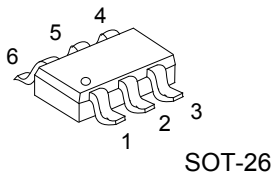
LED DRIVER WITH AVERAGE-MODE CONSTANT CURRENT CONTROL



SOT-26

■ DESCRIPTION

The **UCL5108** is an average current mode control LED driver IC operating in a constant off-time mode. **UCL5108** does not produce a peak-to-average error, and therefore greatly improves accuracy,line and load regulation of the LED current without any need for loop compensation or high-side current sensing. The output LED current accuracy is ±2%. The **UCL5108** can be powered from an 8.0 - 100V supply. PWM & Linear dimming input is provided that accepts an external control TTL compatible signal. The output current can be programmed by an internal 250mV reference.

■ FEATURES

* Fast Average Current Control
* Internal 8 to 100V Linear Regulator
* Linear and PWM Dimming Capability
* Output Short Circuit Protection with Skip Mode
* Requires Few External Components for Operation

■ APPLICATIONS

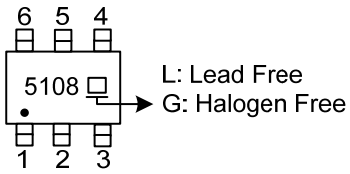
* DC/DC or AC/DC LED Driver Applications
* LED Street Lighting
* Back Lighting of Flat Panel Displays
* General Purpose Constant Current Source
* Signage and Decorative LED Lighting
* Chargers

■ ORDERING INFORMATION

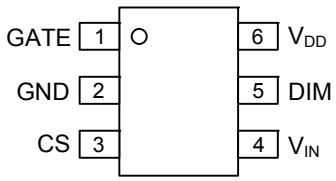
Ordering Number		Package	Packing
Lead Free	Halogen Free		
UCL5108L-AG6-R	UCL5108G-AG6-R	SOT-26	Tape Reel

UCL5108G-AG6-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) AG6: SOT-26 (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



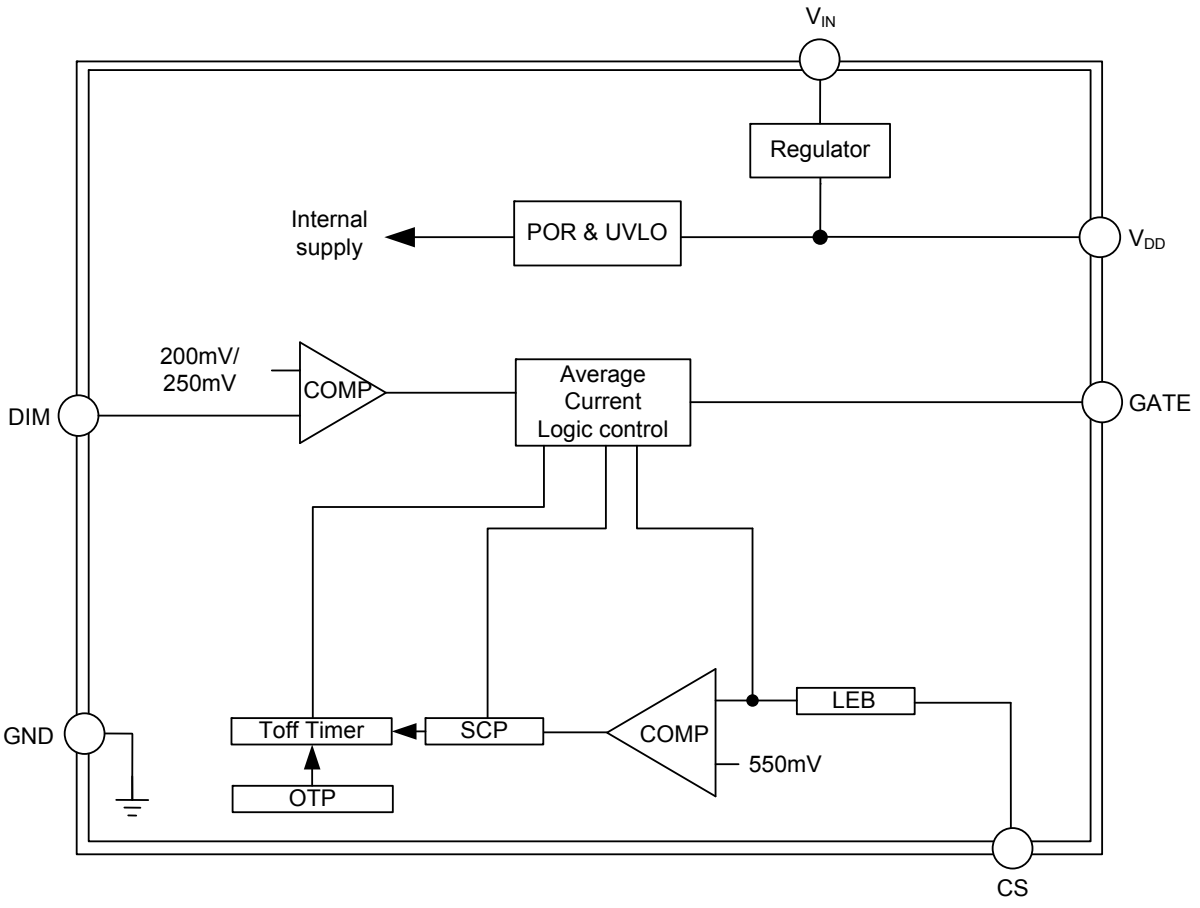
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	GATE	This pin is the output GATE driver for an external N-channel
2	GND	Ground return for all internal circuitry
3	CS	Sense the FET current by means of an external sense resistor
4	V_{IN}	This pin is the input of an 8 - 100V linear regulator
5	DIM	This pin is the linear & PWM dimming input of the IC
6	V_{DD}	This is the power supply pin for all internal circuits

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING (T_A=27°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Power Supply Voltage	V_{IN}	100	V
Junction Temperature	T_J	+150	°C
Storage Temperature	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.

■ ELECTRICAL CHARACTERISTICS (V_{DD}=3.3V, T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
INTERNAL REGULATOR						
Internally Regulated Voltage	V_{DD}	V_{IN}=8V, $I_{DD(ext)}$=0, 500pF at GATE, DIM=V_{DD}	7.25	7.5	7.75	V
Line Regulation of V_{DD}	$\Delta V_{DD,line}$	V_{IN}=8~100V, $I_{DD(ext)}$=0, 500pF at GATE, DIM=V_{DD}	0	-	1.0	V
Load Regulation of V_{DD}	$\Delta V_{DD,load}$	$I_{DD(ext)}$=0~0.6mA, 500pF at GATE, DIM=V_{DD}	0	-	100	mV
V_{DD} Under Voltage Lockout Threshold	UVLO	V_{DD} rising		6.3		V
V_{DD} Under Voltage Lockout Hysteresis	ΔUVLO	V_{DD} falling		500		mV
PWM DIMMING						
Pin DIM input low voltage	$V_{EN(lo)}$	V_{IN}=8~100V			0.1	V
Pin DIM input high voltage	$V_{EN(hi)}$	V_{IN}=8~100V	1.6			V
AVERAGE CURRENT SENSE LOGIC						
Current Sense Reference Voltage	V_{CS}		243	250	257	mV
DIM-to-CS Voltage Ratio	$A_{V(DIM)}$			0.167		
DIM-to-CS Voltage Offset	$A_{V(DIM)}$ (OFFSET)		0		10	mV
CS Threshold Temp Regulation					5	mV
DIM Input Voltage, Shutdown	$V_{DIM(OFF)}$			200		mV
DIM Input Voltage, Enable	$\Delta V_{DIM(OFF)}$			250		mV
Current Sense Blanking Interval	T_{BLANK}		150		320	ns
Minimum Steady-State Duty Cycle	$T_{ON(min)}$				1000	ns
SHORT CIRCUIT PROTECTION						
Hiccup Threshold voltage	V_{CS}		495	550	605	mV
Current Limit Delay CS-GATE	T_{DELAY}	CS=V_{CS} + 30mV			150	ns
Short Circuit Hiccup Time	T_{HICCUP}		450	550	650	us
Minimum On-Time (Short Circuit)	$T_{ON(min)}$	CS=V_{DD}			600	ns
GATE DRIVER						
GATE Sourcing Current	ISOURCE	VGATE=0V, V_{DD}=7.5V	165			mA
GATE Sinking Current	ISINK	VGATE=V_{DD}, V_{DD}=7.5V	165			mA
GATE Output Rise Time	tRISE	CGATE=500pF, V_{DD}=7.5V		30	50	ns
GATE Output Fall Time	tFALL	CGATE=500pF, V_{DD}=7.5V		30	50	ns
OFF-TIME						
Minimum Off Time	$t_{OFF\ Min}$			0.6		us
Maximum Off Time	$t_{OFF\ Max}$			50		us

■ TYPICAL APPLICATION CIRCUIT