

## ● Description

The BPT-HP035A-TRB is a silicon NPN phototransistor detector in a 0805 SMD type package.

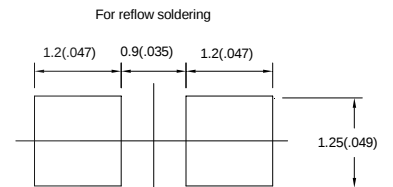
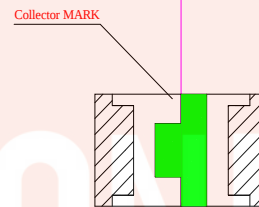
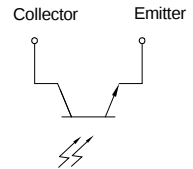
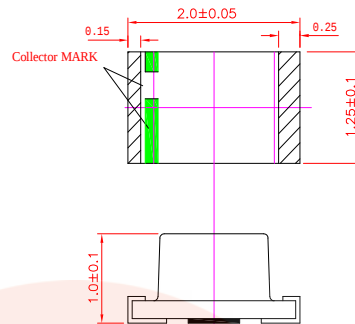
## ● Features:

1. Wide range of collector current.
2. Lend for high sensitivity.
3. Low cost plastic package.
4. Lens Appearance: Water Clear.

## ● Applications:

1. Smoke Detector
2. Automatic Control System
3. Any design requiring sensitivity and stable characteristics.

## ● Package Dimensions:



### NOTES:

1. All dimensions are in millimeters.
2. Tolerance is  $\pm 0.10\text{mm}$  unless otherwise specified.
3. Specifications are subject to change without notice.

## ● Absolute Maximum Ratings( $T_a=25^\circ\text{C}$ )

| Parameter                            | Symbol     | Rating                                    | Unit |
|--------------------------------------|------------|-------------------------------------------|------|
| Power Dissipation                    | $P_d$      | 100                                       | mW   |
| Collector -Emitter Breakdown Voltage | $BV_{CEO}$ | 50                                        | V    |
| Emitter-Collector Breakdown Voltage  | $BV_{ECO}$ | 5                                         | V    |
| Operating Temperature                | $T_{opr}$  | $-40^\circ\text{C} \sim 85^\circ\text{C}$ | -    |
| Storage Temperature                  | $T_{stg}$  | $-40^\circ\text{C} \sim 85^\circ\text{C}$ | -    |
| Soldering Temperature                | $T_{sol}$  | See Page6                                 | -    |

● Electrical and optical characteristics(Ta=25°C)

| Parameter                      | Symbol          | Condition                                           | Min.  | Typ.  | Max. | Unit |
|--------------------------------|-----------------|-----------------------------------------------------|-------|-------|------|------|
| Spectrum Sensitivity           | $\lambda$       | IF=50mA                                             | 500   | -     | 1000 | nm   |
| Wavelength of peak sensitivity | $\lambda_p$     | IF=50mA                                             | -     | 940   | -    | nm   |
| Collector Light Current        | $I_{C(ON)}$     | $V_{CE}=5V$ , $\lambda_p=940nm$ ,<br>$H=1.0mW/cm^2$ | 0.557 | 1.5   | -    | mA   |
| Collector Dark Current         | $I_{CEO}$       | $V_{CE}=20V$                                        | -     | -     | 100  | nA   |
| Rise/Fall Time                 | $T_r/T_f$       | $V_{CE}=5V$ , $I_c=1mA$ , $R_L=1K\Omega$            | -     | 15/15 | -    | us   |
| Viewing Angle                  | $2\theta_{1/2}$ | -                                                   | -     | 120   | -    | deg  |

● Typical Electro-Optical Characteristics Curves

Fig.1 Collector current vs Collector emitter voltage

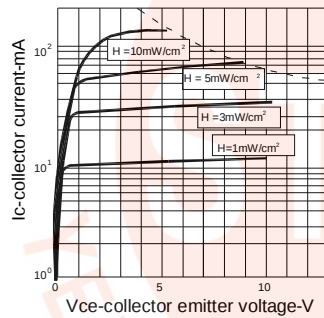


Fig.2 Ambient temperature vs. Collector Dissipantc

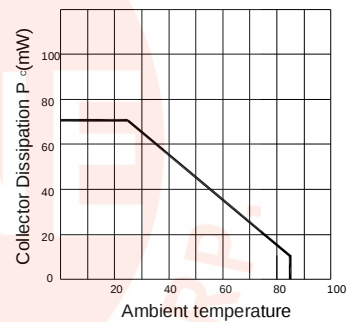


Fig.3 Dark current vs Free-air temperature

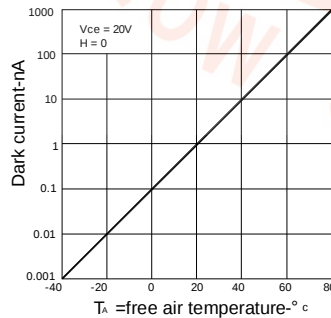


Fig.4 Collector current vs Irradilance

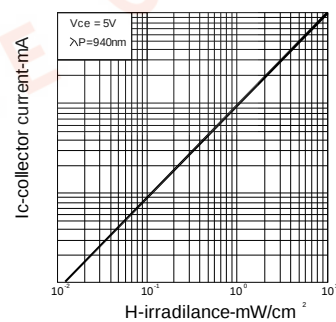
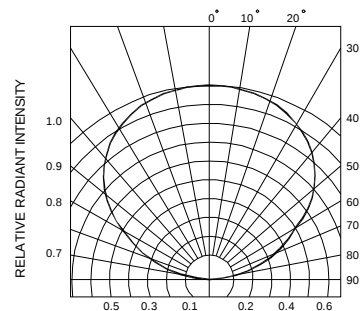
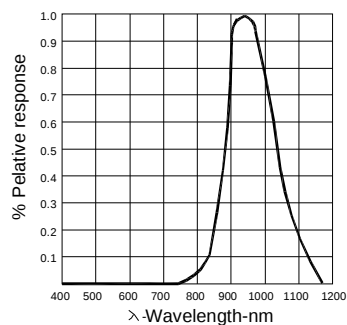
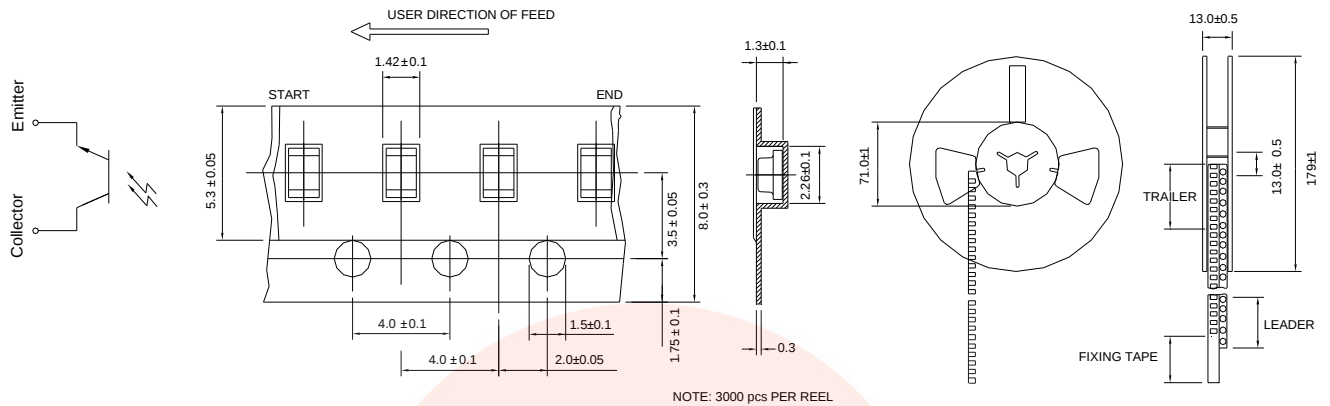


Fig.5 Relative spectral response

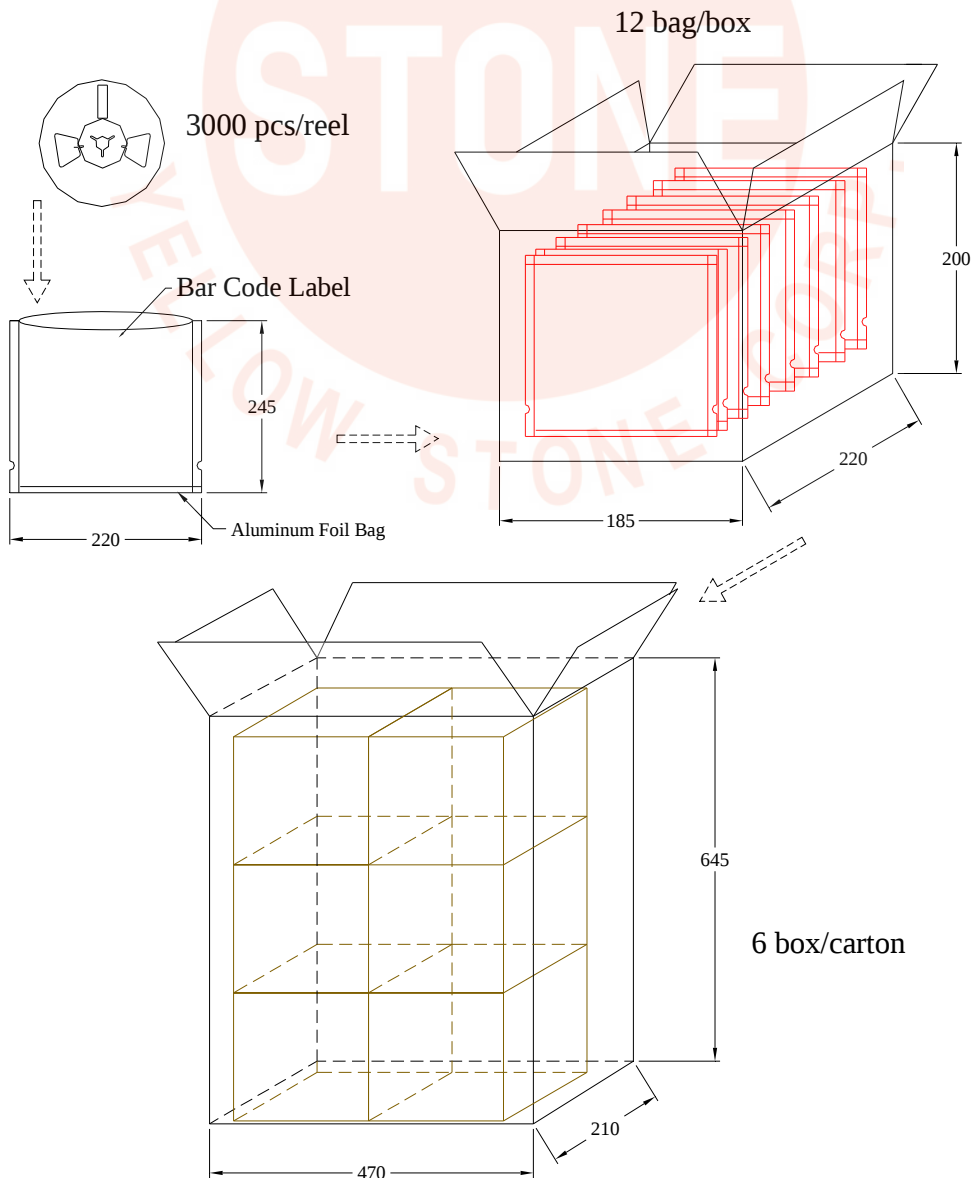


**Tapping and packaging specifications(Units: mm)**

**Quantity:3000PCS**



**●Package Method:(unit:mm) Vacuum**





● Bin Limits:

Collector Light Current Bin Limits( $V_{CE}=5V$ ,  $H=1.0\text{mw}/\text{cm}^2$ ,  $\lambda_p=940\text{nm}$ )

| BIN CODE | $I_{C(ON)}$ (mA) |       |
|----------|------------------|-------|
|          | Min              | Max   |
| H        | 0.557            | 0.803 |
| J        | 0.803            | 1.156 |
| K        | 1.156            | 1.665 |
| L        | 1.665            | 2.398 |

Tolerance for each Bin limit is  $\pm 15\%$ .

● BIN :   X  



Collector Light Current Bin Code



● Reliability Test

| Classification     | Test Item                              | Reference Standard                                                             | Test Conditions                                                               | Result |
|--------------------|----------------------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------|
| Endurance Test     | Operation Life                         | MIL-STD-750D:1026<br>MIL-STD-883D:1005<br>JIS-C-7021 :B-1                      | Ta: Under room temperature<br>Test time:1,000hrs<br>IF=Product Recommended IF | 0/32   |
|                    | High Temperature High Humidity Storage | MIL-STD-202F:103B<br>JIS-C-7021 :B-11                                          | Ta:85±5℃<br>RH:90%-95%<br>Test time:240hrs                                    | 0/32   |
|                    | High Temperature Storage               | MIL-STD-883:1008<br>JIS-C-7021 :B-10                                           | Ta:100±5℃<br>Test time:1,000hrs                                               | 0/32   |
|                    | Low Temperature Storage                | JIS-C-7021 :B-11                                                               | Ta: -45±5℃<br>Test time=1,000hrs                                              | 0/32   |
| Environmental Test | Temperature Cycling                    | MIL-STD-202F:107D<br>MIL-STD-750D:1051<br>MIL-STD-883D:1010<br>JIS-C-7021 :A-2 | Ta:-35±5℃~25±5℃~85±5℃~25±5℃<br>30min 5min 30min 5min<br>Time: 5cycles         | 0/32   |
|                    | Thermal Shock                          | MIL-STD-202F:107D(1980)<br>MIL-STD-750D:1051(1995)<br>MIL-STD-883D:1011(1991)  | Ta:-45±5℃ ~+85±5℃<br>20min 20 min<br>Time: 10cycles                           | 0/32   |
|                    | Wetting balance                        | MIL-STD-883:2003<br>MIL-STD-202F:208D<br>MIL-STD-883D:2003                     | Ta:230±5℃<br>Time:5±0.5s                                                      | 0/32   |
|                    | Solder Resistance                      | MIL-STD-202F:210A<br>MIL-STD-883D:1011<br>JIS-C-7021 :A-1                      | Ta:260±10℃<br>Time:10±1s                                                      | 0/32   |

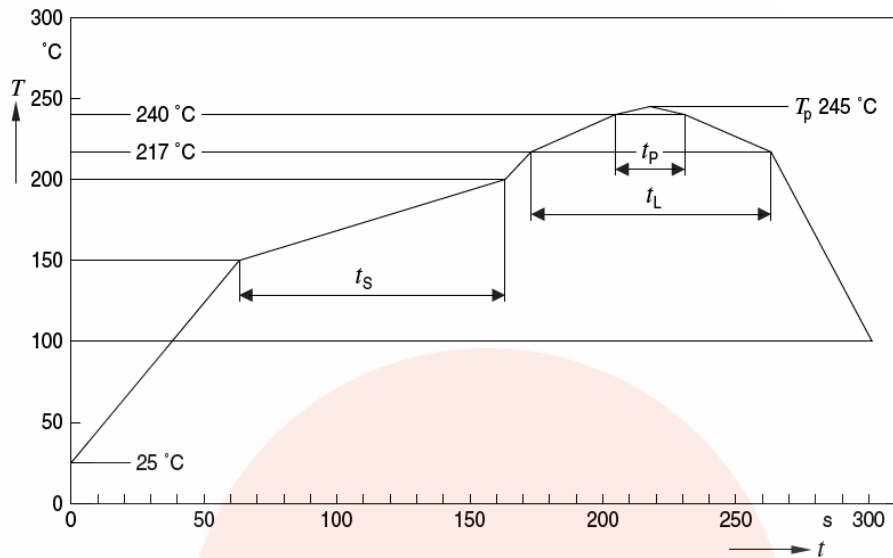
● Judgment criteria of failure for the reliability

| Measuring items    | Symbol                 | Measuring conditions | Judgment criteria for failure |
|--------------------|------------------------|----------------------|-------------------------------|
| Forward voltage    | V <sub>F</sub> ( V )   | I <sub>F</sub> =50mA | Initial Level*1.1             |
| Reverse current    | I <sub>R</sub> (uA)    | V <sub>R</sub> =5V   | Over U*2                      |
| Luminous intensity | I <sub>v</sub> ( mcd ) | I <sub>F</sub> =50mA | Initial Level*0.7             |

Note: 1.U means the upper limit of specified characteristics.

2.Measurment shall be taken between 2 hours and after the test pieces have been returned to normal ambient conditions after completion of each test.

## ● IR-Reflow Soldering



| Profile Feature                                                   | Symbol | Pb-Free (SnAgCu) Assembly |                |         | Unit |
|-------------------------------------------------------------------|--------|---------------------------|----------------|---------|------|
|                                                                   |        | Minimum                   | Recommendation | Maximum |      |
| Ramp-up rate to preheat <sup>1)</sup><br>25 °C to 150 °C          |        |                           | 2              | 3       | K/s  |
| Time $t_s$<br>$T_{smin}$ to $T_{smax}$                            | $t_s$  | 60                        | 100            | 120     | s    |
| Ramp-up rate to peak <sup>2)</sup><br>$T_{smax}$ to $T_p$         |        |                           | 2              | 3       | K/s  |
| Liquidus temperature                                              | $T_L$  |                           | 217            |         | °C   |
| Time above liquidus temperature                                   | $t_L$  |                           | 80             | 100     | s    |
| Peak temperature                                                  | $T_p$  |                           | 245            | 260     | °C   |
| Time within 5 °C of the specified peak<br>temperature $T_p - 5$ K | $t_p$  | 10                        | 20             | 30      | s    |
| Ramp-down rate*<br>$T_p$ to 100 °C                                |        |                           | 3              | 6       | K/s  |
| Time<br>25 °C to $T_p$                                            |        |                           |                | 480     | s    |

All temperatures refer to the center of the package, measured on the top of the component

\* slope calculation  $DT/Dt$ ;  $Dt$  max. 5 s; fulfillment for the whole T-range

1. Avoid any external stress applied to the resin while the LEDs are at high temperature, especially during soldering.
2. Avoid rapid cooling or any excess vibration during temperature ramp-down process.
3. Although the soldering condition is recommended above, soldering at the lowest possible temperature is feasible for the LEDs.

## ● IRON Soldering

**350°C Within 3 sec.,One time only.**



### ● Notes for designing:

Care must be taken to provide the current limiting resistor in the circuit so as to drive the LEDs within the rated figures. Also, caution should be taken not to overload LEDs with instantaneous voltage at the turning ON and OFF of the circuit.

When using the pulse drive care must be taken to keep the average current within the rated figures. Also, the circuit should be designed so as to be subjected to reverse voltage when turning off the LEDs.

### ● Storage:

In order to avoid the absorption of moisture, it is recommended to solder LEDs as soon as possible after unpacking the sealed envelope.

If the envelope is still packed, to store it in the environment as following:

- (1) Temperature : 5°C -30°C (41°F) Humidity : RH 60% Max.
- (2) After this bag is opened, devices that will be applied to infrared reflow, vapor-phase reflow, or equivalent soldering process must be:
  - a. Completed within 168 hours.
  - b. Stored at less than 30% RH.
- (3) Devices require baking before mounting, if:
  - (2) a or (2) b is not met.
- (4) If baking is required, devices must be baked under below conditions:  
48 hours at 60°C±3°C.

### ● Package and Label of Products:

- (1) Package: Products are packed in one bag of 3000 pcs (one taping reel) and a label is attached on each bag.
- (2) Label:

