

**4-PIN ULTRA SMALL FLAT-LEAD, LOW OUTPUT CAPACITANCE (1.6 pF),  
1-ch Optical Coupled MOS FET****DESCRIPTION**

The PS7801K-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.

An ultra small flat-lead package has been provided which realizes a reduction in mounting area of about 50% compared with the PS72xx series.

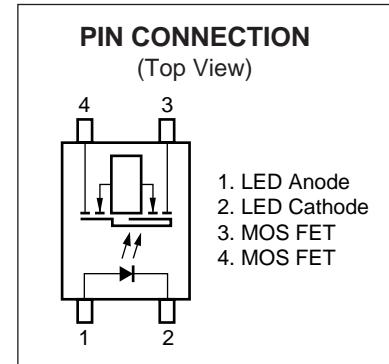
It is suitable for high-frequency signal control, due to its low off-state leakage current and low output capacitance.

**FEATURES**

- Ultra small flat-lead package (4.2 (L) × 2.5 (W) × 1.85 (H) mm)
- Low output capacitance ( $C_{out} = 1.6 \text{ pF TYP.}$ )
- Low off-state leakage current ( $I_{off} = 0.02 \text{ nA TYP.}$ )
- Break down voltage ( $V_L = 80 \text{ V}$ )
- High speed turn-on time ( $t_{on} = 0.06 \text{ ms TYP.}$ )
- 1 channel type (1 a output)
- Designed for AC/DC switching line changer
- Low offset voltage
- Ordering number of taping product: PS7801K-1A-F3 (3 500 pcs/reel)
- Pb-Free product
- Safety standards

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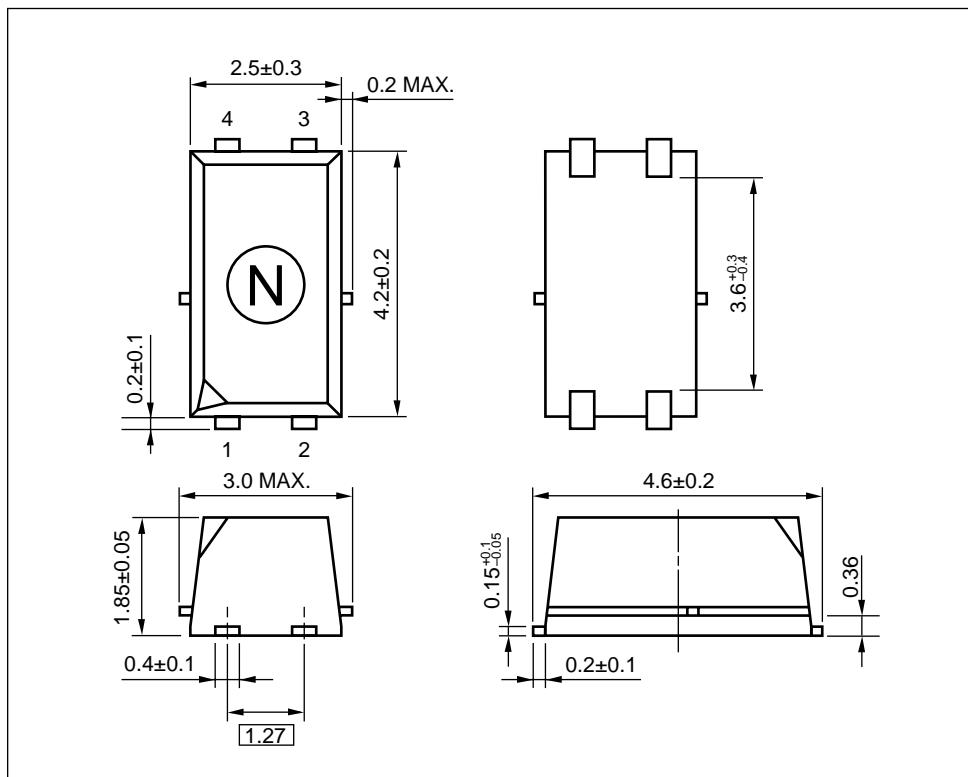
- UL approved: No. E72422

**APPLICATIONS**

- Measurement equipment

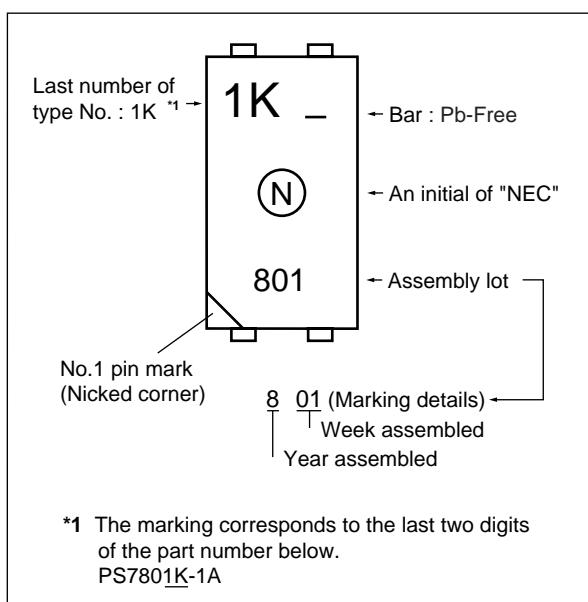
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## PACKAGE DIMENSIONS (UNIT: mm)



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## MARKING EXAMPLE



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**ORDERING INFORMATION**

Part Number	Order Number	Solder Plating Specification	Packing Style	Safety Standard Approval	Application Part Number <sup>*1</sup>
PS7801K-1A	PS7801K-1A-A	Pb-Free	50 pcs (Tape 50 pcs cut)	Standard products (UL approved)	PS7801K-1A
PS7801K-1A-F3	PS7801K-1A-F3-A		Embossed Tape 3 500 pcs/reel		

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

**ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25°C, unless otherwise specified)**

Parameter		Symbol	Ratings	Unit
Diode	Forward Current (DC)	I <sub>F</sub>	50	mA
	Reverse Voltage	V <sub>R</sub>	5.0	V
	Power Dissipation	P <sub>D</sub>	50	mW
	Peak Forward Current <sup>*1</sup>	I <sub>FP</sub>	1	A
MOS FET	Break Down Voltage	V <sub>L</sub>	80	V
	Continuous Load Current	I <sub>L</sub>	40	mA
	Pulse Load Current <sup>*2</sup> (AC/DC Connection)	I <sub>LP</sub>	80	mA
	Power Dissipation	P <sub>D</sub>	250	mW
Isolation Voltage <sup>*3</sup>		BV	500	Vr.m.s.
Total Power Dissipation		P <sub>T</sub>	300	mW
Operating Ambient Temperature		T <sub>A</sub>	-40 to +85	°C
Storage Temperature		T <sub>stg</sub>	-40 to +100	°C

**\*1** PW = 100  $\mu$ s, Duty Cycle = 1%

**\*2** PW = 100 ms, 1 shot

**\*3** AC voltage for 1 minute at T<sub>A</sub> = 25°C, RH = 60% between input and output.

Pins 1-2 shorted together, 3-4 shorted together.

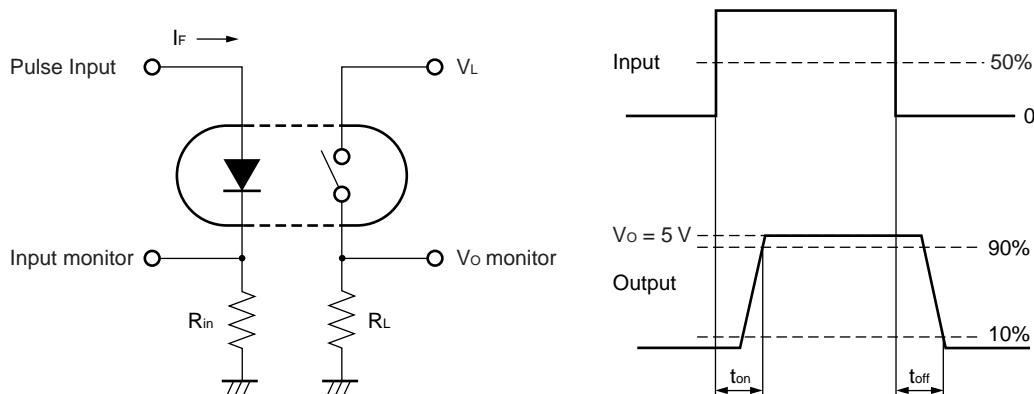
**RECOMMENDED OPERATING CONDITIONS (T<sub>A</sub> = 25°C)**

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
LED Operating Current	I <sub>F</sub>	2	5	20	mA
LED Off Voltage	V <sub>F</sub>	0		0.5	V

ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ )

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	$V_F$	$I_F = 5 \text{ mA}$		1.1	1.4	V
	Reverse Current	$I_R$	$V_R = 5 \text{ V}$			5.0	$\mu\text{A}$
MOS FET	Off-state Leakage Current	$I_{Loff}$	$V_D = 80 \text{ V}$		0.02	1.0	nA
	Output Capacitance	$C_{out}$	$V_D = 0 \text{ V}, f = 1 \text{ MHz}, t < 1 \text{ s}$		1.6	3.5	pF
Coupled	LED On-state Current	$I_{Fon}$	$I_L = 40 \text{ mA}$			2.0	mA
	On-state Resistance	$R_{on}$	$I_F = 5 \text{ mA}, I_L = 40 \text{ mA}, t \leq 10 \text{ ms}$		17.5	25	$\Omega$
	Turn-on Time <sup>*1,2</sup>	$t_{on}$	$I_F = 5 \text{ mA}, V_o = 5 \text{ V}, R_L = 500 \Omega,$		0.06	0.25	ms
	Turn-off Time <sup>*1,2</sup>	$t_{off}$	$PW \geq 10 \text{ ms}$		0.02	0.5	
	Isolation Resistance	$R_{i-o}$	$V_{i-o} = 0.5 \text{ kVDC}$	$10^9$			$\Omega$
	Isolation Capacitance	$C_{i-o}$	$V = 0 \text{ V}, f = 1 \text{ MHz}$		0.3		pF

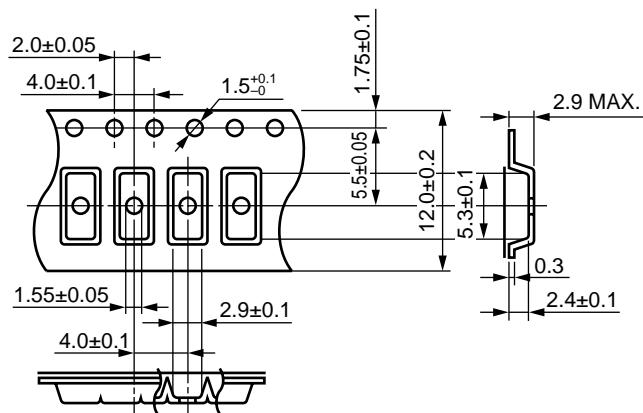
## \*1 Test Circuit for Switching Time

\*2 The turn-on time and turn-off time are specified as input-pulse width  $\geq 10 \text{ ms}$ .

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.

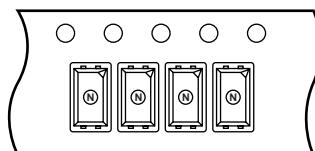
## &lt;R&gt; TAPING SPECIFICATIONS (UNIT: mm)

## Outline and Dimensions (Tape)

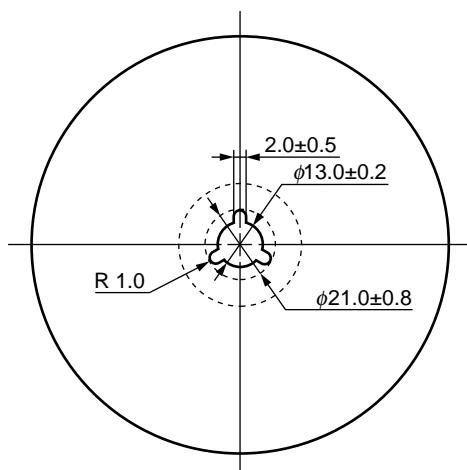


## Tape Direction

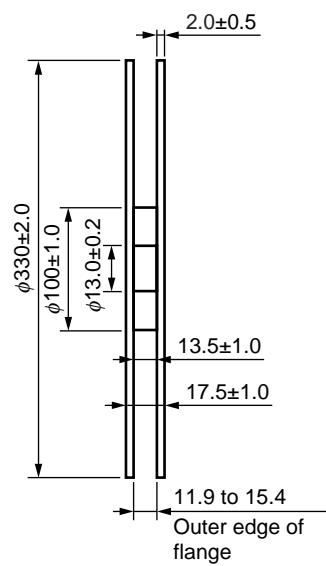
PS7801K-1A-F3



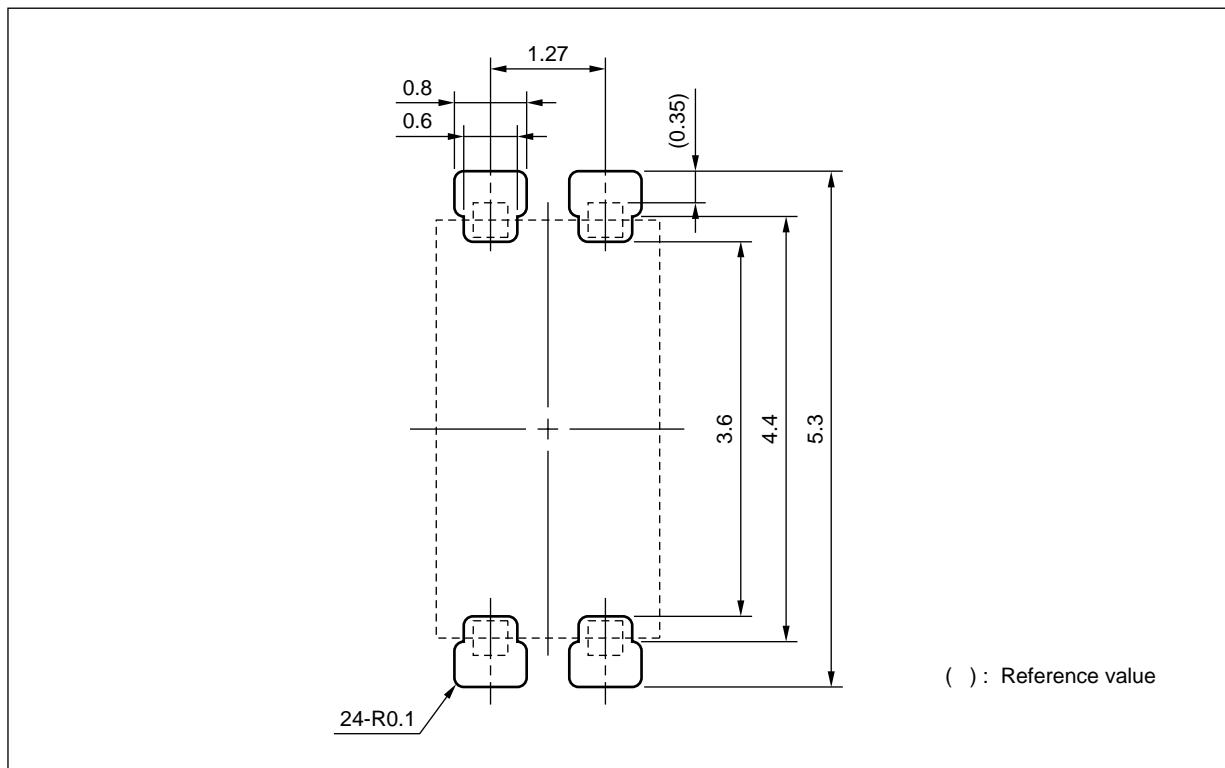
## Outline and Dimensions (Reel)



Packing: 3 500 pcs/reel



## RECOMMENDED MOUNT PAD DIMENSIONS (UNIT: mm)



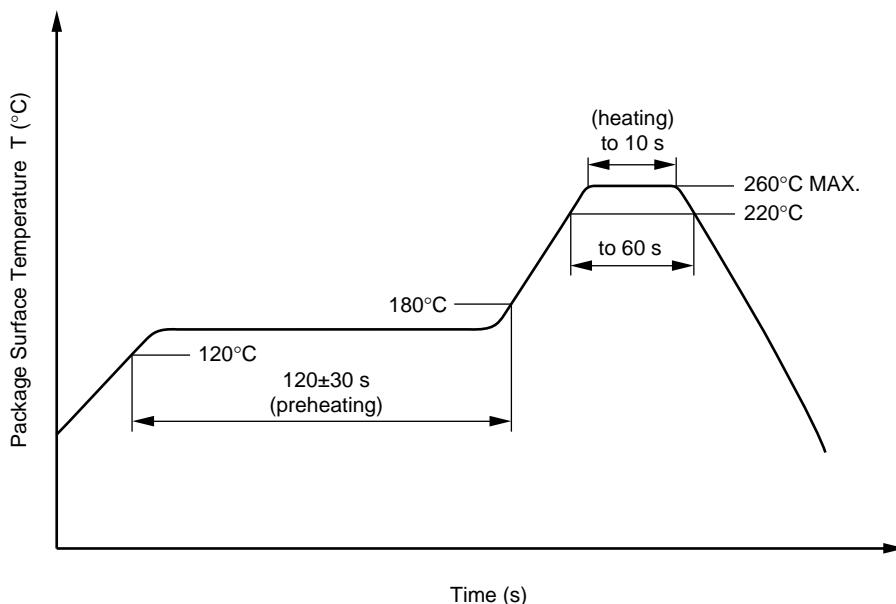
**Remark** All dimensions in this figure must be evaluated before use.

## 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
- Flux Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt% is recommended.)

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### (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.

**<R> USAGE CAUTIONS**

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

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**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 in any way allow it to enter the mouth.

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