

**ANALOG OUTPUT TYPE
5-PIN SOP PHOTOCOUPLER**

–NEPOC Series–

DESCRIPTION

The PS8703 is an optically coupled isolator containing a GaAlAs LED on the light emitting diode (input side) and a PIN photodiode and a high-speed amplifier transistor on the output side on one chip.

This is a plastic SOP (Small Out-line Package) type for high density applications.

FEATURES

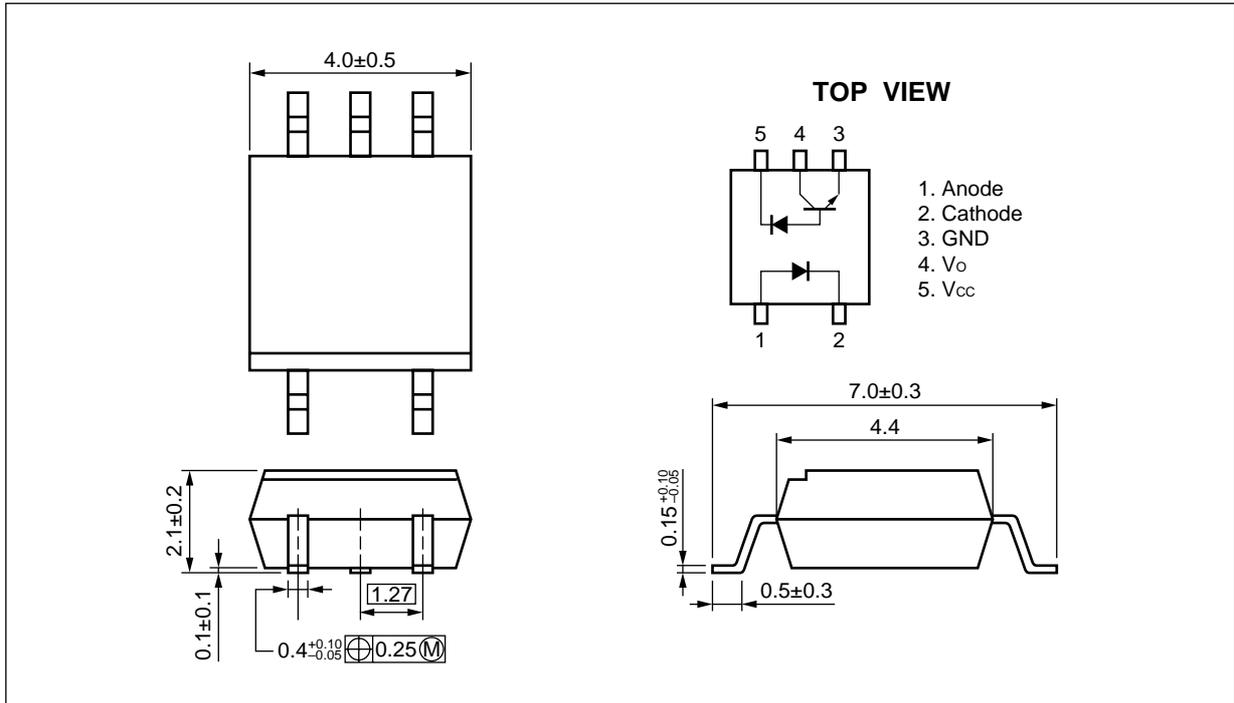
- High supply voltage ($V_{CC} = 15\text{ V}$)
- High isolation voltage ($BV = 2\ 500\text{ Vr.m.s.}$)
- High-speed response ($t_{PHL}, t_{PLH} = 5\ \mu\text{s MAX.}$ (@ $R_L = 4.1\ \text{k}\Omega$))
- Ordering number of taping product: PS8703-F3, F4

APPLICATIONS

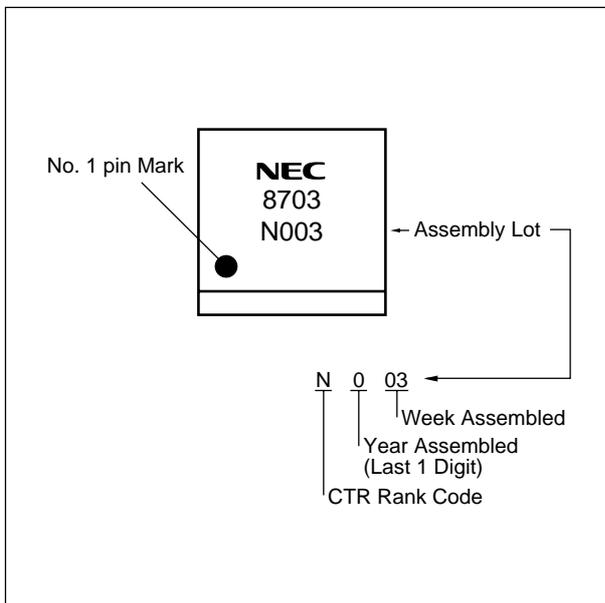
- Computer and peripheral manufactures
- General purpose inverter
- Substitutions for relays and pulse transformers
- Power supply

The information in this document is subject to change without notice. Before using this document, please confirm that this is the latest version.
Not all devices/types available in every country. Please check with local NEC Compound Semiconductor Devices representative for availability and additional information.

PACKAGE DIMENSIONS (UNIT: mm)



MARKING



ORDERING INFORMATION

Part Number	Package	Packing Style	Application Part Number ^{*1}
PS8703	5-pin SOP	Magazine case 100 pcs	PS8703
PS8703-F3		Embossed Tape 3 500 pcs/reel	
PS8703-F4			

*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	I _F	50	mA
	Reverse Voltage	V _R	5	V
Detector	Supply Voltage	V _{CC}	-0.5 to +15	V
	Output Voltage	V _O	-0.5 to +15	V
	Output Current	I _O	8	mA
	Power Dissipation ^{*1}	P _C	80	mW
Isolation Voltage ^{*2}		BV	2 500	Vr.m.s.
Operating Ambient Temperature		T _A	-40 to +100	°C
Storage Temperature		T _{stg}	-55 to +125	°C

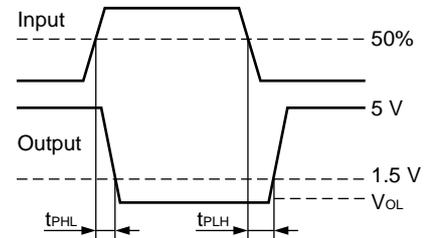
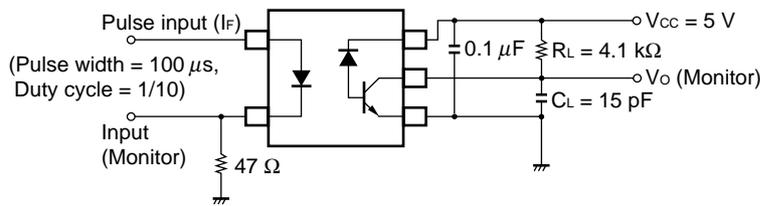
*1 Applies to output pin V_O. Reduced to 0.8 mW/°C at T_A = 25°C or more.

*2 AC voltage for 1 minute at T_A = 25°C, RH = 60% between input and output.

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V _F	I _F = 16 mA		1.2	1.5	V
	Reverse Current	I _R	V _R = 3 V			10	μA
	Terminal Capacitance	C _t	V = 0 V, f = 1 MHz		15		pF
Detector	High Level Output Current	I _{OH} (1)	I _F = 0 mA, V _{CC} = V _O = 5.5 V		3	500	nA
	High Level Output Current	I _{OH} (2)	I _F = 0 mA, V _{CC} = V _O = 15 V			100	μA
	Low Level Output Voltage	V _{OL}	I _F = 16 mA, V _{CC} = 4.5 V, I _{OL} = 1.1 mA		0.1	0.4	V
	High Level Supply Current	I _{CCH}	I _F = 0 mA, V _O = open, V _{CC} = 15 V		0.01	1	μA
	Low Level Supply Current	I _{CCL}	I _F = 16 mA, V _O = open, V _{CC} = 15 V		90	800	
Coupled	Current Transfer Ratio (I _C /I _F)	CTR	I _F = 16 mA, V _{CC} = 4.5 V, V _O = 0.4 V	10	23		%
	Isolation Resistance	R _{I-O}	V _{I-O} = 1 kV _{DC} , R _H = 40 to 60%	10 ¹¹			Ω
	Isolation Capacitance	C _{I-O}	V = 0 V, f = 1 MHz		0.4		pF
	Propagation Delay Time (H → L) ^{*1}	t _{PHL}	I _F = 16 mA, V _{CC} = 5 V, R _L = 4.1 kΩ, C _L = 15 pF		1	5	μs
	Propagation Delay Time (L → H) ^{*1}	t _{PLH}			2	5	
	Propagation Delay Time (H → L) ^{*1}	t _{PHL}	I _F = 16 mA, V _{CC} = 5 V, R _L = 20 kΩ, C _L = 15 pF		1	15	
	Propagation Delay Time (L → H) ^{*1}	t _{PLH}			7	15	

*1 Test circuit for propagation delay time



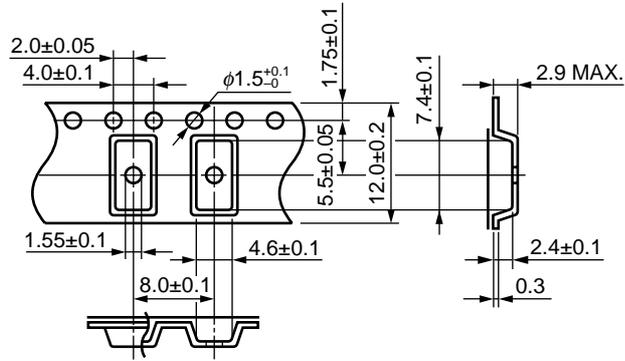
C_L includes probe and stray wiring capacitance.

USAGE CAUTIONS

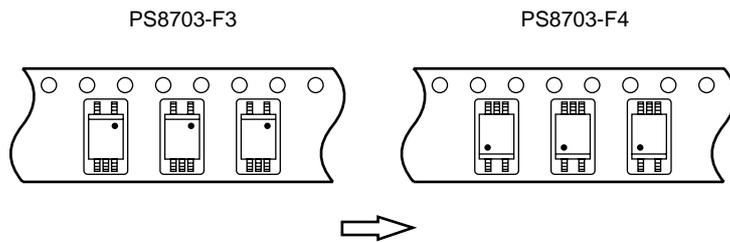
1. This product is weak for static electricity by designed with high-speed integrated circuit so protect against static electricity when handling.
2. By-pass capacitor of more than 0.1 μF is used between V_{CC} and GND near device.

TAPING SPECIFICATIONS (UNIT: mm)

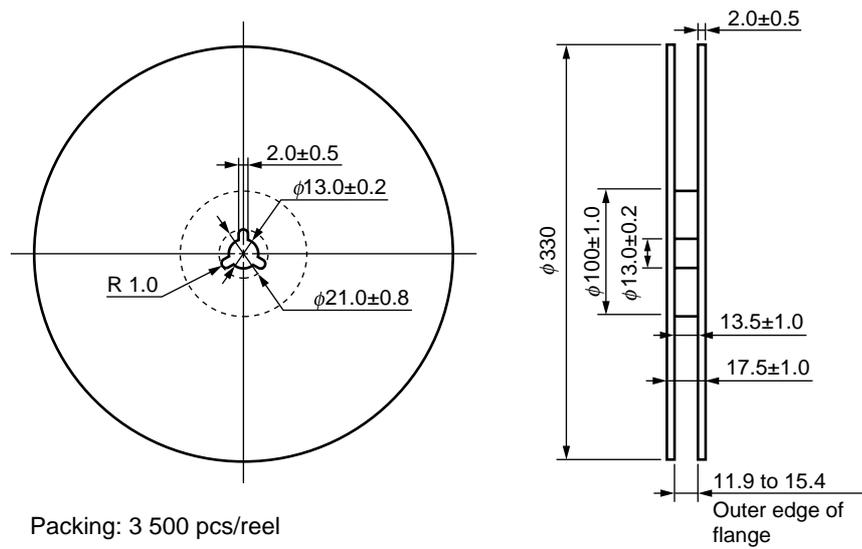
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)

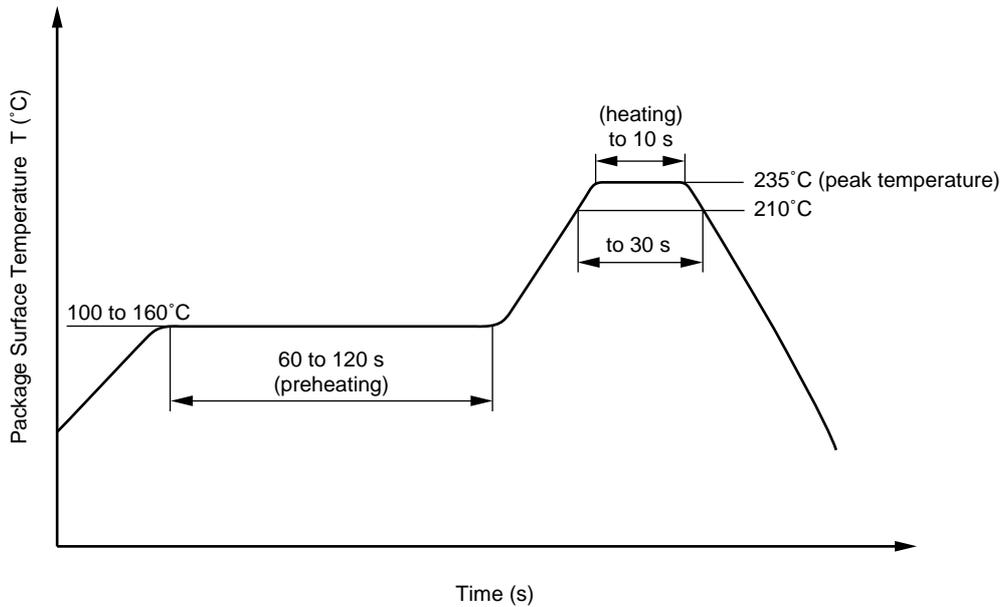


RECOMMENDED SOLDERING CONDITIONS

(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 maximum chlorine content of 0.2 Wt % is recommended.)

Recommended Temperature Profile of Infrared Reflow



(2) Cautions

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

- **The information in this document is current as of January, 2002. The information is subject to change without notice. For actual design-in, refer to the latest publications of NEC's data sheets or data books, etc., for the most up-to-date specifications of NEC semiconductor products. Not all products and/or types are available in every country. Please check with an NEC sales representative for availability and additional information.**
 - No part of this document may be copied or reproduced in any form or by any means without prior written consent of NEC. NEC assumes no responsibility for any errors that may appear in this document.
 - NEC does not assume any liability for infringement of patents, copyrights or other intellectual property rights of third parties by or arising from the use of NEC semiconductor products listed in this document or any other liability arising from the use of such products. No license, express, implied or otherwise, is granted under any patents, copyrights or other intellectual property rights of NEC 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 customer's equipment shall be done under the full responsibility of customer. NEC assumes no responsibility for any losses incurred by customers or third parties arising from the use of these circuits, software and information.
 - While NEC endeavours to enhance the quality, reliability and safety of NEC semiconductor products, customers agree and acknowledge that the possibility of defects thereof cannot be eliminated entirely. To minimize risks of damage to property or injury (including death) to persons arising from defects in NEC semiconductor products, customers must incorporate sufficient safety measures in their design, such as redundancy, fire-containment, and anti-failure features.
 - NEC semiconductor products are classified into the following three quality grades:
 "Standard", "Special" and "Specific". The "Specific" quality grade applies only to semiconductor products developed based on a customer-designated "quality assurance program" for a specific application. The recommended applications of a semiconductor product depend on its quality grade, as indicated below. Customers must check the quality grade of each semiconductor product 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 and medical equipment for life support, etc.
- The quality grade of NEC semiconductor products is "Standard" unless otherwise expressly specified in NEC's data sheets or data books, etc. If customers wish to use NEC semiconductor products in applications not intended by NEC, they must contact an NEC sales representative in advance to determine NEC's willingness to support a given application.
- (Note)
- (1) "NEC" as used in this statement means NEC Corporation, NEC Compound Semiconductor Devices, Ltd. and also includes its majority-owned subsidiaries.
 - (2) "NEC semiconductor products" means any semiconductor product developed or manufactured by or for NEC (as defined above).

M8E 00.4-0110

SAFETY INFORMATION ON THIS PRODUCT

<p>Caution</p>	<p>GaAs Products</p>	<p>The product contains gallium arsenide, GaAs. GaAs vapor and powder are hazardous to human health if inhaled or ingested.</p> <ul style="list-style-type: none"> • Do not destroy or burn the product. • Do not cut or cleave off any part of the product. • Do not crush or chemically dissolve the product. • Do not put the product in the mouth. <p>Follow related laws and ordinances for disposal. The product should be excluded from general industrial waste or household garbage.</p>
-----------------------	----------------------	---

► **Business issue**

NEC Compound Semiconductor Devices, Ltd.

5th Sales Group, Sales Division TEL: +81-3-3798-6372 FAX: +81-3-3798-6783 E-mail: salesinfo@csd-nec.com

NEC Compound Semiconductor Devices Hong Kong Limited

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: +82-2-528-0301 FAX: +82-2-528-0302

NEC Electron Devices European Operations <http://www.nec.de/>

TEL: +49-211-6503-101 FAX: +49-211-6503-487

California Eastern Laboratories, Inc. <http://www.cel.com/>

TEL: +1-408-988-3500 FAX: +1-408-988-0279

► **Technical issue**

NEC Compound Semiconductor Devices, Ltd. <http://www.csd-nec.com/>

Sales Engineering Group, Sales Division
 E-mail: techinfo@csd-nec.com FAX: +81-44-435-1918