LUMISSIL Microsystems
A Division of ISSI

IS32LT3168 LED Driver with Integrated Hall-Effect Sensor

The IS32LT3168 is Lumissil's first device with an integrated Omnipolar Hall-effect sensor to enable magnetic sensing. Example applications includes LED lighting for automotive such as vanity mirror, glove compartment, car trunk, car door puddle light etc. It is also applicable in Industrial applications such as White Goods like refrigerator, washer dryer, interior lighting etc. Basically, anywhere there is a cover or lid or door that requires lighting upon opening or closing. The integrated Hall-effect sensor operates with either a north or south pole magnet to enable contactless control of LEDs or other on-board circuitry.

IS32LT3168 is a standalone single-channel Linear LED driver in a small SOP-8 package. It can be fully configured via resistors and does not require a control processor and additional software. It is an Automotive AEC-Q100 qualified part that meets the stringent automotive quality requirements and also meets the extended temperature range for Industrial market applications.

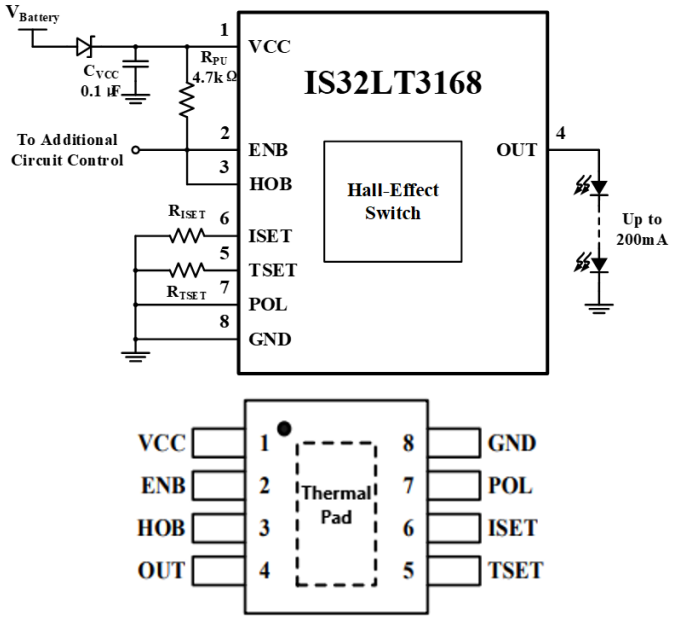

FIGURE 1 - TYPICAL APPLICATION CIRCUIT AND PINMAP

The single channel of constant current source can be configured via an external resistor (RISET in Figure 1); from 20mA to 200mA. RISET = 100/IOUT where IOUT is the output current of OUT pin. Hence RISET varies from 0.5kΩ to 5kΩ. RISET should use 1% tolerance precision resistor.

LED dimming control can be by PWM signal input to ENB pin or a logic control signal to same ENB pin. Changing a PWM signal's duty cycle would set the output current accordingly. If a logic control signal is used then a logic low input to ENB enables automatic Gamma-corrected current output that ramps from 0 to a maximum current set by RISET for a LED fading-in effect. The Gamma-correction is a non-linear function that enables human eyes to perceive the fading as linear increase in luminosity. When a logic high is input to ENB pin, then a Gamma-corrected fading-out effect occurs as the output current ramps from max value set by RISET down to 0. The gamma-corrected current ramping (up or down) timing can be configured by an appropriate valued resistor (RTSET) to TSET pin. The fading time in seconds is $t_{FADE}=R_{TSET}x16x10^{-6}$. If the TSET pin is pulled to ground directly (or RTSET=0Ω) then the fade function is disabled and output current is an instant on/off.

A processor could output the PWM or logic low/high control signal to the ENB pin. Alternatively, the Hall-effect sensor output, HOB pin, could be used as input to the ENB pin to control the driver. The HOB output could also be used to trigger other on-board circuitry. The Hall sensor output polarity can be configured by the POL pin. If POL pin is pulled to ground then as a magnet is moved away from the sensor then HOB goes low and as the magnetic field is moved closer to the sensor then HOB goes high. If POL pin is floated then HOB output logic levels are inverted for the same conditions. The table below summarizes this functionality where BFIELD is the magnetic field from a magnet and BOPX is the operate point magnetic threshold and BRPX is the release point magnetic threshold of the Hall sensor.

POL	$\|B_{FIELD}\|$	HOB State	LED State
GND	> $\|B_{OPx}\|$	Pulled High	Off
	< $\|B_{RPx}\|$	Low	On
Float	> $\|B_{OPx}\|$	Low	On
	< $\|B_{RPx}\|$	Pulled High	Off

FIGURE 2 - POL VS HOB AND LED STATE

For system reliability, IS32LT3168 can detect channel output pin or current setting pin short-to-ground faults and perform thermal shutdown or roll-off should temperature exceed an acceptable threshold to ensure device lifespan. Since it is designed with automotive applications in mind, it accepts a supply voltage of 6.5V to 28V and able to withstand 40V load dump. It has an ultra-low standby current of 50uA when LED is in off state. All these powerful features are in a small SOP-8-EP (4.9x6mm) package with operating temperature range of -40°C to +125ºC.

PRODUCT ORDERING AND AVAILABILITY

Part Number	Package	Quantity
IS32LT3168-GRLA3-TR	SOP-8-EP, Lead-free	2500 per reel

IS32LT3168 is in production. Enquire with your Lumissil Sales Representative to order samples and evaluation boards.

Lumissil Team is committed to provide customers strong technical support and abide to ISSI company's mission to maintain long-term support.

CONTACT:

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