COBP PHOTO REFLECTOR

■ GENERAL DESCRIPTION

The NJL5901R is the small and thin surface mount type photo reflector including a high output infrared LED and a high sensitive Si photo transistor. Compared with the former reflectors, the mounting area is reduced to 45%

■ FEATURES

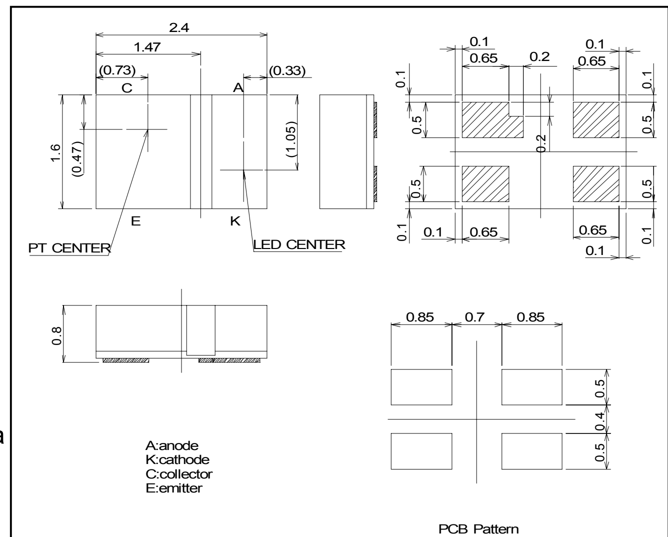
- Pb free solder re-flowing permitted(260°C, 2times)
- Miniature, thin, surface mount 1.6mm × 2.4mm × 0.8mm
- Built-in visible light cut-off filter
- High output, high S/N ratio

■ APPLICATIONS

- End detector of video, audio tape
- Rotation detection of various motors, audio turntables
- Paper edge detection and mechanism timing detection of facsimile, copy machine etc.
- Detecting the location of pick up head for CD-R/RW etc.
- Reading film information and mechanism timing of camera
- Bar code reader, encoder, automatic vending machine
- Various detection in industrial system

■ OUTLINE (typ.)

Unit : mm



■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Emitter			
Forward Current (Continuous)	I_F	30	mA
Reverse Voltage (Continuous)	V_R	6	V
Power Dissipation	P_D	45	mW
Detector			
Collector-Emitter Voltage	V_{CEO}	16	V
Emitter-Collector Voltage	V_{ECO}	6	V
Collector Current	I_C	10	mA
Collector Power Dissipation	P_C	25	mW
Coupled			
Total Power Dissipation	P_{tot}	60	mW
Operating Temperature	T_{opr}	-20 to +85	°C
Storage Temperature	T_{stg}	-40 to +85	°C
Reflow Soldering Temperature	T_{sol}	260	°C

■ ELECTRO-OPTICAL CHARACTERISTICS (Ta=25°C)

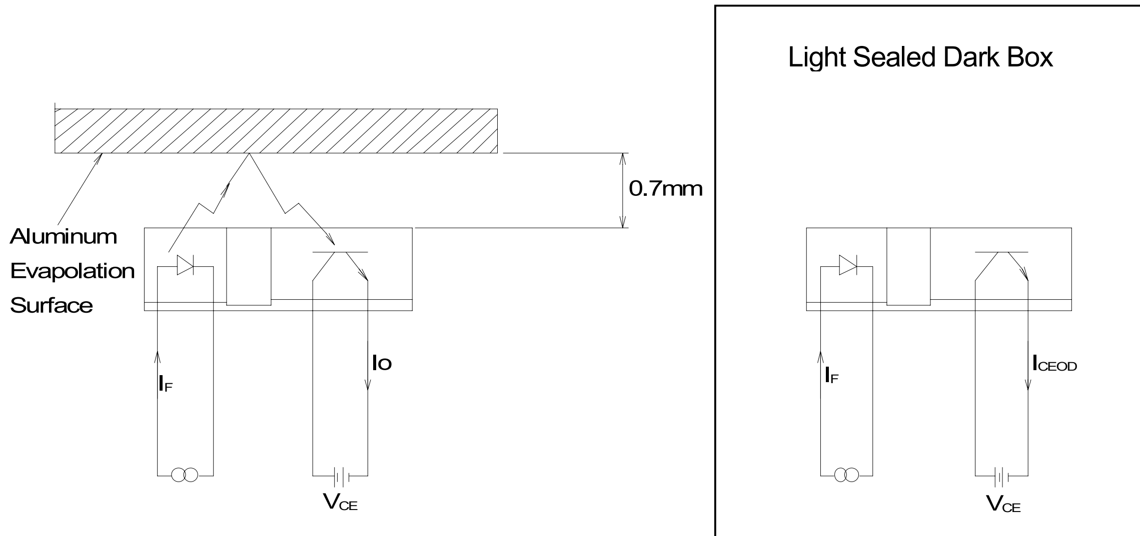
PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Emitter						
Forward Voltage	V_F	I_F=4mA	—	—	1.4	V
Reverse Current	I_R	V_R=6V	—	—	10	μA
Capacitance	Ct	V_R=0V,f=1MHz	—	25	—	pF
Detector						
Dark Current	I_{CEO}	V_{CE}=10V	—	—	0.2	μA
Collector-Emitter Voltage	V_{CEO}	I_C=100μA	16	—	—	V
Coupled						
Output Current	I_O	I_F=4mA,V_{CE}=2V,d=0.7mm	120	—	380	μA
Operating Dark Current *1	I_{CEOD}	I_F=4mA,V_{CE}=2V	—	—	2	μA
Rise Time	tr	I_O=100μA,V_{CE}=2V,RL=1KΩ,d=0.7mm	—	30	—	μs
Fall Time	tf	I_O=100μA,V_{CE}=2V,RL=1KΩ,d=0.7mm	—	30	—	μs

*1 Iceod may increase according to the periphery situation of the surface mounted product.

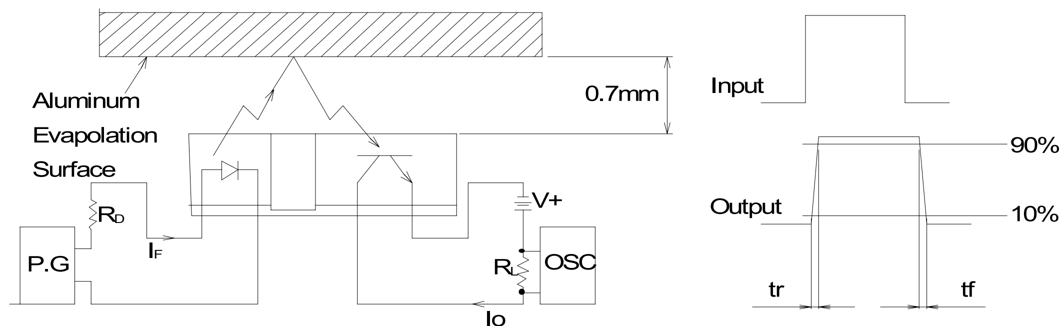
■ OUTPUT CURRENT TEST CONDITION

■ DARK CURRENT TEST CONDITION

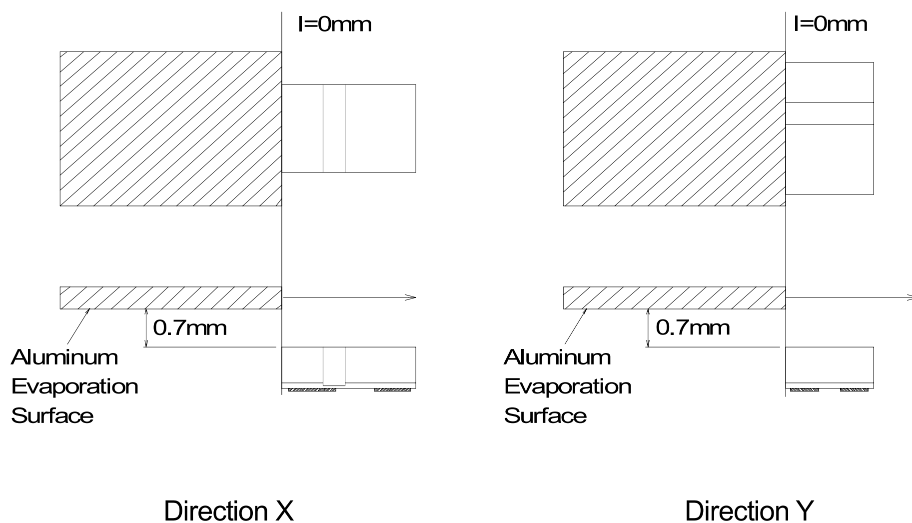
The infrared signal from LED is reflected at the aluminum surface.



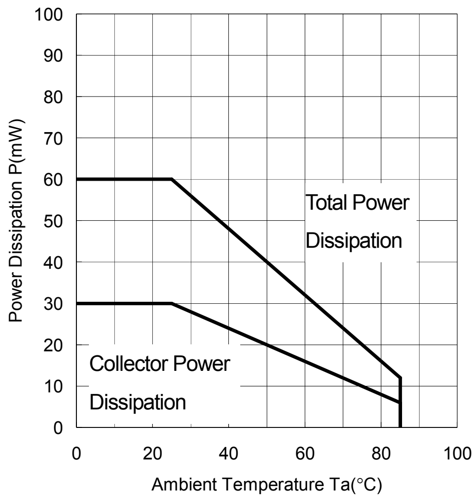
■ RESPONSE TIME TEST CONDITION



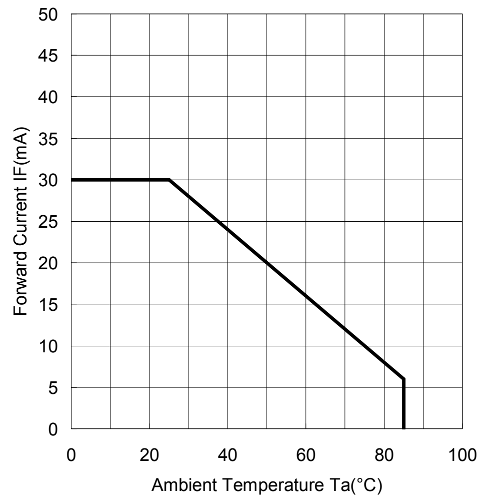
■ EDGE RESPONSE TEST CONDITION



Power Dissipation vs. Temperature

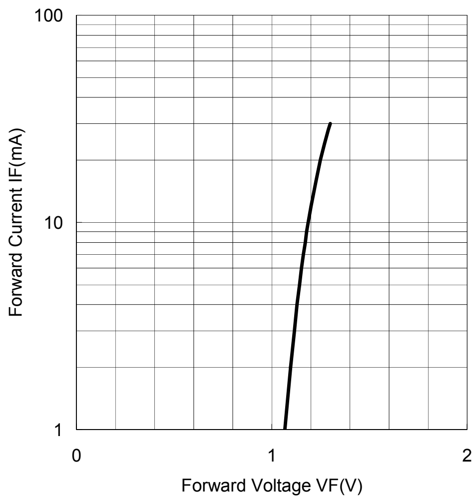


Forward Current vs. Temperature

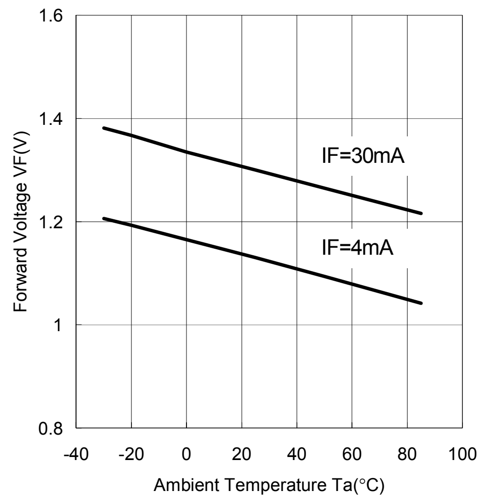


■ TYPICAL CHARACTERISTICS

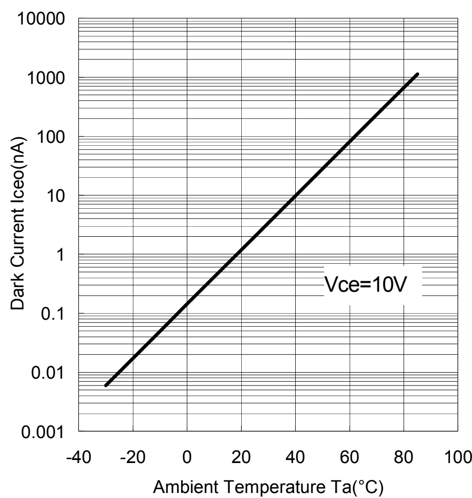
Forward Voltage vs. Forward Current



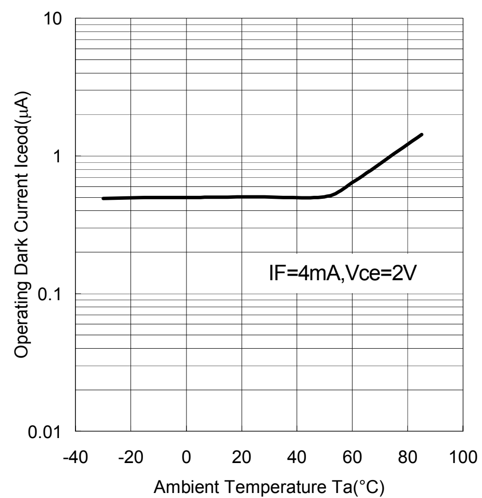
Forward Voltage vs. Temperature



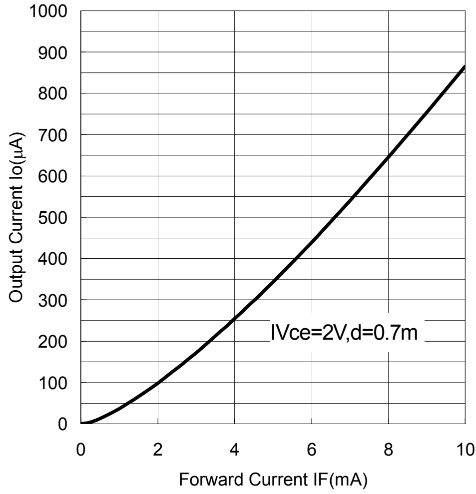
Dark Current vs. Temperature



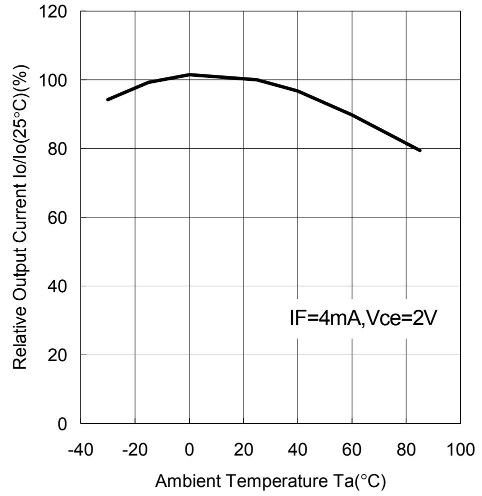
Operating Dark Current vs. Temperature



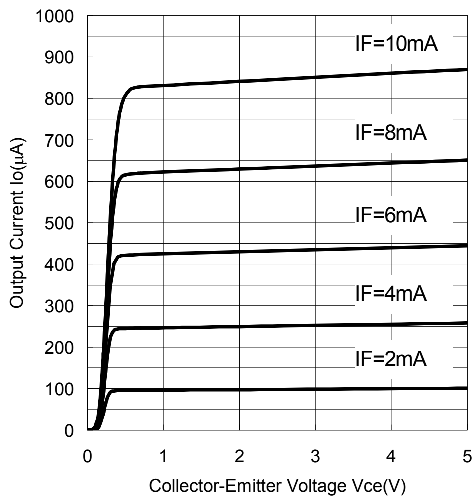
Output Current vs. Forward Current (Ta=25°C)



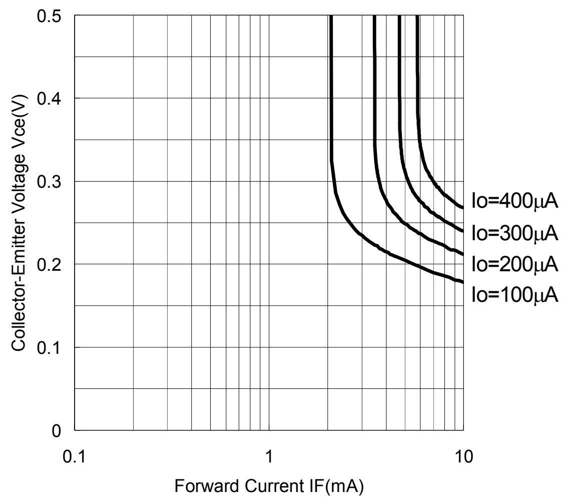
Output Current vs. Temperature



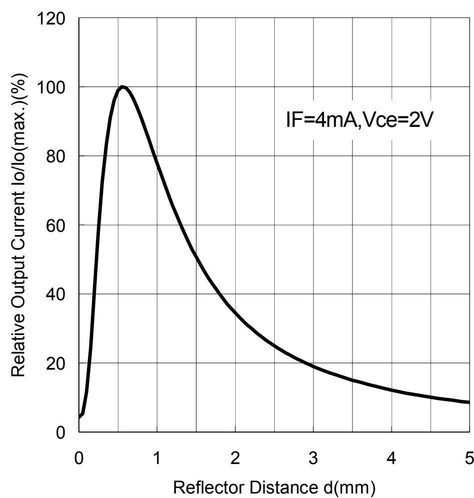
Output Characteristics (Ta=25°C)



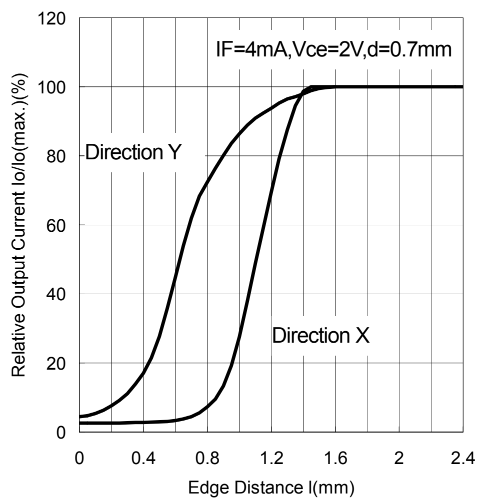
Vce Saturation (Ta=25°C)

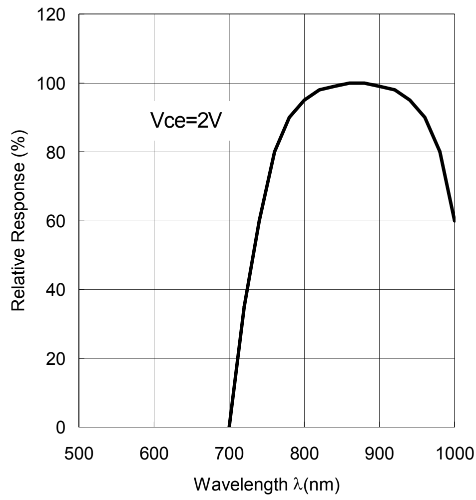


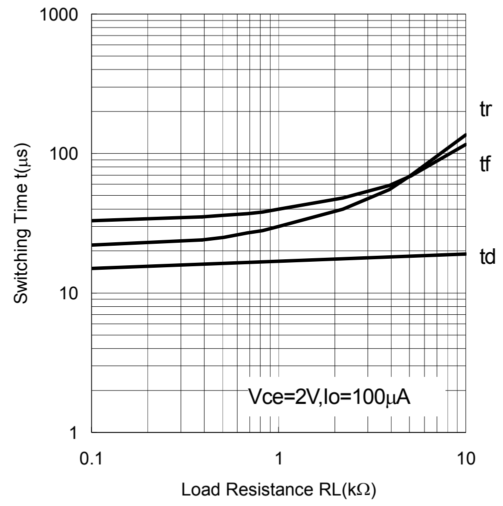
Output Current vs. Distance (Ta=25°C)



Output Current vs. Edge Distance (Ta=25°C)




Spectral Response (Ta=25°C)
Vce=2V
Relative Response (%)
Wavelength λ(nm)
0
20
40
60
80
100
120
500
600
700
800
900
1000


Switching Time vs. Load Resistance
(Ta=25°C)
Switching Time t(μs)
Load Resistance RL(kΩ)
Vce=2V,Io=100μA
tr
tf
td
1
10
100
1000
0.1
1
10

PRECAUTION FOR HANDLING

1. Soldering to actual circuit board

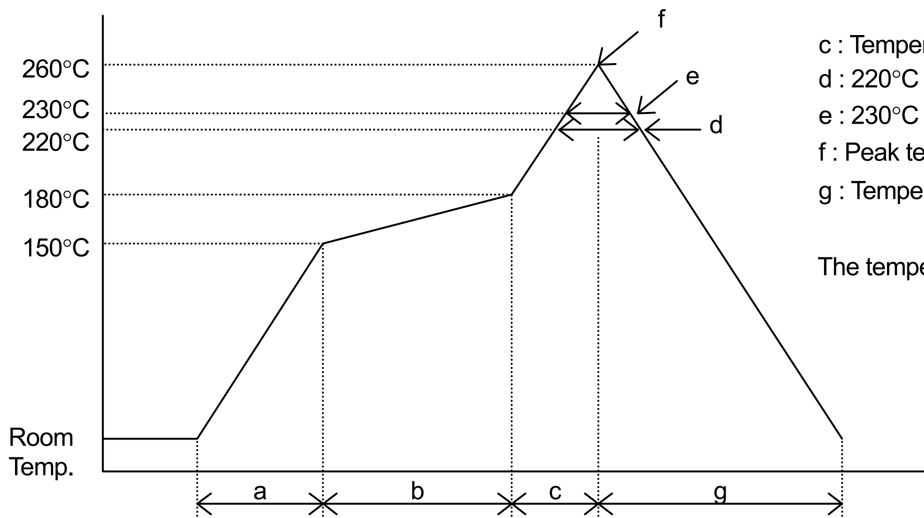
Soldering condition

The surface temperature of plastic package is lower than 260 °C.

Soldering Method

1) Reflow Method

Soldering to be done within twice under the recommended condition mentioned below



a : Temperature ramping rate	: 1 to 4°C/s
b : Pre-heating temperature	: 150 to 180°C
time	: 60 to 120s
c : Temperature ramping rate	: 1 to 4°C /s
d : 220°C or higher time	: Shorter than 60s
e : 230°C or higher time	: Shorter than 40s
f : Peak temperature	: Lower than 260°C
g : Temperature ramping rate	: 1 to 6°C /s

The temperature of the surface of mold package

2) Reflow Method (In case of infrared heating)

The temperature profile is same as the above

Avoid direct irradiation to the plastic package because it may absorb the Infrared Radiation and its surface temperature will be higher than the lead.

3) The other method

Avoid rapid heating up like dipping the devices directly into the melting solder or vapor phase method (VPS).

Solder the device in short time as soon as possible.
If the device is heated and kept in high temperature for longer time, its reliability would be affected.

2. Cleaning

Avoid washing the device after soldering by reflow method.

3. Attention in handling

1) Treat not to touch the lens surface.
2) Avoid dust and any other foreign materials on the lens surface such as paint, bonding material, etc.

4. Storage

Mount the device as soon as possible after opening the envelope. In order to prevent from degradation by the moisture at the reflow process, the device is contained in damp proof packaging.

[CAUTION]
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