

PRELIMINARY DATA SHEET

NEC

Solid State Relay
OCMOS FET

PS720C-1A

4-PIN SOP, 0.1 Ω LOW ON-STATE RESISTANCE
60 V BREAK DOWN VOLTAGE
1.25 A CONTINUOUS LOAD CURRENT
1-ch Optical Coupled MOS FET

—NEPOC Series—

DESCRIPTION

The PS720C-1A is a low on-state resistance solid state relay containing a GaAs LED on the input side and MOS FETs on the output side.

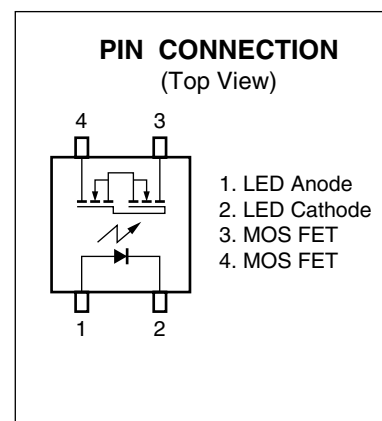
It is suitable for PLC, etc., because of its large continuous load current and low on-state resistance.

FEATURES

- Low on-state resistance ($R_{on} = 0.1 \Omega$ TYP.)
- Large continuous load current ($I_L = 1.25$ A)
- High-speed switching time ($t_{on} = 2$ ms TYP., $t_{off} = 0.05$ ms TYP.)
- 1 channel type (1 a output)
- Designed for AC/DC switching line changer
- Small and thin package (4-pin SOP, Height = 2.1 mm)
- High isolation voltage ($BV = 1\,500$ V_{r.m.s.})
- Low offset voltage
- Ordering number of taping product: PS720C-1A-F3: 3 500 pcs/reel
- Pb-Free product

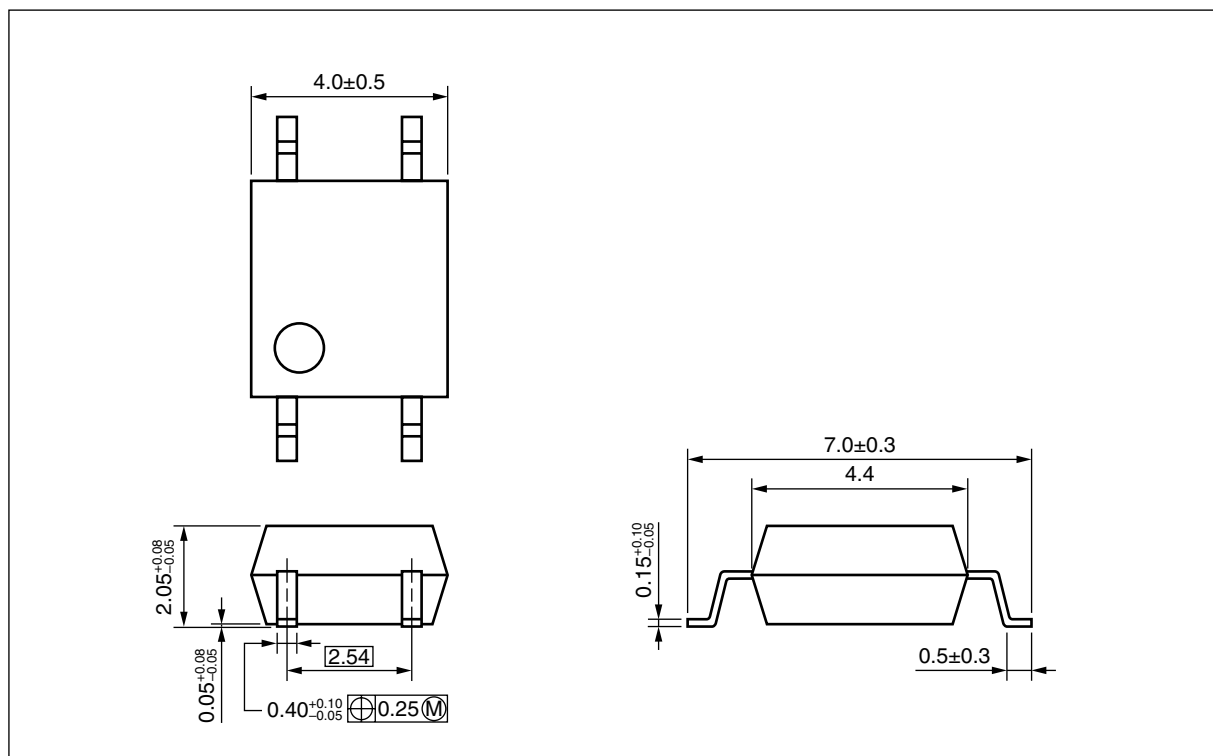
APPLICATIONS

- Measurement equipment
- FA equipment

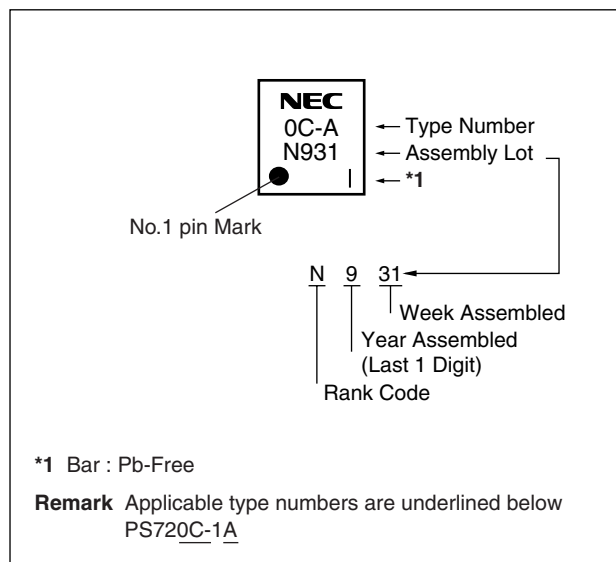


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PACKAGE DIMENSIONS (UNIT: mm)



MARKING EXAMPLE (LASER MARKING)



PHOTOCOUPLER CONSTRUCTION

Parameter	PS720C-1A
Air Distance (MIN.)	5 mm
Outer Creepage Distance (MIN.)	5 mm
Isolation Distance (MIN.)	0.4 mm

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 ^{*1}	I_{FP}	1	A
MOS FET	Break Down Voltage	V_L	60	V
	Continuous Load Current	I_L	1.25	A
	Pulse Load Current ^{*2} (AC/DC Connection)	I_{LP}	2.5	A
	Power Dissipation	P_D	300	mW
Isolation Voltage ^{*3}		BV	1 500	Vr.m.s.
Total Power Dissipation		P_T	350	mW
Operating Ambient Temperature		T_A	-40 to +85	$^{\circ}\text{C}$
Storage Temperature		T_{stg}	-40 to +100	$^{\circ}\text{C}$

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

*2 $PW = 100 \text{ ms}$, 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.

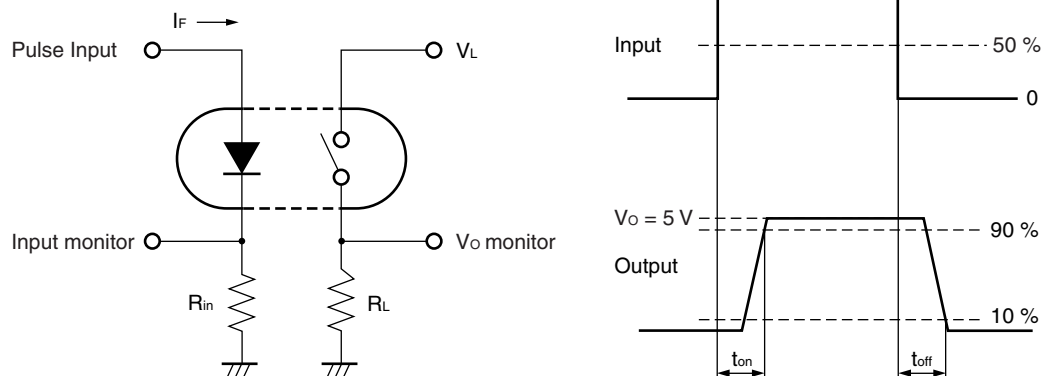
RECOMMENDED OPERATING CONDITIONS ($T_A = 25^\circ\text{C}$)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
LED Operating Current	I_F	5	10	20	mA
LED Off Current	I_F	0.1			mA

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	μA
MOS FET	Off-state Leakage Current	I_{Loff}	$V_D = 60\text{ V}$		10	1 000	nA
	Output Capacitance	C_{out}	$V_D = 0\text{ V}$, $f = 1\text{ MHz}$		230		pF
Coupled	LED On-state Current	I_{Fon}	$I_L = 1.25\text{ A}$			4	mA
	On-state Resistance	R_{on}	$I_F = 10\text{ mA}$, $I_L = 1.25\text{ A}$		0.1	0.19	Ω
	Turn-on Time ^{*1,2}	t_{on}	$I_F = 10\text{ mA}$, $V_O = 5\text{ V}$, $R_L = 500\ \Omega$,		2	10	ms
	Turn-off Time ^{*1,2}	t_{off}	$PW \geq 10\text{ ms}$		0.05	0.5	
	Isolation Resistance	$R_{\text{I-O}}$	$V_{\text{I-O}} = 1.0\text{ kV}_{\text{DC}}$	10^9			Ω
	Isolation Capacitance	$C_{\text{I-O}}$	$V = 0\text{ V}$, $f = 1\text{ MHz}$		0.5		pF

***1 Test Circuit for Switching Time**

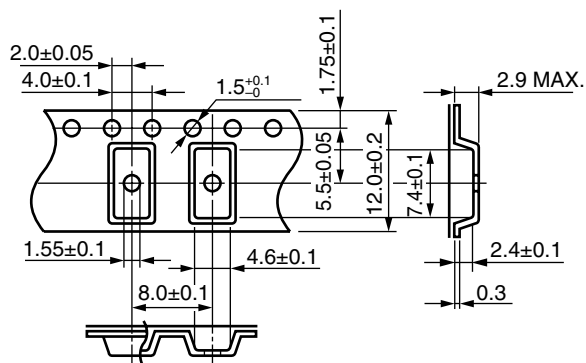


***2 The turn-on time and turn-off time are specified as input-pulse width $\geq 10\text{ ms}$.**

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.

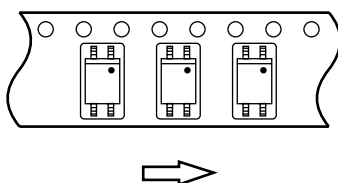
TAPING SPECIFICATIONS (in millimeters)

Outline and Dimensions (Tape)

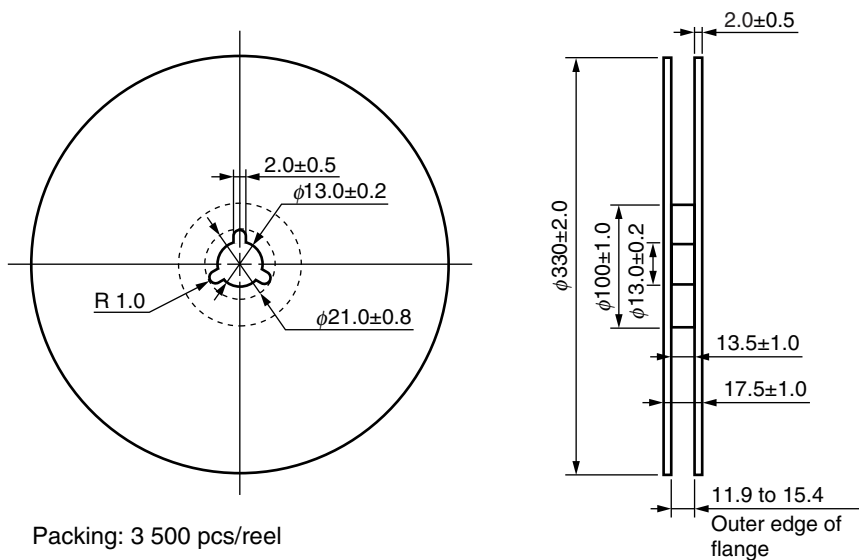


Tape Direction

PS720C-1A-F3



Outline and Dimensions (Reel)

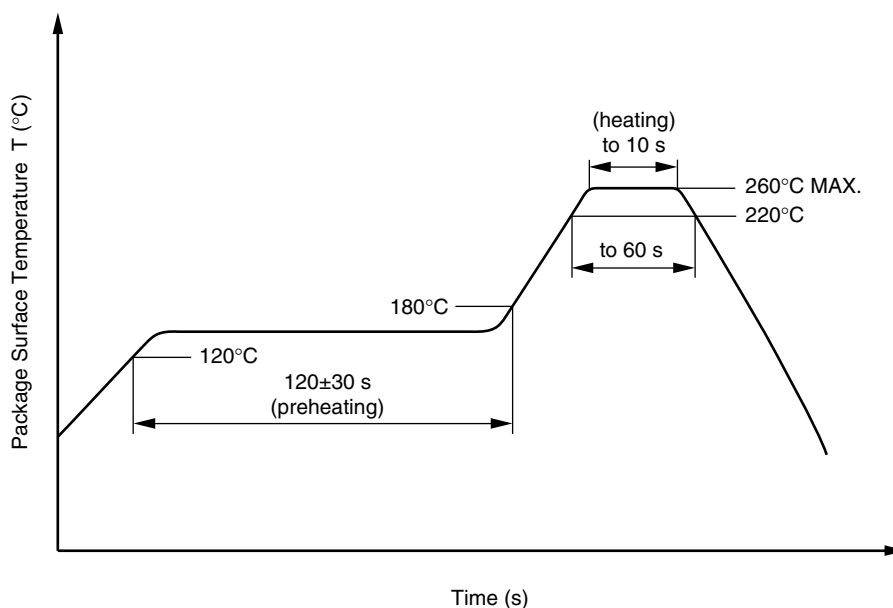


RECOMMENDED SOLDERING CONDITIONS

(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.)

(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.

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<div>Caution</div>	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"> • 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"> 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. <ul style="list-style-type: none"> • 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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