



## Phototransistor

MODEL NO : PT25559B/L2/H3

### ■ Features :

- Wide angle of half sensitivity  $\theta = \pm 65^\circ$
- High sensitivity
- Fast response time

### ■ Description :

EVERLIGHT Dual Photo Transistor(PT2559B/L2/H3) is a high speed and high sensitivity dual photo transistor in a flat side view plastic package.

The epoxy package spectrally matched to IR emitter ( $\lambda_p=940\text{nm}$ )

### ■ Applications :

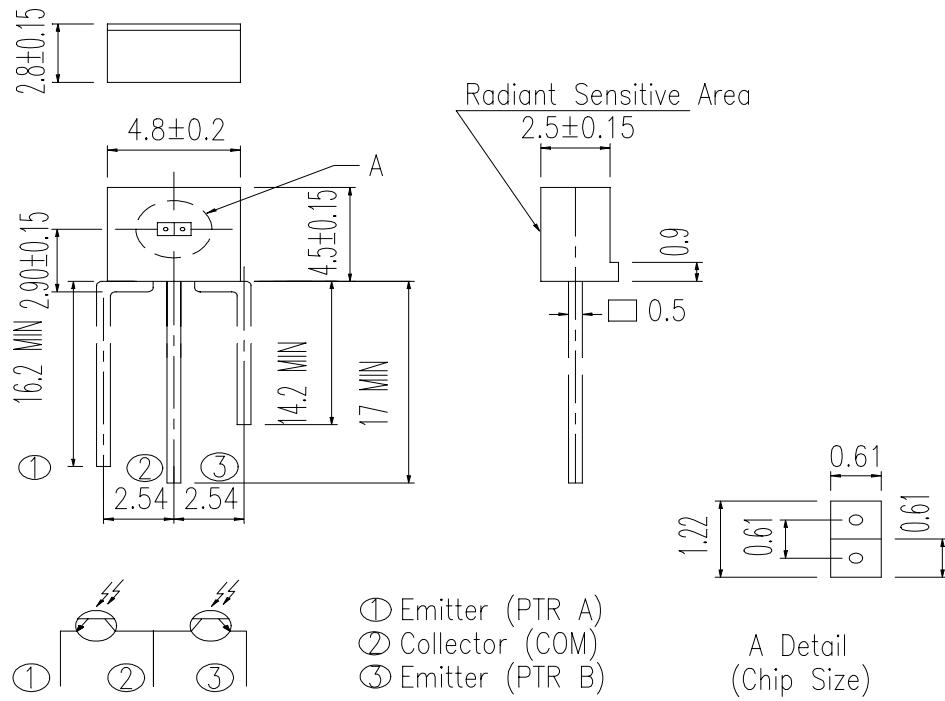
- Mouse
- Optoelectronic Switch
- Photo Interrupter

| PART NO. | CHIP     | LENS<br>COLOR |
|----------|----------|---------------|
|          | MATERIAL |               |
| PT       | Silicon  | Black         |

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### ■ Package Dimension :



### ■ Notes :

1. All dimensions are in millimeter.
2. Tolerance is  $\pm 0.15$  mm unless otherwise note.
3. Lead spacing is measured where the lead emerge from the package.
4. Above specification may be changed without notice. EVERLIGHT will reserve authority on material change for above specification.
5. These specification sheets include materials protected under copyright of EVERLIGHT corporation. Please don't reproduce or cause anyone to reproduce them without EVERLIGHT's consent.
6. When using this product, please observe the absolute maximum ratings and the instructions for use outlined in these specification sheets. EVERLIGHT assumes no responsibility for any damage resulting from use of the product which does not comply with the absolute maximum ratings and the instructions included in these specification sheets.
7. Lens color: Black transparent



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### ■ Absolute Maximum Ratings at $T_A = 25^\circ\text{C}$

| Parameter  | Symbol    | Rating  | Unit             |
|--|-----------|---------|------------------|
| Collector Power Dissipation                                  | $P_D$     | 75      | mW               |
| Collector-Emitter Voltage                                    | $V_{CEO}$ | 30      | V                |
| Emitter-Collector Voltage                                    | $V_{ECO}$ | 5       | V                |
| Collector Current  | $I_C$     | 20      | mA               |
| Operating Temperature  | $T_{opr}$ | -25~+85 | $^\circ\text{C}$ |
| Storage Temperature  | $T_{stg}$ | -40~+85 | $^\circ\text{C}$ |
| Soldering Temperature<br>(1/16 inch from body for 5 seconds) | $T_{sol}$ | 260     | $^\circ\text{C}$ |

### ■ Electronic Optical Characteristics :

| Parameter                   | Symbol                | Min. | Typ. | Max. | Unit          | Condition   |
|-----------------------------|-----------------------|------|------|------|---------------|---|
| Collector dark current      | $I_{ceo}$             | 0.16 | 0.4  |      | nA            | $V_{CE}=20\text{V}$ , $E_e=0\text{mW/cm}^2$               |
| C-E Saturation voltage      | $V_{ce(\text{sat.})}$ |      |      | 0.2  | V             | $I_C=2\text{mA}$ , $IB=100\text{\mu A}$                   |
| C-E Breakdown voltage       | $BV_{ceo}$            | 30   |      |      | V             | $I_C=100\text{\mu A}$ , $IB=0$                            |
| E-C Breakdown voltage       | $BV_{eco}$            | 5    |      |      | V             | $I_e=100\text{\mu A}$ , $IB=0$                            |
| Peak Sensitivity Wavelength | $\lambda_p$           | 800  |      | 1050 | nm            | ---   |
| On stat ecollector current  | $I_c(\text{ON})$      | 129  |      | 944  | $\mu\text{A}$ | $E_e=0.555\text{mW/cm}^2$ , $V_{ce}=5\text{V}$            |
| Rise Time                   | $t_r$                 |      | 15   |      | $\mu\text{s}$ | $V_{ce}=5\text{V}$<br>$I_c=1\text{mA}$<br>$RL=1000\Omega$ |
| Fall Time                   | $t_f$                 |      | 15   |      | $\mu\text{s}$ |   |

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### ■ Typical Electrical/Optical/Characteristics Curves For PT

Fig.1 Collector Power Dissipation vs. Ambient Temperature

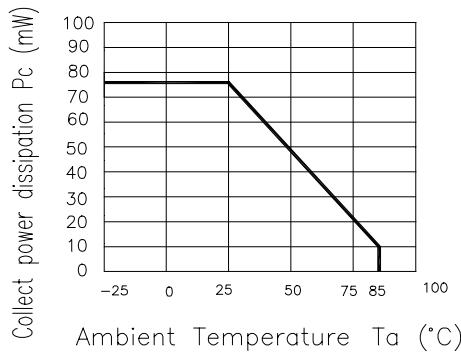


Fig.2 Collector Dark Current vs. Ambient Temperature

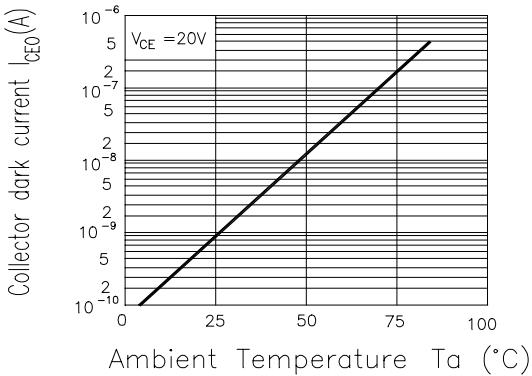


Fig. 3 Relative Collector Current vs. Ambient Temperature

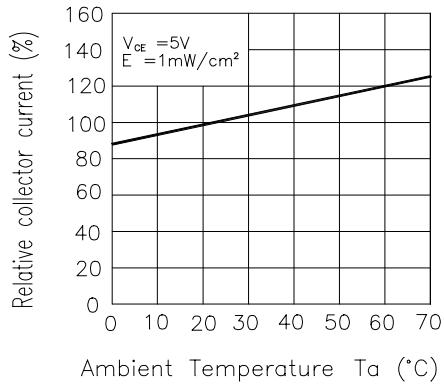


Fig.4 Collector Current vs. Irradiance

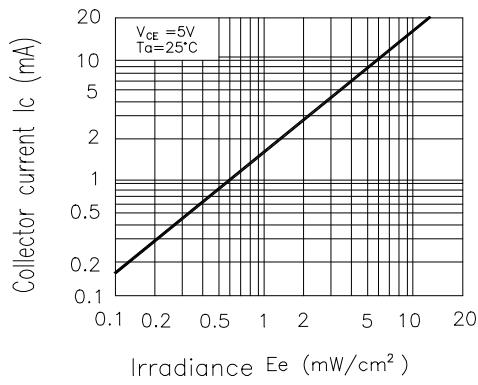


Fig.5 Spectral Sensitivity

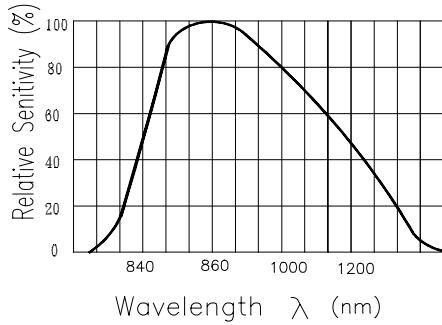
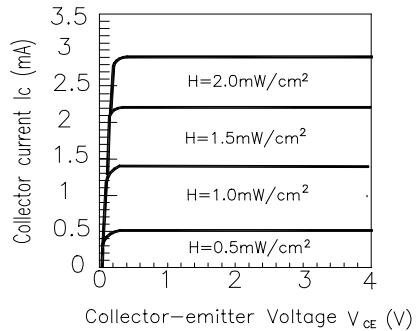


Fig.6 Collector Current vs. Collector-emitter Voltage





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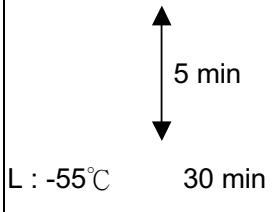
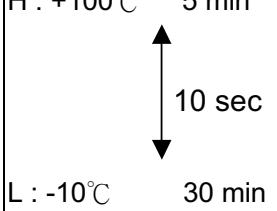
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### ■ Reliability Test Item And Condition

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

Confidence level:90%

LTPD:10%

| NO. | Item                                    | Test Conditions  | Test Hours/Cycle          | Sample Size | Failure Judgement Criteria | Ac/Re  |     |
|-----|---|--|---------------------------|-------------|----------------------------|--|-----|
| 1   | <b>Solder Heat</b>                      | TEMP : $260^{\circ}\text{C} \pm 5^{\circ}\text{C}$   | 5 sec                     | 22 PCs      |                            | 0/1  |     |
| 2   | <b>Temperature Cycle</b>                | H : $+85^{\circ}\text{C}$<br>L : $-55^{\circ}\text{C}$<br>   | 30 min<br>5 min<br>30 min | 50 cycle    | 22 PCs                     | $I_{c(on)} \leq L \times 0.8$<br>L : Lower specification limit | 0/1 |
| 3   | <b>Thermal Shock</b>                    | H : $+100^{\circ}\text{C}$<br>L : $-10^{\circ}\text{C}$<br> | 5 min<br>10 sec<br>30 min | 50 cycle    | 22 PCs                     |  | 0/1 |
| 4   | <b>High Temperature Storage</b>         | TEMP. : $+100^{\circ}\text{C}$   | 1000 hrs                  | 22 PCs      |                            |  | 0/1 |
| 5   | <b>Low Temperature Storage</b>          | TEMP. : $-55^{\circ}\text{C}$  | 1000 hrs                  | 22 PCs      |                            |  | 0/1 |
| 6   | <b>DC Operating Life</b>                | $V_{CE}=5\text{V}$   | 1000 hrs                  | 22 PCs      |                            |  | 0/1 |
| 7   | <b>High Temperature / High Humidity</b> | $85^{\circ}\text{C} / 85\% \text{ R.H.}$   | 1000 hrs                  | 22 PCs      |                            |  | 0/1 |

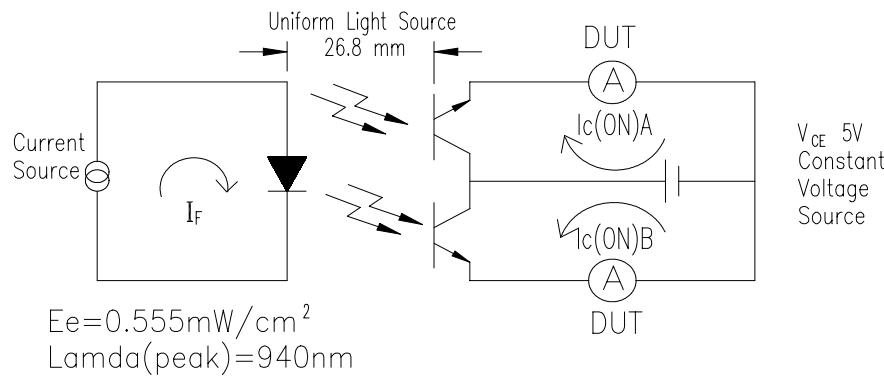
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### ■ Test Method For On State Collector Current :

Condition :  $E_e = 0.555 \text{ mW/cm}^2$ ,  $V_{CE} = 5V$ Test Item : Collector Current [ $I_{C(ON)}$ ]Unit :  $\mu\text{A}$ 

The Light current testing method for PTR:



### ■ To Distinguish Intensity:

Condition:  $V_{CE}: 5V$     $E_e: 0.555 \text{ mW/cm}^2$ 

#### A Ranks

| Color Code                                     | Ranks | Symbol      | Min | Typ | Max | Unit                      | Test Condition                              |
|--|-------|-------------|-----|-----|-----|---------------------------|---|
| Red  | A1    | $I_{C(ON)}$ | 129 | --- | 226 | $\mu\text{A}$             | $E_e = 0.555 \text{ mW/cm}^2$ $V_{CE} = 5V$ |
| Blue   | A2    | $I_{C(ON)}$ | 195 | --- | 306 | $\mu\text{A}$             | $E_e = 0.555 \text{ mW/cm}^2$ $V_{CE} = 5V$ |
| Yellow   | A3    | $I_{C(ON)}$ | 262 | --- | 380 | $\mu\text{A}$             | $E_e = 0.555 \text{ mW/cm}^2$ $V_{CE} = 5V$ |
| Silver   | A4    | $I_{C(ON)}$ | 330 | --- | 461 | $\mu\text{A}$             | $E_e = 0.555 \text{ mW/cm}^2$ $V_{CE} = 5V$ |
| Green  | A5    | $I_{C(ON)}$ | 398 | --- | 544 | $\mu\text{A}$             | $E_e = 0.555 \text{ mW/cm}^2$ $V_{CE} = 5V$ |
| Purple   | A6    | $I_{C(ON)}$ | 468 | --- | 625 | $\mu\text{A}$             | $E_e = 0.555 \text{ mW/cm}^2$ $V_{CE} = 5V$ |
| White  | A7    | $I_{C(ON)}$ | 536 | --- | 703 | $\mu\text{A}$             | $E_e = 0.555 \text{ mW/cm}^2$ $V_{CE} = 5V$ |
| Brown  | A8    | $I_{C(ON)}$ | 604 | --- | 785 | $\mu\text{A}$             | $E_e = 0.555 \text{ mW/cm}^2$ $V_{CE} = 5V$ |
| Orange   | A9    | $I_{C(ON)}$ | 673 | --- | 862 | $\mu\text{A}$             | $E_e = 0.555 \text{ mW/cm}^2$ $V_{CE} = 5V$ |
| Gold   | A10   | $I_{C(ON)}$ | 742 | --- | 944 | $\mu\text{A}$             | $E_e = 0.555 \text{ mW/cm}^2$ $V_{CE} = 5V$ |
| Collector Current Ratio of 2 Photo Transistors |       | R           | 0.8 | --- | 1.2 | $I_{C(ON)A} / I_{C(ON)B}$ |   |

\*  $I_{C(ON)} = [I_{C(ON)A} + I_{C(ON)B}] / 2$



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### N Ranks

| Color Code                                     | Ranks | Symbol      | Min | Typ | Max | Unit                      | Test Condition                 |
|--|-------|-------------|-----|-----|-----|---------------------------|--------------------------------|
| Red  | N1    | $I_{C(ON)}$ | 210 | --- | 350 | $\mu A$                   | $Ee=0.555mW/c\ m^2\ V_{CE}=5V$ |
| Blue   | N2    | $I_{C(ON)}$ | 280 | --- | 430 | $\mu A$                   | $Ee=0.555mW/c\ m^2\ V_{CE}=5V$ |
| Yellow   | N3    | $I_{C(ON)}$ | 350 | --- | 510 | $\mu A$                   | $Ee=0.555mW/c\ m^2\ V_{CE}=5V$ |
| Silver   | N4    | $I_{C(ON)}$ | 420 | --- | 590 | $\mu A$                   | $Ee=0.555mW/c\ m^2\ V_{CE}=5V$ |
| Green  | N5    | $I_{C(ON)}$ | 490 | --- | 670 | $\mu A$                   | $Ee=0.555mW/c\ m^2\ V_{CE}=5V$ |
| Purple   | N6    | $I_{C(ON)}$ | 560 | --- | 750 | $\mu A$                   | $Ee=0.555mW/c\ m^2\ V_{CE}=5V$ |
| White  | N7    | $I_{C(ON)}$ | 630 | --- | 830 | $\mu A$                   | $Ee=0.555mW/c\ m^2\ V_{CE}=5V$ |
| Brown  | N8    | $I_{C(ON)}$ | 700 | --- | 910 | $\mu A$                   | $Ee=0.555mW/c\ m^2\ V_{CE}=5V$ |
| Collector Current Ratio of 2 Photo Transistors |       | R           | 0.8 | --- | 1.2 | $I_{C(ON)A} / I_{C(ON)B}$ |                                |

\*  $I_{C(ON)} = [I_{C(ON)A} + I_{C(ON)B}] / 2$ 

\* For the intensity test method, the output intensity is measured indirectly by a wide uniform light source(unfocused) calibrated to  $0.555mW/cm^2$ ,  $\sim 940nm$  radiant intensity at the PTR face. Details are shown in the above diagram. It's important that light intensity must be uniform across the face of the PTR under test. Maximum and minimum values must include all variation due to mechanical and electrical sorting and measurement error.



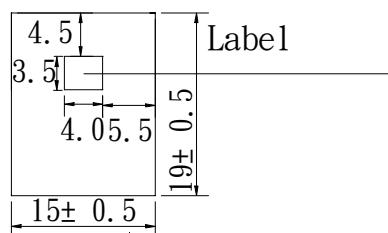
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ECN : \_\_\_\_\_ PAGE : 8/8

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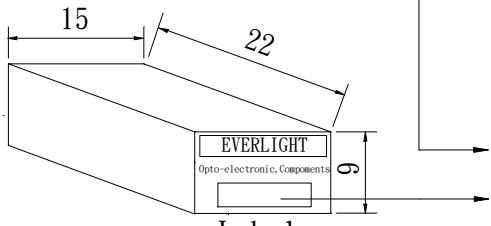
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### ■ Packing Specifications

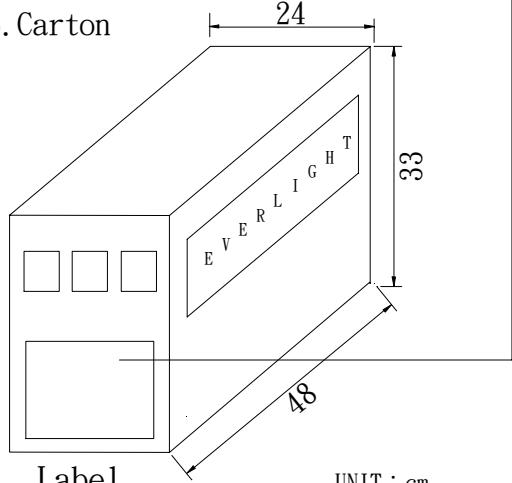
1. Bag



2. Box



3. Carton



Label1

UNIT : cm

EVERLIGHT

CPN:

P/N: 3225598603



PT2559B/L2/H3

QTY:



CAT:

HUE:

REF:

LOT NO:

MADE IN TAIWAN

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

### ■ Packing Quantity Specification

1.500Pcs/1Bag , 10Bags/1Box

2.10Boxes/1Carton