

To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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PS7241E-1A

4-PIN SOP 400 V BREAK DOWN VOLTAGE NORMALLY OPEN TYPE 1-ch Optical Coupled MOS FET

–NEPOC Series–

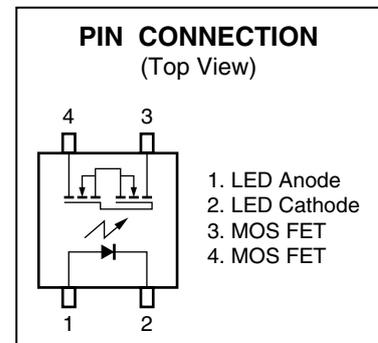
DESCRIPTION

The PS7241E-1A is an optically coupled element that combines a GaAs infrared LED on the input side with a normally-open MOS FET on the output side to realize an excellent cost performance.

The small, thin package and high sensitivity of this element makes it ideal for battery-driven mobile devices, and its small offset voltage at power-on and good linearity are also make it suitable for controlling micro analog signals.

FEATURES

- Small and thin package (4-pin SOP, Height = 2.1 mm)
- 1 channel type (1 a output)
- Designed for AC/DC switching line changer
- Low offset voltage
- <R> • Ordering number of taping product: PS7241E-1A-E3, E4: 900 pcs/reel
: PS7241E-1A-F3, F4: 3 500 pcs/reel
- Pb-Free product
- Safety standards
 - UL approved: No. E72422
 - BSI approved: No. 8241/8242

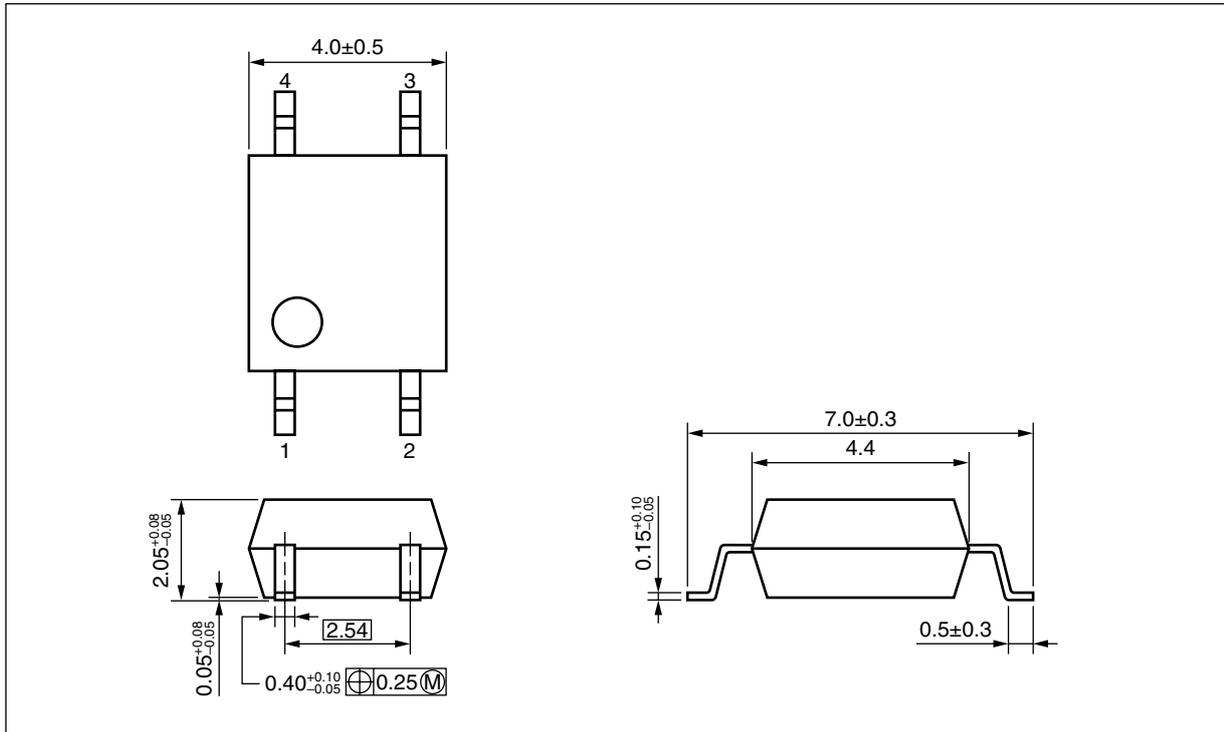


APPLICATIONS

- Laptop PC, PDA
- Modem card
- Telephone, FAX
- Measurement equipment

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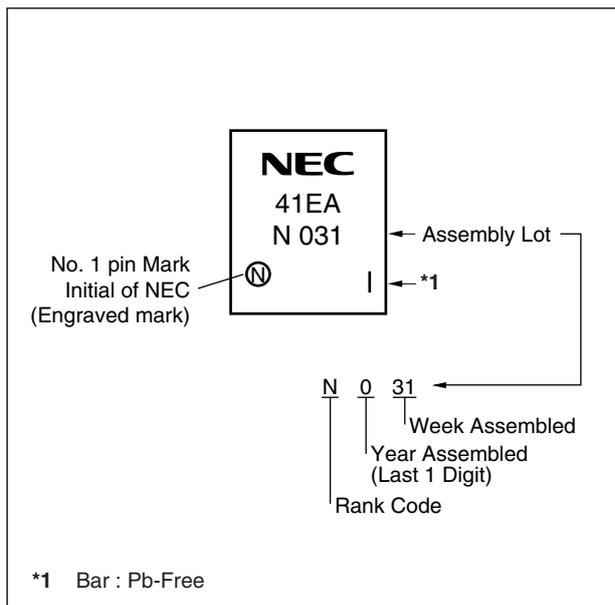
PACKAGE DIMENSIONS (UNIT: mm)



<R> PHOTOCOUPLER CONSTRUCTION

Parameter	Unit (MIN.)
Air Distance	5 mm
Outer Creepage Distance	5 mm
Isolation Distance	0.4 mm

<R> MARKING EXAMPLE



ORDERING INFORMATION

Part Number	Order Number	Solder Plating Specification	Packing Style	Safety Standard Approval	Application Part Number ¹
PS7241E-1A	PS7241E-1A-A	Pb-Free	Magazine case 100 pcs	Standard products (UL, BSI approved)	PS7241E-1A
PS7241E-1A-E3	PS7241E-1A-E3-A		Embossed Tape 900 pcs/reel		
PS7241E-1A-E4	PS7241E-1A-E4-A				
PS7241E-1A-F3	PS7241E-1A-F3-A		Embossed Tape 3 500 pcs/reel		
PS7241E-1A-F4	PS7241E-1A-F4-A				

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

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	5.0	V
	Power Dissipation	P _D	50	mW
	Peak Forward Current ^{*1}	I _{FP}	1	A
MOS FET	Break Down Voltage	V _L	400	V
	Continuous Load Current	I _L	120	mA
	Pulse Load Current ^{*2} (AC/DC Connection)	I _{LP}	240	mA
	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	°C
Storage Temperature		T _{stg}	-40 to +100	°C

*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	10	20	mA
LED Off Voltage	V _F	0		0.5	V

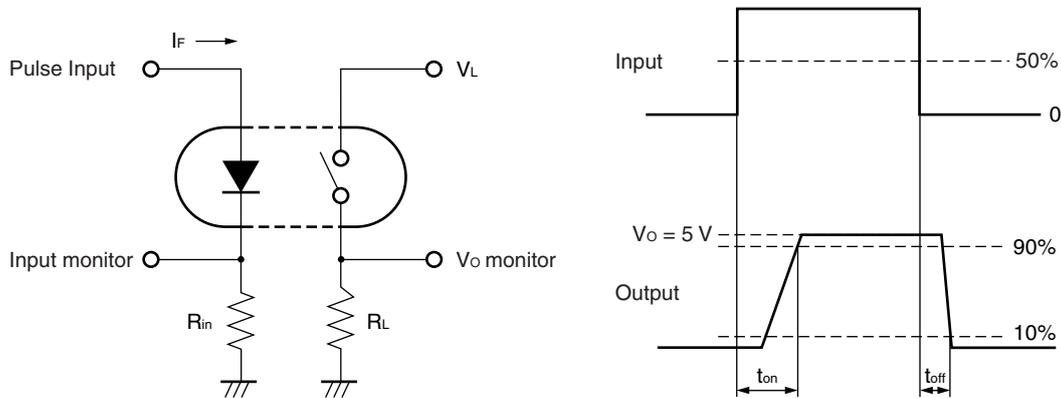
ELECTRICAL CHARACTERISTICS (T_A = 25°C)

<R>

<R>

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V _F	I _F = 10 mA		1.2	1.4	V
	Reverse Current	I _R	V _R = 5 V			5.0	μA
MOS FET	Off-state Leakage Current	I _{Loff}	V _D = 400 V			1.0	μA
	Output Capacitance	C _{out}	V _D = 0 V, f = 1 MHz		50		pF
Coupled	LED On-state Current	I _{Fon}	I _L = 120 mA			4.0	mA
	On-state Resistance	R _{on1}	I _F = 10 mA, I _L = 10 mA		22	30	Ω
		R _{on2}	I _F = 10 mA, I _L = 120 mA, t ≤ 10 ms		17	23	
	Turn-on Time ^{*1,2}	t _{on}	I _F = 10 mA, V _O = 5 V, R _L = 500 Ω,		0.5	1.0	ms
	Turn-off Time ^{*1,2}	t _{off}	PW ≥ 10 ms		0.07	0.2	
	Isolation Resistance	R _{I-O}	V _{I-O} = 1.0 kV _{DC}		10 ⁹		Ω
Isolation Capacitance	C _{I-O}	V = 0 V, f = 1 MHz			0.5	pF	

***1 Test Circuit for Switching Time**

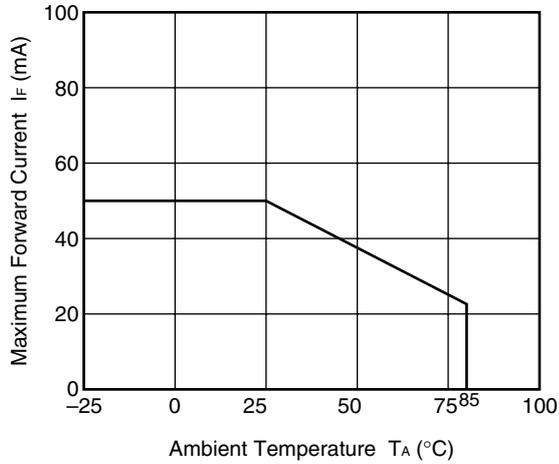


***2** The turn-on time and turn-off time are specified as input-pulse width ≥ 10 ms.

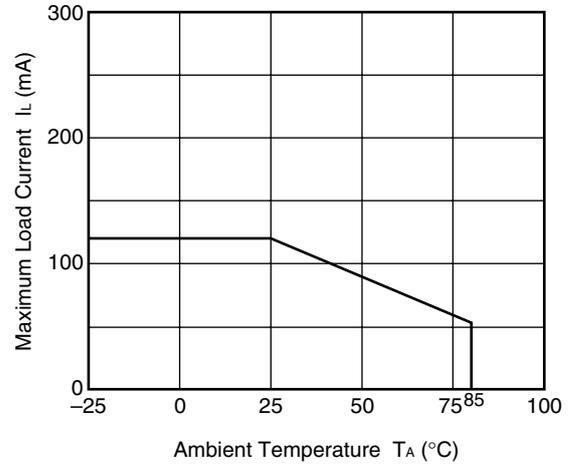
Be aware that when the device operates with an input-pulse width less than 10 ms, the turn-on time and turn-off time will increase.

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

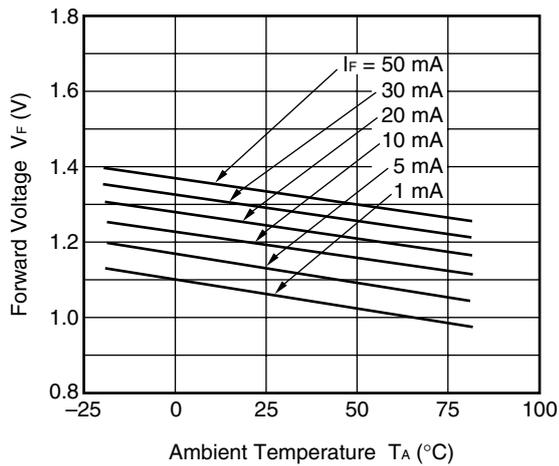
MAXIMUM FORWARD CURRENT vs. AMBIENT TEMPERATURE



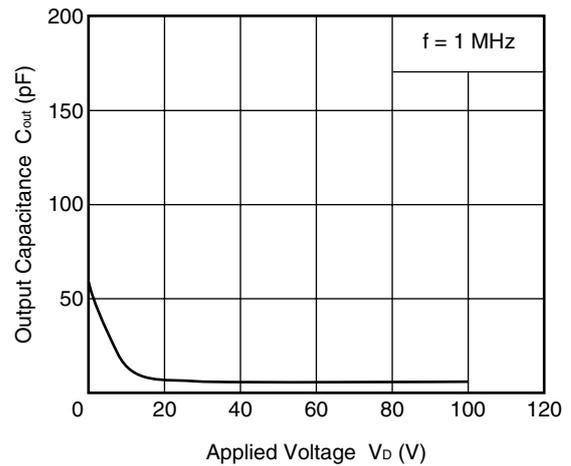
MAXIMUM LOAD CURRENT vs. AMBIENT TEMPERATURE



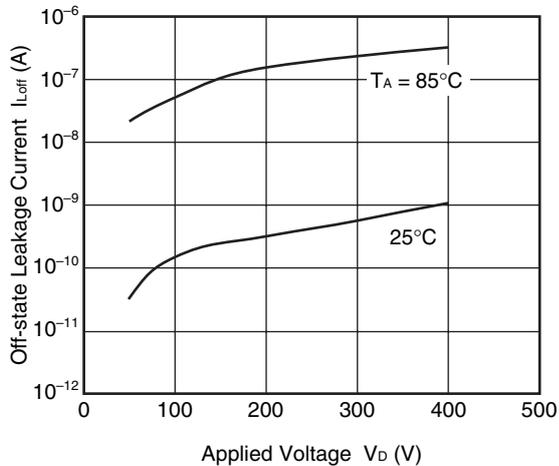
FORWARD VOLTAGE vs. AMBIENT TEMPERATURE



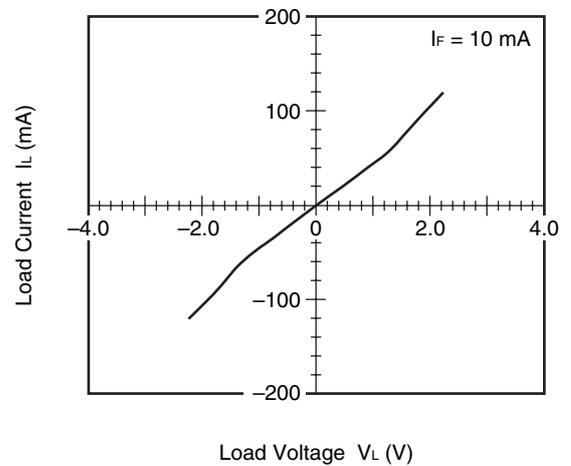
OUTPUT CAPACITANCE vs. APPLIED VOLTAGE



OFF-STATE LEAKAGE CURRENT vs. APPLIED VOLTAGE

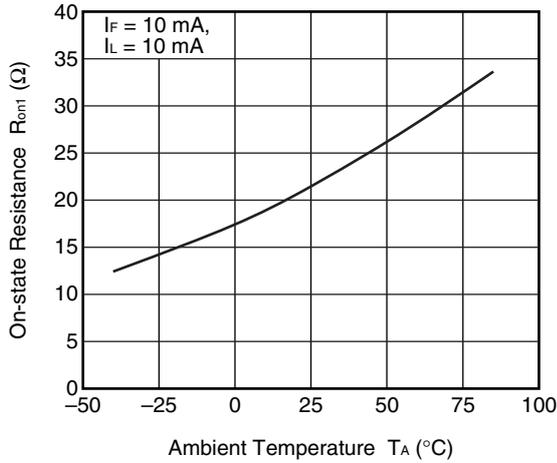


LOAD CURRENT vs. LOAD VOLTAGE

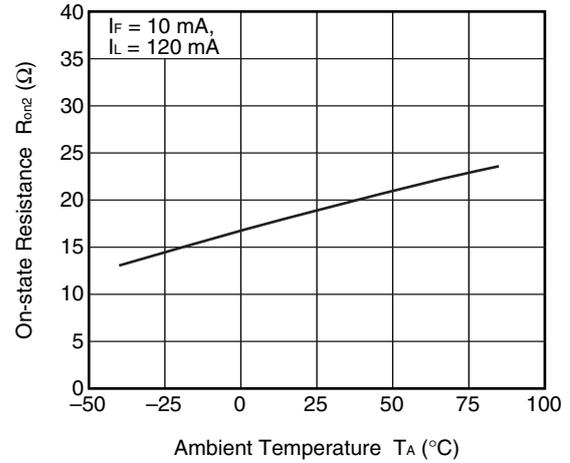


Remark The graphs indicate nominal characteristics.

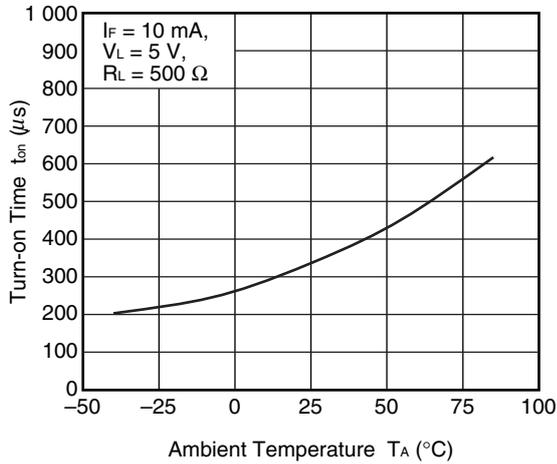
ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE



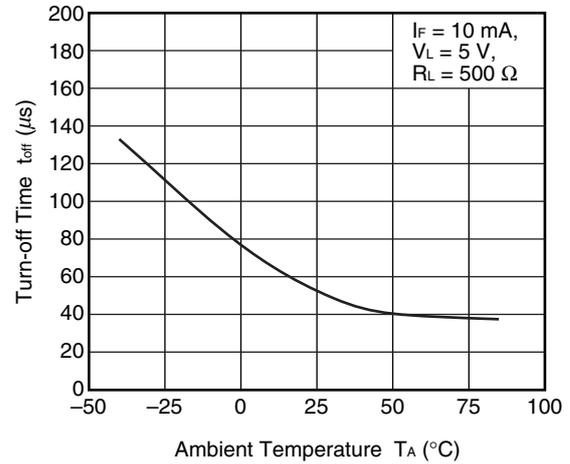
ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE



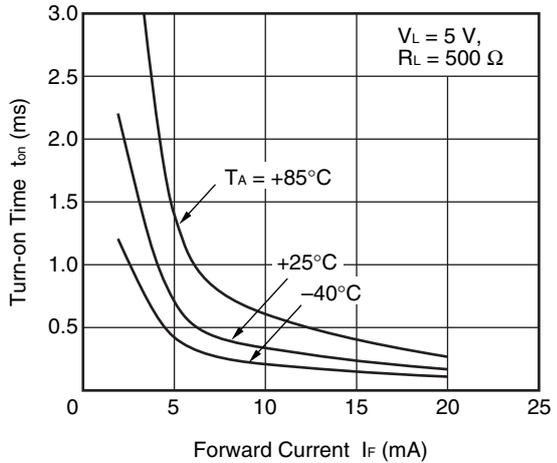
TURN-ON TIME vs. AMBIENT TEMPERATURE



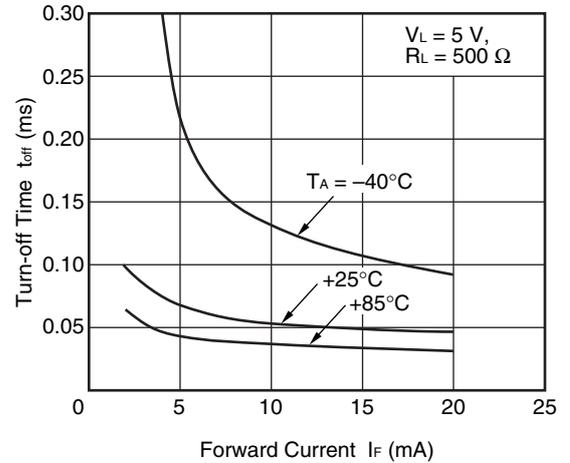
TURN-OFF TIME vs. AMBIENT TEMPERATURE



TURN-ON TIME vs. FORWARD CURRENT

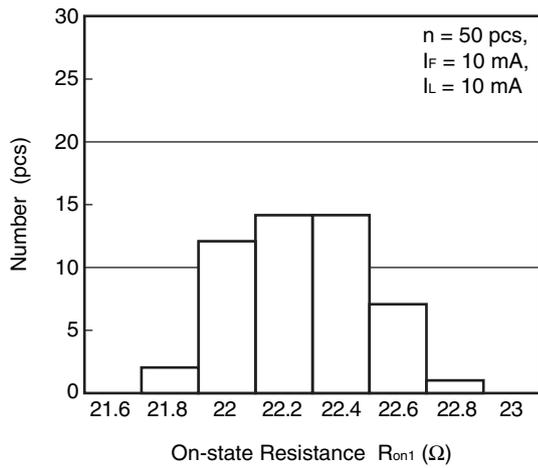


TURN-OFF TIME vs. FORWARD CURRENT

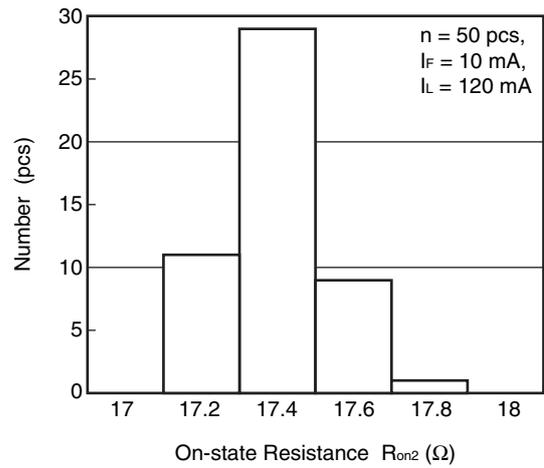


Remark The graphs indicate nominal characteristics.

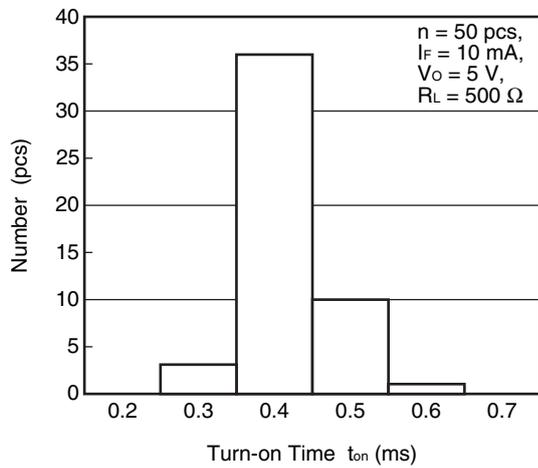
ON-STATE RESISTANCE DISTRIBUTION



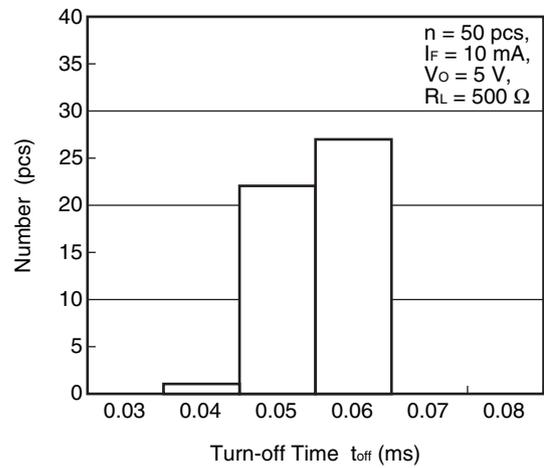
ON-STATE RESISTANCE DISTRIBUTION



TURN-ON TIME DISTRIBUTION



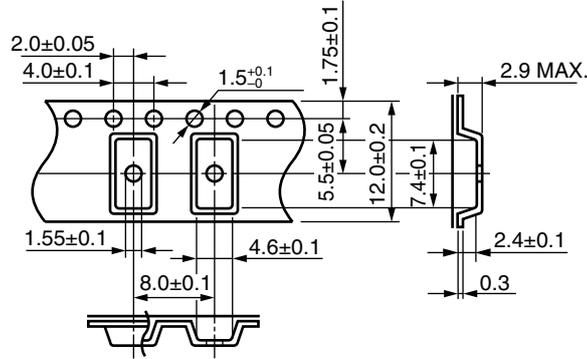
TURN-OFF TIME DISTRIBUTION



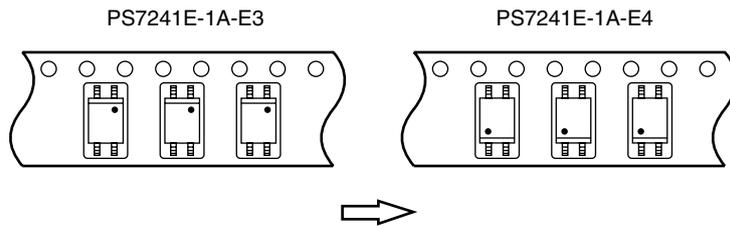
Remark The graphs indicate nominal characteristics.

TAPING SPECIFICATIONS (in millimeters)

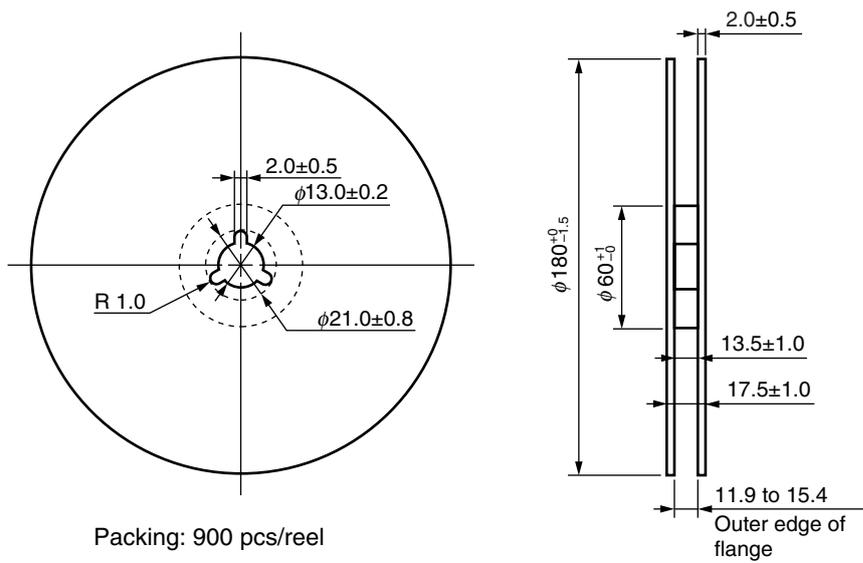
Outline and Dimensions (Tape)



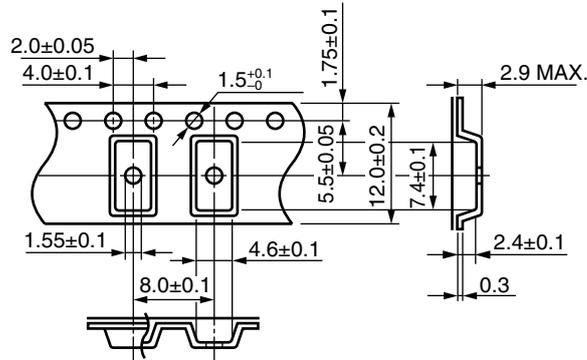
Tape Direction



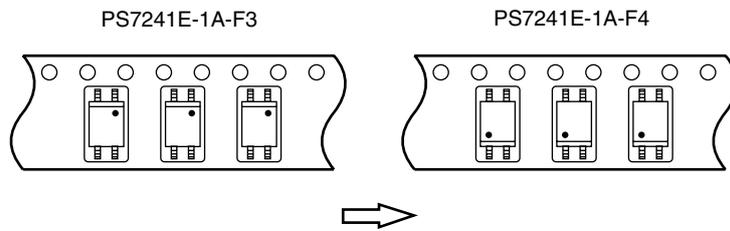
Outline and Dimensions (Reel)



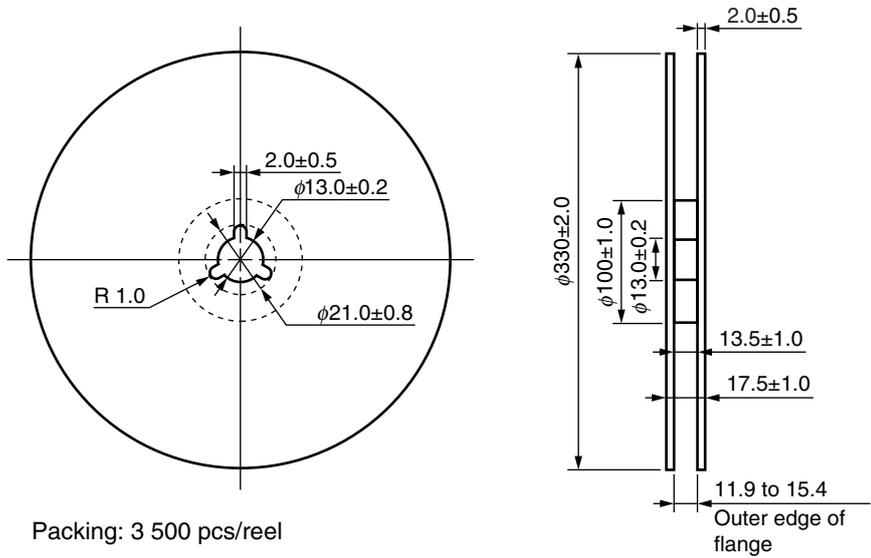
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)

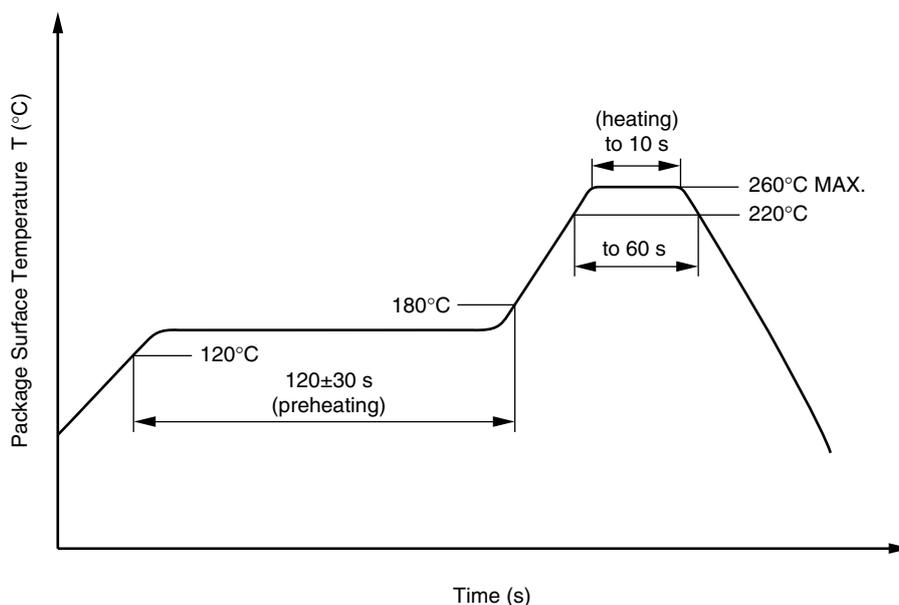


RECOMMENDED SOLDERING CONDITIONS

(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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M8E0904E

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