PS7904-1A

4-PIN SMALL FLAT-LEAD, LOW ON-STATE RESISTANCE
1-ch Optical Coupled MOS FET

R08DS0062EJ0001
Rev.0.01
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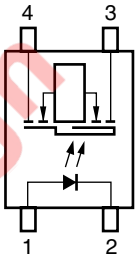
DESCRIPTION

The PS7904-1A 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 × 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 on-state resistance (R_{on} = 1.1 Ω TYP.)
- Low C × R (C × R = 29.7 pF • Ω)
- Large continuous load current (I_L = 400 mA)
- 1 channel type (1 a output)
- Designed for AC/DC switching line changer
- Low offset voltage
- Embossed tape product : PS7904-1A-F3 : 3 500 pcs/reel
- Pb-Free product

PIN CONNECTION
(Top View)

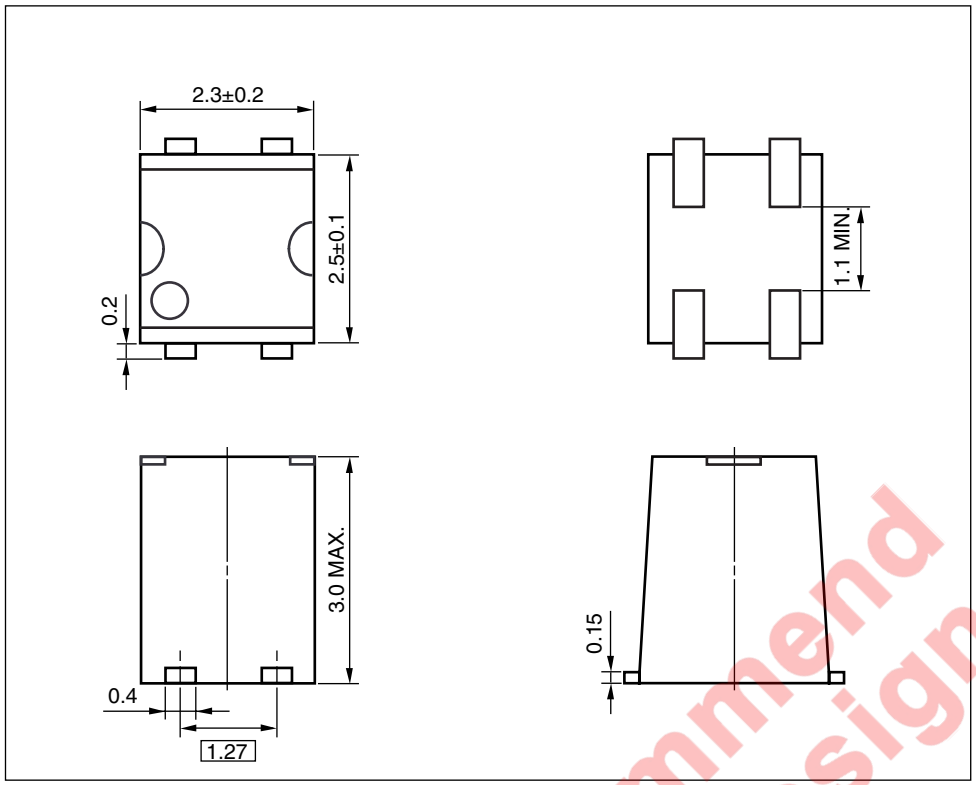


1. LED Anode
2. LED Cathode
3. MOS FET
4. MOS FET

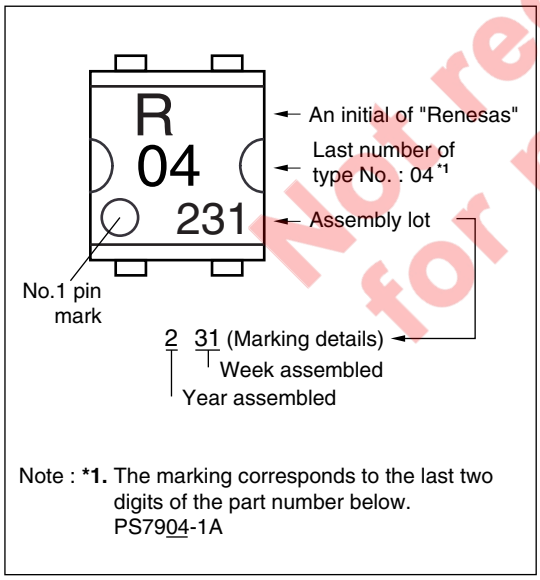
APPLICATIONS

- Measurement equipment

PACKAGE DIMENSIONS (UNIT: mm)



MARKING EXAMPLE



Note : ***1.** The marking corresponds to the last two digits of the part number below.
PS7904-1A

ORDERING INFORMATION

Part Number	Order Number	Solder Plating Specification	Packing Style
PS7904-1A-F3	PS7904-1A-F3-A	Pb-Free	Embossed Tape 3 500 pcs/reel

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

Parameter		Symbol	Ratings	Unit
Diode	Forward Current (DC)	I_F	50	mA
	Reverse Voltage	V_R	5	V
	Power Dissipation	P_D	50	mW
	Peak Forward Current *1	I_{FP}	1	A
MOS FET	Break Down Voltage	V_L	60	V
	Continuous Load Current	I_L	400	mA
	Pulse Load Current *2 (AC/DC Connection)	I_{LP}	800	mA
	Power Dissipation *2	P_D	250	mW
Isolation Voltage *3		BV	500	Vr.m.s.
Total Power Dissipation		P_T	300	mW
Operating Ambient Temperature		T_A	–40 to +85	°C
Storage Temperature		T_{stg}	–40 to +100	°C

Note: *1. PW = 100 μs, Duty Cycle = 1%
*2. PW = 100 ms, 1 shot
*3. AC voltage for 1 minute at T_A = 25°C, RH = 60% between input and output.
Pins 1-2 shorted together, 3-4 shorted together.

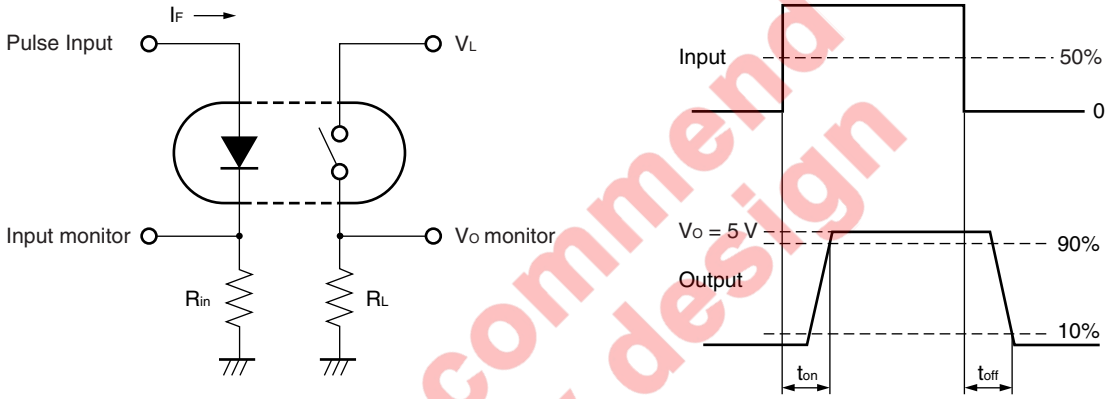
RECOMMENDED OPERATING CONDITIONS (T_A = 25°C)

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_A = 25°C)

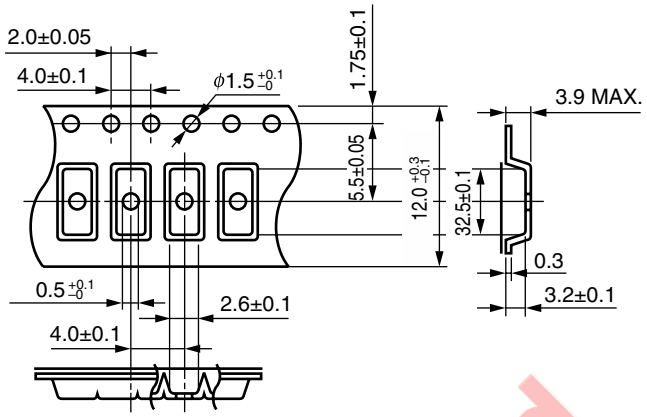
Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V_F	I_F = 5 mA		1.1	1.4	V
	Reverse Current	I_R	V_R = 5 V			5.0	μA
MOS FET	Off-state Leakage Current	I_{Loff}	V_L = 60 V		0.1	1	nA
	Output Capacitance	C_{out}	V_L = 0 V, f = 1 MHz		27	35	pF
Coupled	LED On-state Current	I_{Fon}	I_L = 400 mA			4.0	mA
	On-state Resistance	R_{on}	I_F = 5 mA, I_L = 400 mA, t ≤ 10 ms		1.1	1.5	Ω
	Turn-on Time*1	t_{on}	I_F = 5 mA, V_O = 5 V, R_L = 500 Ω		0.15	0.5	ms
	Turn-off Time*1	t_{off}			0.15	0.5	
	Isolation Resistance	R_{I-O}	V_{I-O} = 0.5 kV_{DC}	10^9			Ω
	Isolation Capacitance	C_{I-O}	V_L = 0 V, f = 1 MHz		0.3		pF

Note: *1. Test Circuit for Switching Time

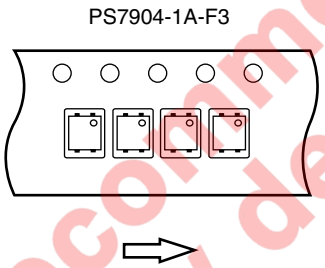


TAPING SPECIFICATIONS (UNIT: mm)

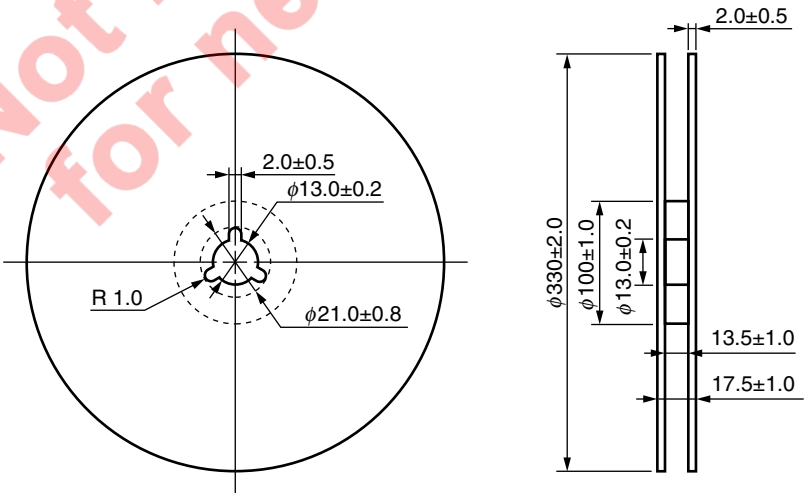
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)



Packing: 3 500 pcs/reel

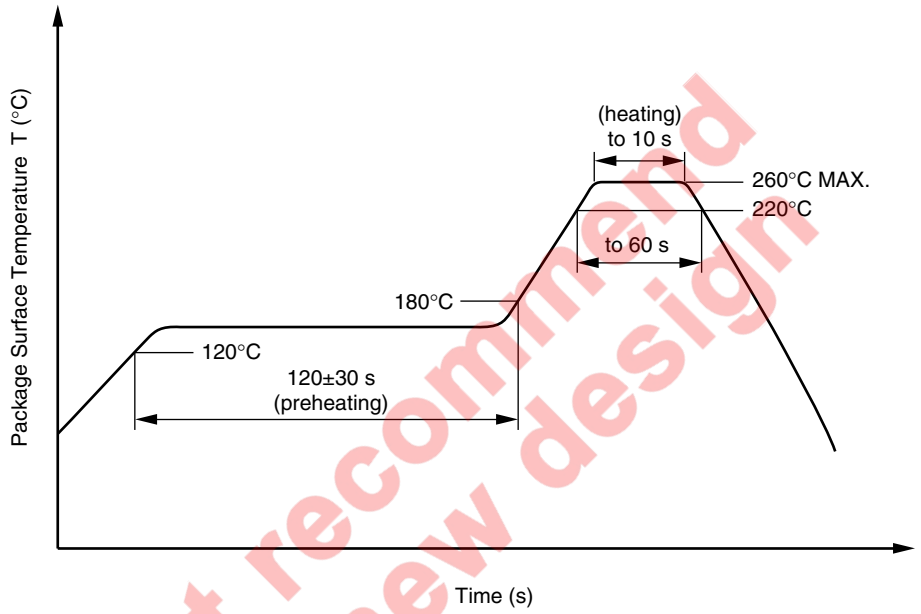
NOTES ON HANDLING

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 pin)	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

(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.

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.

Revision History	PS7904-1A Preliminary Data Sheet

Rev.	Date	Description	
		Page	Summary
0.01	Oct 22, 2012	–	First Edition Issued

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California Eastern Laboratories, Inc.
4590 Patrick Henry Drive, Santa Clara, California 95054, U.S.A.
Tel: +1-408-919-2500, Fax: +1-408-988-0279

Renesas Electronics Europe Limited
Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K
Tel: +44-1628-651-700, Fax: +44-1628-651-804

Renesas Electronics Europe GmbH
Arcadiastrasse 10, 40472 Düsseldorf, Germany
Tel: +49-211-65030, Fax: +49-211-6503-1327

Renesas Electronics (China) Co., Ltd.
7th Floor, Quantum Plaza, No.27 ZhiChunLu Haidian District, Beijing 100083, P.R.China
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

Renesas Electronics (Shanghai) Co., Ltd.
Unit 204, 205, AZIA Center, No.1233 Lujiazui Ring Rd., Pudong District, Shanghai 200120, China
Tel: +86-21-5877-1818, Fax: +86-21-6887-7858 / -7898

Renesas Electronics Hong Kong Limited
Unit 1601-1613, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong
Tel: +852-2886-9318, Fax: +852 2886-9022/9044

Renesas Electronics Taiwan Co., Ltd.
13F, No. 363, Fu Shing North Road, Taipei, Taiwan
Tel: +886-2-8175-9600, Fax: +886 2-8175-9670

Renesas Electronics Singapore Pte. Ltd.
80 Bendemeer Road, Unit #06-02 Hyflux Innovation Centre Singapore 339949
Tel: +65-6213-0200, Fax: +65-6213-0300

Renesas Electronics Malaysia Sdn.Bhd.
Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No. 18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: +60-3-7955-9390, Fax: +60-3-7955-9510

Renesas Electronics Korea Co., Ltd.
11F., Samik Lavied' or Bldg., 720-2 Yeoksam-Dong, Kangnam-Ku, Seoul 135-080, Korea
Tel: +82-2-558-3737, Fax: +82-2-558-5141

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