



PHOTOCOUPLER PS2521-1, PS2521L-1

LARGE FORWARD INPUT TYPE HIGH ISOLATION VOLTAGE MULTI PHOTOCOUPLER SERIES

—NEPOC Series—

DESCRIPTION

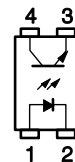
The PS2521-1 and PS2521L-1 are optically coupled isolators containing a GaAs light emitting diode and an NPN silicon phototransistor.

The PS2521-1 is in a plastic DIP (Dual In-line Package) and the PS2521L-1 is lead bending type (Gull-wing) for surface mount.

FEATURES

- Large forward input current ($I_F = 150 \text{ mA}$)
- High Isolation voltage ($BV = 5\,000 \text{ V r.m.s.}$)
- High collector to emitter voltage ($V_{CEO} = 80 \text{ V}$)
- High-speed switching ($t_r = 3 \mu\text{s TYP.}$, $t_f = 5 \mu\text{s TYP.}$)
- <R> • Ordering number of tape product: PS2521L-1-F3: 2 000 pcs/reel
- <R> • Safety standards
 - UL approved: No. E72422
 - CSA approved: No. CA 101391 (CA5A, CAN/CSA-C22.2 60065, 60950)

PIN CONNECTION (Top View)



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

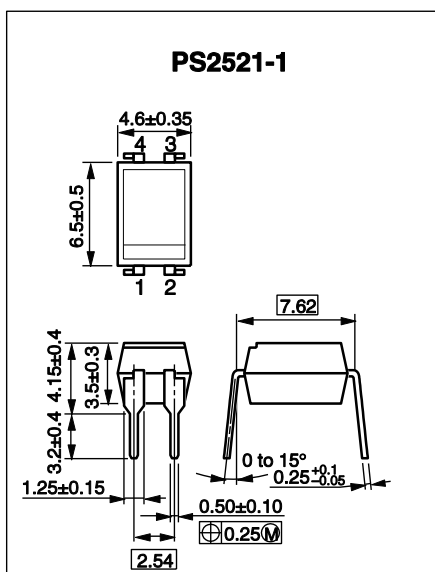
APPLICATIONS

- Exchange equipment
- FAX/MODEM
- LCR adapter

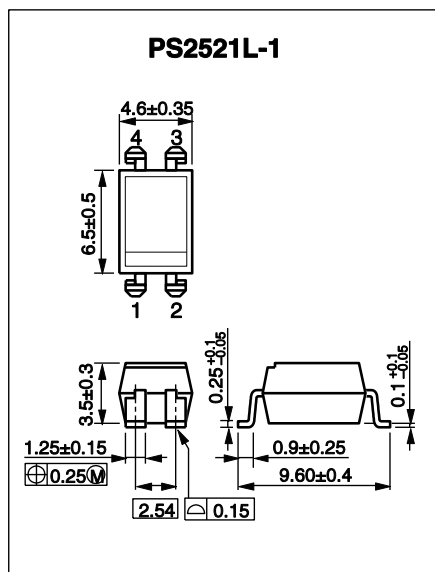
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<R> **PACKAGE DIMENSIONS (Unit : mm)**

DIP Type



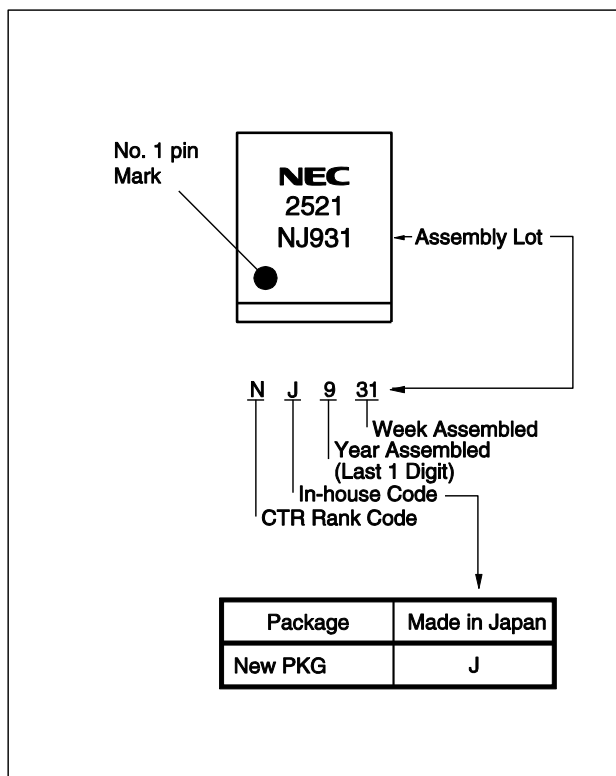
Lead Bending Type



<R> **PHOTOCOUPLER CONSTRUCTION**

Parameter	Unit (MIN.)
Air Distance	7 mm
Outer Creepage Distance	7 mm
Inner Creepage Distance	4 mm
Isolation Thickness	0.4 mm

<R> **MARKING EXAMPLE**



<R> ORDERING INFORMATION

Part Number	Order Number	Solder Plating Specification	Packing Style	Safety Standard Approval	Application Part Number ^{*1}
PS2521-1	PS2521-1-A	Pb-Free	Magazine case 100 pcs	Standard products (UL, CSA Approved)	PS2521-1
PS2521L-1	PS2521L-1-A				
PS2521L-1-F3	PS2521L-1-F3-A		Embossed Tape 2 000 pcs/reel		

^{*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	150	mA
	Reverse Voltage	V _R	6.0	V
	Power Dissipation Derating	ΔP _D /°C	2.5	mW/°C
	Power Dissipation	P _D	250	mW
	Peak Forward Current ^{*1}	I _{FP}	1	A
Transistor	Collector to Emitter Voltage	V _{CEO}	80	V
	Emitter to Collector Voltage	V _{ECO}	6	V
	Collector Current	I _C	50	mA
	Power Dissipation Derating	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%

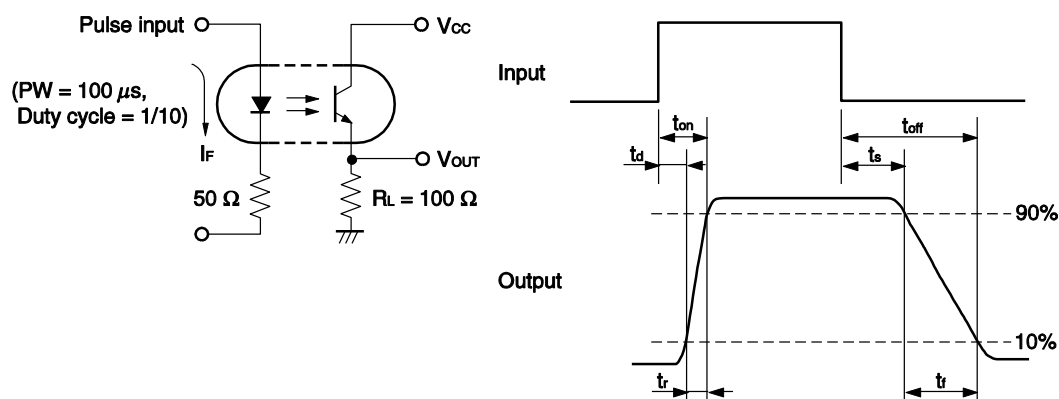
^{*2} AC voltage for 1 minute at T_A = 25°C, RH = 60% between input and output.

Pins 1-2 shorted together, 3-4 shorted together.

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

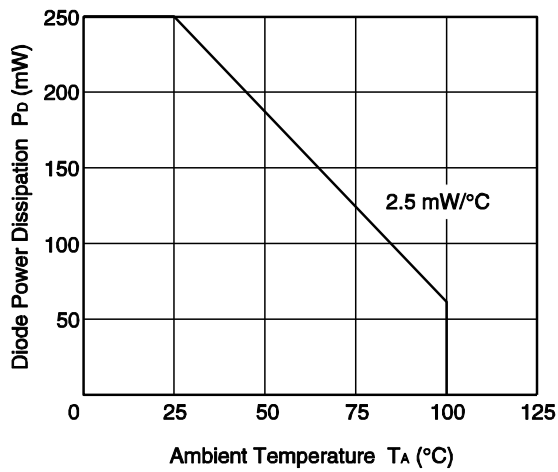
Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V_F	$I_F = 100\text{ mA}$		1.3	1.7	V
	Reverse Current	I_R	$V_R = 5\text{ V}$			5	μA
	Terminal Capacitance	C_t	$V = 0\text{ V}, f = 1.0\text{ MHz}$		70		pF
Transistor	Collector to Emitter Dark Current	I_{CEO}	$V_{CE} = 80\text{ V}, I_F = 0\text{ mA}$			100	nA
Coupled	Current Transfer Ratio (I_C/I_F)	CTR	$I_F = 100\text{ mA}, V_{CE} = 3\text{ V}$	20		80	%
	Collector Saturation Voltage	$V_{CE(sat)}$	$I_F = 100\text{ mA}, I_C = 4\text{ mA}$			0.3	V
	Isolation Resistance	R_{I-O}	$V_{I-O} = 1.0\text{ kV}_{DC}$	10^{11}			Ω
	Isolation Capacitance	C_{I-O}	$V = 0\text{ V}, f = 1.0\text{ MHz}$		0.6		pF
	Rise Time ^{*1}	t_r	$V_{CC} = 10\text{ V}, I_C = 2\text{ mA}, R_L = 100\ \Omega$		3		μs
	Fall Time ^{*1}	t_f			5		

^{*1} Test circuit for switching time

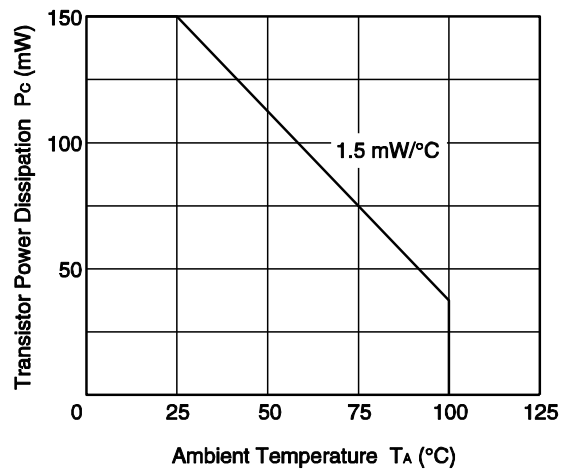


TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise specified)

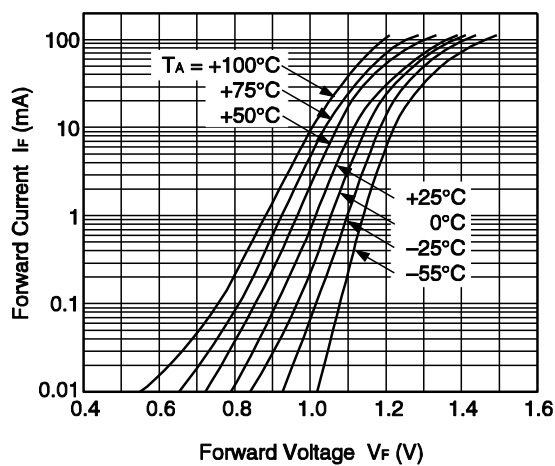
DIODE POWER DISSIPATION vs. AMBIENT TEMPERATURE



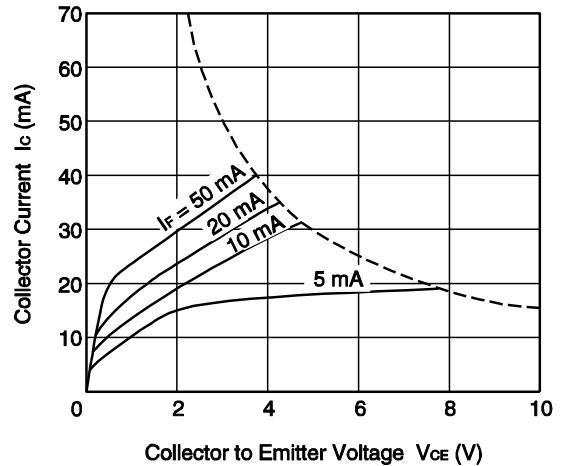
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



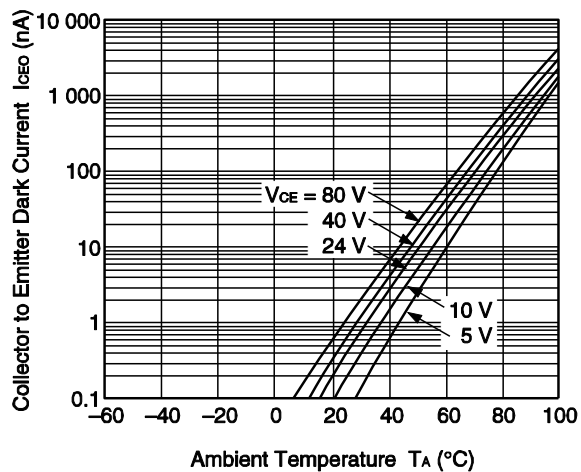
FORWARD CURRENT vs. FORWARD VOLTAGE



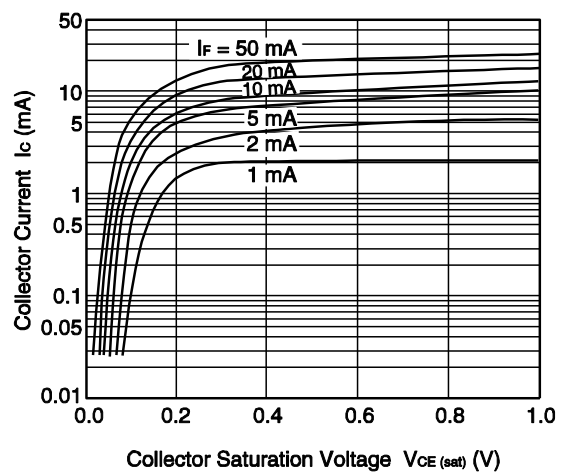
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



COLLECTOR TO EMITTER DARK CURRENT vs. AMBIENT TEMPERATURE

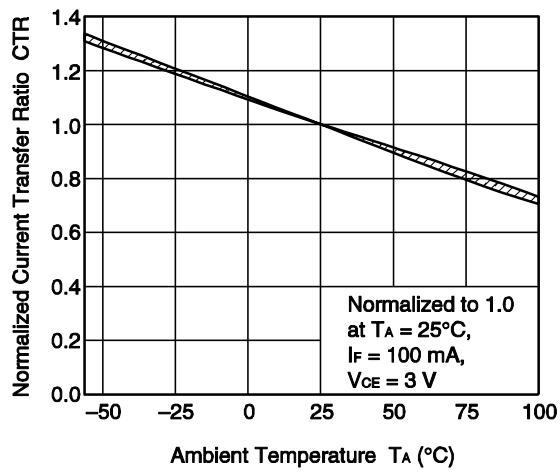


COLLECTOR CURRENT vs. COLLECTOR SATURATION VOLTAGE

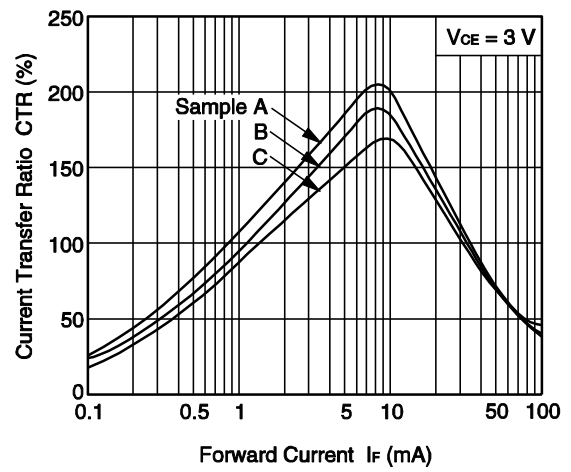


Remark The graphs indicate nominal characteristics.

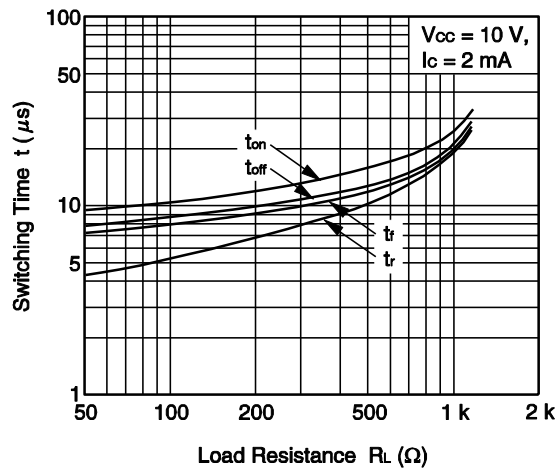
NORMALIZED CURRENT TRANSFER RATIO vs. AMBIENT TEMPERATURE



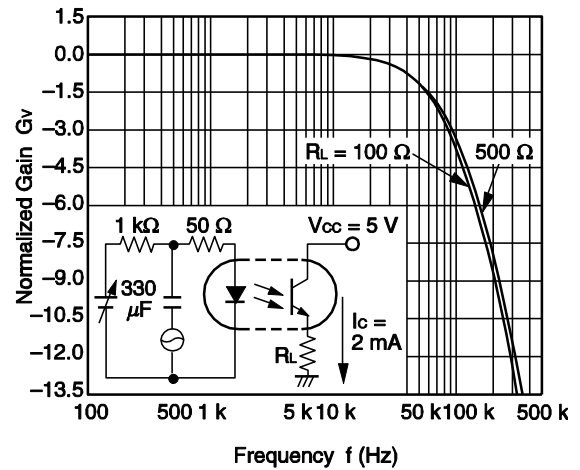
CURRENT TRANSFER RATIO vs. FORWARD CURRENT



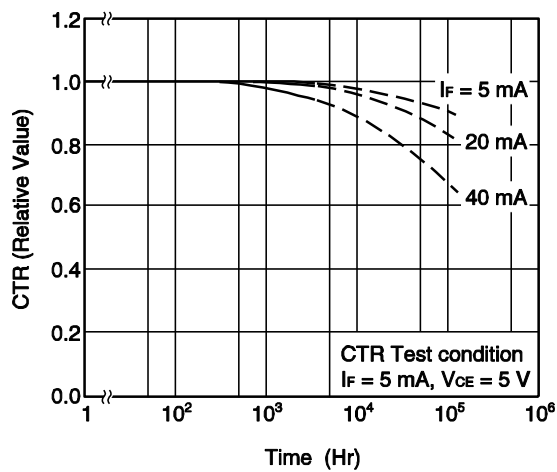
SWITCHING TIME vs. LOAD RESISTANCE



FREQUENCY RESPONSE

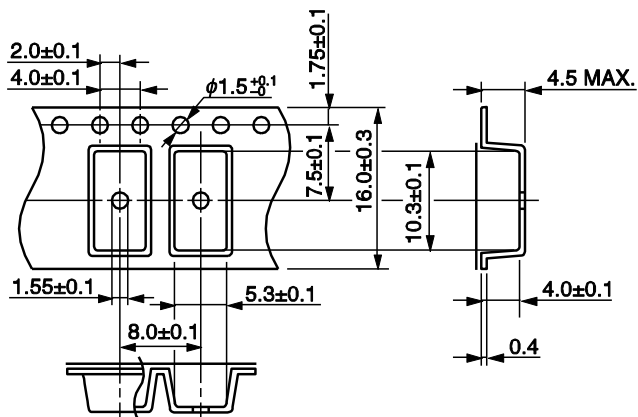


LONG TERM CTR DEGRADATION

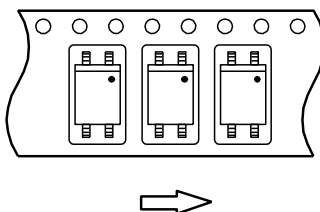


Remark The graphs indicate nominal characteristics.

Outline and Dimensions (Tape)



PS2521L-1-F3



Technical drawing of a circular part with the following dimensions:

- Overall diameter: $\phi 21.0 \pm 0.8$
- Inner hole diameter: $\phi 13.0 \pm 0.2$
- Radial distance from center to hole edge: 2.0 ± 0.5
- Radius of the circular feature: $R 1.0$

Technical drawing of a vertical pipe section showing dimensions for a flange. The drawing includes a side view and a cross-sectional view.

Dimensions shown:

- Total height: $\phi 330 \pm 2.0$
- Section line diameter: $\phi 100 \pm 1.0$
- Flange thickness: 2.0 ± 0.5
- Distance from centerline to outer edge of flange: 17.5 ± 1.0
- Distance from centerline to inner edge of flange: 21.5 ± 1.0
- Distance from centerline to outer edge of flange (range): $15.9 \text{ to } 19.4$

Outer edge of flange

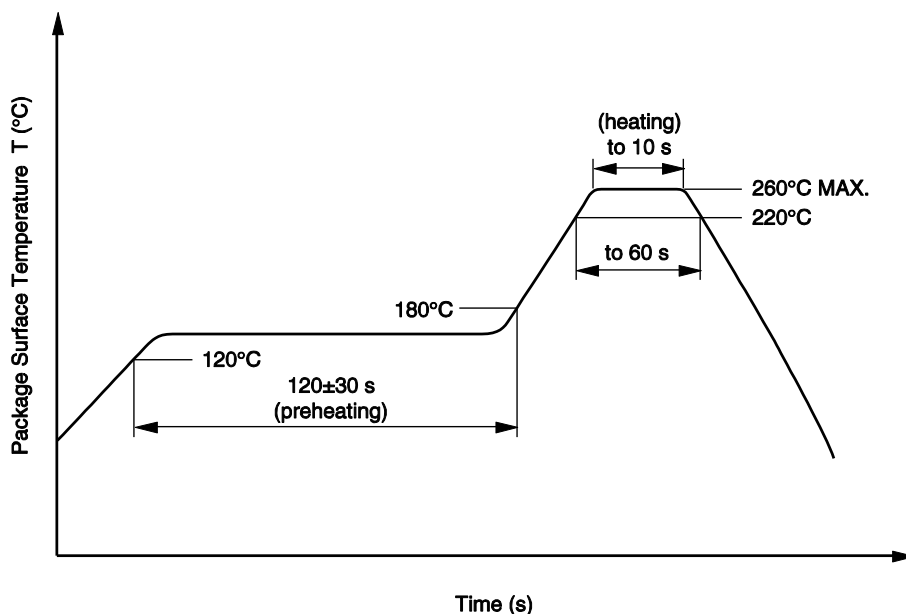
NOTES ON HANDLING

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 transistor may enter the on state, even if the voltage is within the absolute maximum ratings.

3. Measurement conditions of current transfer ratios (CTR), which differ according to photocoupler

Check the setting values before use, since the forward current conditions at CTR measurement differ according to product.

When using products other than at the specified forward current, the characteristics curves may differ from the standard curves due to CTR value variations or the like. Therefore, check the characteristics under the actual operating conditions and thoroughly take variations or the like into consideration before use.

USAGE CAUTIONS

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

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M8E0904E

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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