DATA SHEET

NEC

OCMOS FET™

# PS7342C-1A,PS7342CL-1A

## CURRENT LIMIT TYPE
## 6-PIN DIP OCMOS FET
## (1-ch OCMOS FET)

### DESCRIPTION

The PS7342C-1A and PS7342CL-1A are solid state relays containing a GaAs LED on the light emitting side (input side) and MOS FETs and current control circuit on the output side.

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

The PS7342CL-1A has a surface mount type lead.

### FEATURES

- Limit current ($I_{LMT}$ = 175 to 370 mA)
- High isolation voltage (BV = 3 750 Vr.m.s.)
- 1 channel type (1 a output)
- Designed for AC/DC switching line changer
- Small package (6-pin DIP)
- Low offset voltage
- PS7342CL-1A: Surface mount type

### APPLICATIONS

- Exchange equipment
- Measurement equipment
- FA/OA equipment

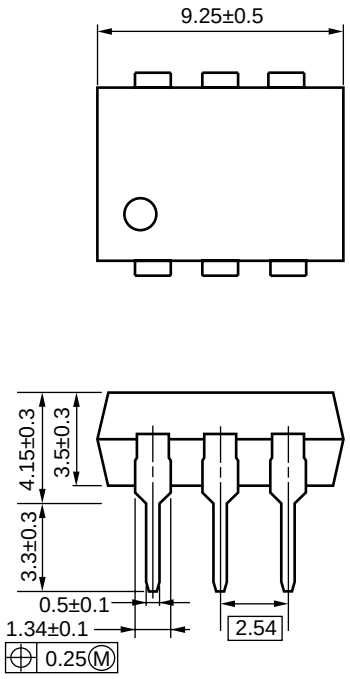


Document No. P12935EJ3V0DS00 (3rd edition)
Date Published March 1999 NS CP(K)
Printed in Japan

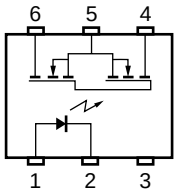
**The mark ★ shows major revised points.**

★ **PACKAGE DIMENSIONS (in millimeters)**

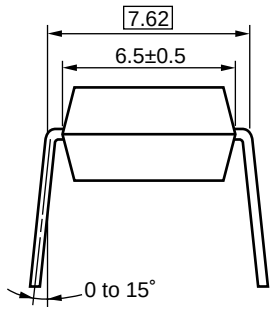
**PS7342C-1A**



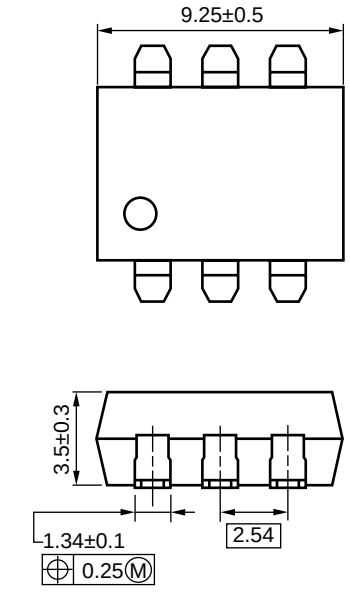

**TOP VIEW**



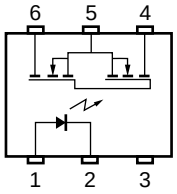

1. LED Anode
2. LED Cathode
3. NC
4. MOS FET Drain
5. MOS FET Source
6. MOS FET Drain



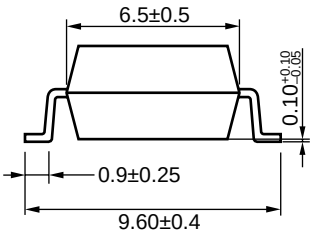

**PS7342CL-1A**




**TOP VIEW**




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



## 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 | $V_L$ | 400 | V |
| | Continuous Load Current | $I_L$ | 170 | mA |
| | Power Dissipation | $P_D$ | 560 | mW |
| Isolation Voltage *2 | | 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** AC voltage for 1 minute at $T_A$ = 25 °C, RH = 60 % between input and output

## 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 |

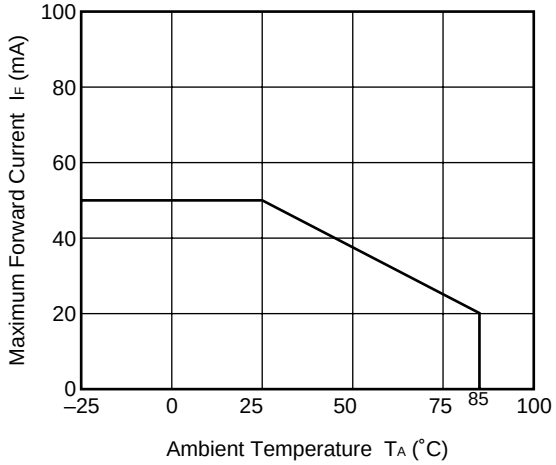
## ELECTRICAL CHARACTERISTICS ($T_A$ = 25 °C)

| 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 | $\mu$A |
| MOS FET | Off-state Leakage Current | $I_{Loff}$ | $V_D$ = 400 V | | 0.001 | 1.0 | $\mu$A |
| | Output Capacitance | $C_{out}$ | $V_D$ = 0 V, f = 1 MHz | | 237 | | pF |
| Coupled | On-state Resistance | $R_{on1}$ | $I_F$ = 10 mA, $I_L$ = 10 mA | | 12 | 20 | Ω |
| | | $R_{on2}$ | $I_F$ = 10 mA, $I_L$ = 170 mA | | 12 | 20 | |
| | Turn-on Time | $t_{on}$ | $I_F$ = 10 mA, $V_L$ = 5 V, $R_L$ = 500 Ω, | | 2.0 | 5.0 | ms |
| | Turn-off Time | $t_{off}$ | PW ≥ 10 ms | | 0.06 | 1.0 | |
| | 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 |
| | Limit Current *1 | $I_{LMT}$ | $I_F$ = 10 mA, t = 5 ms, $V_L$ = 6 V | 175 | 270 | 370 | mA |

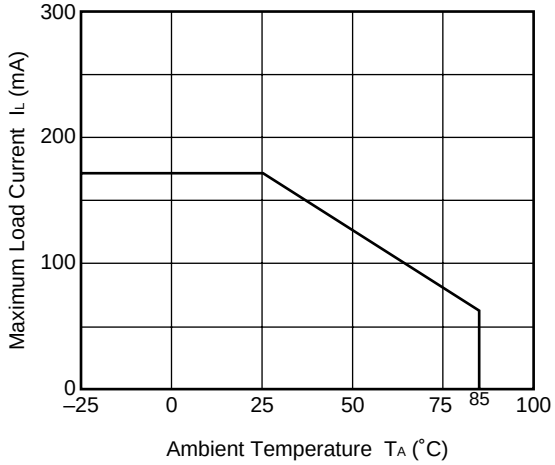
***1** N rank : 175 to 370 mA
M rank : 175 to 250 mA
L rank : 230 to 370 mA

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

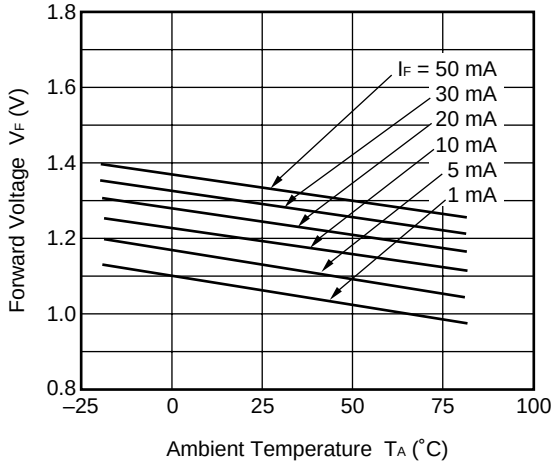
MAXIMUM FORWARD CURRENT vs. AMBIENT TEMPERTURE



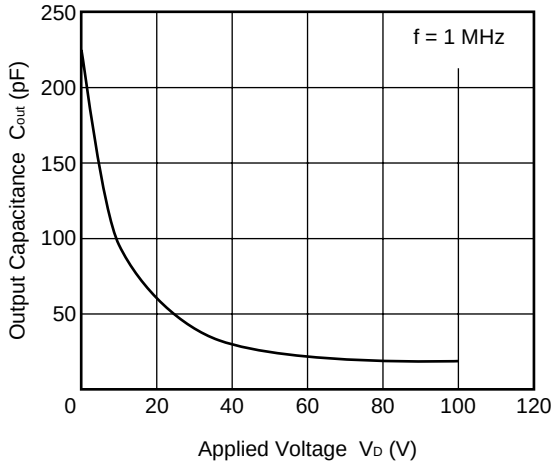

MAXIMUM LOAD CURRENT vs. AMBIENT TEMPERTURE



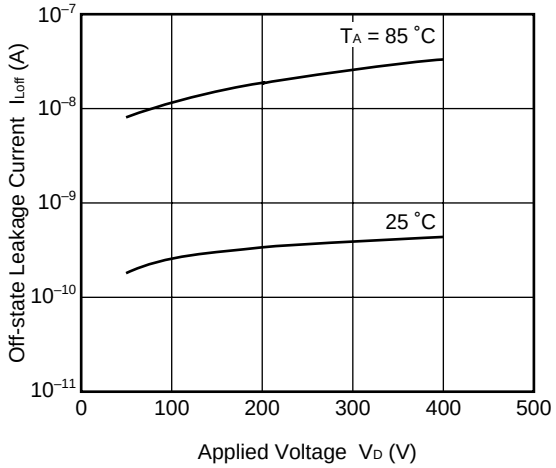

FORWARD VOLTAGE vs. AMBIENT TEMPERTURE



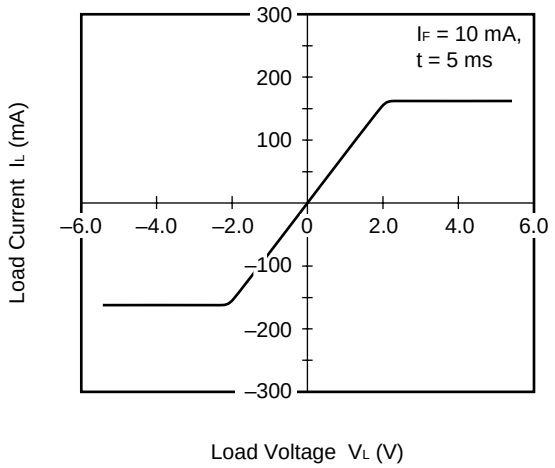

OUTPUT CAPACITANCE vs. APPLIED VOLTAGE



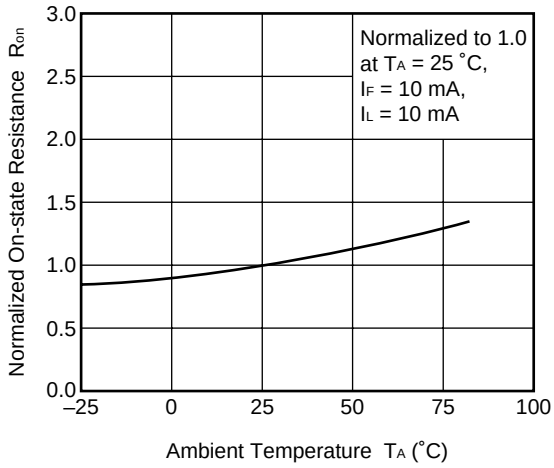

OFF-STATE LEAKAGE CURRENT vs. APPLIED VOLTAGE



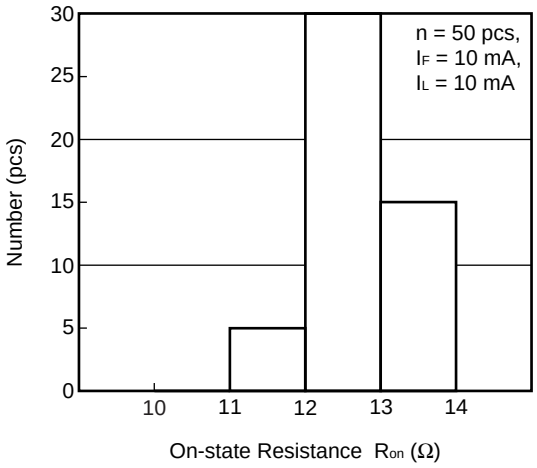

LOAD CURRENT vs. LOAD VOLTAGE



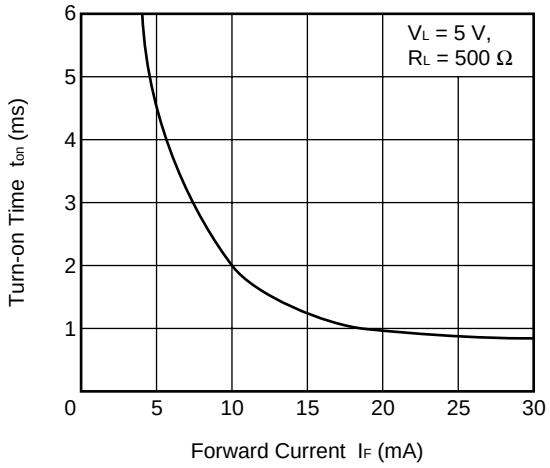
NORMALIZED ON-STATE RESISTANCE vs. AMBIENT TEMPERTURE



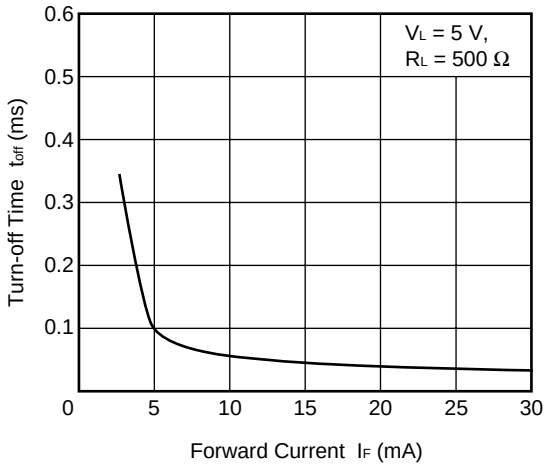

ON-STATE RESISTANCE DISTRIBUTION



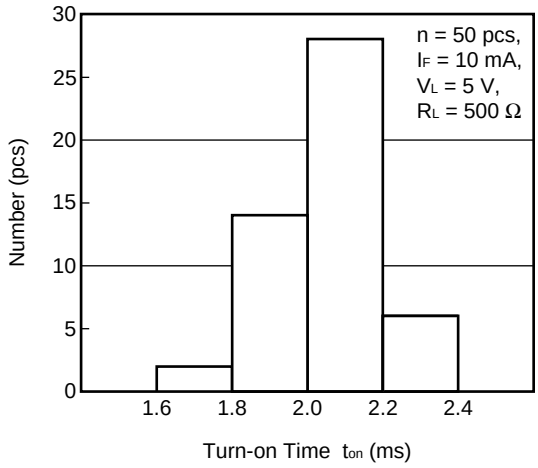

TURN-ON TIME vs. FORWARD CURRENT



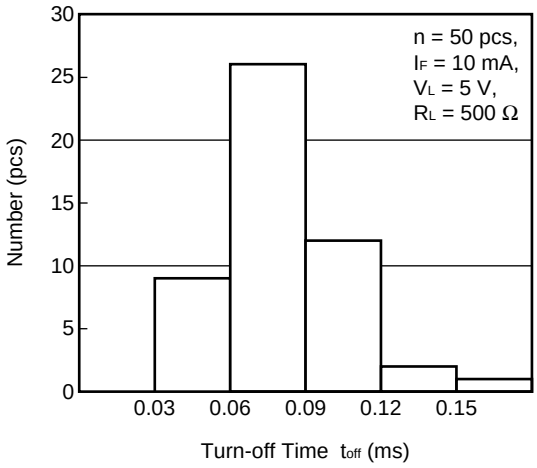

TURN-OFF TIME vs. FORWARD CURRENT



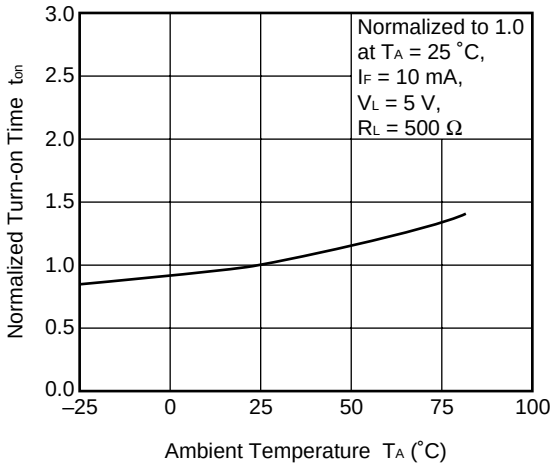

TURN-ON TIME DISTRIBUTION



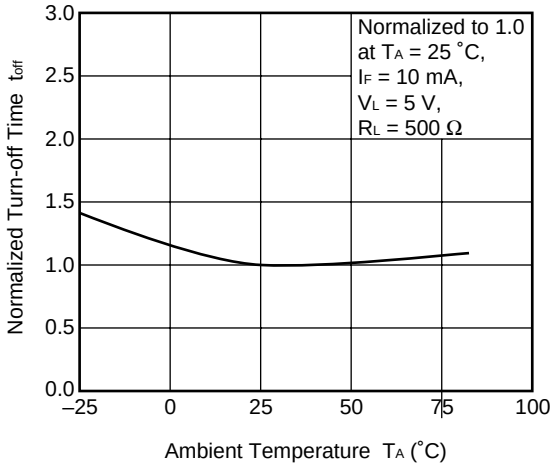

TURN-OFF TIME DISTRIBUTION



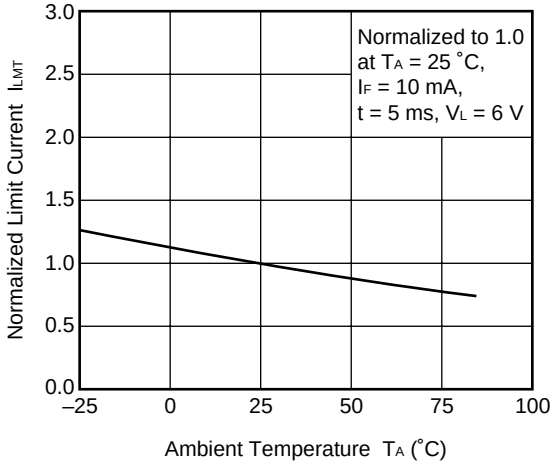
NORMALIZED TURN-ON TIME vs. AMBIENT TEMPERTURE




NORMALIZED TURN-OFF TIME vs. AMBIENT TEMPERTURE



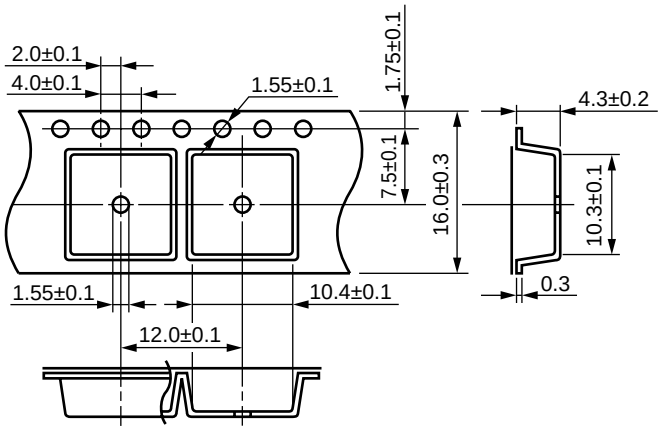

NORMALIZED LIMIT CURRENT vs. AMBIENT TEMPERTURE



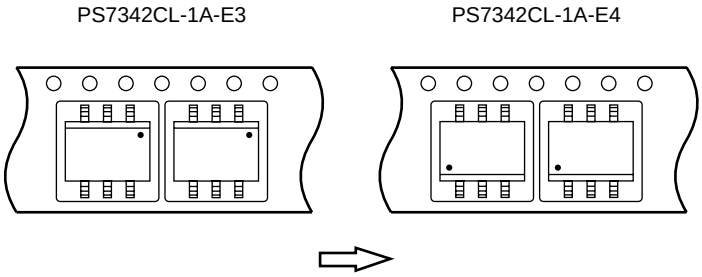

**Remark** The graphs indicate nominal characteristics.

**TAPING SPECIFICATIONS (in millimeters)**

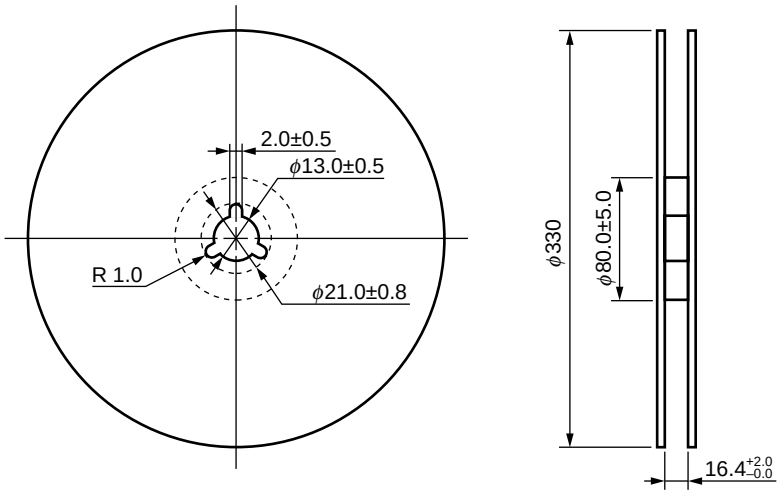
Outline and Dimensions (Tape)




Tape Direction




Outline and Dimensions (Reel)



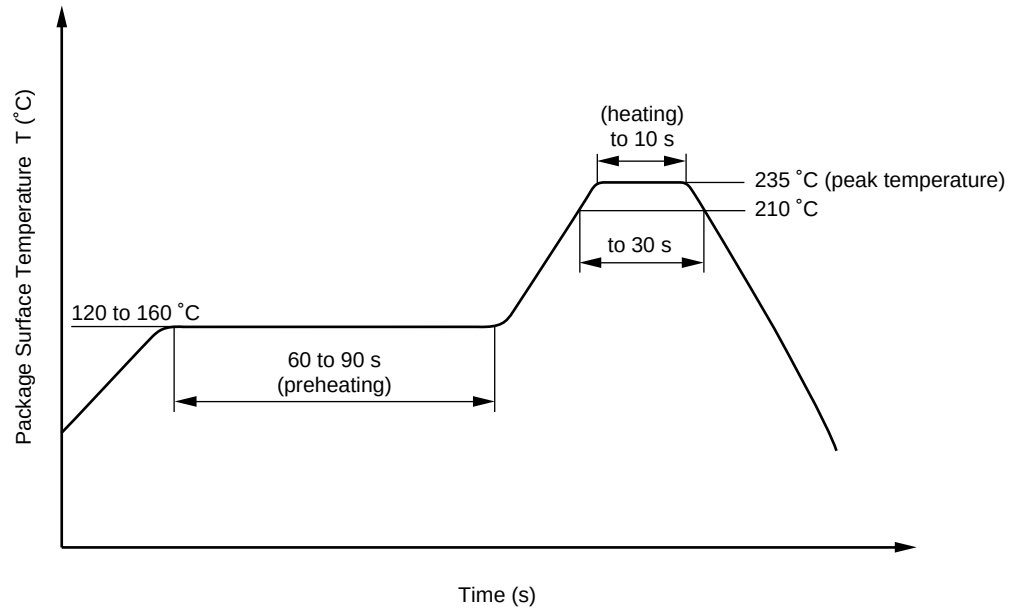

Packing: 1 000 pcs/reel

## ★ RECOMMENDED SOLDERING CONDITIONS

**(1) Infrared reflow soldering**

- Peak reflow temperature — 235 °C (package surface temperature)
- Time of temperature higher than 210 °C — 30 seconds or less
- Number of reflows — One
- 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) Dip soldering**

- Temperature — 260 °C or below (molten solder temperature)
- Time — 10 seconds or less
- 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.)

**(3) Cautions**

- Fluxes
  Avoid removing the residual flux with freon-based and chlorine-based cleaning solvent.
- Products in dry pack
  After opening the dry pack, solder the products within the valid storage period specified on the label on the dry pack.

**[MEMO]**

**[MEMO]**

**[MEMO]**

## CAUTION

**Within this device there exists GaAs (Gallium Arsenide) material which is a harmful substance if ingested. Please do not under any circumstances break the hermetic seal.**

**OCMOS FET is a trademark of NEC Corporation.**

- **The information in this document is subject to change without notice. Before using this document, please confirm that this is the latest version.**
- No part of this document may be copied or reproduced in any form or by any means without the prior written consent of NEC Corporation. NEC Corporation assumes no responsibility for any errors which may appear in this document.
- NEC Corporation does not assume any liability for infringement of patents, copyrights or other intellectual property rights of third parties by or arising from use of a device described herein or any other liability arising from use of such device. No license, either express, implied or otherwise, is granted under any patents, copyrights or other intellectual property rights of NEC Corporation or others.
- Descriptions of circuits, software, and other related information in this document are provided for illustrative purposes in semiconductor product operation and application examples. The incorporation of these circuits, software, and information in the design of the customer's equipment shall be done under the full responsibility of the customer. NEC Corporation assumes no responsibility for any losses incurred by the customer or third parties arising from the use of these circuits, software, and information.
- While NEC Corporation has been making continuous effort to enhance the reliability of its semiconductor devices, the possibility of defects cannot be eliminated entirely. To minimize risks of damage or injury to persons or property arising from a defect in an NEC semiconductor device, customers must incorporate sufficient safety measures in its design, such as redundancy, fire-containment, and anti-failure features.
- NEC devices are classified into the following three quality grades:
  "Standard", "Special", and "Specific". The Specific quality grade applies only to devices developed based on a customer designated "quality assurance program" for a specific application. The recommended applications of a device depend on its quality grade, as indicated below. Customers must check the quality grade of each device before using it in a particular application.
  - Standard: Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots
  - Special: Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)
  - Specific: Aircraft, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems or medical equipment for life support, etc.

  The quality grade of NEC devices is "Standard" unless otherwise specified in NEC's Data Sheets or Data Books. If customers intend to use NEC devices for applications other than those specified for Standard quality grade, they should contact an NEC sales representative in advance.

M7 98.8