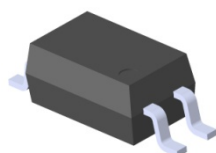




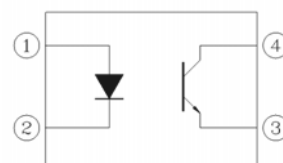
**EN:** This Datasheet/Document is presented by the manufacturer.

Please visit our website for pricing and availability at [www.hestore.hu](http://www.hestore.hu).

### 4 PIN SSOP PHOTOTRANSISTOR PHOTOCOUPLER EL3H7-G Series



Schematic



#### Features:

- Halogens free  
(Br <900 ppm ,Cl <900 ppm , Br+Cl < 1500 ppm)
- Current transfer ratio  
(CTR: 50~600% at IF =5mA, VCE =5V)  
(CTR: 40~320% at IF =10mA, VCE =5V)
- High isolation voltage between input and output (Viso=3750 V rms )
- Compact 4 Pin SSOP with a 2.0 mm profile
- Compliance with EU REACH
- Pb free and RoHS compliant.
- UL and cUL approved(No. E214129)
- VDE approved (No. 132249)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CQC approved

Pin Configuration

1. Anode
2. Cathode
3. Emitter
4. Collector

#### Description

The EL3H7-G Series devices consist of an infrared emitting diode, optically coupled to a phototransistor detector encapsulated with green compound.  
They are packaged in a 4-pin small outline SMD package.

#### Applications

- DC-DC Converters
- Programmable controllers
- Telecommunication equipments
- Signal transmission between circuits of different potentials and impedances

## Absolute Maximum Ratings (Ta=25°C)

|                         | Parameter                                     | Symbol           | Rating     | Unit  |
|-------------------------|-----------------------------------------------|------------------|------------|-------|
| Input                   | Forward current                               | I <sub>F</sub>   | 50         | mA    |
|                         | Peak forward current (1us, pulse)             | I <sub>FP</sub>  | 1          | A     |
|                         | Reverse voltage                               | V <sub>R</sub>   | 6          | V     |
|                         | Power dissipation                             | P <sub>D</sub>   | 70         | mW    |
|                         | Derating factor (above T <sub>a</sub> = 90°C) |                  | 2.0        | mW/°C |
| Output                  | Power dissipation                             | P <sub>C</sub>   | 150        | mW    |
|                         | Derating factor (above T <sub>a</sub> = 70°C) |                  | 3.1        | mW/°C |
|                         | Collector current                             | I <sub>C</sub>   | 50         | mA    |
|                         | Collector-Emitter voltage                     | V <sub>CEO</sub> | 80         | V     |
|                         | Emitter-Collector voltage                     | V <sub>ECO</sub> | 7          | V     |
| Total Power Dissipation |                                               | P <sub>TOT</sub> | 200        | mW    |
| Isolation Voltage*1     |                                               | V <sub>ISO</sub> | 3750       | Vrms  |
| Operating temperature   |                                               | T <sub>OPR</sub> | -55 ~ +110 | °C    |
| Storage temperature     |                                               | T <sub>STG</sub> | -55 ~ +125 | °C    |
| Soldering Temperature*2 |                                               | T <sub>SOL</sub> | 260        | °C    |

### Notes:

\*1 AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1, 2 are shorted together, and pins 3, 4 are shorted together.

\*2 For 10 seconds

**Electro-Optical Characteristics (Ta=25°C unless specified otherwise)**

**Input**

| Parameter         | Symbol   | Min. | Typ. | Max. | Unit          | Condition                |
|-------------------|----------|------|------|------|---------------|--------------------------|
| Forward voltage   | $V_F$    | -    | 1.2  | 1.4  | V             | $I_F = 20\text{mA}$      |
| Reverse current   | $I_R$    | -    | -    | 10   | $\mu\text{A}$ | $V_R = 4\text{V}$        |
| Input capacitance | $C_{in}$ | -    | 30   | 250  | pF            | $V = 0, f = 1\text{kHz}$ |

Note: Reverse Voltage(VR) Condition is applied to IR test only The device is not designed for reverse operation

**Output**

| Parameter                           | Symbol     | Min | Typ. | Max. | Unit | Condition                               |
|-------------------------------------|------------|-----|------|------|------|-----------------------------------------|
| Collector-Emitter dark current      | $I_{CEO}$  | -   | -    | 100  | nA   | $V_{CE} = 20\text{V}, I_F = 0\text{mA}$ |
| Collector-Emitter breakdown voltage | $BV_{CEO}$ | 80  | -    | -    | V    | $I_C = 0.1\text{mA}$                    |
| Emitter-Collector breakdown voltage | $BV_{ECO}$ | 7   | -    | -    | V    | $I_E = 0.1\text{mA}$                    |

**Transfer Characteristics (Ta=25°C unless specified otherwise)**

| Parameter                            | Symbol        | Min                | Typ. | Max. | Unit          | Condition                                               |
|--------------------------------------|---------------|--------------------|------|------|---------------|---------------------------------------------------------|
| Current Transfer ratio               | EL3H7         | 50                 | -    | 600  | %             | $I_F = 5\text{mA}, V_{CE} = 5\text{V}$                  |
|                                      | EL3H7A        | 80                 | -    | 160  |               |                                                         |
|                                      | EL3H7B        | 130                | -    | 260  |               |                                                         |
|                                      | EL3H7C        | 200                | -    | 400  |               |                                                         |
|                                      | EL3H7D        | 300                | -    | 600  |               |                                                         |
|                                      | EL3H7E        | 100                | -    | 200  |               |                                                         |
|                                      | EL3H7F        | 150                | -    | 300  |               |                                                         |
|                                      | EL3H7H        | 40                 | -    | 80   |               |                                                         |
|                                      | EL3H7I        | 63                 | -    | 125  |               | $I_F = 10\text{mA}, V_{CE} = 5\text{V}$                 |
|                                      | EL3H7J        | 100                | -    | 200  |               |                                                         |
|                                      | EL3H7K        | 160                | -    | 320  |               |                                                         |
| Collector-Emitter saturation voltage | $V_{CE(sat)}$ | -                  | 0.1  | 0.2  | V             | $I_F = 10\text{mA}, I_C = 1\text{mA}$                   |
| Isolation resistance                 | $R_{IO}$      | $5 \times 10^{10}$ | -    | -    | $\Omega$      | $V_{IO} = 500\text{Vdc}, 40 \sim 60\% \text{ R.H.}$     |
| Floating capacitance                 | $C_{IO}$      | -                  | 0.3  | 1.0  | pF            | $V_{IO} = 0, f = 1\text{MHz}$                           |
| Rise time                            | $t_r$         | -                  | 5    | 18   | $\mu\text{s}$ | $V_{CE} = 2\text{V}, I_C = 2\text{mA}, R_L = 100\Omega$ |
| Fall time                            | $t_f$         | -                  | 3    | 18   | $\mu\text{s}$ |                                                         |

\* Typical values at  $T_a = 25^\circ\text{C}$

## Typical Electro-Optical Characteristics Curves

Figure 1. Forward Current vs Forward Voltage

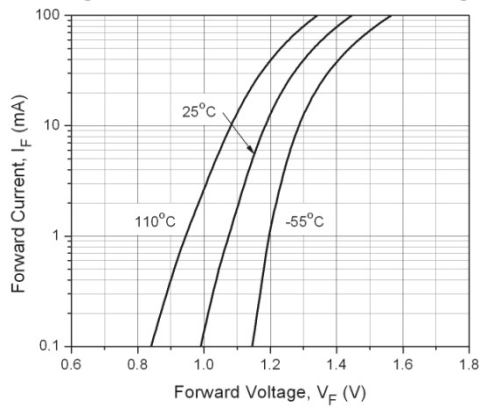


Figure 2. Normalized Collector Current vs Forward Current

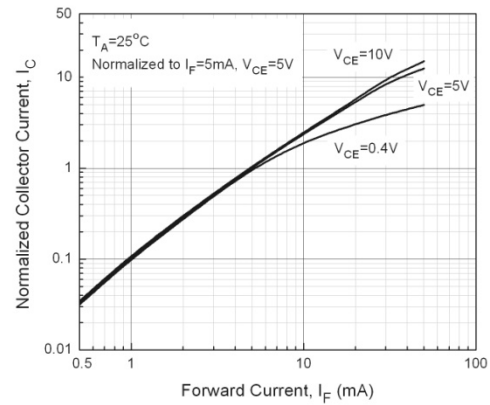


Figure 3. Normalized Current Transfer Ratio vs Forward Current

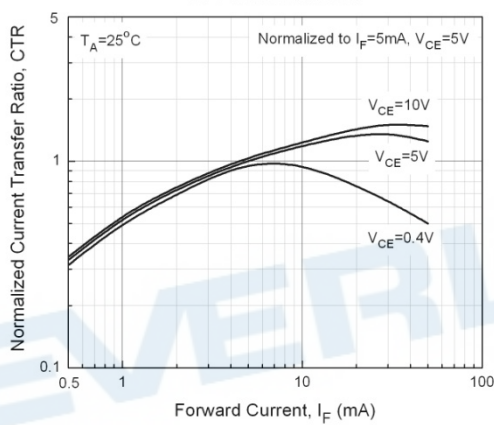


Figure 4. Normalized Collector Current vs Ambient Temperature

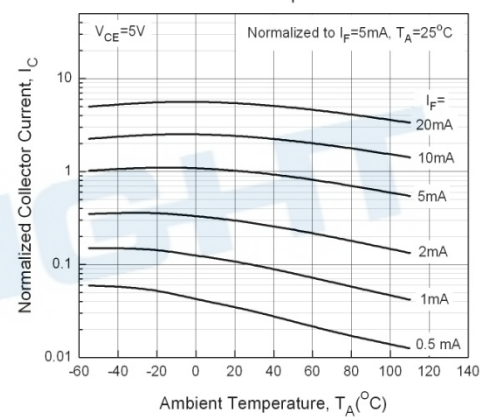


Figure 5. Normalized Current Transfer Ratio vs Ambient Temperature

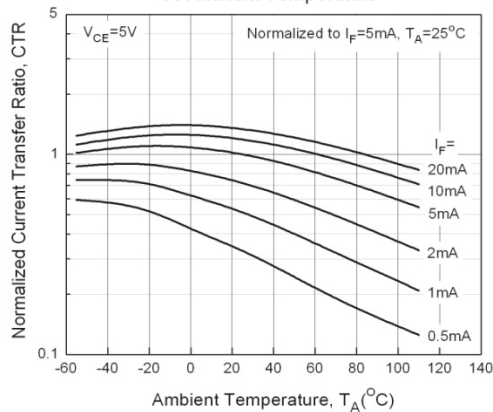


Figure 6. Collector Current vs Collector-Emitter Voltage

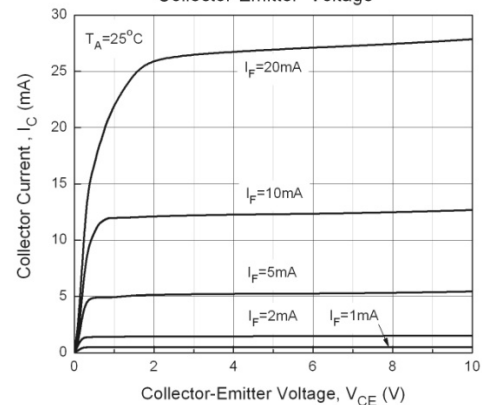


Figure 7. Collector Current vs Collector-Emitter Voltage

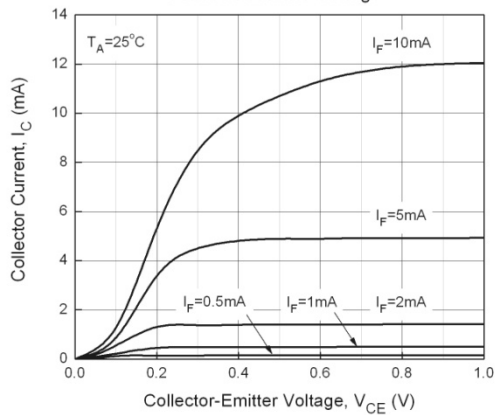


Figure 8. Collector Dark Current vs Ambient Temperature

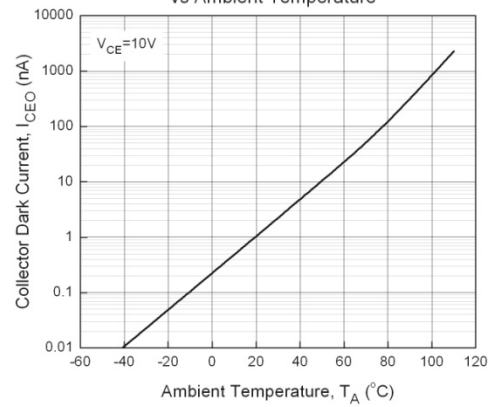


Figure 9. Collector-Emitter Saturation Voltage vs Ambient Temperature

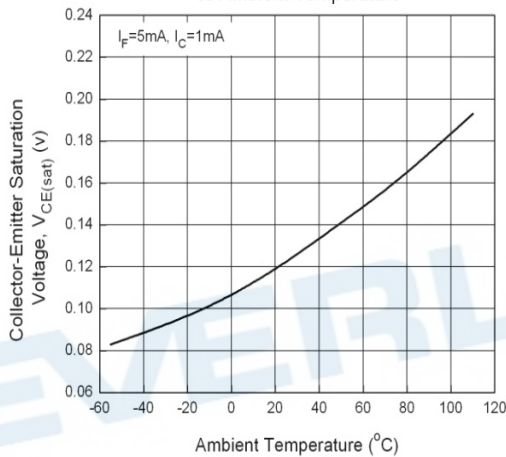


Figure 10. Switching Time vs Load Resistance

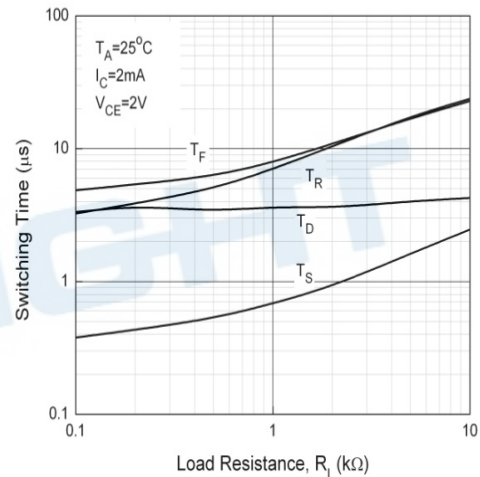
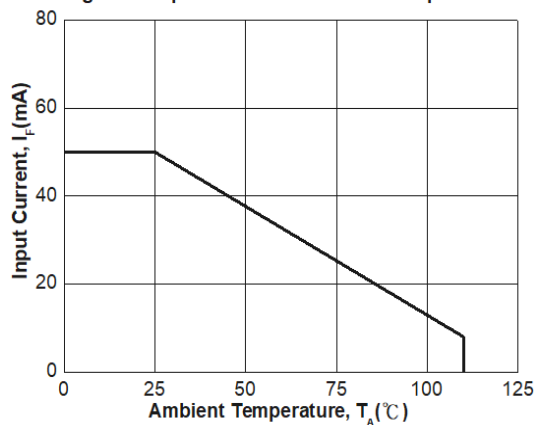


Figure 11. Input Current vs Ambient Temperature



Note: The graphs shown in this datasheet are representing typical data only and do not show guaranteed values

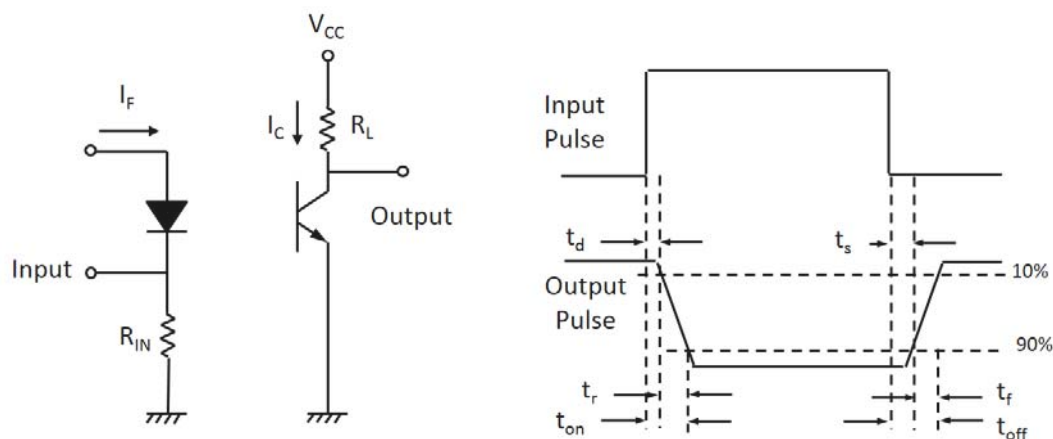


Figure 11. Switching Time Test Circuit & Waveforms

Order Information

Part Number

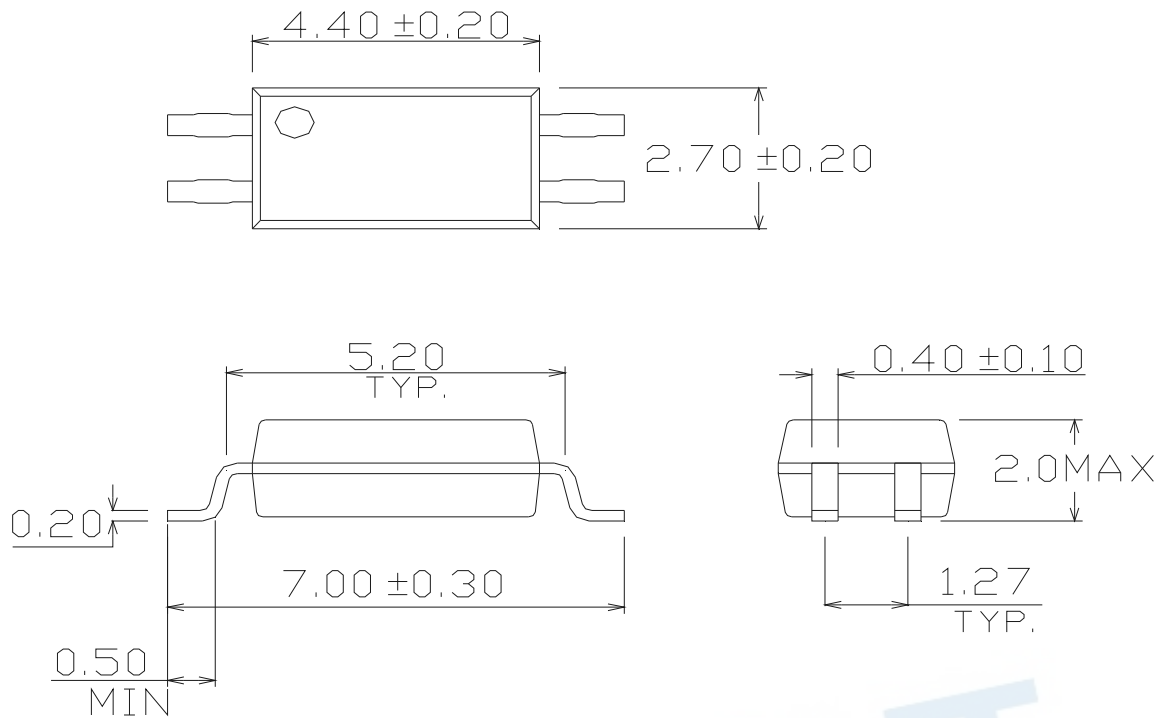
EL3H7(X)(Y)-VG

Note

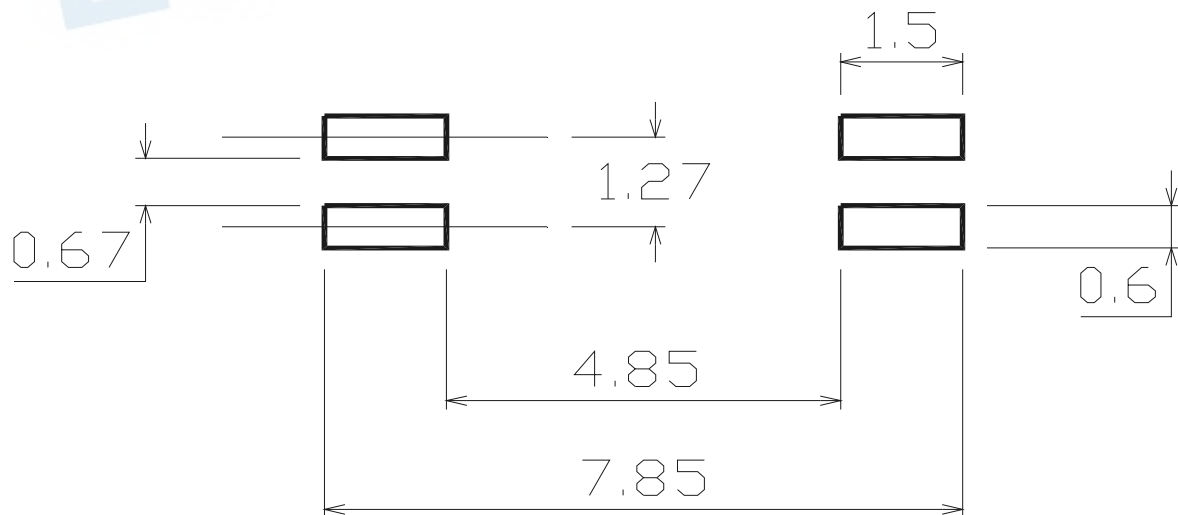
- X = CTR Rank (A, B, C, D, E, F, H, I, J, K or none)
- Y = Tape and reel option (TA, TB, EA, EB or none)
- V = VDE (optional)
- G = Halogens free

| Option | Description                 | Packing quantity    |
|--------|-----------------------------|---------------------|
| None   | Standard SMD option         | 150 units per tube  |
| -V     | Standard SMD option + VDE   | 150 units per tube  |
| (TA)   | TA Tape & reel option       | 6000 units per reel |
| (TB)   | TB Tape & reel option       | 6000 units per reel |
| (TA)-V | TA Tape & reel option + VDE | 6000 units per reel |
| (TB)-V | TB Tape & reel option + VDE | 6000 units per reel |
| (EA)   | EA Tape & reel option       | 1000 units per reel |
| (EB)   | EB Tape & reel option       | 1000 units per reel |
| (EA)-V | EA Tape & reel option + VDE | 1000 units per reel |
| (EB)-V | EB Tape & reel option + VDE | 1000 units per reel |

Package Dimension (Dimensions in mm)



Recommended pad layout for surface mount leadform





## Device Marking



## Notes

|     |                                                         |
|-----|---------------------------------------------------------|
| EL  | denotes Everlight                                       |
| 3H7 | denotes Device Number                                   |
| R   | denotes CTR Rank (A, B, C, D, E, F, H, I, J, K or none) |
| Y   | denotes 1 digit Year code                               |
| WW  | denotes 2 digit Week code                               |
| V   | denotes VDE (optional)                                  |

EVERLIGHT

## Label form

**(Pb)** **EVERLIGHT** **11** → 月份

客戶料號 ← CPN: XXXXXXXXXXXX 測試區 **RoHS** → RoHS標示

億光料號 ← P/N: XXXXXXXXXXXX **CQC** **UL** **CE** → 安規標示

億光品名 ← EL817M(C)-VG

生產周別 ← D/C: YWWX CAT: X QTY: 000000 → 包裝數量

生產序號 ← LOT NO: Y151130XXXXXXXXXX REF: XXXX

標籤識別碼 ← REFERENCE: BTPyyMMddXXXXX

產地 ← MADE IN XXXXXX **QR Code** → QR Code

or

**RoHS 標示** **(Pb)** **EVERLIGHT** **5** → 月份

客戶料號 ← CPN: XXXXXXXXXXXX 測試區 **CQC** **UL** **CE** → 安規標示

客戶品名 ← XXXXXXXXXXXX-XXXXXXXXXX-XXXXXXXXXX-XXXXXXXXXX-XXXXXX

億光料號 ← P/N: XXXXXXXXXXXX

億光品名 ← XXXXXXXXXXXX-XXXXXXXXXX-XXXXXXXXXX-XXXXXX

生產序號 ← LOT NO: Y150516XXX-XXXXXXXXXX-XXXXXXXXXX

包裝數量 ← QTY: 0123456789 HUE: XXXXXXXXXXXX

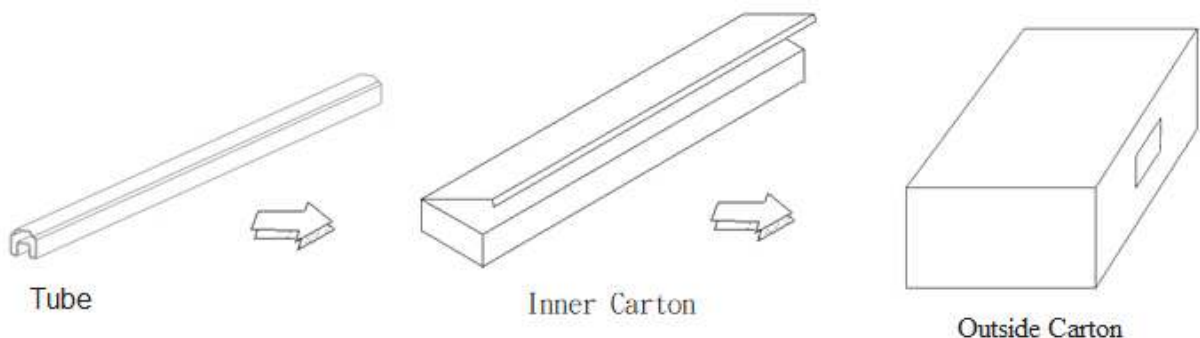
CTR等級 ← CAT: XXXXXXXXXXXX REF: XXXXXXXXXXXX

標籤識別碼 ← REFERENCE: BTPYMMDDXXXXX

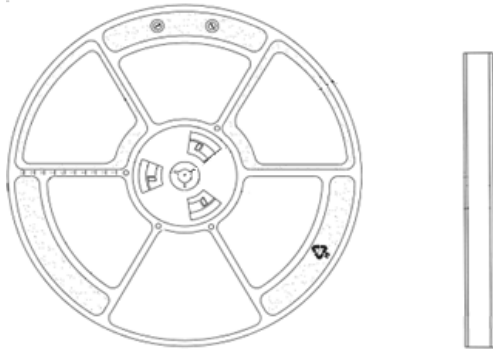
MSL等級 ← MSL-XX MADE IN XXXXXX **QR Code** → QR Code

產地

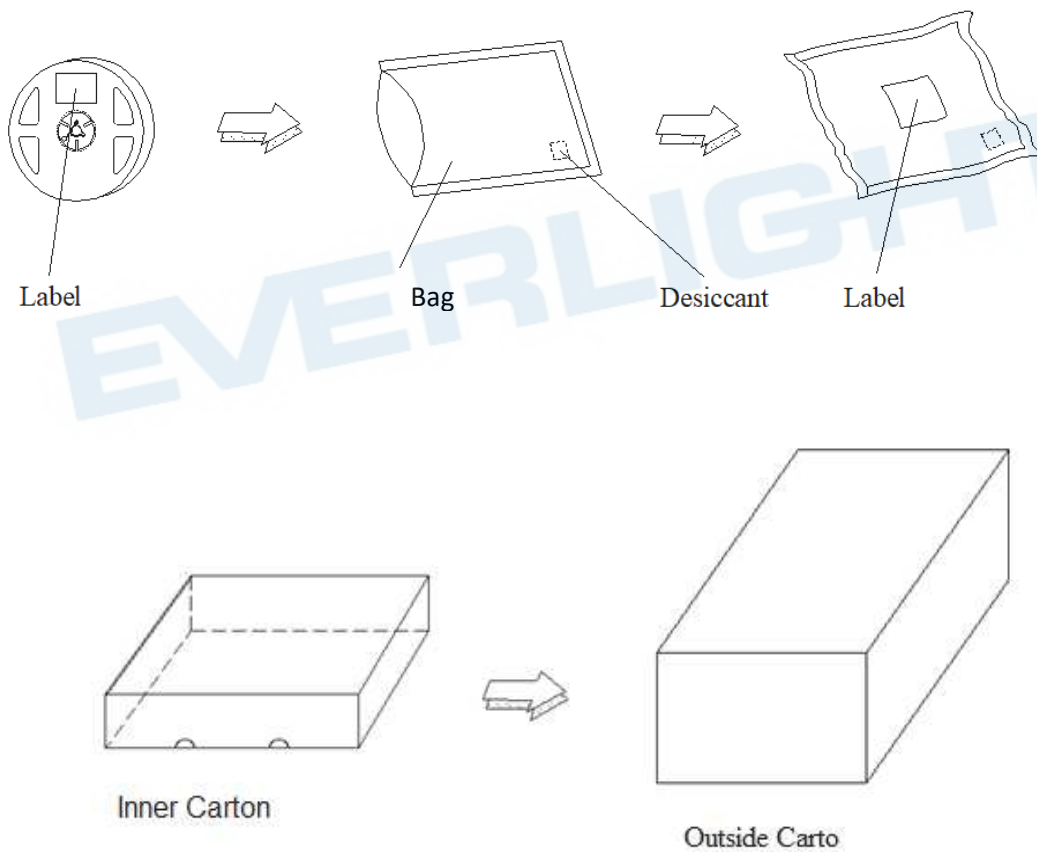
## TUBE Dimension



## Reel Dimension

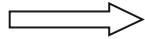
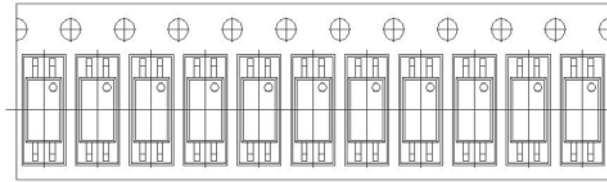


## Moisture Resistant Packaging



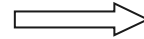
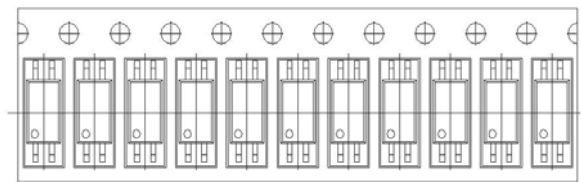
## Tape & Reel Packing Specifications

### Option TA



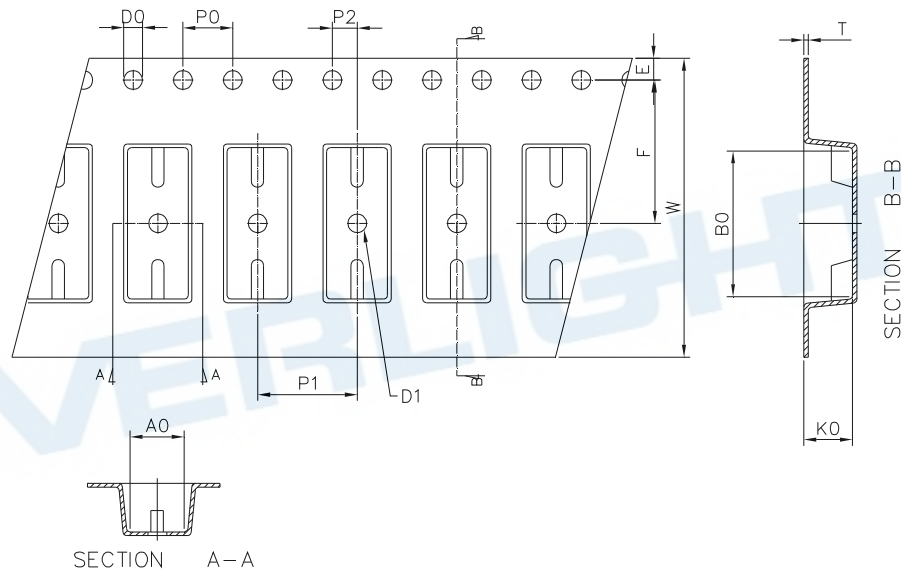
Direction of feed from reel

### Option TB



Direction of feed from reel

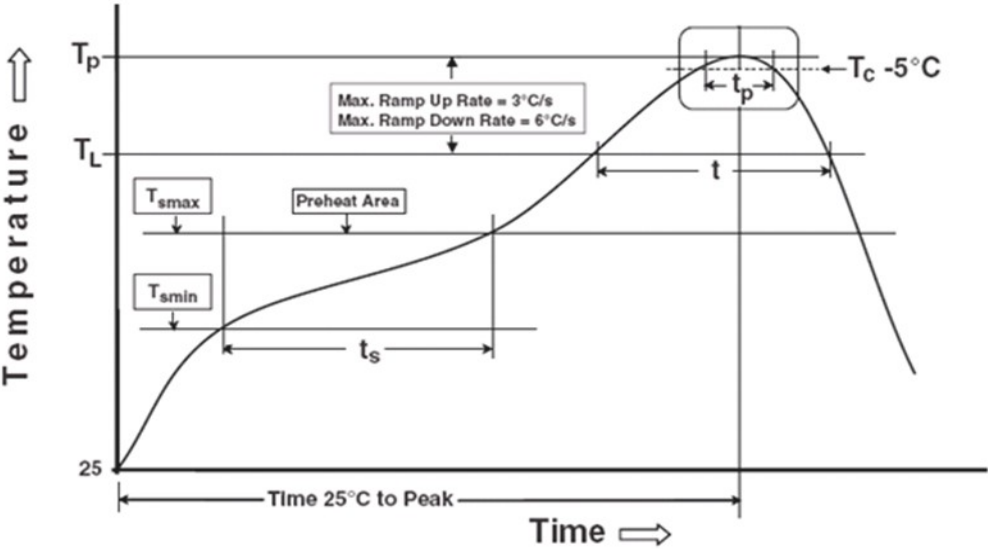
## Tape dimensions



| Dimension No.  | A0          | B0          | D0            | D1          | E           | F           |
|----------------|-------------|-------------|---------------|-------------|-------------|-------------|
| Dimension (mm) | 3.00 ± 0.10 | 7.45 ± 0.10 | 1.50 + 0.1/-0 | 1.50 ± 0.10 | 1.75 ± 0.10 | 5.50 ± 0.10 |
| Dimension No.  | P0          | P1          | P2            | t           | W           | K0          |
| Dimension (mm) | 4.00 ± 0.15 | 4.00 ± 0.10 | 2.00 ± 0.10   | 0.30 ± 0.05 | 12.1 ± 0.2  | 2.45 ± 0.1  |

Precautions for Use

- 1. Soldering Condition
  - 1.1 (A) Maximum Body Case Temperature Profile for evaluation of Reflow Profile



Note: Reference: IPC/JEDEC J-STD-020D

Preheat

|                                              |                 |
|----------------------------------------------|-----------------|
| Temperature min ( $T_{smin}$ )               | 150 °C          |
| Temperature max ( $T_{smax}$ )               | 200°C           |
| Time ( $T_{smin}$ to $T_{smax}$ ) ( $t_s$ )  | 60-120 seconds  |
| Average ramp-up rate ( $T_{smax}$ to $T_p$ ) | 3 °C/second max |

Other

|                                                                |                  |
|----------------------------------------------------------------|------------------|
| Liquidus Temperature ( $T_L$ )                                 | 217 °C           |
| Time above Liquidus Temperature ( $t_L$ )                      | 60-100 sec       |
| Peak Temperature ( $T_p$ )                                     | 260°C            |
| Time within 5 °C of Actual Peak Temperature: $T_p - 5^\circ C$ | 30 s             |
| Ramp- Down Rate from Peak Temperature                          | 6°C /second max. |
| Time 25°C to peak temperature                                  | 8 minutes max.   |
| Reflow times                                                   | 3 times          |

## Precautions for General Storage

- Avoid storage locations where devices may be exposed to moisture or direct sunlight.
- Follow the precautions printed on the packing label of the device for transportation and storage.
- Keep the storage location temperature and humidity within a range of 5°C to 35°C and 20 % to 60 %, respectively.
- Do not store the products in locations with poisonous gases (especially corrosive gases) or in dusty conditions.
- Store the products in locations with minimal temperature fluctuations. Rapid temperature changes during storage can cause condensation, resulting in lead oxidation or corrosion, which will deteriorate the solderability of the leads.
- When restoring devices after removal from their packing, use anti-static containers.
- Do not allow loads to be applied directly to devices while they are in storage.
- If devices have been stored for more than two years under normal storage conditions, it is recommended that you check the leads for ease of soldering prior to use.

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