

DIP PHOTOCOUPLER
OPERATING AMBIENT TEMPERATURE 110°C

–NEPOC Series–

DESCRIPTION

The PS2561D-1 is an optically coupled isolator containing a GaAs light emitting diode and an NPN silicon phototransistor.

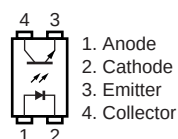
The PS2561D-1 is in a plastic DIP (Dual In-line Package) and the PS2561DL-1 is lead bending type (Gull-wing) for surface mount.

The PS2561DL1-1 is lead bending type for long creepage distance.

The PS2561DL2-1 is lead bending type for long creepage distance (Gull-wing) for surface mount.

FEATURES

- Operating ambient temperature: 110°C
- High Isolation voltage (BV = 5 000 Vr.m.s.)
- High collector to emitter voltage ($V_{CEO} = 80\text{ V}$)
- High current transfer ratio (CTR = 160% TYP.)
- High-speed switching ($t_r = 3\text{ }\mu\text{s}$ TYP., $t_f = 5\text{ }\mu\text{s}$ TYP.)
- Ordering number of taping product: PS2561DL-1-F3 : 2 000 pcs/reel
: PS2561DL2-1-E3: 1 000 pcs/reel
- Pb-Free product
- ★ Safety standards
 - UL approved: No. E72422
 - CSA approved: No. CA 101391 (CA5A, CAN/CSA-C22.2 60065, 60950)
 - BSI approved: No. 7112/7420
 - SEMKO approved: No. 903238
 - NEMKO approved: No. P09210868
 - DEMKO approved: No. 314999
 - FIMKO approved: No. FI 25119
 - DIN EN60747-5-2 (VDE0884 Part2) approved: No. 40008862 (Option)

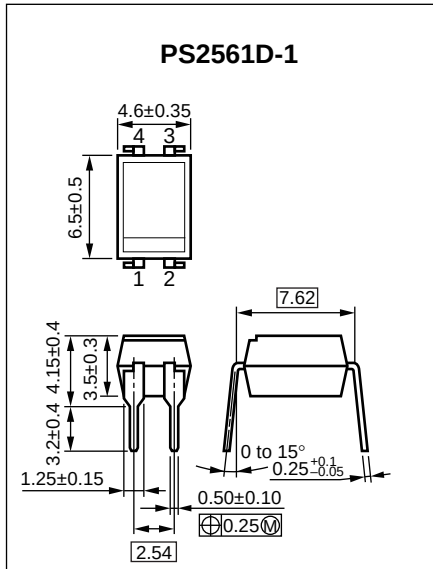
PIN CONNECTION
(Top View)**APPLICATIONS**

- Power supply
- Telephone/FAX.
- FA/OA equipment
- Programmable logic controller

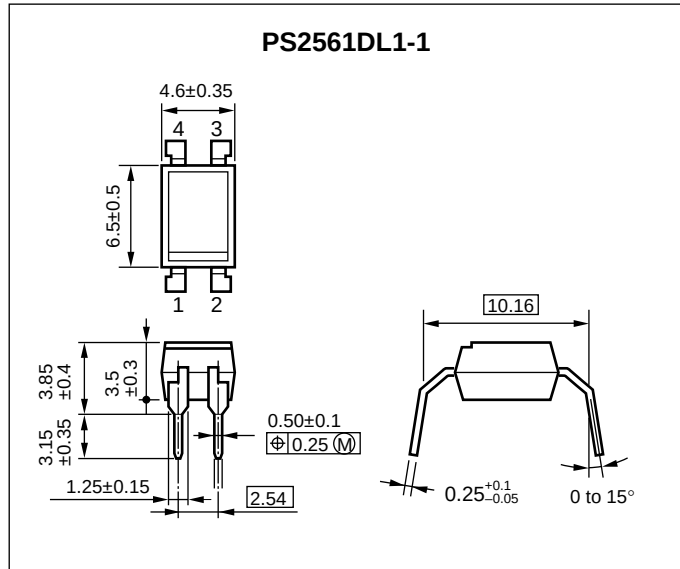
The information in this document is subject to change without notice. Before using this document, please confirm that this is the latest version.

PACKAGE DIMENSIONS (UNIT : mm)

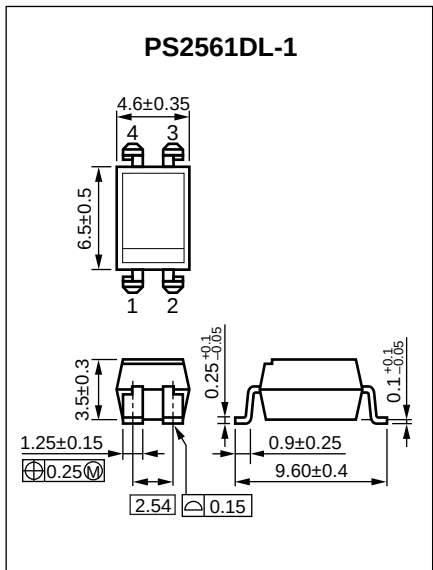
DIP Type



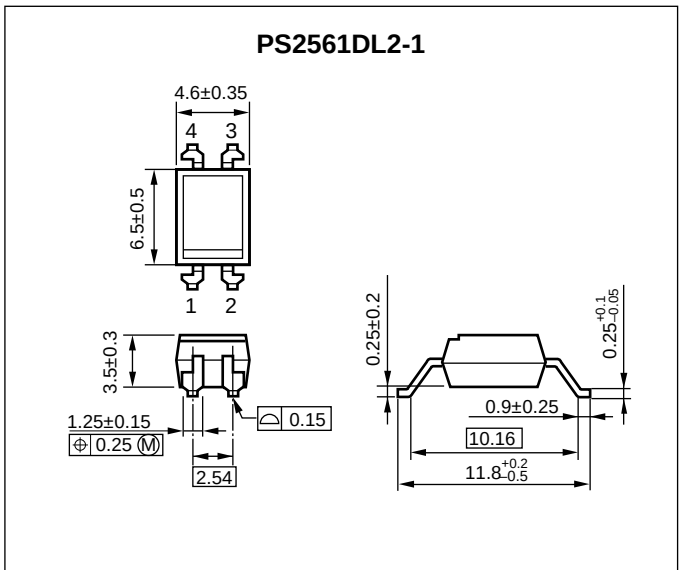
Long Creepage Distance



★ **Lead Bending Type**



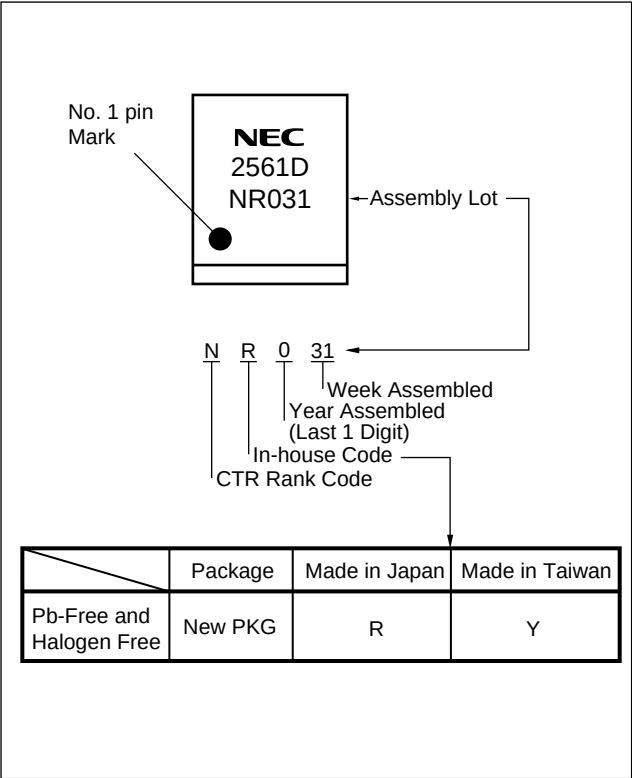
Long Creepage Distance (Gull-Wing)



PHOTOCOUPLER CONSTRUCTION

Parameter	PS2561D-1, PS2561DL-1	PS2561DL1-1, PS2561DL2-1
Air Distance (MIN.)	7 mm	8 mm
Outer Creepage Distance (MIN.)	7 mm	8 mm
Inner Creepage Distance (MIN.)	4 mm	4 mm
Isolation Distance (MIN.)	0.4 mm	0.4 mm

★ MARKING EXAMPLE



★ ORDERING INFORMATION

Part Number	Order Number	Solder Plating Specification	Packing Style	Safety Standard Approval	Application Part Number ^{*1}
PS2561D-1	PS2561D-1Y-A	Special version (Pb-Free and Halogen Free)	Magazine case 100 pcs	Standard products (UL, CSA, BSI, NEMKO, DEMKO, SEMKO, FIMKO approved)	PS2561D-1
PS2561DL-1	PS2561DL-1Y-A				PS2561DL-1
PS2561DL1-1	PS2561DL1-1Y-A				PS2561DL1-1
PS2561DL2-1	PS2561DL2-1Y-A				PS2561DL2-1
PS2561DL-1-F3	PS2561DL-1Y-F3-A		Embossed Tape 2 000 pcs/reel		PS2561DL-1
PS2561DL2-1-E3	PS2561DL2-1Y-E3-A		Embossed Tape 1 000 pcs/reel		PS2561DL2-1
PS2561D-1-V	PS2561D-1Y-V-A		Magazine case 100 pcs	DIN EN60747-5-2 (VDE0884 Part2) approved (Option)	PS2561D-1
PS2561DL-1-V	PS2561DL-1Y-V-A				PS2561DL-1
PS2561DL1-1-V	PS2561DL1-1Y-V-A				PS2561DL1-1
PS2561DL2-1-V	PS2561DL2-1Y-V-A				PS2561DL2-1
PS2561DL-1-V-F3	PS2561DL-1Y-V-F3-A		Embossed Tape 2 000 pcs/reel		PS2561DL-1
PS2561DL2-1-V-E3	PS2561DL2-1Y-V-E3-A		Embossed Tape 1 000 pcs/reel		PS2561DL2-1

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

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$, unless otherwise specified)

Parameter		Symbol	Ratings	Unit
Diode	Reverse Voltage	V_R	6	V
	Forward Current (DC)	I_F	40	mA
	Power Dissipation Derating	$\Delta P_D/^\circ\text{C}$	1.5	mW/ $^\circ\text{C}$
	Power Dissipation	P_D	150	mW
	Peak Forward Current ^{*1}	I_{FP}	1	A
Transistor	Collector to Emitter Voltage	V_{CEO}	80	V
	Emitter to Collector Voltage	V_{ECO}	7	V
	Collector Current	I_C	50	mA
	Power Dissipation Derating	$\Delta P_C/^\circ\text{C}$	1.5	mW/ $^\circ\text{C}$
	Power Dissipation	P_C	150	mW
Isolation Voltage ^{*2}		BV	5 000	Vr.m.s.
Operating Ambient Temperature		T_A	-55 to +110	$^\circ\text{C}$
Storage Temperature		T_{stg}	-55 to +150	$^\circ\text{C}$

***1** PW = 100 μs , Duty Cycle = 1%

***2** AC voltage for 1 minute at $T_A = 25^\circ\text{C}$, RH = 60% between input and output.

Pins 1-2 shorted together, 3-4 shorted together.

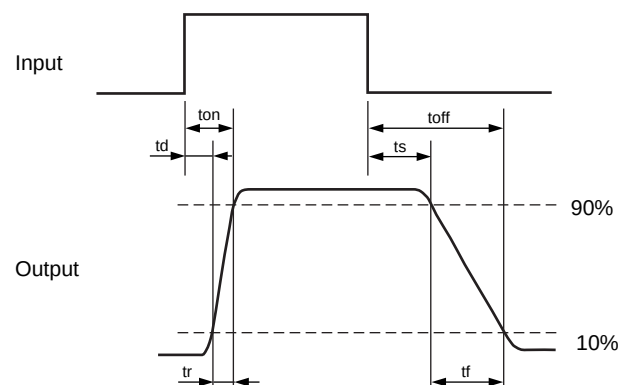
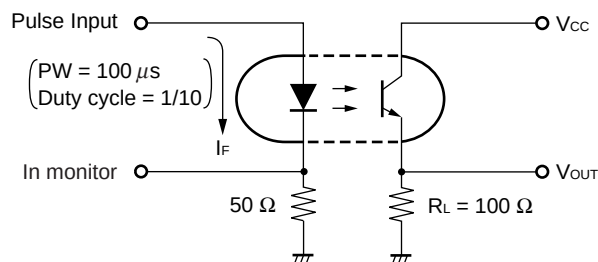
ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V_F	$I_F = 10\text{ mA}$		1.2	1.4	V
	Reverse Current	I_R	$V_R = 5\text{ V}$			5	μA
	Terminal Capacitance	C_t	$V = 0\text{ V}, f = 1.0\text{ MHz}$		10		pF
Transistor	Collector to Emitter Dark Current	I_{CEO}	$V_{CE} = 48\text{ V}, I_F = 0\text{ mA}$			100	nA
Coupled	Current Transfer Ratio (I_C/I_F)* ¹	CTR	$I_F = 5\text{ mA}, V_{CE} = 5\text{ V}$	50	160	400	%
			$I_F = 1\text{ mA}, V_{CE} = 5\text{ V}$	10	80		
	Collector Saturation Voltage	$V_{CE(sat)}$	$I_F = 10\text{ mA}, I_C = 2\text{ mA}$			0.3	V
	Isolation Resistance	R_{I-O}	$V_{I-O} = 1.0\text{ kV}_{DC}$	10^{11}			Ω
	Isolation Capacitance	C_{I-O}	$V = 0\text{ V}, f = 1.0\text{ MHz}$		0.5		pF
	Rise Time* ²	t_r	$V_{CC} = 10\text{ V}, I_C = 2\text{ mA}, R_L = 100\ \Omega$		3		μs
	Fall Time* ²	t_f			5		

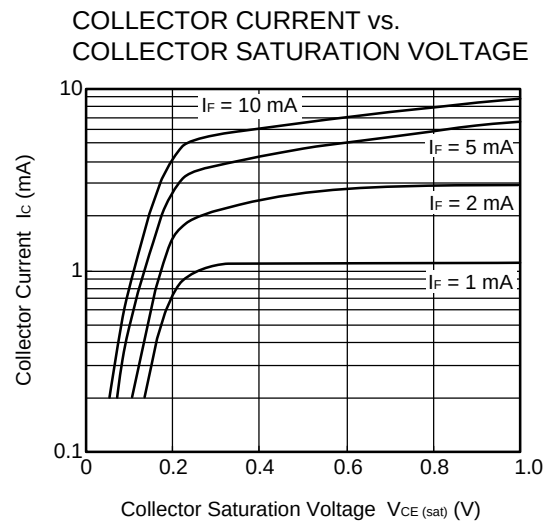
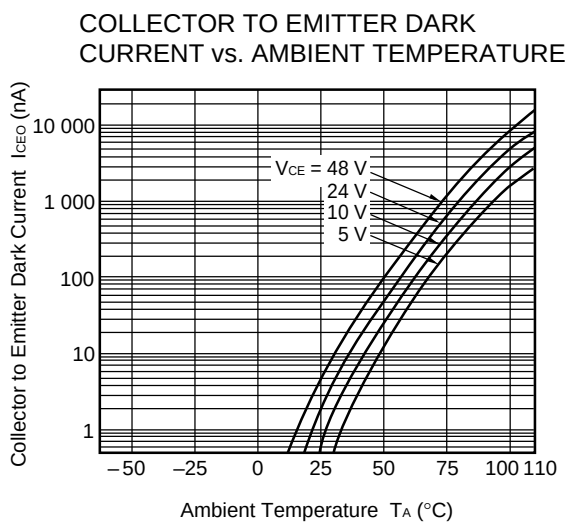
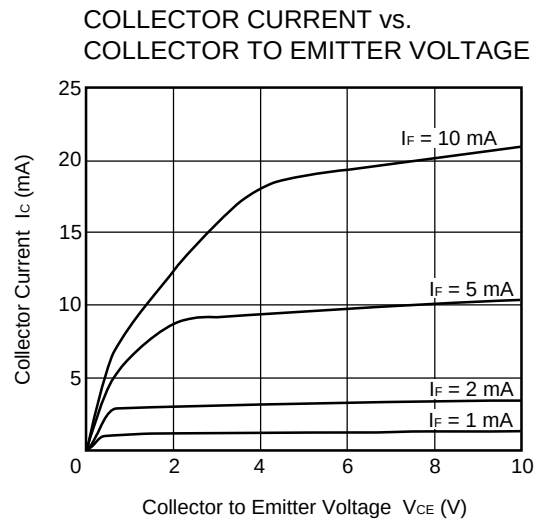
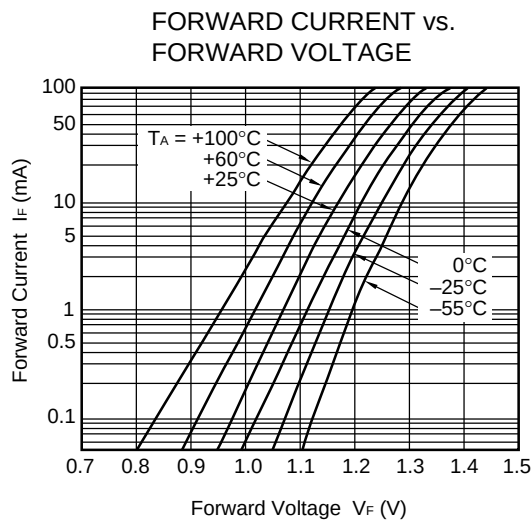
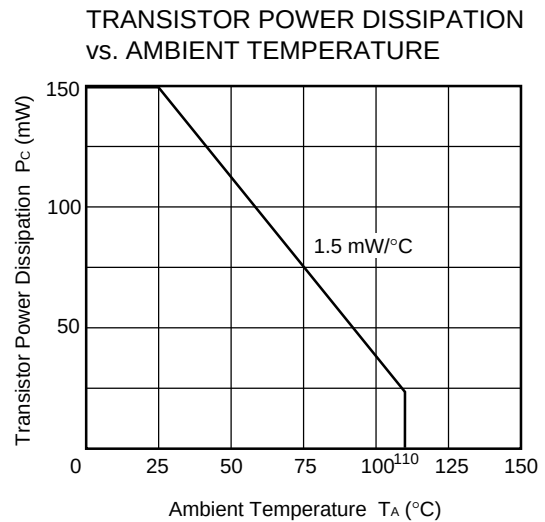
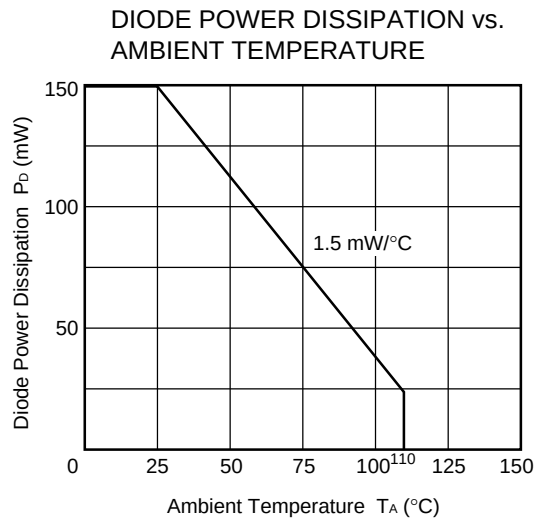
*1 CTR rank

CTR Rank	CTR (%)	Conditions
H	80 to 160	$I_F = 5\text{ mA}, V_{CE} = 5\text{ V}$
	16 and larger	$I_F = 1\text{ mA}, V_{CE} = 5\text{ V}$
Q	100 to 200	$I_F = 5\text{ mA}, V_{CE} = 5\text{ V}$
	20 and larger	$I_F = 1\text{ mA}, V_{CE} = 5\text{ V}$
W	130 to 260	$I_F = 5\text{ mA}, V_{CE} = 5\text{ V}$
	26 and larger	$I_F = 1\text{ mA}, V_{CE} = 5\text{ V}$
L	200 to 400	$I_F = 5\text{ mA}, V_{CE} = 5\text{ V}$
	40 and larger	$I_F = 1\text{ mA}, V_{CE} = 5\text{ V}$
N	50 to 400	$I_F = 5\text{ mA}, V_{CE} = 5\text{ V}$
	10 and larger	$I_F = 1\text{ mA}, V_{CE} = 5\text{ V}$

★ *2 Test circuit for switching time

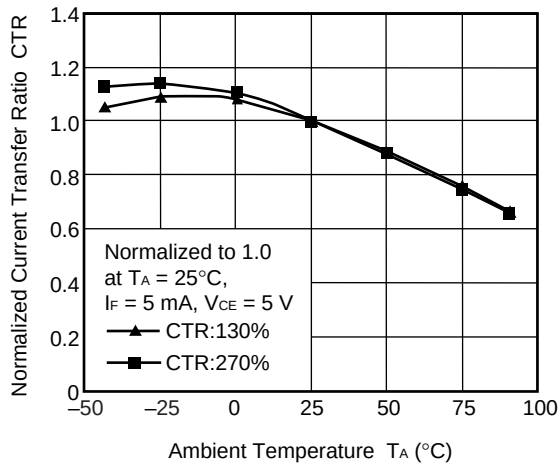


★ TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise specified)

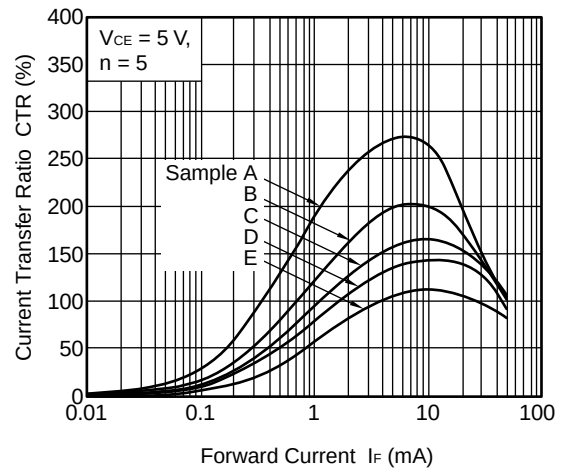


Remark The graphs indicate nominal characteristics.

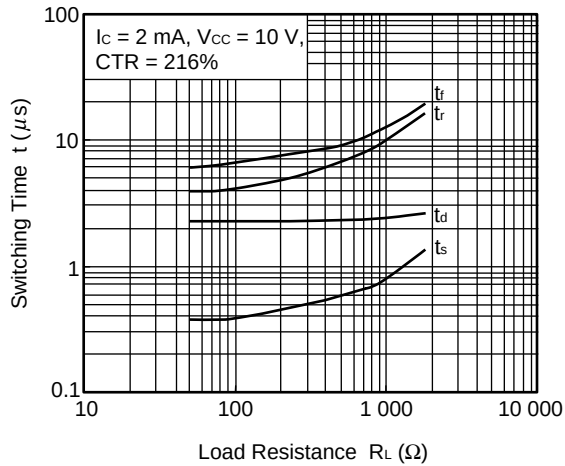
NORMALIZED CURRENT TRANSFER RATIO vs. AMBIENT TEMPERATURE



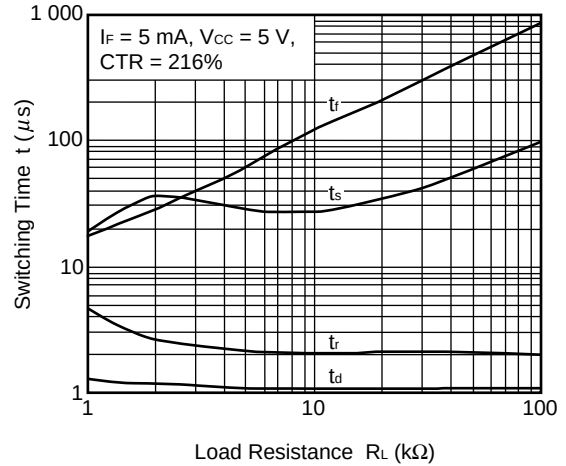
CURRENT TRANSFER RATIO vs. FORWARD CURRENT



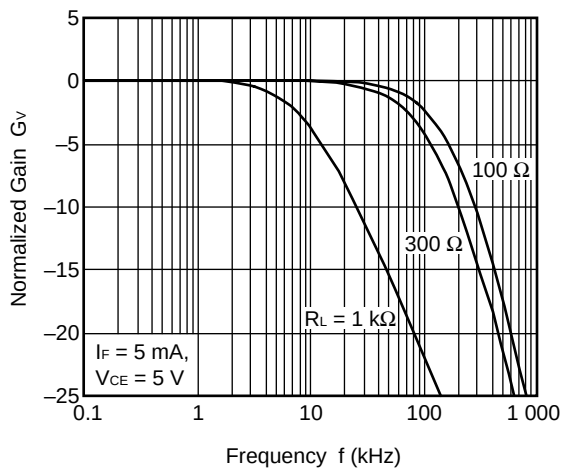
SWITCHING TIME vs. LOAD RESISTANCE



SWITCHING TIME vs. LOAD RESISTANCE



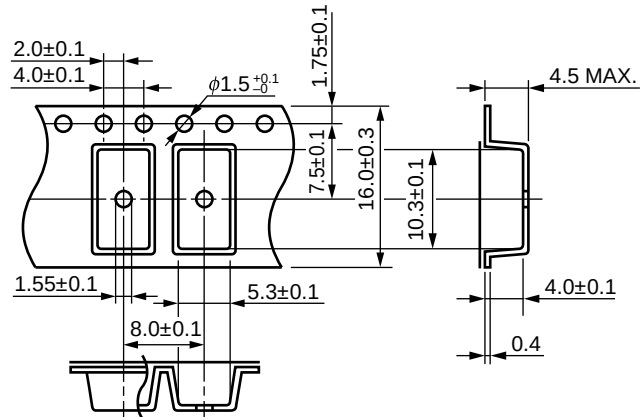
FREQUENCY RESPONSE



Remark The graphs indicate nominal characteristics.

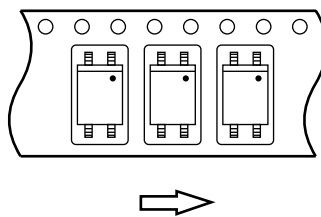
TAPING SPECIFICATIONS (UNIT : mm)

Outline and Dimensions (Tape)

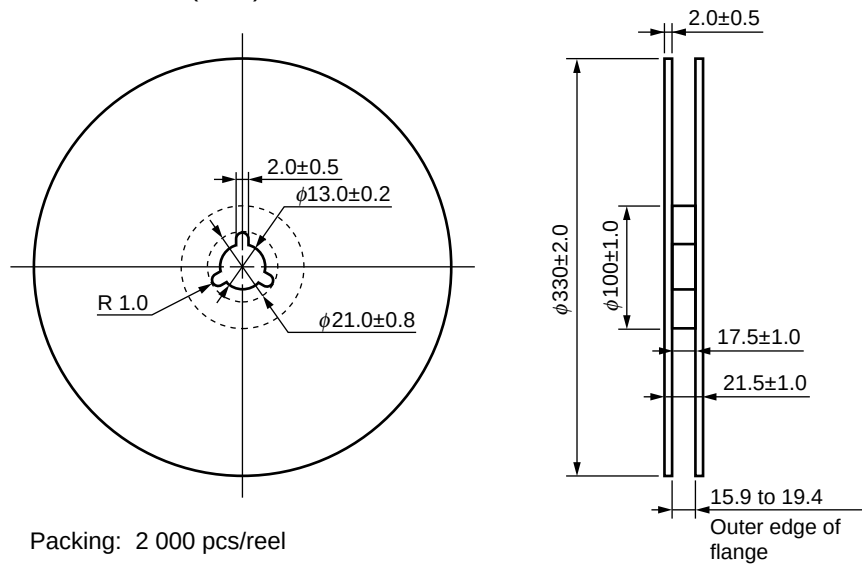


Tape Direction

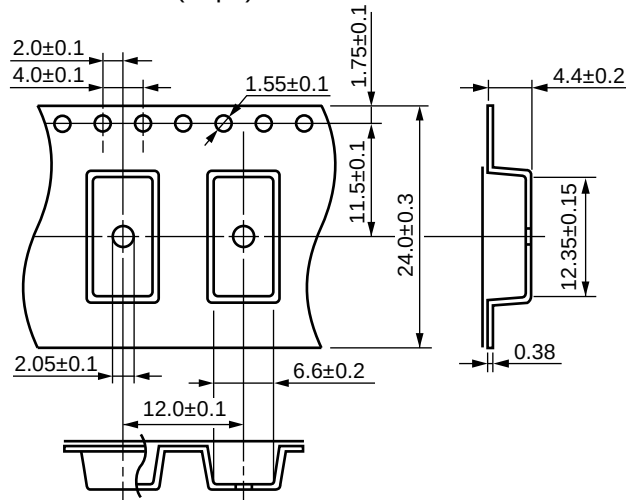
PS2561DL-1-F3



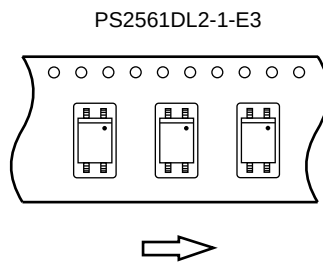
Outline and Dimensions (Reel)



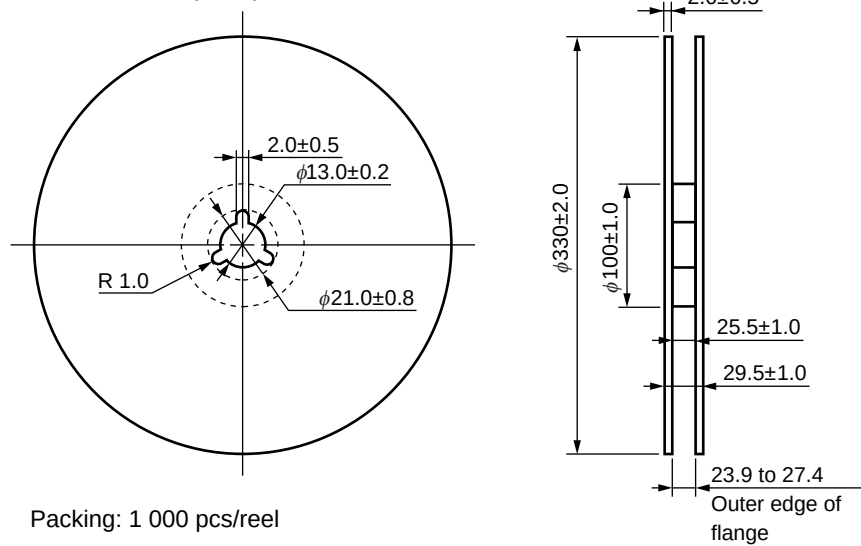
Outline and Dimensions (Tape)



Tape Direction

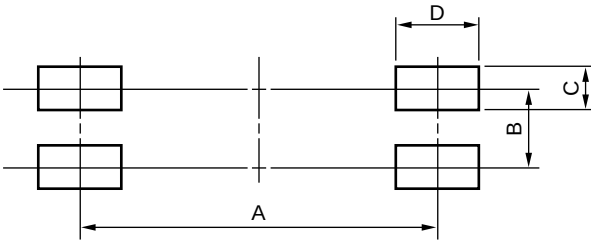
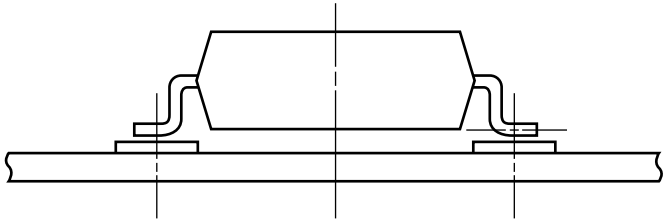


Outline and Dimensions (Reel)



Packing: 1 000 pcs/reel

RECOMMENDED MOUNT PAD DIMENSIONS (UNIT: mm)



Part Number	Lead Bending	A	B	C	D
PS2561DL	lead bending type (Gull-wing) for long creepage distance (surface mount)	8.2	2.54	1.7	2.2
PS2561DL2	lead bending type (Gull-wing) for surface mount	10.2	2.54	1.7	2.2

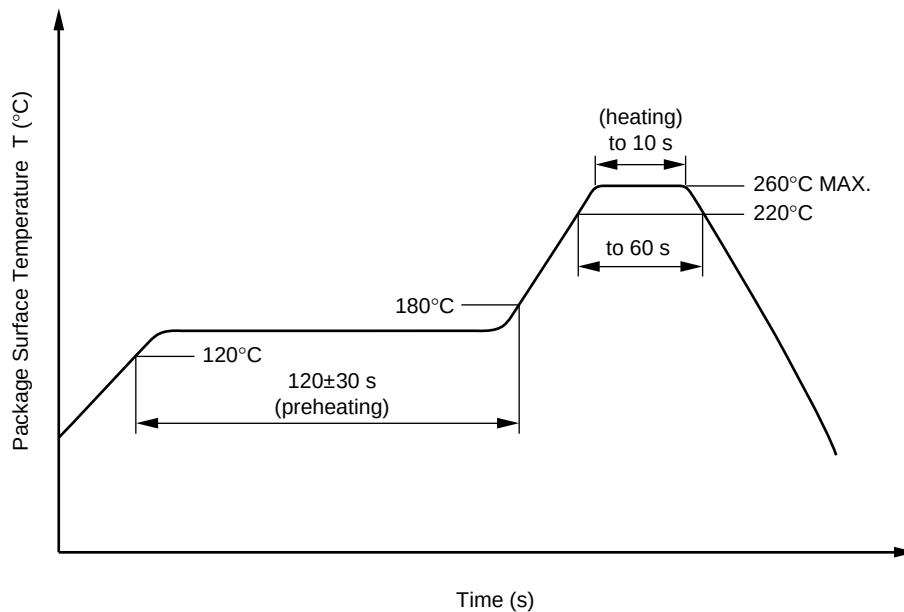
NOTES ON HANDLING

1. 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 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) 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 (Allowed to be dipped in solder including plastic mold portion.)
- Flux Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt% is recommended.)

(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

- Fluxes

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

2. Cautions regarding noise

Be aware that when voltage is applied suddenly between the photocoupler's input and output or between corrector-emitters at startup, the output transistor may enter the on state, even if the voltage is within the absolute maximum ratings.

3. Measurement conditions of current transfer ratios (CTR), which differ according to photocoupler

Check the setting values before use, since the forward current conditions at CTR measurement differ according to product.

When using products other than at the specified forward current, the characteristics curves may differ from the standard curves due to CTR value variations or the like. Therefore, check the characteristics under the actual operating conditions and thoroughly take variations or the like into consideration before use.

USAGE CAUTIONS

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

★ SPECIFICATION OF VDE MARKS LICENSE DOCUMENT (1/2) (PS2561D-1, PS2561DL-1)

Parameter	Symbol	Spec.	Unit
Climatic test class (IEC 60068-1/DIN EN 60068-1)		55/110/21	
Dielectric strength			
maximum operating isolation voltage	U_{IORM}	890	V_{peak}
Test voltage (partial discharge test, procedure a for type test and random test)	U_{pr}	1 335	V_{peak}
$U_{pr} = 1.5 \times U_{IORM}$, $P_d < 5 \text{ pC}$			
Test voltage (partial discharge test, procedure b for all devices)	U_{pr}	1 669	V_{peak}
$U_{pr} = 1.875 \times U_{IORM}$, $P_d < 5 \text{ pC}$			
Highest permissible overvoltage	U_{TR}	8 000	V_{peak}
Degree of pollution (DIN EN 60664-1 VDE0110 Part 1)		2	
Comparative tracking index (IEC 60112/DIN EN 60112 (VDE 0303 Part 11))	CTI	175	
Material group (DIN EN 60664-1 VDE0110 Part 1)		III a	
Storage temperature range	T_{stg}	-55 to +150	°C
Operating temperature range	T_A	-55 to +110	°C
Isolation resistance, minimum value			
$V_{IO} = 500 \text{ V dc}$ at $T_A = 25^\circ\text{C}$	$R_{is \text{ MIN.}}$	10^{12}	Ω
$V_{IO} = 500 \text{ V dc}$ at $T_A \text{ MAX.}$ at least 100°C	$R_{is \text{ MIN.}}$	10^{11}	Ω
Safety maximum ratings (maximum permissible in case of fault, see thermal derating curve)			
Package temperature	T_{si}	175	°C
Current (input current I_F , $\Psi_i = 0$)	I_{si}	400	mA
Power (output or total power dissipation)	Ψ_i	700	mW
Isolation resistance			
$V_{IO} = 500 \text{ V dc}$ at $T_A = T_{si}$	$R_{is \text{ MIN.}}$	10^9	Ω

★ SPECIFICATION OF VDE MARKS LICENSE DOCUMENT (2/2) (PS2561DL1-1, PS2561DL2-1)

Parameter	Symbol	Spec.	Unit
Climatic test class (IEC 60068-1/DIN EN 60068-1)		55/110/21	
Dielectric strength			
maximum operating isolation voltage	U_{IORM}	1 130	V_{peak}
Test voltage (partial discharge test, procedure a for type test and random test)	U_{pr}	1 695	V_{peak}
$U_{pr} = 1.5 \times U_{IORM}$, $P_d < 5 \text{ pC}$			
Test voltage (partial discharge test, procedure b for all devices)	U_{pr}	2 119	V_{peak}
$U_{pr} = 1.875 \times U_{IORM}$, $P_d < 5 \text{ pC}$			
Highest permissible overvoltage	U_{TR}	8 000	V_{peak}
Degree of pollution (DIN EN 60664-1 VDE0110 Part 1)		2	
Comparative tracking index (IEC 60112/DIN EN 60112 (VDE 0303 Part 11))	CTI	175	
Material group (DIN EN 60664-1 VDE0110 Part 1)		III a	
Storage temperature range	T_{stg}	-55 to +150	°C
Operating temperature range	T_A	-55 to +110	°C
Isolation resistance, minimum value			
$V_{IO} = 500 \text{ V dc}$ at $T_A = 25^\circ\text{C}$	Ris MIN.	10^{12}	Ω
$V_{IO} = 500 \text{ V dc}$ at $T_A \text{ MAX.}$ at least 100°C	Ris MIN.	10^{11}	Ω
Safety maximum ratings (maximum permissible in case of fault, see thermal derating curve)			
Package temperature	T_{si}	175	°C
Current (input current I_F , $\Psi_i = 0$)	I_{si}	400	mA
Power (output or total power dissipation)	Ψ_i	700	mW
Isolation resistance			
$V_{IO} = 500 \text{ V dc}$ at $T_A = T_{si}$	Ris MIN.	10^9	Ω

- **The information in this document is current as of January, 2010. The information is subject to change without notice. For actual design-in, refer to the latest publications of NEC Electronics data sheets, etc., for the most up-to-date specifications of NEC Electronics products. Not all products and/or types are available in every country. Please check with an NEC Electronics 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 the prior written consent of NEC Electronics. NEC Electronics assumes no responsibility for any errors that may appear in this document.
- NEC Electronics 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 Electronics 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 Electronics 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 a customer's equipment shall be done under the full responsibility of the customer. NEC Electronics assumes no responsibility for any losses incurred by customers or third parties arising from the use of these circuits, software and information.
- While NEC Electronics endeavors to enhance the quality and safety of NEC Electronics products, customers agree and acknowledge that the possibility of defects thereof cannot be eliminated entirely. In addition, NEC Electronics products are not taken measures to prevent radioactive rays in the product design. When customers use NEC Electronics products with their products, customers shall, on their own responsibility, incorporate sufficient safety measures such as redundancy, fire-containment and anti-failure features to their products in order to avoid risks of the damages to property (including public or social property) or injury (including death) to persons, as the result of defects of NEC Electronics products.
- NEC Electronics products are classified into the following three quality grades: "Standard", "Special" and "Specific".

The "Specific" quality grade applies only to NEC Electronics products developed based on a customer-designated "quality assurance program" for a specific application. The recommended applications of an NEC Electronics product depend on its quality grade, as indicated below. Customers must check the quality grade of each NEC Electronics 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 Electronics products is "Standard" unless otherwise expressly specified in NEC Electronics data sheets or data books, etc. If customers wish to use NEC Electronics products in applications not intended by NEC Electronics, they must contact an NEC Electronics sales representative in advance to determine NEC Electronics' willingness to support a given application.

(Note)

(1) "NEC Electronics" as used in this statement means NEC Electronics Corporation and also includes its majority-owned subsidiaries.

(2) "NEC Electronics products" means any product developed or manufactured by or for NEC Electronics (as defined above).

M8E0904E

Caution	GaAs Products	This product uses gallium arsenide (GaAs). GaAs vapor and powder are hazardous to human health if inhaled or ingested, so please observe the following points. • Follow related laws and ordinances when disposing of the product. If there are no applicable laws and/or ordinances, dispose of the product as recommended below. 1. Commission a disposal company able to (with a license to) collect, transport and dispose of materials that contain arsenic and other such industrial waste materials. 2. Exclude the product from general industrial waste and household garbage, and ensure that the product is controlled (as industrial waste subject to special control) up until final disposal. • Do not burn, destroy, cut, crush, or chemically dissolve the product. • Do not lick the product or in any way allow it to enter the mouth.
--------------------	---------------	---

Данный компонент на территории Российской Федерации

Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru

moschip.ru_4

moschip.ru_6

moschip.ru_9