



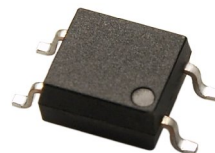
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# 4 PIN ULTRA SMALL SOP PHOTOTRANSISTOR PHOTOCOUPLER

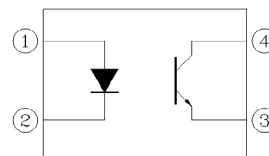
## EL357N-G Series

### 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 4 Pin SOP with a 2.0 mm profile
- Pb free and RoHS compliant.
- UL approved (No. E214129)
- VDE approved (No. 132249)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CSA approved (No. 1408633)



### Schematic



### Description

The EL357N-G series contains an infrared emitting diode, optically coupled to a phototransistor detector.

The devices 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

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# 4 PIN ULTRA SMALL SOP PHOTOTRANSISTOR PHOTOCOUPLER

## EL357N-G Series

### Absolute Maximum Ratings (T<sub>a</sub>=25°C)

| Parameter                |   | Symbol           | Rating     | Unit  |
|--------------------------|---|------------------|------------|-------|
| Input                    | Forward current                                       | I <sub>F</sub>   | 50         | mA    |
|                          | Peak forward current (1us, pulse)                     | I <sub>FP</sub>  | 1          | A     |
|                          | Reverse voltage                                       | V <sub>R</sub>   | 6          | V     |
|                          | Power dissipation<br>Derating factor (about Ta=100°C) | P <sub>D</sub>   | 70         | mW    |
|                          |   |                  | 2.9        | mW/°C |
| Output                   | Power dissipation<br>Derating factor (about Ta=80°C)  | P <sub>C</sub>   | 150        | mW    |
|                          |   |                  | 3.7        | mW/°C |
|                          | Collector current                                     | I <sub>C</sub>   | 50         | mA    |
|                          | Collector-Emitter voltage                             | V <sub>CEO</sub> | 80         | V     |
|                          | Emitter-Collector voltage                             | V <sub>ECO</sub> | 7          | V     |
| Total power dissipation  |   | P <sub>TOT</sub> | 200        | mW    |
| Isolation voltage *1     |   | V <sub>ISO</sub> | 3750       | V rms |
| Operating temperature    |   | T <sub>OPR</sub> | -55 ~ +110 | °C    |
| Storage temperature      |   | T <sub>STG</sub> | -55 ~ +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.



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## EL357N-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    | $I_E = 0.01\text{mA}$                   |

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

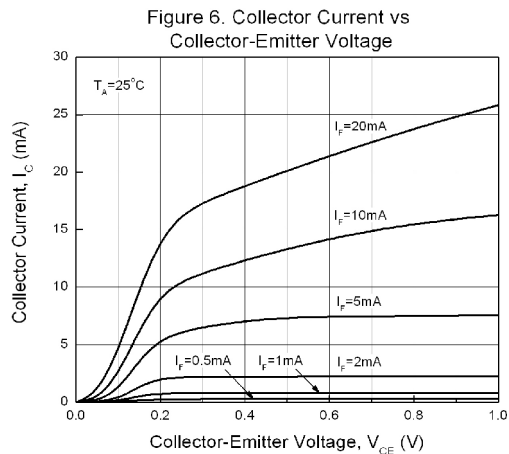
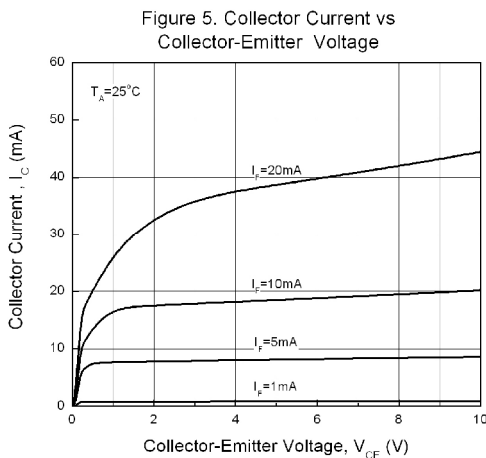
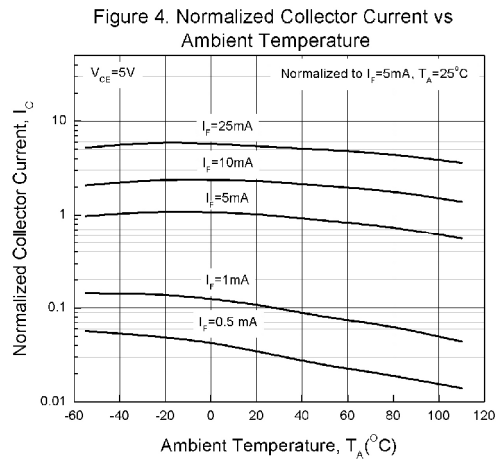
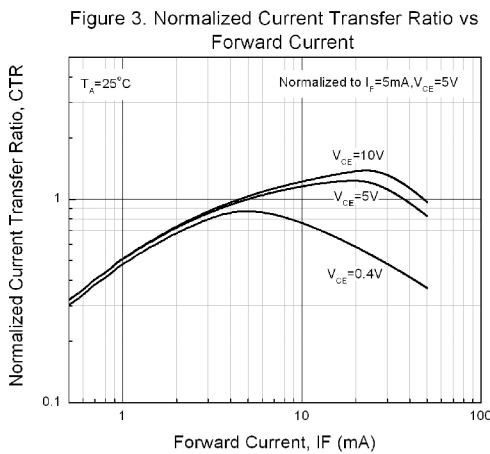
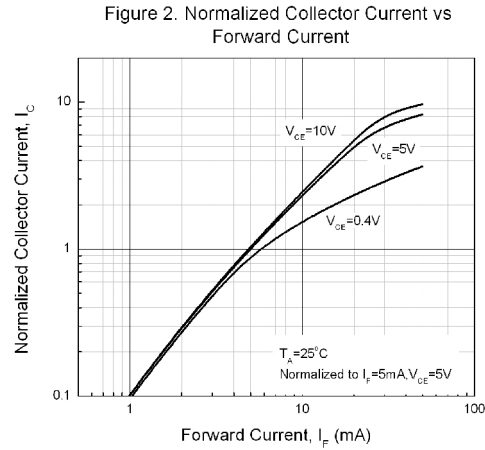
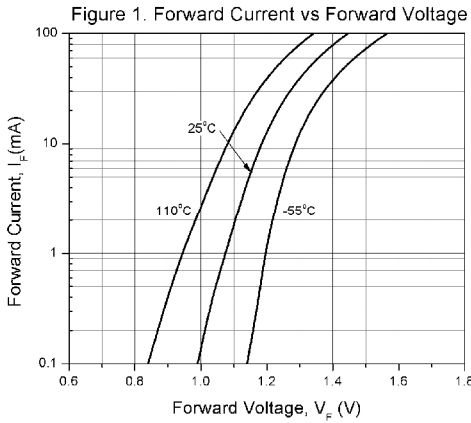
| Parameter                            | Symbol        | Min.               | Typ.* | Max. | Unit          | Condition  |
|--------------------------------------|---------------|--------------------|-------|------|---------------|--|
| Current Transfer ratio               | EL357N        | 50                 | -     | 600  | %             | $I_F = 5\text{mA}, V_{CE} = 5\text{V}$                                   |
|                                      | EL357NA       | 80                 | -     | 160  |               |  |
|                                      | EL357NB       | 130                | -     | 260  |               |  |
|                                      | EL357NC       | 200                | -     | 400  |               |  |
|                                      | EL357ND       | 300                | -     | 600  |               |  |
|                                      | EL357NE       | 100                | -     | 200  |               |  |
|                                      | EL357NF       | 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                            | $t_r$         | -                  | 3     | 18   | $\mu\text{s}$ | $V_{CE} = 2\text{V}, I_C = 2\text{mA}, R_L = 100\Omega$                  |
| Fall time                            | $t_f$         | -                  | 4     | 18   | $\mu\text{s}$ |  |

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

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## EL357N-G Series

### Typical Performance Curves



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## EL357N-G Series

Figure 7. Collector Dark Current vs Ambient Temperature

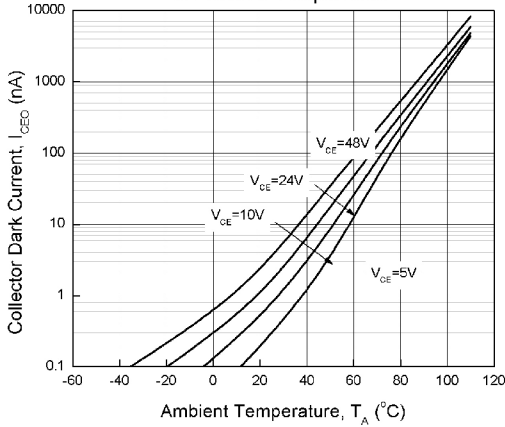


Figure 8. Switching Time vs Load Resistance

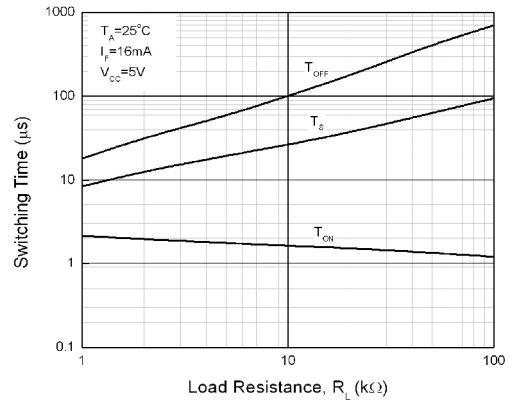
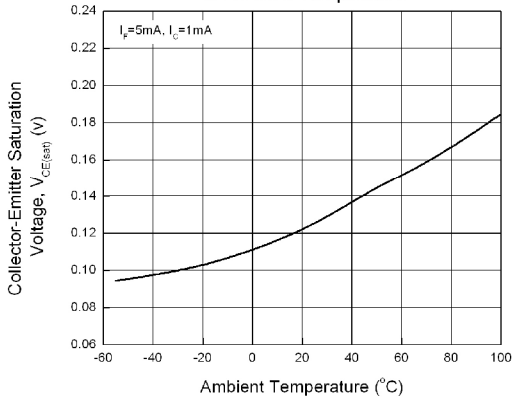


Figure 9. Collector-Emitter Saturation Voltage vs Ambient Temperature



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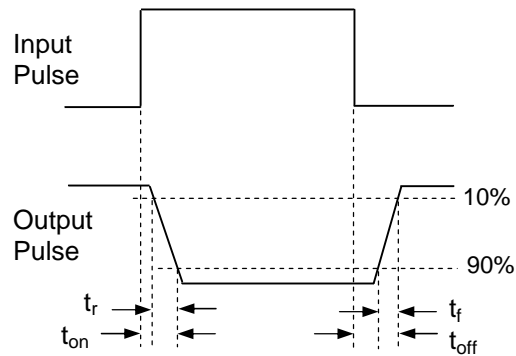
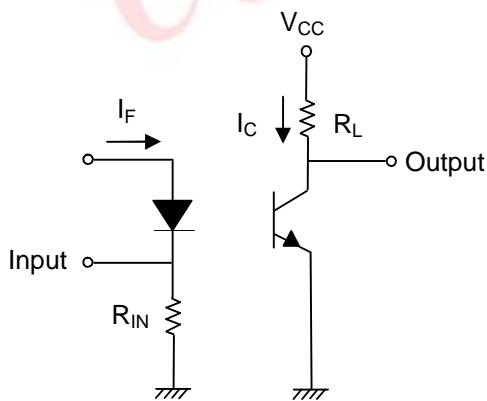


Figure 10. Switching Time Test Circuit & Waveforms



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## EL357N-G Series

### Order Information

Part Number

# EL357NX(Y)-VG

#### Note

- 357N = Part No.
- X = CTR Rank (A, B, C, D, E, For none)
- Y = Tape and reel option (TA, TB or none).
- V = VDE (optional)
- G = Halogen free

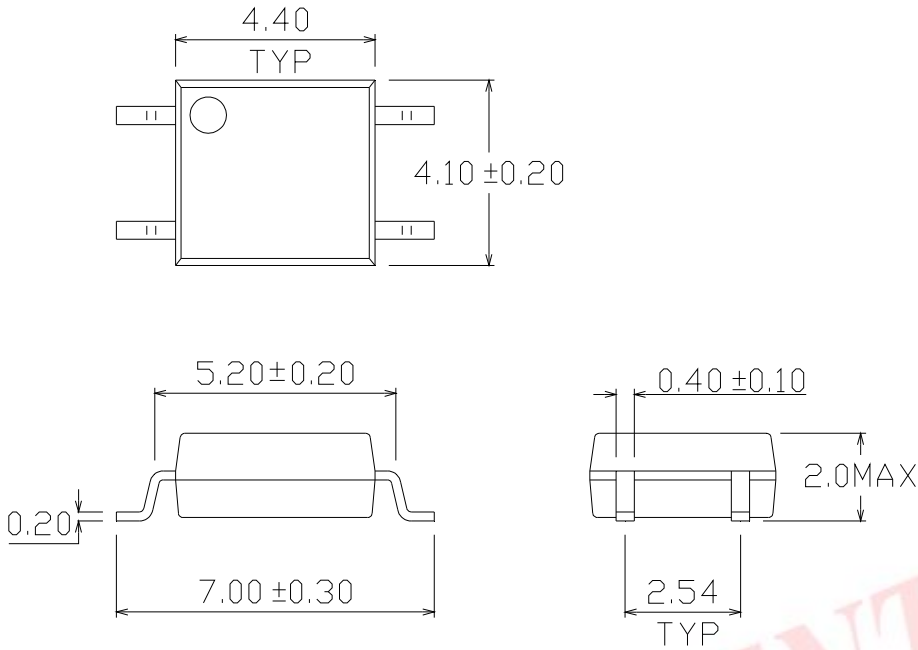
| Option | Description                 | Packing quantity    |
|--------|-----------------------------|---------------------|
| None   | Standard SMD option         | 100 units per tube  |
| -V     | Standard SMD option + VDE   | 100 units per tube  |
| (TA)   | TA Tape & reel option       | 3000 units 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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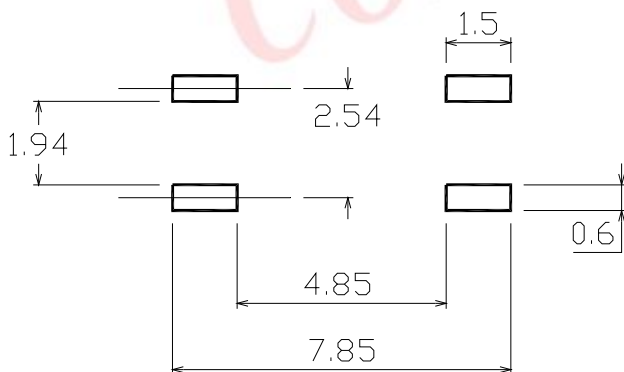
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**EL357N-G Series**

**Package Drawing**  
(Dimensions in mm)



**Recommended pad layout for surface mount leadform**





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# 4 PIN ULTRA SMALL SOP PHOTOTRANSISTOR PHOTOCOUPLER

## EL357N-G Series

### Device Marking



### Notes

- EL denotes Everlight
- 357N denotes Device Number
- R denotes CTR Rank (A, B, C, D, E, F or none)
- Y denotes 1 digit Year code
- WW denotes 2 digit Week code
- V denotes VDE (optional)

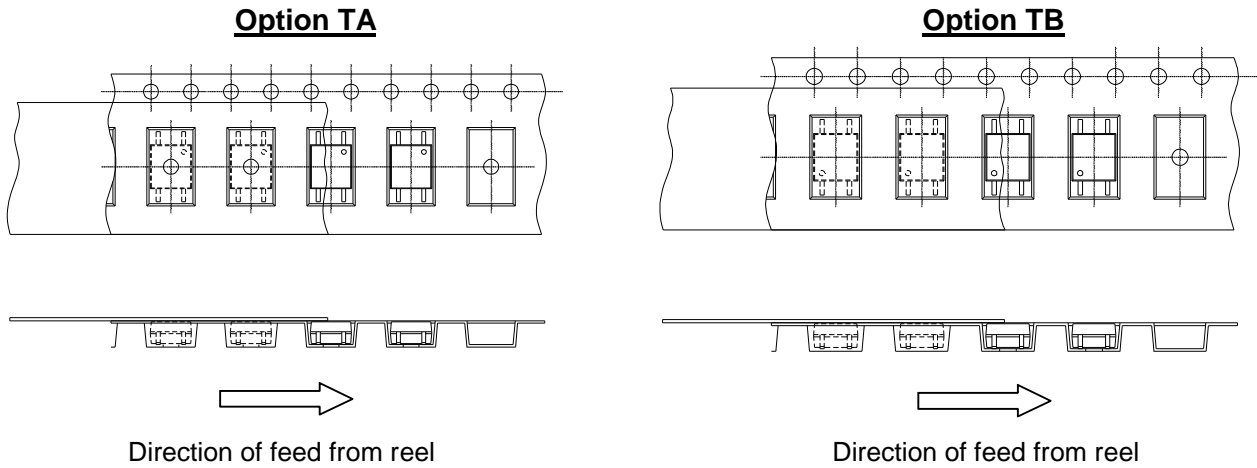
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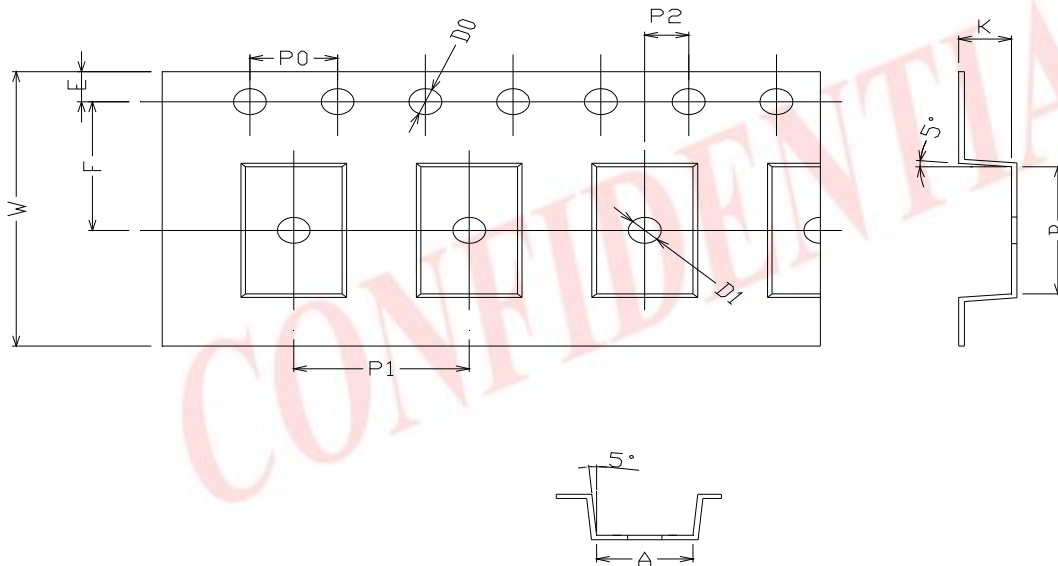
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**EL357N-G Series**

## 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   | 1.7 5± 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 |

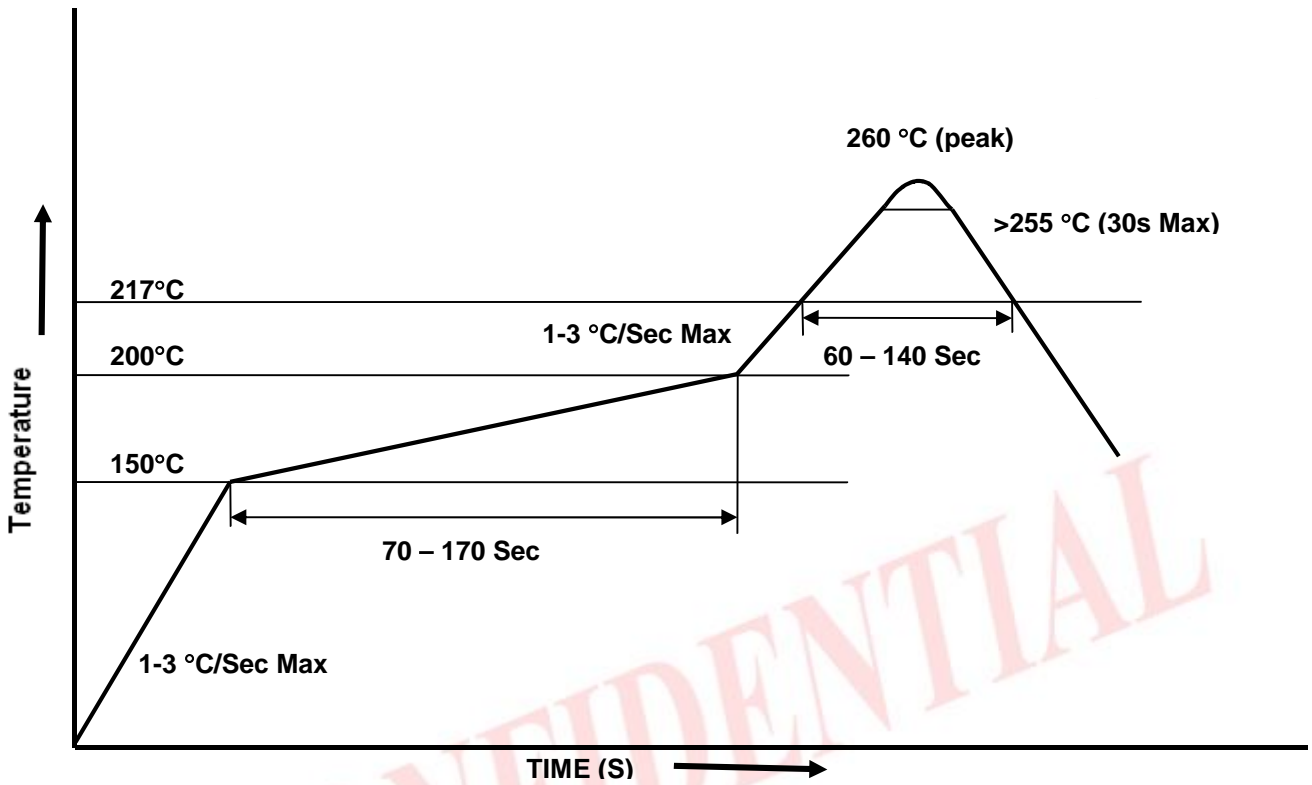


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## EL357N-G Series

### Solder Reflow Temperature Profile



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EL357N-G Series

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