

# PS7901D-1A

## Preliminary Data Sheet

Specifications in this document are tentative and subject to change.

-NEPOC Series- (OCMOS FET)

R08DS0034EJ0001

4-PIN SMALL FLAT-LEAD, LOW OUTPUT CAPACITANCE (0.75 pF)

Rev.0.01

1-ch Optical Coupled MOS FET

Feb 17, 2011

### DESCRIPTION

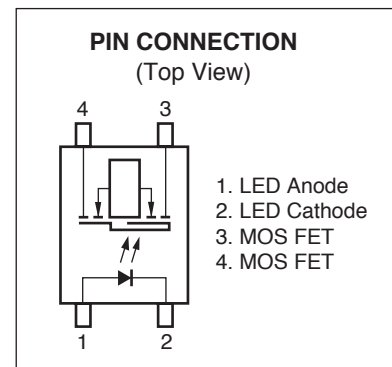
The PS7901D-1A is a low output capacitance solid state relay containing a GaAs LED on the light emitting side (input side) and MOS FETs on the output side.

A small flat-lead package has been provided which realizes a reduction in mounting area of about 50% compared with the PS78xx series.

It is suitable for high-frequency signal control, due to its low  $C \times R$ , low output capacitance, and low off-state leakage current.

### FEATURES

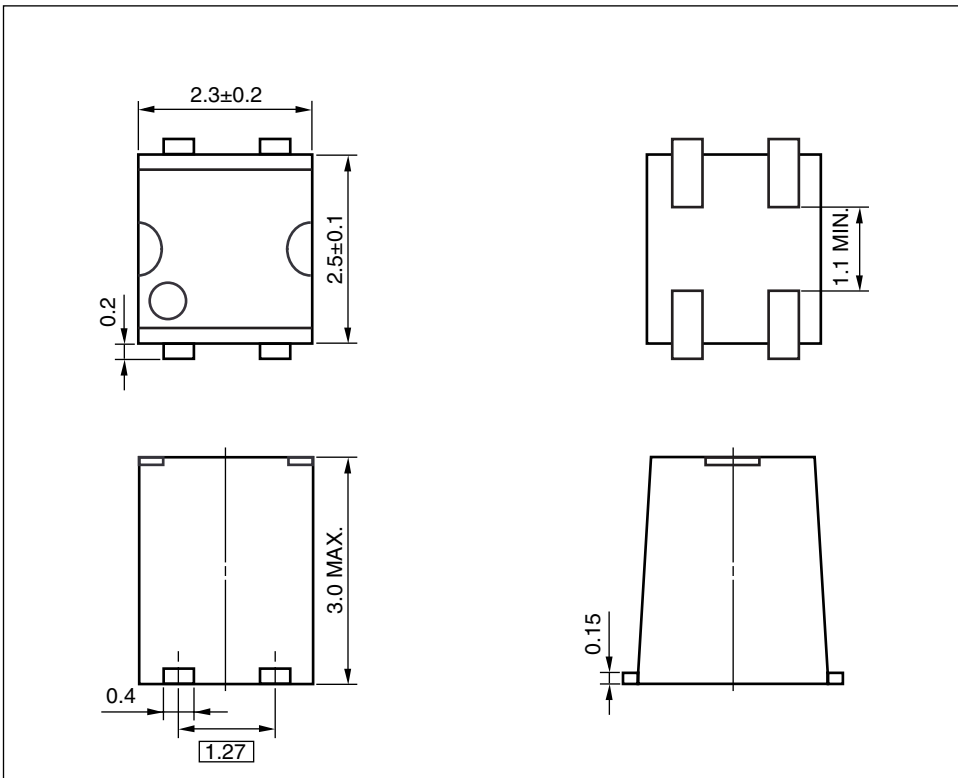
- Small flat-lead package (2.5 (L) × 2.3 (W) × 2.9 (H) mm)
- Low output capacitance ( $C_{out} = 0.75$  pF TYP.)
- Low  $C \times R$  ( $C \times R = 9$  pF •  $\Omega$ )
- 1 channel type (1 a output)
- Designed for AC/DC switching line changer
- Low offset voltage
- Embossed tape product : PS7901D-1A-F3 : 3 500 pcs/reel
- Pb-Free product



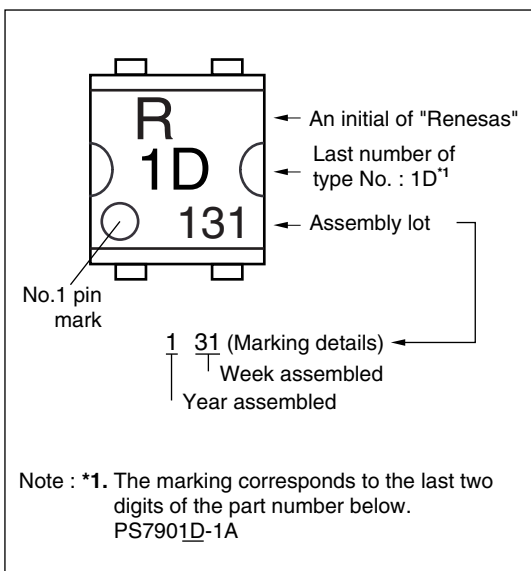
### APPLICATIONS

- Measurement equipment

## PACKAGE DIMENSIONS (UNIT: mm)



## MARKING EXAMPLE



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

Parameter	Symbol	Ratings	Unit	
Diode	Forward Current (DC)	$I_F$	50	mA
	Reverse Voltage	$V_R$	5.0	V
	Power Dissipation	$P_D$	50	mW
	Peak Forward Current <sup>*1</sup>	$I_{FP}$	1	A
MOS FET	Break Down Voltage	$V_L$	40	V
	Continuous Load Current	$I_L$	120	mA
	Pulse Load Current <sup>*2</sup> (AC/DC Connection)	$I_{LP}$	200	mA
	Power Dissipation <sup>*2</sup>	$P_D$	250	mW
Isolation Voltage <sup>*3</sup>	BV	500	Vr.m.s.	
Total Power Dissipation	$P_T$	300	mW	
Operating Ambient Temperature	$T_A$	-40 to +85	$^\circ\text{C}$	
Storage Temperature	$T_{stg}$	-40 to +100	$^\circ\text{C}$	

Notes: \*1. PW = 100  $\mu\text{s}$ , Duty Cycle = 1%

\*2. PW = 100 ms, 1 shot

\*3. 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.

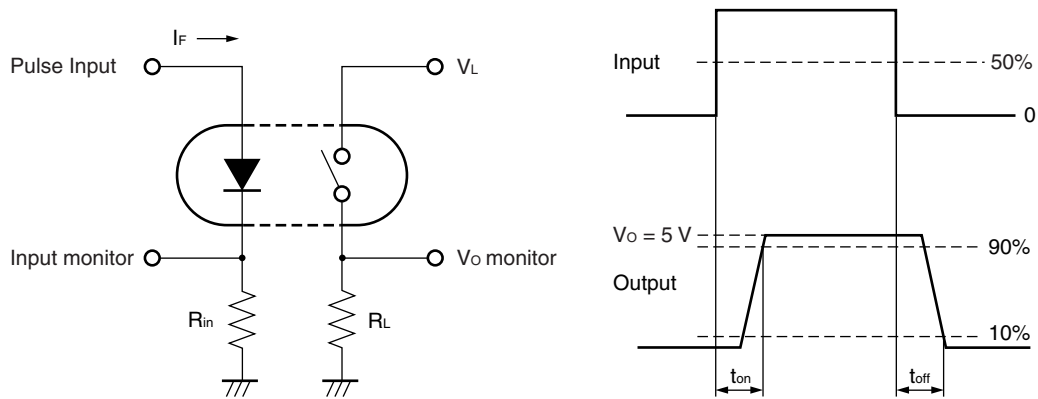
## RECOMMENDED OPERATING CONDITIONS ( $T_A = 25^\circ\text{C}$ )

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
LED Operating Current	$I_F$	4.5	5	20	mA
LED Off Current	$I_F$	0.1			mA

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V <sub>F</sub>	I <sub>F</sub> = 5 mA		1.1	1.4	V
	Reverse Current	I <sub>R</sub>	V <sub>R</sub> = 5 V			5.0	μA
MOS FET	Off-state Leakage Current 1	I <sub>Loff 1</sub>	V <sub>L</sub> = 35 V		0.03	0.3	nA
	Off-state Leakage Current 2	I <sub>Loff 2</sub>	V <sub>L</sub> = 40 V		0.1	1.0	nA
	Output Capacitance	C <sub>out</sub>	V <sub>L</sub> = 0 V, f = 1 MHz, t < 1 s		0.75	1.05	pF
Coupled	LED On-state Current	I <sub>Fon</sub>	I <sub>L</sub> = 120 mA			4.0	mA
	On-state Resistance 1	R <sub>on 1</sub>	I <sub>F</sub> = 5 mA, I <sub>L</sub> = 10 mA	9	12	16	Ω
	On-state Resistance 2	R <sub>on 2</sub>	I <sub>F</sub> = 5 mA, I <sub>L</sub> = 120 mA	9	12	16	Ω
	Turn-on Time <sup>*1, 2</sup>	t <sub>on</sub>	I <sub>F</sub> = 5 mA, V <sub>O</sub> = 5 V,		0.04	0.5	ms
	Turn-off Time <sup>*1, 2</sup>	t <sub>off</sub>	R <sub>L</sub> = 500 Ω, PW ≥ 1 ms		0.1	0.5	ms
	Isolation Resistance	R <sub>I-O</sub>	V <sub>I-O</sub> = 0.5 kV <sub>DC</sub>	10 <sup>9</sup>			Ω
	Isolation Capacitance	C <sub>I-O</sub>	V = 0 V, f = 1 MHz		0.3		pF

Notes: \*1. Test Circuit for Switching Time



\*2. The turn-on time and turn-off time are specified as input-pulse width ≥ 1 ms.

Be aware that when the device operates with an input-pulse width less than 10 ms, the turn-on time and turn-off time will increase.

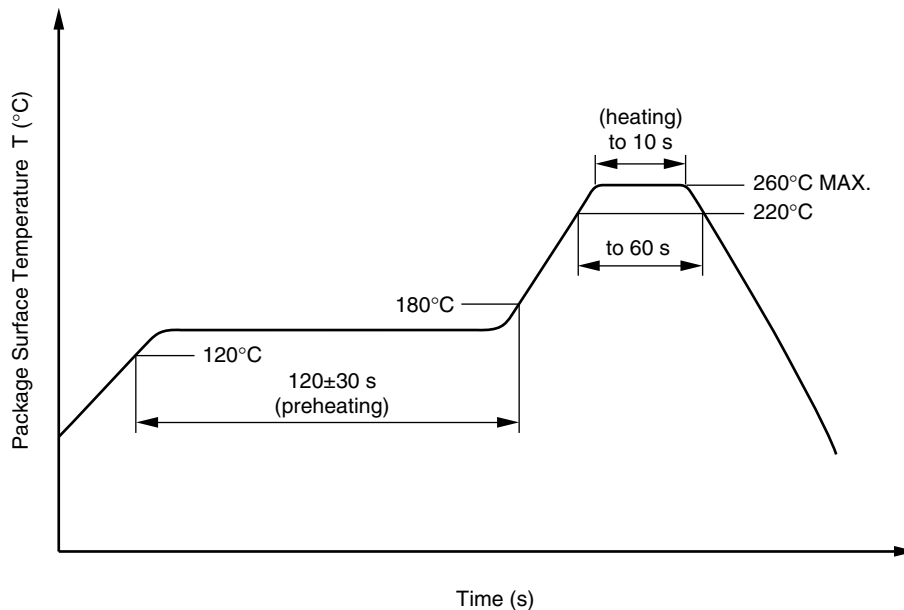
## NOTES ON HANDLING

### 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.

## **USAGE CAUTIONS**

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

<b>Caution</b>	GaAs Products	<p>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.</p> <ul style="list-style-type: none"><li>• 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.<ol style="list-style-type: none"><li>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.</li><li>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.</li></ol></li><li>• Do not burn, destroy, cut, crush, or chemically dissolve the product.</li><li>• Do not lick the product or in any way allow it to enter the mouth.</li></ul>
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<b>Revision History</b>	<b>PS7901D-1A Preliminary Data Sheet</b>
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<b>Rev.</b>	<b>Date</b>	<b>Description</b>	
		<b>Page</b>	<b>Summary</b>
0.01	Feb 17, 2011	-	First edition issued

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