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To our customers,

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On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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|---|---|
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DATA SHEET

Solid State Relay
OCMOS FET

# PS7360-1A,PS7360L-1A

## 6-PIN DIP, HIGH ISOLATION VOLTAGE
## 600 V BREAK DOWN VOLTAGE
## NORMALLY OPEN TYPE
## 1-ch Optical Coupled MOS FET

–NEPOC Series–

### DESCRIPTION

The PS7360-1A and PS7360L-1A are solid state relays containing GaAs LEDs on the light emitting side (input side) and MOS FETs on the output side.

They are suitable for analog signal control because of their low offset and high linearity.

The PS7360L-1A has a surface mount type lead.

### FEATURES

- High isolation voltage (BV = 3 750 Vr.m.s.)
- 1 channel type (1 a output)
- Low LED operating current ($I_F$ = 2 mA)
- Designed for AC/DC switching line changer
- Small package (6-pin DIP)
- Low offset voltage
- Ordering number of taping product : PS7360L-1A-E3, E4: 1 000 pcs/reel
- <R> Pb-Free product
- <R> Safety standards
  - UL approved: File No. E72422
  - BSI approved: No. 8252/8253
  - CSA approved: No. CA 101391
  - SEMKO approved: No. 606398
  - DEMKO approved: No. 309836
  - NEMKO approved: No. P00100964
  - FIMKO approved: No. FI 15188
  - DIN EN60747-5-2 (VDE0884 Part2) approved (Option)

### APPLICATIONS

- Exchange equipment
- Measurement equipment
- FA/OA equipment

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Document No. PN10310EJ02V0DS (2nd edition)
Date Published September 2006 NS CP(K)
Printed in Japan

The mark <R> shows major revised points.

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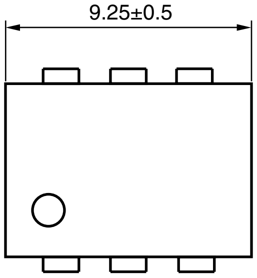
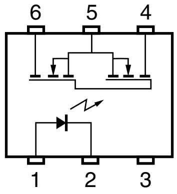
The revised points can be easily searched by copying an "<R>" in the PDF file and specifying it in the "Find what:" field.

## PACKAGE DIMENSIONS (in millimeters)

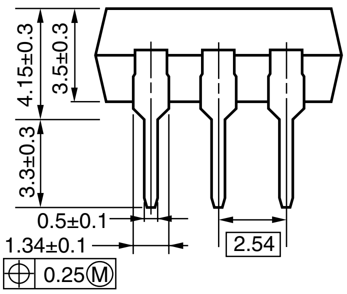
### PS7360-1A

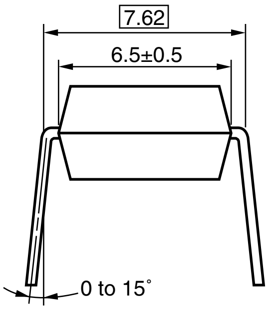


### TOP VIEW

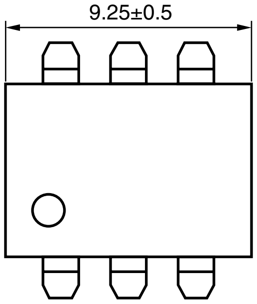


1. LED Anode
2. LED Cathode
3. NC
4. MOS FET Drain
5. MOS FET Source
6. MOS FET Drain

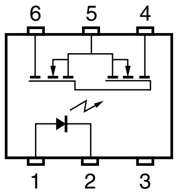




### PS7360L-1A



### TOP VIEW



1. LED Anode
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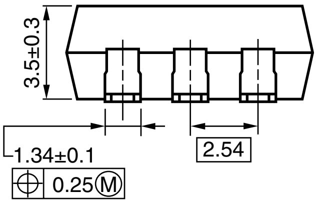
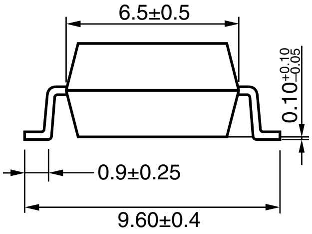
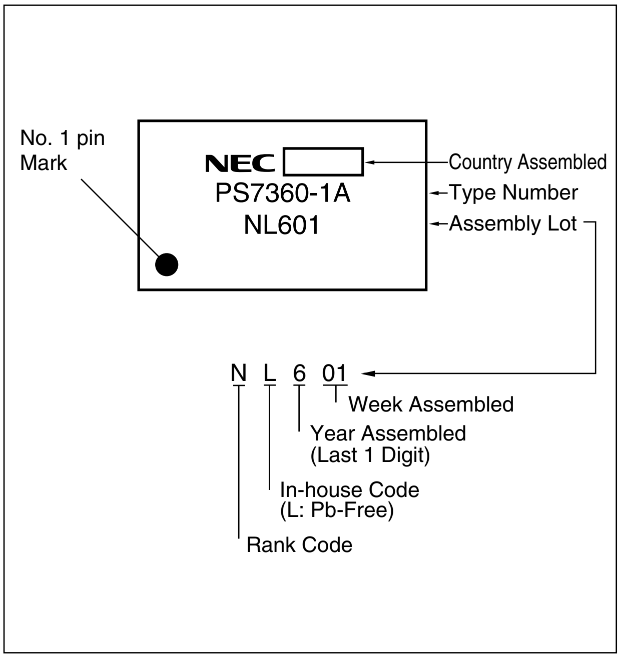




## <R> MARKING EXAMPLE



## <R> ORDERING INFORMATION

| Part Number | Order Number | Solder Plating Specification | Packing Style | Safety Standard Approval | Application Part Number[*1] |
|---|---|---|---|---|---|
| PS7360-1A | PS7360-1A-A | Pb-Free | Magazine case 50 pcs | Standard products (UL, BSI, CSA, SEMKO, DEMKO, NEMKO, FIMKO approved) | PS7360-1A |
| PS7360L-1A | PS7360L-1A-A | | | | |
| PS7360L-1A-E3 | PS7360L-1A-E3-A | | Embossed Tape 1 000 pcs/reel | | |
| PS7360L-1A-E4 | PS7360L-1A-E4-A | | | | |

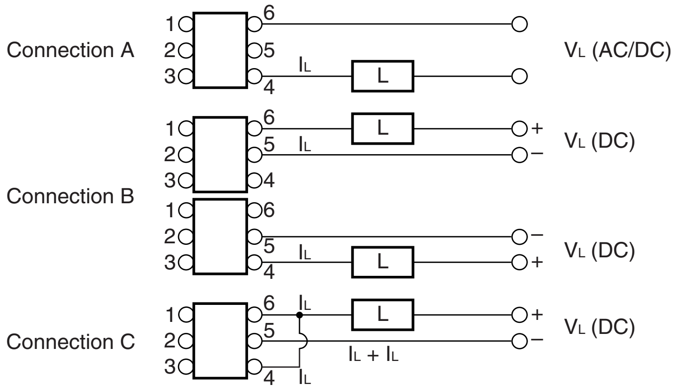
***1** For the application of the Safety Standard, following part number should be used.

## ABSOLUTE MAXIMUM RATINGS ($T_A$ = 25°C, unless otherwise specified)

| Parameter | | | Symbol | Ratings | Unit |
|---|---|---|---|---|---|
| Diode | Forward Current (DC) | | $I_F$ | 50 | mA |
| | Reverse Voltage | | $V_R$ | 5.0 | V |
| | Power Dissipation | | $P_D$ | 50 | mW |
| | Peak Forward Current[*1] | | $I_{FP}$ | 1 | A |
| MOS FET | Break Down Voltage | | $V_L$ | 600 | V |
| | Continuous Load Current[*2] | Connection A | $I_L$ | 90 (120) | mA |
| | | Connection B | | 130 (160) | |
| | | Connection C | | 200 (210) | |
| | Pulse Load Current[*3] (AC/DC Connection) | | $I_{LP}$ | 250 | mA |
| | Power Dissipation | | $P_D$ | 560 | mW |
| Isolation Voltage[*4] | | | BV | 3 750 | Vr.m.s. |
| Total Power Dissipation | | | $P_T$ | 610 | mW |
| Operating Ambient Temperature | | | $T_A$ | −40 to +85 | °C |
| Storage Temperature | | | $T_{stg}$ | −40 to +125 | °C |

***1** PW = 100 $\mu$s, Duty Cycle = 1%

***2** Conditions: $I_F \geq 2$ mA.
Conditions: $I_F \geq 5$ mA. Load current ( ) value is.
The following types of load connections are available.



***3** PW = 100 ms, 1 shot

***4** AC voltage for 1 minute at $T_A$ = 25°C, RH = 60% between input and output
Pins 1-3 shorted together, 4-6 shorted together.

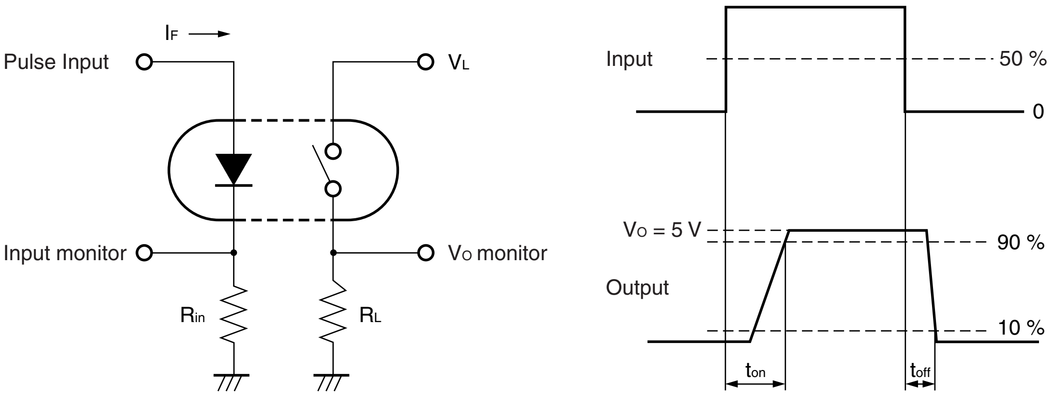
## RECOMMENDED OPERATING CONDITIONS ($T_A$ = 25°C)

| Parameter | Symbol | MIN. | TYP. | MAX. | Unit |
|---|---|---|---|---|---|
| LED Operating Current | $I_F$ | 2 | 10 | 20 | mA |
| LED Off Voltage | $V_F$ | 0 |  | 0.5 | V |

## ELECTRICAL CHARACTERISTICS ($T_A$ = 25°C)

| Parameter |  | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|---|---|---|---|---|---|---|---|
| Diode | Forward Voltage | $V_F$ | $I_F$ = 10 mA |  | 1.2 | 1.4 | V |
|  | Reverse Current | $I_R$ | $V_R$ = 5 V |  |  | 5.0 | μA |
| MOS FET | Off-state Leakage Current | $I_{Loff}$ | $V_D$ = 600 V |  | 0.03 | 1.0 | μA |
|  | Output Capacitance | $C_{out}$ | $V_D$ = 0 V, f = 1 MHz |  | 110 |  | pF |
| Coupled | LED On-state Current | $I_{Fon}$ | $I_L$ = 90 mA |  |  | 2.0 | mA |
|  | On-state Resistance | $R_{on1}$ | $I_F$ = 10 mA, $I_L$ = 10 mA |  | 41 | 50 | Ω |
|  |  | $R_{on2}$ | $I_F$ = 10 mA, $I_L$ = 90 mA, t ≤ 10 ms |  | 33 | 45 |  |
|  | Turn-on Time*1, 2 | $t_{on}$ | $I_F$ = 10 mA, $V_O$ = 5 V, $R_L$ = 2 kΩ, PW ≥ 10 ms |  | 0.6 | 2.0 | ms |
|  | Turn-off Time*1, 2 | $t_{off}$ |  |  | 0.03 | 0.2 |  |
|  | Isolation Resistance | $R_{I-O}$ | $V_{I-O}$ = 1.0 $kV_{DC}$ | $10^9$ |  |  | Ω |
|  | Isolation Capacitance | $C_{I-O}$ | V = 0 V, f = 1 MHz |  | 1.1 |  | pF |

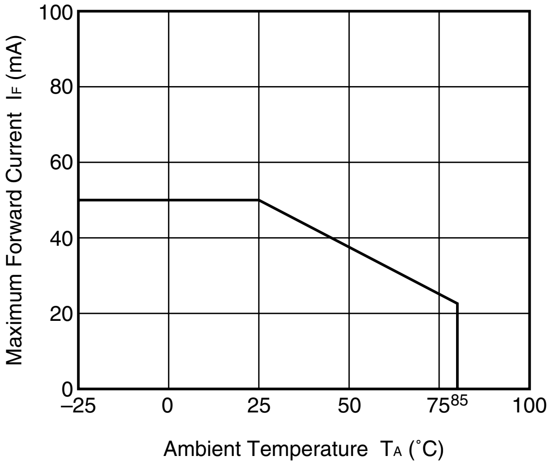
***1** Test Circuit for Switching Time



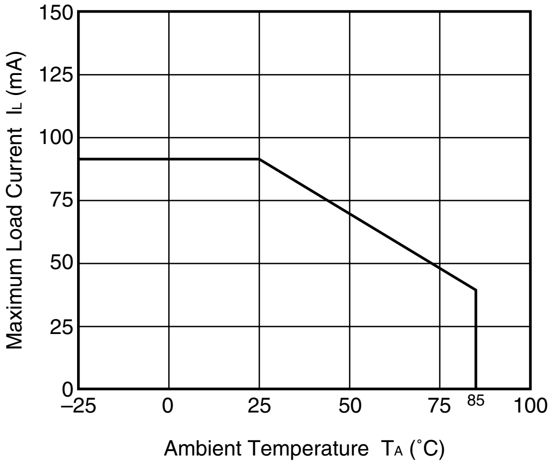
<R> ***2** The turn-on time and turn-off time are specified as input-pulse width ≥ 10 ms.
Be aware that when the device operates with an input-pulse width less than 10 ms, the turn-on time and turn-off time will increase.

## TYPICAL CHARACTERISTICS ($T_A$ = 25°C, unless otherwise specified)

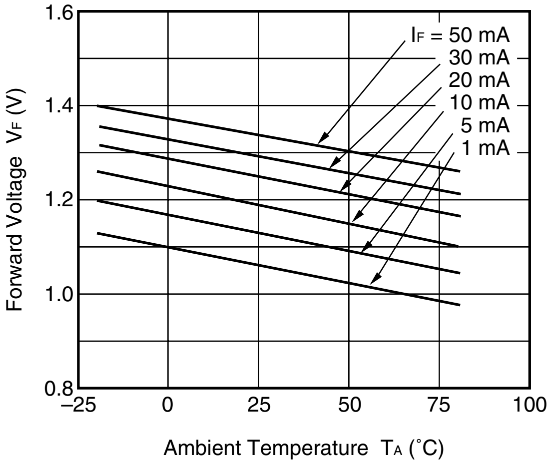
MAXIMUM FORWARD CURRENT vs. AMBIENT TEMPERATURE



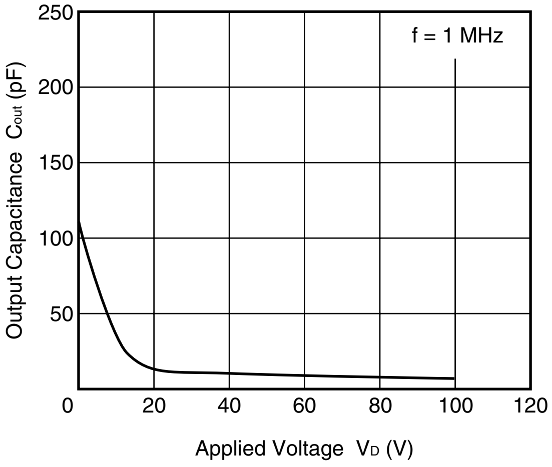
MAXIMUM LOAD CURRENT vs. AMBIENT TEMPERATURE



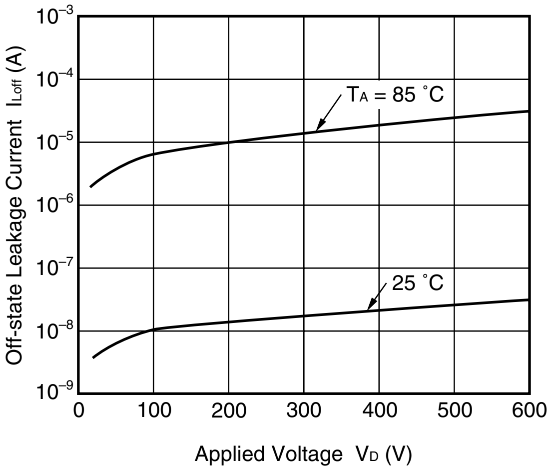
FORWARD VOLTAGE vs. AMBIENT TEMPERATURE



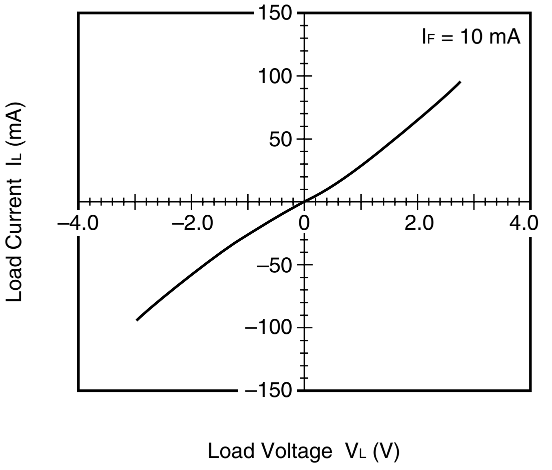
OUTPUT CAPACITANCE vs. APPLIED VOLTAGE



OFF-STATE LEAKAGE CURRENT vs. APPLIED VOLTAGE

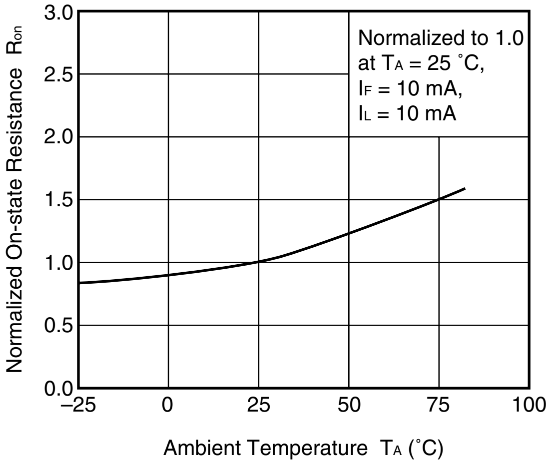


LOAD CURRENT vs. LOAD VOLTAGE

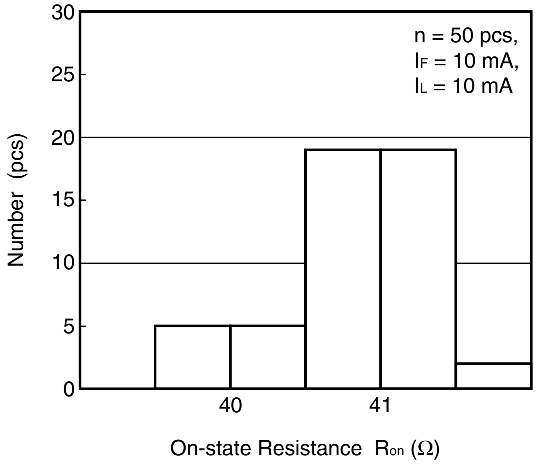


**Remark** The graphs indicate nominal characteristics.

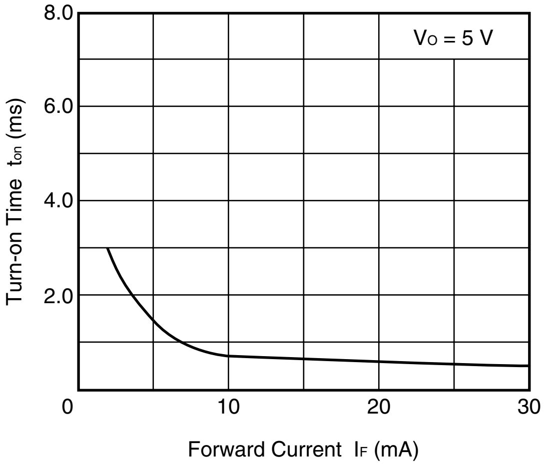
NORMALIZED ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE



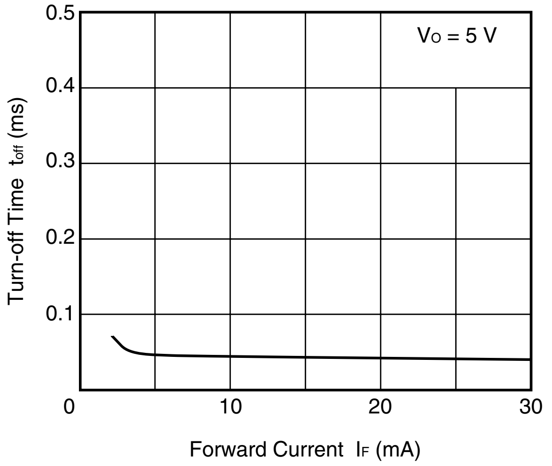
ON-STATE RESISTANCE DISTRIBTION



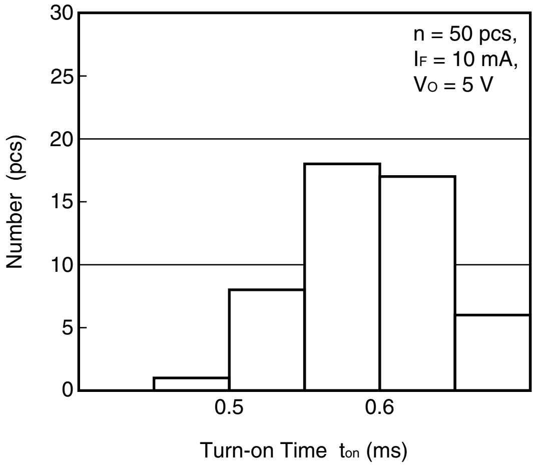
TURN-ON TIME vs. FORWARD CURRENT



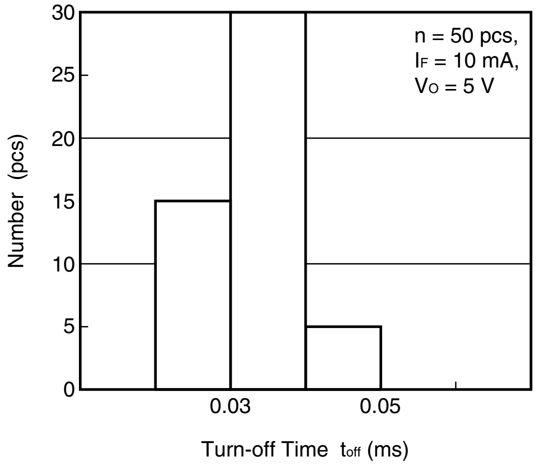
TURN-OFF TIME vs. FORWARD CURRENT



TURN-ON TIME DISTRIBUTION

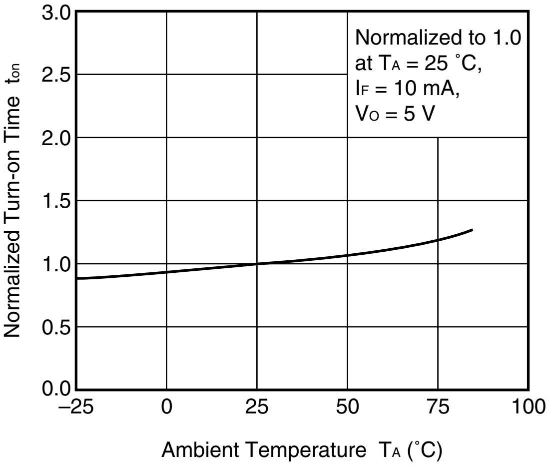


TURN-OFF TIME DISTRIBUTION

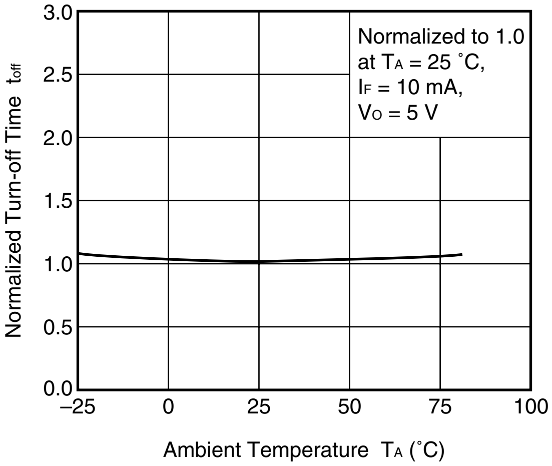


**Remark** The graphs indicate nominal characteristics.

## NORMALIZED TURN-ON TIME vs. AMBIENT TEMPERATURE



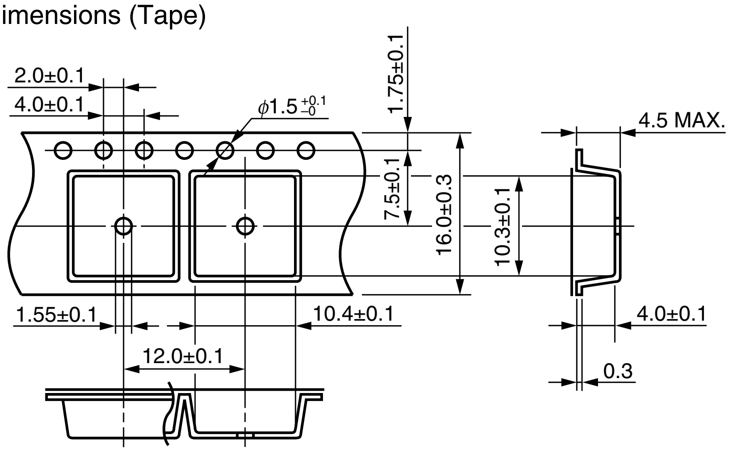
## NORMALIZED TURN-OFF TIME vs. AMBIENT TEMPERATURE



**Remark** The graphs indicate nominal characteristics.

## TAPING SPECIFICATIONS (in millimeters)

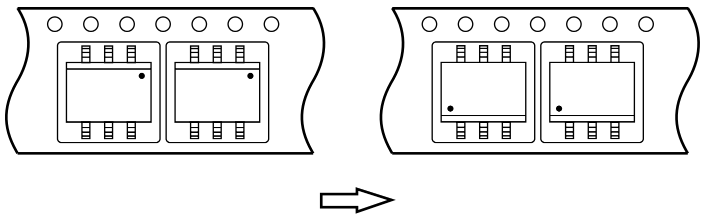
### Outline and Dimensions (Tape)



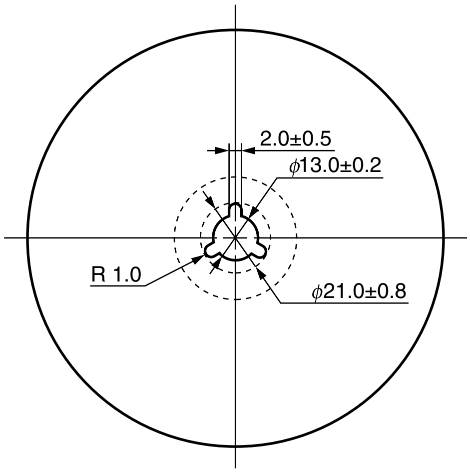
### Tape Direction

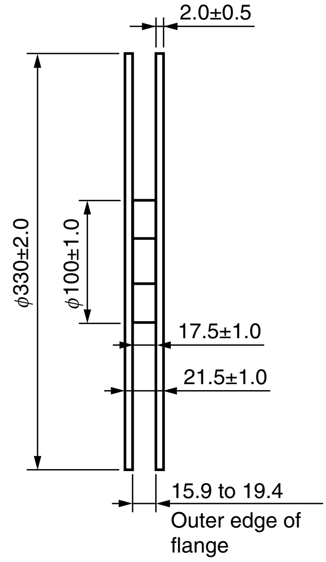
PS7360L-1A-E3

PS7360L-1A-E4



### Outline and Dimensions (Reel)





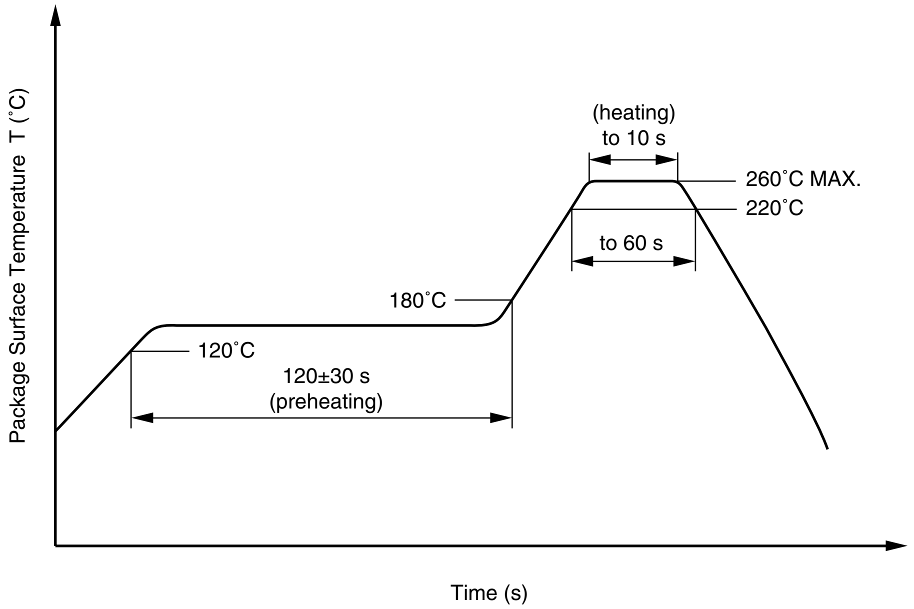
Packing: 1 000 pcs/reel

## RECOMMENDED SOLDERING CONDITIONS

### (1) Infrared reflow soldering

| | |
|---|---|
| • Peak reflow temperature | 260°C or below (package surface temperature) |
| • Time of peak reflow temperature | 10 seconds or less |
| • Time of temperature higher than 220°C | 60 seconds or less |
| • Time to preheat temperature from 120 to 180°C | 120±30 s |
| • Number of reflows | Two |
| • Flux | Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt% is recommended.) |

Recommended Temperature Profile of Infrared Reflow



### (2) Wave soldering

| | |
|---|---|
| • Temperature | 260°C or below (molten solder temperature) |
| • Time | 10 seconds or less |
| • Preheating conditions | 120°C or below (package surface temperature) |
| • Number of times | One |
| • Flux | Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt% is recommended.) |

### <R> (3) Soldering by soldering iron

| | |
|---|---|
| • Peak temperature (lead part temperature) | 350°C or below |
| • Time (each pins) | 3 seconds or less |
| • Flux | Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt% is recommended.) |

(a) Soldering of leads should be made at the point 1.5 to 2.0 mm from the root of the lead.
(b) Please be sure that the temperature of the package would not be heated over 100°C.

**(4) Cautions**

<R>
- To avoid quality degradation, assembling within 1 month after take this device out from covered pack is required. (Storage conditions 25°C, 65%RH MAX.)
- Fluxes

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

<R>

## USAGE CAUTIONS

1. Protect against static electricity when handling.
2. Avoid storage at a high temperature and high humidity.

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**▶For further information, please contact**

**NEC Compound Semiconductor Devices Hong Kong Limited**
E-mail: contact@ncsd-hk.necel.com
Hong Kong Head Office TEL: +852-3107-7303 FAX: +852-3107-7309
Taipei Branch Office TEL: +886-2-8712-0478 FAX: +886-2-2545-3859
Korea Branch Office TEL: +82-2-558-2120 FAX: +82-2-558-5209

**NEC Electronics (Europe) GmbH http://www.eu.necel.com/**
TEL: +49-211-6503-0 FAX: +49-211-6503-1327

**California Eastern Laboratories, Inc. http://www.cel.com/**
TEL: +1-408-988-3500 FAX: +1-408-988-0279

**Compound Semiconductor Devices Division**
**NEC Electronics Corporation**
**URL: http://www.ncsd.necel.com/**