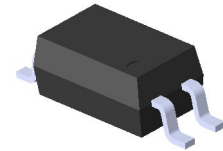
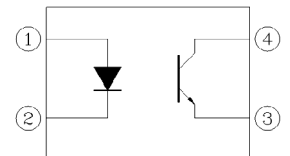


### Features:

- Halogens free
- Current transfer ratio  
(CTR: 50~600% at  $I_F = 5\text{mA}$ ,  $V_{CE} = 5\text{V}$ )  
(CTR: 40~320% at  $I_F = 10\text{mA}$ ,  $V_{CE} = 5\text{V}$ )
- High isolation voltage between input and output (Viso=3750 V rms )
- Compact 4 Pin SSOP with a 2.0 mm profile
- Pb free and RoHS compliant.
- UL approved (No. 214129)
- VDE approval (132249)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CSA approved



### Schematic



### 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.

### Pin Configuration

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

### Applications

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

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

| Parameter                           |                                                                          | Symbol    | Rating     | Unit                   |
|-------------------------------------|--------------------------------------------------------------------------|-----------|------------|------------------------|
| Input                               | Forward current                                                          | $I_F$     | 50         | mA                     |
|                                     | Peak forward current (1us, pulse)                                        | $I_{FP}$  | 1          | A                      |
|                                     | Reverse voltage                                                          | $V_R$     | 6          | V                      |
|                                     | Power dissipation<br>Derating factor (above $T_a = 90^{\circ}\text{C}$ ) | $P_D$     | 70         | mW                     |
|                                     |                                                                          |           | 2.0        | mW/ $^{\circ}\text{C}$ |
| Output                              | Power dissipation<br>Derating factor (above $T_a = 70^{\circ}\text{C}$ ) | $P_C$     | 150        | mW                     |
|                                     |                                                                          |           | 3.1        | mW/ $^{\circ}\text{C}$ |
|                                     | Collector current                                                        | $I_C$     | 50         | mA                     |
|                                     | Collector-Emitter voltage                                                | $V_{CEO}$ | 80         | V                      |
|                                     | Emitter-Collector voltage                                                | $V_{ECO}$ | 7          | V                      |
| Total power dissipation             |                                                                          | $P_{TOT}$ | 200        | mW                     |
| Isolation voltage <sup>*1</sup>     |                                                                          | $V_{ISO}$ | 3750       | V rms                  |
| Operating temperature               |                                                                          | $T_{OPR}$ | -55 ~ +110 | $^{\circ}\text{C}$     |
| Storage temperature                 |                                                                          | $T_{STG}$ | -55 ~ +125 | $^{\circ}\text{C}$     |
| Soldering temperature <sup>*2</sup> |                                                                          | $T_{SOL}$ | 260        | $^{\circ}\text{C}$     |

### 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.

## 4 PIN ULTRA SMALL SSOP PHOTOTRANSISTOR PHOTOCOUPLER

## EL3H7-G Series

### Electrical Characteristics ( $T_a=25^{\circ}\text{C}$ 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            | $V = 0, f = 1\text{kHz}$ |

#### 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 ( $T_a=25^{\circ}\text{C}$ 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  |      | $I_F = 10\text{mA}, V_{CE} = 5\text{V}$ |
|                        | EL3H7H | 40   | -     | 80   |      |                                         |
|                        | EL3H7I | 63   | -     | 125  |      |                                         |
|                        | EL3H7J | 100  | -     | 200  |      |                                         |
|                        | EL3H7K | 160  | -     | 320  |      |                                         |

**Transfer Characteristics ( $T_a=25^{\circ}\text{C}$  unless specified otherwise)**

| Parameter                            | Symbol        | Min.               | Typ.* | Max. | Unit          | Condition                                                        |
|--------------------------------------|---------------|--------------------|-------|------|---------------|------------------------------------------------------------------|
| Collector-Emitter saturation voltage | $V_{CE(sat)}$ | -                  | 0.1   | 0.2  | V             | $I_F = 10\text{mA}$ , $I_C = 1\text{mA}$                         |
| Isolation resistance                 | $R_{IO}$      | $5 \times 10^{10}$ | -     | -    | $\Omega$      | $V_{IO} = 500\text{Vdc}$ ,<br>40~60% R.H.                        |
| Floating capacitance                 | $C_{IO}$      | -                  | 0.3   | 1.0  | pF            | $V_{IO} = 0$ , $f = 1\text{MHz}$                                 |
| Rise time                            | $t_r$         | -                  | 5     | 18   | $\mu\text{s}$ | $V_{CE} = 2\text{V}$ , $I_C = 2\text{mA}$ ,<br>$R_L = 100\Omega$ |
| Fall time                            | $t_f$         | -                  | 3     | 18   | $\mu\text{s}$ |                                                                  |

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

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### Typical Performance Curves

Figure 1. Forward Current vs Forward Voltage

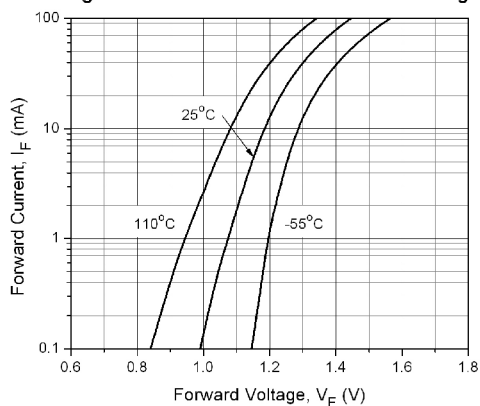


Figure 2. Normalized Collector Current vs Forward Current

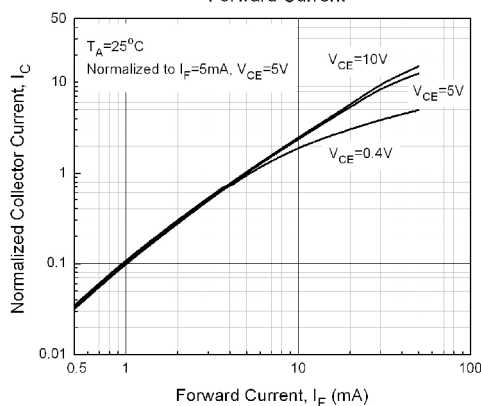


Figure 3. Normalized Current Transfer Ratio vs Forward Current

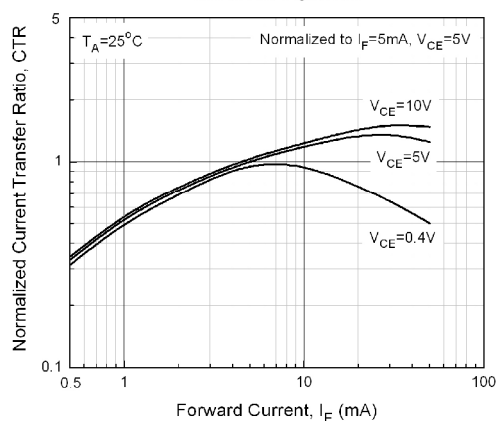


Figure 4. Normalized Collector Current vs Ambient Temperature

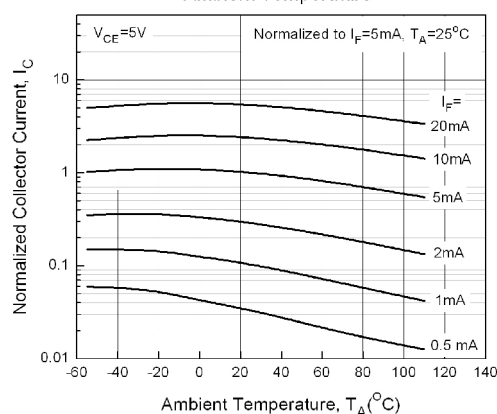


Figure 5. Normalized Current Transfer Ratio vs Ambient Temperature

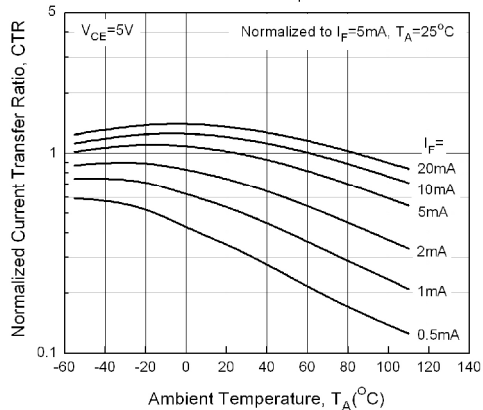


Figure 6. Collector Current vs Collector-Emitter Voltage

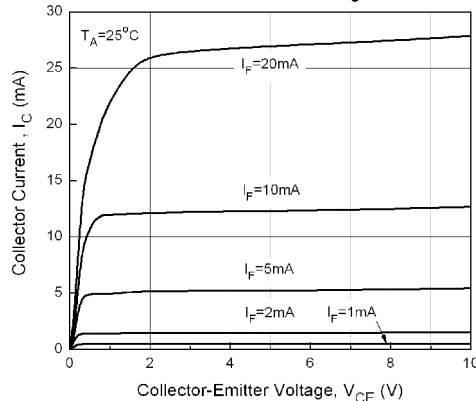


Figure 7. Collector Current vs Collector-Emitter Voltage

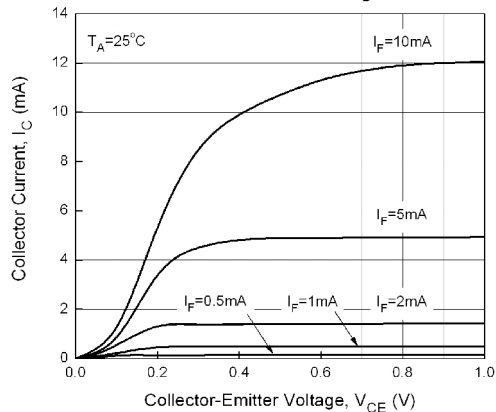


Figure 8. Collector Dark Current vs Ambient Temperature

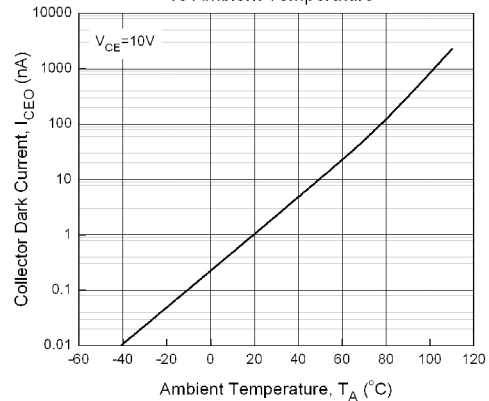


Figure 9. Collector-Emitter Saturation Voltage vs Ambient Temperature

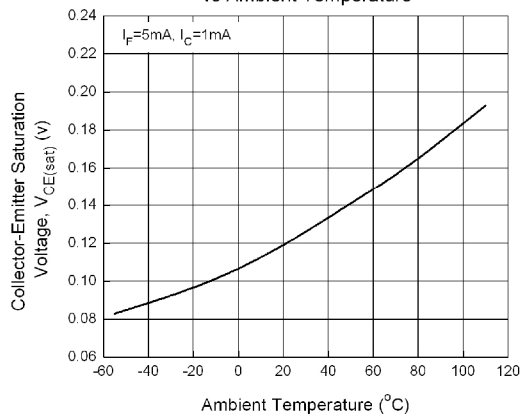


Figure 10. Switching Time vs Load Resistance

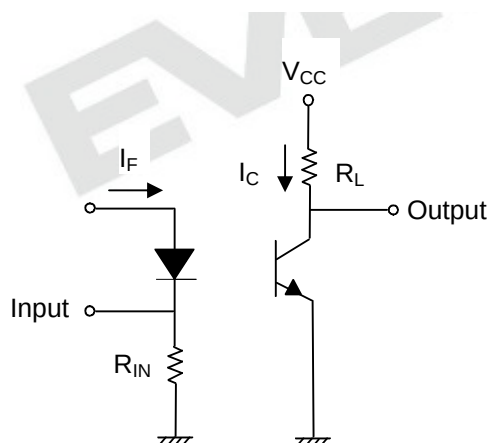
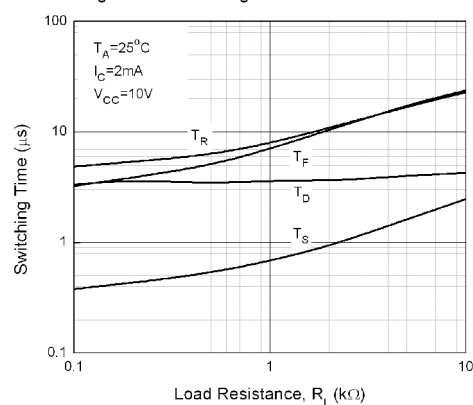


Figure 11. Switching Time Test Circuit & Waveforms

**Order Information****Part Number****EL3H7(X)(Y)-VG****Note**

3H7 = Part No.

X = CTR Rank (A, B, C, D, E, F, H, I, J, K or none)

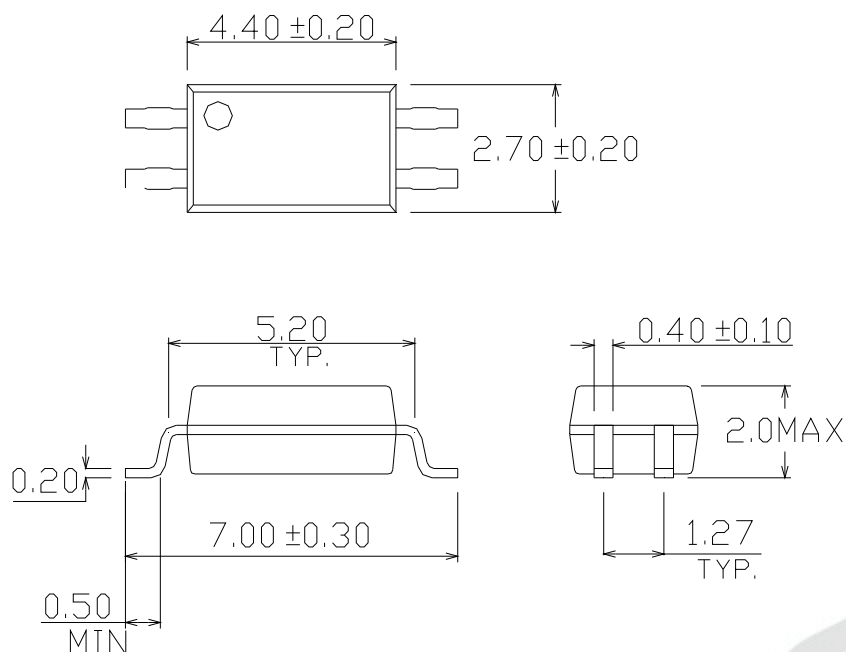
Y = Tape and reel option (TA, TB, EA, EB or none).

V = VDE (optional)

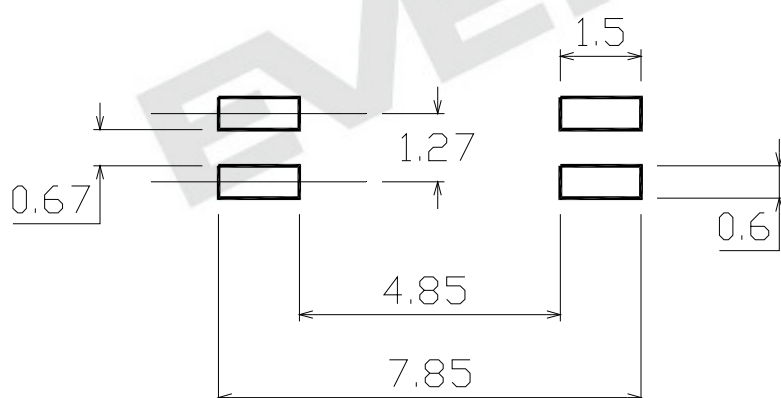
G = Halogens free

| Option | Description                 | Packing quantity    |
|--------|-----------------------------|---------------------|
| None   | Standard SMD option         | 100 units per tube  |
| -V     | Standard SMD option + VDE   | 100 units per tube  |
| (TA)   | TA Tape & reel option       | 5000 units per reel |
| (TB)   | TB Tape & reel option       | 5000 units per reel |
| (TA)-V | TA Tape & reel option + VDE | 5000 units per reel |
| (TB)-V | TB Tape & reel option + VDE | 5000 units per reel |
| (EA)   | TA Tape & reel option       | 1000 units per reel |
| (EB)   | TB Tape & reel option       | 1000 units per reel |
| (EA)-V | TA Tape & reel option + VDE | 1000 units per reel |
| (EB)-V | TB Tape & reel option + VDE | 1000 units per reel |

### Package Drawing (Dimensions in mm)



### Recommended pad layout for surface mount leadform





### Device Marking



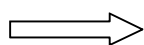
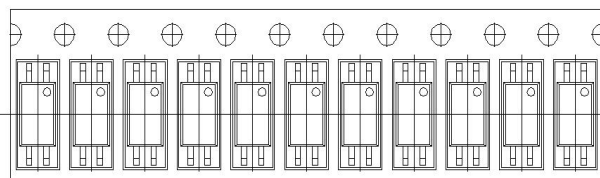
### Notes

|     |                                                         |
|-----|---------------------------------------------------------|
| 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)                                  |

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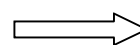
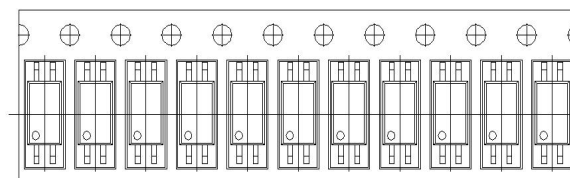
### Tape & Reel Packing Specifications

**Option TA**



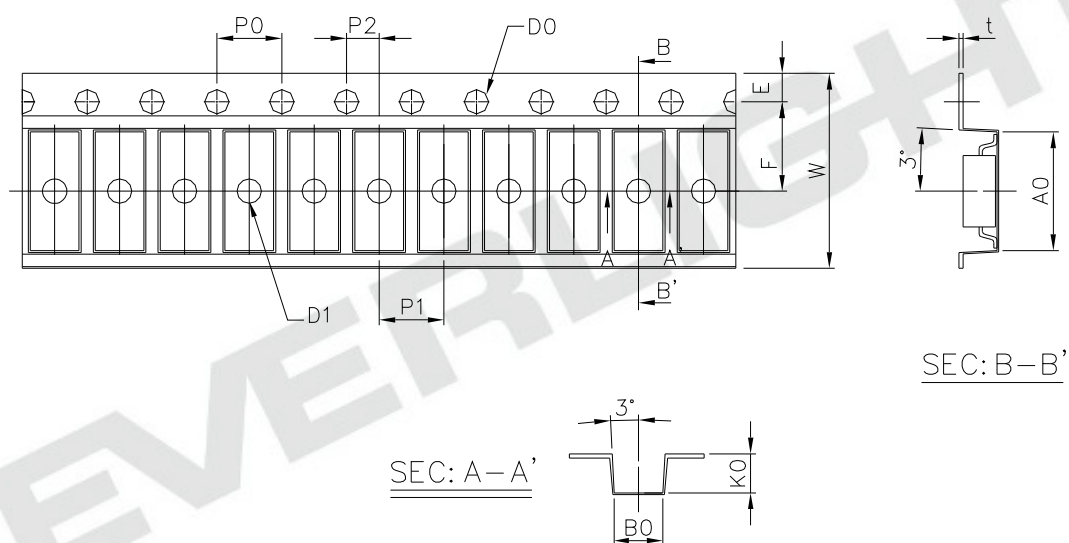
Direction of feed from reel

**Option TB**



Direction of feed from reel

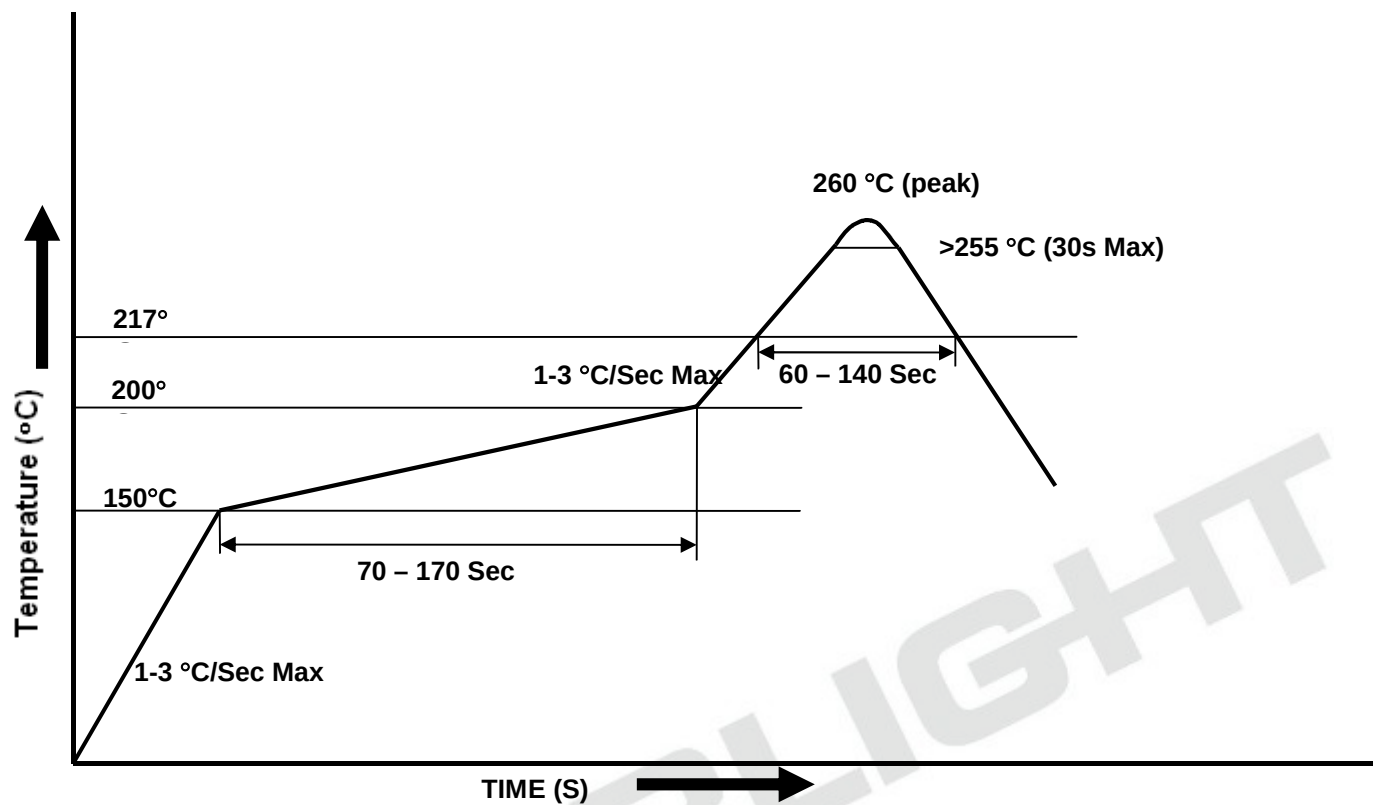
### Tape dimensions



| Dimension No.  | A             | B             | D0             | D1            | E              | F             |
|----------------|---------------|---------------|----------------|---------------|----------------|---------------|
| Dimension (mm) | $3.0 \pm 0.1$ | $7.3 \pm 0.1$ | $1.5 + 0.1/-0$ | $1.5 \pm 0.1$ | $1.75 \pm 0.1$ | $5.5 \pm 0.1$ |

| Dimension No.  | P0             | P1            | P2            | t               | W              | K             |
|----------------|----------------|---------------|---------------|-----------------|----------------|---------------|
| Dimension (mm) | $4.0 \pm 0.15$ | $4.0 \pm 0.1$ | $2.0 \pm 0.1$ | $0.25 \pm 0.03$ | $12.0 \pm 0.2$ | $2.4 \pm 0.1$ |

**Solder Reflow Temperature Profile**

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