

PHOTOCOUPLER PS2801_1

PS2801-1,PS2801-4

HIGH ISOLATION VOLTAGE SOP PHOTOCOUPLER

-NEPOC Series-

DESCRIPTION

The PS2801-1 and PS2801-4 are optically coupled isolators containing a GaAs light emitting diode and an NPN silicon phototransistor in a plastic SOP for high density applications.

This package has shield effect to cut off ambient light.

FEATURES

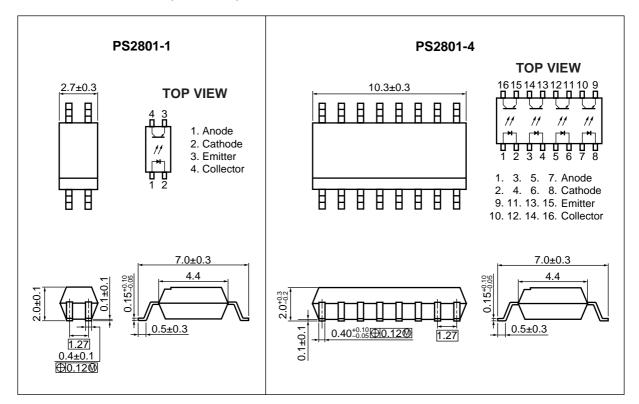
- High isolation voltage (BV = 2 500 Vr.m.s.)
- Small and thin package (4,16-pin SOP, Pin pitch 1.27 mm)
- High collector to emitter voltage (VcEo = 80 V)
- High-speed switching ($t_r = 3 \mu s$ TYP., $t_f = 5 \mu s$ TYP.)
- Ordering number of tape product: PS2801-1-F3, F4, PS2801-4-F3, F4
- Safety standards: PS2801-1, -4
 - UL approved: File No. E72422 (S)
 - BSI approved: No. 8188, 8189
 - VDE0884 approved (Option): PS2801-4 only

APPLICATIONS

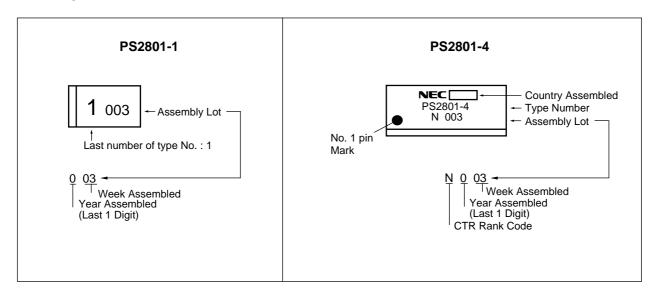
- · Programmable logic controllers
- · Measuring instruments
- Power supply
- Hybrid IC

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★ PACKAGE DIMENSIONS (UNIT: mm)



MARKING



ORDERING INFORMATION

Part Number	Package	Packing Style	Application Part Number ^{*1}
PS2801-1	4-pin SOP	50 pcs (Tape 50 pcs cut)	PS2801-1
PS2801-1-F3		Embossed Tape 3 500 pcs/reel	
PS2801-1-F4			
PS2801-4	16-pin SOP	Magazine Case 45 pcs	PS2801-4
PS2801-4-F3		Embossed Tape 2 500 pcs/reel	
PS2801-4-F4			

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

ABSOLUTE MAXIMUM RATINGS (TA = 25 °C, unless otherwise specified)

Parameter		Symbol	Ratings		Unit
			PS2801-1	PS2801-4	
Diode	Forward Current (DC)	lF	50		mA
	Reverse Voltage V _R 6		3	\ \	
	Power Dissipation Derating	∆P₀/°C	0.6	0.8	mW/°C
	Power Dissipation	Po	60	80	mW/ch
	Peak Forward Current 1	I FP	1		Α
Transistor	Collector to Emitter Voltage	VCEO	80		V
	Emitter to Collector Voltage	VECO	(6	V
	Collector Current	Ic	50		mA/ch
	Power Dissipation Derating	∆Pc/°C	1.2		mW/°C
	Power Dissipation	Pc	120		mW/ch
Isolation Voltage '2		BV	2 500		Vr.m.s.
Operating Ambient Temperature		TA	-55 to +100		°C
Storage Temperature		T _{stg}	-55 to +150		°C

^{*1} PW = 100 μ s, Duty Cycle = 1 %

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

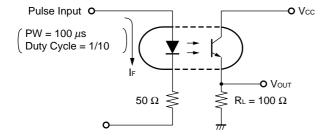
ELECTRICAL CHARACTERISTICS (TA = 25 °C)

	Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	VF	I _F = 5 mA		1.1	1.4	V
	Reverse Current	I R	VR = 5 V			5	μΑ
	Terminal Capacitance	Ct	V = 0 V, f = 1.0 MHz		15		pF
Transistor	Collector to Emitter Dark Current	ICEO	VCE = 80 V, IF = 0 mA			100	nA
Coupled	Current Transfer Ratio	CTR	I _F = 5 mA, V _{CE} = 5 V	80		600	%
	Collector Saturation Voltage	VCE(sat)	IF = 10 mA, Ic = 2 mA			0.3	V
	Isolation Resistance	R _{I-O}	Vi-o = 1.0 kVpc	10 ¹¹			Ω
	Isolation Capacitance	C _{I-O}	V = 0 V, f = 1.0 MHz		0.4		pF
	Rise Time *2	tr	$Vcc = 5 \text{ V}, \text{ Ic} = 2 \text{ mA}, \text{ RL} = 100 \Omega$		3		μs
	Fall Time*2	t _f			5		

*1 CTR rank (PS2801-1 only)

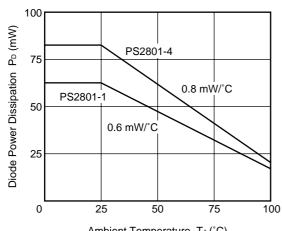
K: 300 to 600 (%) P: 150 to 300 (%) L: 100 to 300 (%) N: 80 to 600 (%)

*2 Test circuit for switching time



TYPICAL CHARACTERISTICS (TA = 25 °C, unless otherwise specified)





Ambient Temperature TA(°C)

Transistor Power Dissipation Pc (mW) 100 PS2801-1 PS2801-4 1.2 mW/°C 50

50 Ambient Temperature TA (°C)

75

100

TRANSISTOR POWER DISSIPATION

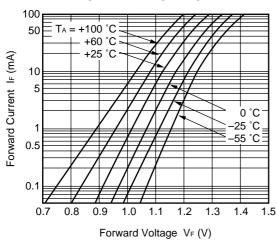
vs. AMBIENT TEMPERATURE

200

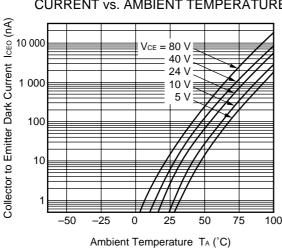
150

0

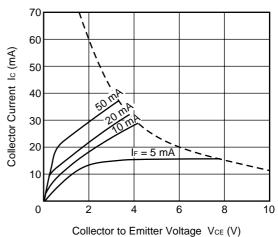
FORWARD CURRENT vs. FORWARD VOLTAGE



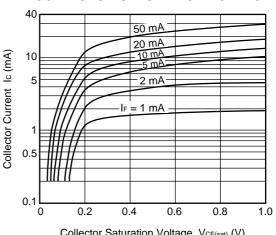
COLLECTOR TO EMITTER DARK **CURRENT vs. AMBIENT TEMPERATURE**



COLLECTOR CURRENT vs. **COLLECTOR TO EMITTER VOLTAGE**

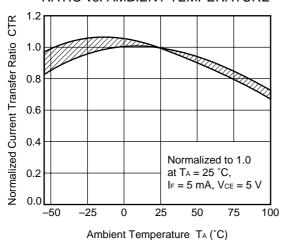


COLLECTOR CURRENT vs. **COLLECTOR SATURATION VOLTAGE**

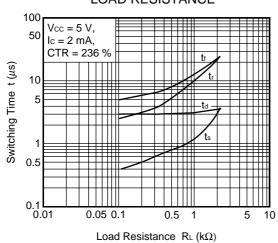


Collector Saturation Voltage VcE(sat) (V)

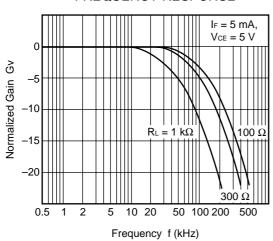
NORMALIZED CURRENT TRANSFER RATIO vs. AMBIENT TEMPERATURE



SWITCHING TIME vs. LOAD RESISTANCE

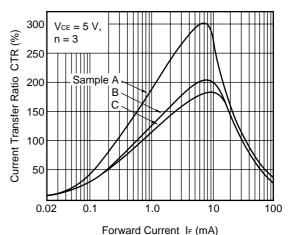


FREQUENCY RESPONSE

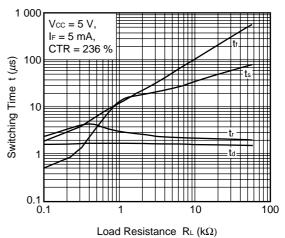


Remark The graphs indicate nominal characteristics.

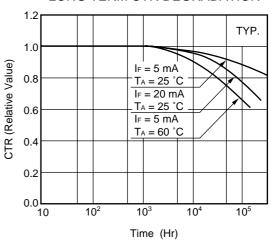
CURRENT TRANSFER RATIO vs. FORWARD CURRENT



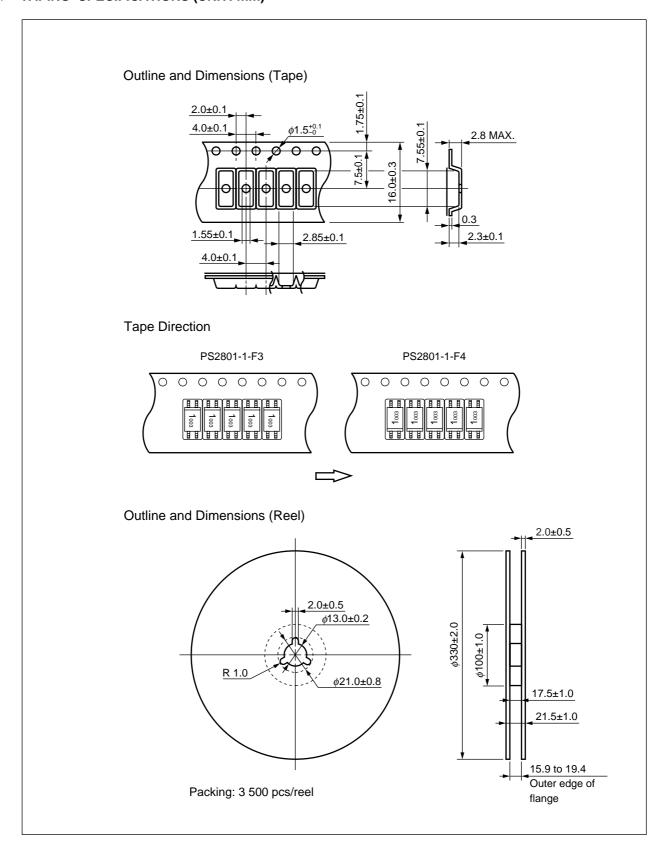
SWITCHING TIME vs. LOAD RESISTANCE

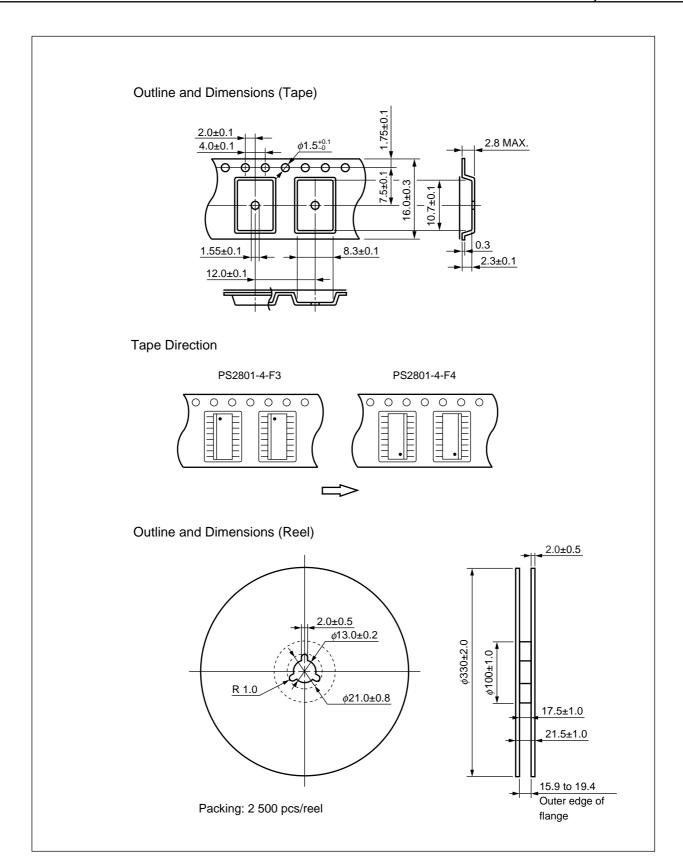


LONG TERM CTR DEGRADATION



★ TAPING SPECIFICATIONS (UNIT: mm)





★ NOTES ON HANDLING

1. Recommended soldering conditions

(1) Infrared reflow soldering

• Peak reflow temperature 260°C or below (package surface temperature)

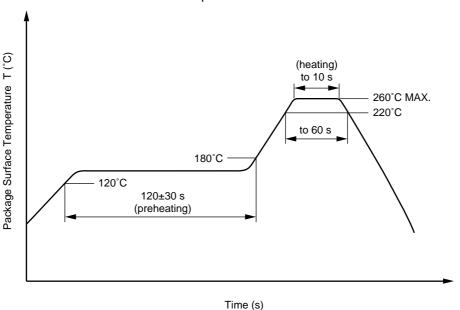
Time of peak reflow temperature
 Time of temperature higher than 220°C
 60 seconds or less

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) Cautions

Fluxes

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

2. Cautions regarding noise

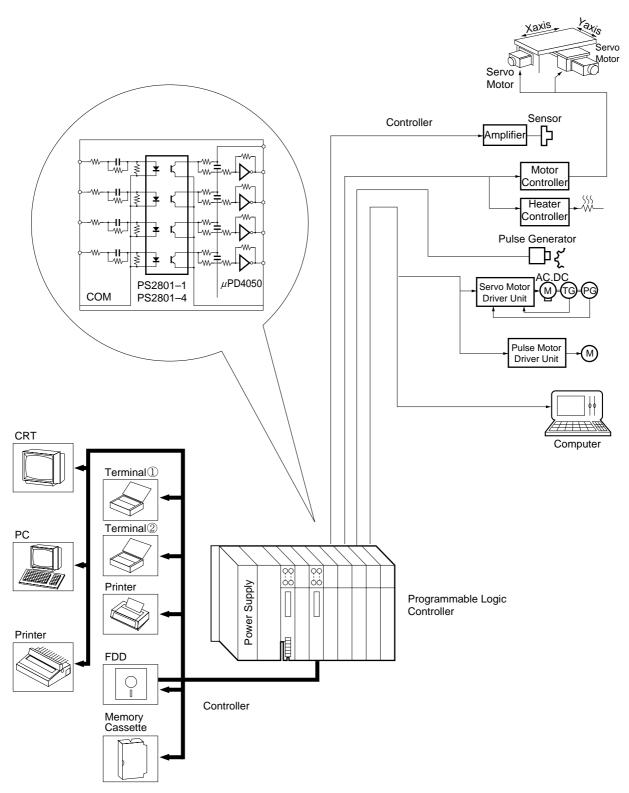
Be aware that when voltage is applied suddenly between the photocoupler's input and output or between collector-emitters at startup, the output side may enter the on state, even if the voltage is within the absolute maximum ratings.

★ USAGE CAUTIONS

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

PROGRAMMABLE LOGIC CONTROLLERS EXAMPLE

Purpose: In-out interface



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M8E 00.4-0110

SAFETY INFORMATION ON THIS PRODUCT

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GaAs Products

The product contains gallium arsenide, GaAs.

GaAs vapor and powder are hazardous to human health if inhaled or ingested.

- 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.

Follow related laws and ordinances for disposal. The product should be excluded from general industrial waste or household garbage.

▶For further information, please contact

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