ALS-5FLAMPODO-V1.00
Ambient Light Sensor with Open-Drain Output and De-Glitch Low-Pass Filter

■ FEATURES

- Spectral response close to human eye's response
- Excellent temperature compensation: -30 to 85 C
- 2.7V to 5.5V operating voltage range
- Setting luminance threshold by an external resistance
- Built-in luminance hysteresis function
- Built-in de-glitch low pass filter
- Open-Drain output to external hosts
- 4-lead 5 mm lamp package

■ APPLICATIONS

- Ambient light sensing and control for IR-Cut Removable (ICR) of surveillance cameras.
- Automatic residential and commercial lighting management
- Automatic contrast enhancement for electronic signboard
- Ambient light monitoring device for daylight and artificial light

■ DESCRIPTION

ALS-5FLAMPODO is an advanced ambient light sensor used to control the switch of the IR filter in IR-Cut Removable (ICR) of surveillance cameras by deciding day time or night time according to the user's luminance threshold setting. With built-in photodiodes, amplifiers and analog circuits, it offers the best spectral sensitivity close to human eyes. The luminance threshold is determined by the voltage (set by the RSET resistance) fed to the internal hysteresis comparator. The built-in 3-second glitch filter is to eliminate the light flash or any transient change of the illumination. With built-in excellent temperature compensation circuit, it is suitable for the application with wide temperature range. The open-drain output can be used to inform the DSP/MCU the day/night time status. With 4-lead 5f flat top lamp package, it is suitable to be adopted in the LED lighting board and extend itself close to the best position of sensing luminance.

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Absolute Maximum Ratings (unless otherwise specified, Temperature=25℃)

Characteristic	Symbol	Rating	Unit
Supply Voltage	VDD	5.5	V
ODOUT Sink Current	IOUT	15	mA
Operating Temperature Range	TOPR	-30~85	℃
Storage Temperature Range	TSTO	-40~100	℃

Electrical Characteristics (unless otherwise specified, Temperature=25℃ & VDD=5.0V)

Characteristic	Sym.	Condition	Limit			Unit
			Min.	Typ.	Max.	
Supply Voltage	VDD	-	2.7	5.0	5.5	V
Open-Drain output ODOUT						
Output Low Voltage	VOL	VDD=5V and ISINK=10mA	-	-	0.21	V
Luminance threshold control RSET						
RSET resistance	RSET	Luminance threshold 25lux~5lux	54	-	230	KΩ

Solder Characteristics

Characteristic	Condition	Limit			Unit
		Min.	Typ.	Max.	
IR Reflow Temperature Time above Liquidus	Temperature = 250°C	-	-	10	sec
IR Reflow Max Temperature Time	Temperature = 260°C	-	-	3	sec
Hand solder Max Temperature Time	Temperature = 350°C	-	-	3	sec

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Typical Application

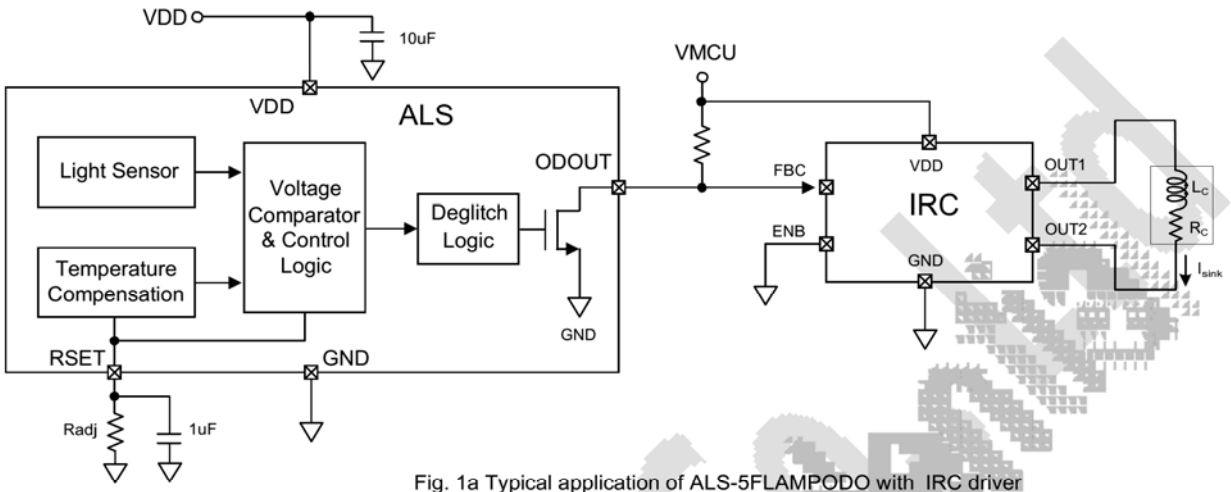


Fig. 1a Typical application of ALS-5FLAMPODO with IRC driver

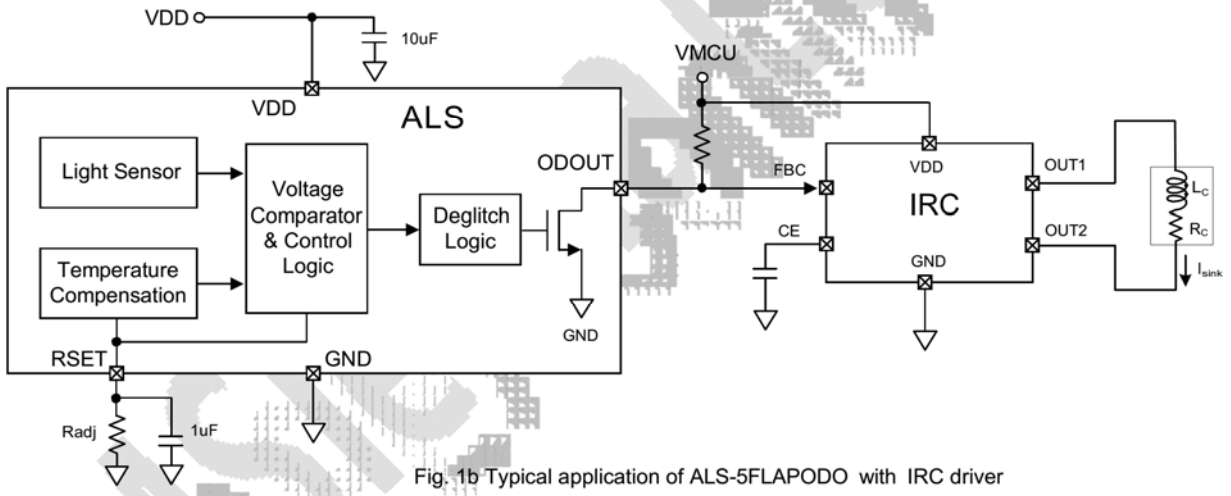


Fig. 1b Typical application of ALS-5FLAPODO with IRC driver

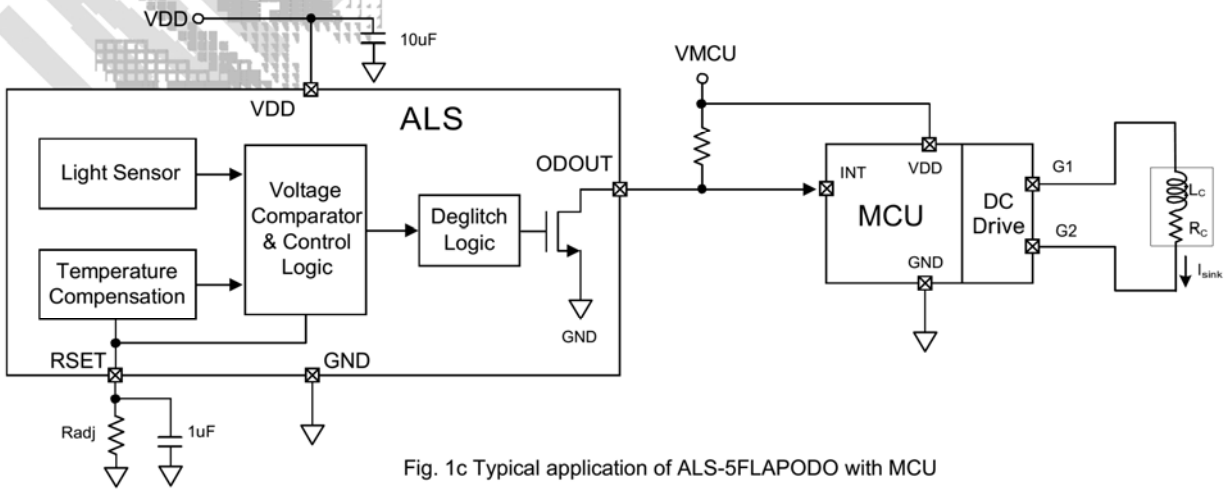
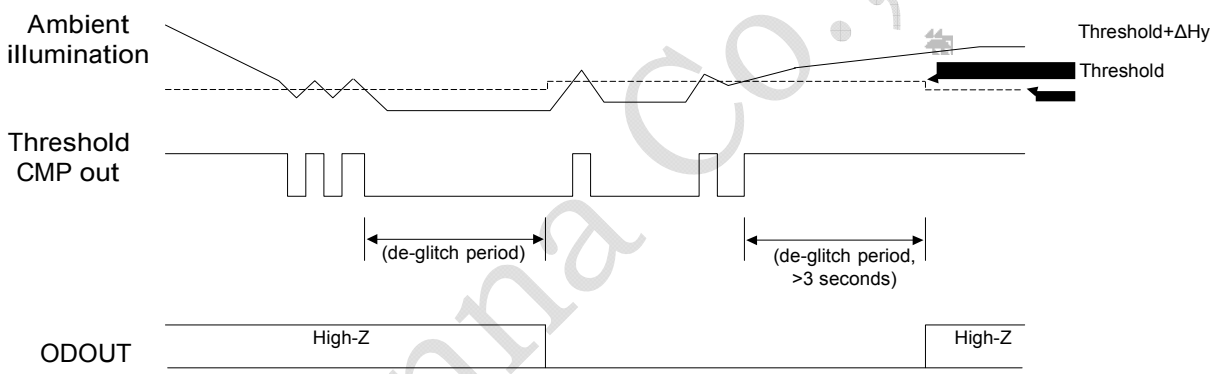


Fig. 1c Typical application of ALS-5FLAPODO with MCU

■ Illumination Glitch Filter and Open Drain output

With the ambient illumination on built-in sensor, ALS-5FLAMPODO determines day time or night time based on current luminance value higher or lower than a preset threshold value. A glitch filter is built to avoid any unexpected transient change of the luminance. The luminance change must last for a period of time before the glitch filter determines the threshold comparator output. The state of open-drain output ODOUT pin is then determined according to the de-glitch output.

Fig. 2 Waveform of ODOUT with preset illumination threshold



■ Illumination Hysteresis

To avoid ODOUT output oscillation when the natural illumination is not stable in the morning or evening, it supports illumination hysteresis function to keep stable ODOUT output. As shown in Fig. 2, when the ODOUT state is driven low (i.e., the luminance value is lower than preset threshold value), the thresholdvalue is then added with a ΔHy value which raises the threshold for turning ODOUT into High-Z state. When ODOUT is in High-Z state, the ΔHy value is then removed and reduces the threshold value for turning ODOUT into low state. Normally, the hysteresis range of the luminance is around 7~10lux.

■ Adjustment of Illumination Threshold Value

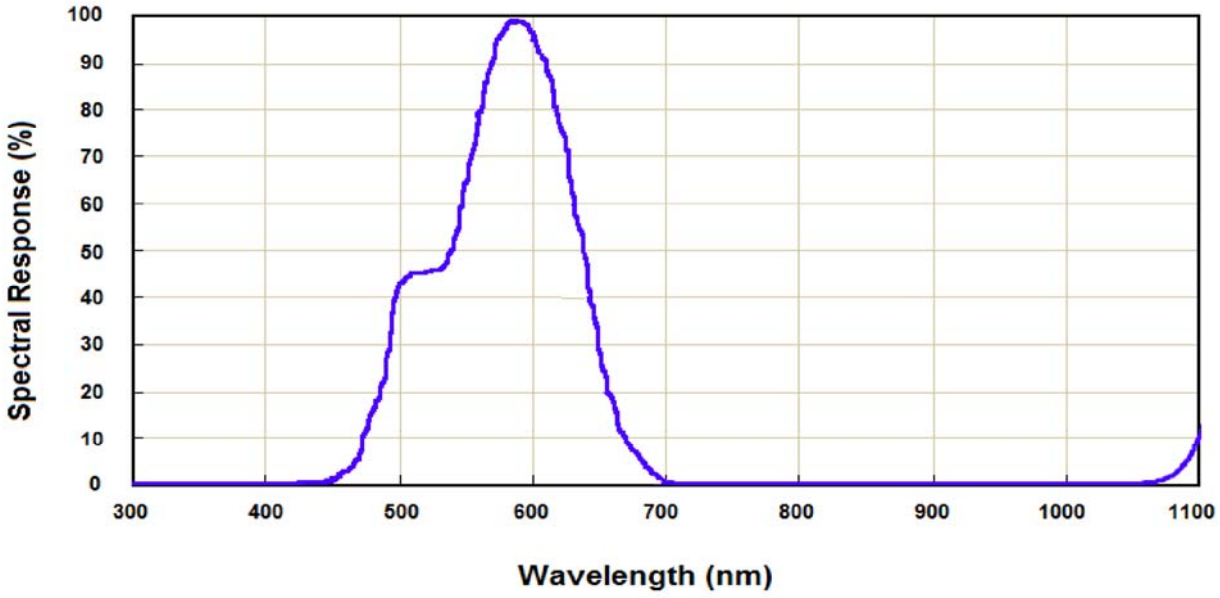
The illumination threshold value can be adjusted to meet the desired light intensity by adjusting the resistance connected to RSET pin. Table 1 lists the resistance values (in KΩ) and the corresponding illumination threshold value (in lux). Note that the de-glitch period is also be affected by RSET resistance.

RSET * resistance (KΩ)	Night-to-day threshold (ODOUT High-Z)	Day-to-night threshold (ODOUT output Low)	De-glitch period (sec)
54	>25 lux	<11 lux	1
68	>20 lux	<9 lux	1.2
85	>15 lux	<7 lux	1.5
137	>10 lux	<4 lux	2.4
230	>5 lux	<2 lux	4

Table 1 RSET resistance with illumination threshold values
* 5% resistance variation results in +/- 1 lux threshold variation.

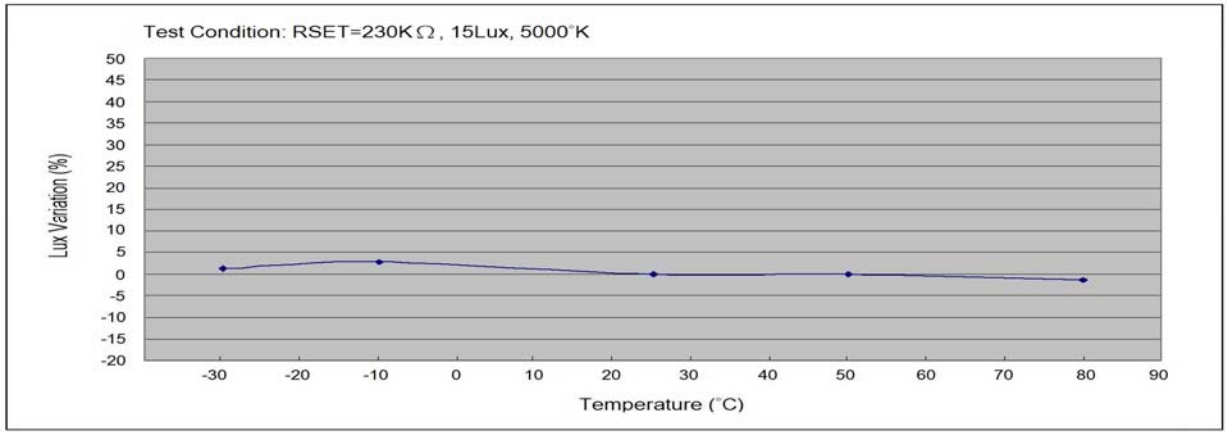
■ Spectrum Profile

The package of this is designed to contain near infrared cutting material for optical encapsulation purpose. The spectrum profile is shown as below.



■ Temperature Compensation

ALS-5FLAMPODO supports built-in temperature compensation function to eliminate the temperature effects of light sensing. No extra circuits are needed to implement temperature compensation by users. The measurement result shows that, comparing with the result in 25°C, the lux variation is within ±2.7% when the temperature ranges from -30 ℃ to 80 ℃



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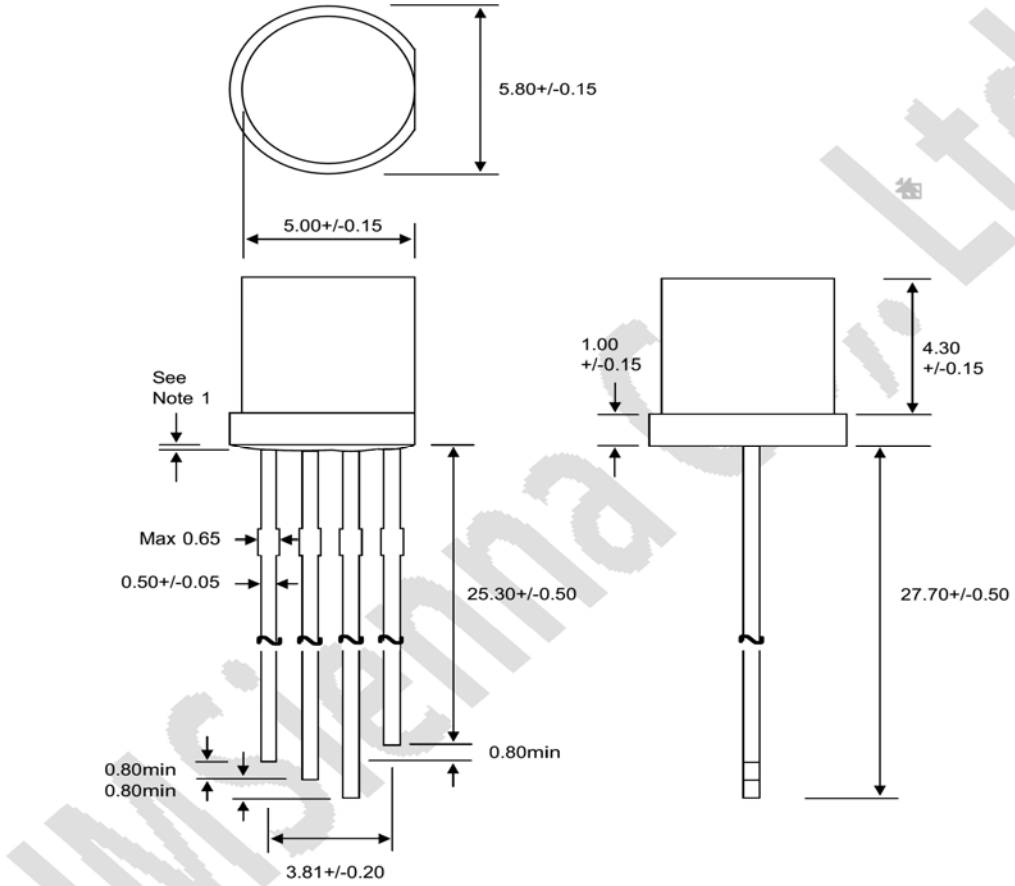
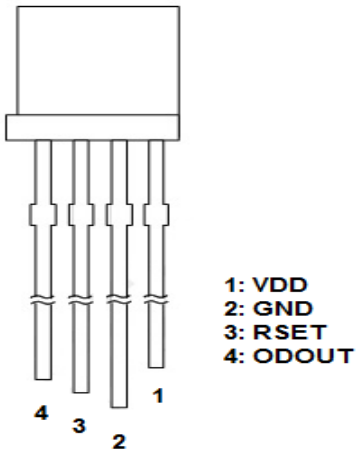
DIMENSION (in unit of mm)



Note 1: Protruded resin under flange is maximally 0.5mm.



Pin #	Mnemonic	I/O	Description
1	VDD	-	Power supply
2	GND	-	Ground
3	RSET	I	Threshold control
4	ODOUT	O	Open-drain output