

PHOTOCOUPLER

PS2801C-1,PS2801C-4

HIGH ISOLATION VOLTAGE SSOP PHOTOCOUPLER

-NEPOC Series-

DESCRIPTION

The PS2801C-1 and PS2801C-4 are optically coupled isolators containing a GaAs light emitting diode and an NPN silicon phototransistor in a plastic SSOP for high density applications to realize an excellent cost performance.

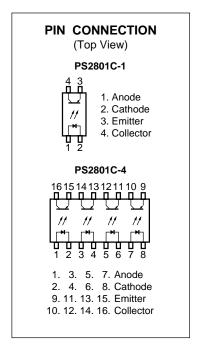
This package has shield effect to cut off ambient light.

FEATURES

- High isolation voltage (BV = 2 500 Vr.m.s.)
- Small and thin package (4, 16-pin SSOP, Pin pitch 1.27 mm)
- Vceo: 80 V
- Ordering number of tape product: PS2801C-1-F3, F4, PS2801C-4-F3, F4
- · Pb-Free product
- · Safety standards
 - UL approved: File No. E72422
 - DIN EN60747-5-2 (VDE0884 Part2) approved (Option)

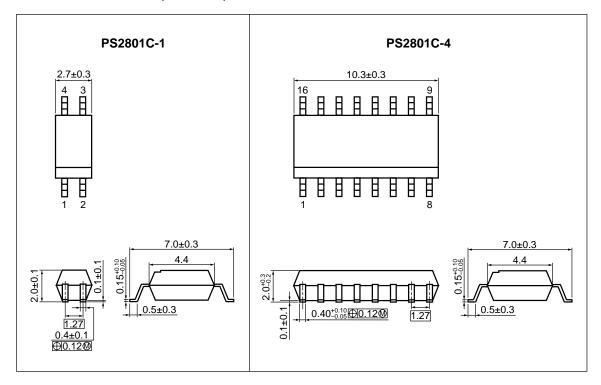
APPLICATIONS

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

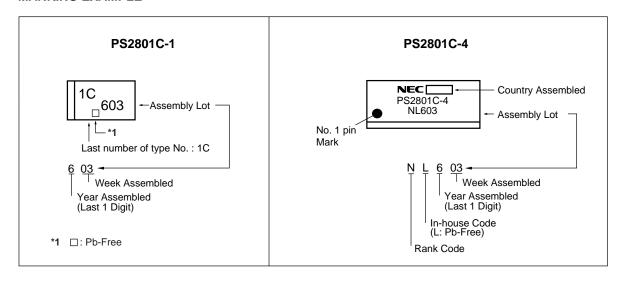


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PACKAGE DIMENSIONS (UNIT: mm)



MARKING EXAMPLE



ORDERING INFORMATION

Part Number	Order Number	Solder Plating Specification	Packing Style	Safety Standard Approval	Application Part Number
PS2801C-1	PS2801C-1-A	Pb-Free	50 pcs (Tape 50 pcs cut)	Standard products	PS2801C-1
PS2801C-1-F3	PS2801C-1-F3-A		Embossed Tape 3 500 pcs/reel	(UL approved)	
PS2801C-1-F4	PS2801C-1-F4-A				
PS2801C-4	PS2801C-4-A		Magazine Case 45 pcs		PS2801C-4
PS2801C-4-F3	PS2801C-4-F3-A		Embossed Tape 2 500 pcs/reel		
PS2801C-4-F4	PS2801C-4-F4-A				
PS2801C-1-V	PS2801C-1-V-A		50 pcs (Tape 50 pcs cut)	DIN EN60747-5-2	PS2801C-1
PS2801C-1-V-F3	PS2801C-1-V-F3-A		Embossed Tape 3 500 pcs/reel	(VDE0884 Part2)	
PS2801C-1-V-F4	PS2801C-1-V-F4-A			Approved (Option)	
PS2801C-4-V	PS2801C-4-V-A		Magazine Case 45 pcs		PS2801C-4
PS2801C-4-V-F3	PS2801C-4-V-F3-A		Embossed Tape 2 500 pcs/reel		
PS2801C-4-V-F4	PS2801C-4-V-F4-A				

^{*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
			PS2801C-1	PS2801C-4	
Diode	Forward Current (DC)	lF	30		mA/ch
	Reverse Voltage	VR	6		V
	Power Dissipation Derating	⊿P _D /°C	0.6	0.8	mW/°C
	Power Dissipation	P□	60	80	mW/ch
	Peak Forward Current ^{*1}	IFP	0.5		A/ch
Transistor	Collector to Emitter Voltage	VCEO	80		V
	Emitter to Collector Voltage	VECO		5	V
	Collector Current	lc	3	0	mA/ch
	Power Dissipation Derating	⊿Pc/°C	C 1.2		mW/°C
	Power Dissipation	Pc	12	20	mW/ch
Isolation Voltage *2		BV	2 500		Vr.m.s.
Operating Ambient Temperature		TA	-55 to +100		°C
Storage Temperature		Tstg	-55 to +150		°C

^{*1} PW = 100 μ s, Duty Cycle = 1%

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

Pins 1-2 shorted together, 3-4 shorted together (PS2801C-1).

Pins 1-8 shorted together, 9-16 shorted together (PS2801C-4).

ELECTRICAL CHARACTERISTICS (TA = 25°C)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	VF	I _F = 5 mA		1.2	1.4	V
	Reverse Current	lr	V _R = 5 V			5	μА
	Terminal Capacitance	Ct	V = 0 V, f = 1.0 MHz		10		pF
Transistor	Collector to Emitter Dark Current	Iceo	Vce = 80 V, I _F = 0 mA			100	nA
Coupled	Current Transfer Ratio	CTR	I _F = 5 mA, V _{CE} = 5 V	50		400	%
	Collector Saturation Voltage	VCE (sat)	I _F = 10 mA, I _C = 2 mA		0.13	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	t r	$Vcc = 5 \text{ V, } Ic = 2 \text{ mA, } RL = 100 \Omega$		5		μS
	Fall Time *2	tr			7		

*1 CTR rank

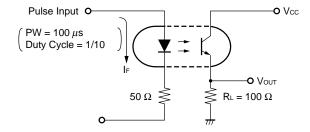
PS2801C-1

N: 50 to 400 (%) P: 150 to 300 (%) L: 100 to 300 (%) M: 100 to 400 (%)

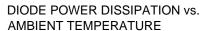
PS2801C-4

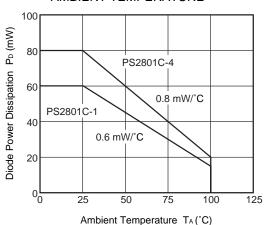
N: 50 to 400 (%) M: 100 to 400 (%)

*2 Test circuit for switching time

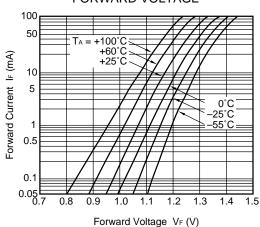


TYPICAL CHARACTERISTICS (TA = 25°C, unless otherwise specified)

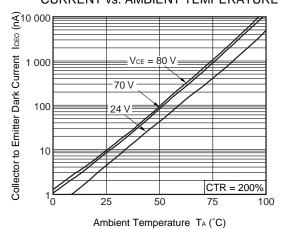




FORWARD CURRENT vs. FORWARD VOLTAGE

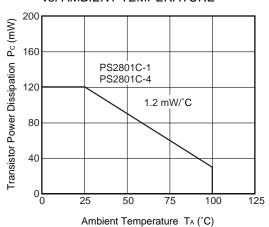


COLLECTOR TO EMITTER DARK CURRENT vs. AMBIENT TEMPERATURE

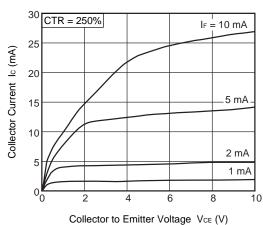


Remark The graphs indicate nominal characteristics.

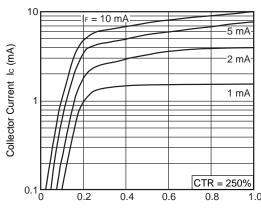
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE

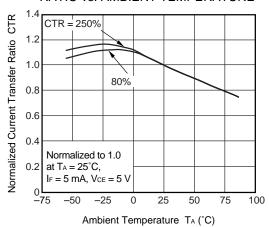


COLLECTOR CURRENT vs. COLLECTOR SATURATION VOLTAGE

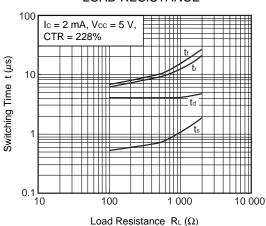


Collector Saturation Voltage VCE(sat) (V)

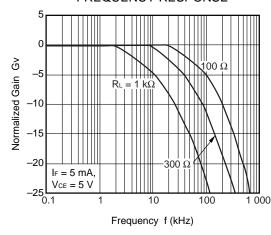
NORMALIZED CURRENT TRANSFER RATIO vs. AMBIENT TEMPERATURE



SWITCHING TIME vs. LOAD RESISTANCE

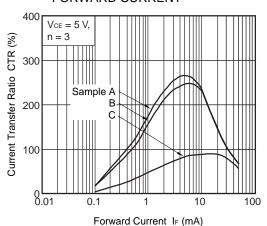


FREQUENCY RESPONSE

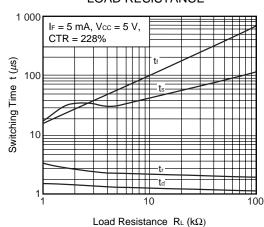


Remark The graphs indicate nominal characteristics.

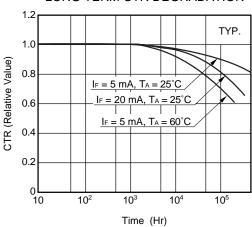
CURRENT TRANSFER RATIO vs. FORWARD CURRENT



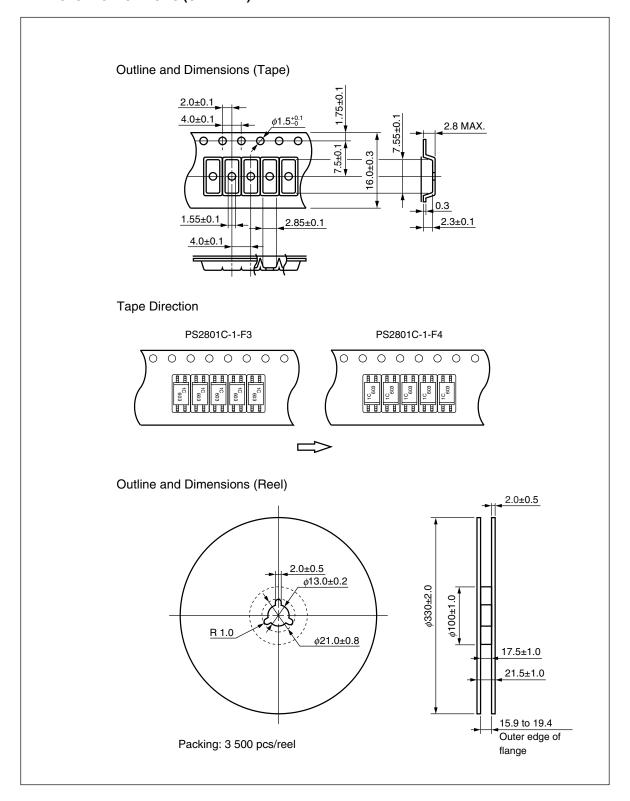
SWITCHING TIME vs. LOAD RESISTANCE

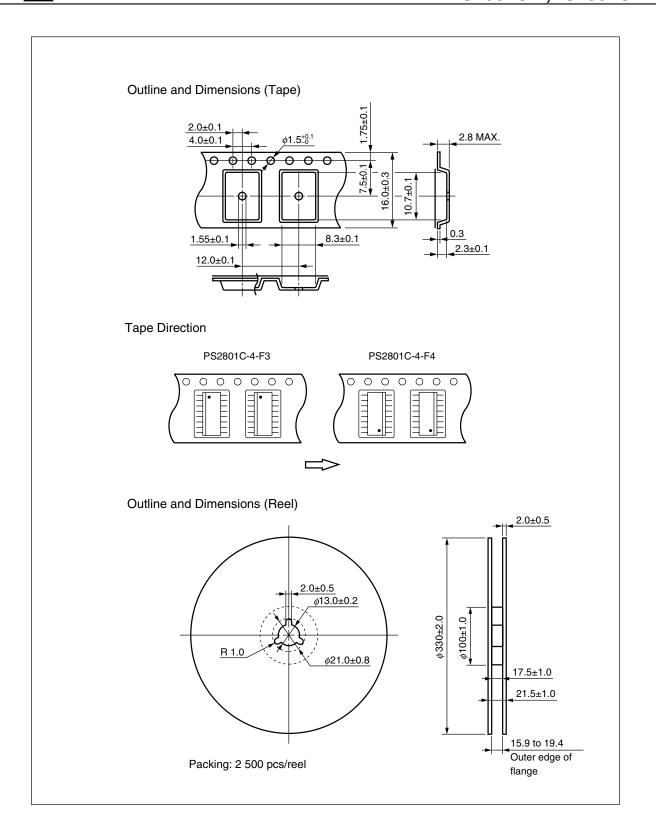


LONG TERM CTR DEGRADATION



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)

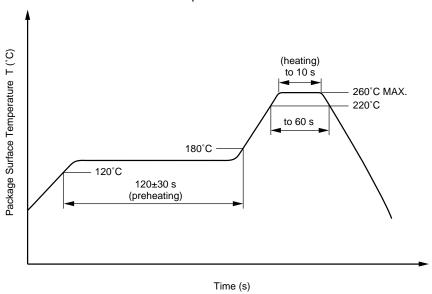
Time of peak reflow temperature
 Time of temperature higher than 220°C
 50 seconds or less
 60 seconds or less

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 collector-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. This tendency may sometimes be obvious, especially below $I_F = 1 \text{ mA}$.

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.

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M8E 02.11-1

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.
- 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.

▶ For further information, please contact

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Subject: Compliance with EU Directives

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CEL Pb-free products have the same base part number with a suffix added. The suffix –A indicates that the device is Pb-free. The –AZ suffix is used to designate devices containing Pb which are exempted from the requirement of RoHS directive (*). In all cases the devices have Pb-free terminals. All devices with these suffixes meet the requirements of the RoHS directive.

This status is based on CEL's understanding of the EU Directives and knowledge of the materials that go into its products as of the date of disclosure of this information.

Restricted Substance per RoHS	Concentration Limit per RoHS (values are not yet fixed)	Concentration in CEL	on contained devices	
Lead (Pb)	< 1000 PPM	-A Not Detected	-AZ (*)	
Mercury	< 1000 PPM	Not Detected		
Cadmium	< 100 PPM	Not Detected		
Hexavalent Chromium	< 1000 PPM	Not Detected		
PBB	< 1000 PPM	Not Detected		
PBDE	BDE < 1000 PPM Not De		etected	

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