

## 1.9mm Round Subminiature “Gull Wing”Lead Phototransistor PT91-21C/TR9



### Features

- Fast response time
- High photo sensitivity
- Small junction capacitance
- Compatible with infrared and vapor phase reflow solder process.
- Pb free
- The product itself will remain within RoHS compliant version.
- Compliance with EU REACH.
- Compliance Halogen Free .(Br <900 ppm ,Cl <900 ppm , Br+Cl < 1500 ppm).

### Descriptions

- PT91-21C/TR7(EMM) is a phototransistor in miniature SMD package which is molded in water clear plastic with spherical top view lens. The device is spectrally matched to infrared emitting diode.

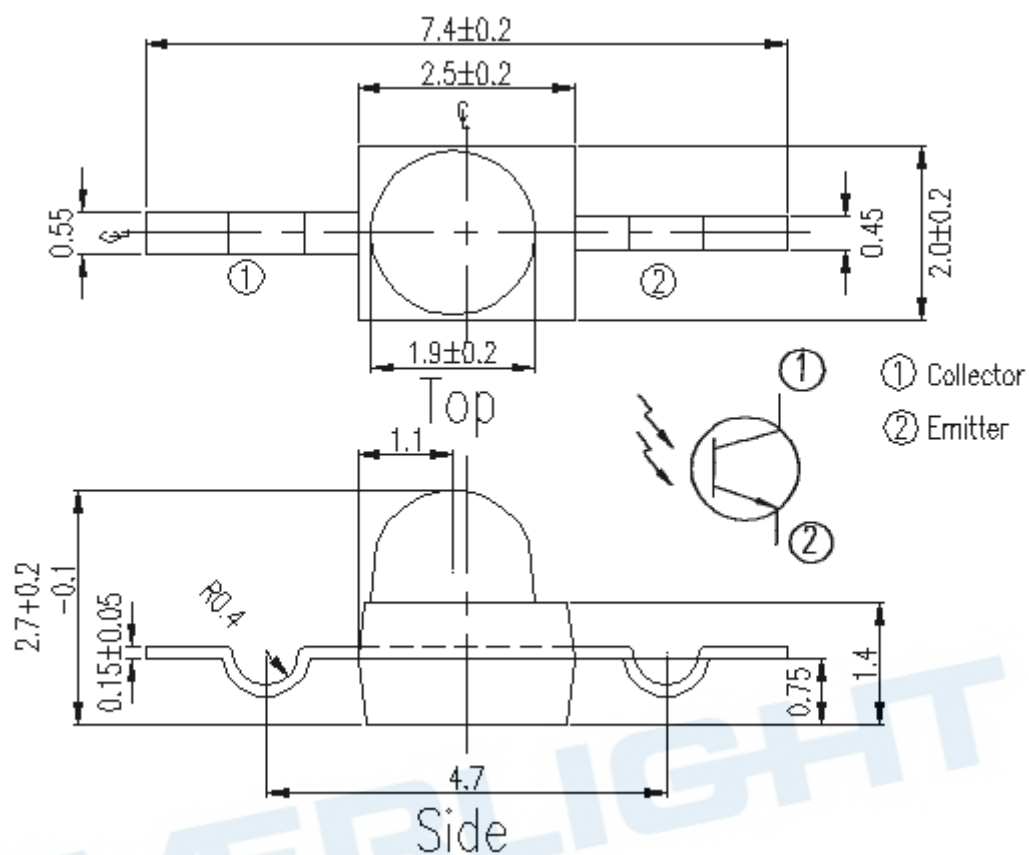
### Applications

- Miniature switch
- Counters and sorter
- Position sensor
- Infrared applied system

### Device Selection Guide

Part Category	Chip Material	Lens Color
PT	Silicon	Water clear

## Package Dimensions



**Notes:** 1.All dimensions are in millimeters  
2.Tolerances unless dimensions  $\pm 0.1\text{mm}$

### Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Rating	Units
Collector-Emitter Voltage	V <sub>CEO</sub>	30	V
Emitter-Collector-Voltage	V <sub>ECO</sub>	5	V
Collector Current	I <sub>C</sub>	20	mA
Operating Temperature	T <sub>opr</sub>	-25 ~ +85	°C
Storage Temperature	T <sub>stg</sub>	-40 ~ +85	°C
Soldering Temperature *1	T <sub>sol</sub>	260	°C
Power Dissipation at(or below) 25°C Free Air Temperature	P <sub>d</sub>	75	mW

Notes: \*1:Soldering time ≤ 5 seconds.

### Electro-Optical Characteristics (Ta=25°C)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Rang Of Spectral Bandwidth	λ <sub>0.5</sub>	---	400	---	1100	nm
Wavelength Of Peak Sensitivity	λ <sub>P</sub>	---	---	940	---	nm
Collector-Emitter Breakdown Voltage	BV <sub>CEO</sub>	I <sub>C</sub> =100μA Ee=0mW/cm <sup>2</sup>	30	---	---	V
Emitter-Collector Breakdown Voltage	BV <sub>ECO</sub>	I <sub>E</sub> =10μA Ee=0mW/cm <sup>2</sup>	5	---	---	V
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> =2 mA Ee=1 mW/cm <sup>2</sup> λ <sub>P</sub> =940nm	---	---	0.4	V
Collector Dark Current	I <sub>CEO</sub>	V <sub>CE</sub> =20V Ee=0mW/cm <sup>2</sup>	---	---	100	nA
On State Collector Current	I <sub>C(ON)</sub>	V <sub>CE</sub> =5 V Ee=1mW/cm <sup>2</sup> λ <sub>P</sub> =940nm	1.0	2.0	---	mA
Rise Time *1	t <sub>r</sub>	V <sub>CE</sub> =5V I <sub>C</sub> =mA RL=1000 Ω	---	15	---	μS
Fall Time *2	t <sub>f</sub>		---	15	---	

Notes: 1.\*1&\*2 For reference only, it is not measured at production line.

2. Tolerance of Luminous Intensity: ±11%

## Typical Electro-Optical Characteristics Curves

Fig.1 Spectral Sensitivity

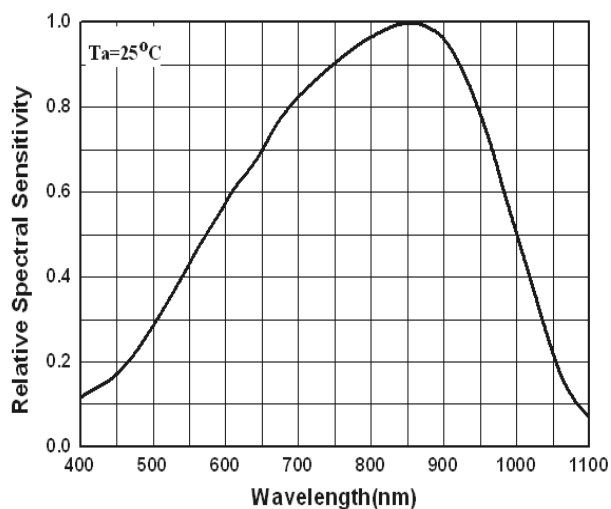


Fig.2 Collector Current vs Irradiance

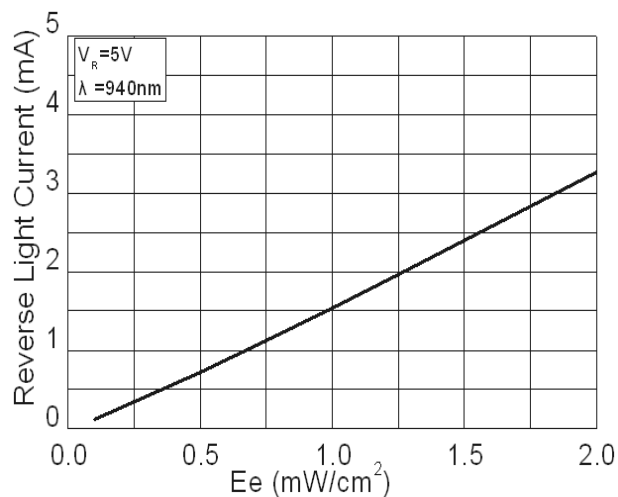


Fig.3 Collector Current vs Collector-Emitter Voltage

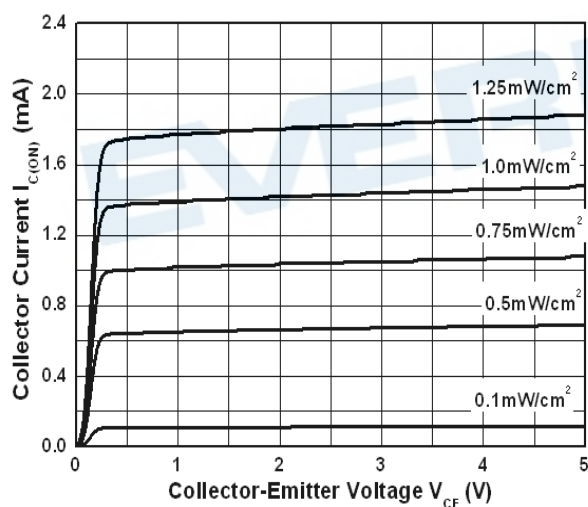


Fig.4 Collector Dark Current vs. Ambient Temperature

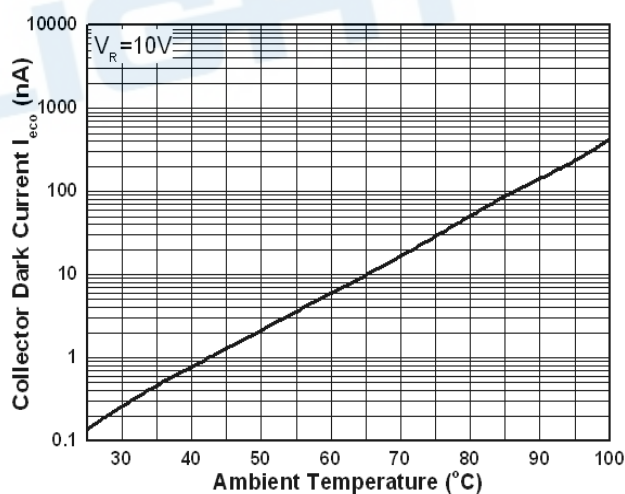
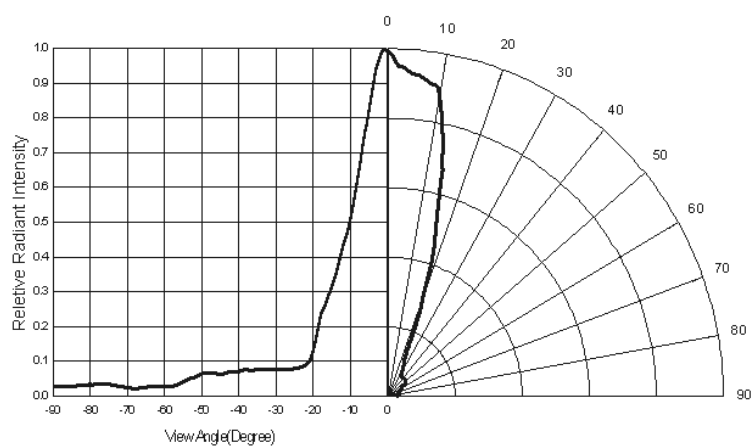


Fig.5 Relative Light Current vs. Angular Displacement



## Precautions For Use

### 1. Over-current-proof

Customer must apply resistors for protection , otherwise slight voltage shift will cause big current change ( Burn out will happen ).

### 2. Storage

2.1 Do not open moisture proof bag before the products are ready to use.

2.2 Before opening the package, the Phototransistor should be kept at 30°C or less and 90%RH or less.

2.3 The Phototransistor should be used within a year.

2.4 After opening the package, the Phototransistor should be kept at 30°C or less and 70%RH or less.

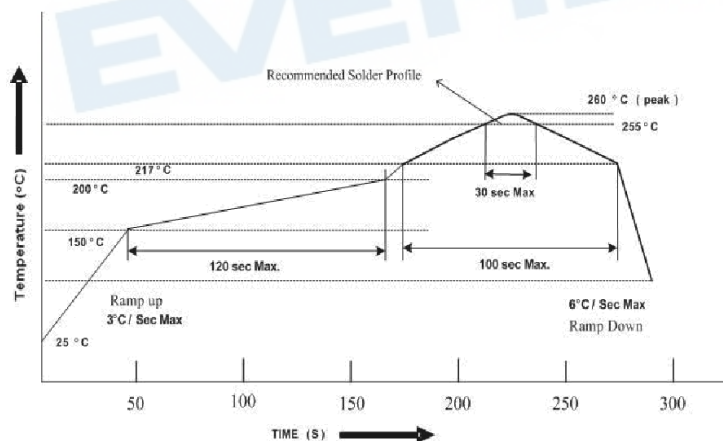
2.5 The Phototransistor should be used within 168 hours (7 days) after opening the package.

2.6 If the moisture absorbent material (silica gel) has faded away or the Phototransistor have exceeded the storage time, baking treatment should be performed using the following conditions.

Baking treatment : 60±5°C for 24 hours.

### 3. Soldering Condition

#### 3.1 Pb-free solder temperature profile



3.2 Reflow soldering should not be done more than two times.

3.3 When soldering, do not put stress on the Phototransistor during heating.

3.4 After soldering, do not warp the circuit board.

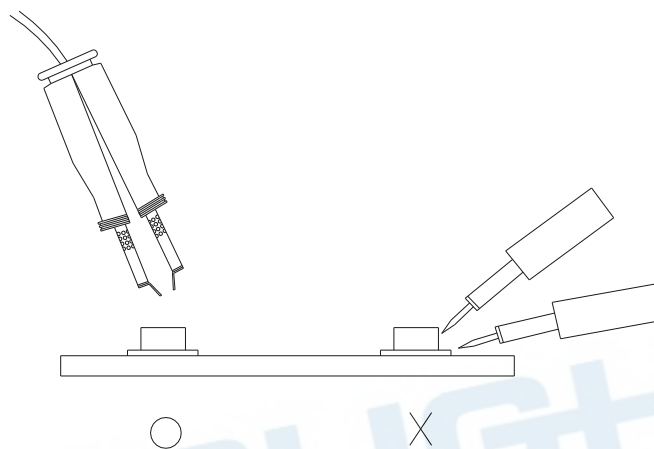
### 4. Soldering Iron

Each terminal is to go to the tip of soldering iron temperature less than 350°C for 3

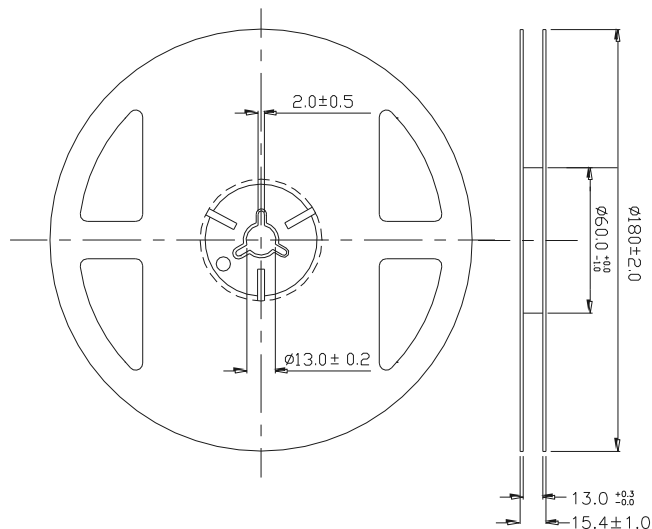
seconds within once in less than the soldering iron capacity 25W. Leave two seconds and more intervals, and do soldering of each terminal. Be careful because the damage of the product is often started at the time of the hand solder.

#### 5.Repairing

Repair should not be done after the Phototransistor have been soldered. When repairing is unavoidable, a double-head soldering iron should be used (as below figure). It should be confirmed beforehand whether the characteristics of the Phototransistor will or will not be damaged by repairing.

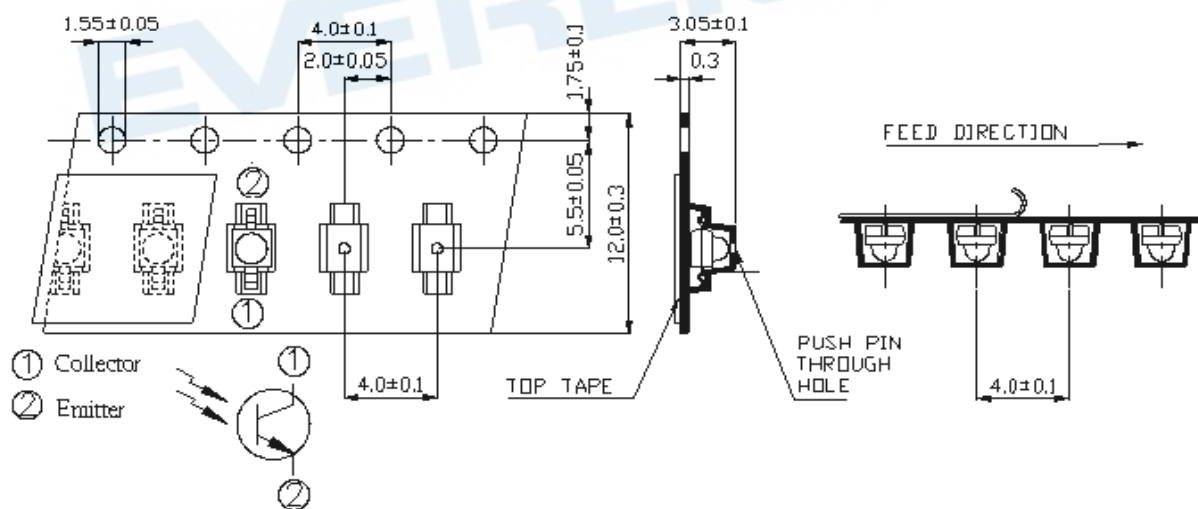


## Package Dimensions



Note: The tolerances unless mentioned are  $\pm 0.1$ , unit=mm.

## Carrier Taping Dimensions: (Quantity: 1000PCS/Reel)



Note: The tolerances unless mentioned are  $\pm 0.1$ , unit=mm



## Label Form Specification



CPN: Customer's Production Number

P/N : Production Number

QTY: Packing Quantity

CAT: Ranks

Peak Wavelength

REF: Reference

LOT No: Lot Number

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