



LIGHTING FOREVER

4 PIN SOP PHOTOTRANSISTOR PHOTOCOUPLER

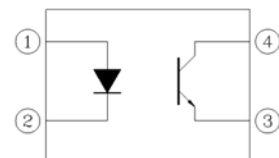
EL357-G Series

Features:

- Halogens free
- Current transfer ratio
(CTR: 50~600% at $I_F = 5\text{mA}$, $V_{CE} = 5\text{V}$)
- High isolation voltage between input and output ($V_{iso} = 3750\text{ V rms}$)
- Compact small outline package
- Pb free and RoHS compliant.
- UL approved (No. E214129)
- VDE approved (No. 132249)
- SEMKO approved (No. 7161608)
- NEMKO approved (No. P06206474)
- DEMKO approved (No. 313924)
- FIMKO approved (No. FI 22807)
- CSA approved (No. 1969127)



Schematic



Pin Configuration

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

Description

The EL357 series contains an infrared emitting diode, optically coupled to a phototransistor encapsulated with green compound.

The devices in a 4-pin small outline SMD package.

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 | 50 | mA |
| | Peak forward current (1us, pulse) | I_{FP} | 1 | A |
| | Reverse voltage | V_R | 6 | V |
| | Power dissipation No derating required up to $T_a = 100^{\circ}\text{C}$ | P_D | 70 | mW |
| Output | Power dissipation Derating factor (above $T_a = 80^{\circ}\text{C}$) | P_C | 150 | mW |
| | | | 3.7 | mW/ $^{\circ}\text{C}$ |
| | Collector current | I_C | 80 | mA |
| | Collector-Emitter voltage | V_{CEO} | 80 | V |
| | Emitter-Collector voltage | V_{ECO} | 7 | V |
| Total power dissipation | | P_{TOT} | 200 | mW |
| Isolation voltage ^{*1} | | 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 ^{*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°C unless specified otherwise)

Input

| Parameter | Symbol | Min. | Typ.* | Max. | Unit | Condition |
|-------------------|-----------------|------|-------|------|------|-----------------------|
| Forward voltage | V _F | - | 1.2 | 1.4 | V | I _F = 20mA |
| Reverse current | I _R | - | - | 10 | μA | V _R = 4V |
| Input capacitance | C _{in} | - | 30 | 250 | pF | V = 0, f = 1kHz |

Output

| Parameter | Symbol | Min. | Typ.* | Max. | Unit | Condition |
|-------------------------------------|-------------------|------|-------|------|------|---|
| Collector-Emitter dark current | I _{CEO} | - | - | 100 | nA | V _{CE} = 20V, I _F = 0mA |
| Collector-Emitter breakdown voltage | BV _{CEO} | 80 | - | - | V | I _C = 0.1mA |
| Emitter-Collector breakdown voltage | BV _{ECO} | 7 | - | - | V | I _E = 0.1mA |

Transfer Characteristics (T_a=25°C unless specified otherwise)

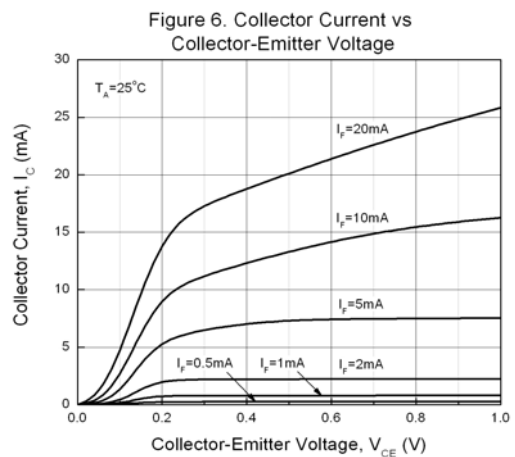
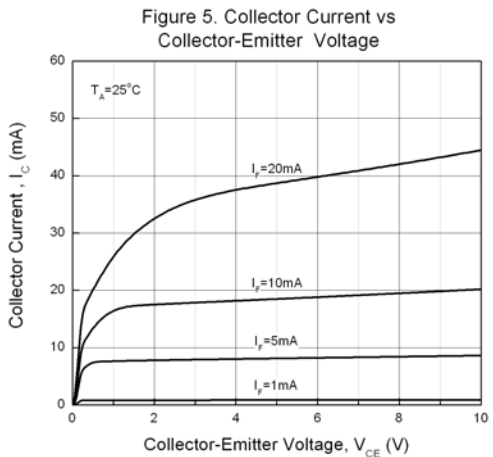
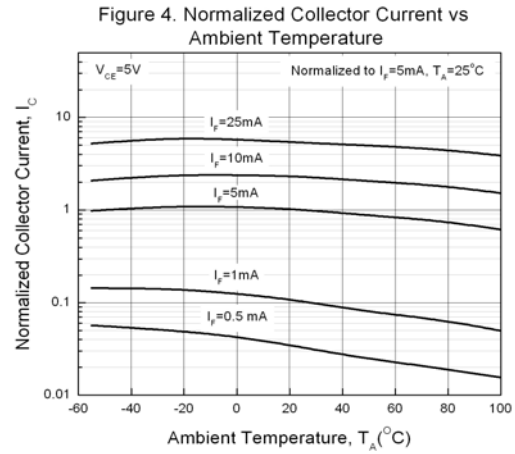
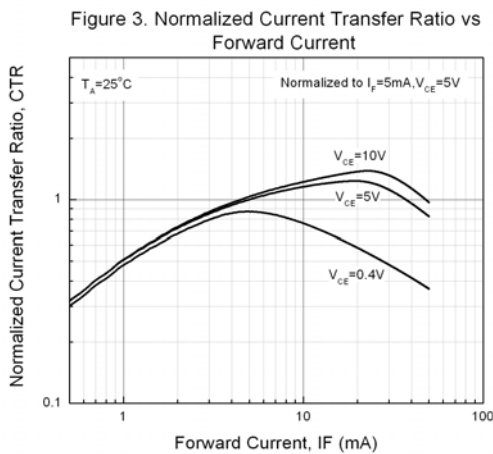
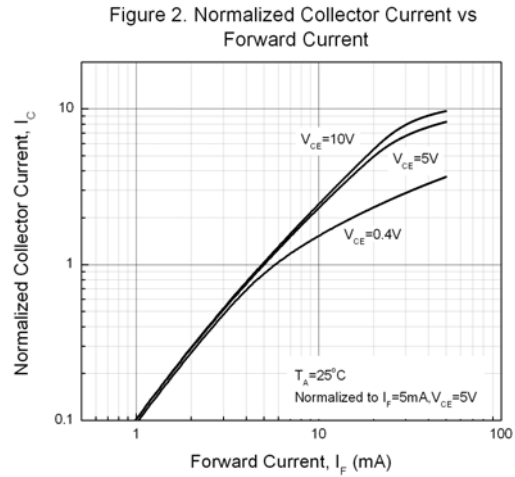
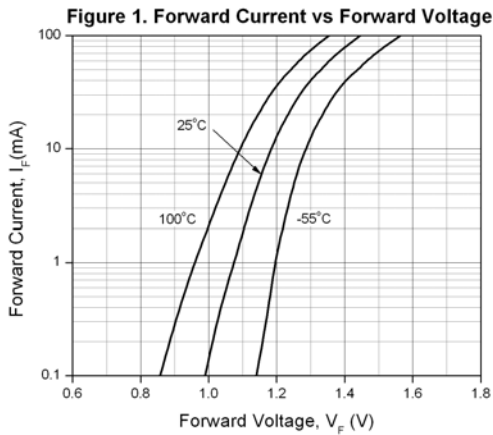
| Parameter | Symbol | Min. | Typ.* | Max. | Unit | Condition |
|--------------------------------------|----------------------|--------------------|-------|------|------|---|
| Current Transfer ratio | EL357 | 50 | - | 600 | % | I _F = 5mA, V _{CE} = 5V |
| | EL357A | 80 | - | 160 | | |
| | EL357B | 130 | - | 260 | | |
| | EL357C | 200 | - | 400 | | |
| | EL357D | 300 | - | 600 | | |
| Collector-Emitter saturation voltage | V _{CE(sat)} | - | 0.1 | 0.2 | V | I _F = 1mA, I _C = 20mA |
| Isolation resistance | R _{IO} | 5×10 ¹⁰ | - | - | Ω | V _{IO} = 500Vdc, 40~60% R.H. |
| Floating capacitance | C _{IO} | - | 0.6 | 1.0 | pF | V _{IO} = 0, f = 1MHz |
| Cut-off frequency | f _c | - | 80 | - | kHz | V _{CE} = 5V, I _C = 2mA R _L = 100Ω, -3dB |
| Rise time | t _r | - | 6 | 18 | μs | V _{CE} = 2V, I _C = 2mA, R _L = 100Ω |
| Fall time | t _f | - | 8 | 18 | μs | |

* Typical values at T_a = 25°C

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Typical Performance Curves



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Figure 7. Collector Dark Current vs Ambient Temperature

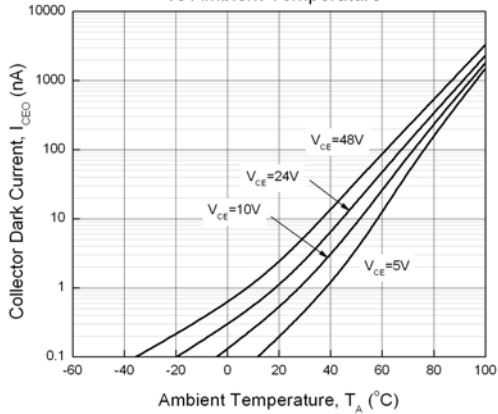


Figure 8. Switching Time vs Load Resistance

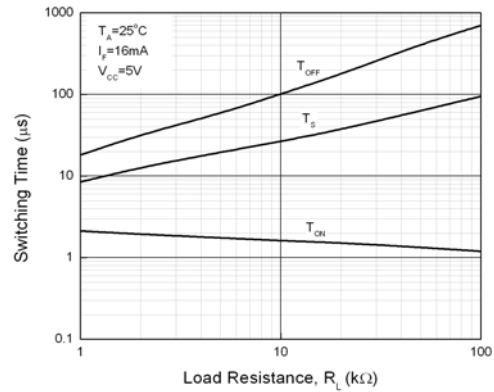


Figure 9. Collector-Emitter Saturation Voltage vs Ambient Temperature

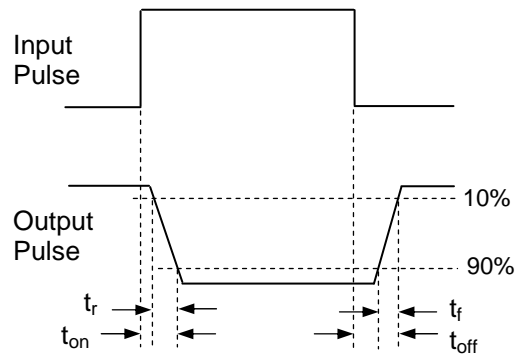
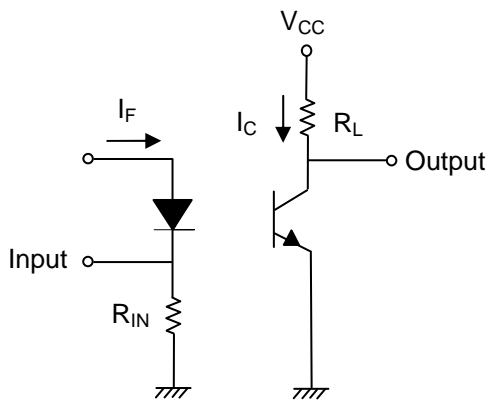
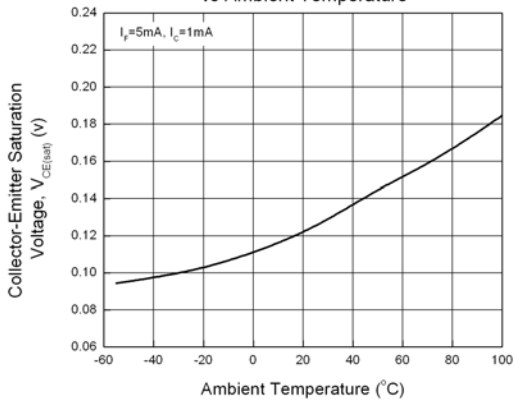


Figure 10. Switching Time Test Circuit & Waveforms



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Order Information

Part Number

EL357(X)(Y)-VG

Note

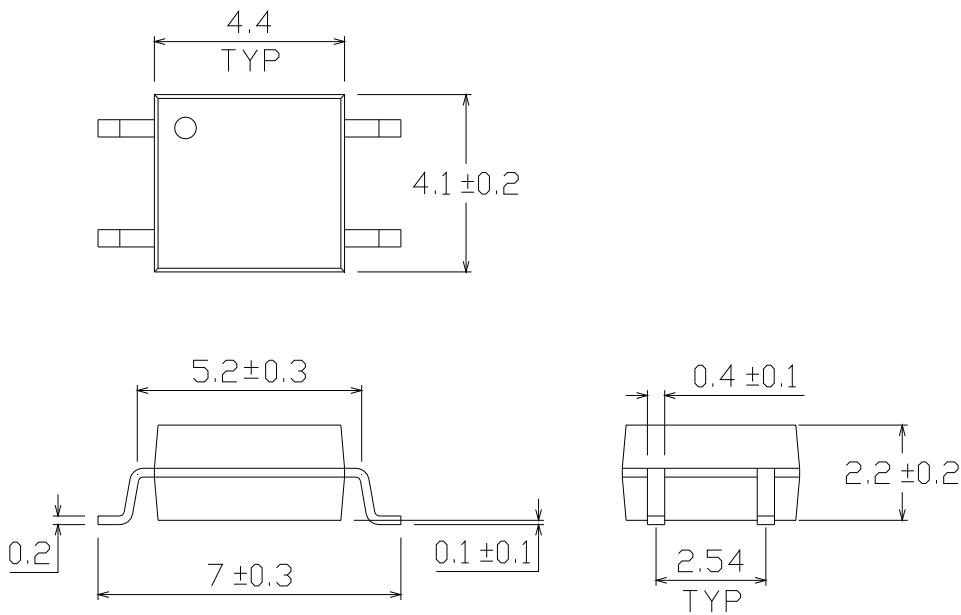
- X = CTR Rank (A, B, C, D or none)
- Y = Tape and reel option (TA, TB or none).
- V = VDE option
- G = Halogen free

| 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 | 3000 units per reel |
| (TB) | TB Tape & reel option | 3000 units per reel |
| (TA)-V | TA Tape & reel option + VDE | 3000 units per reel |
| (TB)-V | TB Tape & reel option + VDE | 3000 units per reel |

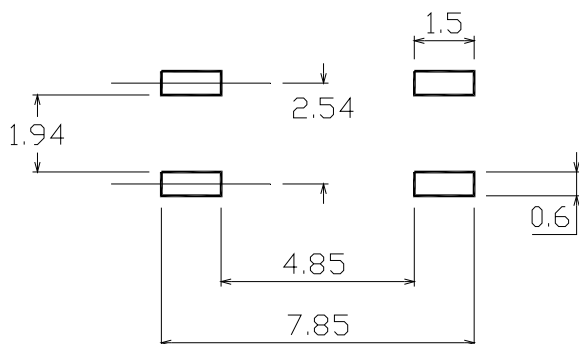
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Package Drawing (Dimensions in mm)



Recommended pad layout for surface mount leadform



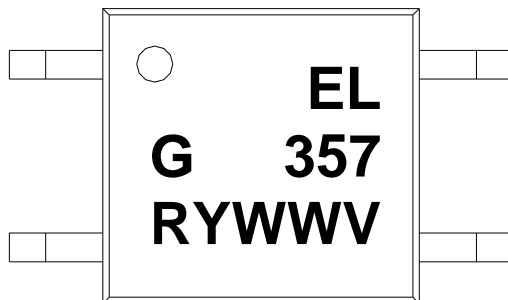


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Device Marking



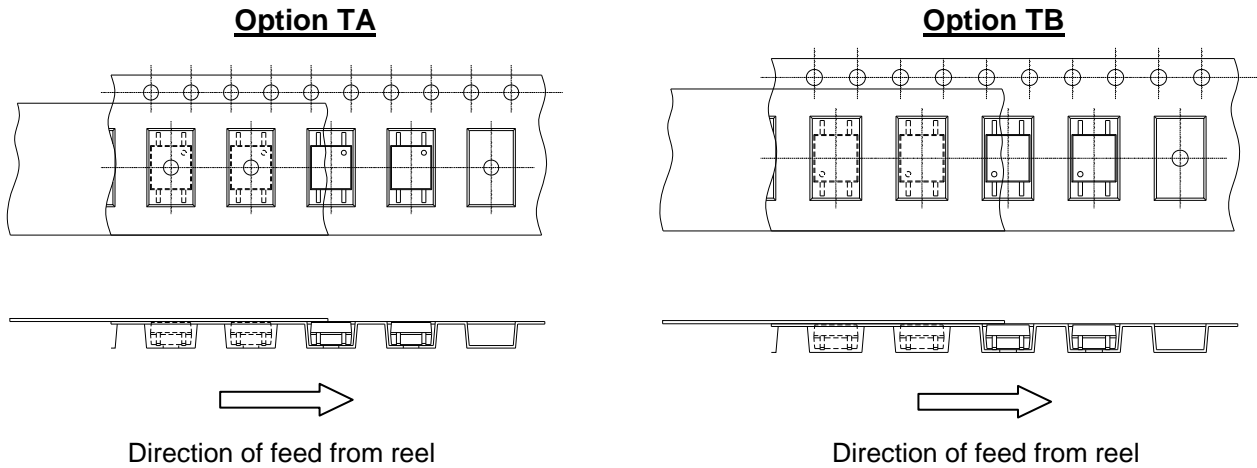
Notes

| | |
|-----|---------------------------------------|
| EL | denotes Everlight |
| 357 | denotes Part Number |
| R | denotes CTR Rank (A, B, C, D or none) |
| Y | denotes 1 digit Year code |
| WW | denotes 2 digit Week code |
| V | denotes VDE (optional) |
| G | denotes Halogens free |

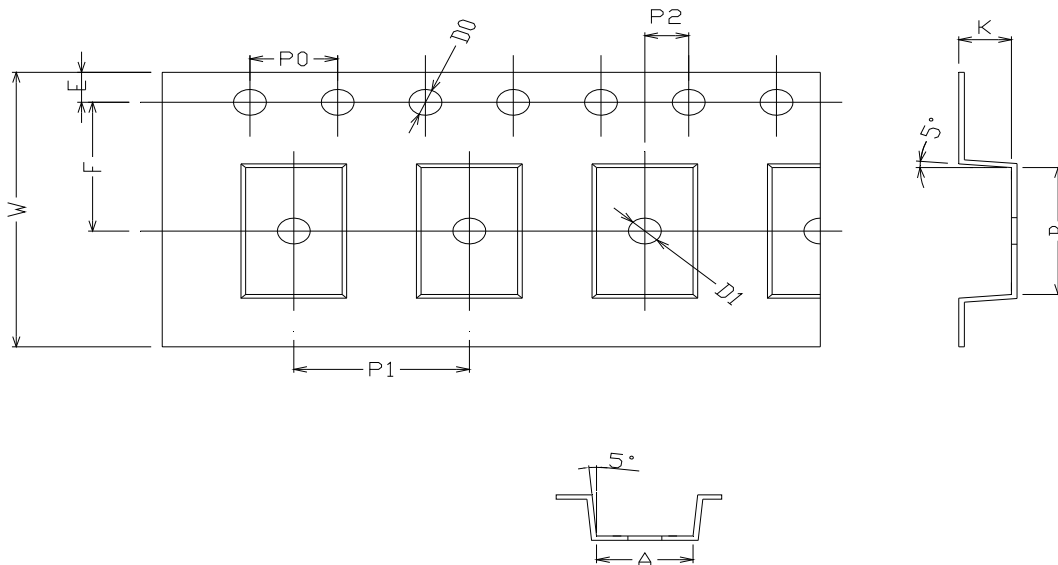
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Tape & Reel Packing Specifications



Tape dimensions



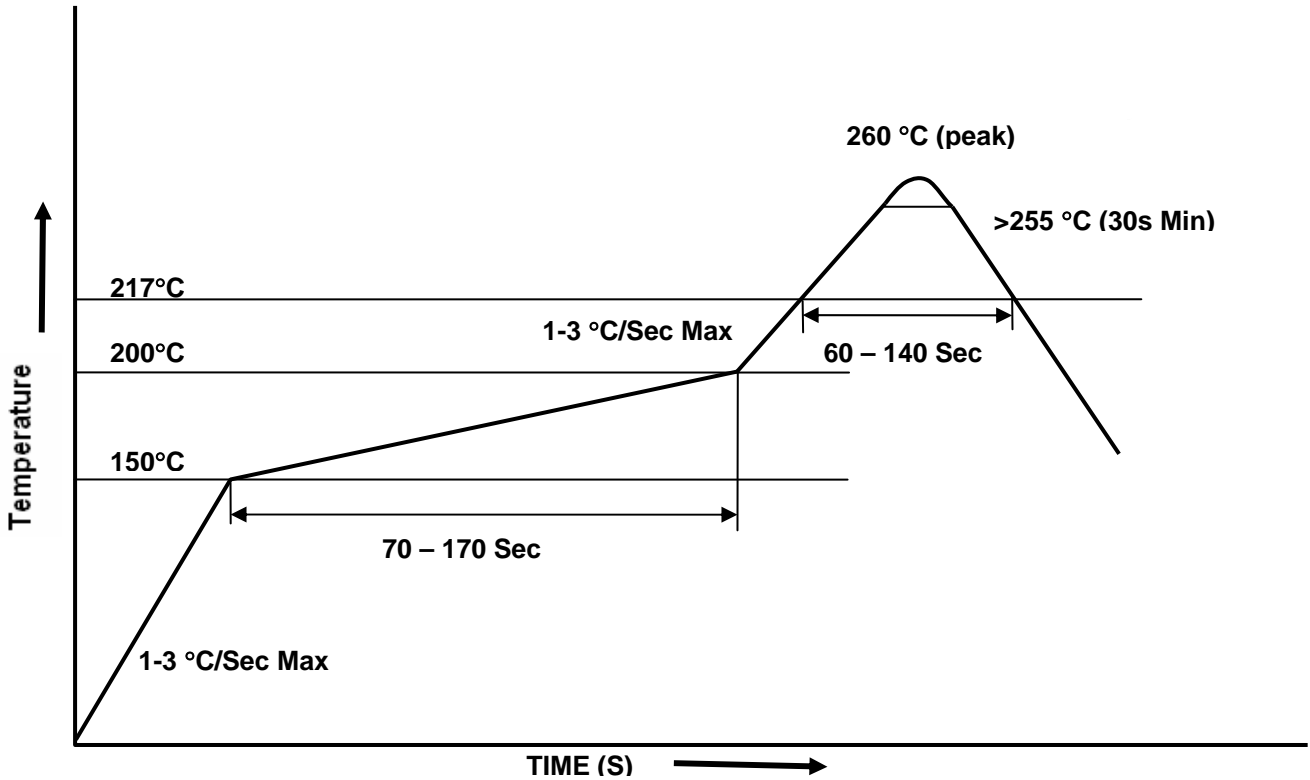
| Dimension No. | A | B | Do | D1 | E | F |
|----------------|-----------|-----------|--------------|-----------|------------|-----------|
| Dimension (mm) | 4.4 ± 0.1 | 7.4 ± 0.1 | 1.5 + 0.1/-0 | 1.5 ± 0.1 | 1.75 ± 0.1 | 7.5 ± 0.1 |

| Dimension No. | Po | P1 | P2 | t | W | K |
|----------------|------------|-----------|-----------|-------------|------------|-----------|
| Dimension (mm) | 4.0 ± 0.15 | 8.0 ± 0.1 | 2.0 ± 0.1 | 0.25 ± 0.03 | 16.0 ± 0.2 | 2.4 ± 0.1 |

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Solder Reflow Temperature Profile





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