

# PS7141-1C,PS7141L-1C

# 8-PIN DIP, 400 V BREAK DOWN VOLTAGE

TRANSFER TYPE

-NEPOC Series-

Solid State Relay

# 2-ch Optical Coupled MOS FET

### DESCRIPTION

The PS7141-1C and PS7141L-1C are transfer type solid state relays containing normally open (N.O.) contact and normally close (N.C.) contact on output side.

They are suitable for analog signal control because of their low offset and high linearity.

The PS7141L-1C has a surface mount type lead.

## FEATURES

- 2 channel type (1 a + 1 b output)
- Low LED operating current (IF = 2 mA)
- Designed for AC/DC switching line changer
- Small package (8-pin DIP)
- · Low offset voltage
- Ordering number of taping product : PS7141L-1C-E3, E4: 1 000 pcs/reel
- <R> Pb-Free product
  - Safety standards
    - UL approved: File No. E72422
    - BSI approved: No. 8245/8246
    - CSA approved: No. CA 101391

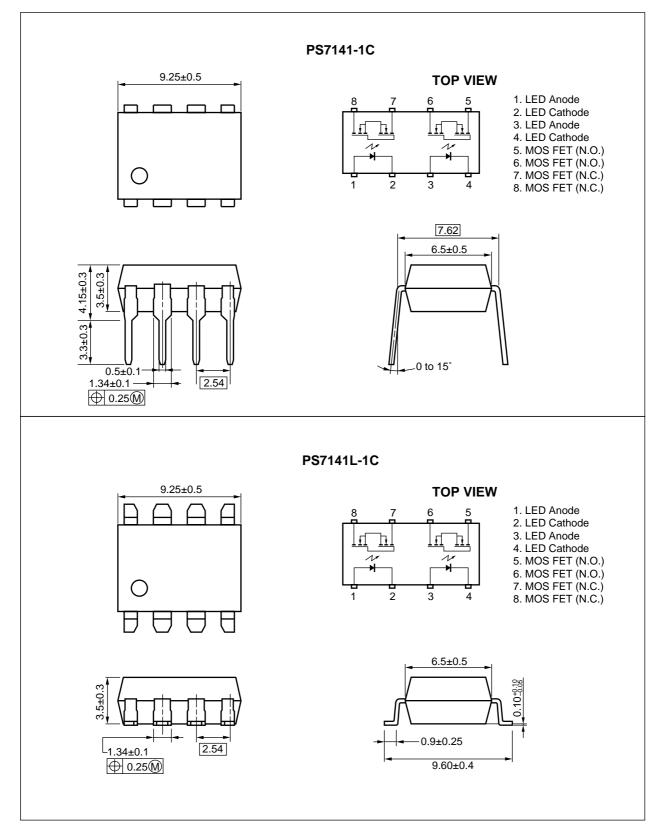
#### **APPLICATIONS**

- Exchange equipment
- Measurement equipment
- FA/OA equipment

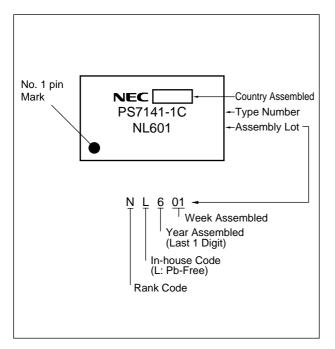
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The revised points can be easily searched by copying an "<R>" in the PDF file and specifying it in the "Find what:" field.

# PACKAGE DIMENSIONS (in millimeters)



# <R> MARKING EXAMPLE



# <R> ORDERING INFORMATION

Part Number	Order Number	Solder Plating Specification	Packing Style	Safety Standard Approval	Application Part Number <sup>*1</sup>
PS7141-1C	PS7141-1C-A	Pb-Free	Magazine case 50 pcs	Standard products	PS7141-1C
PS7141L-1C	PS7141L-1C-A			(UL, BSI, CSA	
PS7141L-1C-E3	PS7141L-1C-E3-A		Embossed Tape 1 000 pcs/reel	approved)	
PS7141L-1C-E4	PS7141L-1C-E4-A				

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

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

Parameter		Symbol	Ratings	Unit
Diode	Forward Current (DC)	lF	50	mA/ch
	Reverse Voltage	VR	5.0	V
	Power Dissipation	PD	50	mW/ch
	Peak Forward Current *1	IFP	1	A/ch
MOS FET	Break Down Voltage	VL	400	V
	Continuous Load Current	lı.	150	mA/ch
	Pulse Load Current <sup>*2</sup> (AC/DC Connection)	LP	300	mA/ch
	Power Dissipation	Po	375	mW/ch
Isolation Voltage *3		BV	1 500	Vr.m.s.
Total Power Dissipation		Рт	850	mW
Operating Ambient Temperature		TA	-40 to +85	°C
Storage Temperature		Tstg	-40 to +100	°C

\***1** PW = 100 *µ*s, Duty Cycle = 1%

\*2 PW = 100 ms, 1 shot

\*3 AC voltage for 1 minute at  $T_A = 25^{\circ}C$ , RH = 60% between input and output Pins 1-4 shorted together, 5-8 shorted together.

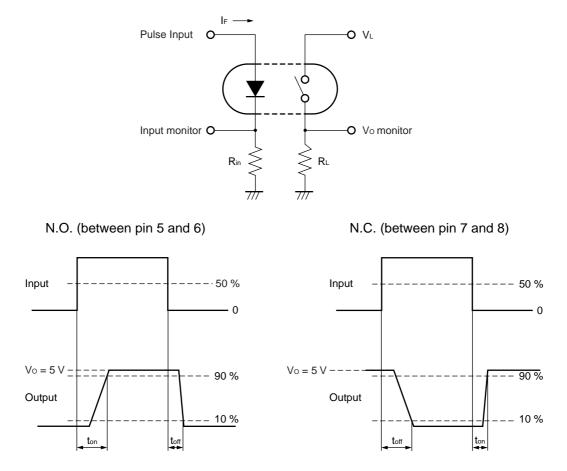
# **RECOMMENDED OPERATING CONDITIONS (TA = 25°C)**

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
LED Operating Current	lF	2	10	20	mA
LED Off Voltage	VF	0		0.5	V

# ELECTRICAL CHARACTERISTICS (TA = 25°C)

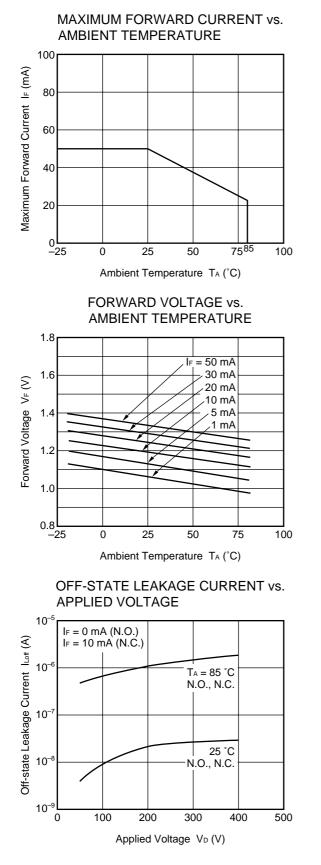
Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	VF	IF = 10 mA		1.2	1.4	V
	Reverse Current	IR	V <sub>R</sub> = 5 V			5.0	μA
MOS FET	Off-state Leakage Current	ILoff	N.O.: IF = 0 mA, VD = 400 V		0.03	1.0	μA
			N.C.: IF = 10 mA, VD = 400 V				
	Output Capacitance	Cout	N.O.: V <sub>D</sub> = 0 V, f = 1 MHz		65		pF/ch
			N.C.: V <sub>D</sub> = 0 V, f = 1 MHz, I <sub>F</sub> = 10 mA		185		
Coupled	LED On-state Current	lFon	N.O.: I∟ = 150 mA			2.0	mA
	LED Off-state Current	Foff	N.C.: I∟ = 150 mA			2.0	mA
	On-state Resistance	Ron1	N.O.: IF = 10 mA, IL = 10 mA		20	30	Ω
			N.C.: IF = 0 mA, IL = 10 mA		24	30	
		Ron2	N.O.: IF = 10 mA, IL = 150 mA, t $\leq$ 10 ms		16	25	
			N.C.: IF = 0 mA, IL = 150 mA, t $\leq$ 10 ms		16	25	
	Turn-on Time *1, 2	ton (N.O.)	$I_F$ = 10 mA, Vo = 5 V, RL = 500 Ω,		0.33	1.0	ms
		ton (N.C.)	PW ≥ 10 ms		0.02	0.2	
	Turn-off Time *1, 2	toff (N.O.)			0.03	0.2	
		toff (N.C.)			0.20	1.0	
	Isolation Resistance	Ri-o	VI-O = 1.0 kVDC	10 <sup>9</sup>			Ω
	Isolation Capacitance	CI-O	V = 0 V, f = 1 MHz		1.1		pF/ch

\*1 Test Circuit for Switching Time

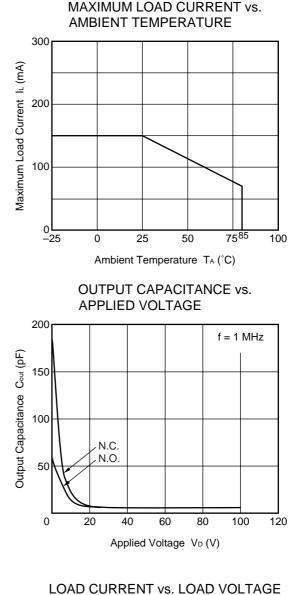


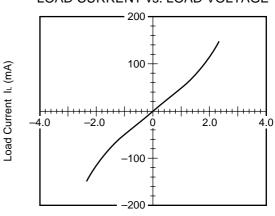
<R> \*2 The turn-on time and turn-off time are specified as input-pulse width ≥ 10 ms. Be aware that when the device operates with an input-pulse width less than 10 ms, the turn-on time and turn-off time will increase.

# TYPICAL CHARACTERISTICS (TA = 25°C, unless otherwise specified)





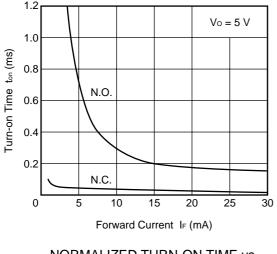




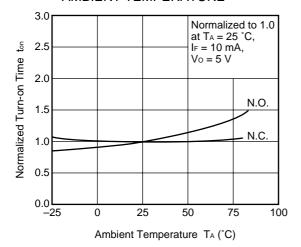
Load Voltage VL (V)

Data Sheet PN10280EJ02V0DS

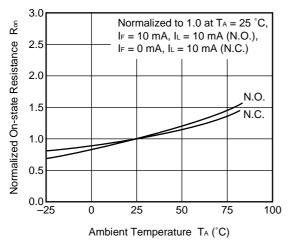






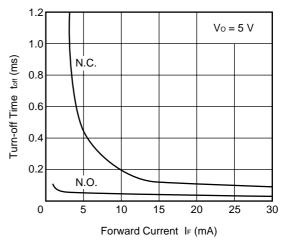


NORMALIZED ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE

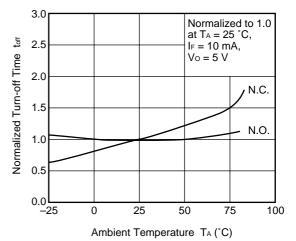


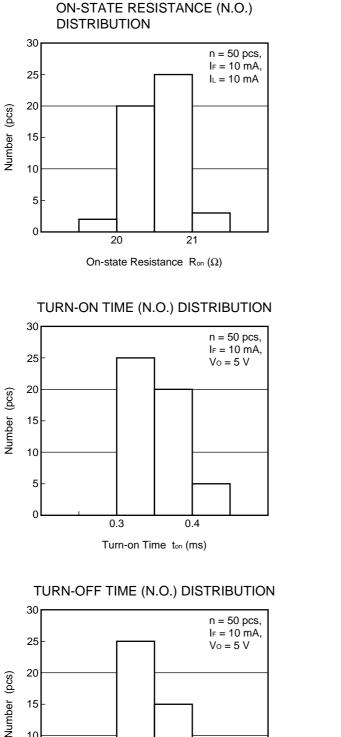
Remark The graphs indicate nominal characteristics.

TURN-OFF TIME vs. FORWARD CURRENT

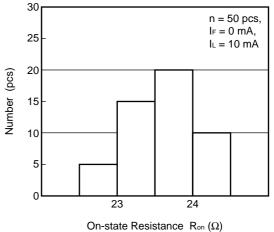


NORMALIZED TURN-OFF TIME vs. AMBIENT TEMPERATURE

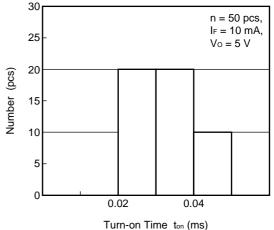




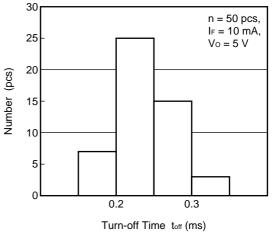
# **ON-STATE RESISTANCE (N.C.)** DISTRIBUTION



### TURN-ON TIME (N.C.) DISTRIBUTION



#### TURN-OFF TIME (N.C.) DISTRIBUTION



Remark The graphs indicate nominal characteristics.

Turn-off Time toff (ms)

0.05

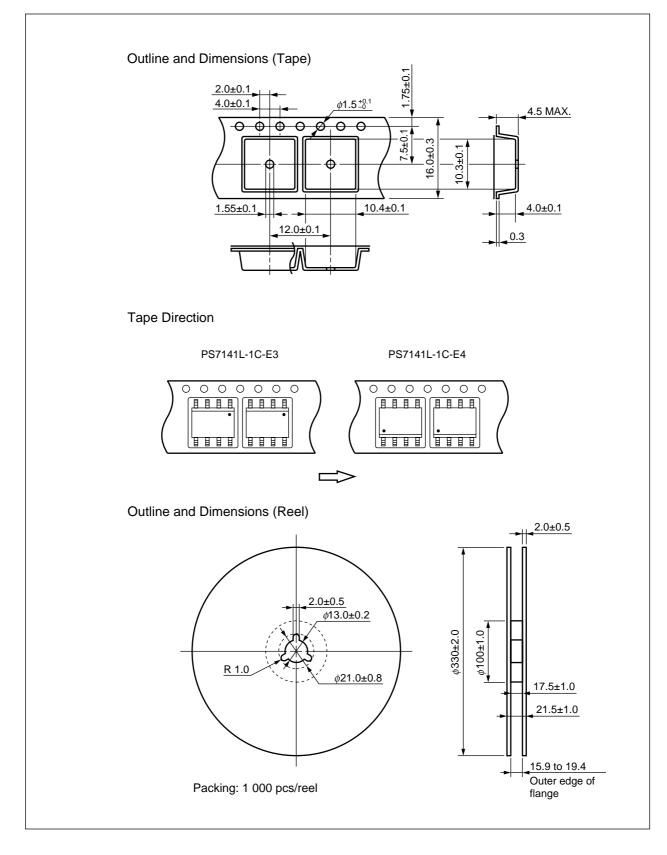
0.03

10

5

0

# **TAPING SPECIFICATIONS (in millimeters)**



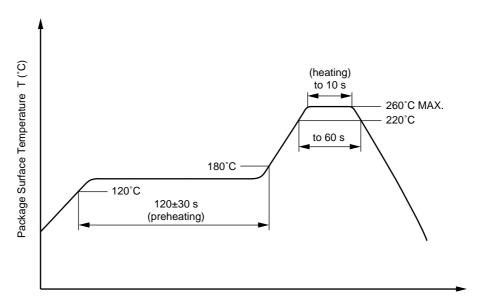
# **RECOMMENDED SOLDERING CONDITIONS**

- (1) Infrared reflow soldering
  - Peak reflow temperature
  - Time of peak reflow temperature
  - Time of temperature higher than 220°C
  - Time to preheat temperature from 120 to 180°C
  - Number of reflows
  - Flux

260°C or below (package surface temperature) 10 seconds or less 60 seconds or less 120±30 s Three 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



Time (s)

#### (2) Wave soldering

<ul> <li>Temperature</li> </ul>	260°C or below (molten solder temperature)
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- 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.)

#### <R> (3) Soldering by soldering iron

I amount of chlorine (The flux with a
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  $100^{\circ}$ 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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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.
	<ol> <li>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> </ol>
	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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