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[CEL \(California Eastern Laboratories\)](#)

[PS7241E-1B-A](#)

For any questions, you can email us directly:

sales@integrated-circuit.com

**Solid State Relay
OCMOS FET**

PS7241E-1B

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

-NEPOC Series-

DESCRIPTION

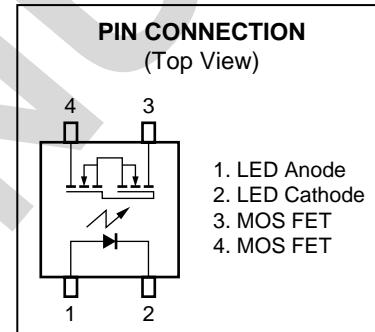
The PS7241E-1B is an optically coupled element that combines a GaAs infrared LED on the input side with a normally close MOS FET on the output side to realize an excellent cost performance.

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 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 b output)
- Low LED operating current ($I_F = 3$ mA)
- Designed for AC/DC switching line changer
- Low offset voltage
- Ordering number of taping product: PS7241E-1B-E3, E4, F3, F4
- Pb-Free product
- Safety standards
 - UL approved: File No. E72422
 - BSI approved: File No. 8241/8242

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APPLICATIONS

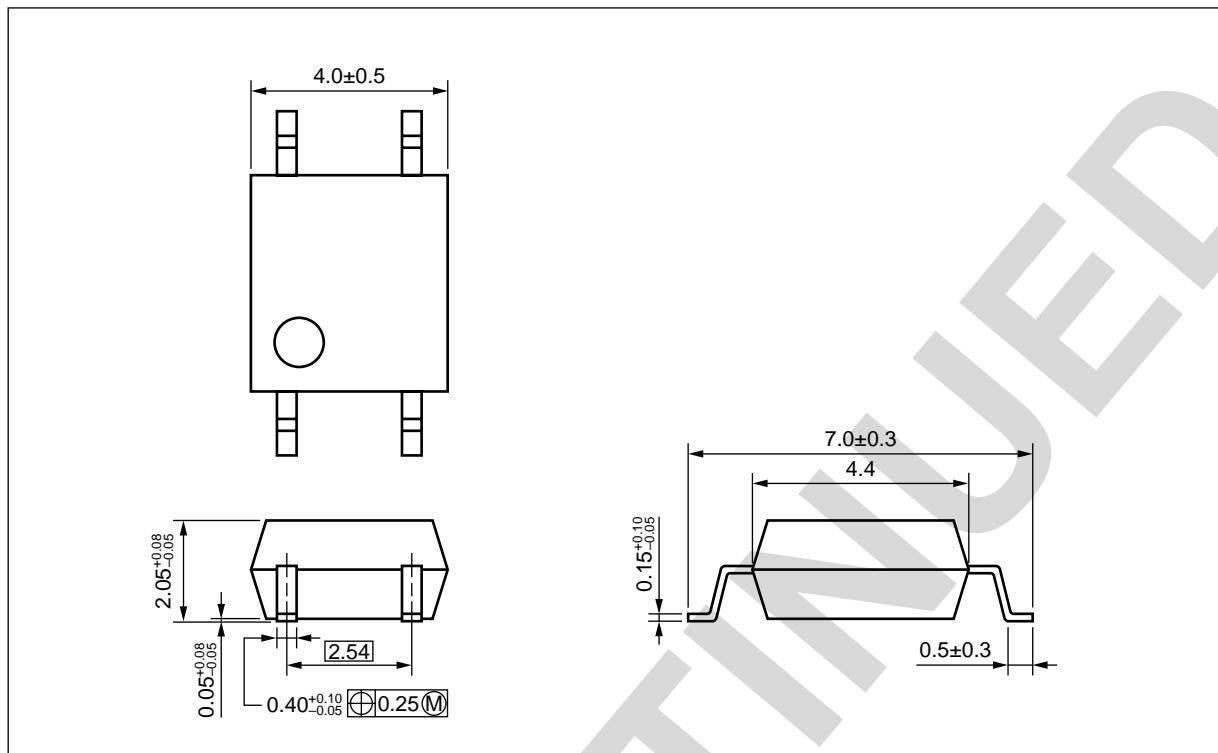
- Laptop PC, PDA
- Modem card
- Telephone, FAX
- Measurement equipment

The information in this document is subject to change without notice. Before using this document, please confirm that this is the latest version.

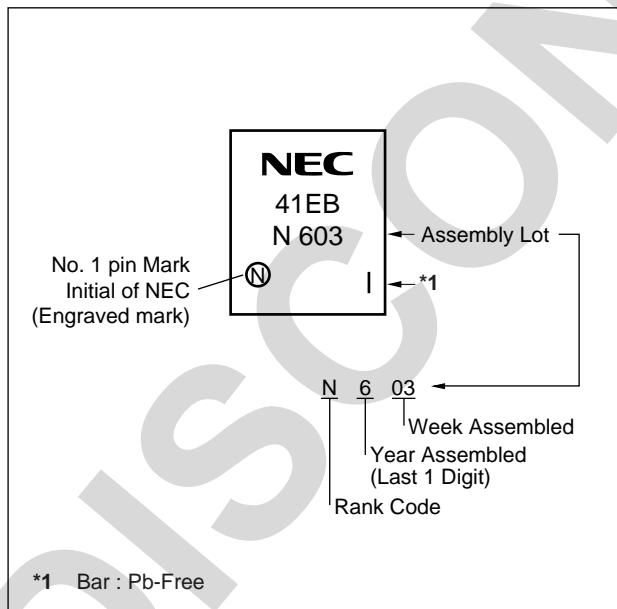
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PS7241E-1B

PACKAGE DIMENSIONS (UNIT: mm)



MARKING EXAMPLE



CEL California Eastern Laboratories

PS7241E-1B

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ORDERING INFORMATION

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

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PS7241E-1B

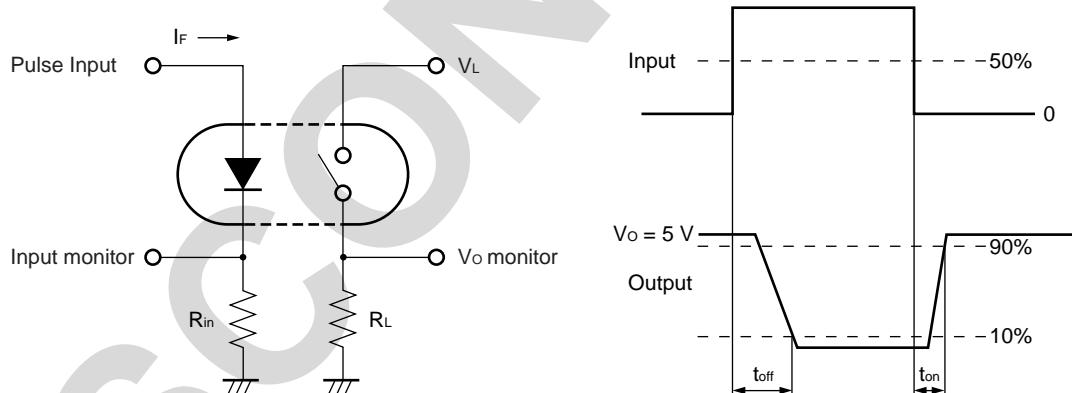
RECOMMENDED OPERATING CONDITIONS ($T_A = 25^\circ\text{C}$)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
LED Operating Current	I_F	3	10	20	mA
LED Off Voltage	V_F	0		0.5	V

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

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V_F $I_F = 10 \text{ mA}$		1.2	1.4	V
	Reverse Current	I_R $V_R = 5 \text{ V}$			5.0	μA
MOS FET	Off-state Leakage Current	I_{Loff} $I_F = 10 \text{ mA}, V_D = 400 \text{ V}$		0.03	1.0	μA
	Output Capacitance	C_{out} $I_F = 10 \text{ mA}, V_D = 0 \text{ V}, f = 1 \text{ MHz}$		206		pF
Coupled	LED Off-state Current	I_{Loff} $I_L = 120 \text{ mA}$			3.0	mA
	On-state Resistance	R_{on1} $I_F = 0 \text{ mA}, I_L = 10 \text{ mA}$		22	35	Ω
		R_{on2} $I_F = 0 \text{ mA}, I_L = 120 \text{ mA}, t \leq 10 \text{ ms}$		17	24	
	Turn-on Time ^{*1,2}	t_{on} $I_F = 10 \text{ mA}, V_o = 5 \text{ V}, R_L = 500 \Omega,$		0.07	0.2	ms
	Turn-off Time ^{*1,2}	t_{off} $PW \geq 10 \text{ ms}$		1.0	3.0	
	Isolation Resistance	R_{i-o} $V_{i-o} = 1.0 \text{ kVdc}$	10^9			Ω
	Isolation Capacitance	C_{i-o} $V = 0 \text{ V}, f = 1 \text{ MHz}$		0.5		pF

*1 Test Circuit for Switching Time



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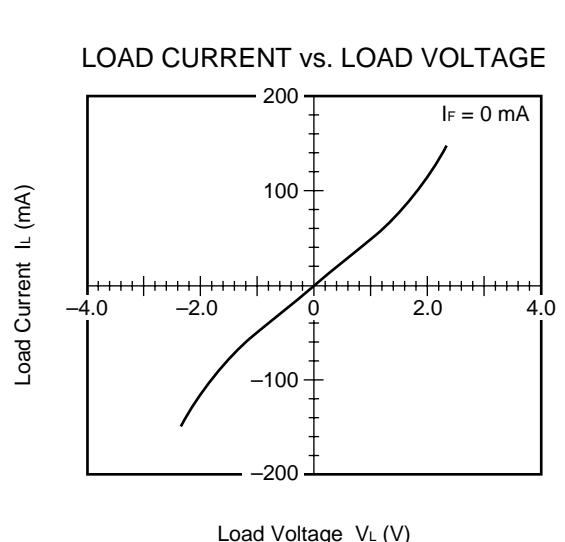
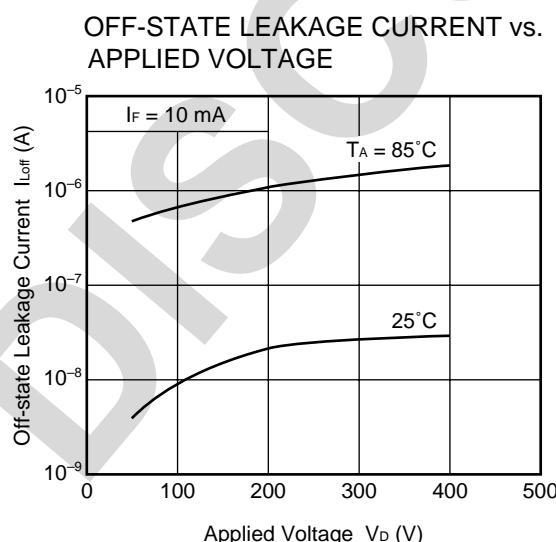
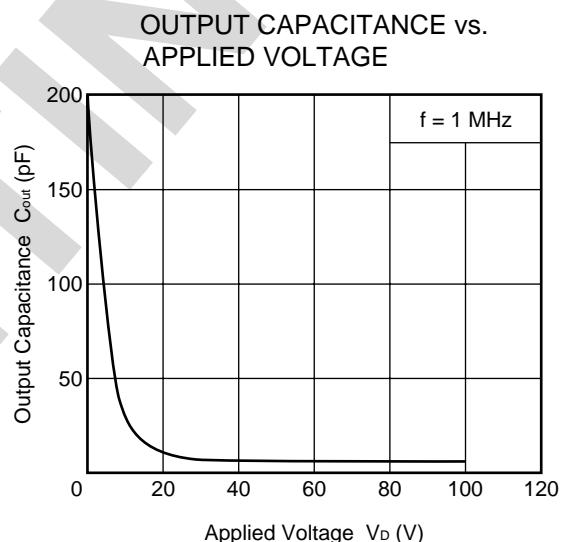
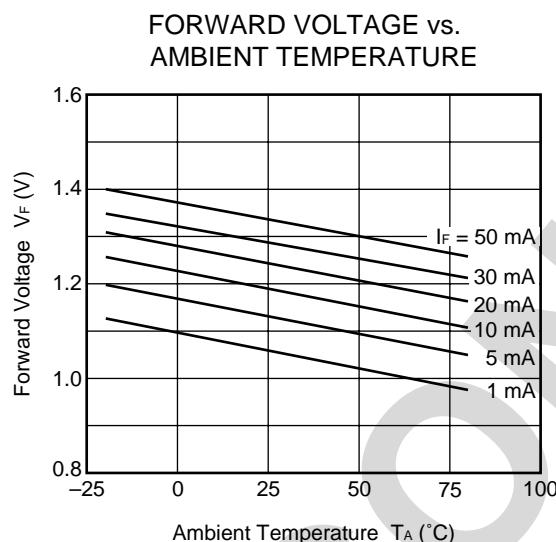
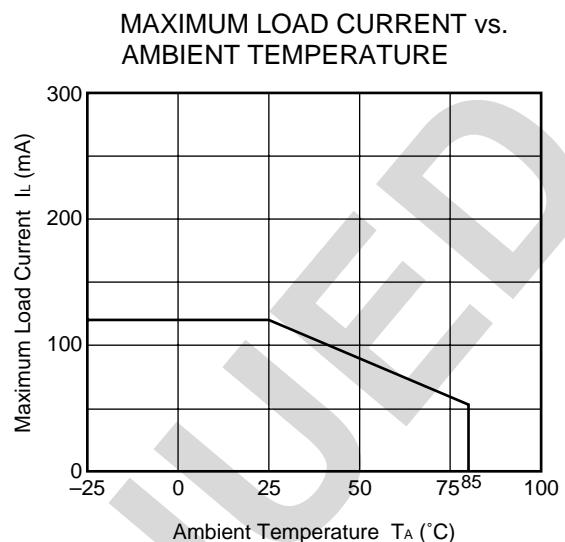
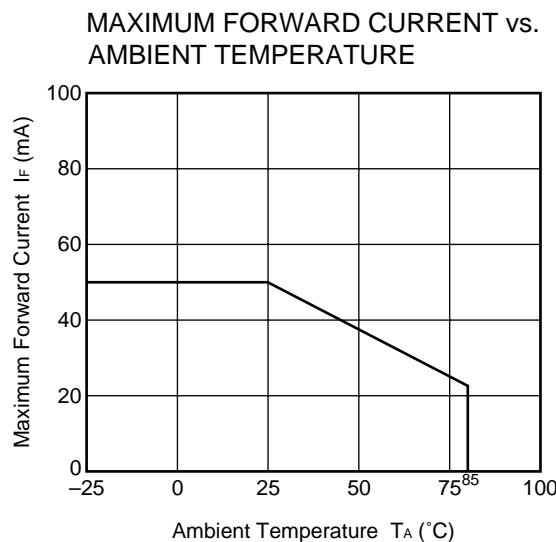
*2 The turn-on time and turn-off time are specified as input-pulse width $\geq 10 \text{ ms}$.

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.

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PS7241E-1B

<R> **TYPICAL CHARACTERISTICS (TA = 25°C, unless otherwise specified)**

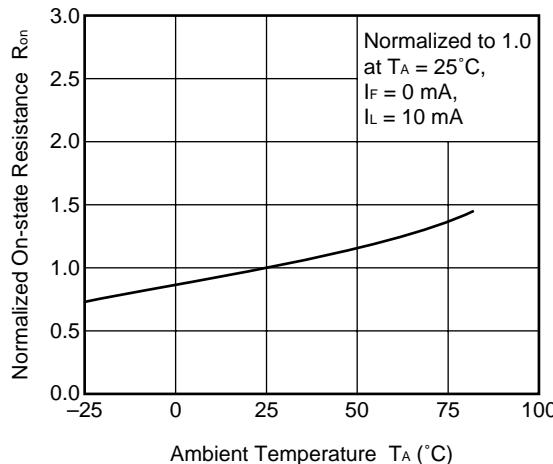


Remark The graphs indicate nominal characteristics.

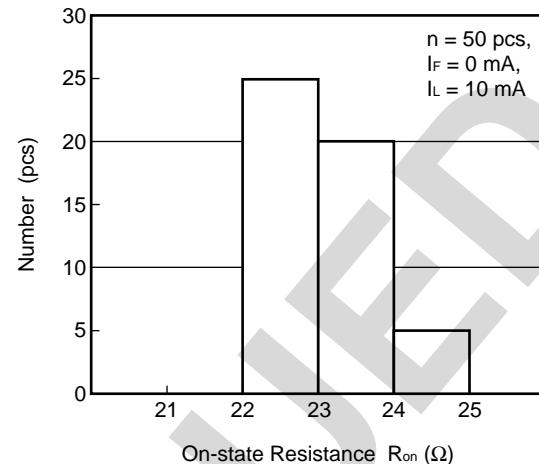
CEL California Eastern Laboratories

PS7241E-1B

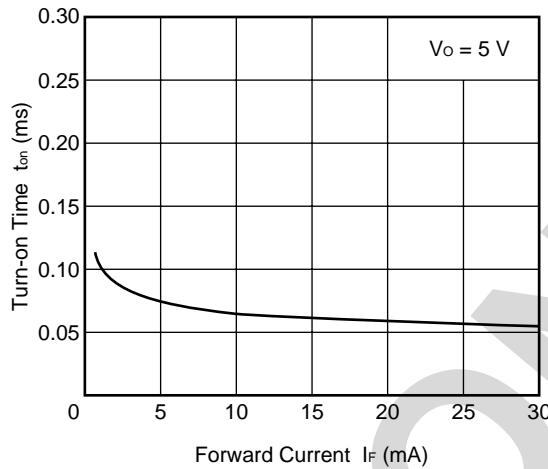
**NORMALIZED ON-STATE RESISTANCE vs.
AMBIENT TEMPERATURE**



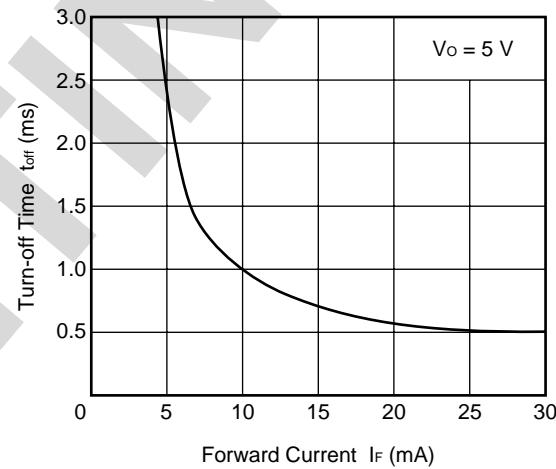
ON-STATE RESISTANCE DISTRIBUTION



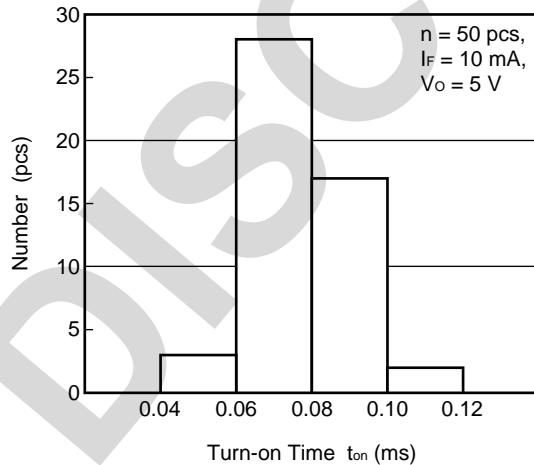
TURN-ON TIME vs. FORWARD CURRENT



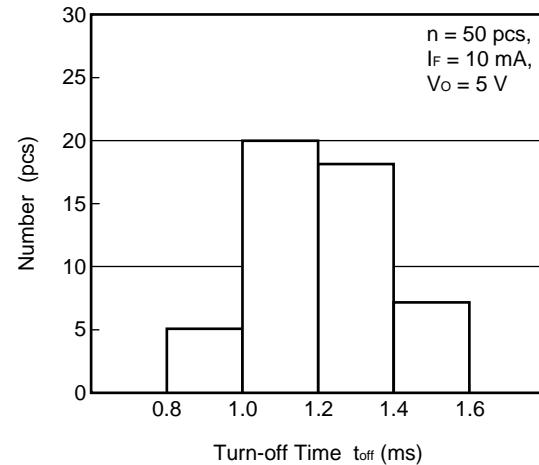
TURN-OFF TIME vs. FORWARD CURRENT



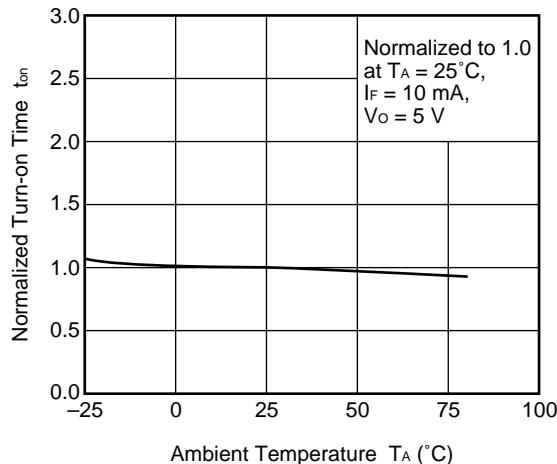
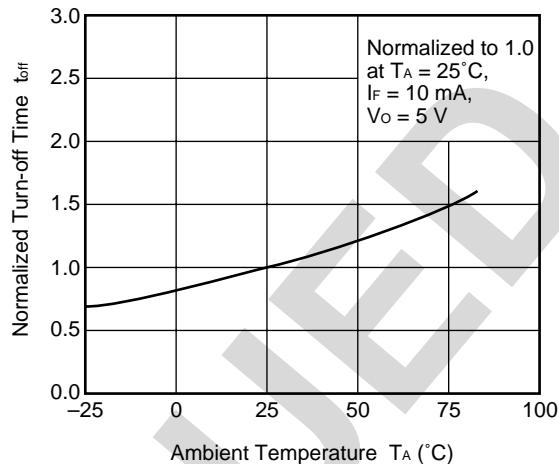
TURN-ON TIME DISTRIBUTION



TURN-OFF TIME DISTRIBUTION



Remark The graphs indicate nominal characteristics.

CEL California Eastern Laboratories**PS7241E-1B**NORMALIZED TURN-ON TIME vs.
AMBIENT TEMPERATURENORMALIZED TURN-OFF TIME vs.
AMBIENT TEMPERATURE

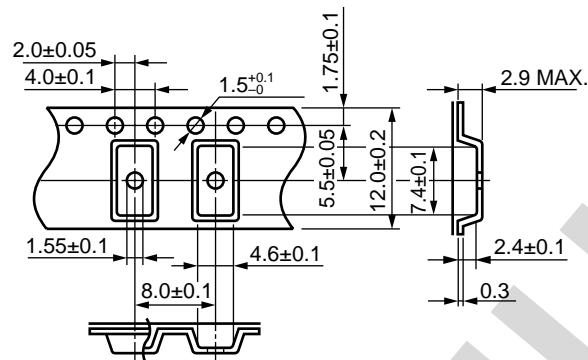
Remark The graphs indicate nominal characteristics.

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PS7241E-1B

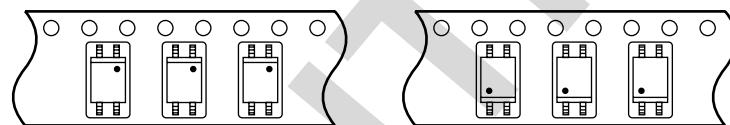
TAPING SPECIFICATIONS (in millimeters)

Outline and Dimensions (Tape)

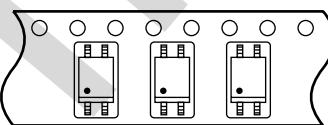


Tape Direction

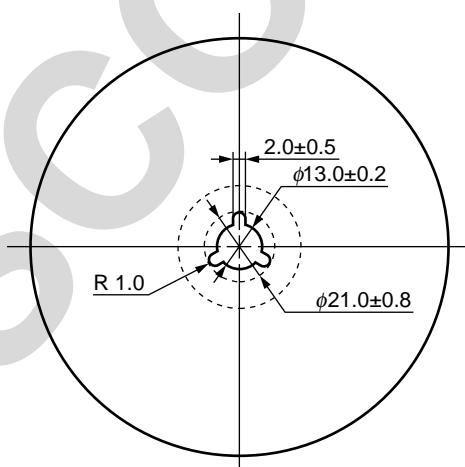
PS7241E-1B-E3



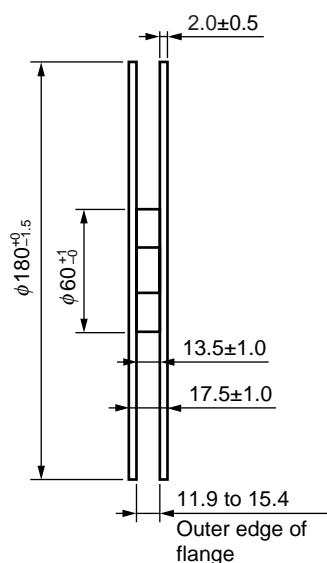
PS7241E-1B-E4



Outline and Dimensions (Reel)



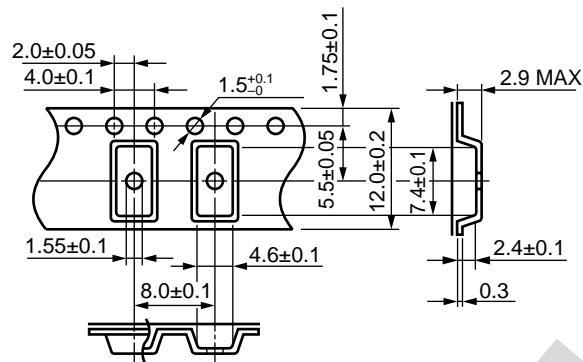
Packing: 900 pcs/reel



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PS7241E-1B

Outline and Dimensions (Tape)



Tape Direction

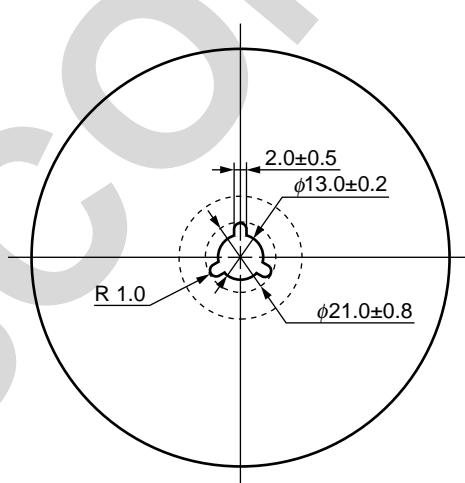
PS7241E-1B-F3



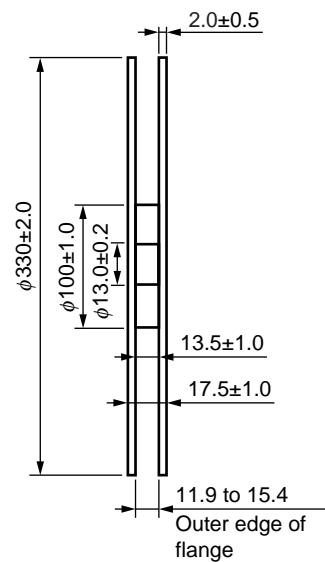
PS7241E-1B-F4



Outline and Dimensions (Reel)



Packing: 3 500 pcs/reel

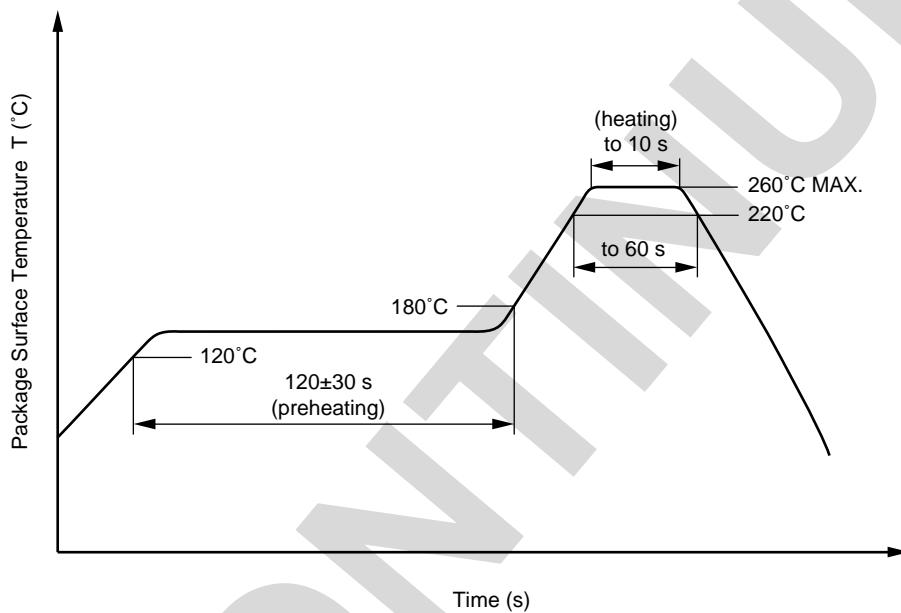


RECOMMENDED SOLDERING CONDITIONS

(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.)

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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.

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USAGE CAUTIONS

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

DISCONTINUED

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CEL California Eastern Laboratories**PS7241E-1B****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.

►For further information, please contact**NEC Compound Semiconductor Devices Hong Kong Limited**

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Subject: Compliance with EU Directives

CEL certifies, to its knowledge, that semiconductor and laser products detailed below are compliant with the requirements of European Union (EU) Directive 2002/95/EC Restriction on Use of Hazardous Substances in electrical and electronic equipment (RoHS) and the requirements of EU Directive 2003/11/EC Restriction on Penta and Octa BDE.

CEL Pb-free products have the same base part number with a suffix added. The suffix -A indicates that the device is Pb-free. The -AZ suffix is used to designate devices containing Pb which are exempted from the requirement of RoHS directive (*). In all cases the devices have Pb-free terminals. All devices with these suffixes meet the requirements of the RoHS directive.

This status is based on CEL's understanding of the EU Directives and knowledge of the materials that go into its products as of the date of disclosure of this information.

Restricted Substance per RoHS	Concentration Limit per RoHS (values are not yet fixed)	Concentration contained in CEL devices	
Lead (Pb)	< 1000 PPM	-A	-AZ
		Not Detected	(*)
Mercury	< 1000 PPM	Not Detected	
Cadmium	< 100 PPM	Not Detected	
Hexavalent Chromium	< 1000 PPM	Not Detected	
PBB	< 1000 PPM	Not Detected	
PBDE	< 1000 PPM	Not Detected	

If you should have any additional questions regarding our devices and compliance to environmental standards, please do not hesitate to contact your local representative.

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