NEC

PHOTOCOUPLER

PS8302L,PS8302L2

1 Mbps, HIGH CMR, ANALOG OUTPUT TYPE, 8 mm CREEPAGE 6-PIN SDIP PHOTOCOUPLER –NEPOC Series–

DESCRIPTION

The PS8302L and PS8302L2 are optical coupled isolators containing a GaAlAs LED on the input side and a PIN photodiode and a high-speed amplifier transistor on the output side on one chip.

The PS8302L and PS8302L2 are designed specifically for high supply voltage and high common mode transient immunity (CMR).

The PS8302L and PS8302L2 are in 6-pin plastic SDIP (Shrink Dual In-line Package). The PS8302L2 has 8 mm creepage distance and is half size of 8-pin DIP.

The PS8302L is lead bending type (Gull-wing) for surface mounting.

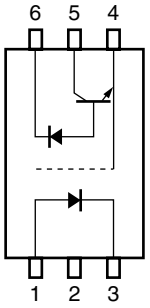
The PS8302L2 is lead bending type for long creepage distance (Gull-wing) for surface mount.

FEATURES

- High common mode transient immunity (CM_H, CM_L = ±15 kV/μs MIN.)
- Half size of 8-pin DIP
- Long creepage distance (8 mm MIN. : PS8302L2)
- High supply voltage (V_{CC} = 35 V)
- High isolation voltage (BV = 5 000 Vr.m.s.)
- High-speed response (t_{PHL} = 0.8 μs MAX., t_{PLH} = 0.8 μs MAX.)
- Pb-Free product

<R>
- Safety standards
  - UL approved: File No. E72422
  - CSA approved: No. CA 101391
  - DIN EN60747-5-2 (VDE0884 Part2) approved: No. 40024069 (Option)

PIN CONNECTION
(Top View)



1. Anode
2. NC
3. Cathode
4. GND
5. V_O
6. V_{CC}

APPLICATIONS

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

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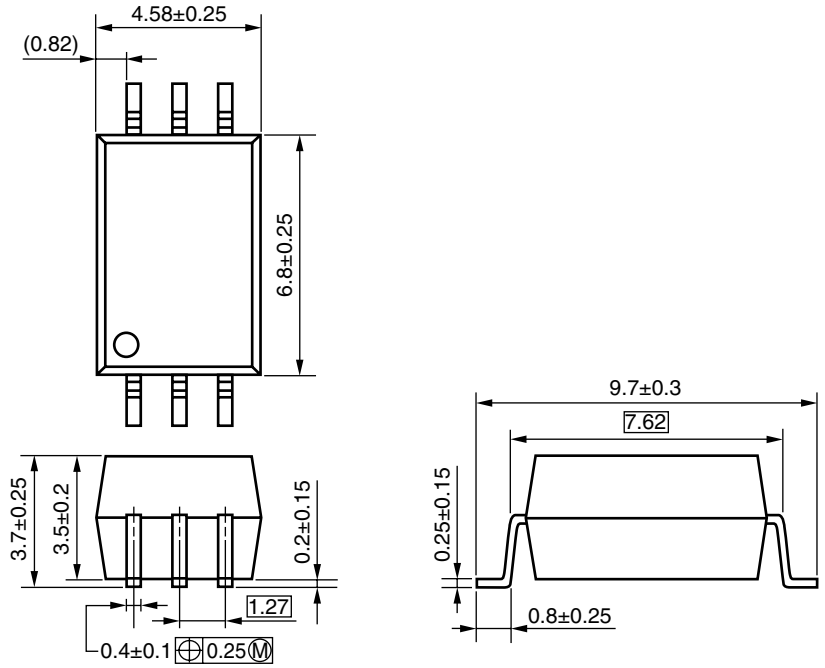
The mark <R> shows major revised points.

The revised points can be easily searched by copying an "<R>" in the PDF file and specifying it in the "Find what:" field.

PACKAGE DIMENSIONS (UNIT: mm)

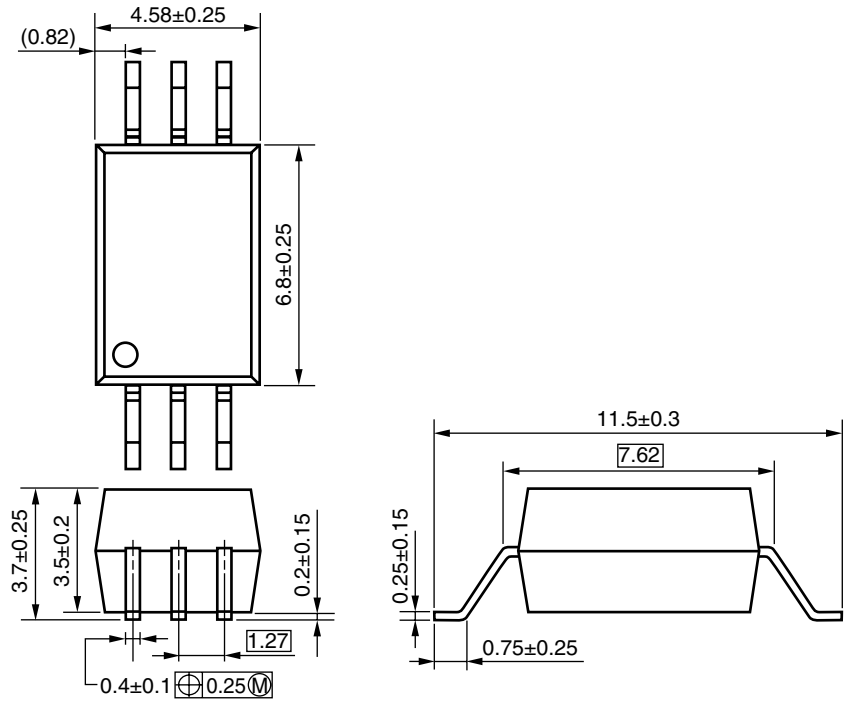
Lead Bending Type (Gull-wing) For Surface Mount

PS8302L

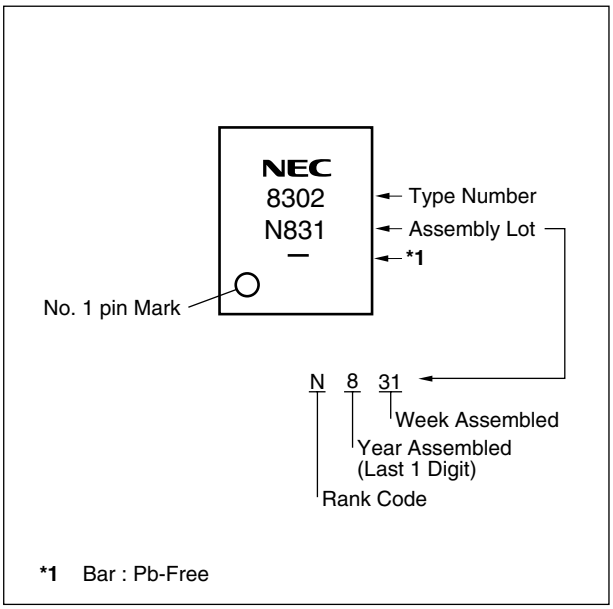


Lead Bending Type For Long Creepage Distance (Gull-wing) For Surface Mount

PS8302L2



<R> **MARKING EXAMPLE**



PHOTOCOUPLER CONSTRUCTION

Parameter	PS8302L	PS8302L2
Air Distance (MIN.)	7 mm	8 mm
Outer Creepage Distance (MIN.)	7 mm	8 mm
Isolation Distance (MIN.)	0.4 mm	0.4 mm

<R> **ORDERING INFORMATION**

Part Number	Order Number	Solder Plating Specification	Packing Style	Safety Standard Approval	Application Part Number*1
PS8302L	PS8302L-AX	Pb-Free	20 pcs (Tape 20 pcs cut)	Standard products	PS8302L
PS8302L-E3	PS8302L-E3-AX	(Ni/Pd/Au)	Embossed Tape 2 000 pcs/reel	(UL, CSA approved)	
PS8302L2	PS8302L2-AX		20 pcs (Tape 20 pcs cut)		PS8302L2
PS8302L2-E3	PS8302L2-E3-AX		Embossed Tape 2 000 pcs/reel		
PS8302L-V	PS8302L-V-AX		20 pcs (Tape 20 pcs cut)	DIN EN60747-5-2	PS8302L
PS8302L-E3-V	PS8302L-E3-V-AX		Embossed Tape 2 000 pcs/reel	(VDE0884 Part2)	
PS8302L2-V	PS8302L2-V-AX		20 pcs (Tape 20 pcs cut)	Approved (Option)	PS8302L2
PS8302L2-E3-V	PS8302L2-E3-V-AX		Embossed Tape 2 000 pcs/reel		

***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*1	I_F	25	mA
	Reverse Voltage	V_R	5.0	V
Detector	Supply Voltage	V_{CC}	35	V
	Output Voltage	V_O	35	V
	Output Current	I_O	8.0	mA
	Power Dissipation*2	P_C	100	mW
Isolation Voltage*3		BV	5 000	Vr.m.s.
Operating Ambient Temperature		T_A	–55 to +110	°C
Storage Temperature		T_{stg}	–55 to +125	°C

***1** Reduced to 0.33 mA/°C at T_A = 70°C or more.

***2** Reduced to 2.00 mW/°C at T_A = 75°C or more.

***3** AC voltage for 1 minute at T_A = 25°C, RH = 60% between input and output.
Pins 1-3 shorted together, 4-6 shorted together.

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

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V_F	I_F = 16 mA		1.6	2.0	V
	Reverse Current	I_R	V_R = 3 V			10	μA
	Forward Voltage Temperature Coefficient	$\Delta V_F/\Delta T_A$	I_F = 16 mA		−2.1		mV/°C
	Terminal Capacitance	C_t	V = 0 V, f = 1 MHz		60		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 = 35 V			100	μA
	Low Level Output Voltage	V_{OL}	I_F = 16 mA, V_{CC} = 4.5 V, I_O = 2.4 mA		0.15	0.4	V
	High Level Supply Current	I_{CCH}	I_F = 0 mA, V_O = open, V_{CC} = 35 V		0.01	1	μA
	Low Level Supply Current	I_{CCL}	I_F = 16 mA, V_O = open, V_{CC} = 35 V		150		
Coupled	Current Transfer Ratio	CTR	I_F = 16 mA, V_{CC} = 4.5 V, V_O = 0.4 V	15			%
	Input-Output Isolation Resistance	R_{I-O}	V_{I-O} = 1 kV_{DC}	10^{11}			Ω
	Input-Output Isolation Capacitance	C_{I-O}	V = 0 V, f = 1 MHz		0.7		pF
	Propagation Delay Time (H → L)	t_{PHL}	I_F = 16 mA, V_{CC} = 5 V, R_L = 1.9 kΩ		0.22	0.8	μs
	Propagation Delay Time (L → H)	t_{PLH}			0.35	0.8	
	Common Mode Transient Immunity at High Level Output	CM_H	I_F = 0 mA, V_{CC} = 5 V, R_L = 4.1 kΩ, V_{CM} = 1.5 kV	15			kV/μs
	Common Mode Transient Immunity at Low Level Output	CM_L	I_F = 16 mA, V_{CC} = 5 V, R_L = 4.1 kΩ, V_{CM} = 1.5 kV	−15			

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 μF is used between V_{CC} 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.

NOTES ON HANDLING

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.

<R> SPECIFICATION OF VDE MARKS LICENSE DOCUMENT

Parameter		Symbol	Speck	Unit
Application classification (DIN EN 60664-1 VDE0110 Part 1) for rated line voltages ≤ 300 Vr.m.s. for rated line voltages ≤ 600 Vr.m.s.			 IV III	
Climatic test class (DIN EN 60664-1 VDE0110)			55/110/21	
Dielectric strength maximum operating isolation voltage Test voltage (partial discharge test, procedure a for type test and random test) $U_{pr} = 1.5 \times U_{IORM}$, $P_d < 5$ pC		 U_{IORM} U_{pr}	 1 130 1 695	 V_{peak} V_{peak}
Test voltage (partial discharge test, procedure b for all devices) $U_{pr} = 1.875 \times U_{IORM}$, $P_d < 5$ pC		U_{pr}	2 119	V_{peak}
Highest permissible overvoltage		U_{TR}	8 000	V_{peak}
Degree of pollution (DIN EN 60664-1 VDE0110 Part 1)			2	
Clearance distance	PS8302L		>7.0	mm
	PS8302L2		>8.0	
Creepage distance	PS8302L		>7.0	mm
	PS8302L2		>8.0	
Comparative tracking index (DIN IEC 112/VDE 0303 Part 1)		CTI	175	
Material group (DIN EN 60664-1 VDE0110 Part 1)			III a	
Storage temperature range		T_{stg}	–55 to +125	°C
Operating temperature range		T_A	–55 to +110	°C
Isolation resistance, minimum value V_{IO} = 500 V dc at T_A = 25°C V_{IO} = 500 V dc at T_A MAX. at least 100°C		 Ris MIN. Ris MIN.	 10^{12} 10^{11}	 Ω Ω
Safety maximum ratings (maximum permissible in case of fault, see thermal derating curve) Package temperature Current (input current I_F, Psi = 0) Power (output or total power dissipation) Isolation resistance V_{IO} = 500 V dc at T_A = Tsi		 Tsi Isi Psi Ris MIN.	 175 400 700 10^9	 °C mA mW Ω

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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. 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 i any way allow it to enter the mouth.