

PHOTOCOUPLER

PS2581AL1, PS2581AL2

LONG CREEPAGE HIGH ISOLATION VOLTAGE 4-PIN PHOTOCOUPLER

–NEPOC Series–

DESCRIPTION

- ★ The PS2581AL1, PS2581AL2 are optically coupled isolators containing a GaAs light emitting diode and an NPN silicon phototransistor in a plastic DIP (Dual In-line Package) to realize an excellent cost performance.

Creepage distance and clearance of leads are over 8 millimeters.

The PS2581AL2 is lead bending type (Gull-wing) for surface mounting.

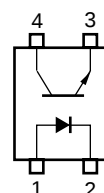
FEATURES

- ★
- Lead-free product : Solder plating specification Sn-Bi
 - Long creepage and clearance distance (8 mm)
 - High isolation voltage ($BV = 5\,000\text{ V r.m.s.}$)
 - High-speed switching ($t_r = 5\ \mu\text{s TYP.}$, $t_f = 7\ \mu\text{s TYP.}$)
 - UL, BSI, CSA, NEMKO, DEMKO, SEMKO, FIMKO approved
- ★
- DIN EN60747-5-2 (VDE0884 Part2) approved

APPLICATIONS

- Power supply
- Telephone/FAX.
- FA/OA equipment
- Programmable logic controller

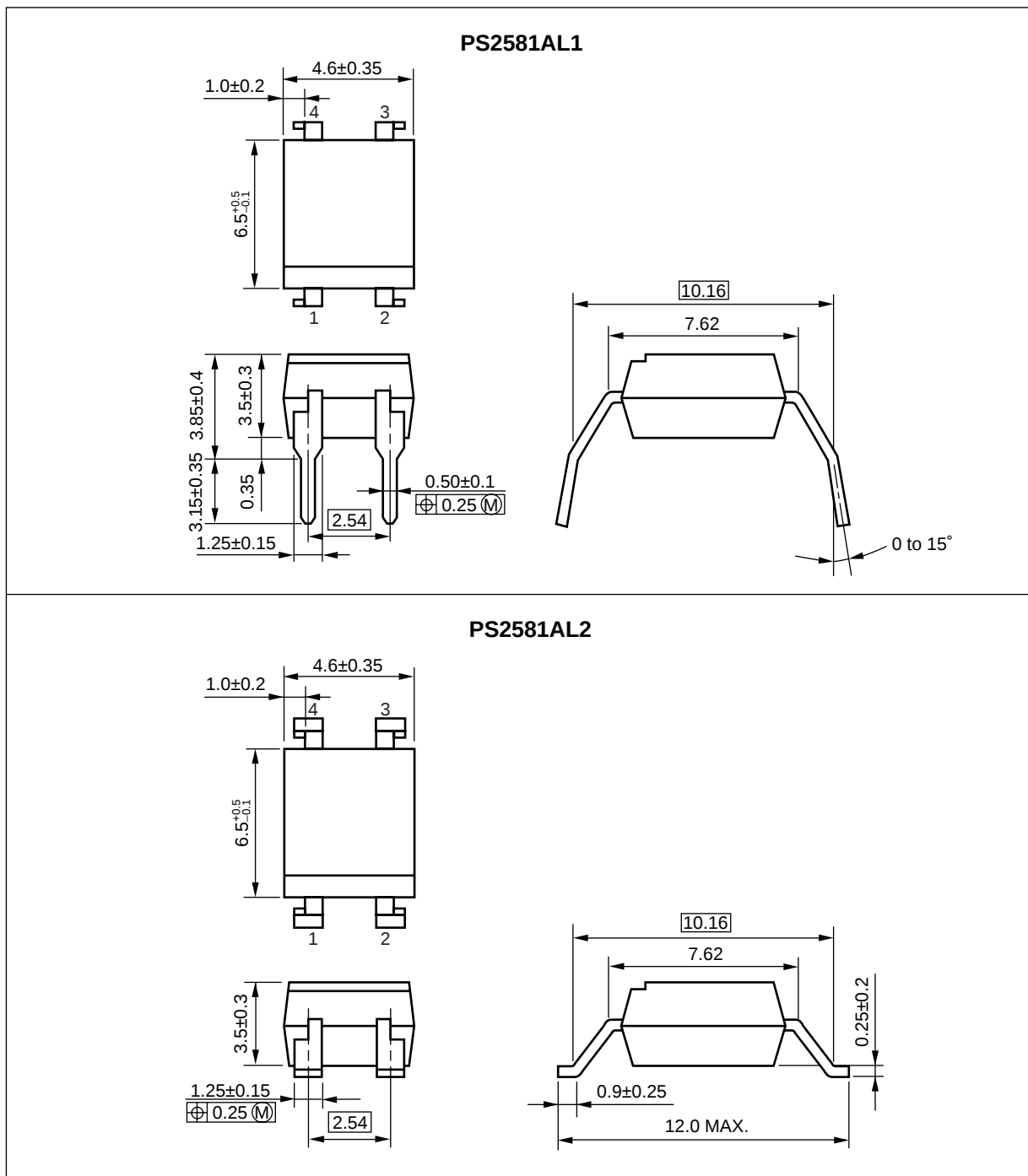
PIN CONNECTION (Top View)



1. Anode
2. Cathode
3. Emitter
4. Collector

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Not all devices/types available in every country. Please check with local NEC Compound Semiconductor Devices representative for availability and additional information.

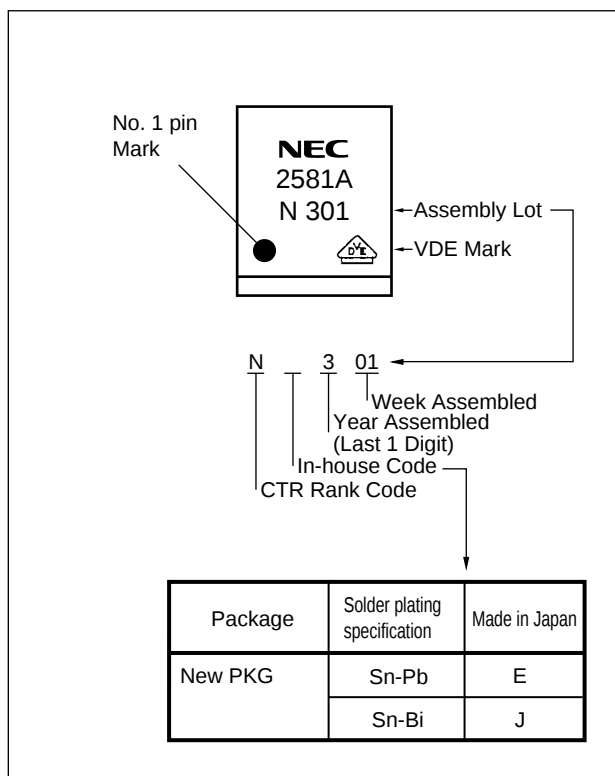
PACKAGE DIMENSIONS (UNIT : mm)



PHOTOCOUPLER CONSTRUCTION

Parameter	Unit (MIN.)
Air Distance	8 mm
Outer Creepage Distance	8 mm
Inner Creepage Distance	4 mm
Isolation Thickness	0.4 mm

★ MARKING EXAMPLE



★ ORDERING INFORMATION

Part Number	Package	Packing Style	Safety Standard Approval	Solder plating Specification	Application Part Number ¹
PS2581AL1	4-pin DIP	Magazine case 100 pcs	Standard products (UL, CSA, BSI, NEMKO, SEMKO, DEMKO, FIMKO, DIN EN60747-5-2	Sn-Pb	PS2581AL1
PS2581AL2					PS2581AL2
PS2581AL2-E3					
PS2581AL2-E4					
PS2581AL1-A		Magazine case 100 pcs	(VDE0884 Part2) Approved products)	Sn-Bi	PS2581AL1
PS2581AL2-A					PS2581AL2
PS2581AL2-E3-A					
PS2581AL2-E4-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	Reverse Voltage	V _R	6	V
	Forward Current (DC)	I _F	30	mA
	Power Dissipation Derating	ΔP _D /°C	1.5	mW/°C
	Power Dissipation	P _D	150	mW
	Peak Forward Current ^{*1}	I _{FP}	0.5	A
Transistor	Collector to Emitter Voltage	V _{CEO}	70	V
	Emitter to Collector Voltage	V _{ECO}	5	V
	Collector Current	I _C	30	mA
	Power Dissipation Delay	ΔP _C /°C	1.5	mW/°C
	Power Dissipation	P _C	150	mW
Isolation Voltage ^{*2}		BV	5 000	Vr.m.s.
Operating Ambient Temperature		T _A	−55 to +100	°C
Storage Temperature		T _{stg}	−55 to +150	°C

*1 PW = 100 μs, Duty Cycle = 1%

*2 AC voltage for 1 minute at T_A = 25°C, RH = 60% between input and output

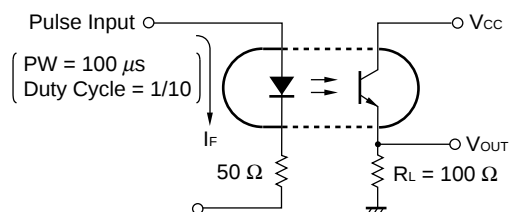
ELECTRICAL CHARACTERISTICS (T_A = 25°C)

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	μA
	Terminal Capacitance	C _t	V = 0 V, f = 1.0 MHz		10		pF
Transistor	Collector to Emitter Dark Current	I _{CEO}	V _{CE} = 70 V, I _F = 0 mA			100	nA
Coupled	Current Transfer Ratio (I _c /I _F) ^{*1}	CTR	I _F = 5 mA, V _{CE} = 5 V	50		300	%
	Collector Saturation Voltage	V _{CE(sat)}	I _F = 10 mA, I _c = 2 mA		0.13	0.3	V
	Isolation Resistance	R _{I-O}	V _{I-O} = 1.0 kV _{DC}	10 ¹¹			Ω
	Isolation Capacitance	C _{I-O}	V = 0 V, f = 1.0 MHz		0.4		pF
	Rise Time ^{*2}	t _r	V _{CC} = 10 V, I _c = 2 mA, R _L = 100 Ω		5		μs
	Fall Time ^{*2}	t _f			7		

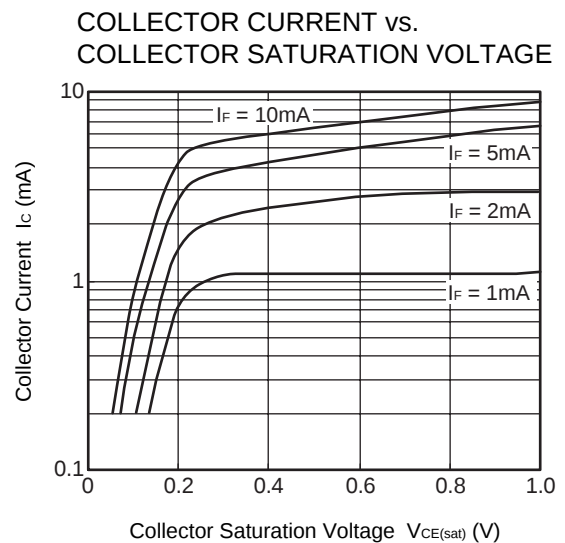
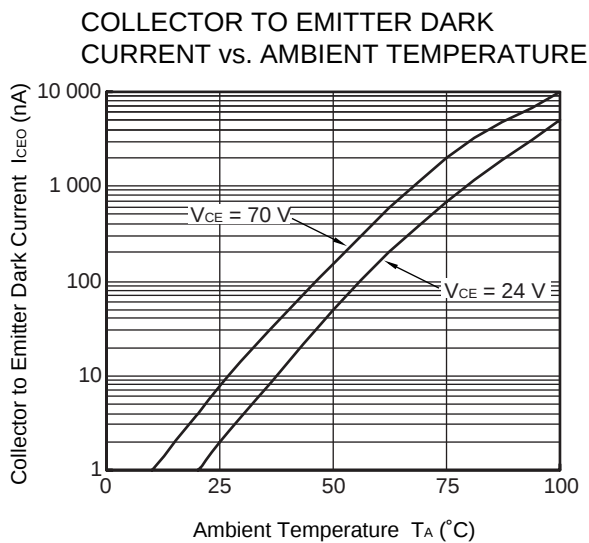
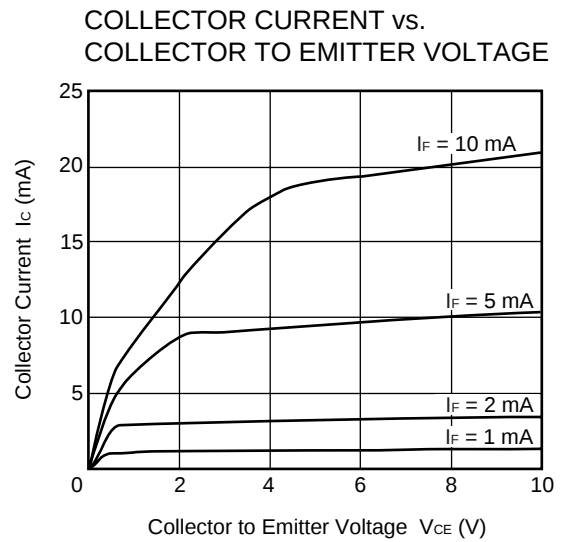
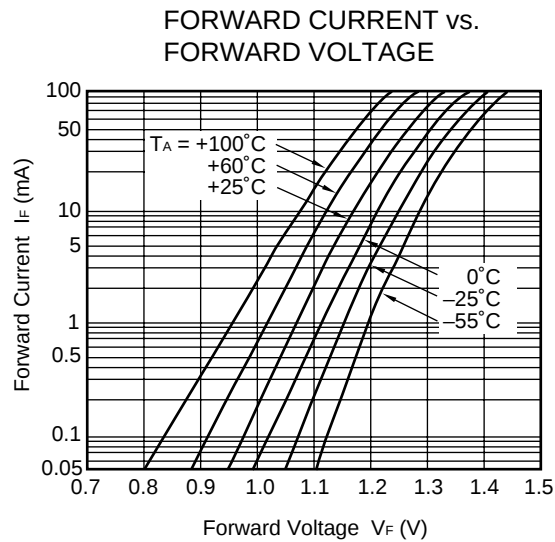
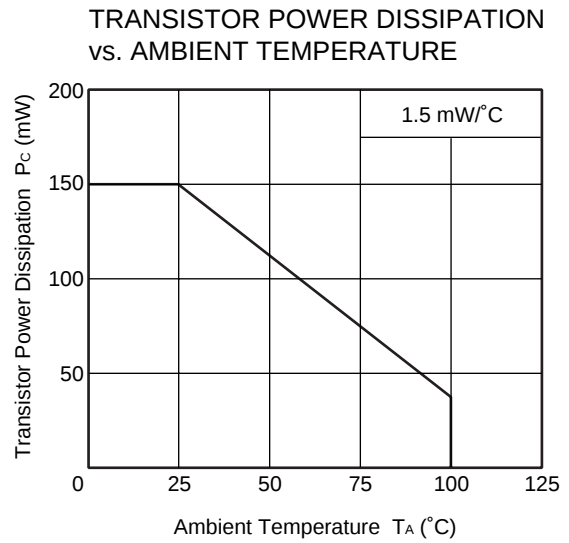
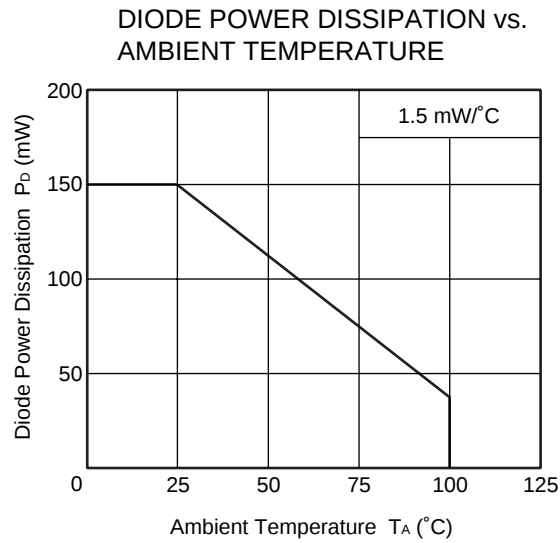
***1** CTR rank

N : 50 to 300 (%)
H : 80 to 160 (%)
Q : 100 to 200 (%)
W : 130 to 260 (%)

***2** Test circuit for switching time

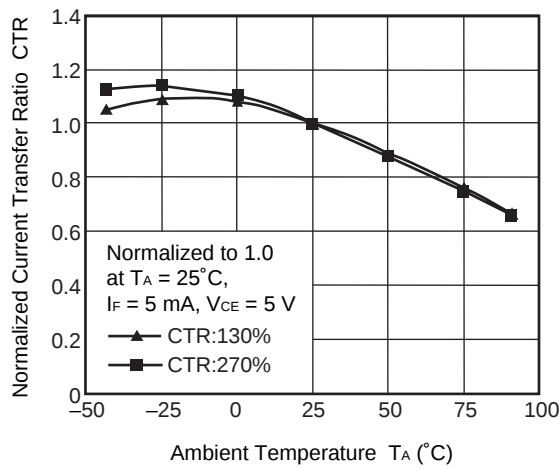


TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise specified)

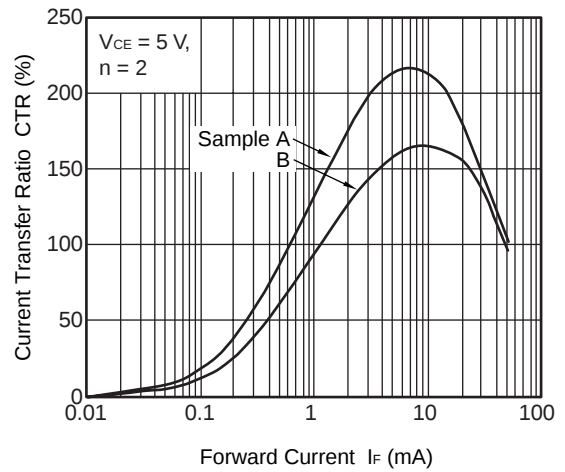


Remark The graphs indicate nominal characteristics.

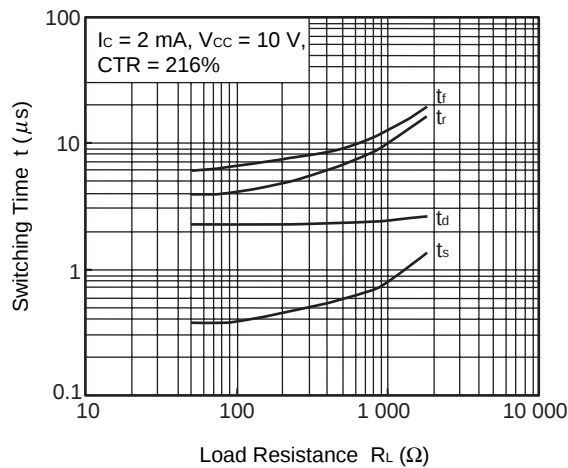
NORMALIZED CURRENT TRANSFER RATIO vs. AMBIENT TEMPERATURE



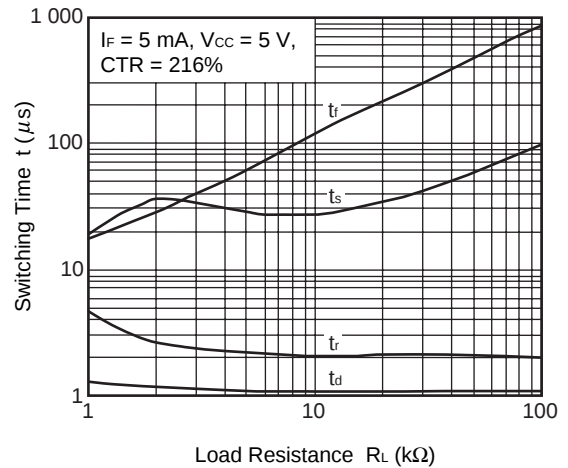
CURRENT TRANSFER RATIO vs. FORWARD CURRENT



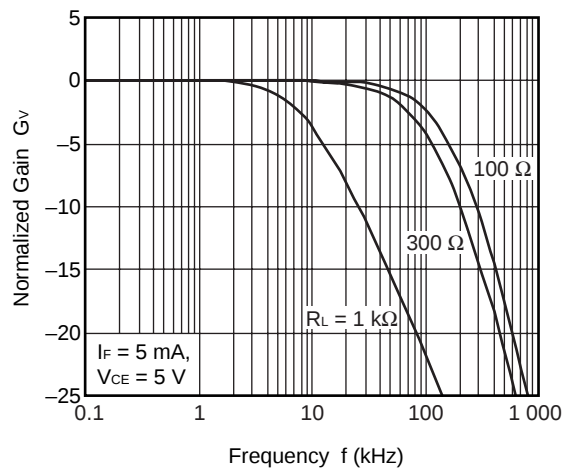
SWITCHING TIME vs. LOAD RESISTANCE



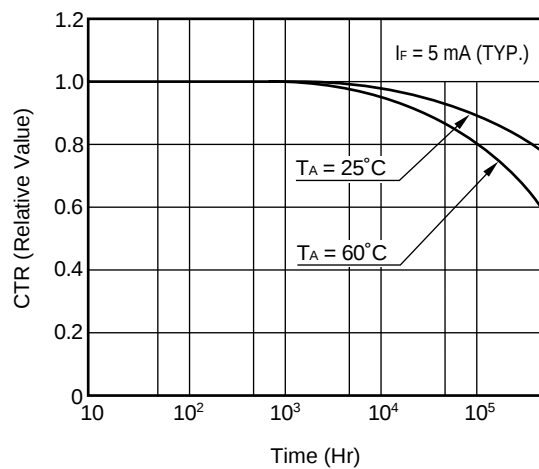
SWITCHING TIME vs. LOAD RESISTANCE



FREQUENCY RESPONSE



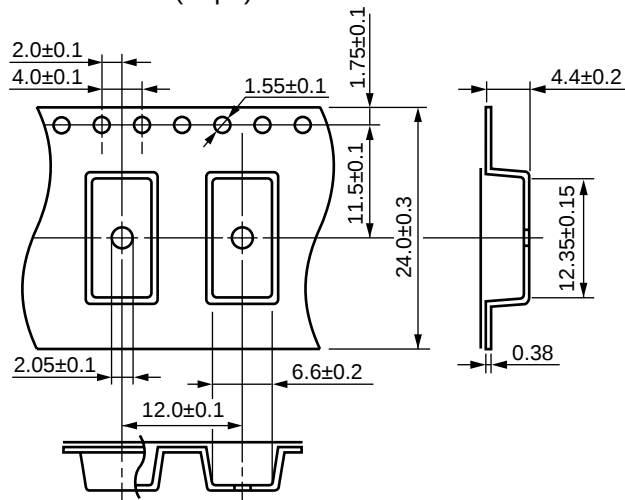
LONG TERM CTR DEGRADATION



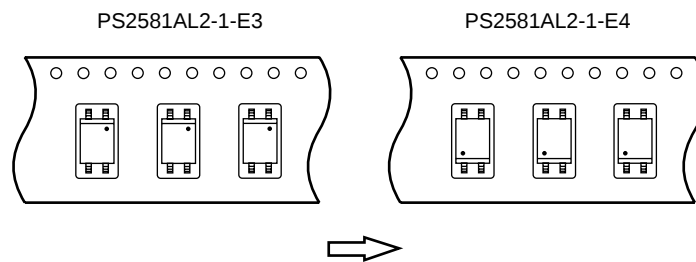
Remark The graphs indicate nominal characteristics.

TAPING SPECIFICATIONS (UNIT : mm)

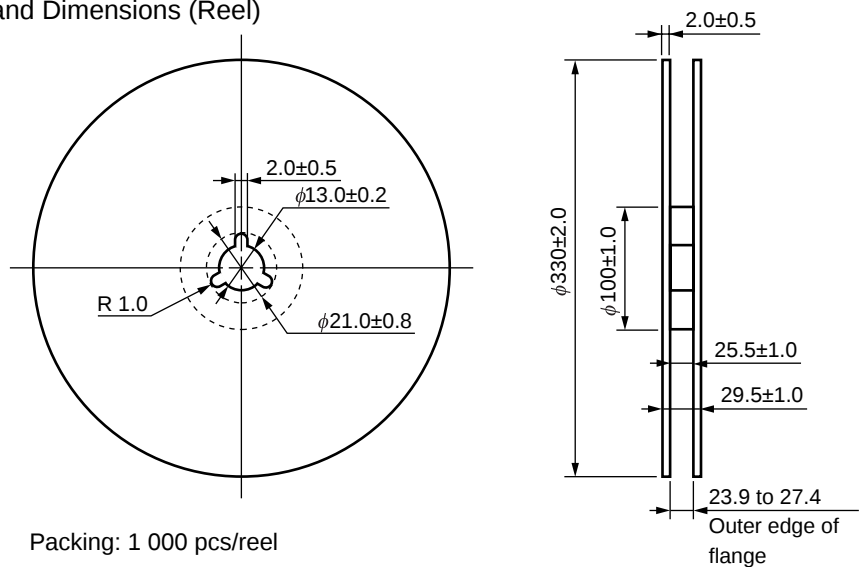
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)



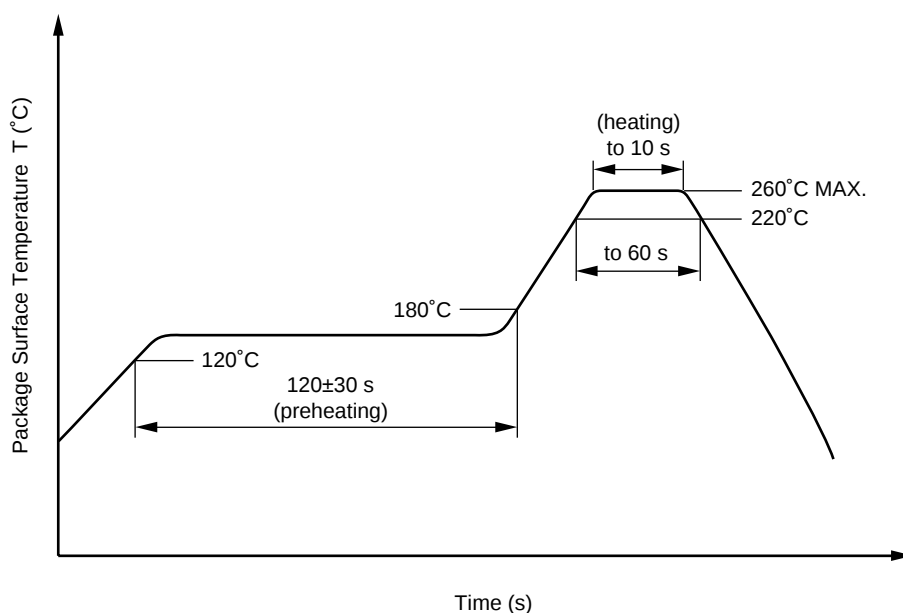
NOTES ON HANDLING

1. 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 (Allowed to be dipped in solder including plastic mold portion.)
- 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.

★ 2. Cautions regarding noise

Be aware that when voltage is applied suddenly between the photocoupler's input and output or between collector-emitters at startup, the output side may enter the on state, even if the voltage is within the absolute maximum ratings.

USAGE CAUTIONS

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

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M8E 00.4-0110

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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