_{IN}	0~30	V
Operating Temperature	T_{OPR}	-40~+85	°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	300	℃/W

■ ELECTRICAL CHARACTERISTICS (Note 1, 2)

(The following specifications apply for V_{IN}=12V, T_A=25°C, unless specified otherwise.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Voltage	V_{IN}		5		30	V
Under Voltage Lock Out	V_{UVLO}	V_{IN} Falling		4.7		V
UVLO Hysteresis	$V_{UVLO, HYS}$	V_{IN} Rising		100		mV
Current Sense						
Mean Current Sense Threshold Voltage	V_{CS}	V_{IN}-V_{CS}	97	100	103	mV
Sense Threshold Hysteresis	V_{CS_HYS}			±15		%
CS Pin Input Current	I_{CS}	V_{IN}-V_{CS}=50mV		8		μA
Operating Frequency						
Maximum Operation Frequency	F_{SW}				1	MHz
Operating Current						
Quiescent Supply Current with Output Off	I_{OFF}	V_{DIM}<0.3V		100		μA
DIM Input						
Internal Supply Voltage	V_{DIM}	DIM Floating		5		V
DIM Input Voltage High	V_{DIM_H}		2.5			V
DIM Input Voltage Low	V_{DIM_L}				0.3	V
DIM Pull Up Resistor to Internal Supply Voltage	R_{DIM}			150		KΩ
DIM Input Leakage to Ground	I_{DIM_L}	V_{DIM}=0		33		μA
DIM Brightness Dimmer						
DC Brightness Control Range	V_{DIM_DC}		0.5		2.5	V
Max. DIM Frequency	f_{DIM}	f_{OSC}=500kHz			50	kHz
Duty Cycle Range of Low Frequency Dimming	D_{PWM_LF}	f_{DIM}=100Hz	0.05%		1	
Brightness Control Ratio				2000:1		
Duty Cycle Range of High Frequency Dimming	D_{PWM_HF}	f_{DIM}=20KHz	10%		1	
Brightness Control Ratio				10:1		
Output Power Switch						
SW On Resistance	R_{SW}			0.8		Ω
Continuous SW Current	I_{SWmean}				0.5	A
SW Leakage Current	I_{LEAK}			0.5	5	μA
Thermal Shutdown						
Thermal Shutdown Threshold	T_{SD}			150		°C
Thermal Shutdown hysteresis	T_{SD-hys}			20		°C

Notes: 1. Typical parameters are measured at 25˚C and represent the parametric norm.
2. Datasheet min/max specification limits are guaranteed by design, test, or statistical analysis.

■ TYPICAL APPLICATION CIRCUIT