



Solid State Relay
OCMOS FET

PS7802-1A

4-PIN ULTRA SMALL FLAT-LEAD, LOW OUTPUT CAPACITANCE 1-ch Optical Coupled MOS FET

—NEPOC Series—

DESCRIPTION

The PS7802-1A 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.

An ultra small flat-lead package has been provided which realizes a reduction in mounting area of about 50% compared with the PS72xx series.

It is suitable for high-frequency signal control, due to its low $C \times R$, low output capacitance, and low off-state leakage current.

FEATURES

- Ultra small flat-lead package (4.2 (L) $\times$ 2.5 (W) $\times$ 1.85 (H) mm)
- Low $C \times R$ ($C \times R = 12.6 \text{ pF} \cdot \Omega$)
- Low on-state resistance ($R_{on} = 1.1 \Omega$ TYP.)
- High pass characteristics (ERT = 45 ps TYP.)
- 1 channel type (1 a output)
- Designed for AC/DC switching line changer
- Low offset voltage
- Ordering number of taping product: PS7802-1A-F3, F4: 3 500 pcs/reel
- Pb-Free product
- Safety standards
 - UL approved: File No. E72422

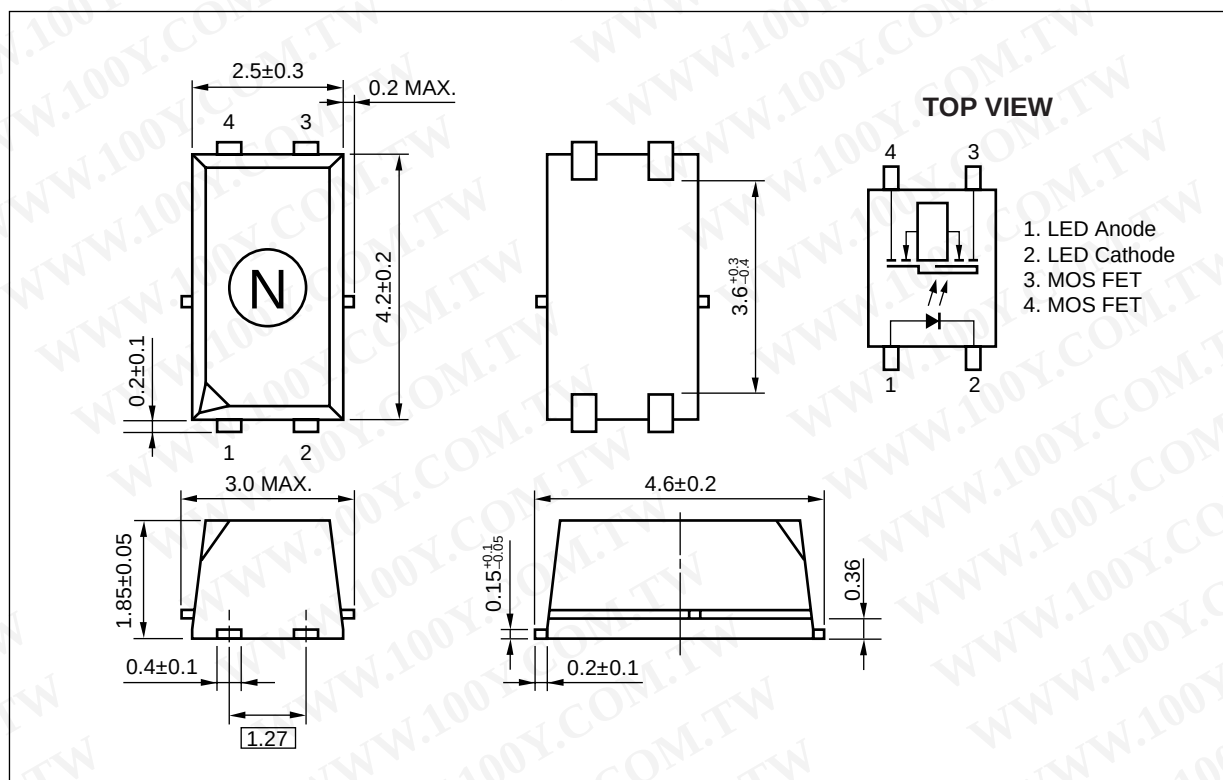
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APPLICATIONS

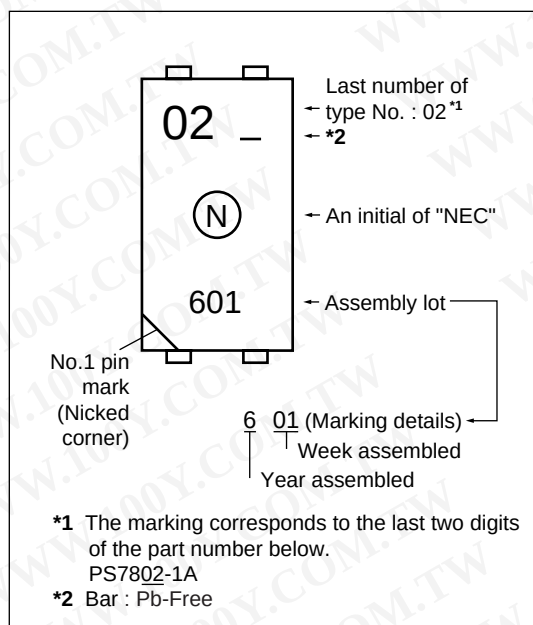
- Measurement equipment

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PACKAGE DIMENSIONS (UNIT: mm)



<R> MARKING EXAMPLE



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<R> ORDERING INFORMATION

Part Number	Order Number	Solder Plating Specification	Packing Style	Safety Standard Approval	Application Part Number ^{*1}
PS7802-1A	PS7802-1A-A	Pb-Free	50 pcs (Tape 50 pcs cut)	Standard products (UL approved)	PS7802-1A
PS7802-1A-F3	PS7802-1A-F3-A		Embossed Tape 3 500 pcs/reel		
PS7802-1A-F4	PS7802-1A-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	40	V
	Continuous Load Current	I _L	250	mA
	Pulse Load Current ^{*2} (AC/DC Connection)	I _{LP}	500	mA
	Power Dissipation	P _D	100	mW
Isolation Voltage ^{*3}		BV	500	Vr.m.s.
Total Power Dissipation		P _T	150	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)

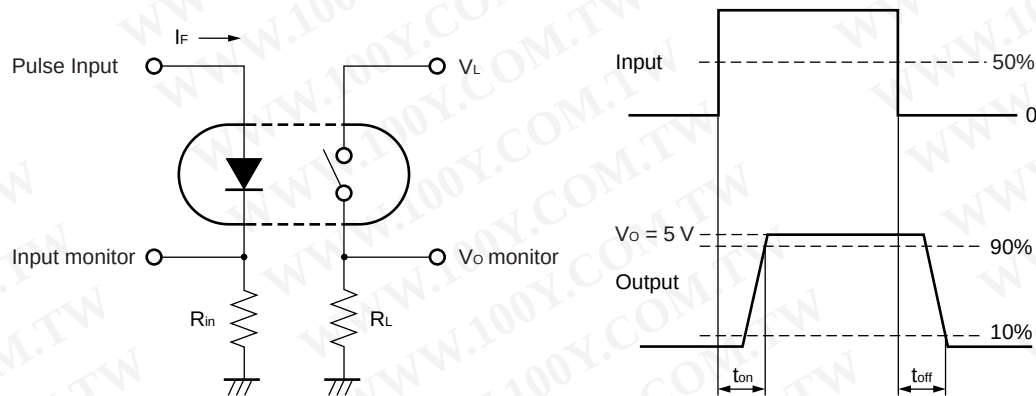
Parameter	Symbol	MIN.	TYP.	MAX.	Unit
LED Operating Current	I _F	2	5	20	mA
LED Off Voltage	V _F	0		0.5	V

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

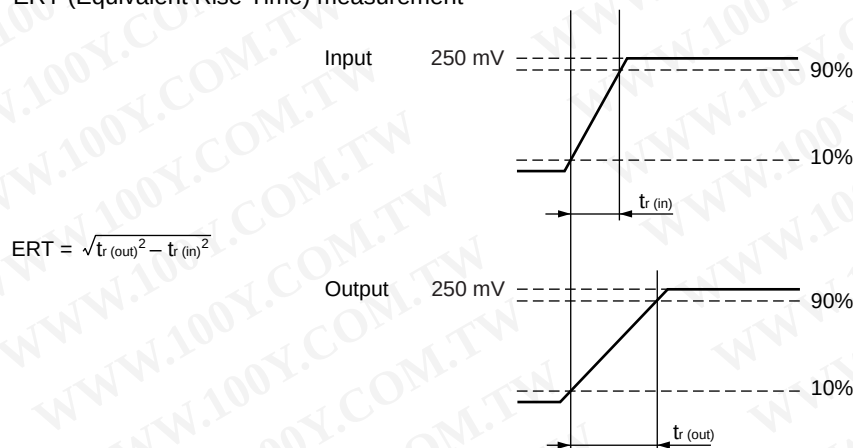
Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V_F	$I_F = 5\text{ mA}$		1.1	1.4	V
	Reverse Current	I_R	$V_R = 5\text{ V}$			5.0	μA
MOS FET	Off-state Leakage Current	I_{loff}	$V_D = 40\text{ V}$		0.1	10	nA
	Output Capacitance	C_{out}	$V_D = 0\text{ V}, f = 1\text{ MHz}$		11.5		pF
Coupled	On-state Resistance	R_{on}	$I_F = 5\text{ mA}, I_L = 250\text{ mA}$		1.1	1.6	Ω
	Turn-on Time ^{*1,2}	t_{on}	$I_F = 5\text{ mA}, V_O = 5\text{ V}, R_L = 500\text{ }\Omega,$ $PW \geq 10\text{ ms}$		0.1	0.5	ms
	Turn-off Time ^{*1,2}	t_{off}			0.08	0.50	
	Isolation Resistance	$R_{\text{I-O}}$	$V_{\text{I-O}} = 0.5\text{ kV}_{\text{DC}}$	10^9			Ω
	Isolation Capacitance	$C_{\text{I-O}}$	$V = 0\text{ V}, f = 1\text{ MHz}$		0.3		pF
	Equivalent Rise Time ^{*3}	ERT	$I_F = 10\text{ mA}, t_{\text{r(in)}} = 25.0\text{ ps},$ $V = 250\text{ mV}, 50\text{ }\Omega$ termination		45		ps

*1 Test Circuit for Switching Time

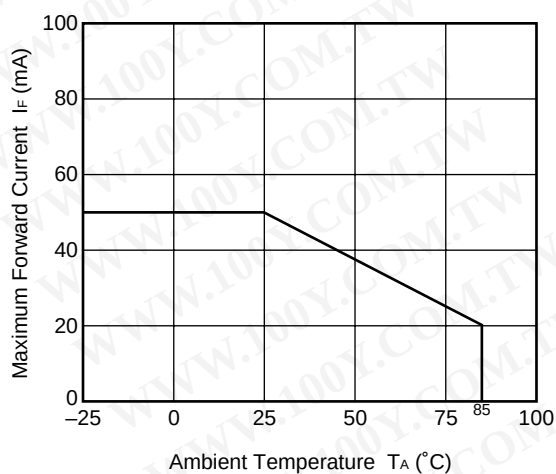
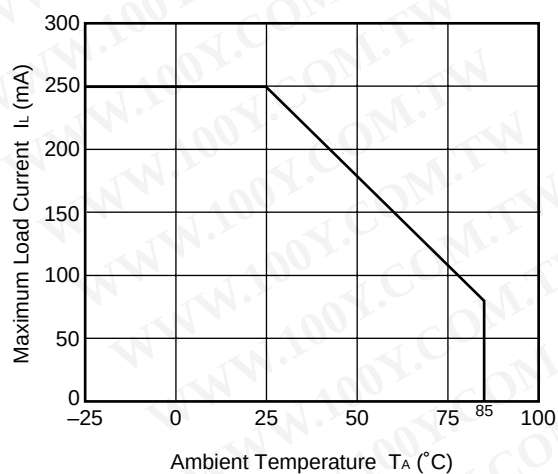
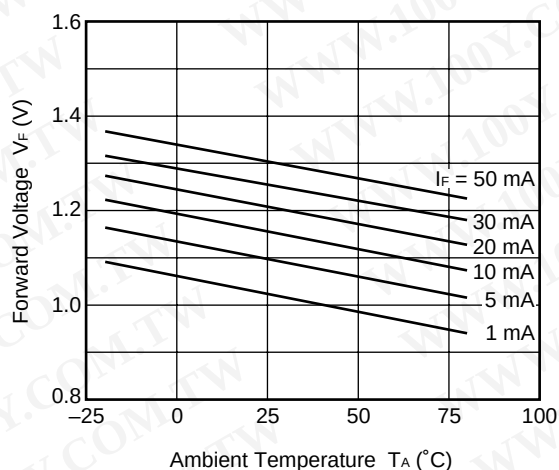
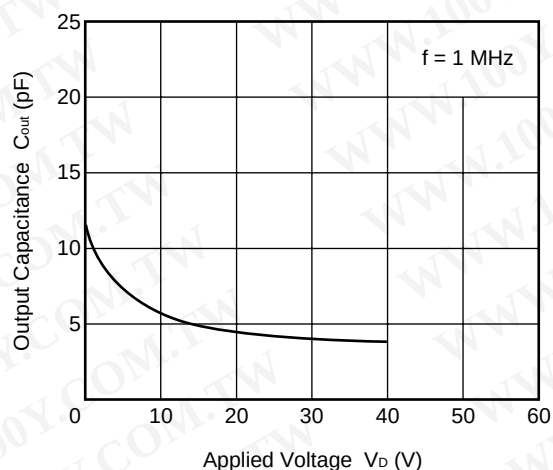
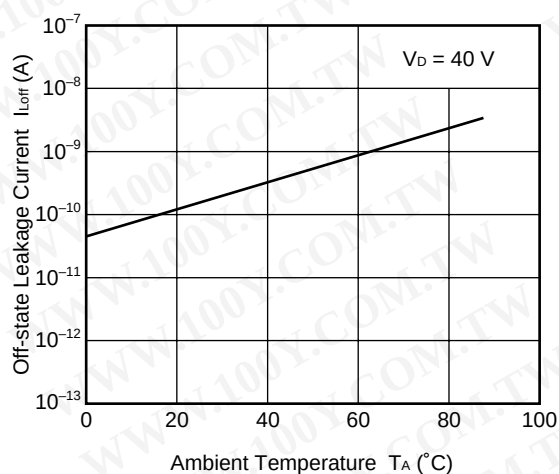
*2 The turn-on time and turn-off time are specified as input-pulse width $\geq 10\text{ ms}$.

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.

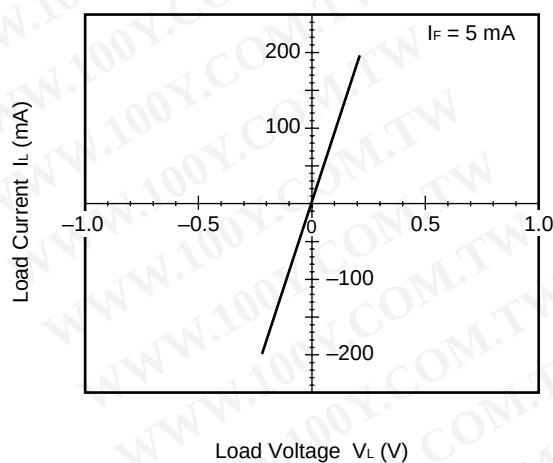
*3 ERT (Equivalent Rise Time) measurement



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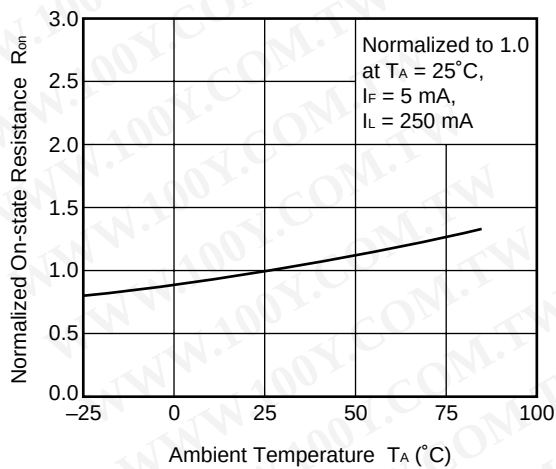
TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise specified)MAXIMUM FORWARD CURRENT vs.
AMBIENT TEMPERATUREMAXIMUM LOAD CURRENT vs.
AMBIENT TEMPERATUREFORWARD VOLTAGE vs.
AMBIENT TEMPERATUREOUTPUT CAPACITANCE vs.
APPLIED VOLTAGEOFF-STATE LEAKAGE CURRENT vs.
AMBIENT TEMPERATURE

LOAD CURRENT vs. LOAD VOLTAGE

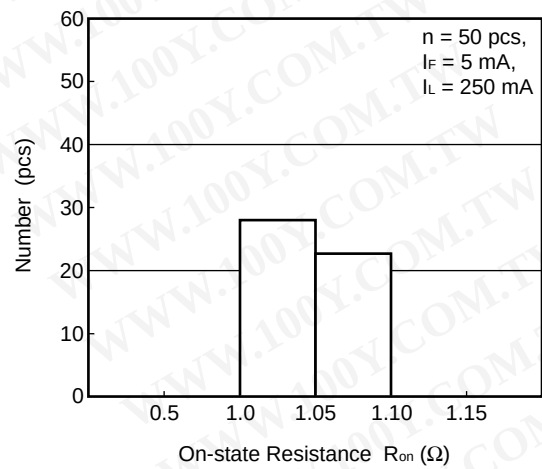


Remark The graphs indicate nominal characteristics.

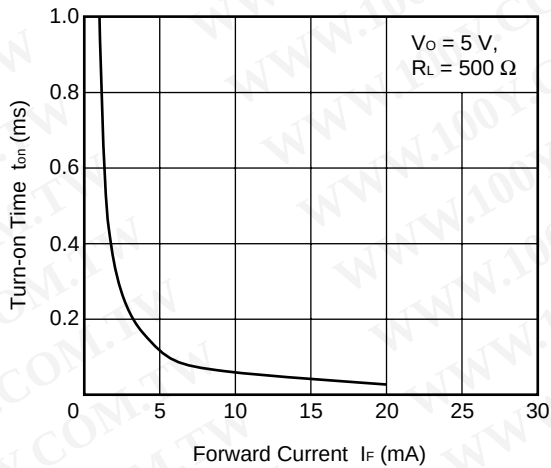
NORMALIZED ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE



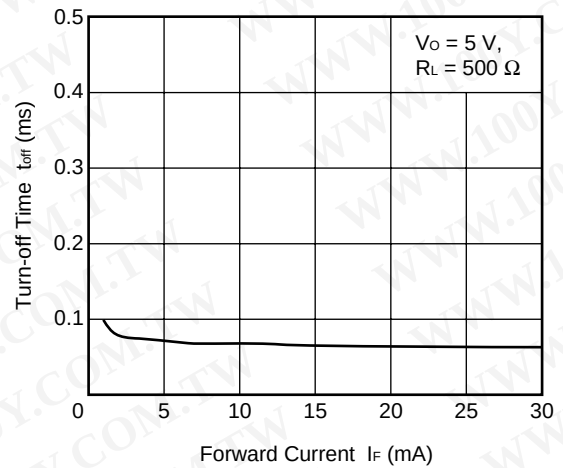
ON-STATE RESISTANCE DISTRIBUTION



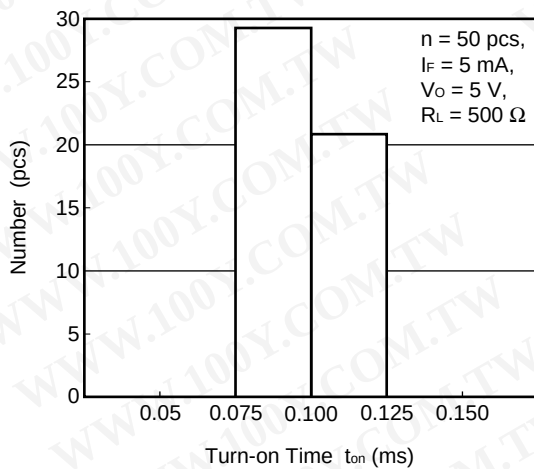
TURN-ON TIME vs. FORWARD CURRENT



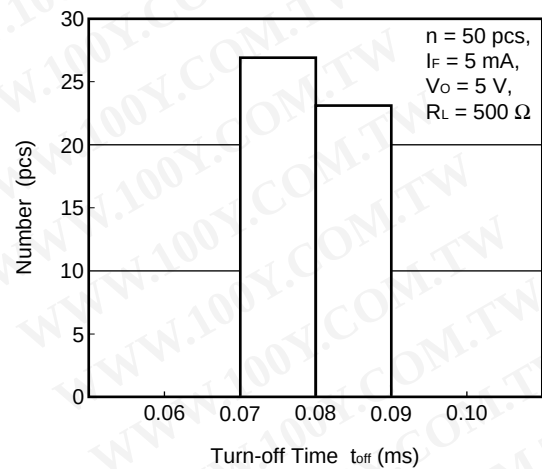
TURN-OFF TIME vs. FORWARD CURRENT



TURN-ON TIME DISTRIBUTION

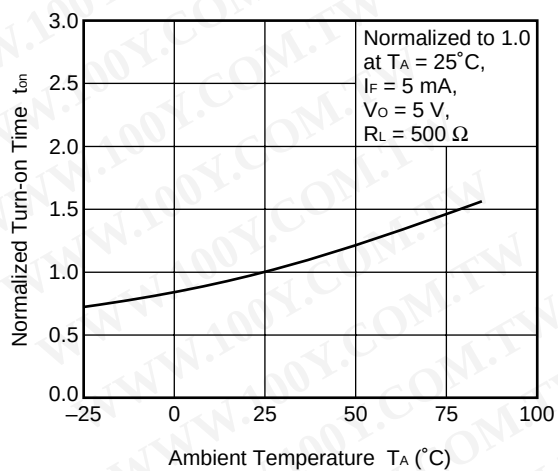
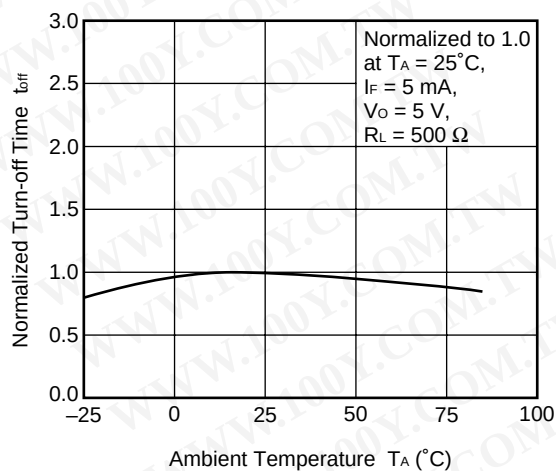


TURN-OFF TIME DISTRIBUTION



Remark The graphs indicate nominal characteristics.

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NORMALIZED TURN-ON TIME vs.
AMBIENT TEMPERATURENORMALIZED TURN-OFF TIME vs.
AMBIENT TEMPERATURE

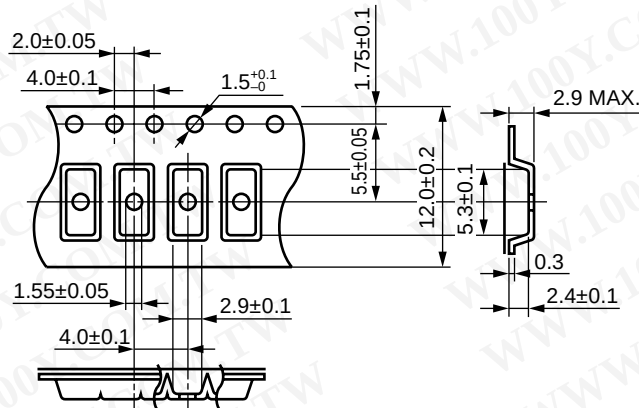
Remark The graphs indicate nominal characteristics.

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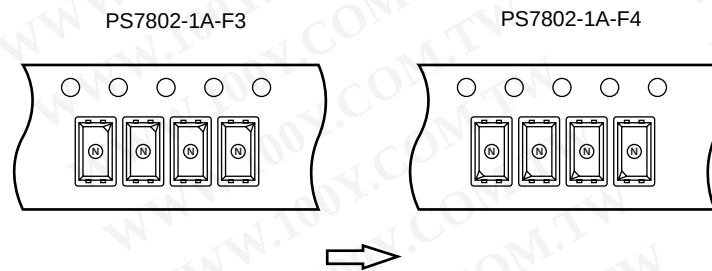
TAPING SPECIFICATIONS (UNIT: mm)

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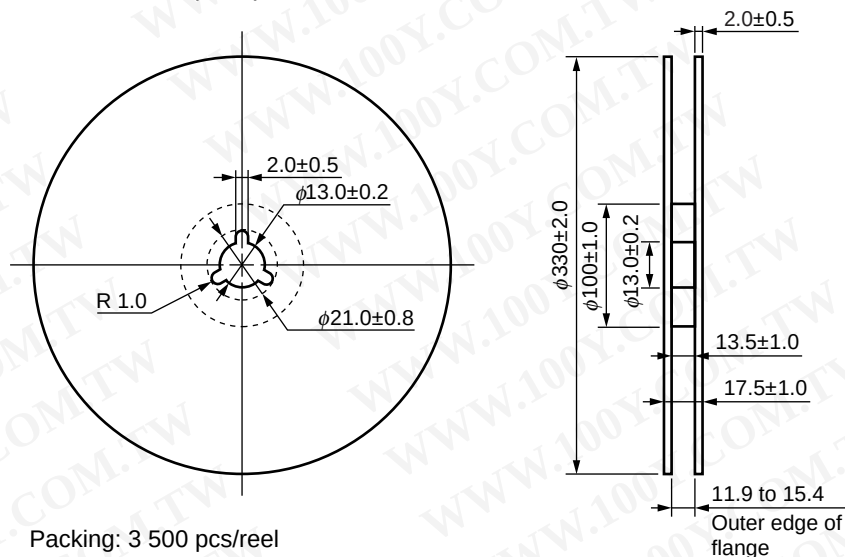
Outline and Dimensions (Tape)



Tape Direction

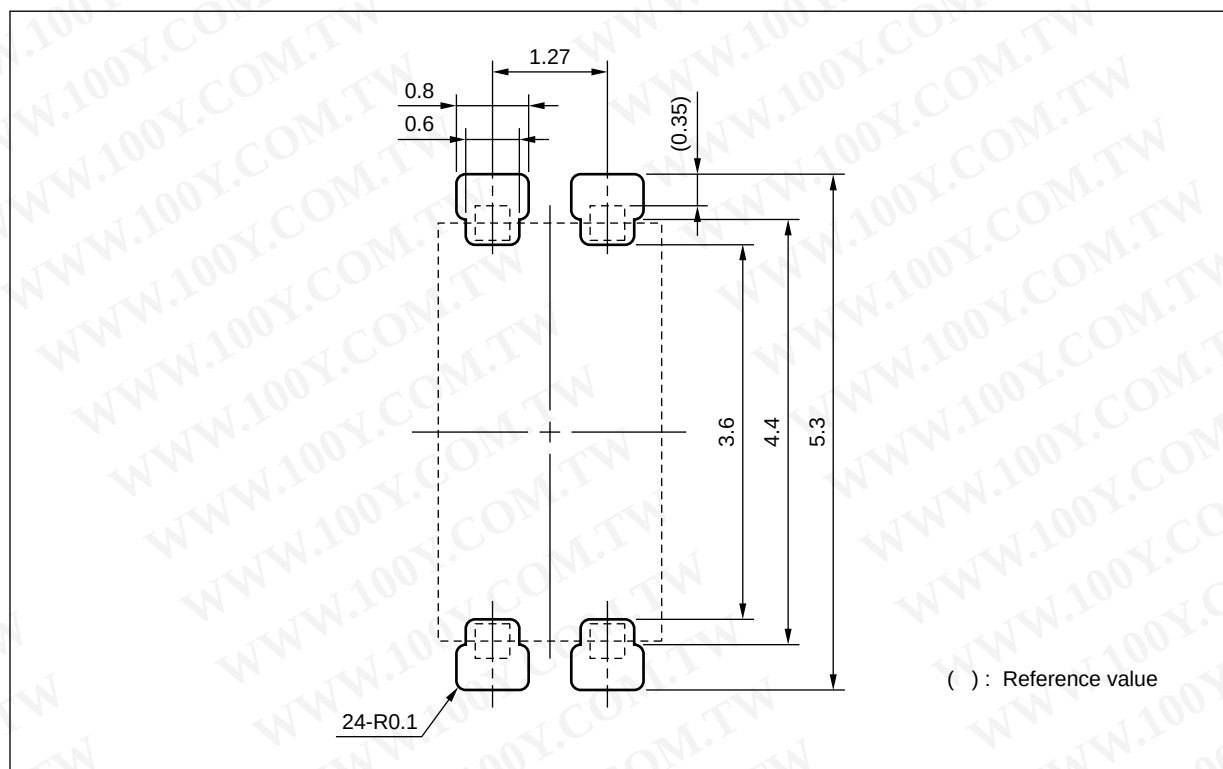


Outline and Dimensions (Reel)



Packing: 3 500 pcs/reel

RECOMMENDED MOUNT PAD DIMENSIONS (UNIT: mm)



Remark All dimensions in this figure must be evaluated before use.

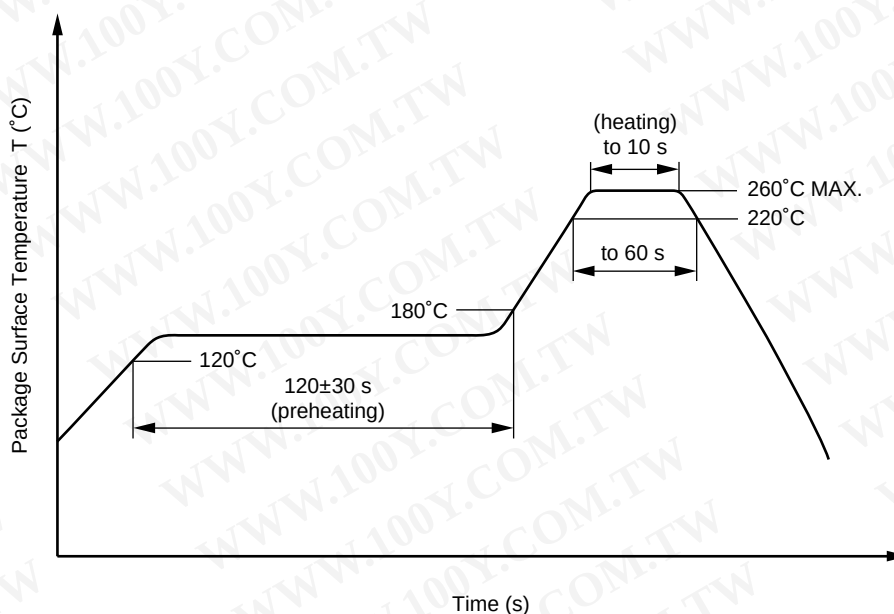
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RECOMMENDED SOLDERING CONDITIONS

(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.) |

<R>

(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.

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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.

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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	
		-A	-AZ
Lead (Pb)	< 1000 PPM	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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