

FEATURES

- Switch-mode controller for single switch LED driver
- Wide operating voltage range : 8Vdc ~ 450Vdc
- Open-loop peak current mode controller without loop compensation
- Constant frequency or constant off-time mode
- PWM or analog dimming capability
- Few external components required
- SOP-8 Lead-free Package

Applications

- TFT flat panel backlighting
- AC/DC LED lamps
- DC/DC, AC/DC LED drivers
- T5, T8 LED line bars
- MR-16 lamps
- Signage or decorative LED lamps

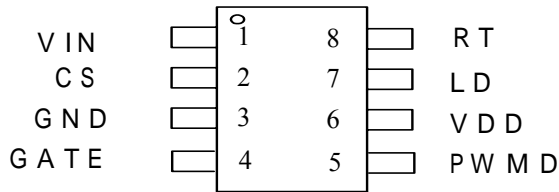
GENERAL DESCRIPTION

The T8601 is a low cost, simple, high-efficiency off-line LED driver IC. A built-in high voltage regulator enables the T8601 to work from 8Vdc to 450Vdc. The T8601 is operated in an open loop, peak current mode to produce a constant LED current rather than constant voltage.

The T8601 drives an external power MOSFET in either a constant frequency or constant off-time mode. The T8601 features PWM and linear dimming capability. To control LED brightness, the LED current can be controlled by applying a PWM signal with a duty ratio of 0~100% and a frequency up to a few kilohertz, or it can be adjusted linearly to any value between 0 ~ 250mV(typ.) by applying an analog voltage to the LD pin. The T8601 is available in SOP-8 Lead-free package.

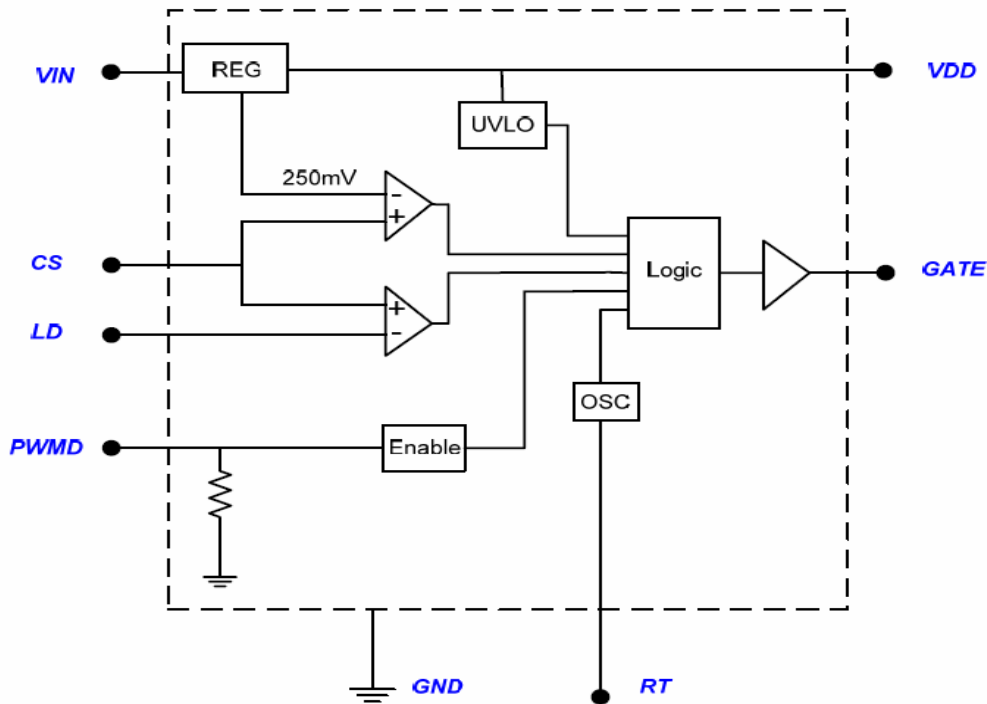
PART NUMBER EXAMPLES

PART NO.	PACKAGE
T8601-AD	SOP-8

PIN ARRANGEMENT(Top view)

SOP-8
PIN DESCRIPTION

SYMBOL	SOP-8	DESCRIPTION
VIN	1	The supply of an internal 8.0dc ~ 450Vdc voltage regulator.
CS	2	Being used to sense the external power MOSFET current by means of an external sense resistor. When the CS voltage exceeds the lower of either the reference 250mV (typ) or the the LD voltage, the GATE goes low.
GND	3	The T8601 ground. It has to be electrically connected to the ground of the power train.
GATE	4	The output of driver for an external N-channel MOSFET.
PWMD	5	The enable and PWM dimming inputs of the IC. When this PWMD is pulled to GND, the GATE goes low. When the PWMD is pulled high, the GATE driver works normally.
VDD	6	Internally regulated voltage. It must be bypassed with a sufficient, low ESR capacitor to GND.
LD	7	The linear dimming input. It sets the current sense threshold as the LD voltage is less than 250mV (typ).
RT	8	This pin sets the switching frequency or off-time. As the T8601 works in constant frequency mode, a resistor is connected between RT and GND; as the IC operates in constant off-time mode, a resistor is connected between RT and GATE.

Block Diagram



ABSOLUTE MAXIMUM RATINGS

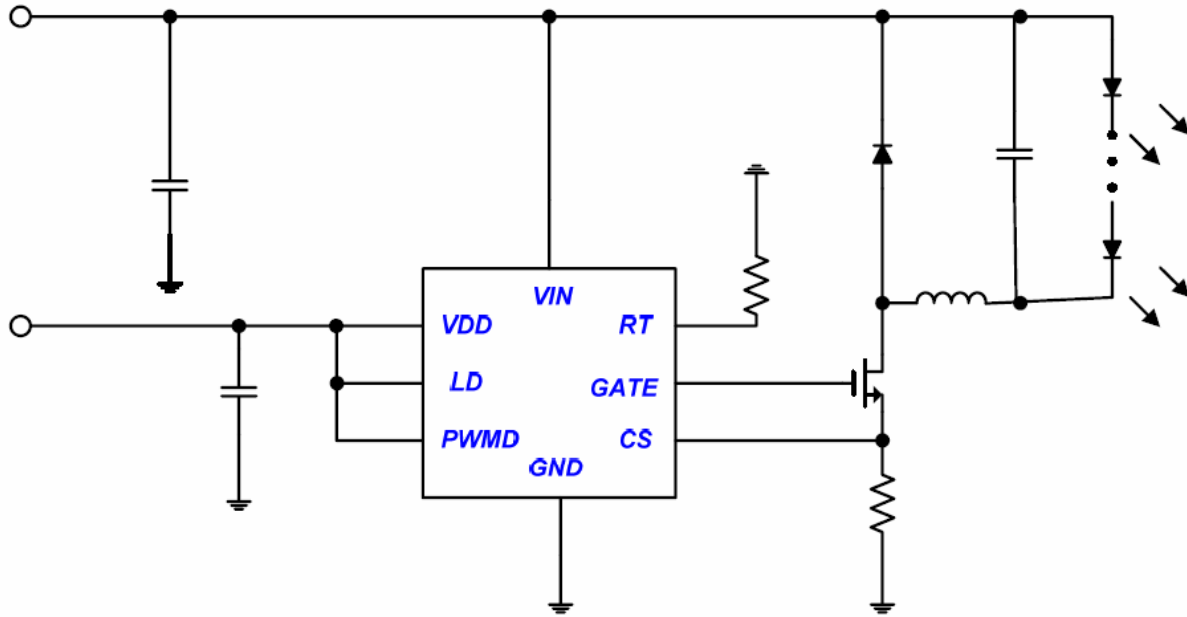
Package	Power Dissipation @TA=25°C	θJC °C/W	θJA °C/W
SOP-8 With Heat Slug	0.6W	23	70

Parameter	Value	Units
V _{IN} to GND	-0.5 ~ 450	V
CS, GATE, PWMD, LD, RT to GND	-0.3 ~ (V _{DD} +0.3)	V
V _{DD} to GND	+13.5	V
Operating Junction Temperature	-40 ~ +125	°C
Storage Temperature	-65 ~ +150	°C

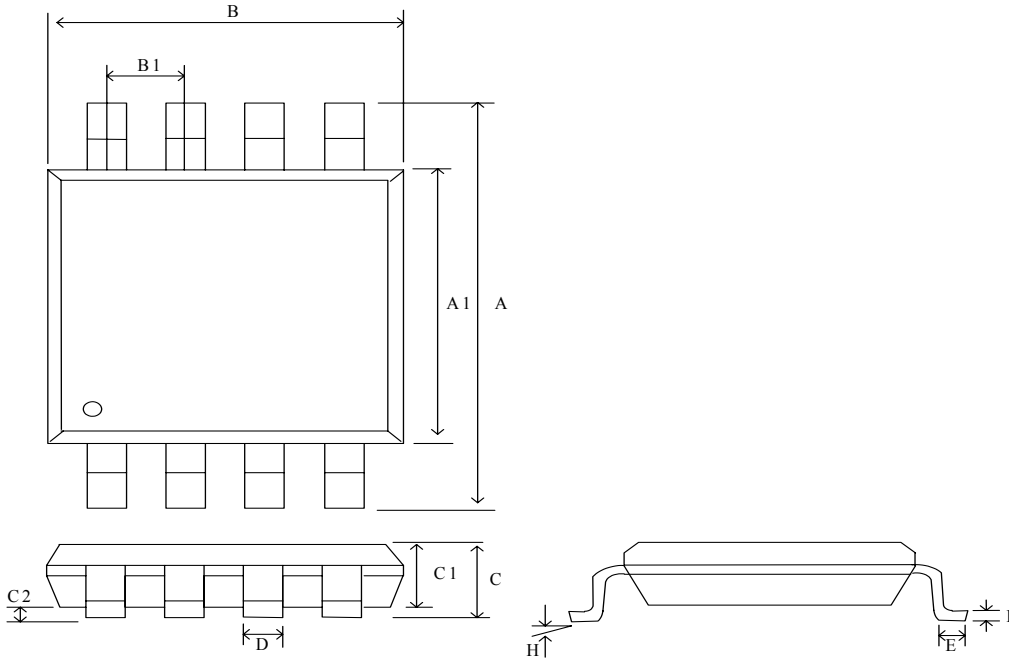
Electrical Characteristics (The specification and production tested at TA=25°C, unless otherwise noted.)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Units
Input						
Input DC voltage range	VINDC	DC input voltage	8	–	450	V
Chip shut-down current	IINSD	PMD to GND, VIN = 8~450V	–	0.5	1.0	mA
VDD maximum Voltage	VDDmax	External voltage applied to VDD pin	–	–	13.5	V
Internal Regulator						
Output voltage	VDD	VIN = 8V, 2.2uF at VDD, IDD(ext)=0, 500pF at GATE, RT=226kΩ, PWMD=VDD	7.0	7.5	8.0	V
Line regulation	ΔVDD,Line	VIN = 8~450V, 2.2uF at VDD, IDD(ext)=0, 500pF at GATE, RT=226kΩ, PWMD=VDD	0		1	V
Load regulation	ΔVDD,Load	VIN = 12V, 2.2uF at VDD, IDD(ext)=0~1mA, 500pF at GATE, RT=226kΩ, PWMD=VDD	0	–	100	mV
VDD under voltage lockout threshold	UVLO	VDD rising	6.2	6.7	6.95	V
VDD under voltage lockout hysteresis	ΔUVLO	VDD falling	–	500	–	mV
PWM Dimming						
PWMD input low voltage	VPWMD(lo)	VIN = 8~450V	–	–	1	V
PWMD input high voltage	VPWMD(hi)	VIN = 8~450V	2.4	–	–	V
PWMD pull-down resistance	RPWMD	VPWMD = 5V	50	100	150	kΩ
Current Sense Comparator						
Current sense threshold voltage	VCS,TH	VIN = 12V	225	250	275	mV
Current Sense Blanking Interval	TBLANK	VIN = 12V, VCS = 0.4V, VLD = VDD	150	215	280	ns
Delay from CS trip to GATE low	TDELAY	VIN = 12V, VLD = VDD, VCS = 0~0.4V step after TBLANK	–		300	ns
GATE Driver						
GATE sourcing current	ISOURCE	VGATE = 0V, VDD = 7.5V	165			mA
GATE sinking current	ISINK	VGATE = VDD=7.5V	165			mA
GATE output rise time	TRISE	CGATE = 500pF, VDD = 7.5V	–	30	50	ns
GATE output fall time	TFALL	CGATE = 500pF, VDD = 7.5V	–	30	50	ns
Oscillator						
Oscillator frequency	fOSC1	VIN = 12V, RT= 1MΩ	20	25	30	kHz
Oscillator frequency	fOSC2	VIN = 12V, RT= 226KΩ	80	100	120	kHz

TYPICAL APPLICATION CIRCUITS



**PACKAGE DIMENSIONS
8-LEAD SOP**



Symbol	Dimension in mm			Dimension in inch		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	5.70	6.00	6.30	0.224	0.236	0.248
A1	3.75	3.95	4.10	0.148	0.156	0.164
B	-	-	5.13	-	-	0.202
B1	-	1.27	-	-	0.050	-
C	-	-	1.80	-	-	0.071
C1	1.35	1.55	1.75	0.052	0.061	0.069
C2	0.10	-	0.25	0.001	-	0.004
D	0.31	0.41	0.51	0.012	0.016	0.020
E	0.30	0.50	0.70	0.012	0.020	0.028
F	0.10	0.15	0.25	0.004	0.006	0.010
J		2.23 REF			0.088 REF	
K		2.97 REF			0.117 REF	
H	0~8°			0~8°		