CEL

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 mA)
- High Isolation voltage (BV = 5 000 Vr.m.s.)
- High collector to emitter voltage (V_{CEO} = 80 V)
- High-speed switching (t_r = 3 μs TYP., t_f = 5 μs TYP.)
- ★ Ordering number of tape product: PS2521L-1-E3, E4, F3, F4
- Safety standards
  - UL approved: File No. E72422
  - CSA approved: No. CA 101391

APPLICATIONS

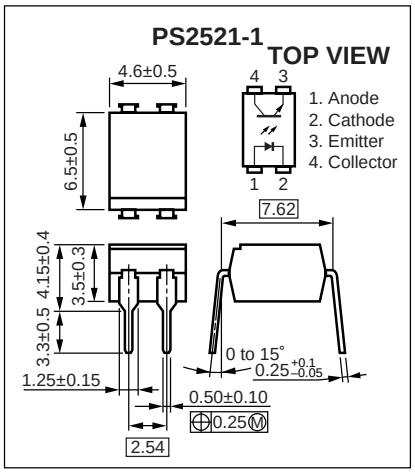
- Exchange equipment
- FAX/MODEM
- LCR adapter

Document No. PN10230EJ02V0DS (2nd edition)
Date Published March 2006 CP(K)

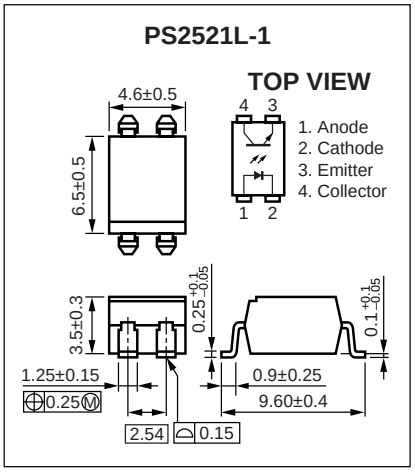
The mark ★ shows major revised points.

★ **PACKAGE DIMENSIONS (Unit : mm)**

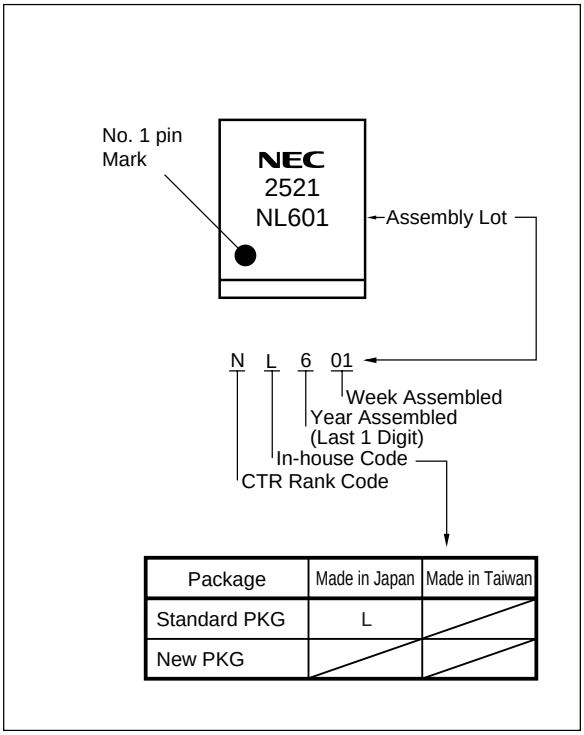
DIP Type



Lead Bending Type



★ **MARKING EXAMPLE**



Package	Made in Japan	Made in Taiwan
Standard PKG	L	
New PKG		

★ 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-E3	PS2521L-1-E3-A		Embossed Tape 1 000 pcs/reel		
PS2521L-1-E4	PS2521L-1-E4-A				
PS2521L-1-F3	PS2521L-1-F3-A		Embossed Tape 2 000 pcs/reel		
PS2521L-1-F4	PS2521L-1-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	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

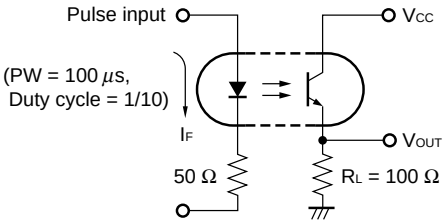
***1** PW = 100 μs, Duty Cycle = 1%

***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°C)

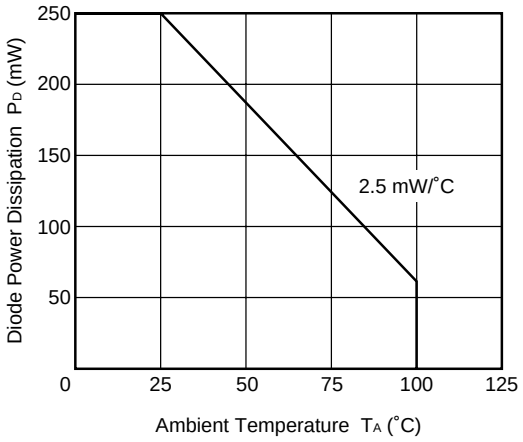
Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V_F	I_F = 100 mA		1.3	1.7	V
	Reverse Current	I_R	V_R = 5 V			5	μA
	Terminal Capacitance	C_t	V = 0 V, f = 1.0 MHz		70		pF
Transistor	Collector to Emitter Dark Current	I_{CEO}	V_{CE} = 80 V, I_F = 0 mA			100	nA
Coupled	Current Transfer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

***1** Test circuit for switching time

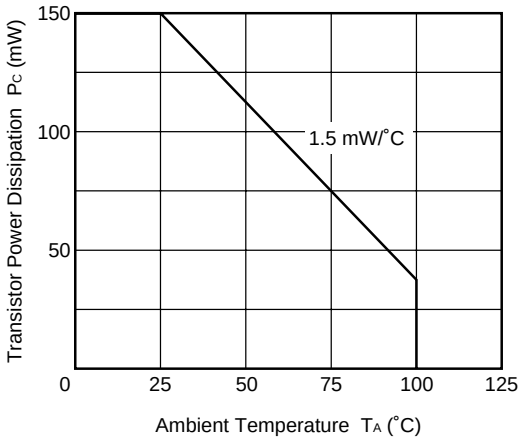


★ **TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise specified)**

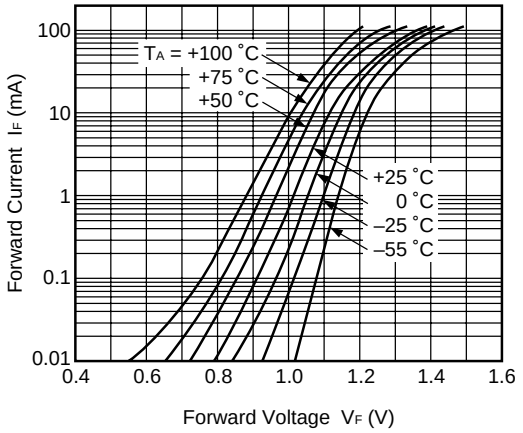
DIODE POWER DISSIPATION vs. AMBIENT TEMPERATURE



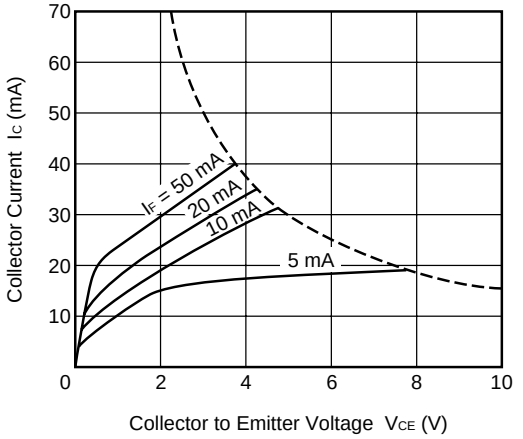
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



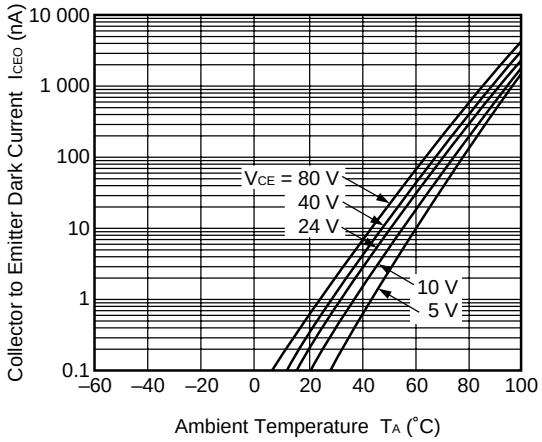
FORWARD CURRENT vs. FORWARD VOLTAGE



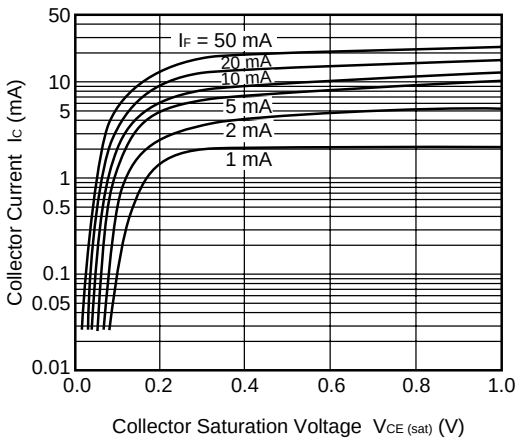
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



COLLECTOR TO EMITTER DARK CURRENT vs. AMBIENT TEMPERATURE

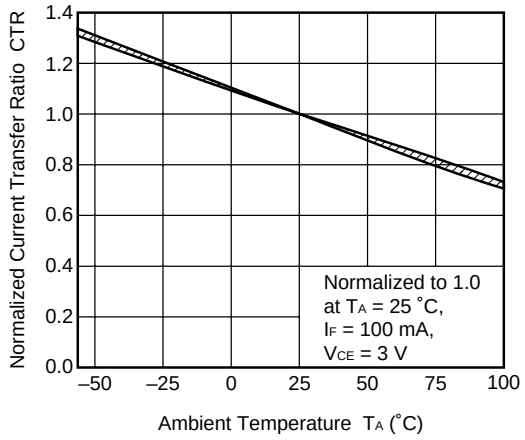


COLLECTOR CURRENT vs. COLLECTOR SATURATION VOLTAGE

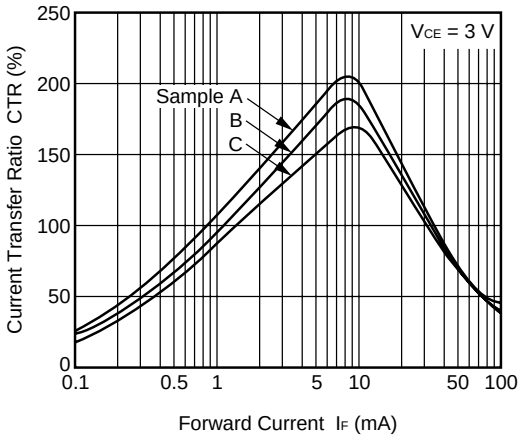


Remark The graphs indicate nominal characteristics.

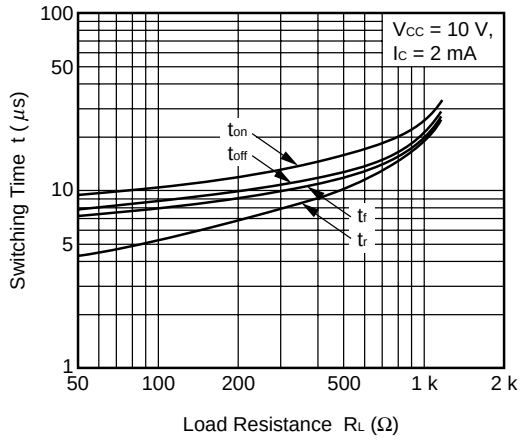
NORMALIZED CURRENT TRANSFER RATIO vs. AMBIENT TEMPERATURE



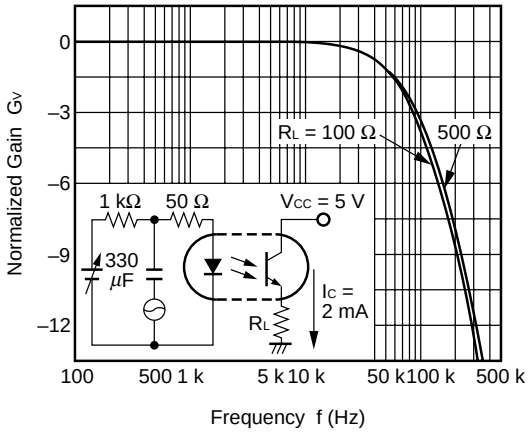
CURRENT TRANSFER RATIO vs. FORWARD CURRENT



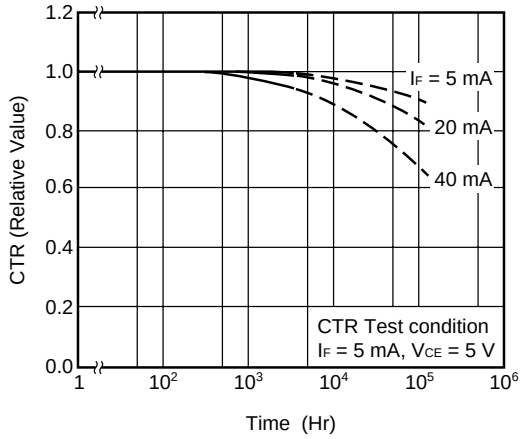
SWITCHING TIME vs. LOAD RESISTANCE



FREQUENCY RESPONSE



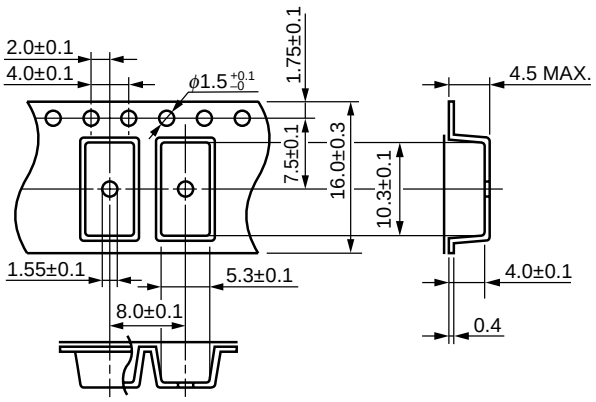
LONG TERM CTR DEGRADATION



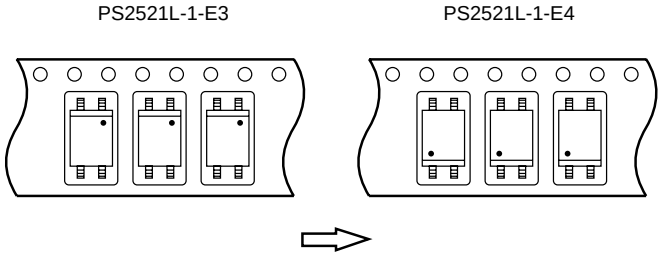
Remark The graphs indicate nominal characteristics.

★ **TAPING SPECIFICATIONS (Unit : mm)**

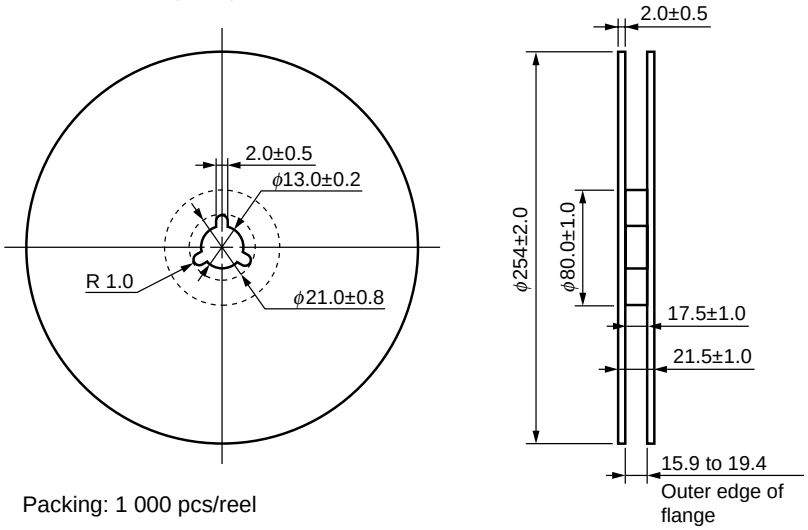
Outline and Dimensions (Tape)



Tape Direction

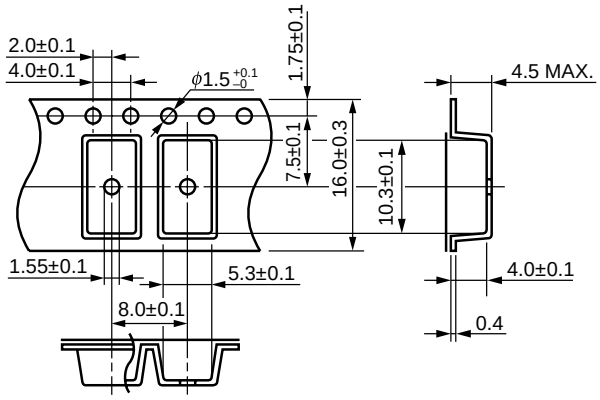


Outline and Dimensions (Reel)

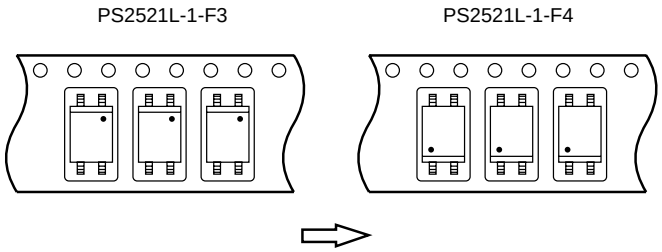


Packing: 1 000 pcs/reel

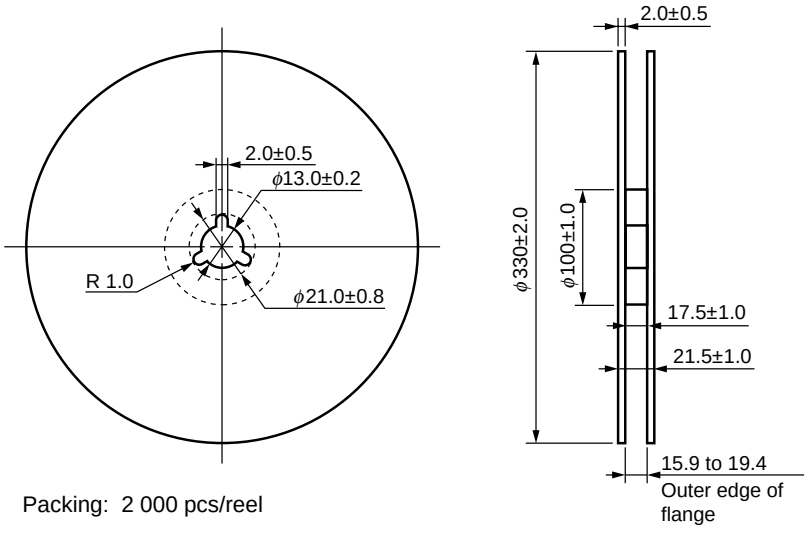
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)



Packing: 2 000 pcs/reel

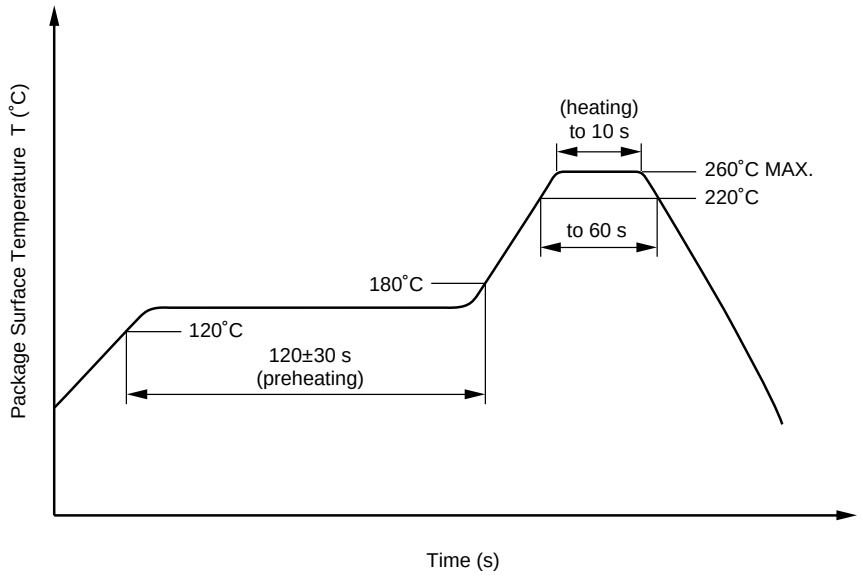
NOTES ON HANDLING

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 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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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.

▶**For further information, please contact**

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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.