



## ULD3380

Preliminary

LINEAR INTEGRATED CIRCUIT

### HIGH EFFICIENCY PWM BUCK LED DRIVER CONTROLLER

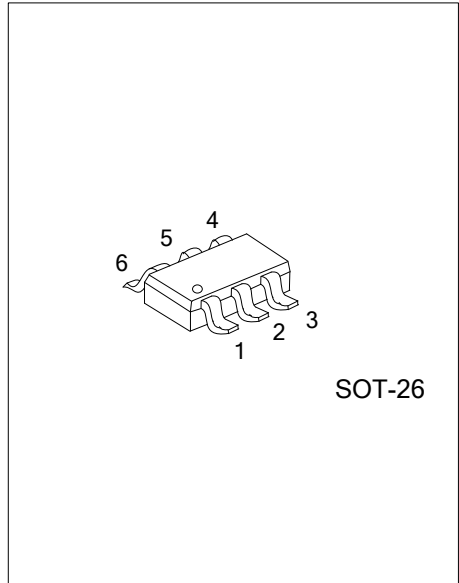
#### DESCRIPTION

The UTC **ULD3380** is a PWM mode step-down converter. By well controlling the external MOSFET and regulating a constant output current. The output duty cycle of the UTC **ULD3380** can be up to 100% for wider input voltage application.

The UTC **ULD3380** is available in a SOT-26 package.

#### FEATURES

- \* Universal input voltage range with off-line topology
- \* Programmable constant LED current
- \* Output LED string short protection
- \* Output LED string open protection
- \* Dimmable LED current by ACTL
- \* OCP
- \* Built-in OTP

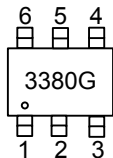


#### ORDERING INFORMATION

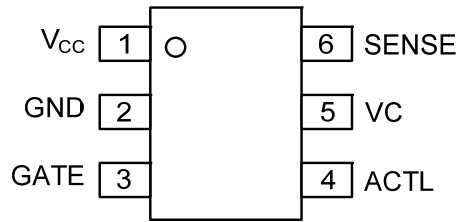
Ordering Number	Package	Packing
ULD3380G-AG6-R	SOT-26	Tape Reel

<p>ULD3380G-AG6-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) R: Tape Reel (2) AG6: SOT-26 (3) G: Halogen Free and Lead Free</p>
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#### MARKING



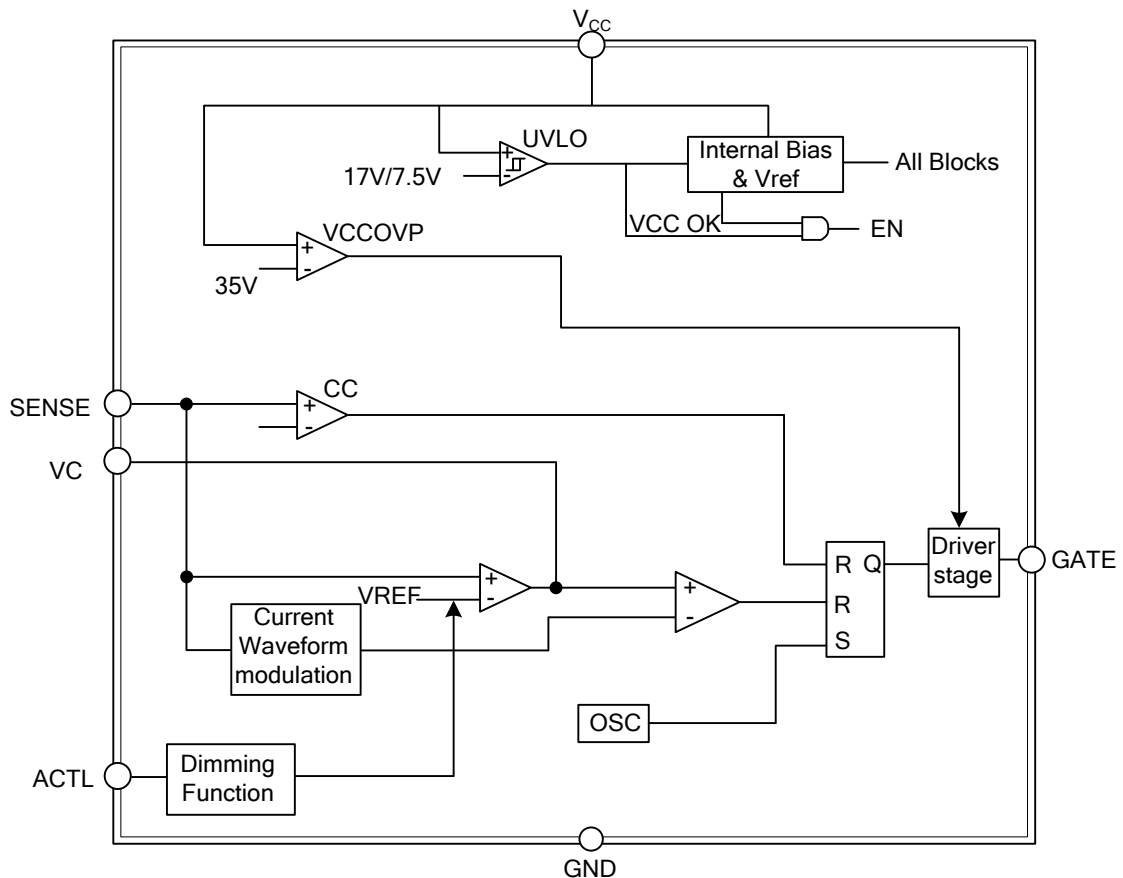
■ PIN CONFIGURATIONS



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	V <sub>CC</sub>	Power supply
2	GND	Ground of the chip.
3	GATE	Gate driver for external MOSFET switch.
4	ACTL	Analog dimming control.
5	VC	Compensation pin.
6	SENSE	LED current sense input pin.

■ BLOCK DIAGRAM



### ■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Input Voltage	$V_{CC}$	40	V
GATE Voltage	$V_{GATE}$	14	V
ACTL Voltage (Note 2)	$V_{ACTL}$	8	V
VC Voltage	$V_{VC}$	6	V
SENSE Voltage	$V_{SENSE}$	-0.3 ~ 6	V
Power Dissipation ( $T_A=25^\circ\text{C}$ )	$P_D$	0.392	W
Junction Temperature	$T_J$	+150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-65 ~ +150	$^\circ\text{C}$

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. If the ACTL pin is connected with a serial 1M $\Omega$  resistor, the maximum voltage can go up to 36V.

### ■ RECOMMENDED OPERATING CONDITIONS (Note)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Input Voltage	$V_{CC}$	17 ~ 32	V
Junction Temperature Range	$T_J$	-40 ~ +125	$^\circ\text{C}$

Note: The device is not guaranteed to function outside its operating conditions.

### ■ THERMAL DATA

PARAMETER	SYMBOL	RATING	UNIT
Junction to Ambient	$\theta_{JA}$	255	$^\circ\text{C/W}$

### ■ ELECTRICAL CHARACTERISTICS ( $V_{CC}=24V_{DC}$ , $T_A=25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Start-Up Voltage	$V_{ST}$		15	17	19	V
Minimum Operation Voltage After Start-Up	$V_{IN(MIN)}$		6.0	7.5	9.0	V
Input Quiescent Current	$I_{QC}$	After Start-Up, $V_{CC}=24V$		1.65	5.0	mA
Maximum Startup Current in $V_{CC}$ Hiccup Operation	$I_{ST(MAX)}$	Maximum $I_{CC}$ at low end of $V_{CC}$		250	300	$\mu\text{A}$
Input Shutdown Current	$I_{SHDN}$	Before Start-Up, $V_{CC}=15V$		0.1	5.0	$\mu\text{A}$
Over Voltage Protection	$V_{OVP}$	VCC Pin	32.5	35.5	36.5	V
Current Sense Voltage	$V_{SENSE}$			178		mV
Switching Frequency	$f_{SW}$		38	47	55	kHz
Oscillator Maximum Duty Cycle	$D_{MAX}$	$V_C=3V$			100	%
Minimum Turn-On Time	$t_{ON(MIN)}$		300			ns
GATE Pin Maximum Voltage	$V_{GATE}$	No Load at GATE Pin	11.1	12	13.1	V
GATE Voltage High	$V_{GATE\_H}$	$I_{GATE}=-20\text{mA}$	11	12	13	V
		$I_{GATE}=-100\mu\text{A}$	11.1	12	13.1	V
GATE Voltage Low	$V_{GATE\_L}$	$I_{GATE}=20\text{mA}$	0.55	0.75	0.95	V
		$I_{GATE}=100\mu\text{A}$	0.3	0.5	0.7	V
GATE Drive Rise and Fall Time		1nF Load at GATE		75		ns
GATE Drive Source and Sink Peak Current		1nF Load at GATE		0.2		A

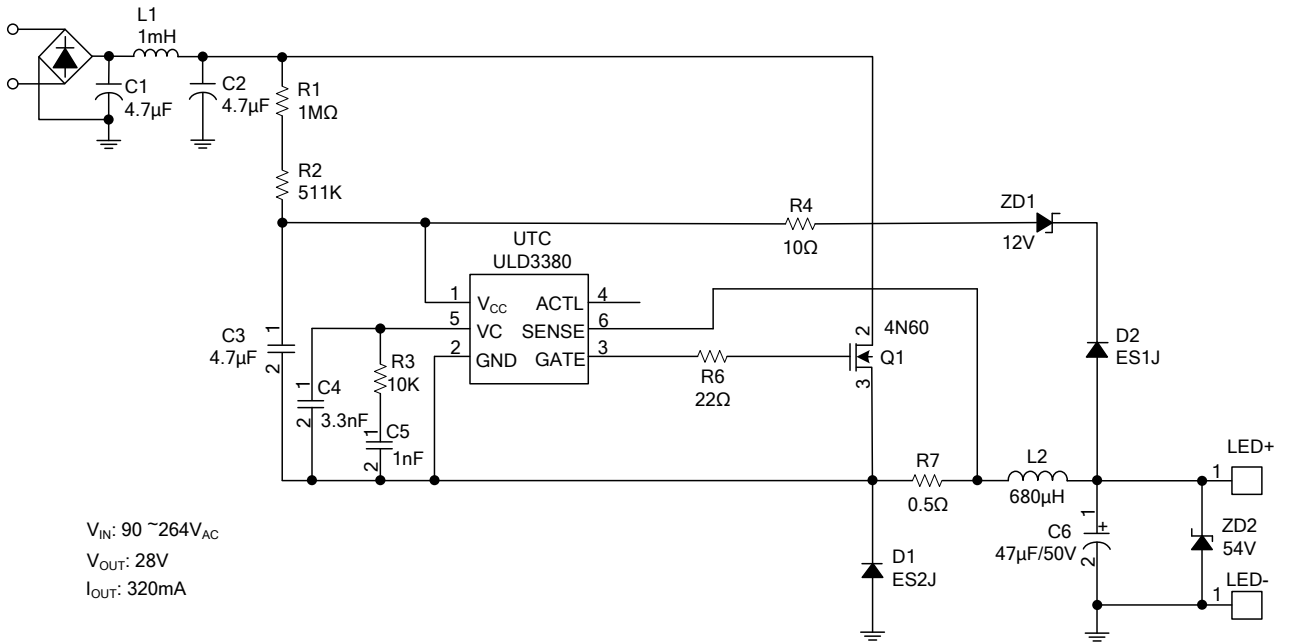
#### ACTL LED Dimming

Analog Dimming ACTL Pin Input Current	$I_{ACTL}$				25	$\mu\text{A}$
Analog Dimming Range			0		1.3	V
Analog Dimming Threshold Voltage	High Level			1.2	1.3	V
	Low Level		0	0.1		V
VC Threshold for PWM Switch Off	$V_{VC}$		1.1	1.25	1.4	V

#### Thermal Protection

Thermal Shutdown Temperature	$T_{SD}$			150		$^\circ\text{C}$
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■ TYPICAL APPLICATION CIRCUIT



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