

**HIGH ISOLATION VOLTAGE
SOP PHOTOCOUPLER**

–NEPOC Series–

DESCRIPTION

The PS2705A-1 is an optically coupled isolator containing a GaAs light emitting diode and an NPN silicon phototransistor to realize an excellent cost performance.

This package is SOP (Small Outline Package) type and has shield effect to cut off ambient light.

It is designed for high density mounting applications.

FEATURES

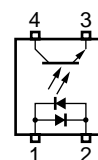
- AC input response
- High isolation voltage (BV = 3 750 Vr.m.s.)
- SOP (Small Outline Package) type
- Ordering number of taping product: PS2705A-1-F3, F4
- Pb-Free product
- Safety standards
 - UL approved: File No. E72422
 - DIN EN60747-5-2 (VDE0884 Part2) approved (Option)

APPLICATIONS

- Hybrid IC
- Telephone/FAX.
- FA/OA equipment
- Programmable logic controllers
- Power supply

PIN CONNECTION

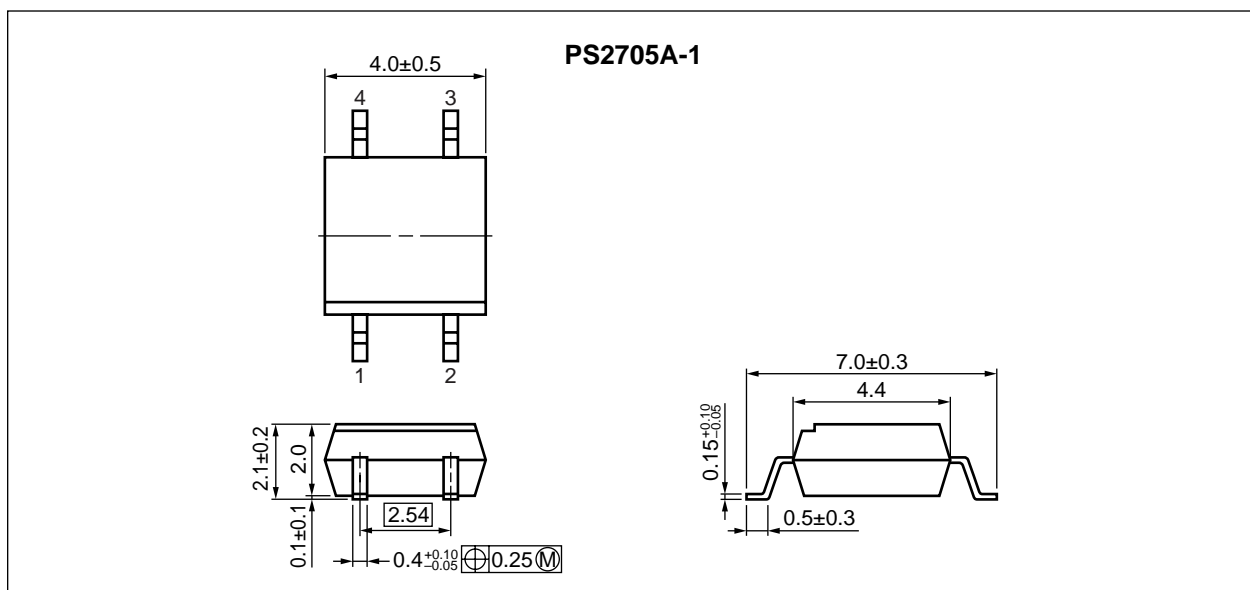
(Top View)



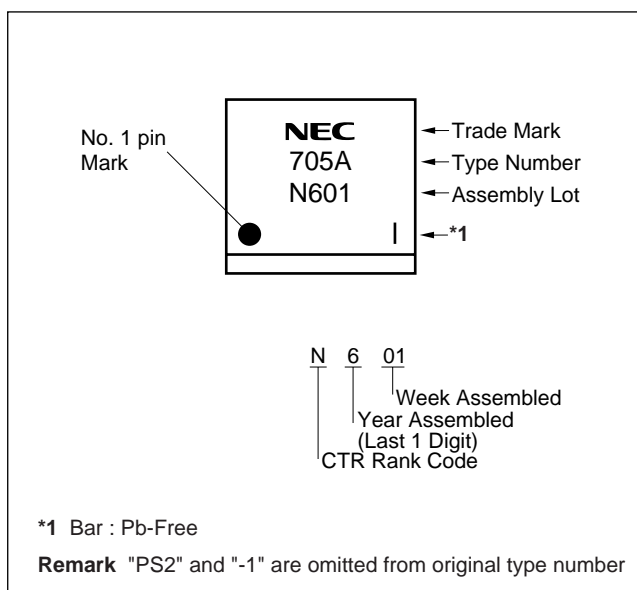
1. Anode, Cathode
2. Cathode, Anode
3. Emitter
4. Collector

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PACKAGE DIMENSIONS (in millimeters)



MARKING EXAMPLE



★ ORDERING INFORMATION

Part Number	Order Number	Solder Plating Specification	Packing Style	Safety Standard Approval	Application Part Number ^{*1}
PS2705A-1	PS2705A-1-A	Pb-Free	Magazine case 100 pcs	Standard products (UL approved)	PS2705A-1
PS2705A-1-F3	PS2705A-1-F3-A		Embossed Tape 3 500 pcs/reel		
PS2705A-1-F4	PS2705A-1-F4-A				
PS2705A-1-V	PS2705A-1-V-A		Magazine case 100 pcs	DIN EN60747-5-2	
PS2705A-1-V-F3	PS2705A-1-V-F3-A		Embossed Tape 3 500 pcs/reel	(VDE0884 Part2)	
PS2705A-1-V-F4	PS2705A-1-V-F4-A			Approved (Option)	

^{*1} For the application of the Safety Standard, following part number should be used.

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$, unless otherwise specified)

Parameter		Symbol	Ratings	Unit
Diode	Forward Current (DC)	I_F	± 30	mA
	Power Dissipation Derating	$\Delta P_D/^\circ\text{C}$	0.8	mW/ $^\circ\text{C}$
	Power Dissipation	P_D	80	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 Derating	$\Delta P_C/^\circ\text{C}$	1.5	mW/ $^\circ\text{C}$
	Power Dissipation	P_C	150	mW
Isolation Voltage ^{*2}		BV	3 750	Vr.m.s.
Operating Ambient Temperature		T_A	-55 to $+100$	$^\circ\text{C}$
Storage Temperature		T_{stg}	-55 to $+150$	$^\circ\text{C}$

*1 $PW = 100 \mu\text{s}$, Duty Cycle = 1%

*2 AC voltage for 1 minute at $T_A = 25^\circ\text{C}$, RH = 60% between input and output
Pins 1-2 shorted together, 3-4 shorted together.

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

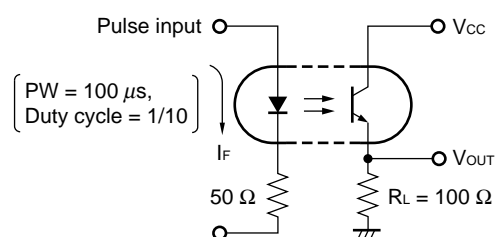
Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V_F	$I_F = \pm 5 \text{ mA}$		1.2	1.4	V
	Terminal Capacitance	C_t	$V = 0 \text{ V}$, $f = 1.0 \text{ MHz}$		20		pF
Transistor	Collector to Emitter Dark Current	I_{CEO}	$I_F = 0 \text{ mA}$, $V_{CE} = 70 \text{ V}$			100	nA
Coupled	Current Transfer Ratio (I_C/I_F)* ¹	CTR	$I_F = \pm 5 \text{ mA}$, $V_{CE} = 5 \text{ V}$	50		300	%
	Collector Saturation Voltage	$V_{CE(sat)}$	$I_F = \pm 10 \text{ mA}$, $I_C = 2 \text{ mA}$		0.13	0.3	V
	Isolation Resistance	R_{I-O}	$V_{I-O} = 1.0 \text{ kV}_{DC}$	10^{11}			Ω
	Isolation Capacitance	C_{I-O}	$V = 0 \text{ V}$, $f = 1.0 \text{ MHz}$		0.4		pF
	Rise Time * ²	t_r	$V_{CC} = 5 \text{ V}$, $I_C = 2 \text{ mA}$, $R_L = 100 \Omega$		5		μs
	Fall Time * ²	t_f			7		

***1 CTR rank**

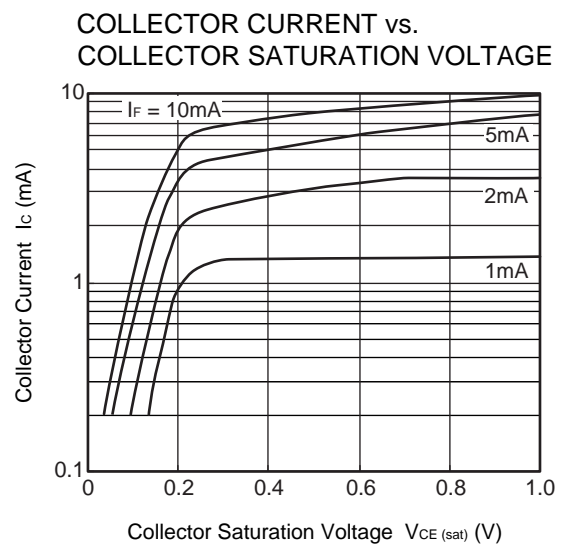
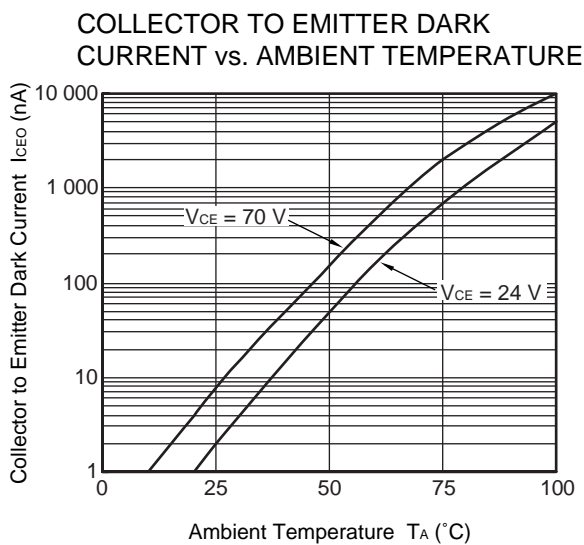
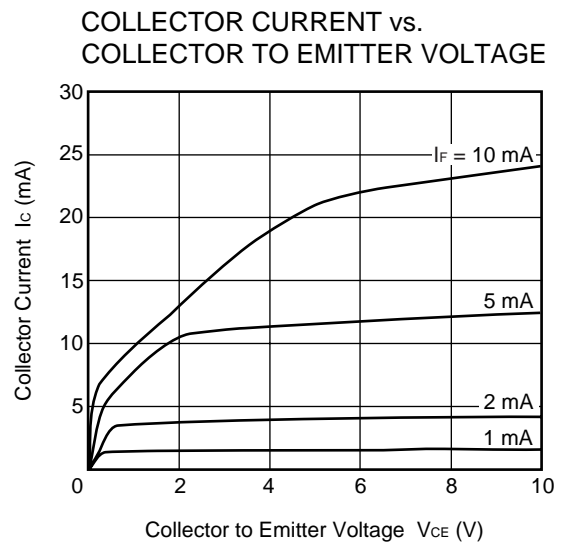
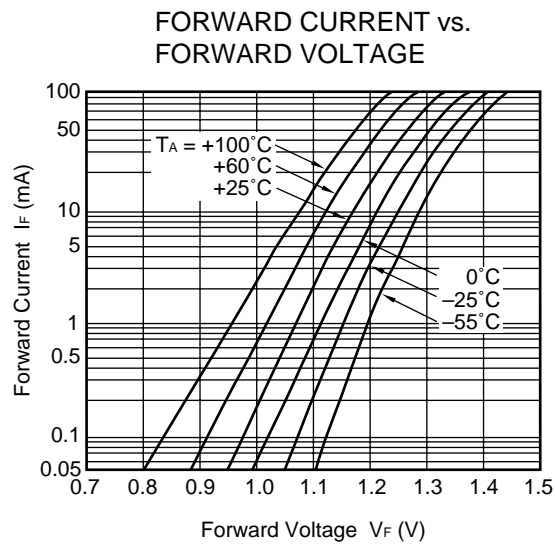
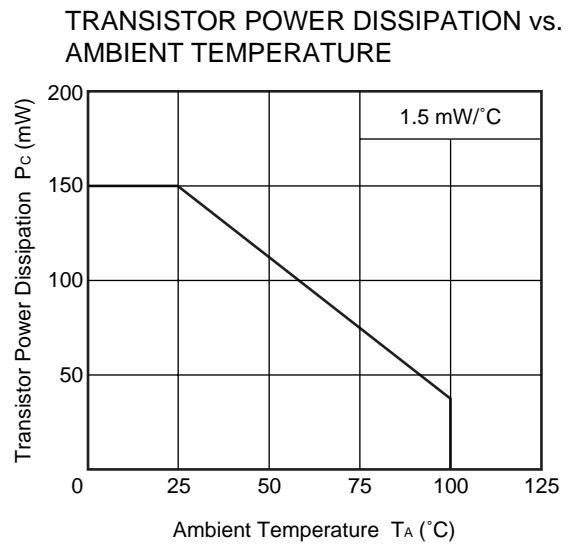
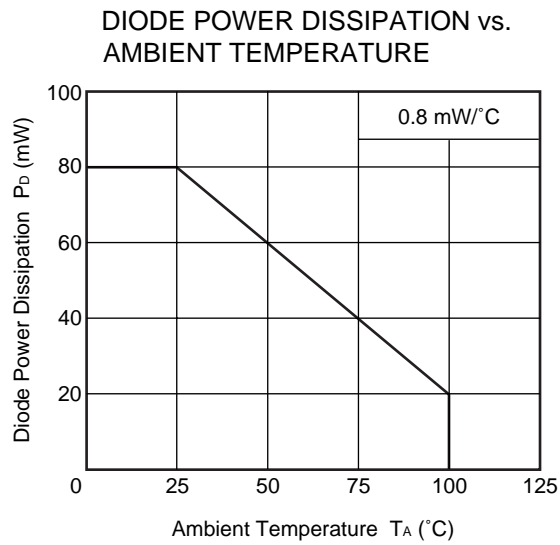
N: 50 to 300 (%)

L: 100 to 300 (%)

M: 50 to 150 (%)

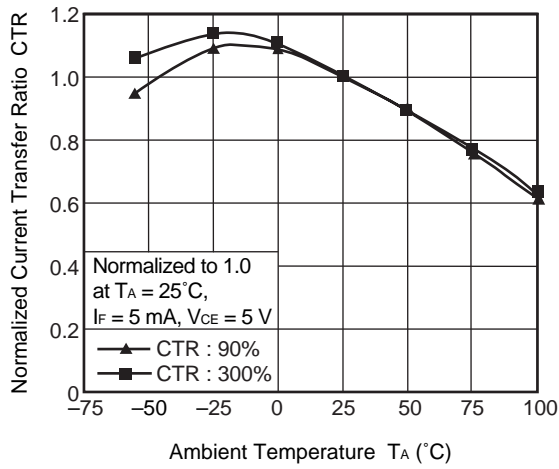
***2 Test circuit for switching time**

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

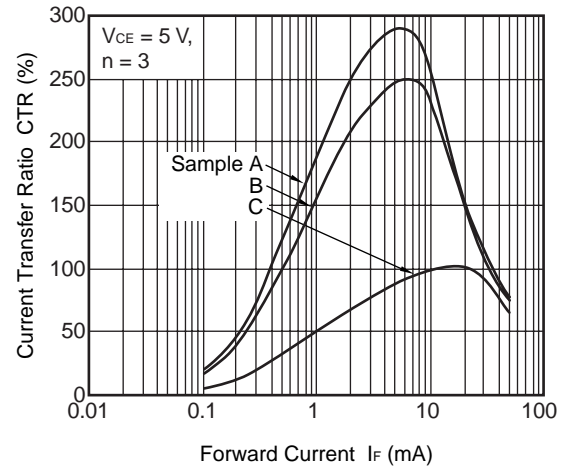


Remark The graphs indicate nominal characteristics.

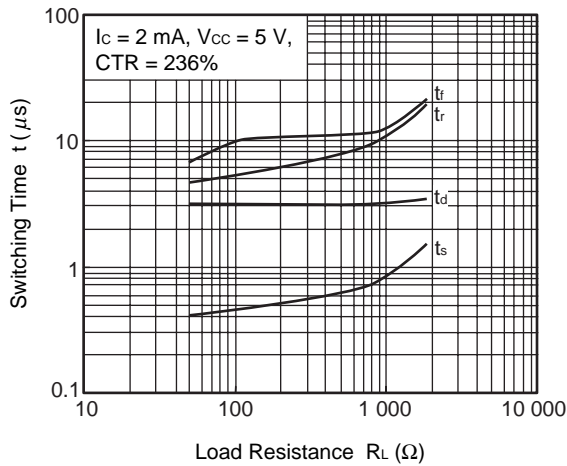
NORMALIZED CURRENT TRANSFER RATIO vs. AMBIENT TEMPERATURE



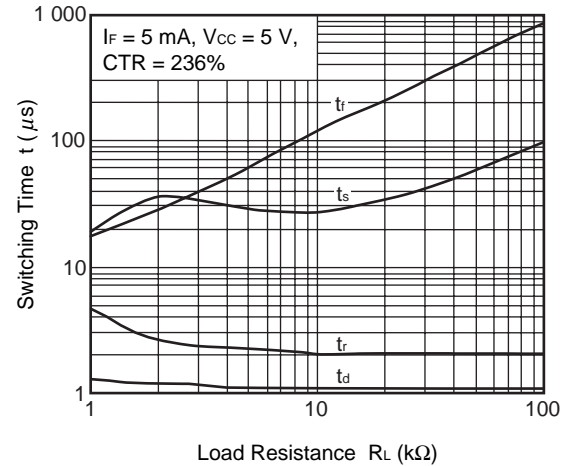
CURRENT TRANSFER RATIO vs. FORWARD CURRENT



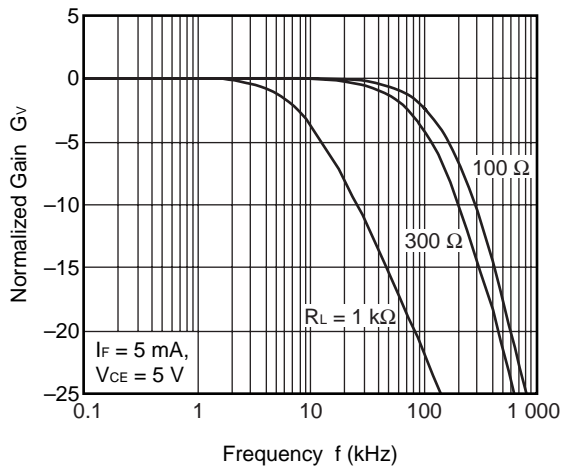
SWITCHING TIME vs. LOAD RESISTANCE



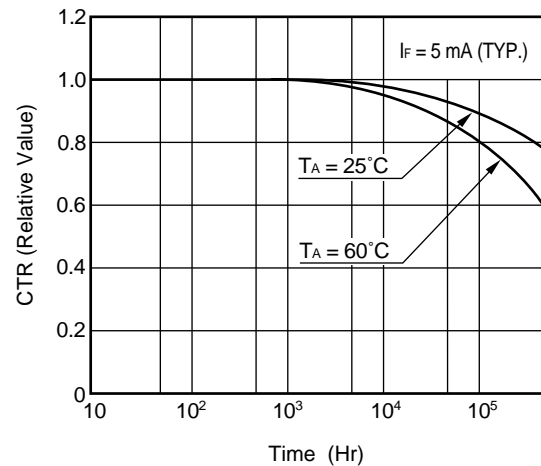
SWITCHING TIME vs. LOAD RESISTANCE



FREQUENCY RESPONSE



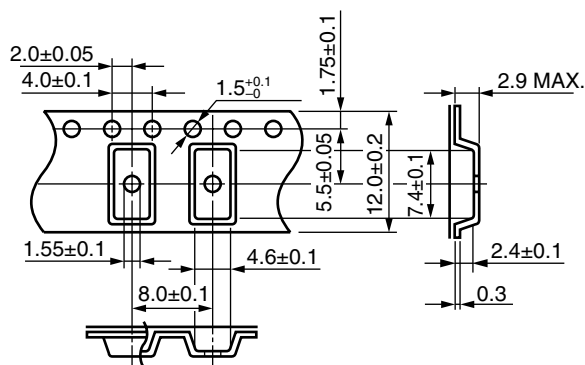
LONG TERM CTR DEGRADATION



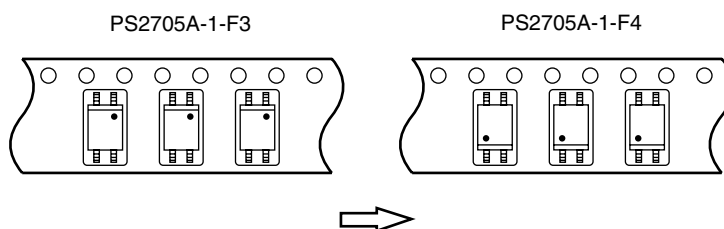
Remark The graphs indicate nominal characteristics.

TAPING SPECIFICATIONS (in millimeters)

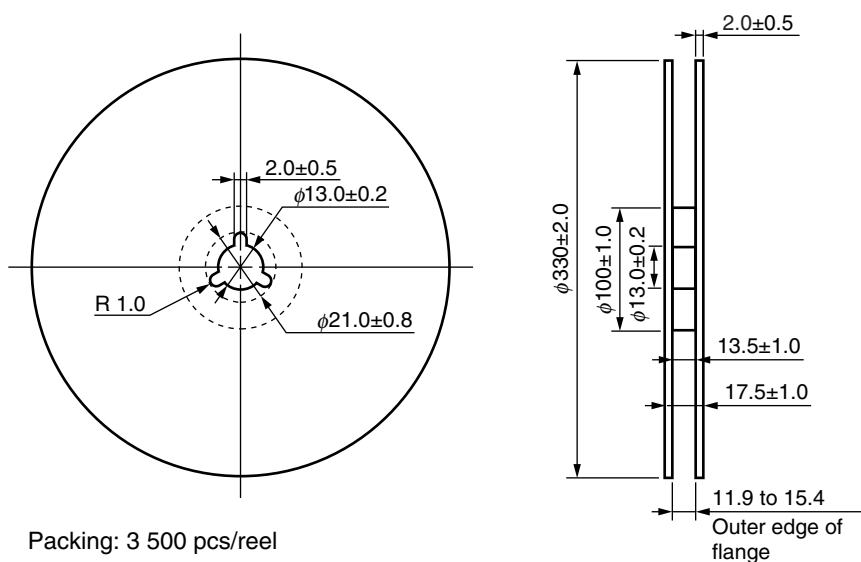
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)



Packing: 3 500 pcs/reel

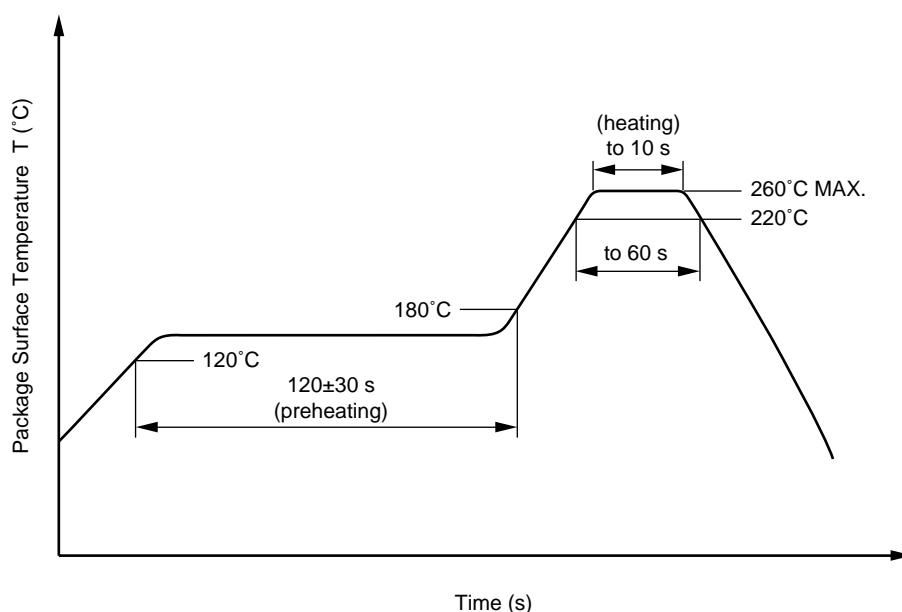
NOTES ON HANDLING

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. This tendency may sometimes be obvious, especially below $I_F = 1 \text{ mA}$.

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

<div data-bbox="175 224 287 280" style="border: 1px solid black; padding: 2px; display: inline-block;">Caution</div> <div data-bbox="295 224 446 280">GaAs Products</div>	<p>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.</p> <ul style="list-style-type: none"> • 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. <ol style="list-style-type: none"> 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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► For further information, please contact

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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	

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