

PHOTOCOUPLER **PS8802-1,-2**

1 Mbps HIGH CMR ANALOG OUTPUT TYPE 8-PIN SSOP (SO-8) HIGH-SPEED PHOTOCOUPLER

-NEPOC Series-

DESCRIPTION

The PS8802-1, -2 are optically coupled isolators 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.

The PS8802-1, -2 are designed specifically for high common mode transient immunity (CMR), the PS8802-2 is suitable for high density applications.

FEATURES

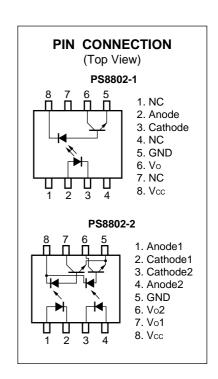
- 40% reduction of mounting area (5-pin SOP × 2)
- High common mode transient immunity (CMH, CML = $\pm 10 \text{ kV/}\mu\text{s MIN.}$)
- High supply voltage (Vcc = 35 V)
- High isolation voltage (BV = 2 500 Vr.m.s.)
- High-speed response (tphL = 0.8 μ s MAX., tpLH = 1.2 μ s MAX.)
- Ordering number of tape product: PS8802-1-F3, F4: 1 500 pcs/reel

: PS8802-2-F3, F4: 1 500 pcs/reel

- ★ Pb-Free product
 - · Safety standards
 - UL approved: File No. E72422
 - DIN EN60747-5-2 (VDE0884 Part2) approved No.40008347 (option)

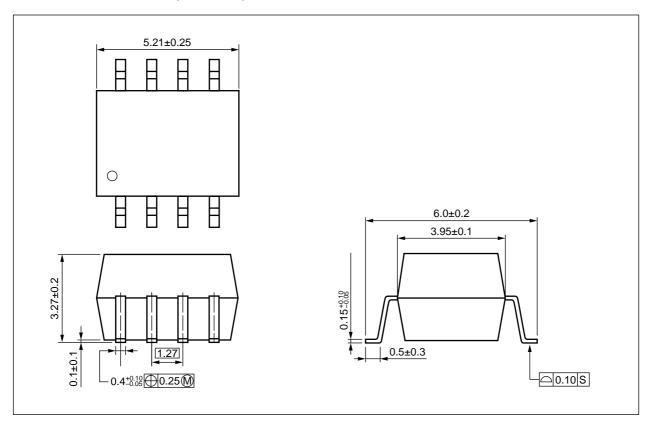
APPLICATIONS

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

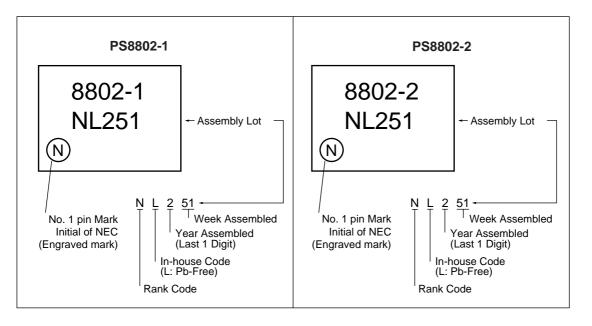


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PACKAGE DIMENSIONS (UNIT: mm)



★ MARKING EXAMPLE



★ ORDERING INFORMATION

Part Number	Order Number	Solder Plating Specification	Packing Style	Safety Standard Approval	Application Part Number*1
PS8802-1	PS8802-1-A	Pb-Free*2	20 pcs (Tape 20 pcs cut)	Standard products	PS8802-1
PS8802-1-F3	PS8802-1-F3-A		Embossed Tape 1 500 pcs/reel	(UL approved)	
PS8802-1-F4	PS8802-1-F4-A				
PS8802-2	PS8802-2-A		20 pcs (Tape 20 pcs cut)		PS8802-2
PS8802-2-F3	PS8802-2-F3-A		Embossed Tape 1 500 pcs/reel		
PS8802-2-F4	PS8802-2-F4-A				
PS8802-1-V	PS8802-1-V-A		20 pcs (Tape 20 pcs cut)	DIN EN60747-5-2	PS8802-1
PS8802-1-V-F3	PS8802-1-V-F3-A		Embossed Tape 1 500 pcs/reel	(VDE0884 Part2)	
PS8802-1-V-F4	PS8802-1-V-F4-A			Approved (Option)	
PS8802-2-V	PS8802-2-V-A		20 pcs (Tape 20 pcs cut)		PS8802-2
PS8802-2-V-F3	PS8802-2-V-F3-A		Embossed Tape 1 500 pcs/reel		
PS8802-2-V-F4	PS8802-2-V-F4-A				

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

^{*2} With regards to terminal solder (the solder contains lead) plated products (conventionally plated), contact your nearby sales office.

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

	Parameter	Symbol	Ratings	Unit
Diode	Forward Current	lF	25	mA/ch
	Reverse Voltage	VR	5.0	V/ch
	Power Dissipation*1	Po	45	mW/ch
Detector	Supply Voltage	Vcc	35	V
	Output Voltage	Vo	35	V/ch
	Output Current	lo	8.0	mA/ch
	Power Dissipation*2	Pc	100	mW/ch
Isolation Voltage*3		BV	2 500	Vr.m.s.
Operating Ambient Temperature		TA	-55 to +100	°C
Storage Temperature		T _{stg}	-55 to +125	°C

^{*1} Reduced to 0.45 mW/ $^{\circ}$ C at T_A = 25 $^{\circ}$ C or more.

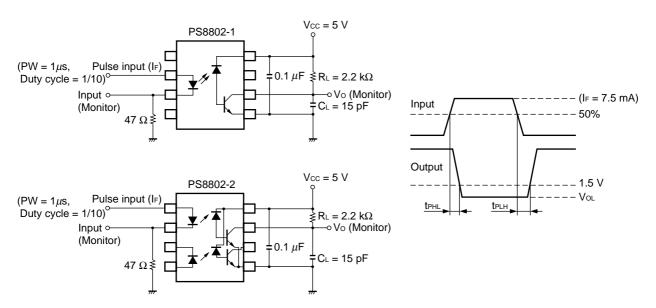
^{*2} Reduced to 1.00 mW/ $^{\circ}$ C at T_A = 25 $^{\circ}$ C or more.

^{*3} AC voltage for 1 minute at $T_A = 25$ °C, RH = 60% between input and output.

ELECTRICAL CHARACTERISTICS (Ta = 25°C, unless otherwise specified)

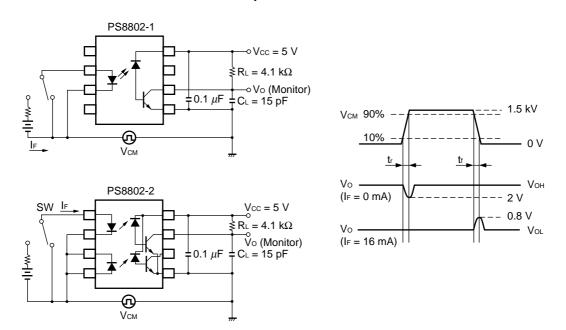
Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	VF	IF = 16 mA		1.7	2.2	V
	Reverse Current	IR	VR = 3 V			10	μΑ
	Forward Voltage Temperature Coefficient	△VF/△TA	I _F = 16 mA		-2.1		mV/°C
	Terminal Capacitance	Ct	V = 0 V, f = 1 MHz		30		pF
Detector	High Level Output Current	Іон (1)	$I_F = 0 \text{ mA}, V_{CC} = V_0 = 5.5 \text{ V}$		10	500	nA
	High Level Output Current	Іон (2)	$I_F = 0 \text{ mA}$, $V_{CC} = V_0 = 30 \text{ V}$			100	μΑ
	Low Level Output Voltage	Vol	IF = 16 mA, Vcc = 4.5 V, IoL = 1.2 mA		0.1	0.4	V
	High Level Supply Current (PS8802-1)	Іссн	IF = 0 mA, Vo = open, Vcc = 30 V		0.1	2	μΑ
	High Level Supply Current (PS8802-2)				0.2	4	
	Low Level Supply Current (PS8802-1)	Iccl	IF = 16 mA, Vo = open, Vcc = 30 V		100		
	Low Level Supply Current (PS8802-2)				200		
Coupled	Current Transfer Ratio	CTR	IF = 16 mA, Vcc = 4.5 V, Vo = 0.4 V	15	25	45	%
	Input-Output Isolation Resistance	R _{I-O}	V _{I-O} = 1 kV _{DC} , RH = 40 to 60%	10 ¹¹			Ω
	Insulation Resistance (Input-Input), (PS8802-2)	R _{I-I}	V _{I-I} = 1 kV _{DC} , RH = 40 to 60%	10 ¹⁰			
	Input-Output Isolation Capacitance	C _{I-O}	V = 0 V, f = 1 MHz		0.6		pF
	Insulation Capacitance (Input-Input), (PS8802-2)	C _{I-I}			0.3		
	Propagation Delay Time $(H \rightarrow L)^{*1}$	tрнL	IF = 16 mA, Vcc = 5 V, RL = 2.2 k Ω , CL = 15 pF		0.3	0.8	μs
	Propagation Delay Time $(L \to H)^{*1}$	tрLН			0.6	1.2	
	Common Mode Transient Immunity at High Level Output ²	Смн	$I_F = 0 \text{ mA, } V_{CC} = 5 \text{ V, } R_L = 4.1 \text{ k}\Omega,$ $V_{CM} = 1.5 \text{ kV}$	10			kV/μs
	Common Mode Transient Immunity at Low Level Output ²	Смь	IF = 16 mA, Vcc = 5 V, RL = 4.1 k Ω , VcM = 1.5 kV	-10			

*1 Test circuit for propagation delay time



Remark CL is approximately 15 pF which includes probe and stray wiring capacitance.

*2 Test circuit for common mode transient immunity

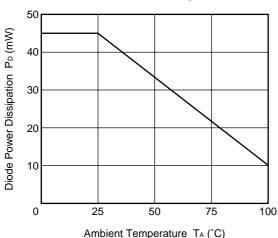


USAGE CAUTIONS

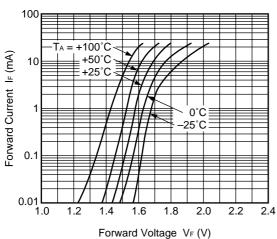
- 1. This product is weak for static electricity by designed with high-speed integrated circuit so protect against static electricity when handling.
- 2. By-pass capacitor of 0.1 μ F is used between Vcc and GND near device. Also, ensure that the distance between the leads of the photocoupler and capacitor is no more than 10 mm.
- 3. Avoid storage at a high temperature and high humidity.

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

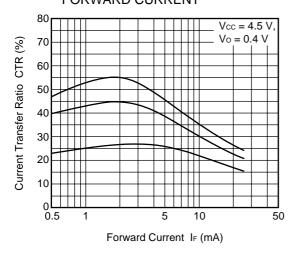




FORWARD CURRENT vs. FORWARD VOLTAGE

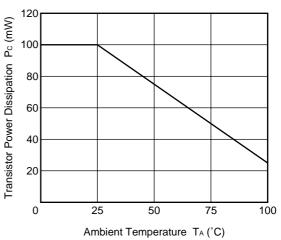


CURRENT TRANSFER RATIO vs. FORWARD CURRENT

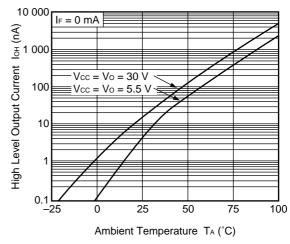


Remark The graphs indicate nominal characteristics.

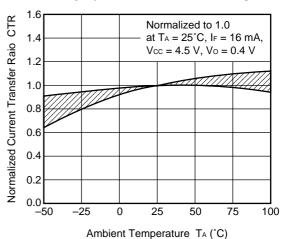
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



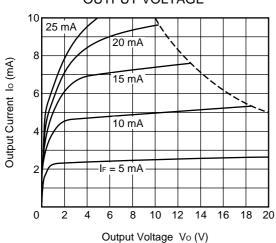
HIGH LEVEL OUTPUT CURRENT vs. AMBIENT TEMPERATURE



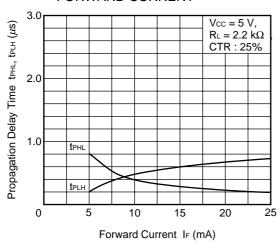
NORMALIZED CURRENT TRANSFER RATIO vs. AMBIENT TEMPERATURE



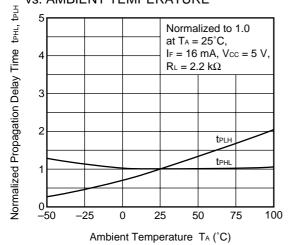




PROPAGATION DELAY TIME vs. FORWARD CURRENT

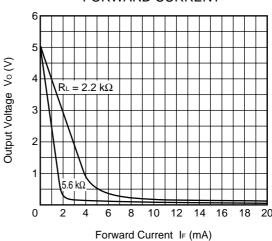


NORMALIZED PROPAGATION DELAY TIME vs. AMBIENT TEMPERATURE

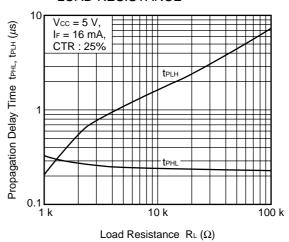


Remark The graphs indicate nominal characteristics.

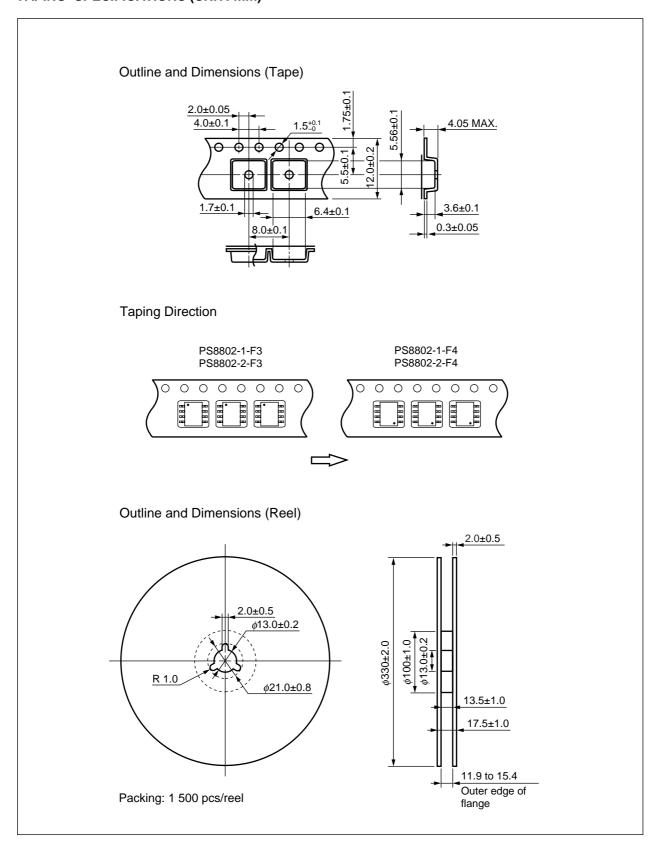
OUTPUT VOLTAGE vs. FORWARD CURRENT



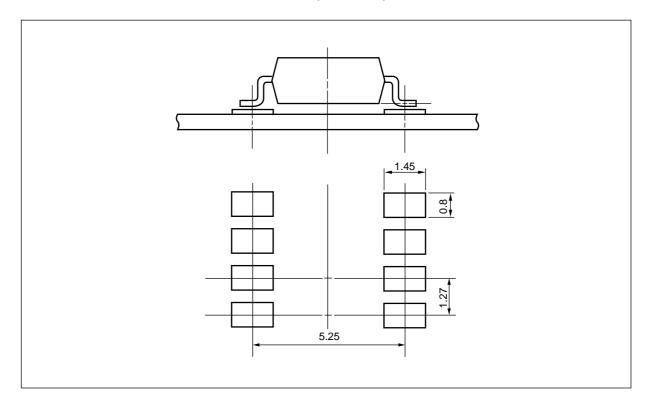
PROPAGATION DELAY TIME vs. LOAD RESISTANCE



TAPING SPECIFICATIONS (UNIT: mm)



RECOMMENDED MOUNT PAD DIMENSIONS (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
 10 seconds or less
 60 seconds or less

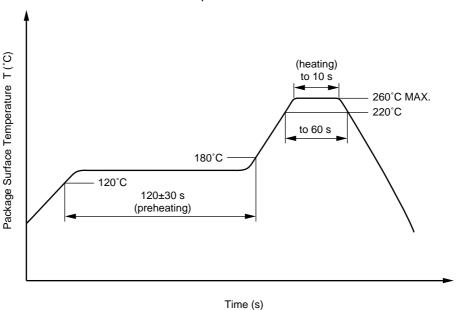
• Time to preheat temperature from 120 to 180°C 120±30 s

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.

USAGE CAUTIONS

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



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Subject: Compliance with EU Directives

CEL certifies, to its knowledge, that semiconductor and laser products detailed below are compliant with the requirements of European Union (EU) Directive 2002/95/EC Restriction on Use of Hazardous Substances in electrical and electronic equipment (RoHS) and the requirements of EU Directive 2003/11/EC Restriction on Penta and Octa BDE.

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	admium < 100 PPM		Not Detected		
Hexavalent Chromium	< 1000 PPM Not Detected		etected		
PBB	< 1000 PPM	Not Detected			
PBDE	< 1000 PPM Not Detected		etected		

If you should have any additional questions regarding our devices and compliance to environmental standards, please do not hesitate to contact your local representative.

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