Technical Data Sheet
1206 Package Phototransistor

Features
- Fast response time
- High photo sensitivity
- Small junction capacitance

Descriptions
- PT15-21C/TR8 is a phototransistor in miniature SMD package which is molded in a water clear with flat top view lens. The device is Spectrally matched to visible and infrared emitting diode.

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

Device Selection Guide

<table>
<thead>
<tr>
<th>LED Part No.</th>
<th>Chip Material</th>
<th>Lens Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT</td>
<td>Silicon</td>
<td>Water clear</td>
</tr>
</tbody>
</table>
Package Dimensions

![Package Diagram]

**Notes:**
1. All dimensions are in millimeters.
2. Tolerances unless dimensions ±0.1mm.

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Rating</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collector-Emitter Voltage</td>
<td>V_{CEO}</td>
<td>30 V</td>
<td></td>
</tr>
<tr>
<td>Emitter-Collector-Voltage</td>
<td>V_{ECO}</td>
<td>5 V</td>
<td></td>
</tr>
<tr>
<td>Collector Current</td>
<td>I_{C}</td>
<td>20 mA</td>
<td></td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>T_{opr}</td>
<td>-25 ~ 85°C</td>
<td></td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>T_{stg}</td>
<td>-40 ~ 85°C</td>
<td></td>
</tr>
<tr>
<td>Soldering Temperature</td>
<td>T_{sol}</td>
<td>260°C</td>
<td></td>
</tr>
<tr>
<td>Power Dissipation at(or below) 25°C Free Air Temperature</td>
<td>P_{c}</td>
<td>75 mW</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
*1:Soldering time 5 seconds.
### Electro-Optical Characteristics (Ta=25 ℃)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rang Of Spectral Bandwidth</td>
<td>$\lambda$</td>
<td>---</td>
</tr>
<tr>
<td>Wavelength Of Peak Sensitivity</td>
<td>$\lambda_p$</td>
<td>---</td>
</tr>
</tbody>
</table>
| Collector-Emitter Breakdown Voltage    | $BV_{CEO}$ | $I_C=100 \mu A$  
 Ee=0mW/cm$^2$ | 30   | ---     | --- | V |
| Emitter-Collector Breakdown Voltage    | $BV_{ECO}$ | $I_E=100 \mu A$  
 Ee=0mW/cm$^2$ | 5    | ---     | --- | V |
| Collector-Emitter Saturation Voltage   | $V_{CE(sat)}$ | $I_C=2mA$  
 Ee=1mW/cm$^2$ | ---  | ---     | 0.4  | V |
| Collector Dark Current                 | $I_{CEO}$ | $V_{CE}=20V$  
 Ee=0mW/cm$^2$ | ---  | ---     | 100  | nA|
| On State Collector Current             | $I_{C(ON)}$ | $V_{CE}=5V$  
 Ee=1mW/cm$^2$ | 0.1  | 0.3     | ---  | mA|
| Rise Time                              | $t_r$ | $V_{CE}=5V$  
 $I_C=1mA$  
 $R_L=1000 \Omega$ | ---  | 15     | ---  | S |
| Fall Time                              | $t_f$ | $V_{CE}=5V$  
 $I_C=1mA$  
 $R_L=1000 \Omega$ | ---  | 15     | ---  | S |
Typical Electro-Optical Characteristics Curves

Fig. 1 Collector Power Dissipation vs. Ambient Temperature

Fig. 2 Spectral Sensitivity

Fig. 3 Relative Collector Current vs. Ambient Temperature

Fig. 4 Collector Current vs. Irradiance
Typical Electro-Optical Characteristics Curves

Fig. 5 Collector Dark Current vs. Ambient Temperature

Fig. 6 Collector Current vs. Collector-Emitter Voltage

![Graphs showing electro-optical characteristics](image-url)
PT15-21C/TR8

Package Dimensions

Loaded Quantity Per Reel 2000PCS/Reel

Unit: mm
Soldering heat reliability (DIP)

Please refer to the following figure

Soldering heat Max. 260 °C

245±5°C within 5 sec.

120~150 °C Preheat

120~180 sec.

Soldering Iron

Basic spec is \( \leq 5 \text{ sec when } 260 \degree \). If temperature is higher, time should be shorter \((+10 \degree \rightarrow -1 \text{sec})\). Power dissipation of Iron should be smaller than 15W, and temperature should be controllable. Surface temperature of the device should be under 230 \degree.

Rework

1. Customer must finish rework within 5 sec under 245 \degree
2. The head of iron can not touch copper foil.
3. Twin-head type is preferred.
PT15-21C/TR8

Reflow Temp./Time

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 The operation of temperature and R.H are: 5°C ~ 35°C, R.H.60%.
   2.2 Once the package is opened, the products should be used within a week.
       Otherwise, they should be keep in a damp proof box with desiccation anent.
       Considering the tape life, we suggest our customers to use products within a year (from production date).
   2-3. If opened more than one week in an atmosphere 5°C ~35°C, R.H.60%, they should be treated at 60°C ± 5°C for 15hrs.
   2-4. When you discover that the desiccant in the package has a pink color (normal=blue), you should treat them in the same conditions as 2.3
## Reliability Test Item And Condition

The reliability of products shall be satisfied with items listed below.

**Confidence level**: 90%

**LTPD**: 10%

<table>
<thead>
<tr>
<th>NO.</th>
<th>Item</th>
<th>Test Conditions</th>
<th>Test Hours/ Cycles</th>
<th>Sample Sizes</th>
<th>Failure Judgement Criteria</th>
<th>Ac/Re</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>REFLOW</td>
<td>TEMP. : 240 ± 5 ± 5secs</td>
<td>6Mins</td>
<td>22pcs</td>
<td></td>
<td>0/1</td>
</tr>
<tr>
<td>2</td>
<td>Temperature Cycle</td>
<td>H : +85 ☃</td>
<td>30mins</td>
<td>22pcs</td>
<td>I_{(ON)} ≤ L × 0.8</td>
<td>0/1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>L : -55 ☃</td>
<td>5mins</td>
<td></td>
<td>L : Lower</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Thermal Shock</td>
<td>H :+100 ☃</td>
<td>5mins</td>
<td>22pcs</td>
<td></td>
<td>0/1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>L : -10 ☃</td>
<td>10secs</td>
<td></td>
<td>Specification Limit</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>High Temperature Storage</td>
<td>TEMP. : +100 ☃</td>
<td>1000hrs</td>
<td>22pcs</td>
<td></td>
<td>0/1</td>
</tr>
<tr>
<td>5</td>
<td>Low Temperature Storage</td>
<td>TEMP. : -55 ☃</td>
<td>1000hrs</td>
<td>22pcs</td>
<td></td>
<td>0/1</td>
</tr>
<tr>
<td>6</td>
<td>DC Operating Life</td>
<td>V_{CE}=5V</td>
<td>1000hrs</td>
<td>22pcs</td>
<td></td>
<td>0/1</td>
</tr>
<tr>
<td>7</td>
<td>High Temperature/ High Humidity</td>
<td>85 ☃ / 85% R.H</td>
<td>1000hrs</td>
<td>22pcs</td>
<td></td>
<td>0/1</td>
</tr>
</tbody>
</table>
Packing Quantity Specification
1. 2000Pcs/1Volume , 1Volume/1Bag
2. 10Boxes/1Carton

Label Form Specification

| CPN: Customer’s Production Number |
| P/N : Production Number |
| QTY: Packing Quantity |
| CAT: Ranks |
| HUE: Peak Wavelength |
| REF: Reference |
| LOT No: Lot Number |
| MADE IN TAIWAN: Production Place |

Notes
1. Above specification may be changed without notice. EVERLIGHT will reserve authority on material change for above specification.
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