COBP PHOTO REFLECTOR

■ GENERAL DESCRIPTION

NJL5901R-1 is the compact surface mount type photo reflector, which miniaturized outside dimension compared with the current COBP reflector, NJL5901R. Compared with the NJL5901R, the mounting area of NJL5901R-1 is reduced to 54%. Moreover, the output current is 400μA typ. and is raised 180% compared with the NJL5901R.

■ FEATURES

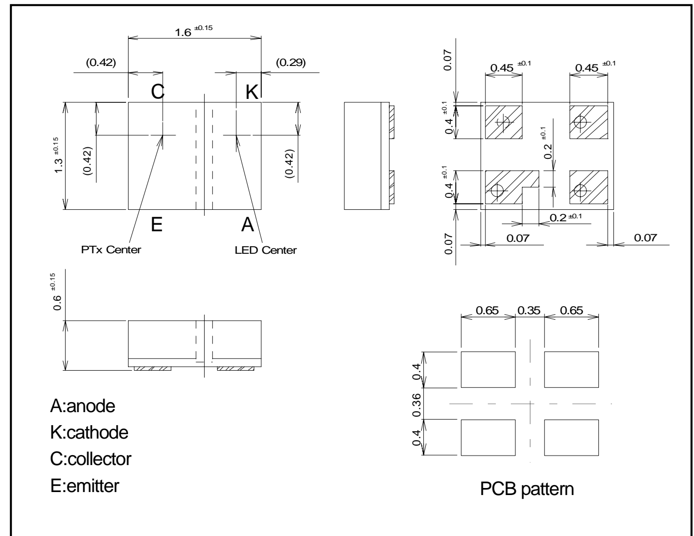
- Miniature, thin package : 1.3mm × 1.6mm × 0.6mm
- High output : 400μA typ.
- Pb free solder re-flowing permitted : 260°C, 2times
- Built-in visible light cut-off filter

■ APPLICATIONS

- Detecting the location of Lens unit for Cellular Phone's camera module
- Detecting the location of CD/DVD optical pickup head
- Detecting the rotation of various motors
- Paper edge detection and mechanism timing detection of facsimile, copy machine etc

■ 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

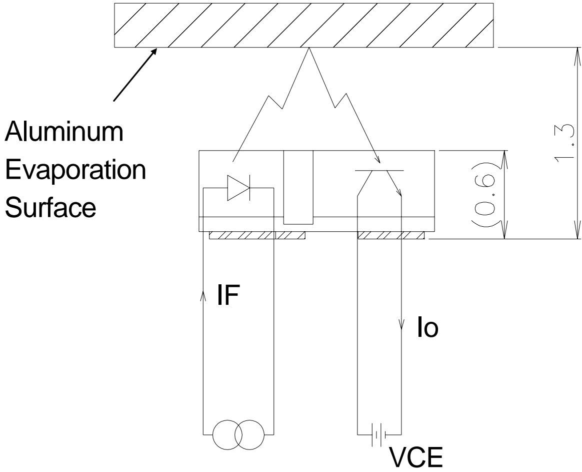
■ ELECTRO-OPTICAL CHARACTERISTICS (Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Emitter						
Forward Voltage	V_F	I_F=4mA	—	—	1.3	V
Reverse Current	I_R	V_R=6V	—	—	10	μA
Capacitance	C_t	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	280	—	700	μA
Operating Dark Current *1	I_{CEOD}	I_F=4mA,V_{CE}=2V	—	—	5	μA
Rise Time	t_r	I_O=100μA,V_{CE}=2V,R_L=1KΩ,d=0.7mm	—	30	—	μs
Fall Time	t_f	I_O=100μA,V_{CE}=2V,R_L=1KΩ,d=0.7mm	—	30	—	μs

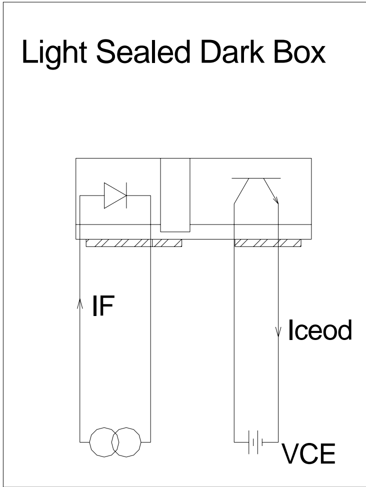
*1 Icoed may increase according to the periphery situation of the surface mounted product.

■ OUTPUT CURRENT TEST CONDITION

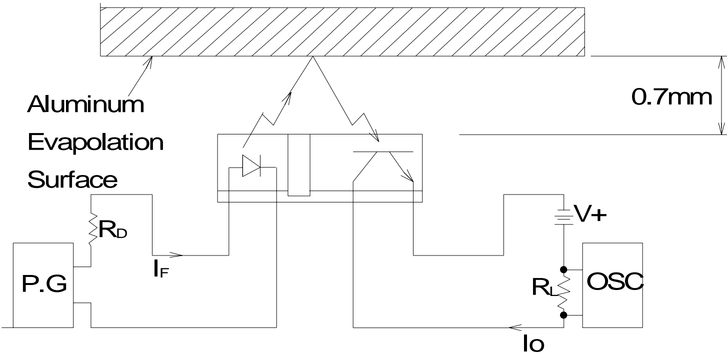
The infrared signal from LED is reflected at the aluminum surface

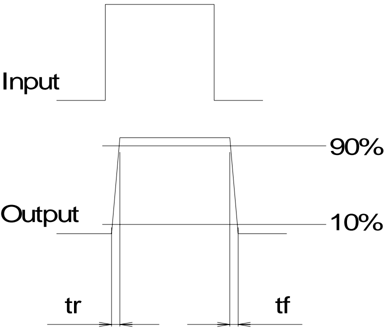


■ DARK CURRENT TEST CONDITION

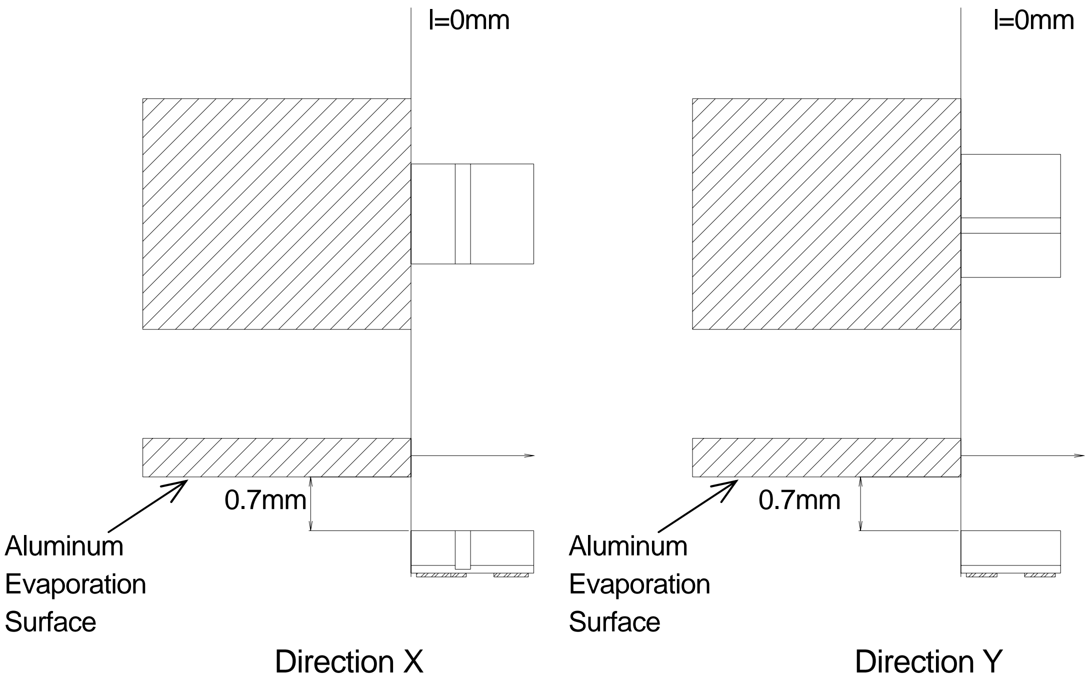


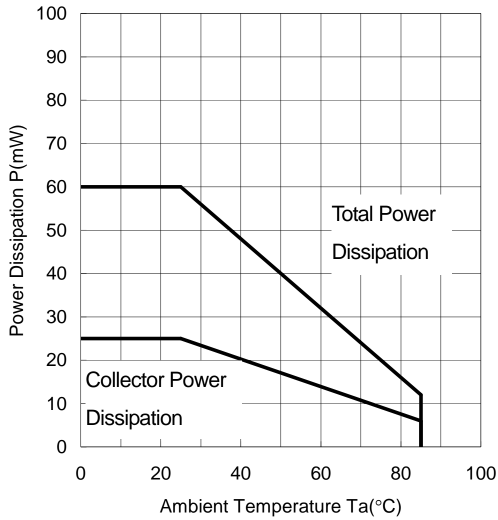
■ RESPONSE TIME TEST CONDITION

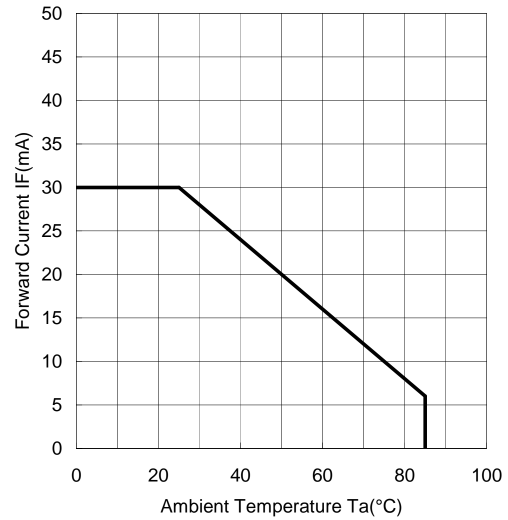




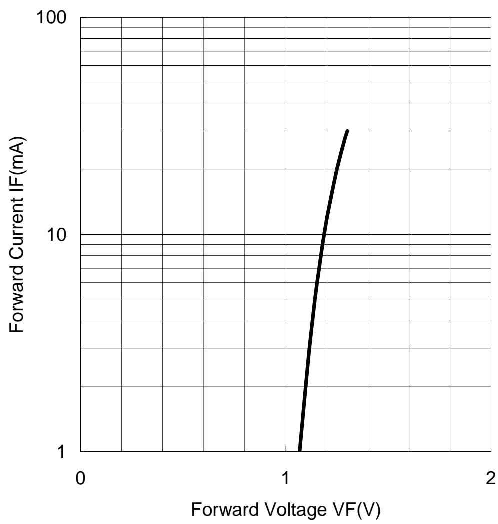
■ EDGE RESPONSE TEST CONDITION

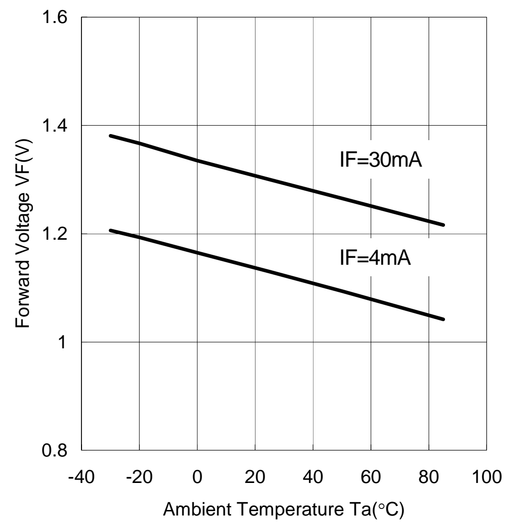


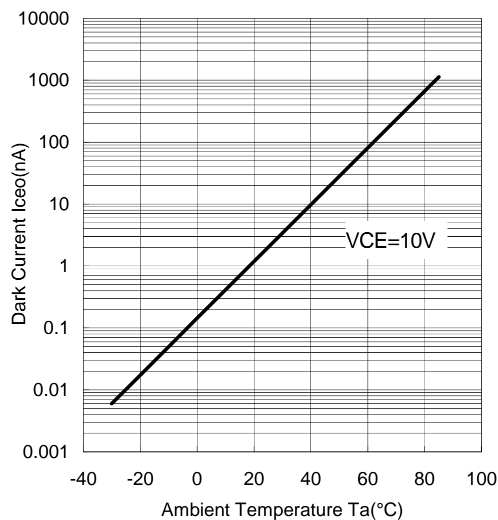


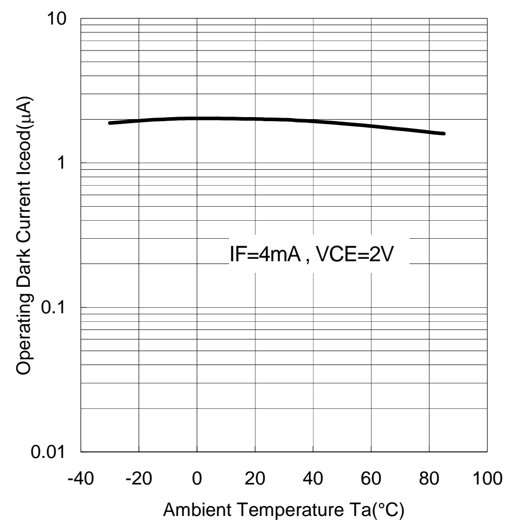


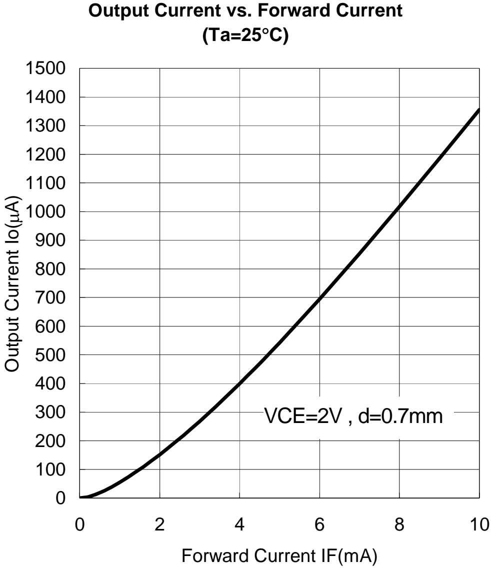
■ TYPICAL CHARACTERISTICS

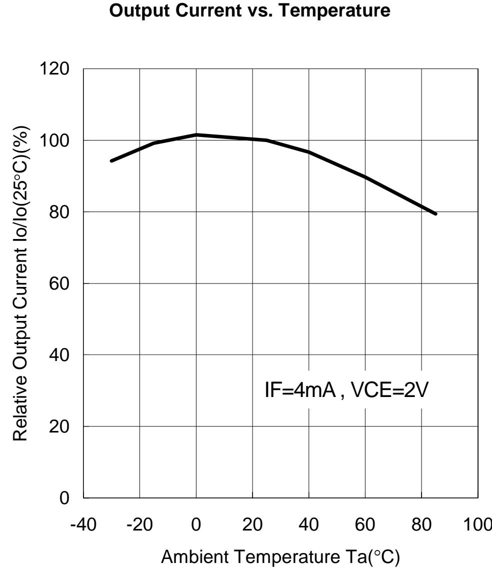


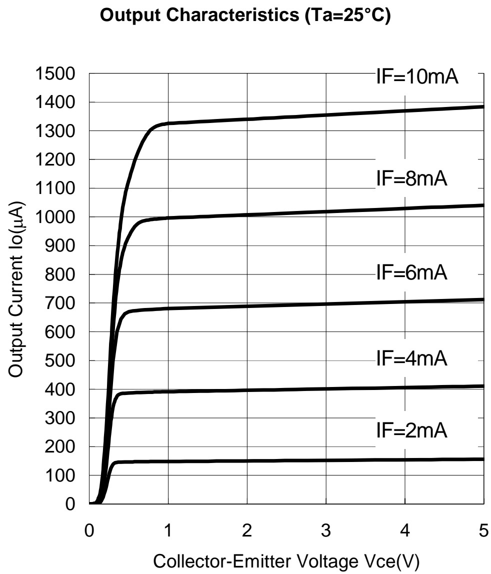


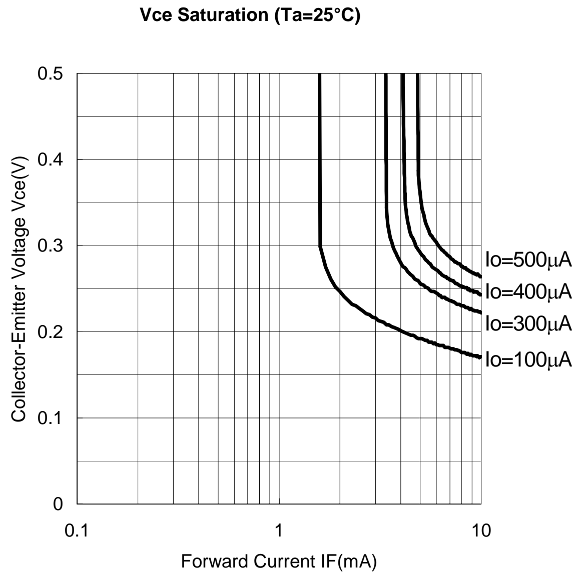


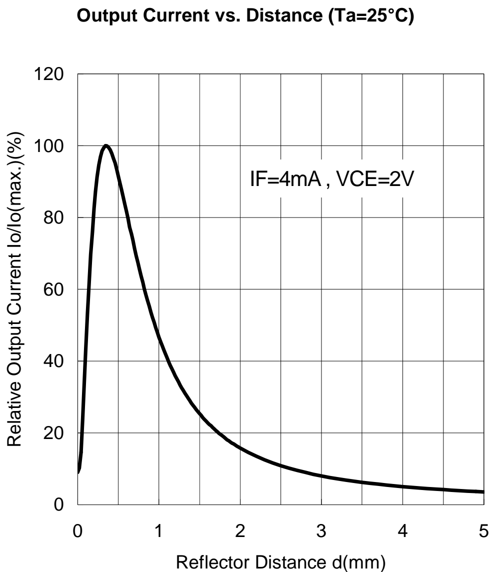


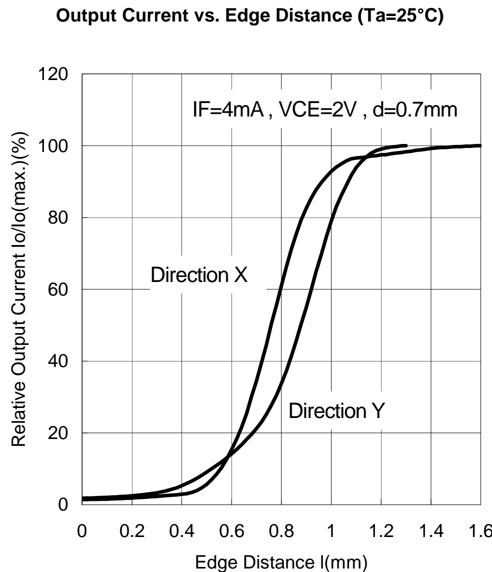

Output Current vs. Forward Current
(Ta=25°C)
Output Current Io(μA)
Forward Current IF(mA)
VCE=2V , d=0.7mm
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
0
2
4
6
8
10

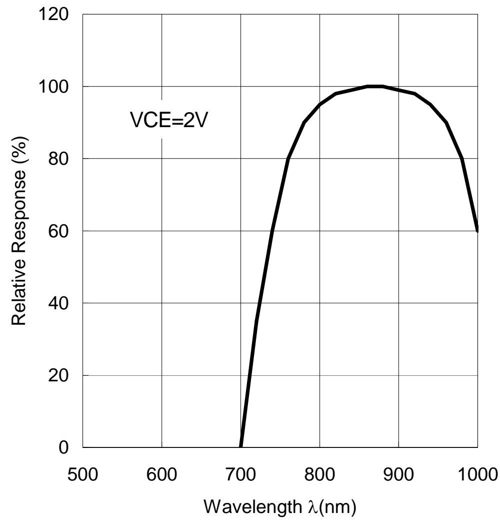

Output Current vs. Temperature
Relative Output Current Io/Io(25°C)(%)
Ambient Temperature Ta(°C)
IF=4mA , VCE=2V
0
20
40
60
80
100
120
-40
-20
0
20
40
60
80
100

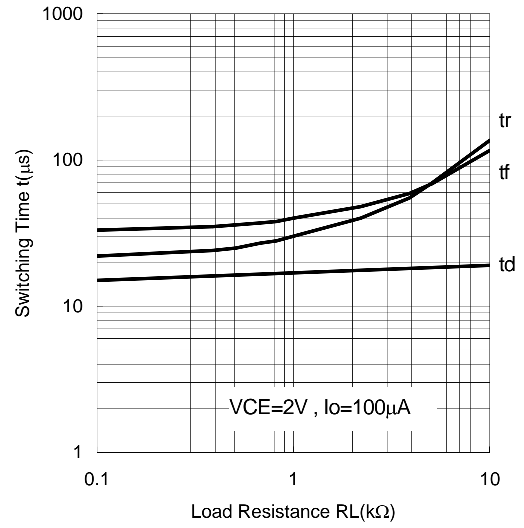

Output Characteristics (Ta=25°C)
Output Current Io(μA)
Collector-Emitter Voltage Vce(V)
IF=10mA
IF=8mA
IF=6mA
IF=4mA
IF=2mA
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
0
1
2
3
4
5


Vce Saturation (Ta=25°C)
Collector-Emitter Voltage Vce(V)
Forward Current IF(mA)
Io=500μA
Io=400μA
Io=300μA
Io=100μA
0
0.1
0.2
0.3
0.4
0.5
0.1
1
10


Output Current vs. Distance (Ta=25°C)
Relative Output Current Io/Io(max.)(%)
Reflector Distance d(mm)
IF=4mA , VCE=2V
0
20
40
60
80
100
120
0
1
2
3
4
5


Output Current vs. Edge Distance (Ta=25°C)
Relative Output Current Io/Io(max.)(%)
Edge Distance l(mm)
IF=4mA , VCE=2V , d=0.7mm
Direction X
Direction Y
0
20
40
60
80
100
120
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6


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


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

PRECAUTION FOR HANDLING

1. Soldering to actual circuit board

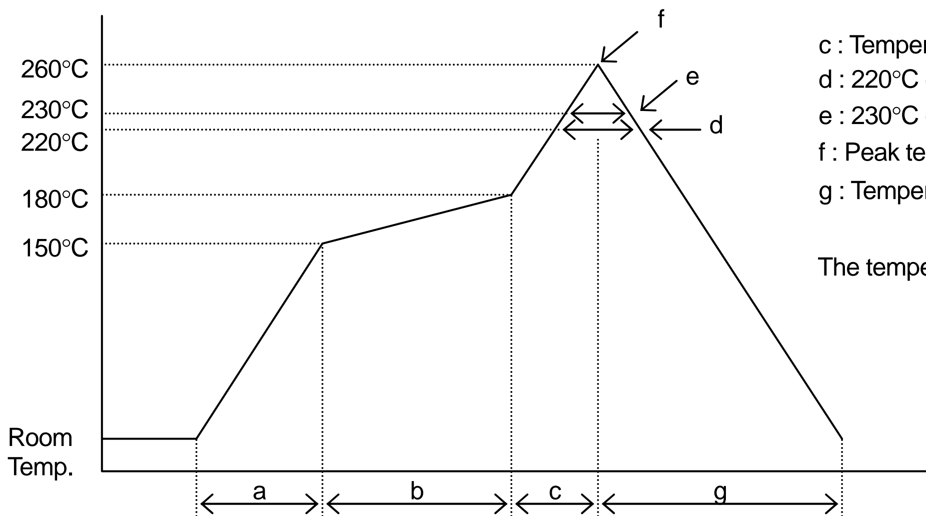
Soldering condition

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.

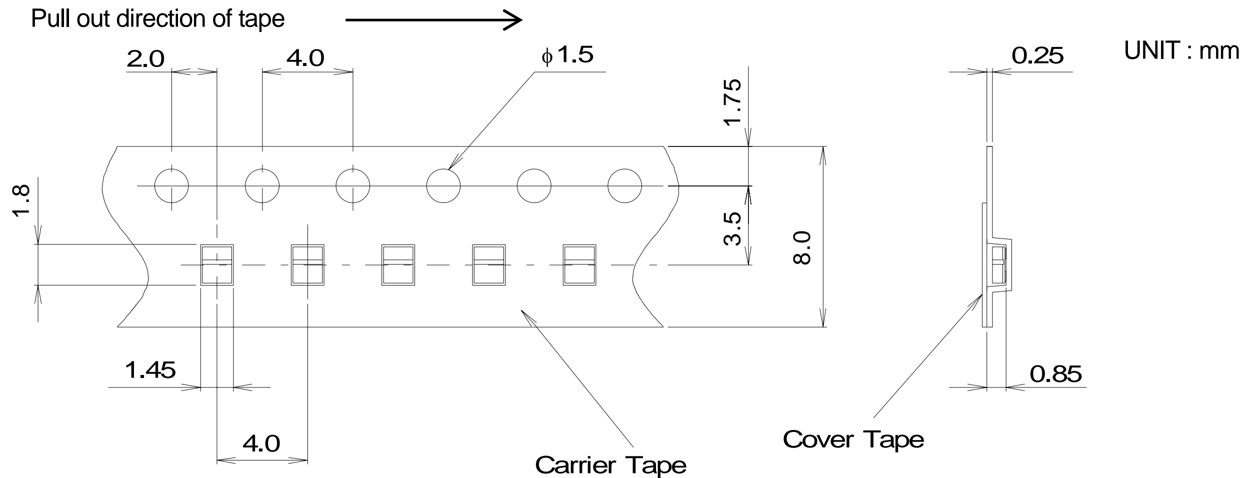
4. Storage

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 deaeration packaging.

NJL5901R-1 Taping Specification **(TE1)**

1. Taping Size

1) Carrier tape is used with Styrene type Carbonated Plastic.
2) Cover tape is used with electro statistically prevention treated Polyester type tape.
3) Product taping direction is to place the index mark against the pull out direction of the tape as in the drawing.

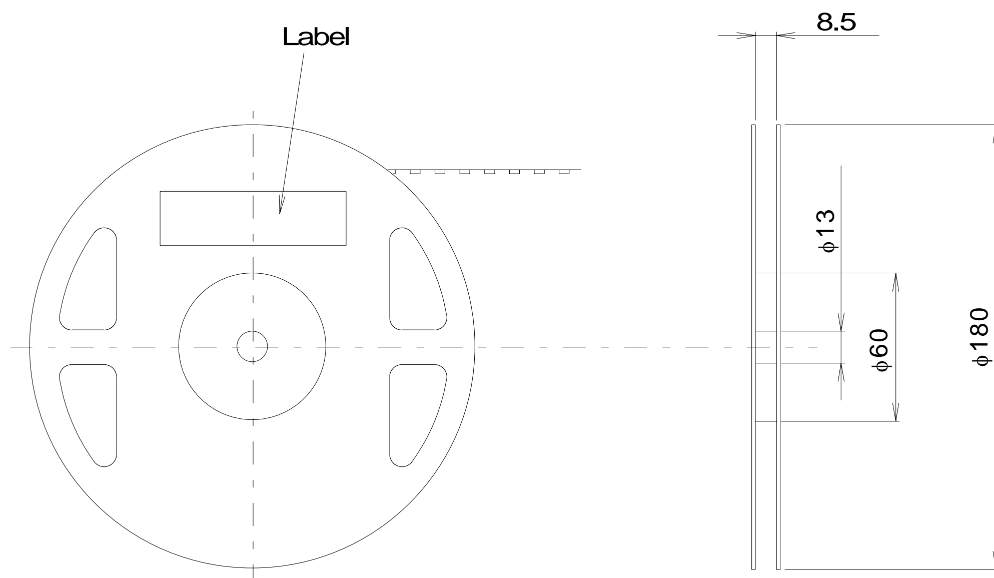


2. Taping Strength

Pull up the cover tape from the carrier tape, and when the opening angle comes around 10 to 15°, and the peeling-off strength is to be within the power of 20 to 70g.

3. Packaging

1) The taped products are to be rolled up on the taping reel as on the drawing.
2) Rolling up specification
   2-1) Start rolling : Carrier tape open space more than 20 Pieces.
   2-2) End of rolling : Carrier tape open space more than 20 Pieces, and 2 round of reel space at the cover tape only.
3) Taping quantity : 2,000 Pieces.
4) Seal off after putting each reels in a damp proof bag with silica gel (3 bags).



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