



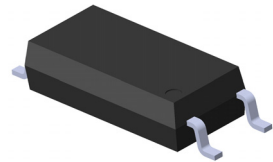
LIGHTING FOREVER

5 PIN LONG CREEPAGE SOP PHOTOTRANSISTOR PHOTOCOUPLER

EL111X-G Series

Features:

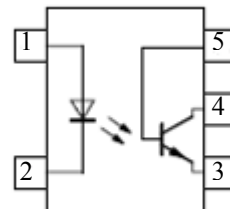
- Free halogens compliant
- Current transfer ratio
(CTR: 50~600% at $I_F = 5\text{mA}$, $V_{CE} = 5\text{V}$)
(CTR: 63~320% at $I_F = 10\text{mA}$, $V_{CE} = 5\text{V}$)
- High isolation voltage between input and output (Viso=5000 V rms)
- Compact 5 Pin SOP with a 2.0 mm profile
- 8mm long creepage distance
- Pb free and RoHS compliant.
- CUL approval (No. E214129)
- VDE approval (No. 40028391)
- SEMKO approved (pending)
- NEMKO approved (pending)
- DEMKO approved (pending)
- FIMKO approved (pending)



Description

The EL111X-G series devices consist of an infrared emitting diode, optically coupled to a phototransistor detector. Compound use free halogens and Sb_2O_3 . They are packaged in a 5-pin SOP package.

Schematic



Pin Configuration

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

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



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

| Parameter | | Symbol | Rating | Unit |
|-------------------------------------|-----------------------------------|-----------|------------|--------------------|
| Input | Forward current | I_F | 60 | mA |
| | Peak forward current (1us, pulse) | I_{FP} | 1.5 | A |
| | Reverse voltage | V_R | 6 | V |
| | Power dissipation | P_D | 100 | mW |
| Output | Power dissipation | P_C | 150 | mW |
| | 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} | 250 | mW |
| Isolation voltage ^{*1} | | V_{ISO} | 5000 | V rms |
| Operating temperature | | T_{OPR} | -55 ~ +110 | $^{\circ}\text{C}$ |
| Storage temperature | | T_{STG} | -55 ~ +125 | $^{\circ}\text{C}$ |
| Soldering temperature ^{*2} | | 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.



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

Input

| Parameter | Symbol | Min. | Typ.* | Max. | Unit | Condition |
|-------------------|----------|------|-------|------|---------------|--------------------------|
| Forward voltage | V_F | - | - | 1.5 | V | $I_F = 50\text{mA}$ |
| Reverse current | I_R | - | - | 10 | μA | $V_R = 6\text{V}$ |
| Input capacitance | C_{in} | - | 50 | - | 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 | EL1110 | CTR | 50 | - | 600 | % | $I_F = 5\text{mA}, V_{CE} = 5\text{V}$ | |
| | EL1116 | | 100 | - | 300 | | | |
| | EL1117 | | 80 | - | 160 | | | |
| | EL1118 | | 130 | - | 260 | | | |
| | EL1119 | | 200 | - | 400 | | | |
| | EL1112 | CTR | 63 | - | 125 | % | $I_F = 10\text{mA}, V_{CE} = 5\text{V}$ | |
| | EL1113 | | 100 | - | 200 | | | |
| | EL1114 | | 160 | - | 320 | | | |
| | EL1112 | | 22 | - | - | | | $I_F = 1\text{mA}, V_{CE} = 5\text{V}$ |
| | EL1113 | | 34 | - | - | | | |
| | EL1114 | | 56 | - | - | | | |
| | Collector-Emitter saturation voltage | $V_{CE(sat)}$ | - | - | 0.4 | V | $I_F = 10\text{mA}, I_C = 1\text{mA}$ | |
| Isolation resistance | R_{IO} | 5×10^{10} | - | - | Ω | $V_{IO} = 500\text{Vdc}, 40\sim 60\% \text{ R.H.}$ | | |
| Floating capacitance | C_{IO} | - | - | 1.0 | pF | $V_{IO} = 0, f = 1\text{MHz}$ | | |



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

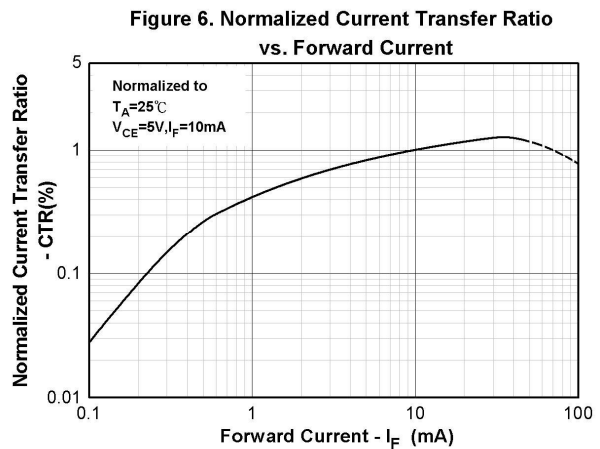
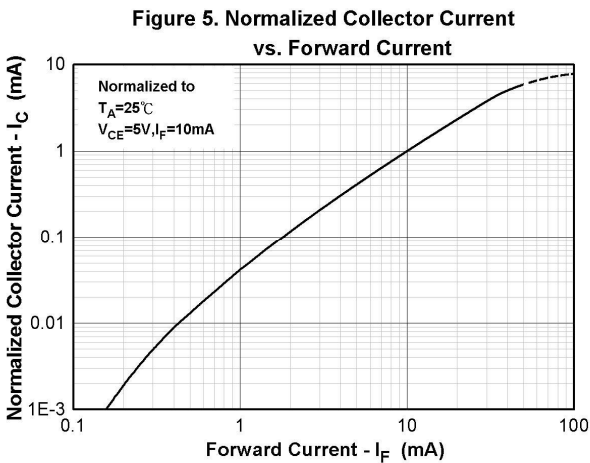
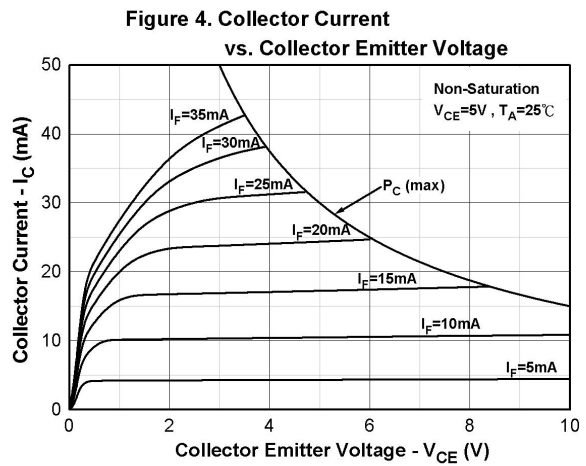
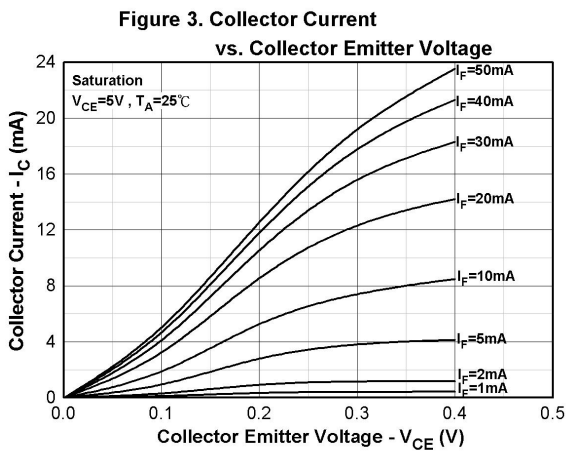
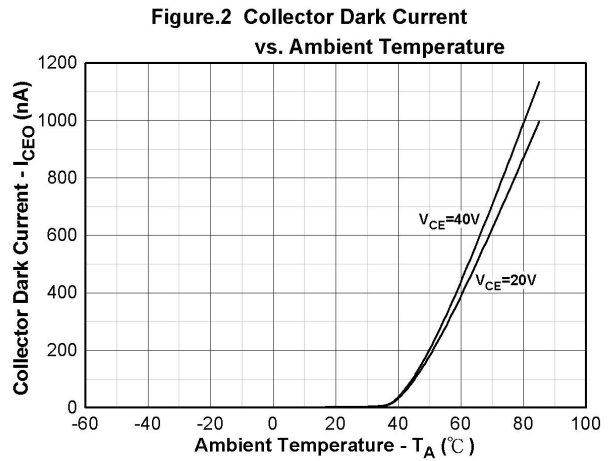
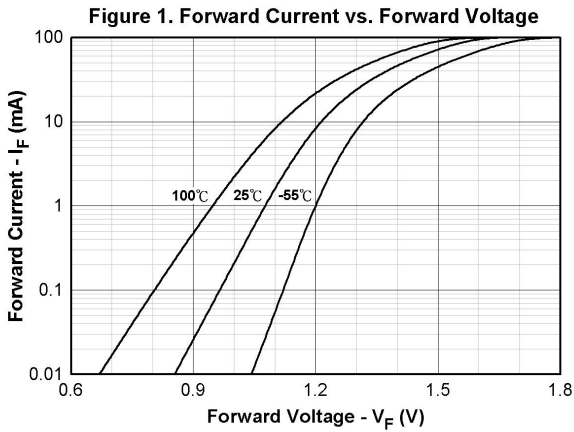
| | | | | | | |
|---------------|-------|---|---|----|---------------|--|
| Turn on time | Ton | - | 4 | - | μs | $V_{CE} = 5\text{V}, I_C = 5\text{mA},$ $R_L = 100\Omega$ |
| Turn off time | Toff | - | 3 | - | | |
| Rise time | t_r | - | 2 | 18 | μs | $V_{CE} = 5\text{V}, I_C = 5\text{mA},$ $R_L = 100\Omega$ |
| Fall time | t_f | - | 3 | 18 | μs | |

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

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Typical Performance Curves



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Figure 7. Normalized Current Transfer Ratio vs. Ambient Temperature

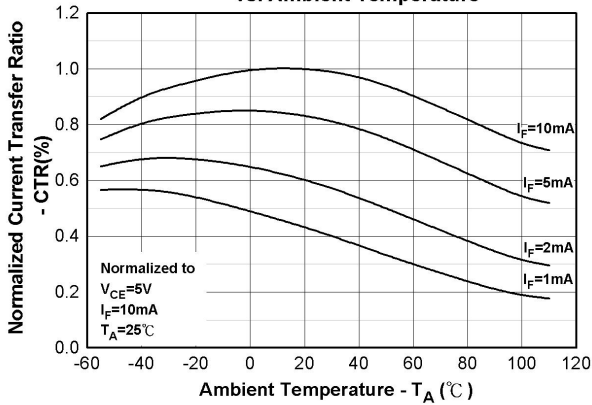


Figure 8. Normalized Current Transfer Ratio vs. Ambient Temperature

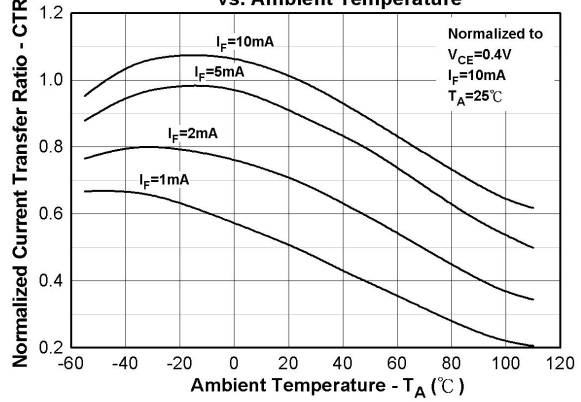


Figure 9. Turn on/off Time vs. Collector Current

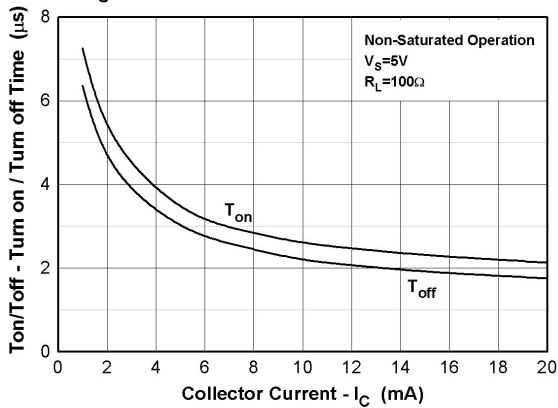


Figure 10. Turn on/off Time vs. Forward Current

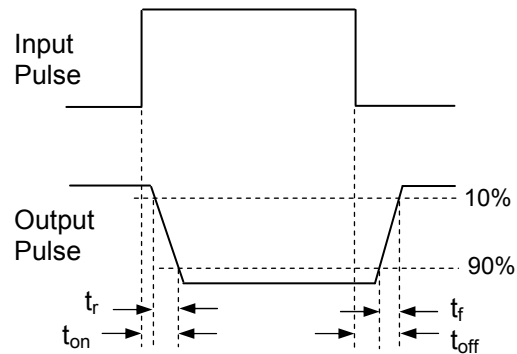
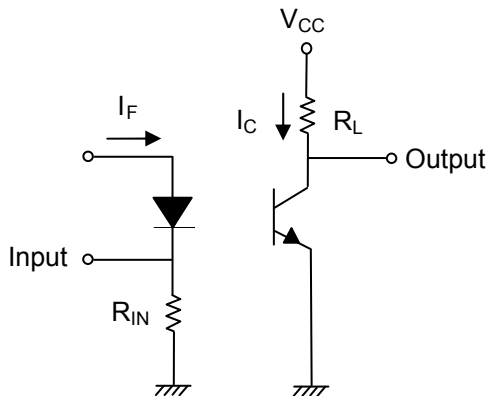
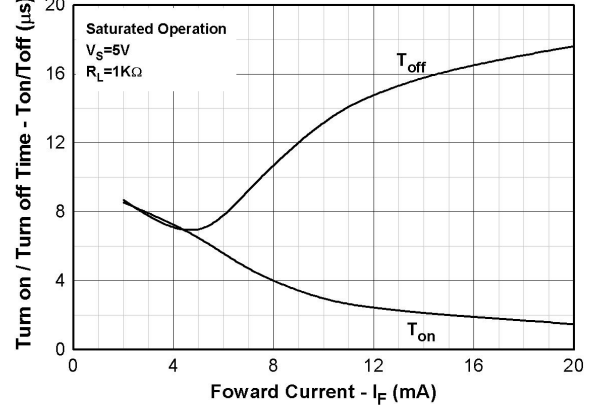


Figure 11. Switching Time Test Circuit & Waveforms



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EL111X-G Series

Order Information

Part Number

EL111X(Y)-VG

Note

EL111 = Part No.

X = CTR Rank (0, 2, 3, 4, 7, 8 or 9)

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

V = VDE safety (optional)

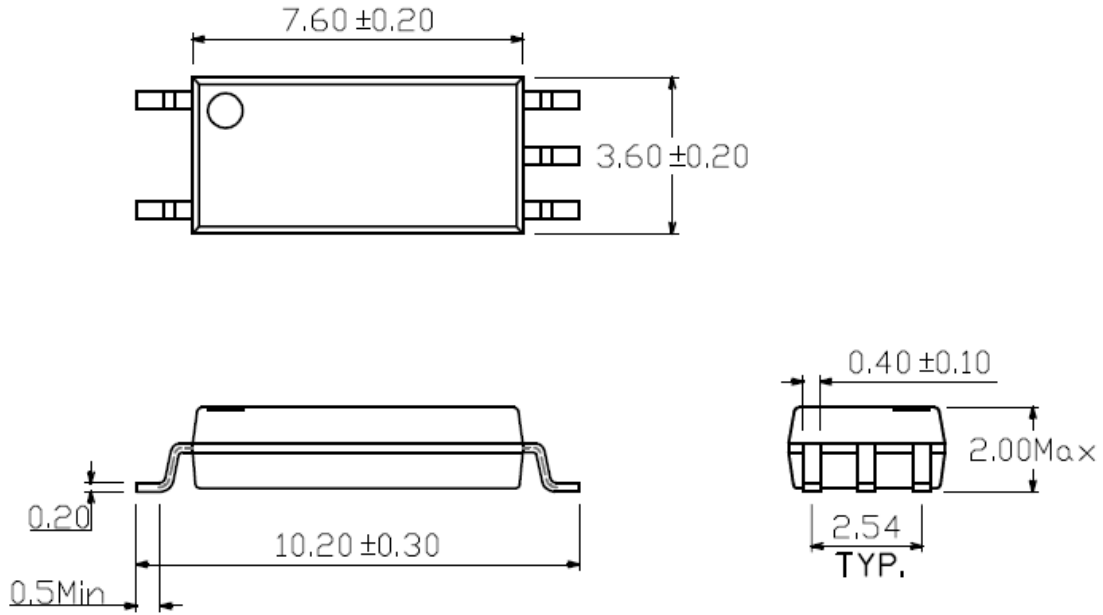
G = Halogens free

| 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 | 2000 units per reel |
| (TB) | TB Tape & reel option | 2000 units per reel |
| (TA)-V | TA Tape & reel option + VDE | 2000 units per reel |
| (TB)-V | TB Tape & reel option + VDE | 2000 units per reel |

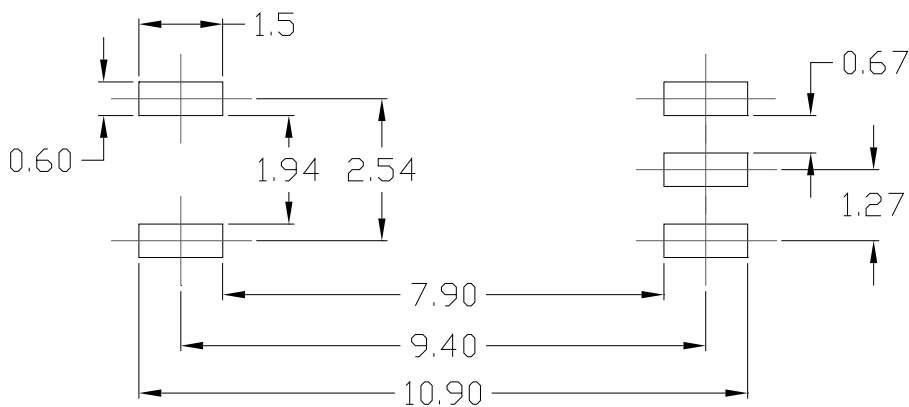
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EL111X-G Series

Package Drawing
(Dimensions in mm)



Recommended pad layout for surface mount leadform



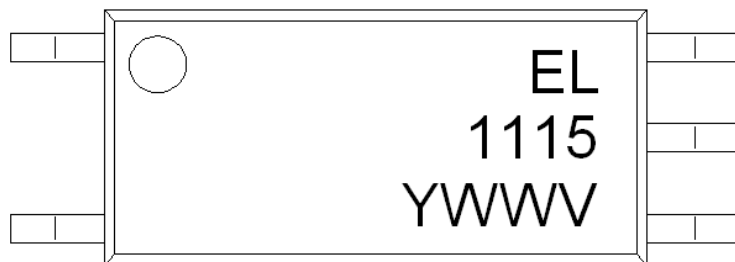


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Device Marking



Notes

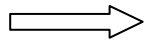
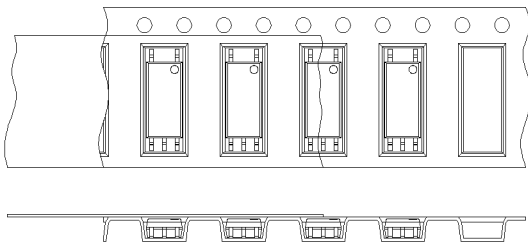
| | |
|------|---------------------------|
| EL | denotes Everlight |
| 1115 | denotes Device Number |
| Y | denotes 1 digit Year code |
| WW | denotes 2 digit Week code |
| V | denotes VDE (optional) |

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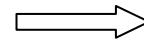
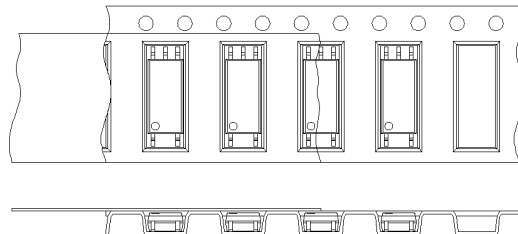
Tape & Reel Packing Specifications

Option TA



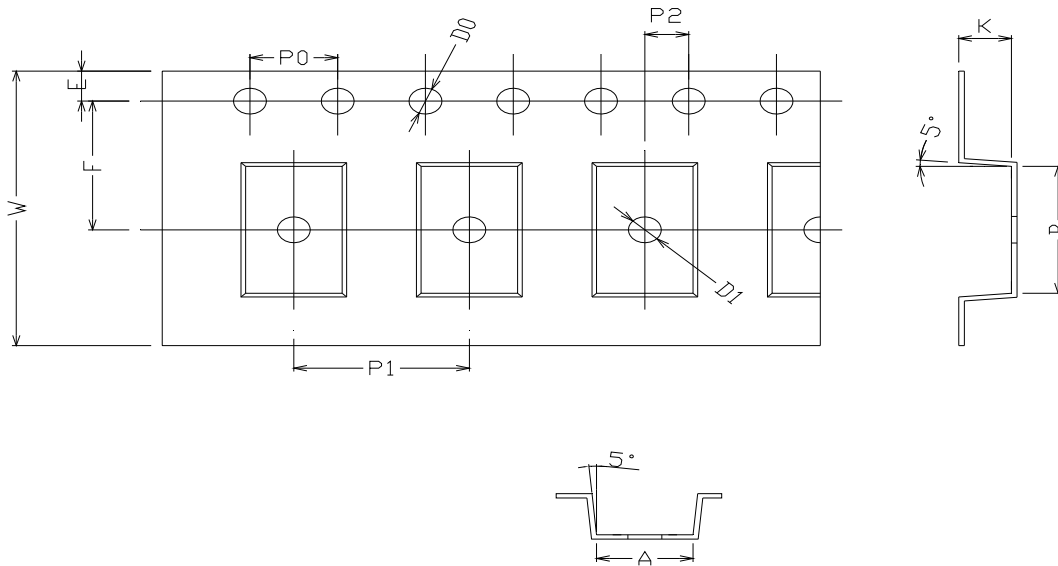
Direction of feed from reel

Option TB



Direction of feed from reel

Tape dimensions



| Dimension No. | A | B | Do | D1 | E | F |
|----------------|-----------|------------|--------------|-----------|------------|-----------|
| Dimension (mm) | 4.4 ± 0.1 | 10.5 ± 0.1 | 1.5 + 0.1/-0 | 1.5 ± 0.1 | 1.75 ± 0.1 | 7.5 ± 0.1 |

| Dimension No. | Po | P1 | P2 | t | W | K |
|----------------|-----------|-----------|-----------|------------|------------|------------|
| Dimension (mm) | 3.8 ± 0.1 | 8.0 ± 0.1 | 2.0 ± 0.1 | 0.3 ± 0.05 | 16.0 ± 0.3 | 2.14 ± 0.1 |

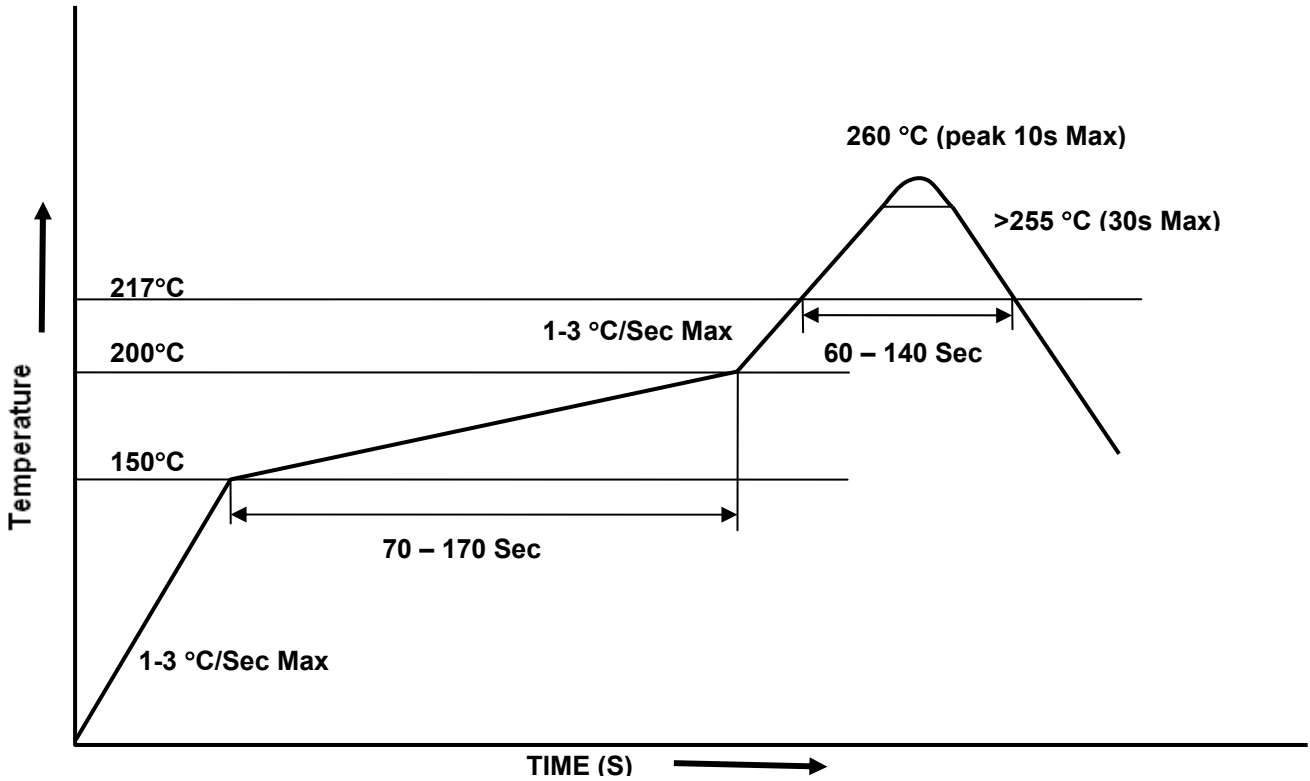


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Solder Reflow Temperature Profile





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