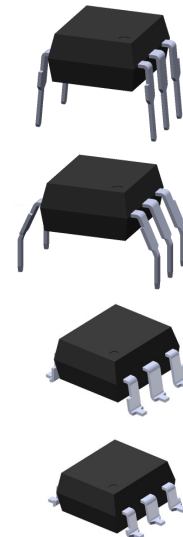


### Features:

- Peak breakdown voltage
  - 250V: EL303X(P5)
  - 400V: EL304X(P5)
  - 600V: EL306X(P5)
  - 800V: EL308X(P5)
- High isolation voltage between input and output (Viso=5000 V rms )
- Zero voltage crossing
- Pb free and RoHS compliant.
- UL approved (No.E214129)
- VDE approved (No.132249)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CSA approved
- CQC approved



### Description

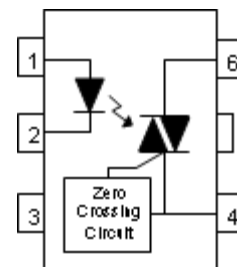
The EL303X(P5), EL304X(P5), EL306X(P5) and EL308X(P5) series of devices each consist of a GaAs infrared emitting diode optically coupled to a monolithic silicon zero voltage crossing photo triac.

They are designed for use with a discrete power triac in the interface of logic systems to equipment powered from 110 to 380 VAC lines, such as solid-state relays, industrial controls, motors, solenoids and consumer appliances.

### Applications

- Solenoid/valve controls
- Light controls
- Static power switch
- AC motor drivers
- E.M. contactors
- Temperature controls
- AC Motor starters

### Schematic



### Pin Configuration

1. Anode
2. Cathode
3. No Connection
4. Terminal
5. Pin Cut
6. Terminal

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

| Parameter                           |                                      |        | Symbol           | Rating   | Unit  |
|-------------------------------------|--------------------------------------|--------|------------------|----------|-------|
| Input                               | Forward current                      |        | I <sub>F</sub>   | 60       | mA    |
|                                     | Reverse voltage                      |        | V <sub>R</sub>   | 6        | V     |
|                                     | Power dissipation                    |        | P <sub>D</sub>   | 100      | mW    |
|                                     | Derating factor (above 85℃)          |        |                  | 3.8      | mW /℃ |
| Output                              | Off-state Output<br>Terminal Voltage | EL303X | V <sub>DRM</sub> | 250      | V     |
|                                     |                                      | EL304X |                  | 400      |       |
|                                     |                                      | EL306X |                  | 600      |       |
|                                     |                                      | EL308X |                  | 800      |       |
|                                     | Peak Repetitive Surge Current        |        | I <sub>TSM</sub> | 1        | A     |
|                                     | Power dissipation                    |        | P <sub>D</sub>   | 300      | mW    |
|                                     | Derating factor (above 85℃)          |        |                  | 7.6      | mW /℃ |
| Isolation voltage <sup>*1</sup>     |                                      |        | V <sub>iso</sub> | 5000     | V rms |
| Total power dissipation             |                                      |        | P <sub>D</sub>   | 330      | mW    |
| Operating temperature               |                                      |        | T <sub>opr</sub> | -55~+100 | ℃     |
| Storage temperature                 |                                      |        | T <sub>stg</sub> | -55~+125 | ℃     |
| Soldering temperature <sup>*2</sup> |                                      |        | T <sub>sol</sub> | 260      | ℃     |

**Notes**

\*1 AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1, 2 & 3 are shorted together, and pins 4, 5 & 6 are shorted together.

\*2 For 10 seconds.

### Electrical Characteristics (T<sub>a</sub>=25 °C unless specified otherwise)

#### Input

| Parameter               | Symbol         | Min. | Typ.* | Max. | Unit | Condition             |
|-------------------------|----------------|------|-------|------|------|-----------------------|
| Forward voltage         | V <sub>F</sub> | -    | -     | 1.5  | V    | I <sub>F</sub> = 30mA |
| Reverse Leakage current | I <sub>R</sub> | -    | -     | 10   | μA   | V <sub>R</sub> = 6V   |

#### Output

| Parameter                                                             | Symbol             | Min.              | Typ.* | Max. | Unit | Condition                                                                                     |
|-----------------------------------------------------------------------|--------------------|-------------------|-------|------|------|-----------------------------------------------------------------------------------------------|
| Peak Blocking Current                                                 | EL303X/304X        | I <sub>DRM1</sub> | -     | 100  | nA   | V <sub>DRM</sub> = Rated V <sub>DRM</sub><br>I <sub>F</sub> = 0mA                             |
|                                                                       | EL306X/308X        |                   |       | 500  |      |                                                                                               |
| Peak On-state Voltage                                                 | V <sub>TM</sub>    | -                 | -     | 3    | V    | I <sub>TM</sub> =100mA peak, I <sub>F</sub> =Rated I <sub>FT</sub>                            |
| Critical Rate of Rise of off-state Voltage                            | EL303X /304X /306X | dv/dt             | 1000  | -    | V/μs | V <sub>PEAK</sub> =Rated V <sub>DRM</sub> , I <sub>F</sub> =0<br>(Fig. 10)                    |
|                                                                       | EL308X             |                   | 600   | -    |      |                                                                                               |
| Inhibit Voltage (MT1-MT2 voltage above which device will not trigger) | V <sub>INH</sub>   | -                 | -     | 20   | V    | I <sub>F</sub> = Rated I <sub>FT</sub>                                                        |
| Leakage in Inhibited State                                            | I <sub>DRM2</sub>  | -                 | -     | 500  | μA   | I <sub>F</sub> = Rated I <sub>FT</sub> , V <sub>DRM</sub> =Rated V <sub>DRM</sub> , off state |

#### Transfer Characteristics

| Parameter           | Symbol                               | Min.            | Typ.* | Max. | Unit | Condition                |
|---------------------|--------------------------------------|-----------------|-------|------|------|--------------------------|
| LED Trigger Current | EL3031<br>EL3041<br>EL3061<br>EL3081 | I <sub>FT</sub> | -     | 15   | mA   | Main terminal Voltage=3V |
|                     | EL3032<br>EL3042<br>EL3062<br>EL3082 |                 | -     | 10   |      |                          |
|                     | EL3033<br>EL3043<br>EL3063<br>EL3083 |                 | -     | 5    |      |                          |
| Holding Current     | I <sub>H</sub>                       | -               | 280   | -    | μA   |                          |

\* Typical values at T<sub>a</sub> = 25 °C

### Typical Performance Curves

Figure 1. Forward Current vs Forward Voltage

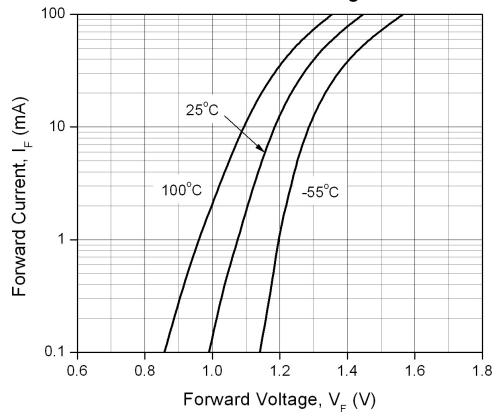


Figure 2. On-State Characteristics

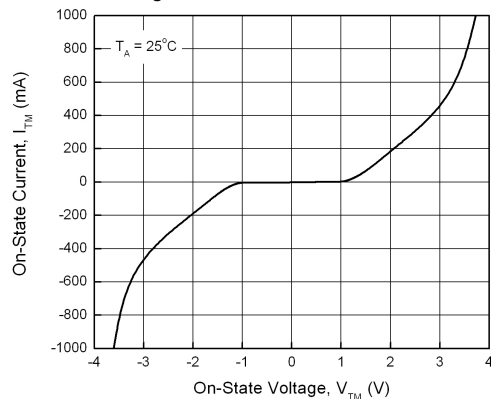


Figure 3. Holding Current vs. Ambient Temperature

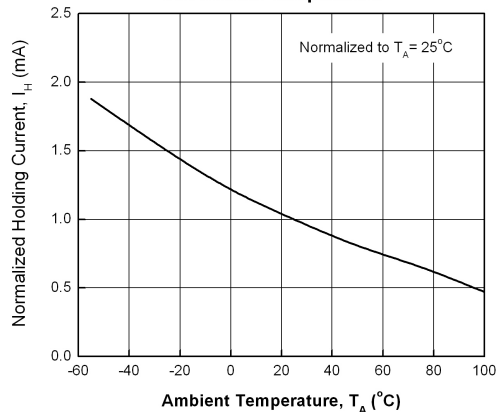


Figure 4. LED Current Required to Trigger vs. LED Pulse Width

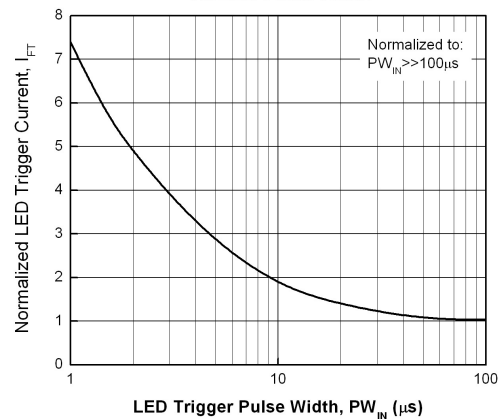


Figure 5. Leakage Current vs. Ambient Temperature

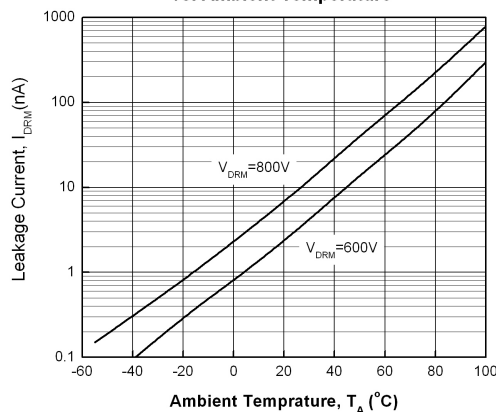


Figure 6. LED Trigger Current vs. Ambient Temperature

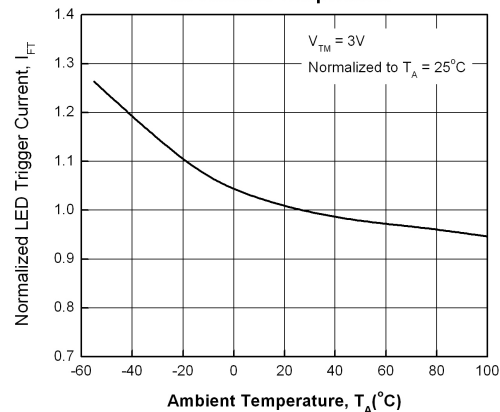


Figure 7. Off-State Output Terminal Voltage  
vs. Ambient Temperature

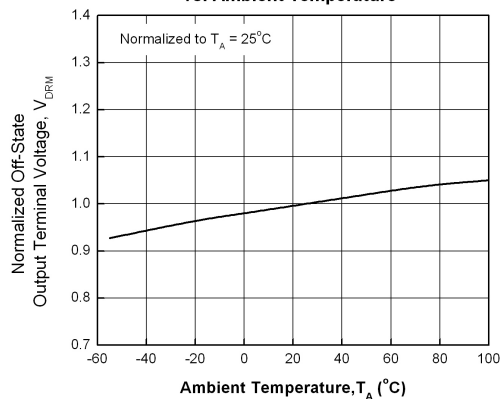


Figure 8. Leakage in Inhibit State  
vs. Ambient Temperature

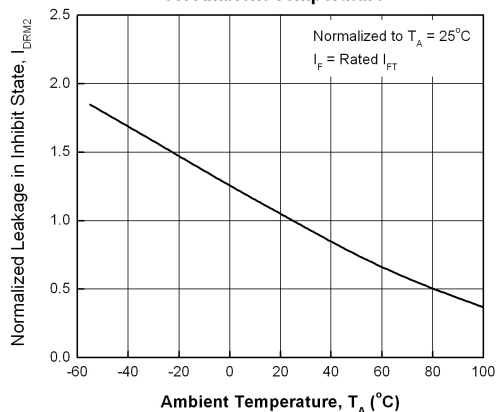


Figure 9. Inhibit Voltage  
vs. Ambient Temperature

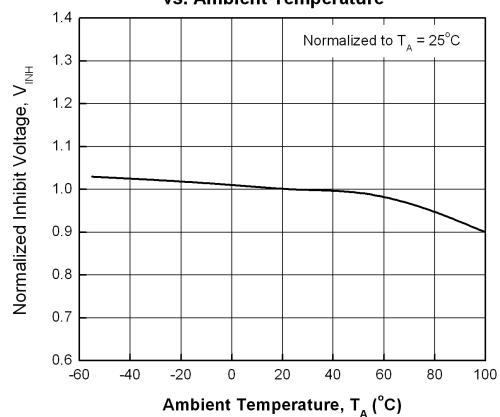
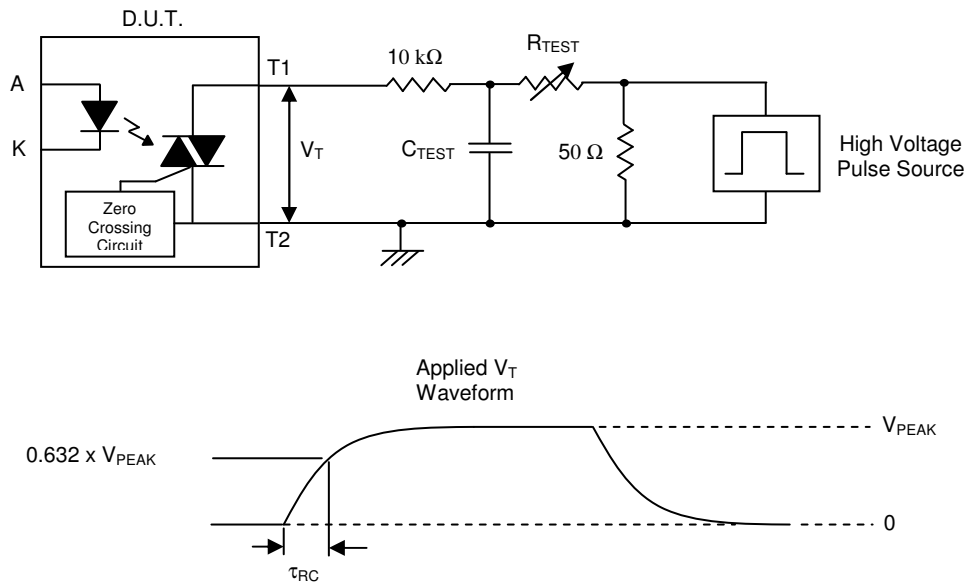


Figure 10. Static dv/dt Test Circuit & Waveform



### Measurement Method

The high voltage pulse is set to the required  $V_{PEAK}$  value and applied to the D.U.T. output side through the RC circuit above. LED current is not applied. The waveform  $V_T$  is monitored using a x100 scope probe. By varying  $R_{TEST}$ , the dv/dt (slope) is increased, until the D.U.T. is observed to trigger (waveform collapses). The dv/dt is then decreased until the D.U.T. stops triggering. At this point,  $\tau_{RC}$  is recorded and the dv/dt calculated.

$$dv/dt = \frac{0.632 \times V_{PEAK}}{\tau_{RC}}$$

For example,  $V_{PEAK} = 600V$  for EL306X series. The dv/dt value is calculated as follows:

$$dv/dt = \frac{0.63 \times 600}{\tau_{RC}} = \frac{378}{\tau_{RC}}$$

**Order Information****Part Number**

**EL303XY(Z)(P5)-V**  
or **EL304XY(Z)(P5)-V**  
or **EL306XY(Z)(P5)-V**  
or **EL308XY(Z)(P5)-V**

Note

X = Part No. (1, 2 or 3)

Y = Lead form option (S, S1, M or none)

Z = Tape and reel option (TA, TB or none).

P5 = 5 pins type

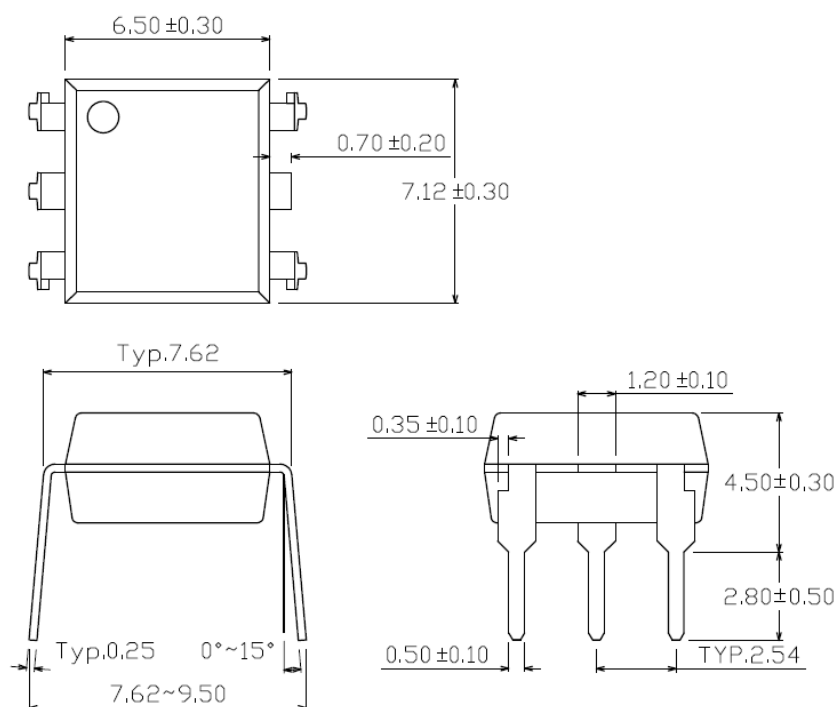
V = VDE safety approved (optional)

| Option  | Description                                                   | Packing quantity    |
|---------|---------------------------------------------------------------|---------------------|
| None    | Standard DIP-6                                                | 65 units per tube   |
| M       | Wide lead bend (0.4 inch spacing)                             | 65 units per tube   |
| S (TA)  | Surface mount lead form + TA tape & reel option               | 1000 units per reel |
| S (TB)  | Surface mount lead form + TB tape & reel option               | 1000 units per reel |
| S1 (TA) | Surface mount lead form (low profile) + TA tape & reel option | 1000 units per reel |
| S1 (TB) | Surface mount lead form (low profile) + TB tape & reel option | 1000 units per reel |

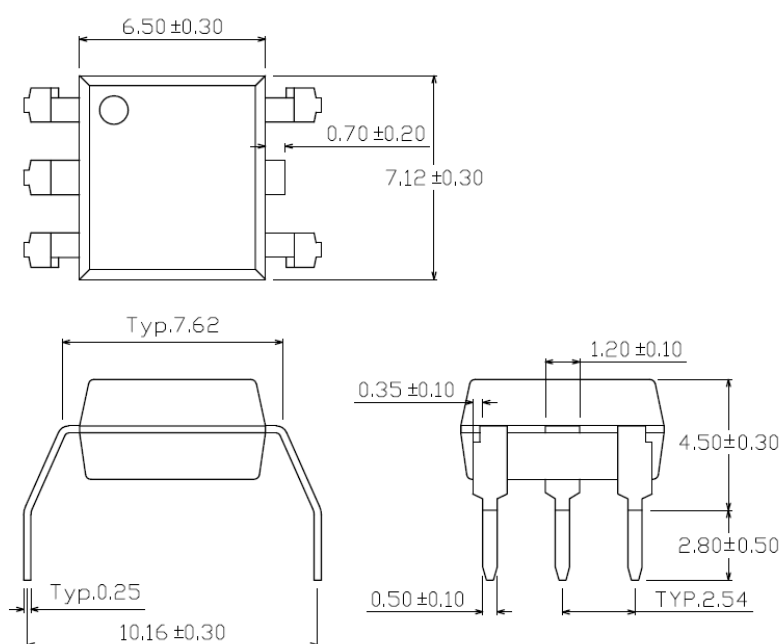
### Package Drawings

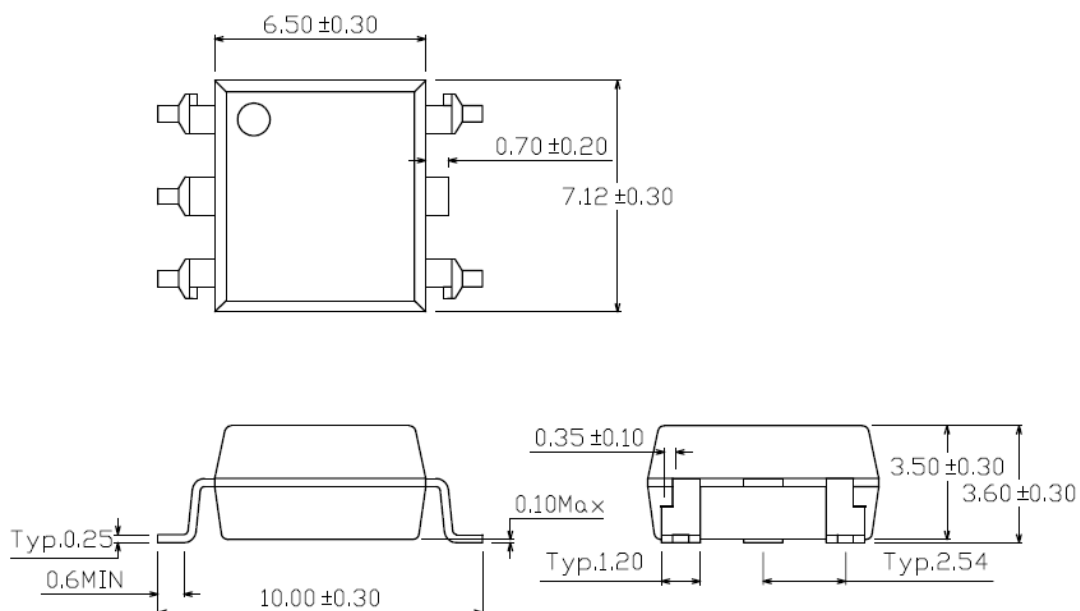
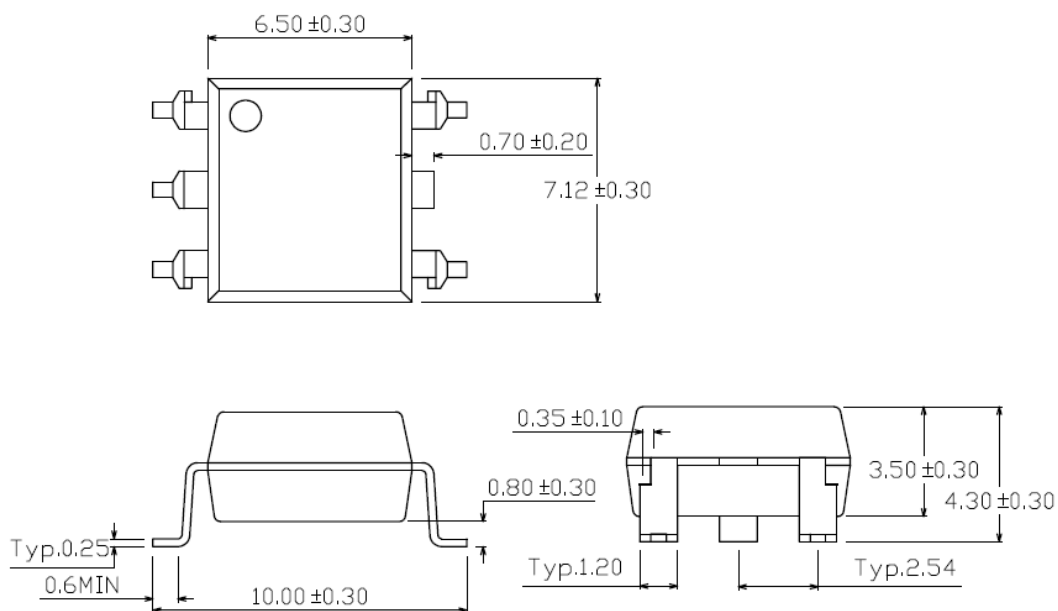
(Dimensions in mm)

#### Standard DIP Type

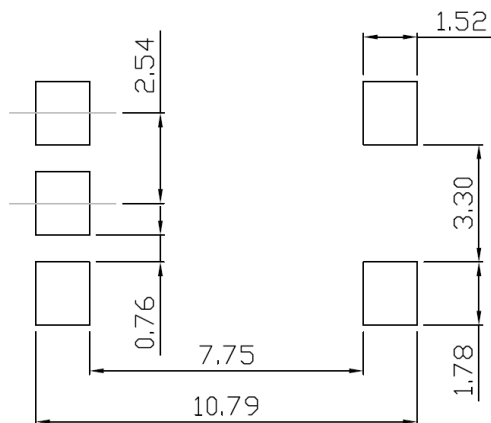


#### Option M Type

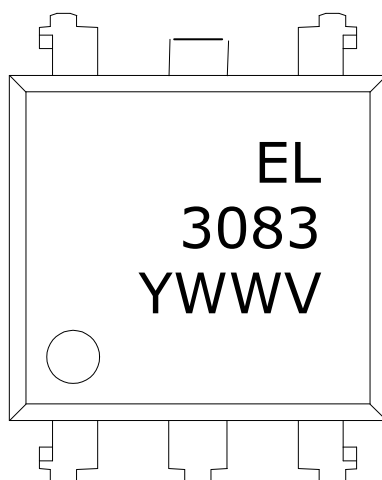




### Recommended pad layout for surface mount leadform



### Device Marking

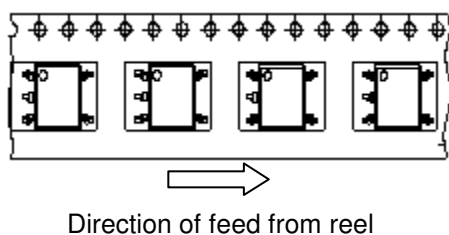


### Notes

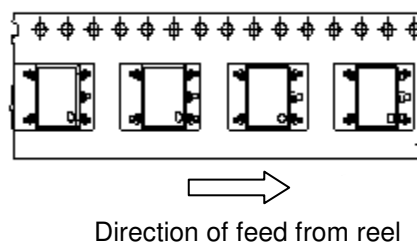
|      |                           |
|------|---------------------------|
| EL   | denotes Everlight         |
| 3083 | denotes Device Number     |
| Y    | denotes 1 digit Year code |
| WW   | denotes 2 digit Week code |
| V    | denotes VDE optional      |

### Tape & Reel Packing Specifications

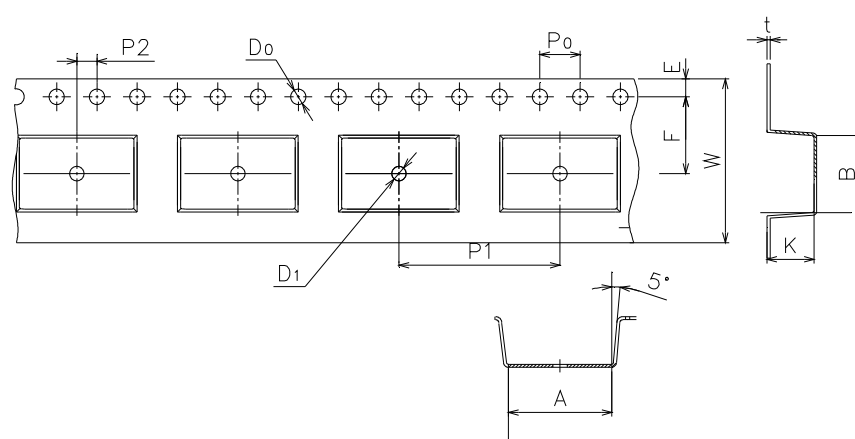
**Option TA**



**Option TB**



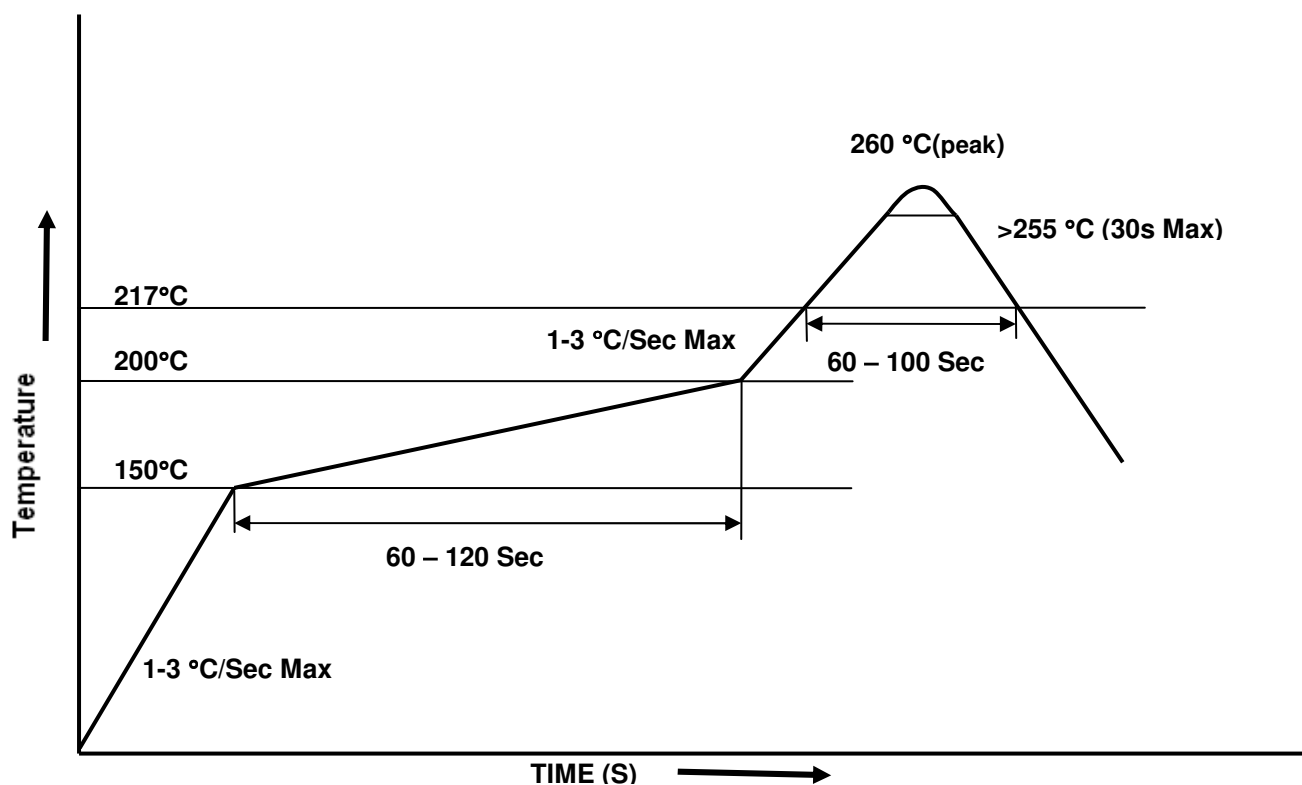
### Tape dimensions



| Dimension No.  | A        | B        | Do         | D1         | E        | F       |
|----------------|----------|----------|------------|------------|----------|---------|
| Dimension (mm) | 10.4±0.1 | 7.52±0.1 | 1.5+0.1/-0 | 1.5+0.1/-0 | 1.75±0.1 | 7.5±0.1 |

| Dimension No.  | Po       | P1      | P2      | t         | W        | K       |
|----------------|----------|---------|---------|-----------|----------|---------|
| Dimension (mm) | 4.0±0.15 | 1.6±0.1 | 2.0±0.1 | 0.35±0.03 | 16.0±0.2 | 4.5±0.1 |

### Solder Reflow Temperature Profile



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