

**CEL**

# NEC's HIGH SPEED (200 kbps) ANALOG OUTPUT TYPE 5 PIN SOP OPTOCOUPLER

**PS8703****FEATURES**

- WIDE OPERATING V<sub>CC</sub> RANGE:**  
 $V_{CC} = -0.5$  to  $+15$  V
- HIGH ISOLATION VOLTAGE:**  
 $BV: 2500$  V<sub>r.m.s.</sub>
- HIGH-SPEED RESPONSE:**  
 $t_{PHL}, t_{PLH} = 5 \mu s$  MAX (@ $R_L = 4.1$  kΩ)
- AVAILABLE IN TAPE AND REEL:**  
PS8703-F3, F4

**DESCRIPTION**

NEC's PS8703 is an optically coupled isolator containing a GaAlAs LED on the input side and a PIN photodiode and a high speed amplifier transistor on the output side. This is a plastic SOP (Small Outline Package) type for high density applications.

**APPLICATIONS**

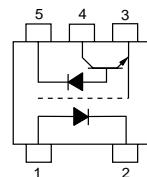
- COMPUTERS AND PERIPHERALS**
- GENERAL PURPOSE INVERTER**
- SUBSTITUTIONS FOR RELAY AND PULSE TRANSFORMERS**
- POWER SUPPLY**

**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ C$ )

|          |             | PART NUMBER   | PS8703 |           |     |     |
|----------|-------------|---|--------|-----------|-----|-----|
| SYMBOLS  |             | PARAMETERS  | UNITS  | MIN       | TYP | MAX |
| Diode    | $V_F$       | Forward Voltage, $I_F = 16$ mA  | V      |           | 1.2 | 1.5 |
|          | $I_R$       | Reverse Current, $V_R = 3$ V  | μA     |           |     | 10  |
|          | $C_t$       | Terminal Capacitance, $V = 0$ V, $f = 1.0$ MHz  | pF     | 30        |     |     |
| Detector | $I_{OH(1)}$ | High Level Output Current<br>$I_F = 0$ mA, $V_{CC} = V_O = 5.5$ V   | nA     |           | 7   | 500 |
|          | $I_{OH(2)}$ | High Level Output Current<br>$I_F = 0$ mA, $V_{CC} = V_O = 15$ V  | μA     |           |     | 100 |
|          | $V_{OL}$    | Low Level Output Voltage<br>$I_F = 16$ mA, $V_{CC} = 4.5$ V, $I_{OL} = 1.1$ mA                                    | V      | 0.1       | 0.4 |     |
|          | $I_{CCH}$   | High Level Supply Current<br>$I_F = 0$ mA, $V_O = \text{Open}$ , $V_{CC} = 15$ V                                  | μA     | 0.01      | 1   |     |
|          | $I_{CCL}$   | Low Level Supply Current<br>$I_F = 16$ mA, $V_O = \text{Open}$ , $V_{CC} = 15$ V                                  | μA     | 150       | 800 |     |
| Coupled  | $CTR$       | Current Transfer Ratio ( $I_C/I_F$ ) <sup>1</sup> , $I_F = 16$ mA, $V_{CC} = 4.5$ V, $V_O = 0.4$ V                | %      | 10        | 23  | 30  |
|          | $R_{i-o}$   | Isolation Resistance, $V_{IN-OUT} = 1$ kVDC, $R_H = 40$ to 60 %   | Ω      | $10^{11}$ |     |     |
|          | $C_{i-o}$   | Isolation Capacitance, $V = 0$ , $f = 1.0$ MHz  | pF     |           | 0.4 |     |
|          | $t_{PHL}$   | Propagation Delay Time, (High → Low) <sup>2</sup><br>$I_F = 16$ mA, $V_{CC} = 5$ V, $R_L = 4.1$ kΩ, $C_L = 15$ pF | μs     | 1         | 5   |     |
|          | $t_{PLH}$   | Propagation Delay Time, (Low → High) <sup>2</sup><br>$I_F = 16$ mA, $V_{CC} = 5$ V, $R_L = 4.1$ kΩ, $C_L = 15$ pF | μs     | 2         | 5   |     |
|          | $t_{PHL}$   | Propagation Delay Time, (High → Low) <sup>2</sup><br>$I_F = 16$ mA, $V_{CC} = 5$ V, $R_L = 20$ kΩ, $C_L = 15$ pF  | μs     | 1         | 15  |     |
|          | $t_{PLH}$   | Propagation Delay Time, (Low → High) <sup>2</sup><br>$I_F = 16$ mA, $V_{CC} = 5$ V, $R_L = 20$ kΩ, $C_L = 15$ pF  | μs     | 7         | 15  |     |

PLEASE SEE NOTES ON NEXT PAGE.

Pin Connection (Top View)



California Eastern Laboratories

**ABSOLUTE MAXIMUM RATINGS<sup>1</sup>** ( $T_A = 25^\circ\text{C}$ )

| SYMBOLS          | PARAMETERS                     | UNITS               | RATING      |
|------------------|--------------------------------|---------------------|-------------|
| Diode            |                                |                     |             |
| I <sub>F</sub>   | Forward Current                | mA                  | 50          |
| V <sub>R</sub>   | Reverse Voltage                | V                   | 5           |
| Detector         |                                |                     |             |
| V <sub>CC</sub>  | Supply Voltage                 | V                   | -0.5 to +15 |
| V <sub>O</sub>   | Output Voltage                 | V                   | -0.5 to +15 |
| I <sub>O</sub>   | Output Current                 | mA                  | 8           |
| P <sub>C</sub>   | Power Dissipation <sup>2</sup> | mW                  | 80          |
| Coupled          |                                |                     |             |
| BV               | Isolation Voltage <sup>3</sup> | V <sub>r.m.s.</sub> | 2500        |
| T <sub>A</sub>   | Operating Ambient Temp.        | °C                  | -40 to +100 |
| T <sub>STG</sub> | Storage Temperature            | °C                  | -55 to +125 |

## Notes:

1. Operation in excess of any one of these parameters may result in permanent damage.
2. Applies to output pin V<sub>O</sub>. Reduced to 0.8 mW/°C at T<sub>A</sub> = 25°C or more.
2. AC voltage for one minute at T<sub>A</sub> = 25°C, RH = 60% between input and output.

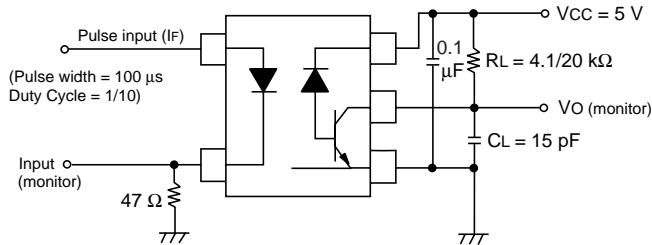
**ORDERING INFORMATION**

| PART NUMBER | PACKING STYLE               |
|-------------|-----------------------------|
| PS8703      | Magazine case 100 pcs       |
| PS8703-F3   | Embossed Tape 3500 pcs/reel |
| PS8703-F4   |                             |

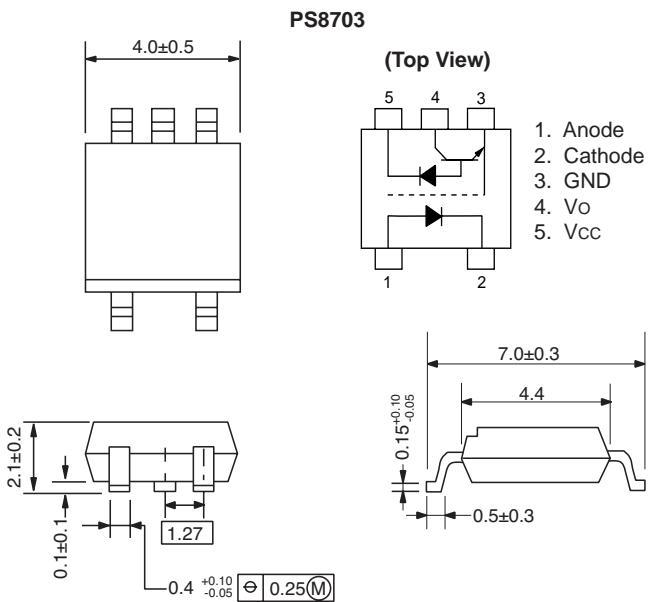
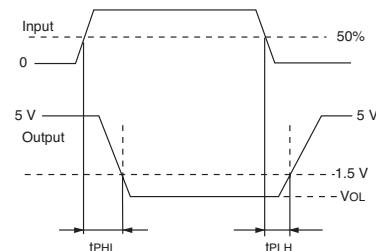
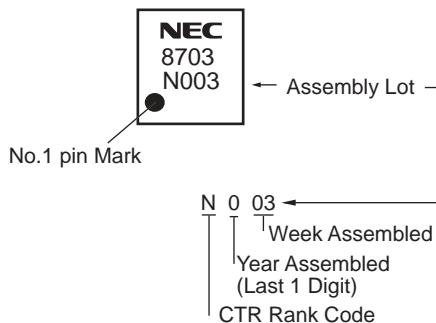
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## NOTES:

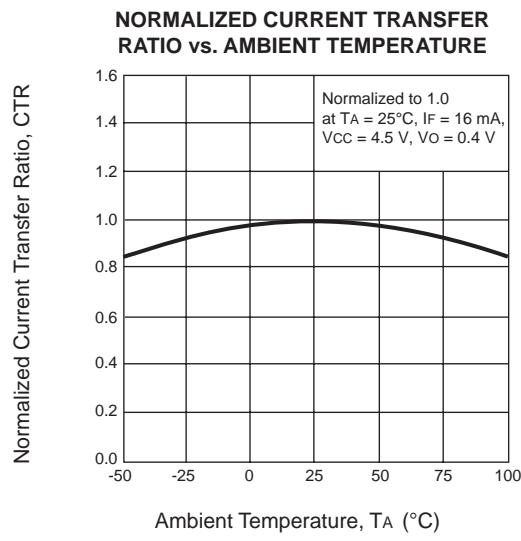
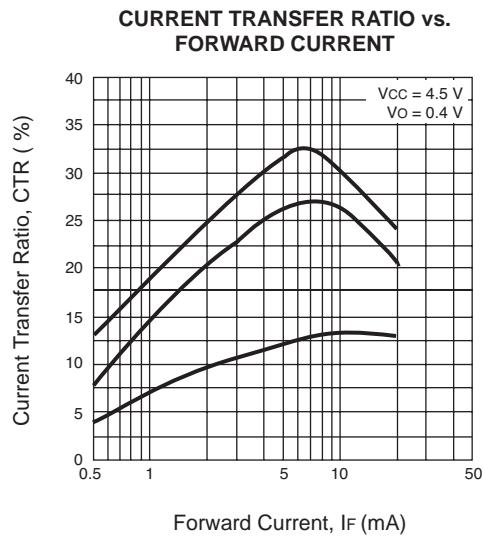
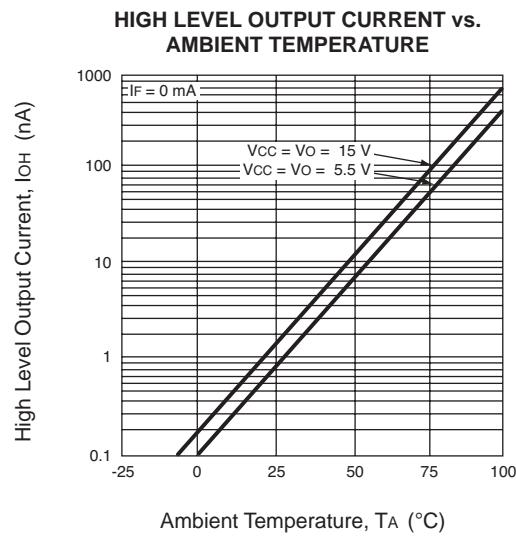
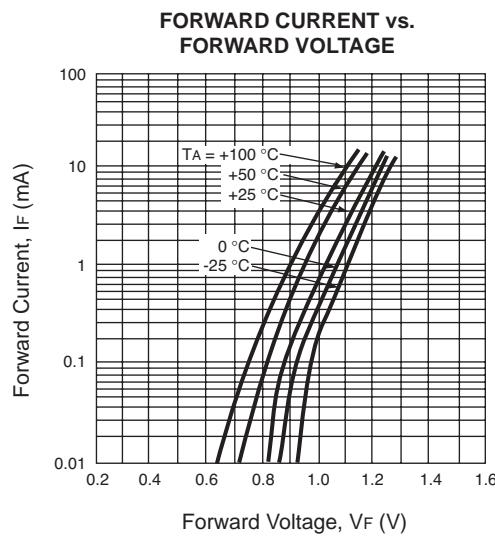
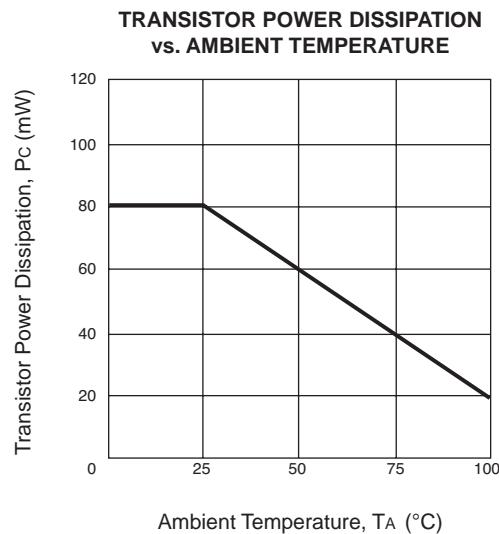
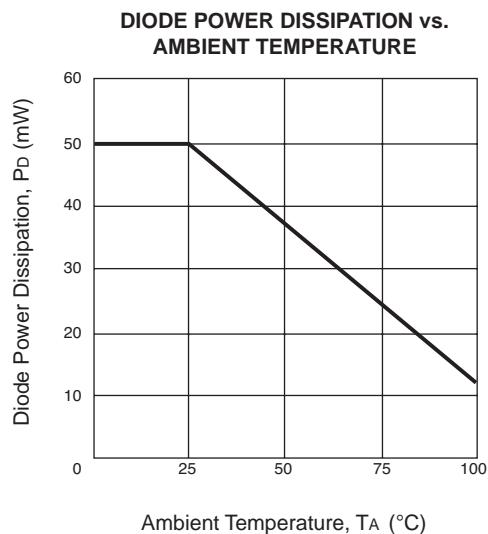
1. CTR rank
  - L: 15 to 30 (%)
  - N: 10 to 30 (%)
2. Test Circuit for Propagation Delay Time:

\*C<sub>L</sub> includes probe and stray wiring capacitance.**Usage Cautions:**

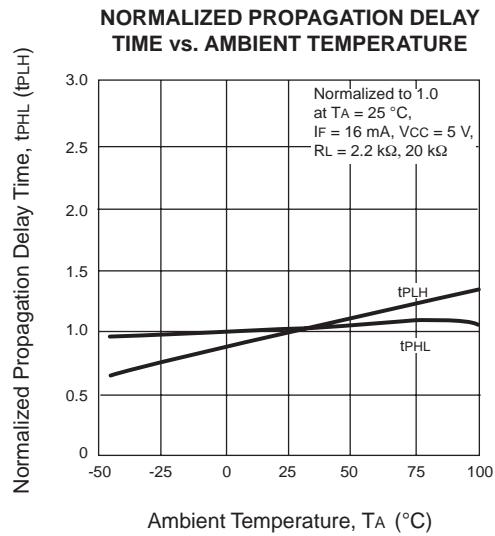
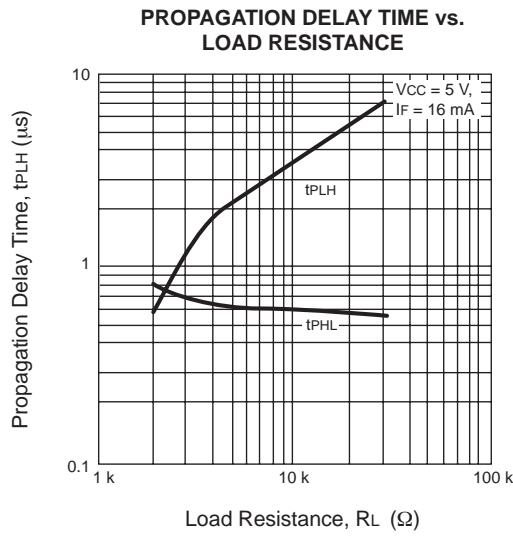
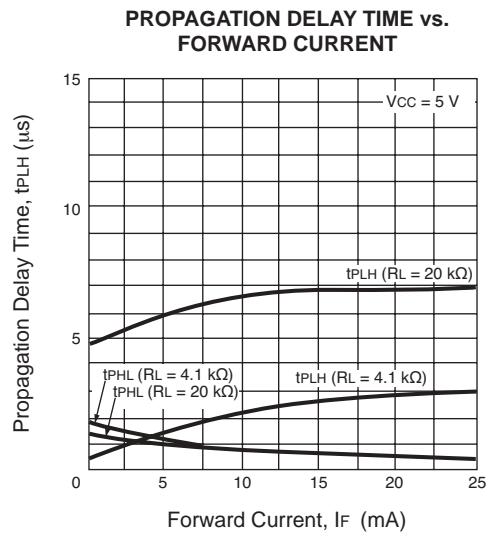
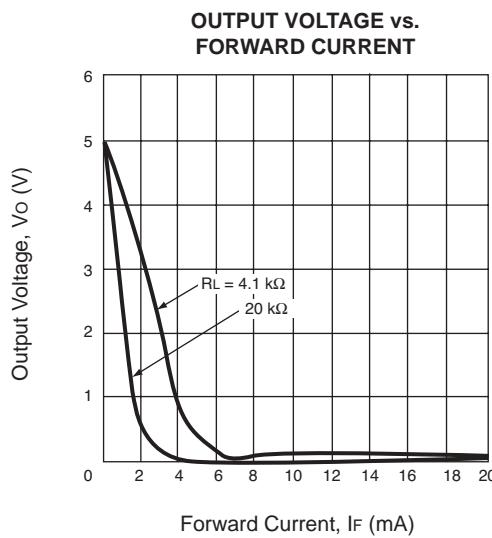
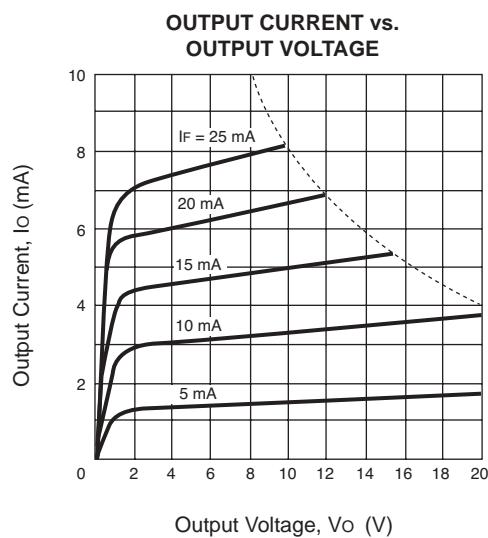
1. When handling this product, precautions should be taken against static electricity.
2. A by-pass capacitor of  $\geq 0.1 \mu\text{F}$  is used between V<sub>CC</sub> and GND.

**OUTLINE DIMENSIONS** (Units in mm)**MARKING**

## TYPICAL PERFORMANCE CURVES (TA = 25 °C unless otherwise specified)



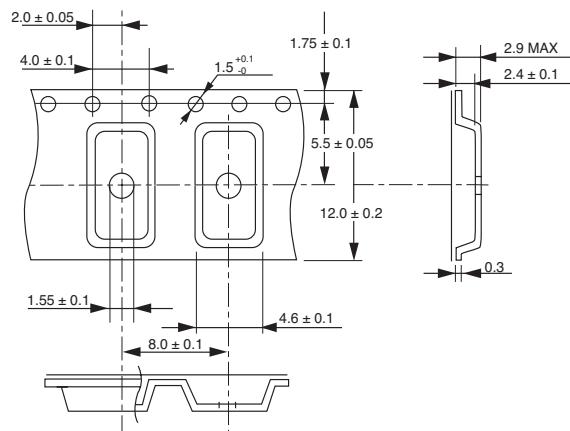
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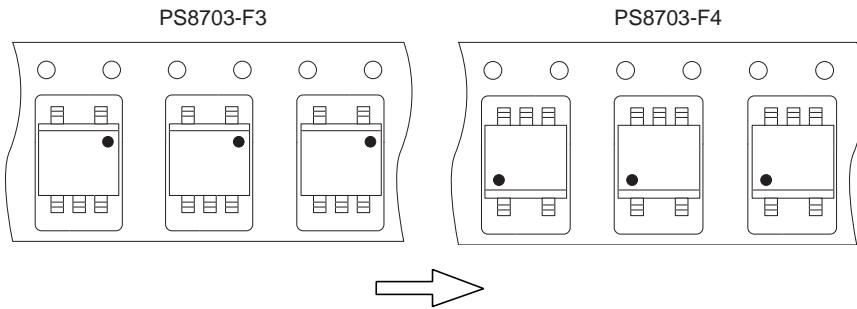
Remark: The graphs indicate nominal characteristics.

## TAPING SPECIFICATIONS (Units in mm)

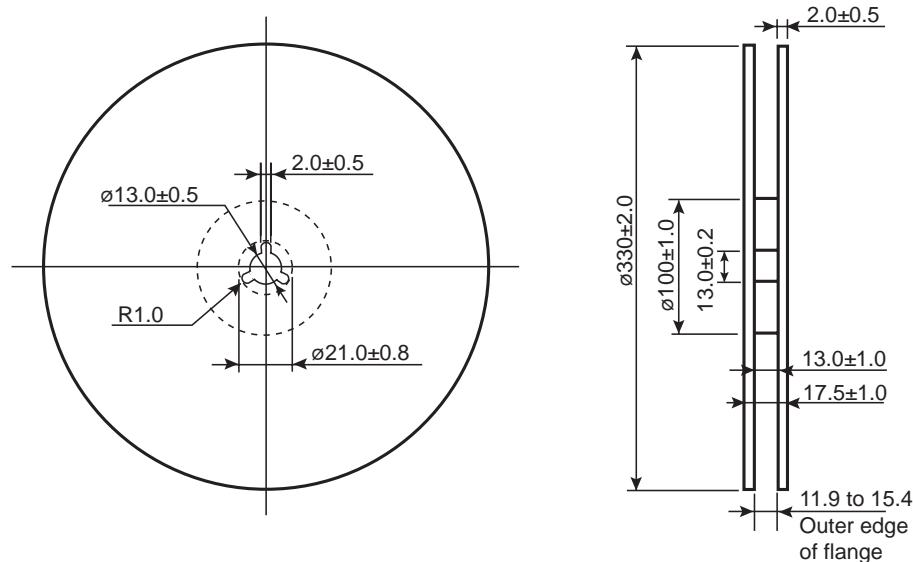
### Tape Outline and Dimensions



### Tape Direction



### Reel Outline and Dimensions

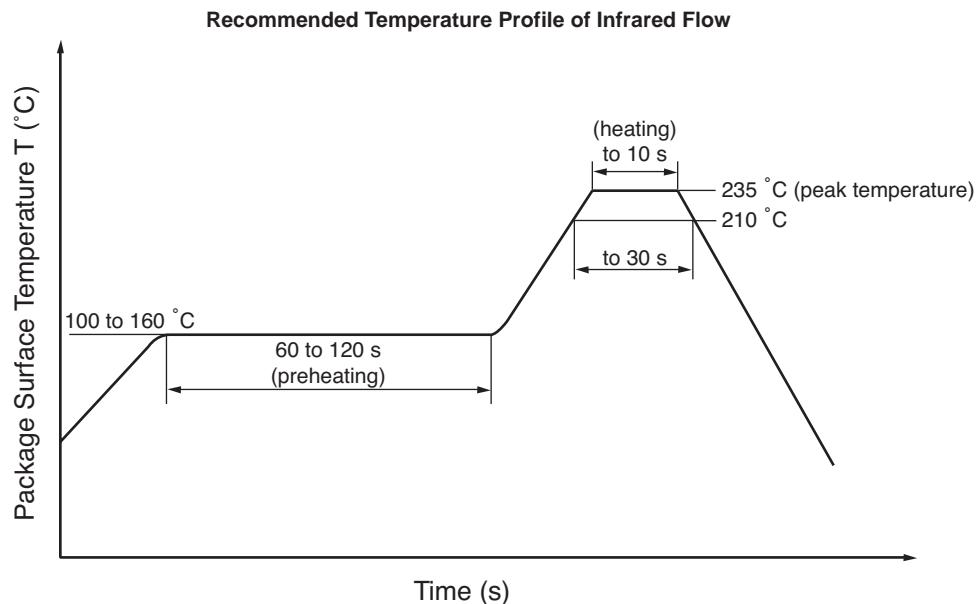


Packing: 3500 pcs/reel

## 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 small amount of chlorine (The flux with a max. chlorine content of 0.2 Wt % is recommended)



### (2) Cautions

- Fluxes

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

#### Life Support Applications

These NEC products are not intended for use in life support devices, appliances, or systems where the malfunction of these products can reasonably be expected to result in personal injury. The customers of CEL using or selling these products for use in such applications do so at their own risk and agree to fully indemnify CEL for all damages resulting from such improper use or sale.

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4590 Patrick Henry Drive • Santa Clara, CA 95054-1817 • (408) 988-3500 • FAX (408) 988-0279 • [www.cel.com](http://www.cel.com)

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02/11/2003

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