

### FEATURES

- **SOP (SMALL OUTLINE PACKAGE)**  
4.5 x 7.3 x 2.3 mm MAX
- **HIGH SPEED RESPONSE**  
 $t_{PHL}$ ,  $t_{PLH}$  = 50 ns TYP
- **HIGH ISOLATION VOLTAGE**  
BV = 2500 V<sub>r.m.s.</sub> MIN
- **LOW INPUT CURRENT**  
I<sub>FHL</sub> = 2.5 mA TYP
- **TAPING PRODUCT NUMBER**  
PS9701-F3

### DESCRIPTION

PS9701 is an optically coupled isolator containing a GaAlAs LED on the light emitting side (input side) and a photodiode and a signal processing circuit on the light receiving side (output side) on one chip. This is an SOP (Small Out-line Package) type for high density applications.

### APPLICATIONS

- COMPUTER AND PERIPHERAL MEMORY
- ELECTRONIC INSTRUMENT
- AUDIO-VISUAL INTERFACE

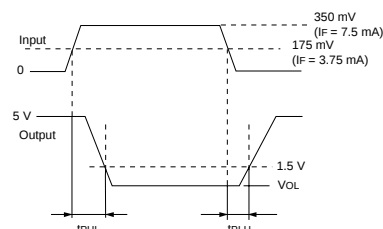
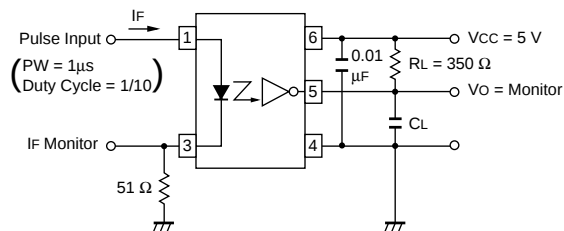


ESD SENSITIVE

### ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C)

| PART NUMBER |                  |                                                                                                                                                                                                                                              | PS9701 |                  |               |
|-------------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|---------------|
| SYMBOL      | PARAMETERS       | UNITS                                                                                                                                                                                                                                        | MIN    | TYP              | MAX           |
| Diode       | V <sub>F</sub>   | Forward Voltage, I <sub>F</sub> = 10 mA                                                                                                                                                                                                      | V      | 1.4              | 1.9           |
|             | I <sub>R</sub>   | Reverse Current, V <sub>R</sub> = 5 V                                                                                                                                                                                                        | μA     |                  | 10            |
|             | C <sub>t</sub>   | Capacitance, V = 0, f = 1 MHz                                                                                                                                                                                                                | pF     | 60               |               |
| Detector    | I <sub>OH</sub>  | High Level Output Current<br>V <sub>CC</sub> = V <sub>O</sub> = 5.5 V, I <sub>F</sub> = 250 μA, T <sub>A</sub> = 0 to 70°C                                                                                                                   | μA     |                  | 250           |
|             | V <sub>OL</sub>  | Low Level Output Voltage<br>V <sub>CC</sub> = 5.5 V, I <sub>F</sub> = 7.5 mA, I <sub>O</sub> = 13 mA, T <sub>A</sub> = 0 to 70°C                                                                                                             | V      | 0.3              | 0.6           |
|             | I <sub>CCH</sub> | High Level Supply Current, V <sub>CC</sub> = 5.5 V, I <sub>F</sub> = 0, T <sub>A</sub> = 0 to 70°C                                                                                                                                           | mA     | 4                | 8             |
|             | I <sub>CCL</sub> | Low Level Supply Current, V <sub>CC</sub> = 5.5 V, I <sub>F</sub> = 10 mA, T <sub>A</sub> = 0 to 70°C                                                                                                                                        | mA     | 9                | 15            |
| Coupled     | I <sub>FHL</sub> | Threshold Input Current, High → Low<br>V <sub>CC</sub> = 5 V, V <sub>O</sub> = 0.8 V, R <sub>L</sub> = 350 Ω, T <sub>A</sub> = 25°C<br>V <sub>CC</sub> = 5 V, T <sub>A</sub> = -40 to +85 °C, V <sub>O</sub> = 0.8 V, R <sub>L</sub> = 350 Ω | mA     | 0.5              | 2.5<br>5<br>7 |
|             | R <sub>1-2</sub> | Isolation Resistance, V <sub>in-out</sub> = 1 k V <sub>DC</sub> , R <sub>H</sub> = 40 to 60%                                                                                                                                                 | Ω      | 10 <sup>11</sup> |               |
|             | C <sub>1-2</sub> | Isolation Capacitance, V = 0, f = 1 MHz                                                                                                                                                                                                      | pF     | 0.4              |               |
|             | t <sub>PHL</sub> | Propagation Delay Time <sup>1</sup> , High → Low<br>V <sub>CC</sub> = 5 V, I <sub>F</sub> = 7.5 mA, R <sub>L</sub> = 350 Ω, C <sub>L</sub> = 15 pF                                                                                           | ns     | 50               | 75            |
|             | t <sub>PLH</sub> | Propagation Delay Time <sup>1</sup> , Low → High<br>V <sub>CC</sub> = 5 V, I <sub>F</sub> = 7.5 mA, R <sub>L</sub> = 350 Ω, C <sub>L</sub> = 15 pF                                                                                           | ns     | 50               | 75            |
|             | t <sub>r</sub>   | Rise Time, V <sub>CC</sub> = 5 V, I <sub>F</sub> = 7.5 mA, R <sub>L</sub> = 350 Ω, C <sub>L</sub> = 15 pF                                                                                                                                    | ns     | 20               |               |
|             | t <sub>f</sub>   | Fall Time, V <sub>CC</sub> = 5 V, I <sub>F</sub> = 7.5 mA, R <sub>L</sub> = 350 Ω, C <sub>L</sub> = 15 pF                                                                                                                                    | ns     | 10               |               |

#### 1. Test Circuit for Propagation delay time



\*C<sub>L</sub> is approximately 15 pF, which includes probe and stray wiring capacitance.

ABSOLUTE MAXIMUM RATINGS<sup>1</sup> (T<sub>A</sub> = 25 °C)

| SYMBOLS          | PARAMETERS                     | UNITS               | RATINGS     |
|------------------|--------------------------------|---------------------|-------------|
| Diode            |                                |                     |             |
| I <sub>F</sub>   | Forward Current                | mA                  | 30          |
| V <sub>R</sub>   | Reverse Voltage                | V                   | 5           |
| Detector         |                                |                     |             |
| V <sub>CC</sub>  | Supply Voltage                 | V                   | 7           |
| V <sub>O</sub>   | Output Voltage                 | V                   | 7           |
| I <sub>O</sub>   | Output Current                 | mA                  | 50          |
| P <sub>C</sub>   | Power Dissipation              | mW                  | 85          |
| Coupled          |                                |                     |             |
| BV               | Isolation Voltage <sup>2</sup> | V <sub>r.m.s.</sub> | 2500        |
| T <sub>OP</sub>  | Operating Temperature          | °C                  | -40 to +85  |
| T <sub>STG</sub> | Storage Temperature            | °C                  | -55 to +125 |

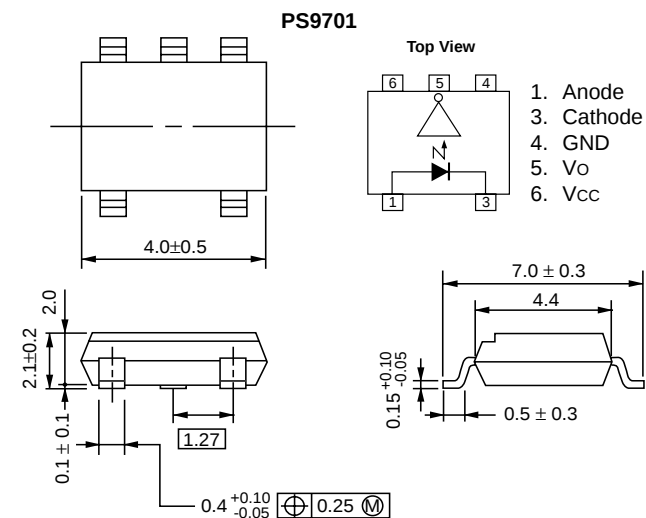
- Notes:
- Operation in excess of any one of these parameters may result in permanent damage.
  - AC voltage for 1 minute at T<sub>A</sub> = 25 °C, RH = 60% between input and output.

RECOMMENDED  
OPERATING CONDITIONS

| PART NUMBER     |                          |       | PS9701 |     |     |
|-----------------|--------------------------|-------|--------|-----|-----|
| SYMBOLS         | PARAMETERS               | UNITS | MIN    | TYP | MAX |
| I <sub>FL</sub> | Low Level Input Current  | μA    | 0      |     | 250 |
| I <sub>FH</sub> | High Level Input Current | mA    | 5      | 7.5 | 15  |
| V <sub>CC</sub> | Supply Voltage           | V     | 4.5    | 5   | 5.5 |
| T <sub>OP</sub> | Operating Temperature    | °C    | 0      | 25  | 70  |

\* By-pass capacitor of more than 0.1 μF is used between V<sub>CC</sub> and GND near the device.

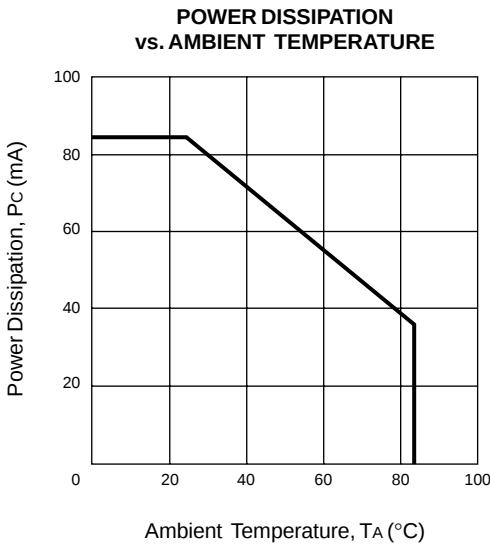
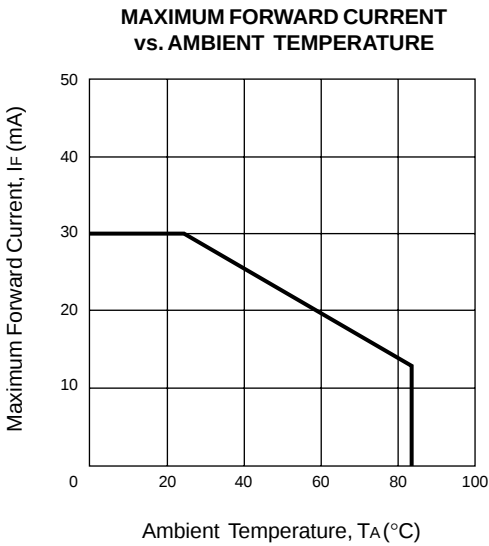
OUTLINE DIMENSIONS (Units in mm)



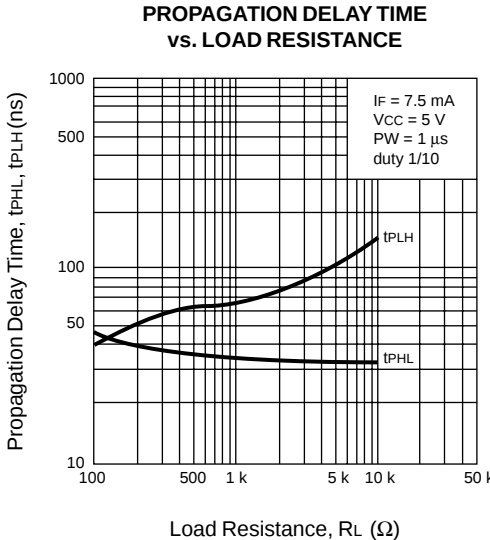
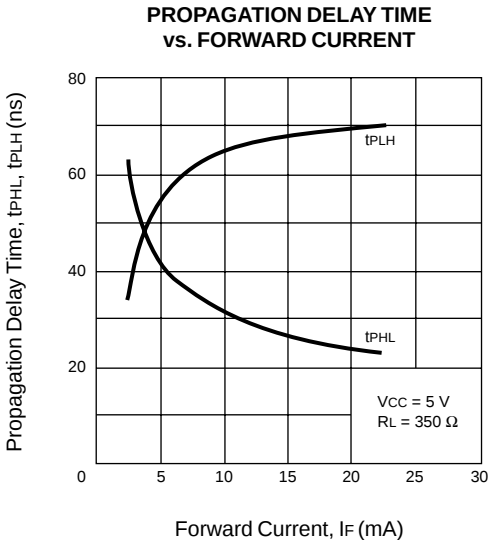
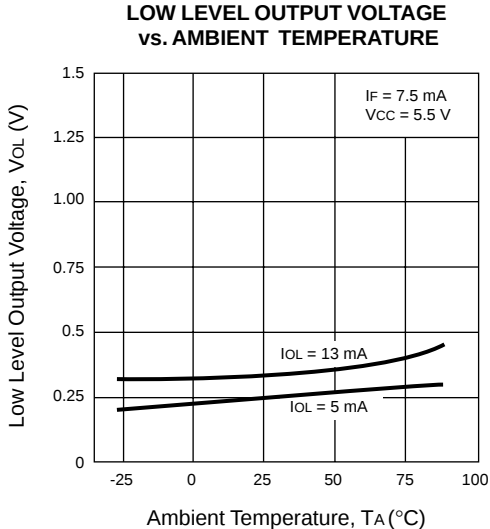
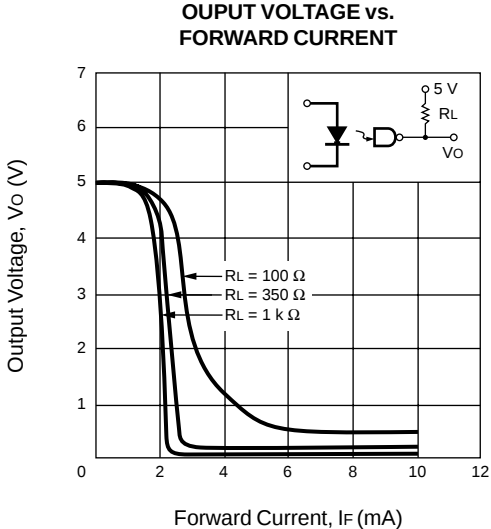
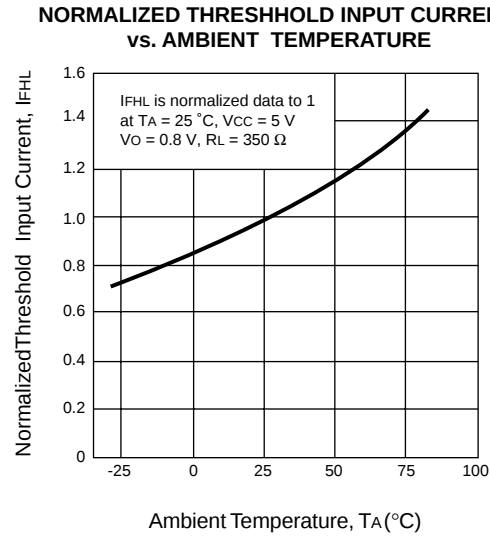
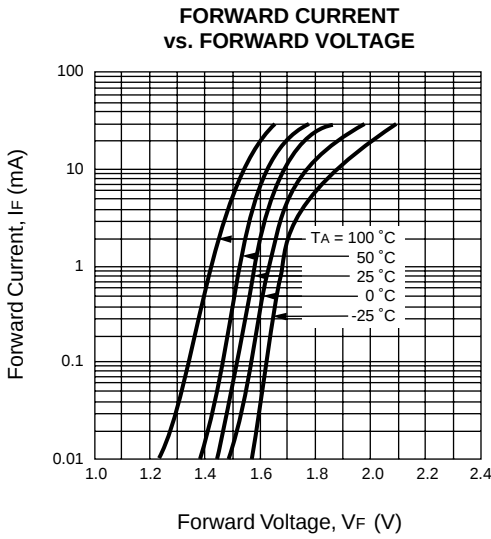
ORDERING INFORMATION

| PART NUMBER | PACKAGE                     | PACKING STYLE               | SAFETY STANDARDS APPROVAL |
|-------------|-----------------------------|-----------------------------|---------------------------|
| PS9701      | 5 Pin SOP                   | Magazine case 100 pcs       | UL approved               |
| PS9701-E3   |                             | Embossed Tape 900 pcs/reel  |                           |
| PS9701-E4   |                             |                             |                           |
| PS9701-F3   |                             | Embossed Tape 3500 pcs/reel |                           |
| PS9701-F3   |                             |                             |                           |
| PS9701-V    |                             | Magazine case 100 pcs       | VDE0884 approved          |
| PS9701-V-E3 | Embossed Tape 900 pcs/reel  |                             |                           |
| PS9701-V-E4 |                             |                             |                           |
| PS9701-V-F3 | Embossed Tape 3500 pcs/reel |                             |                           |
| PS9701-V-F4 |                             |                             |                           |

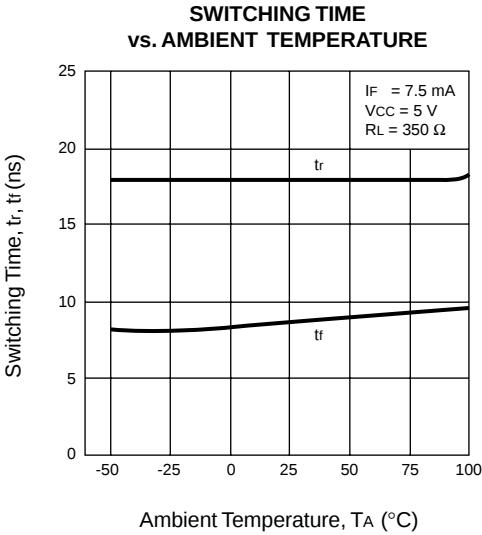
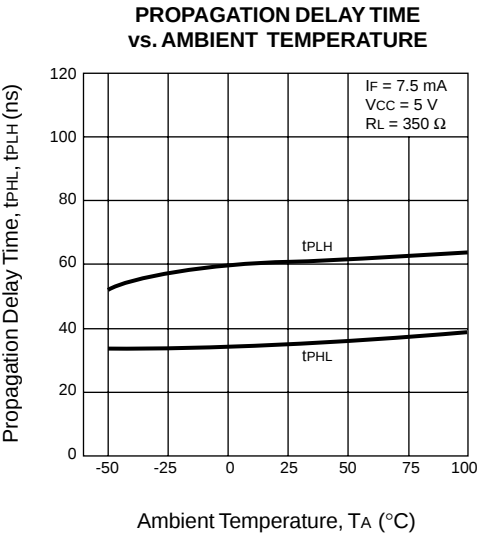
TYPICAL PERFORMANCE CURVES (T<sub>A</sub> = 25 °C)



TYPICAL PERFORMANCE CURVES (TA = 25 °C)

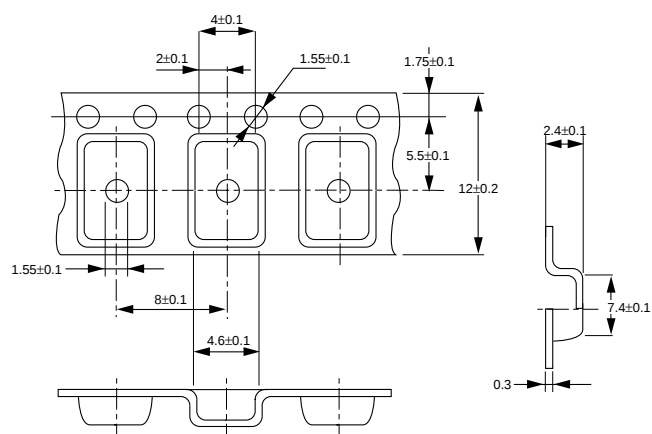


TYPICAL PERFORMANCE CURVES (T<sub>A</sub> = 25 °C)

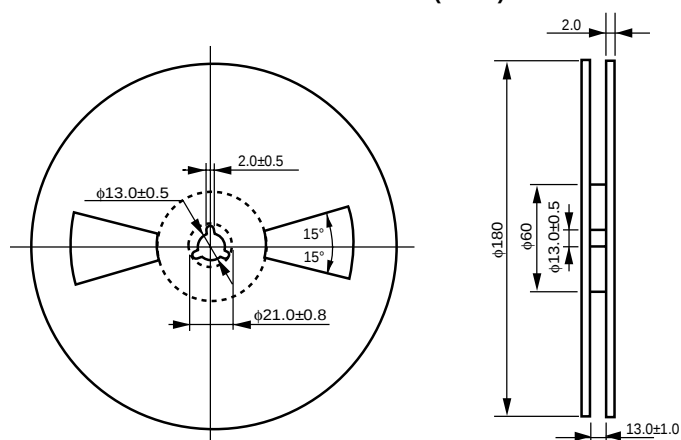


# TAPING SPECIFICATIONS (Units in mm)

## OUTLINE AND DIMENSIONS (TAPE)

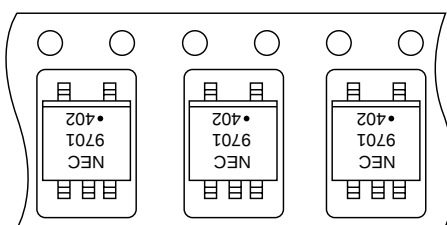


## OUTLINE AND DIMENSIONS (REEL)

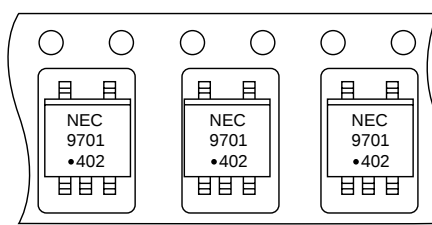


Packing : 900 pcs/reel

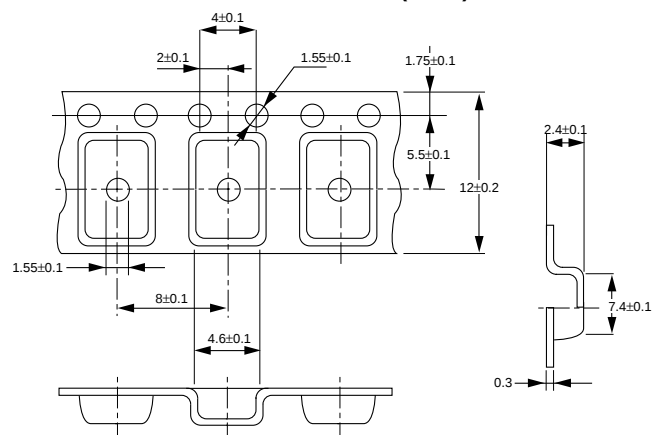
## TAPE DIRECTION PS9701-E3



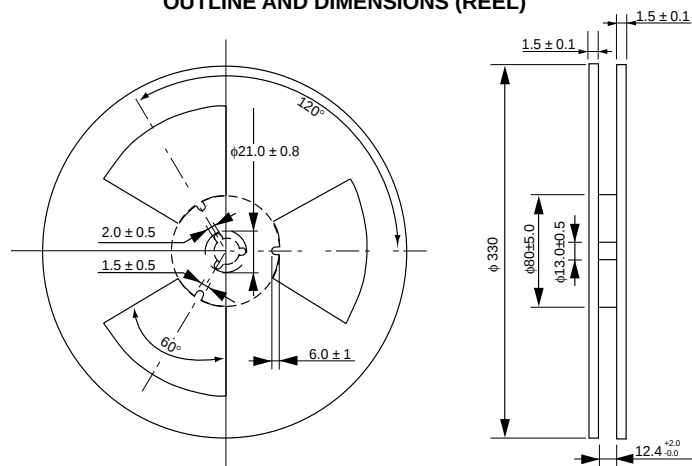
## PS9701-E4



## OUTLINE AND DIMENSIONS (TAPE)



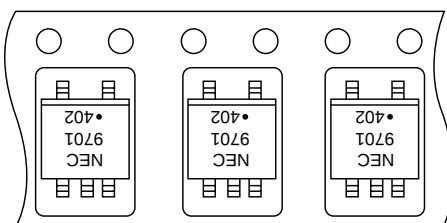
## OUTLINE AND DIMENSIONS (REEL)



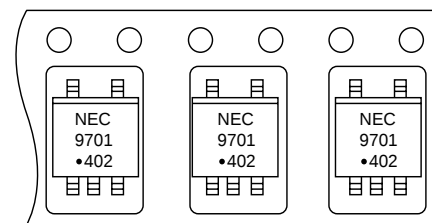
Packing: 3500 pcs/reel

## TAPE DIRECTION

## PS9701-F3



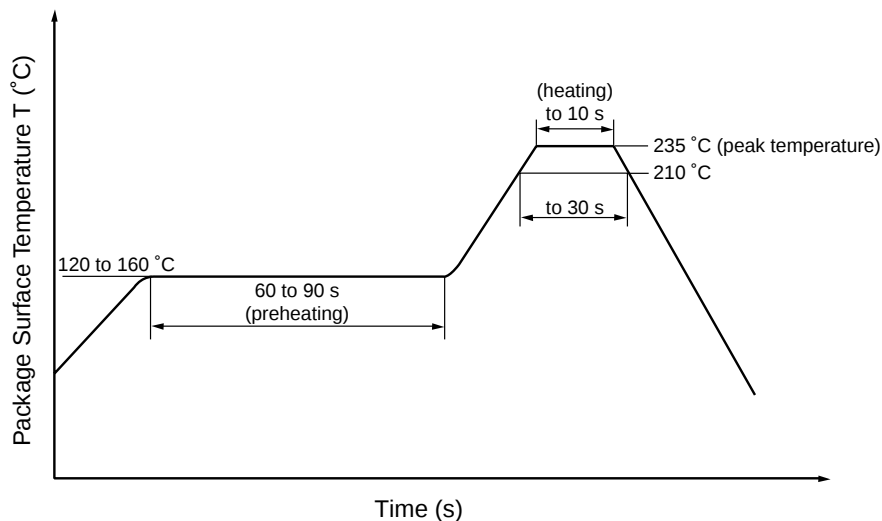
## PS9701-F4



## RECOMMENDED SOLDERING CONDITIONS

### (1) Infrared reflow soldering

- Peak reflow temperature 235 °C or below (package surface temperature)
- Time of temperature higher than 210 °C 30 seconds or less
- Number of reflows Three
- Flux Rosin flux containing a small amount of chlorine  
(The flux with a maximum chlorine content of 0.2 Wt % is recommended)



### (2) Dip soldering

- Temperature 260 °C or below
- Time 10 seconds or less
- Number of times One
- Flux Rosin flux containing a small amount of chlorine  
(The flux with a maximum chlorine content of 0.2 Wt % is recommended.)

### (3) Cautions

- Fluxes  
Avoid removing the residual flux with freon-based and chlorine-based cleaning solvent.

#### Life Support Applications

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