

This product is under development, and specifications are subject to change without notice.

Optical Touchless Sensor

■FEATURES

- ~50mm range touchless sensor
- Built-in interference prevention for adjoining sensors and ambient light
- Operational ambient light tolerance ~10,000lux
- Digital output appears "H" by light input.
- Miniature, thin package : (3.6 X 5.8 X 1.2mm)
- Pb free solder re-flowing permitted
- Halogen free, Pb free, Compliant with RoHS directive

■APPLICATION

- Operation Switch
- Operation Panel

■GENERAL DESCRIPTION

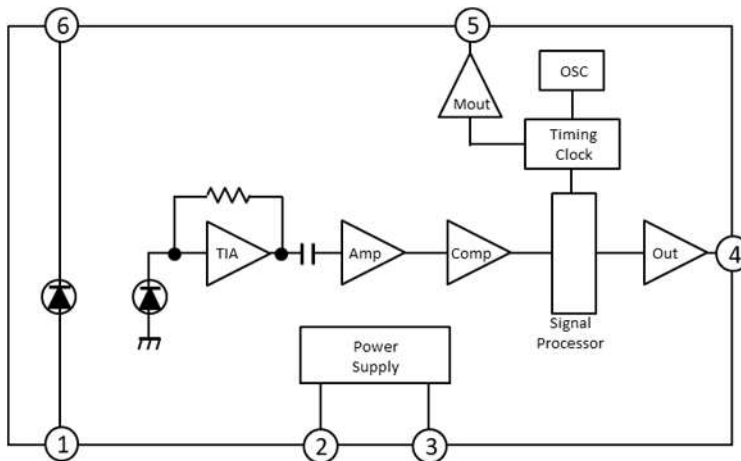
The NJL5830R is a reflective type optical sensor that incorporates a high power infrared LED and a IC with photo diode sensor in a unique package.

By incorporating this product, possible to realize touchless operation without direct human contact to the panel or buttons.

Touchless operation of buttons on equipment in the public realm will provide countermeasures against bacterial and viral infection and improvement of hygiene.

It is also highly resistant to ambient light, and can be used for outdoor equipment.

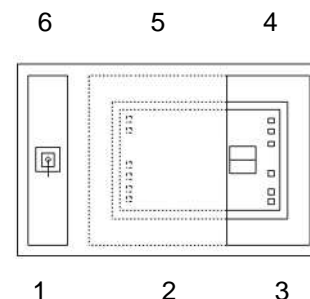
■BLOCK DIAGRAM



■PIN CONFIGURATION

PIN NO.	SYMBOL	DESCRIPTION
1	Anode (LED)	Anode for LED
2	V _{CC}	Power Supply
3	GND	GND
4	OUT	Output
5	MOUT	Modulation Output for LED
6	Cathode (LED)	Cathode for LED

(Top View)



■ORDERING INFORMATION

PART NUMBER	PACKAGE OUTLINE	RoHS	HALOGEN-FREE	TERMINAL FINISH	MARKING	WEIGHT (mg)	MOQ (pcs)
NJL5830R	COBP	○	○	Au	No marking	TBD	500

■ **ABSOLUTE MAXIMUM RATINGS**($T_a=25$ deg.C)

Parameter	Symbol	Rating	Unit
Emitter			
Forward DC Current	I_F	30	mA
Forward Pulse Current *1	I_{FP}	200	mA
Reverse DC Voltage	V_R	6	V
Power Dissipation	P_D	55	mW
Detector(PDIC)			
Supply Voltage	V_{CC}	15	V
Power Dissipation	P_{PDIC}	250	mW
Coupled *2			
Total Power Dissipation	P_{tot}	300	mW
Operating Temperature	T_{opr}	-30 to +70	°C
Storage Temperature	T_{stg}	-30 to +85	°C
Reflow Soldering Temperature	T_{sol}	200	°C

*1 When the pulse width is 3.5 μ sec,pulse period 112 μ sec.

*2 Use the recommended reflector. (AL deposited mirror: 85% reflectivity)

■ **RECOMMENDATION OPERATING CONDITION**

Parameter	Symbol	Value	Unit
Forward Current *1	I_{FP}	20	mA
Supply Voltage	V_{CC}	+5.0	V
Detection distance* 2	Gap	20	mm

*1 When the pulse width is 3.5 μ sec,pulse period 112 μ sec.

*2 Use the recommended reflector. (AL deposited mirror: 85% reflectivity)

■ **ELECTRONICAL AND OPTICAL CHARACTERISTICS**($T_a=25$ deg.C)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Emitter						
Forward Voltage	V_F	$I_F=20$ mA	1.3	1.45	1.9	V
Revers Voltage	I_R	$V_R=6$ V	-	1	10	μ A
Peak Wavelength	λ_P	$I_F=20$ mA	-	940	-	nm
Detector						
Supply Voltage	V_{CC}		4.5	5.0	12.0	V
Current Consumption	I_{CC}	$V_{CC}=5.0$ V, No incident light	1.4	2.7	3.6	mA
		$V_{CC}=12.0$ V, No incident light	2.2	3.1	4.0	mA
MOUT voltage	V_{MOUT}	$V_{CC}=5.0$ V, load MOUT-GND 1k Ω	3.0	4.0		V
		$V_{CC}=12.0$ V, load MOUT-GND 1k Ω	10.0	11.0		V
MOUT Pulse width	T_w	$V_{CC}=5.0$ V, load MOUT-GND 1k Ω		3.5		μ s
MOUT Pulse period	T_p	$V_{CC}=5.0$ V, load MOUT-GND 1k Ω		112		μ s
Coupled *2						
L-H Threshold LED Current	IFLH	$V_{CC}=5.0$ V, $R_L=100$ k d=20mm(Al Mirror) (LED driven by MOUT signal) *1	-	7	15	mA

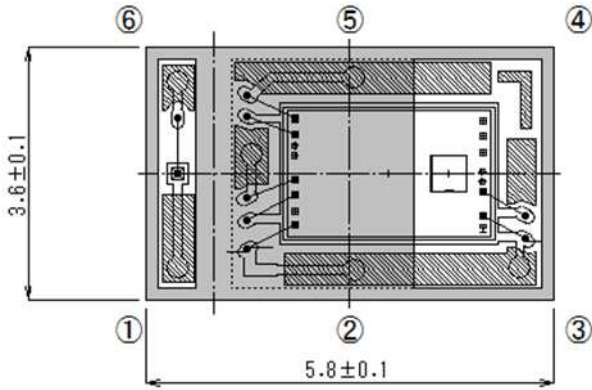
Hysteresis	H _{ys}	Hys=IFHL/IFLH	0.6	0.8	0.95	
High Level Output Voltage	V _{oH}	V _{CC} =5.0V, R _L =100kΩ incident light d=20mm, I _{FP} =20mA	4.5			V
		V _{CC} =12.0V, R _L =100kΩ incident light d=20mm, I _{FP} =20mA	11.0			V
Low Level Output Voltage	V _{oL}	V _{CC} =5.0V, R _L =100kΩ No incident light			0.5	V
		V _{CC} =12.0V, R _L =100kΩ No incident light			0.5	V
Response Time	Respl	V _{CC} =5.0V, R _L =100kΩ d=20mm, I _{FP} =0 20mA		200		μs
Response Time	Respd	V _{CC} =5.0V, R _L =100kΩ d=20mm, I _{FP} =0 20mA		280		μs

*1 When the pulse width is 3.5μsec, pulse period 112μsec.

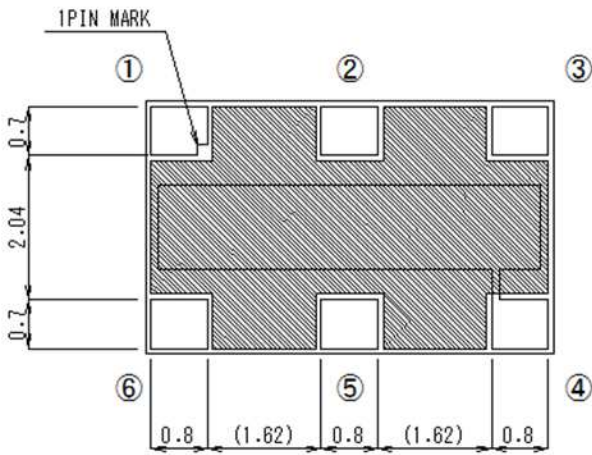
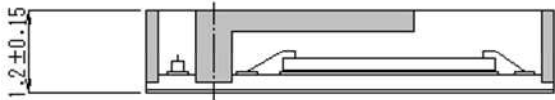
*2 Use the recommended reflector.

Items for which only standard values are listed in the electrical and optical characteristics table are not measured due to the manufacturing process.

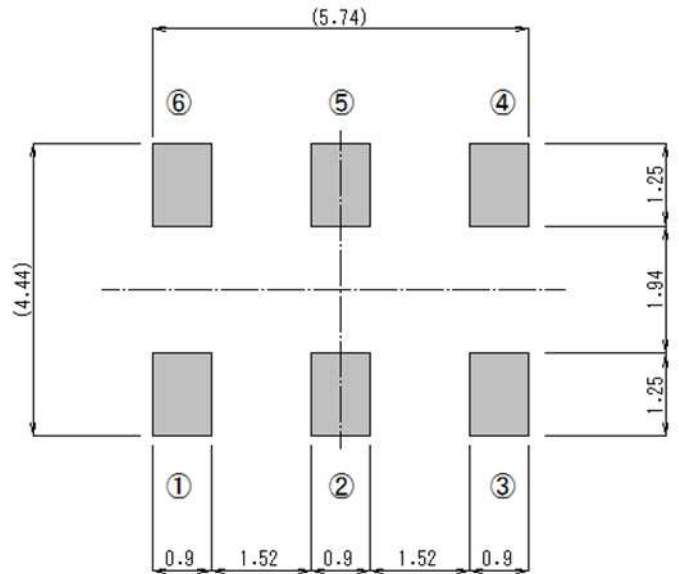
■PACKAGE OUTLINE unit : mm



- : Anode(LED)
- : Vcc
- : GND
- : OUT
- : MOUT
- : Cathode(LED)

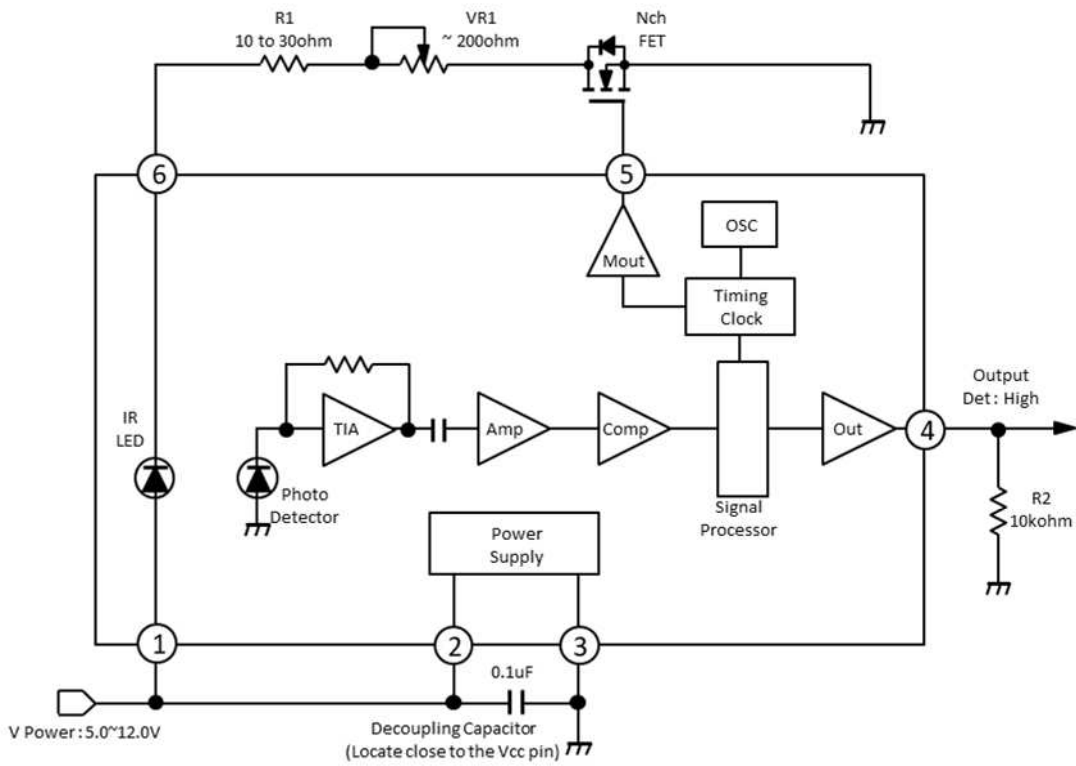


Foot Pattern



Unspecified tolerance ± 0.1 mm

■ CONNECTION DIAGRAM



■APPLICATION NOTES

(1) Attention in handling

Avoid touching the light receiving and light emitting area of the device.

Avoid dust and any other foreign materials on the light receiving and light emitting area of the device when in operation.

When the LED is operated by voltage, it should be connected to the current adjustment resistor. Avoid applying direct voltage to the LED, because of the possibility the LED will be damaged.

When mounting, special care has to be taken on the mounting position and tilting of the device because of the importance of placing the device to the optimum position to the object.

(2) Attention in designing

Avoid the access of ambient light to the photo diode sensor since this could cause the device to malfunction. Furthermore, there is possibility of malfunction when there are the other mounted parts by near this product peripheral.

There will be changing characteristics by detection object. Refer to this datasheet and evaluate by actual detection object.

When LED has been applied continuous power on long period of time, the output current is dropped. If it uses by always applying power to LED, have to consider the circuit designing of including output current decrease.

■RECOMMENDED MOUNTING METHOD(Low temperature reflow)

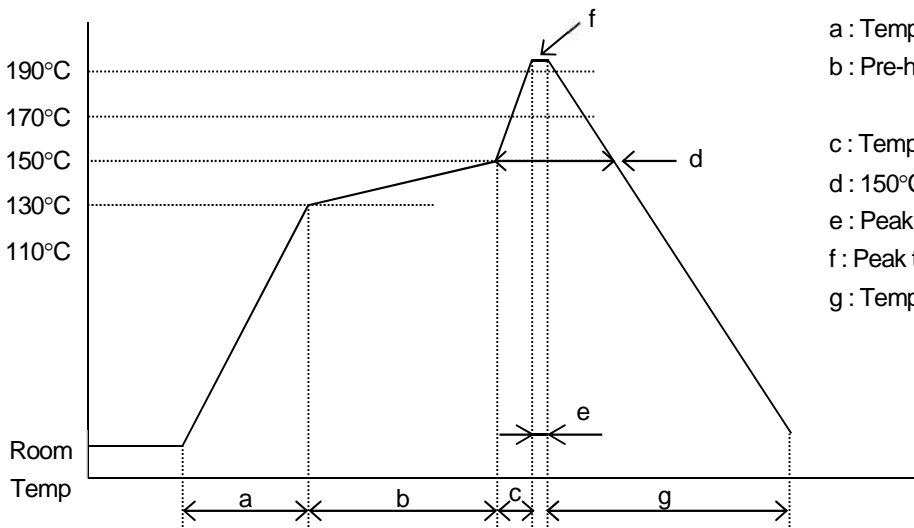
NOTE

Mounting was evaluated relative to the following profiles in our company. No problems were observed. However, it is recommended the user confirm their own mounting technique is viable and problem free.

Mounting: It is limit the soldering process to Once.

■INFRARED REFLOW SOLDERING METHOD

Recommended reflow soldering procedure



- a : Temperature ramping rate : Lower than 2°C /sec
- b : Pre-heating temperature : 130 to 150°C
- time : Lower than 90sec
- c : Temperature ramping rate : Lower than 3.6°C /sec
- d : 150°C or higher time : Lower than 50sec
- e : Peak temperature time : Lower than 3sec
- f : Peak temperature : Lower than 200°C
- g : Temperature ramping rate : Lower 3.1°C /sec

The temperature of the surface of mold package

(NOTE1) Use a reflow furnace with short wave infrared radiation heater such as a halogen lamp.

Regarding temperature profile, please refer to those for reflow furnace.

In this case the resin surface temperature may become higher than lead terminals due to endothermic ally of black colored mold resin. Therefore, please avoid direct exposure to mold resin.

(NOTE2) Other method

Such other methods of soldering as dipping the device into melted solder and vapor phase method (VPS) are not appropriate because the body of device will be heated rapidly. Therefore, these are not recommended to apply.

(NOTE3) The resin gets softened right after soldering, so, the following care has to be taken

Not to contact the lens surface to anything.

Not to dip the device into water or any solvents.

■FLOW SOLDERING METHOD

Flow soldering is not possible.

■IRON SOLDERING METHOD

Iron soldering is not possible.

■RECOMMENDED MOUNTING METHOD

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Mounting: It is limit the soldering process to Once.

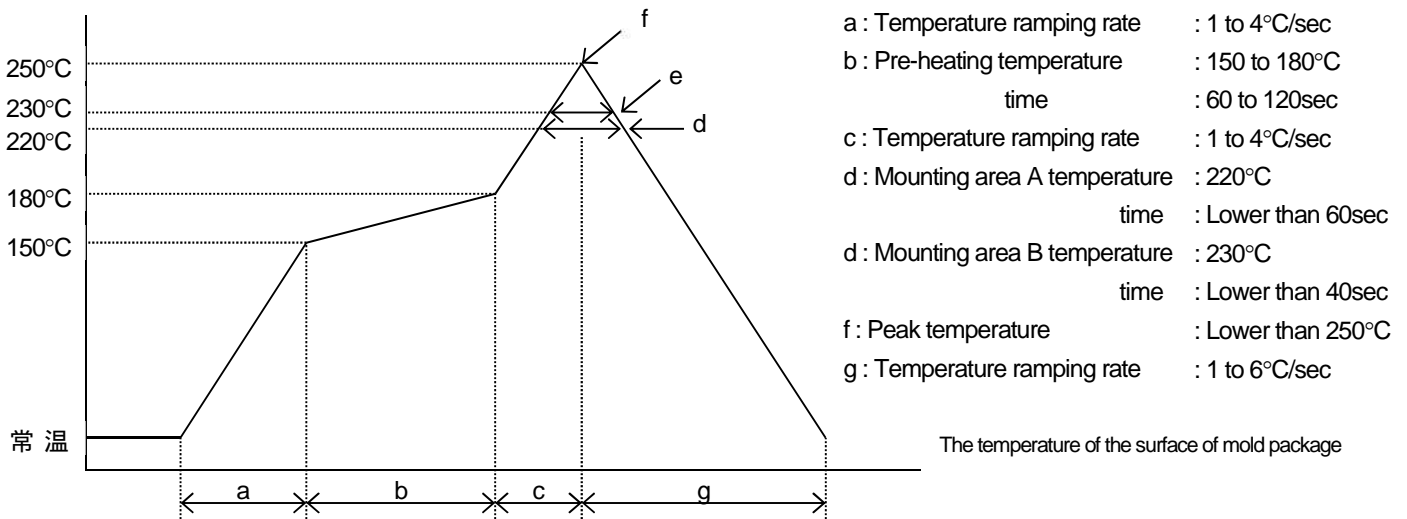
Please carry out baking under the following conditions before mounting.

Please implement it immediately after baking.

Baking conditions: 100 / 2hr

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Iron soldering is not possible.

■CLEANING

Avoid washing the device after soldering by reflow method.

■IC STORAGE CONDITIONS AND ITS DURATION

(1) Temperature and humidity ranges

Pack Sealing	Temperature:	5 to 40 [°C]
	Humidity:	40 to 80 [%]
Pack Opening	Temperature:	5 to 30 [°C]
	Humidity:	40 to 70 [%]

Baking is please mounted quickly.

Avoid a dry environment below 40% because the product is easily damaged by electrical discharge.

Store the product in a place where it does not create dew due to a sudden change in temperature.

- (2) When baking, place the reel vertically to avoid load to the side.
- (3) Do not store the devices in a corrosive-gas atmosphere.
- (4) Do not store the devices in a dusty place.
- (5) Do not expose the devices to direct rays of the sun.
- (6) Do not allow external forces or loads to be applied to IC's.
- (7) Be careful because affixed label on the reel might be peeled off when baking.
- (8) It is recommended to bake the product before using for optimum reliability.

■BAKING

Baking method: Ta=100°C, 2 to 4h Only one time baking is recommended.

■STORAGE DURATION

Limited to one year after the receipt of the product.

For product stored longer than a year, confirm the terminal solderability before they are used.

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