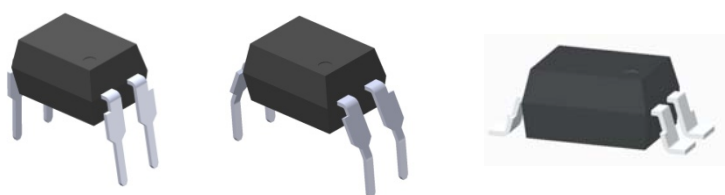
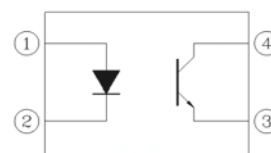


### 4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER EL817 Series



Schematic



Pin Configuration

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

#### Features:

- Compliance Halogens Free (Only copper leadframe)  
(Br < 900 ppm, Cl < 900 ppm, Br+Cl < 1500 ppm)
- Current transfer ratio  
(CTR: 50~600% at  $I_F = 5\text{mA}$ ,  $V_{CE} = 5\text{V}$ )
- High isolation voltage between input and output (Viso = 5000Vrms)
- Creepage distance > 7.62mm
- Operating temperature up to +110°C
- Compact small outline package
- Pb free
- The product itself will remain within RoHS compliant version
- Compliance with EU REACH
- UL and cUL approved(No.E214129)
- VDE approved (No. 132249)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CQC approved

#### Description

The EL817 series of devices each consist of an infrared emitting diodes, optically coupled to a phototransistor detector. They are packaged in a 4-pin DIP package and available in wide-lead spacing and SMD option.

#### Applications

- Programmable controllers
- System appliances, measuring instruments
- Telecommunication equipments
- Home appliances, such as fan heaters, etc.
- 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>   | 60         | 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>   | 100        | mW    |
|                         | Derating factor (above T <sub>a</sub> = 100°C) |                  | 2.9        | mW/°C |
| Output                  | Power dissipation                              | P <sub>C</sub>   | 150        | mW    |
|                         | Derating factor (above T <sub>a</sub> = 100°C) |                  | 5.8        | mW/°C |
|                         | Collector current                              | I <sub>C</sub>   | 50         | mA    |
|                         | Collector-Emitter voltage                      | V <sub>CEO</sub> | 35         | V     |
|                         | Emitter-Collector voltage                      | V <sub>ECO</sub> | 6          | V     |
| Total Power Dissipation |                                                | P <sub>TOT</sub> | 200        | mW    |
| Isolation Voltage*1     |                                                | V <sub>ISO</sub> | 5000       | V rms |
| Operating Temperature   |                                                | T <sub>OPR</sub> | -55 to 110 | °C    |
| Storage Temperature     |                                                | T <sub>STG</sub> | -55 to 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

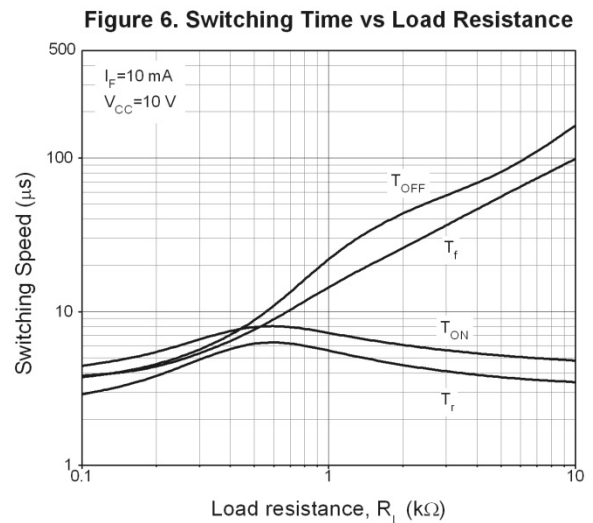
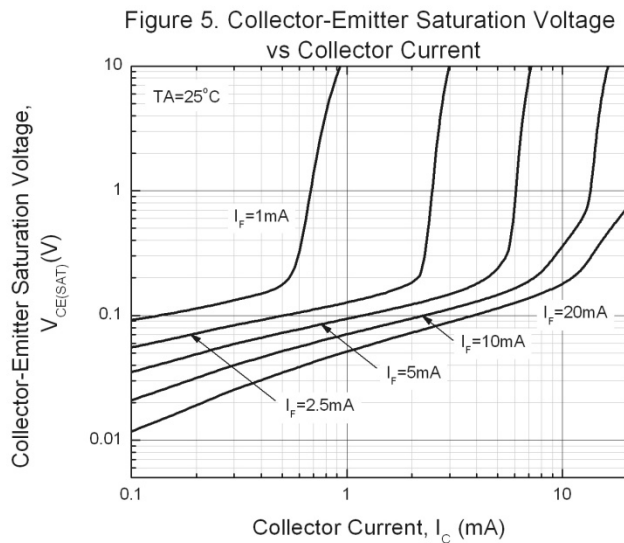
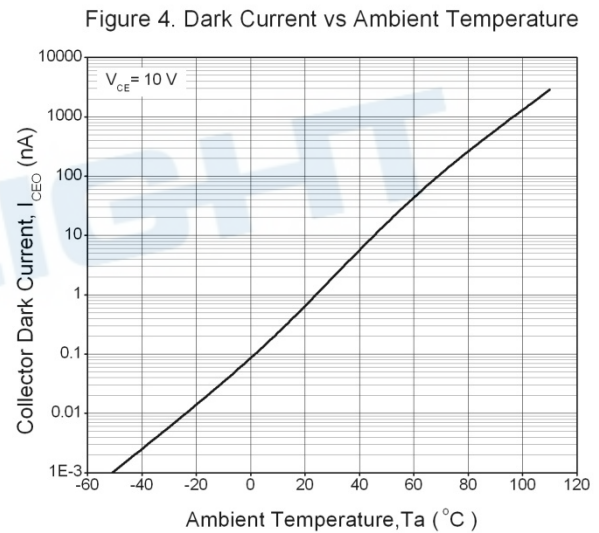
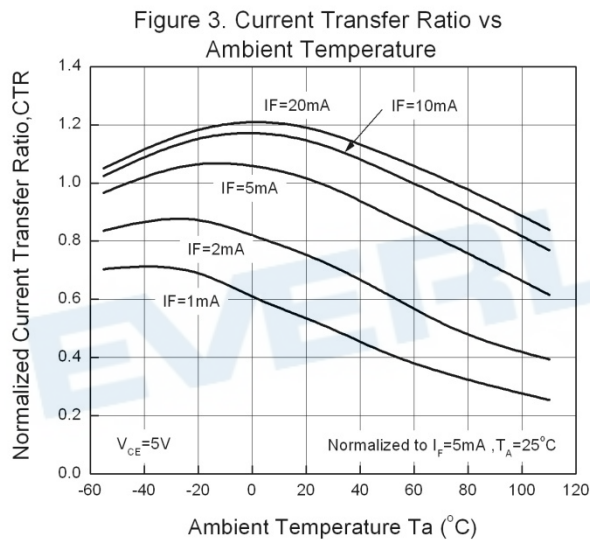
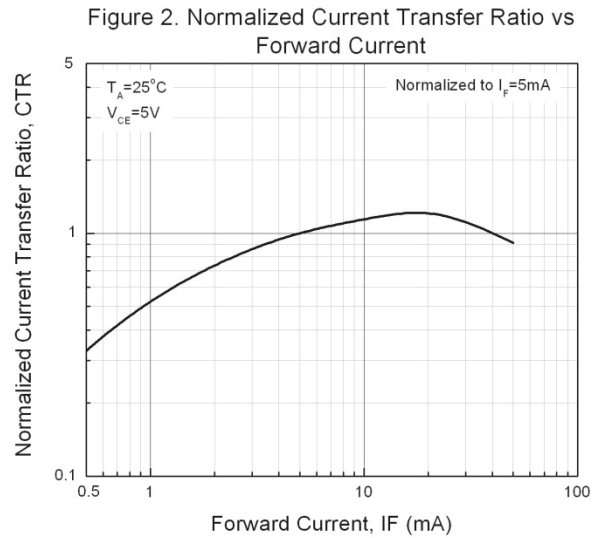
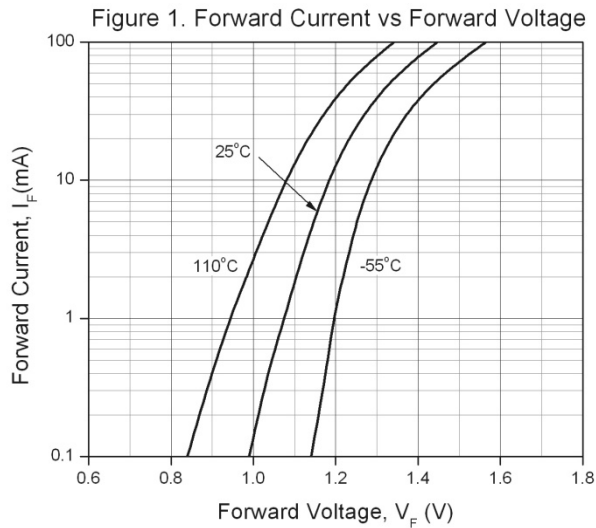
| Parameter                           | Symbol     | Min | Typ. | Max. | Unit | Condition                               |
|-------------------------------------|------------|-----|------|------|------|-----------------------------------------|
| Collector-Emitter dark current      | $I_{CEO}$  | -   | -    | 100  | nA   | $V_{CE} = 20\text{V}, I_F = 0\text{mA}$ |
| Collector-Emitter breakdown voltage | $BV_{CEO}$ | 35  | -    | -    | V    | $I_C = 0.1\text{mA}$                    |
| Emitter-Collector breakdown voltage | $BV_{ECO}$ | 6   | -    | -    | V    | $I_E = 0.1\text{mA}$                    |

### Transfer Characteristics

| Parameter                            | Symbol        | Min                | Typ. | Max. | Unit          | Condition                                                                |
|--------------------------------------|---------------|--------------------|------|------|---------------|--------------------------------------------------------------------------|
| Current Transfer ratio               | EL817         | 50                 | -    | 600  | %             | $I_F = 5\text{mA}, V_{CE} = 5\text{V}$                                   |
|                                      | EL817A        | 80                 | -    | 160  |               |                                                                          |
|                                      | EL817B        | 130                | -    | 260  |               |                                                                          |
|                                      | EL817C        | 200                | -    | 400  |               |                                                                          |
|                                      | EL817D        | 300                | -    | 600  |               |                                                                          |
|                                      | EL817X        | 100                | -    | 200  |               |                                                                          |
|                                      | EL817Y        | 150                | -    | 300  |               |                                                                          |
| Collector-Emitter saturation voltage | $V_{CE(sat)}$ | -                  | 0.1  | 0.2  | V             | $I_F = 20\text{mA}, I_C = 1\text{mA}$                                    |
| Isolation resistance                 | $R_{IO}$      | $5 \times 10^{10}$ | -    | -    | $\Omega$      | $V_{IO} = 500\text{Vdc}, 40\sim 60\% \text{ R.H.}$                       |
| Floating capacitance                 | $C_{IO}$      | -                  | 0.6  | 1.0  | pF            | $V_{IO} = 0, f = 1\text{MHz}$                                            |
| Cut-off frequency                    | $f_c$         | -                  | 80   | -    | kHz           | $V_{CE} = 5\text{V}, I_C = 2\text{mA}$<br>$R_L = 100\Omega, -3\text{dB}$ |
| Rise time                            | $t_r$         | -                  | -    | 18   | $\mu\text{s}$ | $V_{CE} = 2\text{V}, I_C = 2\text{mA}, R_L = 100\Omega$                  |
| Fall time                            | $t_f$         | -                  | -    | 18   | $\mu\text{s}$ |                                                                          |

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

## Typical Electro-Optical Characteristics Curves



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

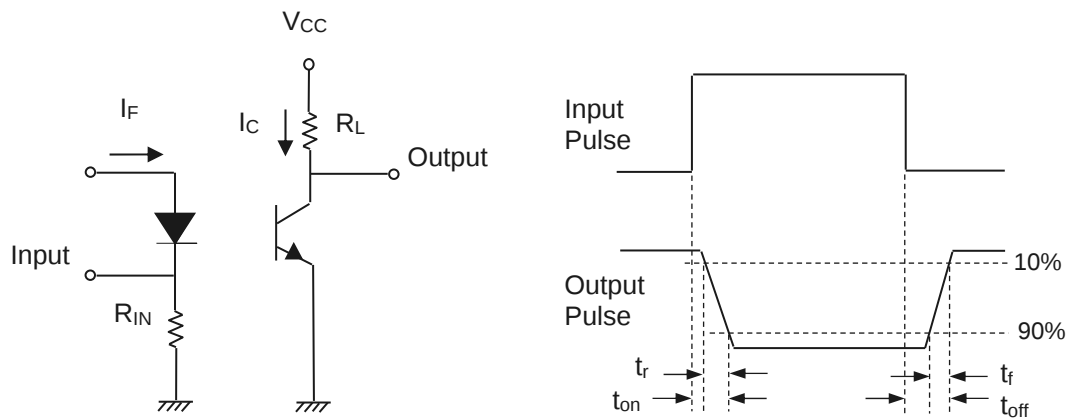


Figure 7. Switching Time Test Circuit & Waveforms

EVERLIGHT

## Order Information

### Part Number

**EL817X(Y)(Z)-FV**

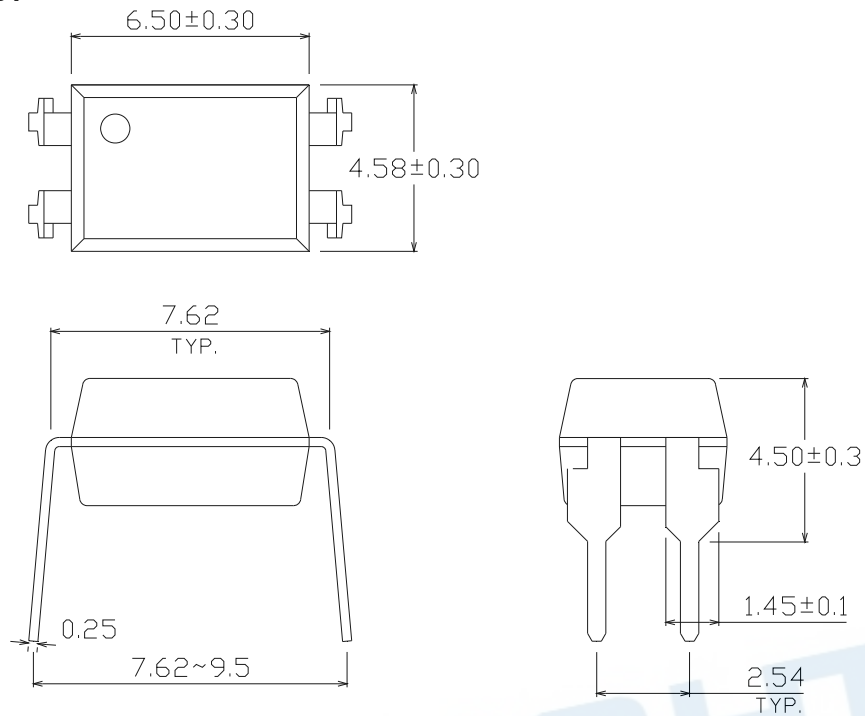
### Note

- X = Lead form option (S1, S2, M or none)  
Y = CTR Rank (A, B, C, D, X, Y or none)  
Z = Tape and reel option (TU, TD or none)  
F = Lead frame option (F: Iron, None: copper)  
V = VDE safety (optional)

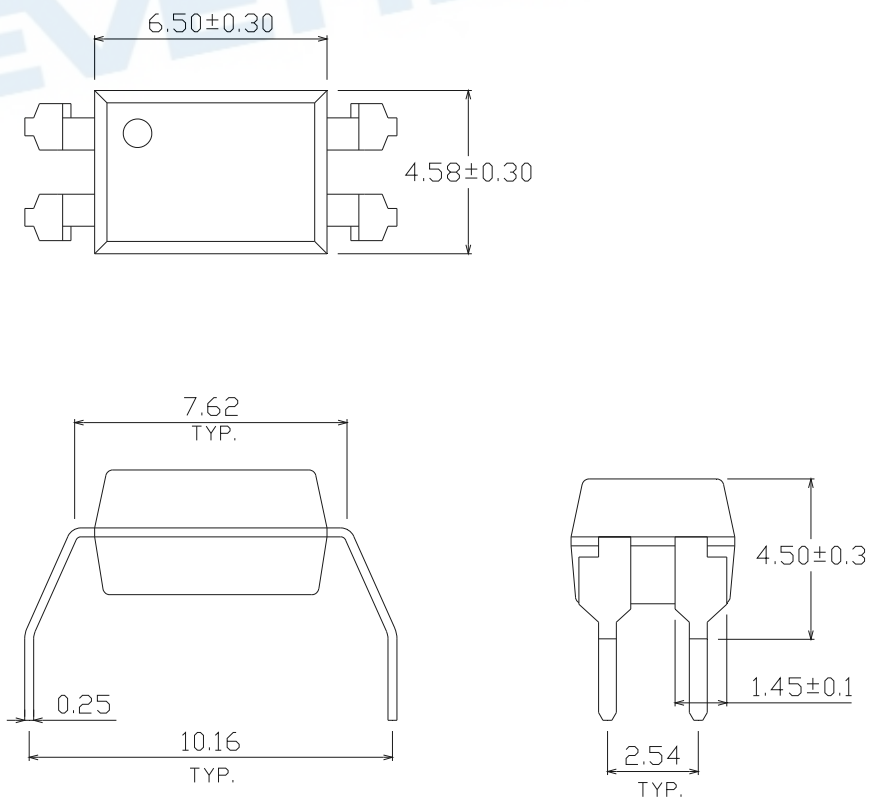
| Option  | Description                                                   | Packing quantity    |
|---------|---------------------------------------------------------------|---------------------|
| None    | Standard DIP-4                                                | 100 units per tube  |
| M       | Wide lead bend (0.4 inch spacing)                             | 100 units per tube  |
| S1 (TU) | Surface mount lead form (low profile) + TU tape & reel option | 2000 units per reel |
| S1 (TD) | Surface mount lead form (low profile) + TD tape & reel option | 2000 units per reel |
| S2 (TU) | Surface mount lead form (low profile) + TU tape & reel option | 2000 units per reel |
| S2 (TD) | Surface mount lead form (low profile) + TD tape & reel option | 2000 units per reel |

Package Dimension (Dimensions in mm)

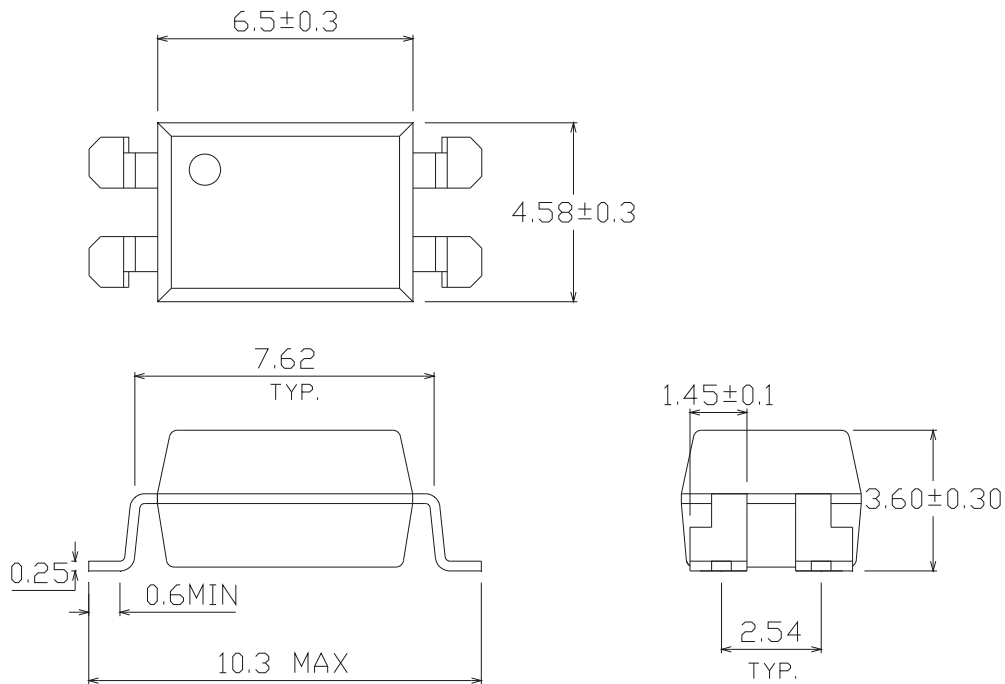
Standard DIP Type



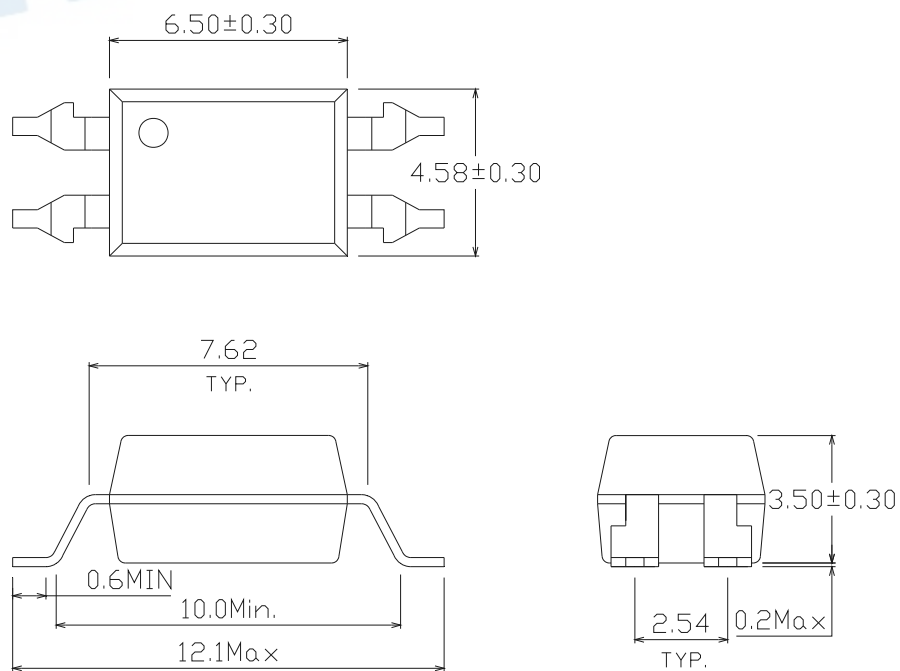
Option M Type



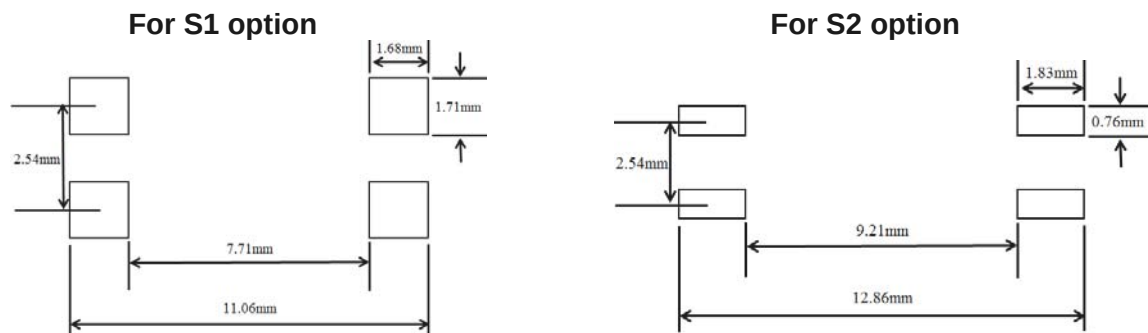
Option S1 Type



Option S2 Type



## Recommended pad layout for surface mount leadform



### Notes

Suggested pad dimension is just for reference only.  
Please modify the pad dimension based on individual need.

EVERLIGHT

## Device Marking



## Notes

|     |                                                |
|-----|------------------------------------------------|
| EL  | denotes EVERLIGHT                              |
| 817 | denotes Device Number                          |
| G   | denotes Factory Code (G: China and Green part) |
| R   | denotes CTR Rank (A, B, C, D , X , Y 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

億光料號 ← P/N: XXXXXXXXXXXX

億光品名 ← EL817M(C)-VG

生產周別 ← D/C: YWWX CAT: X QTY: 000000

生產序號 ← LOT NO: Y151130XXXXXXXXXX

標籤識別碼 ← REFERENCE: BTPyyMMddXXXXX

產地 ← MADE IN XXXXXX

RoHS 標示

安規標示

包裝數量

QR Code

or

RoHS 標示

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

客戶料號 ← CPN: XXXXXXXXXXXX 測試區

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

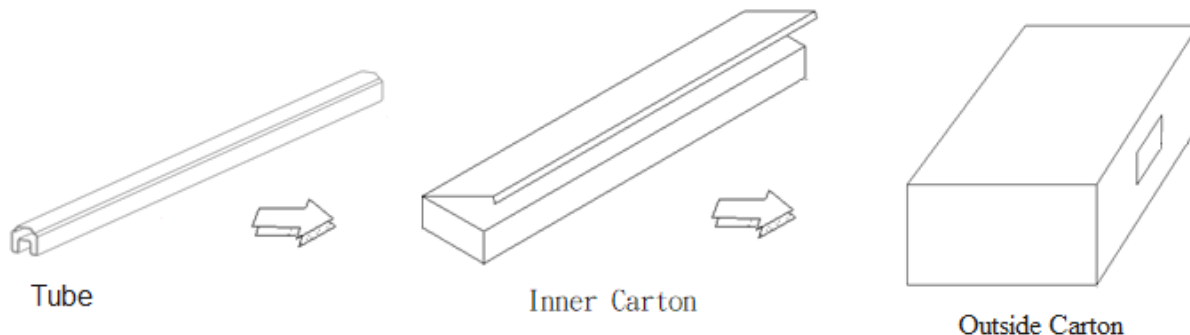
MADE IN XXXXXX

產地

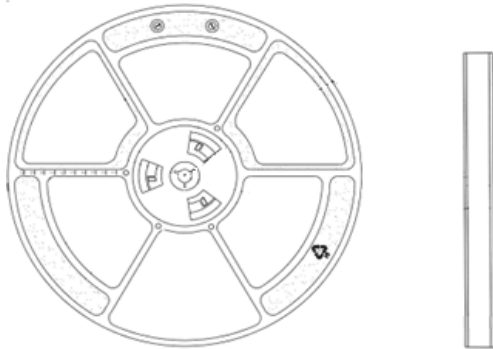
安規標示

QR Code

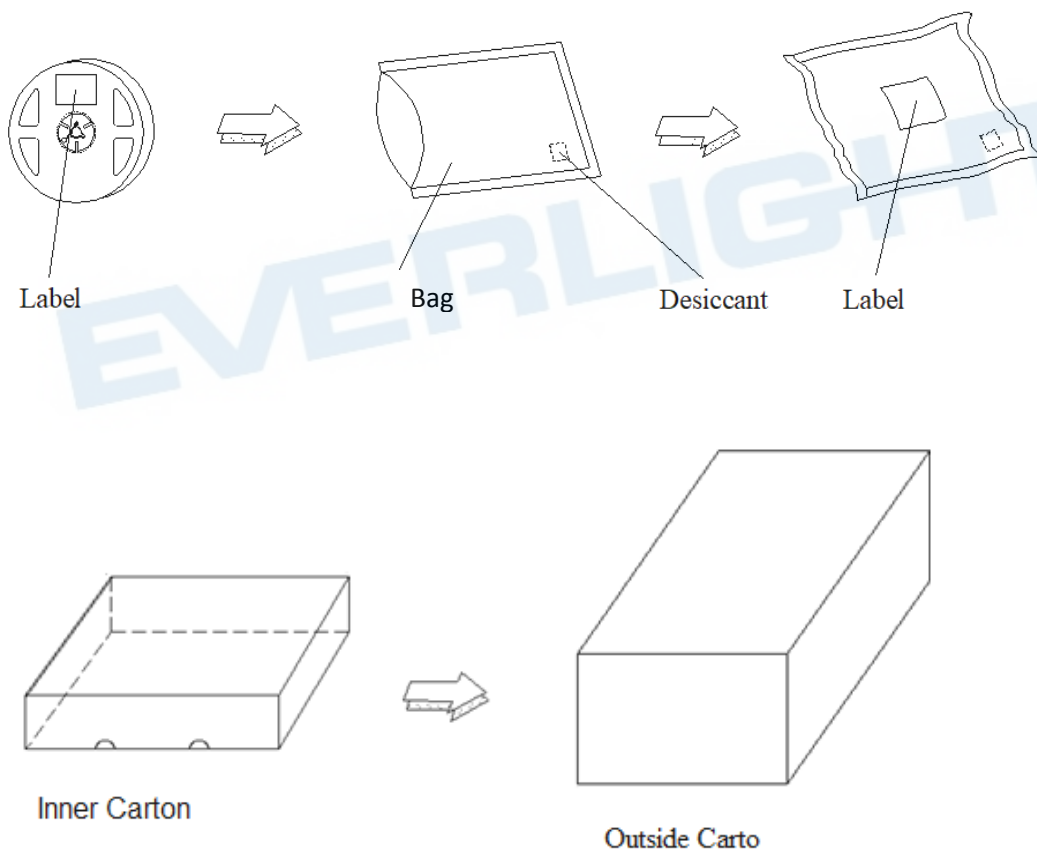
## TUBE Dimension



## Reel Dimension

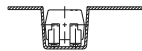
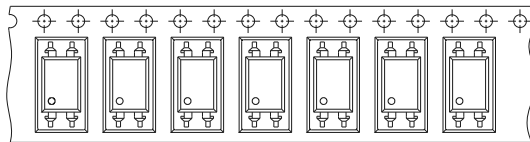


## Moisture Resistant Packaging

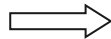


## Tape & Reel Packing Specifications

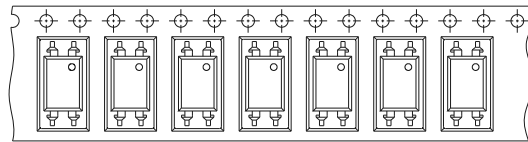
**Option TD**



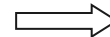
Direction of feed from reel



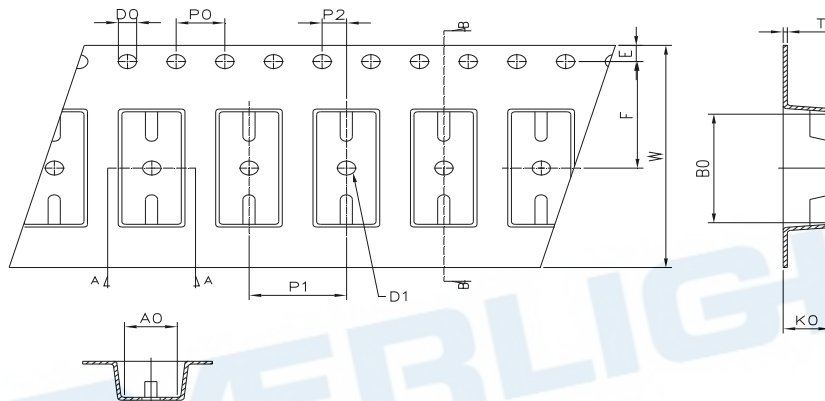
**Option TU**



Direction of feed from reel



## Tape dimensions

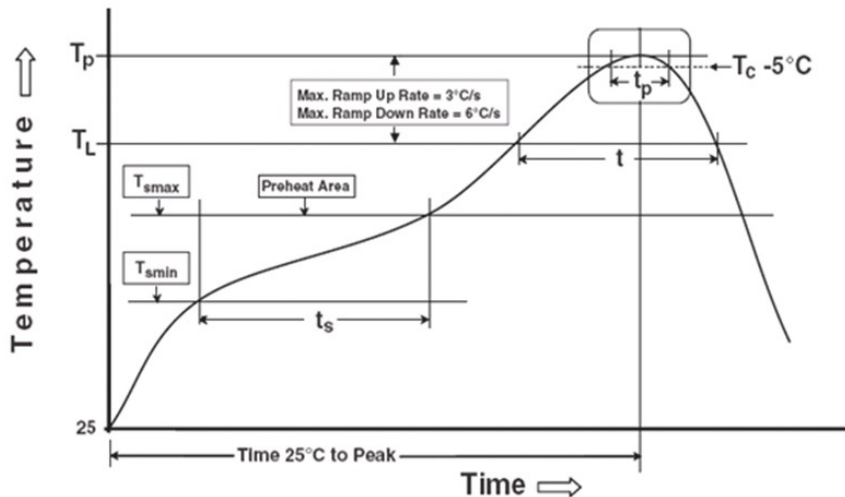


| Dimension No.        | Ao       | Bo        | Do       | D1       | E         | F        |
|----------------------|----------|-----------|----------|----------|-----------|----------|
| Dimension (mm)<br>S1 | 4.90±0.1 | 10.40±0.1 | 1.5±0.1  | 1.50±0.1 | 1.75±0.1  | 7.50±0.1 |
| Dimension (mm)<br>S2 | 4.88±0.1 | 12.55±0.1 | 1.5±0.1  | 1.50±0.1 | 1.75±0.1  | 11.5±0.1 |
| Dimension No.        | Po       | P1        | P2       | t        | W         | Ko       |
| Dimension (mm)<br>S1 | 4.00±0.1 | 8.00±0.1  | 2.00±0.1 | 0.40±0.1 | 16.00±0.3 | 4.00±0.1 |
| Dimension (mm)<br>S2 | 4.00±0.1 | 8.00±0.1  | 2.00±0.1 | 0.40±0.1 | 24.00±0.3 | 4.00±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.

EVERLIGHT

## DISCLAIMER

1. Above specification may be changed without notice. EVERLIGHT will reserve authority on material change for above specification.
2. The graphs shown in this datasheet are representing typical data only and do not show guaranteed values.
3. 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.
4. These specification sheets include materials protected under copyright of EVERLIGHT. Reproduction in any form is prohibited without the specific consent of EVERLIGHT.
5. This product is not intended to be used for military, aircraft, automotive, medical, life sustaining or life saving applications or any other application which can result in human injury or death. Please contact authorized Everlight sales agent for special application request.
6. Statements regarding the suitability of products for certain types of applications are based on Everlight's knowledge of typical requirements that are often placed on Everlight products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Everlight's terms and conditions of purchase, including but not limited to the warranty expressed therein.