



PHOTOCOUPLER PS2732-1, PS2733-1

HIGH COLLECTOR TO EMITTER VOLTAGE SOP MULTI PHOTOCOUPLER

–NEPOC Series–

DESCRIPTION

The PS2732-1 and PS2733-1 are optically coupled isolators containing a GaAs light emitting diode and an NPN silicon darlington-connected phototransistor.

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

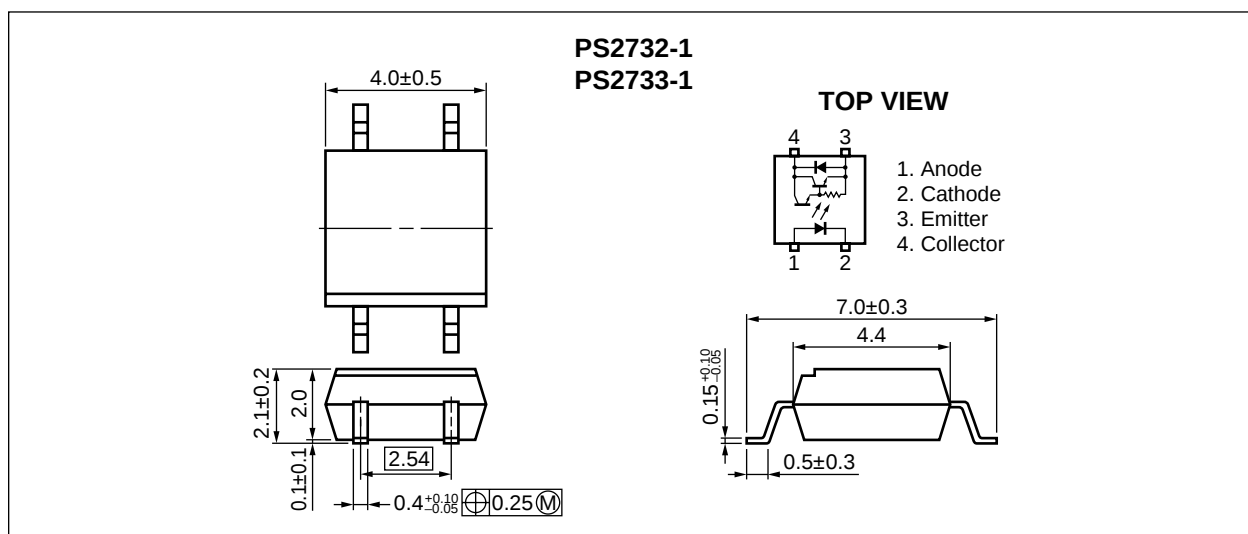
- High isolation voltage ($BV = 2\,500\text{ V r.m.s.}$)
- High collector to emitter voltage ($V_{CEO} = 300\text{ V}$: PS2732-1)
($V_{CEO} = 350\text{ V}$: PS2733-1)
- SOP (Small Outline Package) type
- High current transfer ratio ($CTR = 4\,000\%$ TYP.)
- Ordering number of taping product : PS2732-1-F3, F4, PS2733-1-F3, F4
- ★ • Safety standards
 - UL approved: File No. E72422
 - BSI approved: File No. 8219/8220
 - CSA approved: File No. CA 101391
 - DIN EN60747-5-2 (VDE0884 Part2) approved (Option)

APPLICATIONS

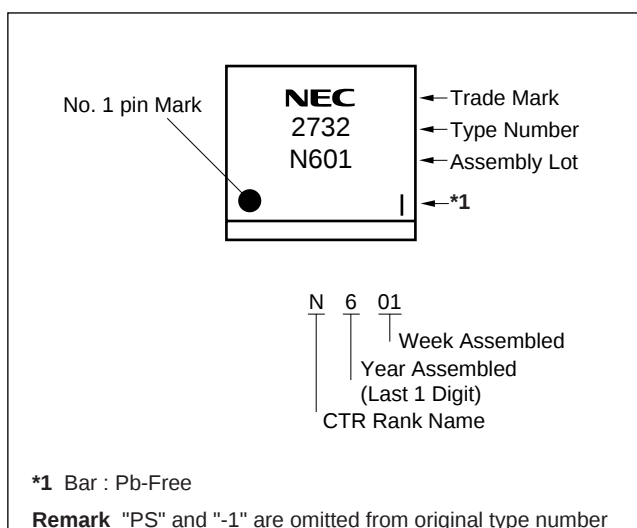
- Hybrid IC
- Telephone/Telegraph Receiver
- FAX

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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}
PS2732-1	PS2732-1-A	Pb-Free	Magazine case 100 pcs	Standard products (UL, BSI, CSA approved)	PS2732-1
PS2732-1-F3	PS2732-1-F3-A		Embossed Tape 3 500 pcs/reel		
PS2732-1-F4	PS2732-1-F4-A				
PS2732-1-V	PS2732-1-V-A		Magazine case 100 pcs	DIN EN60747-5-2	
PS2732-1-V-F3	PS2732-1-V-F3-A		Embossed Tape 3 500 pcs/reel	(VDE0884 Part2)	
PS2732-1-V-F4	PS2732-1-V-F4-A			Approved (Option)	
PS2733-1	PS2733-1-A		Magazine case 100 pcs	Standard products (UL, BSI, CSA approved)	PS2733-1
PS2733-1-F3	PS2733-1-F3-A		Embossed Tape 3 500 pcs/reel		
PS2733-1-F4	PS2733-1-F4-A				
PS2733-1-V	PS2733-1-V-A		Magazine case 100 pcs	DIN EN60747-5-2	
PS2733-1-V-F3	PS2733-1-V-F3-A		Embossed Tape 3 500 pcs/reel	(VDE0884 Part2)	
PS2733-1-V-F4	PS2733-1-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
			PS2732-1	PS2733-1	
Diode	Forward Current (DC)	I_F	50		mA
	Reverse Voltage	V_R	6		V
	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}	1		A
Transistor	Collector to Emitter Voltage	V_{CEO}	300	350	V
	Emitter to Collector Voltage	V_{ECO}	0.3		V
	Collector Current	I_C	150		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	2 500		Vr.m.s.
Operating Ambient Temperature		T_A	-55 to +100		$^\circ\text{C}$
Storage Temperature		T_{stg}	-55 to +150		$^\circ\text{C}$

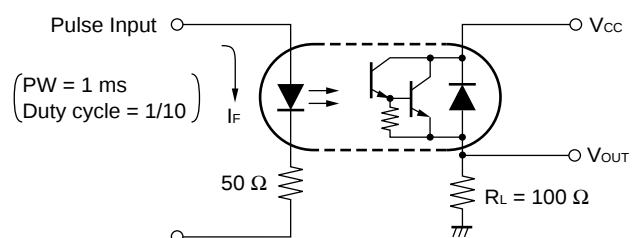
^{*1} PW = 100 μs , Duty Cycle = 1%

^{*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.

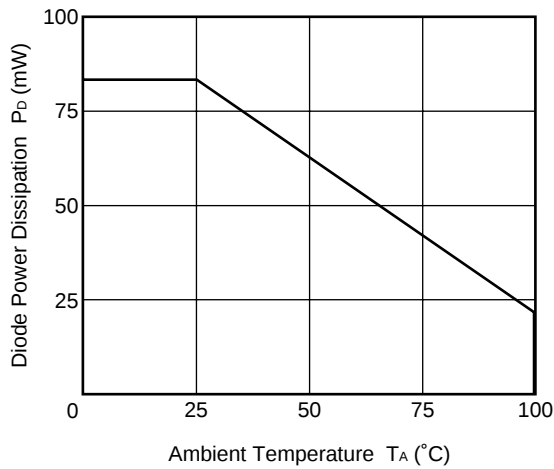
ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V_F	$I_F = 10\text{ mA}$		1.15	1.4	V
	Reverse Current	I_R	$V_R = 5\text{ V}$			5	μA
	Terminal Capacitance	C_t	$V = 0\text{ V}$, $f = 1\text{ MHz}$		30		pF
Transistor	Collector to Emitter Dark Current	I_{CEO}	$I_F = 0\text{ mA}$, $V_{CE} = 300\text{ V}$			400	nA
Coupled	Current Transfer Ratio (I_C/I_F)	CTR	$I_F = 1\text{ mA}$, $V_{CE} = 2\text{ V}$	1 500	4 000		%
	Collector Saturation Voltage	$V_{CE(sat)}$	$I_F = 1\text{ mA}$, $I_C = 2\text{ mA}$			1.0	V
	Isolation Resistance	R_{I-O}	$V_{I-O} = 1\text{ kV}_{DC}$	10^{11}			Ω
	Isolation Capacitance	C_{I-O}	$V = 0\text{ V}$, $f = 1\text{ MHz}$		0.4		pF
	Rise Time ^{*1}	t_r	$V_{CC} = 5\text{ V}$, $I_C = 10\text{ mA}$, $R_L = 100\text{ }\Omega$		100		μs
	Fall Time ^{*1}	t_f			100		

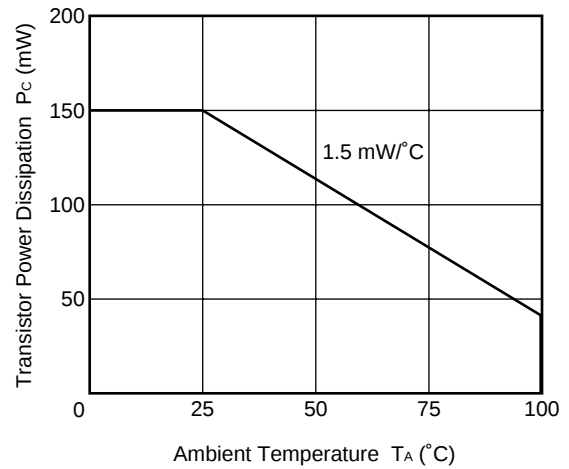
***1** Test circuit for switching time

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

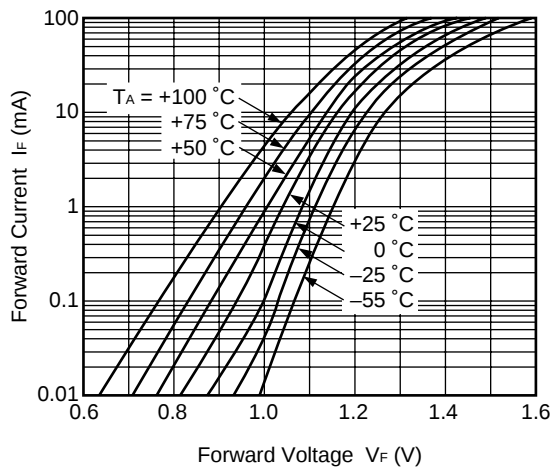
DIODE POWER DISSIPATION vs. AMBIENT TEMPERATURE



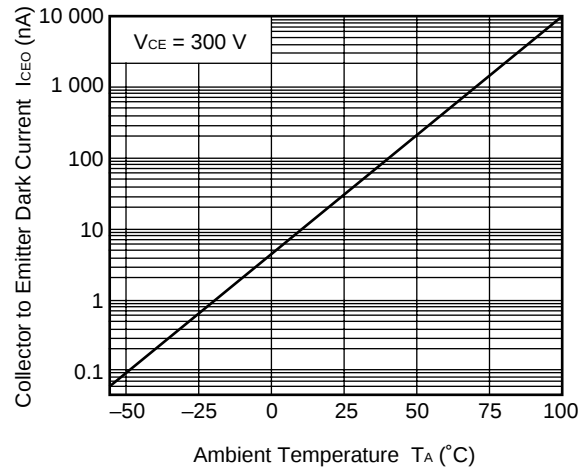
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



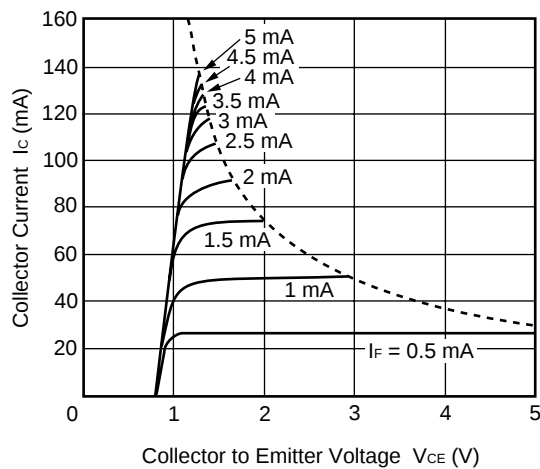
FORWARD CURRENT vs. FORWARD VOLTAGE



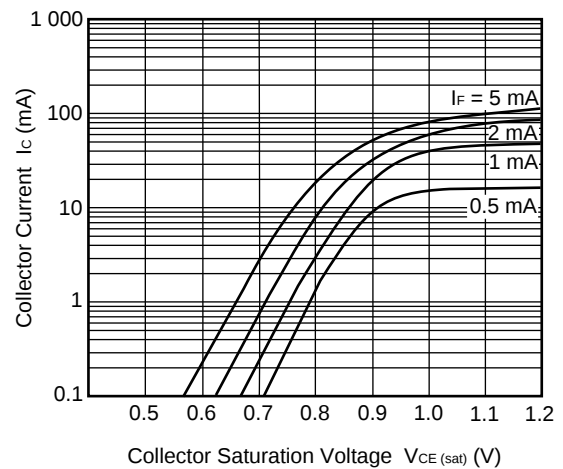
COLLECTOR TO EMITTER DARK CURRENT vs. AMBIENT TEMPERATURE



COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE

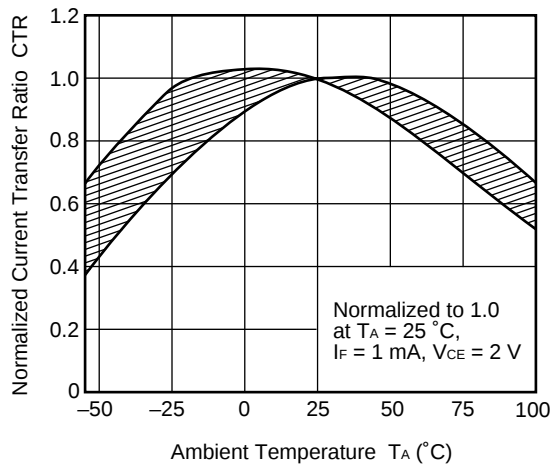


COLLECTOR CURRENT vs. COLLECTOR SATURATION VOLTAGE

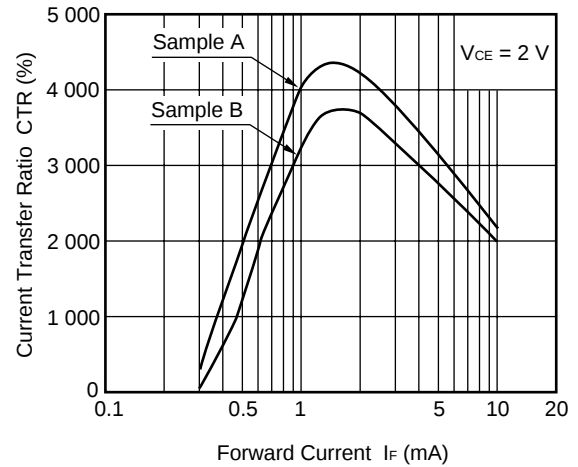


Remark The graphs indicate nominal characteristics.

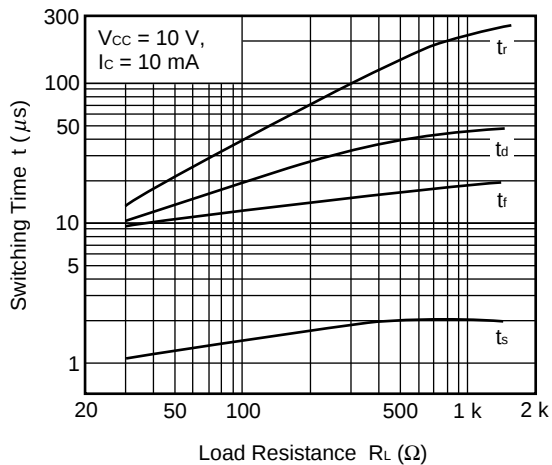
NORMALIZED CURRENT TRANSFER RATIO vs. AMBIENT TEMPERATURE



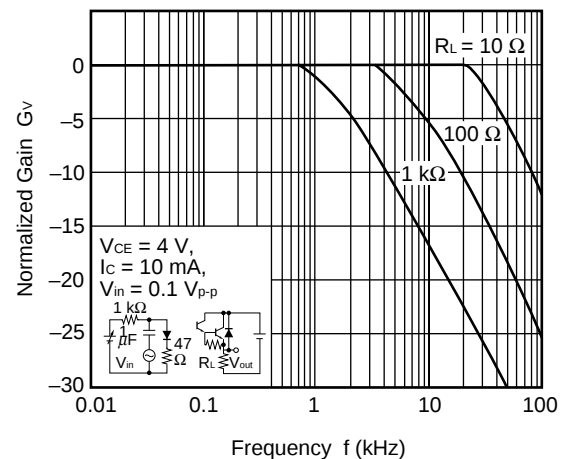
CURRENT TRANSFER RATIO vs. FORWARD CURRENT



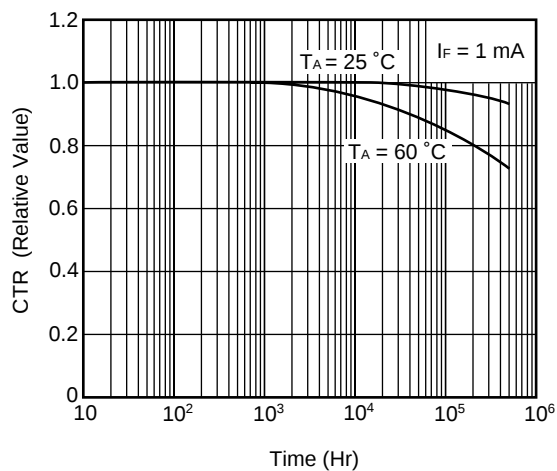
SWITCHING TIME vs. LOAD RESISTANCE



FREQUENCY RESPONSE



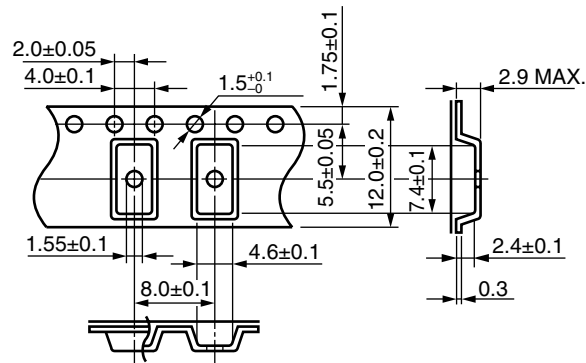
LONG TERM CTR DEGRADATION



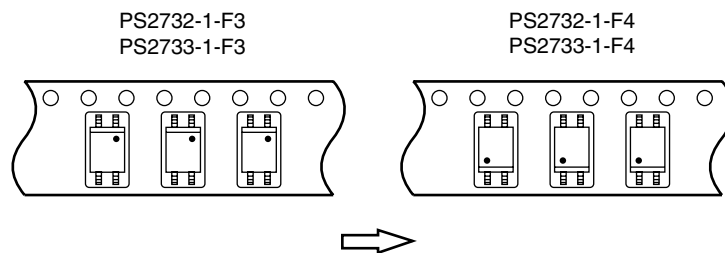
Remark The graphs indicate nominal characteristics.

TAPING SPECIFICATIONS (in millimeters)

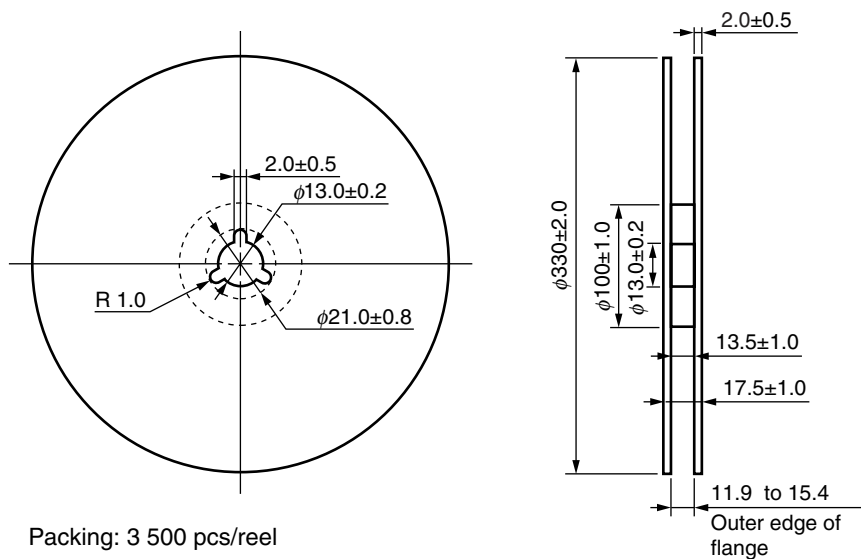
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)



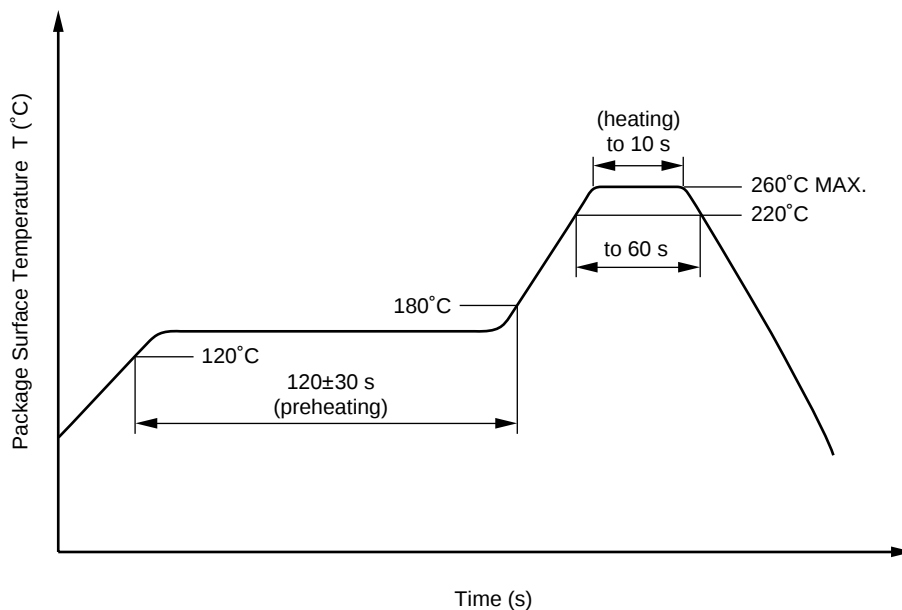
NOTES ON HANDLING

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 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.

SPECIFICATION OF VDE MARKS LICENSE DOCUMENT (VDE0884)

Parameter	Symbol	Speck	Unit
Application classification (DIN VDE 0109) for rated line voltages ≤ 150 Vr.m.s. for rated line voltages ≤ 300 Vr.m.s.		IV III	
Climatic test class (DIN IEC 68 Teil 1/09.80)		55/100/21	
Dielectric strength Maximum operating isolation voltage Test voltage (partial discharge test, procedure a for type test and random test) $U_{pr} = 1.2 \times U_{IORM}$, $P_d < 5$ pC	U_{IORM} U_{pr}	710 850	V_{peak} V_{peak}
Test voltage (partial discharge test, procedure b for all devices test) $U_{pr} = 1.6 \times U_{IORM}$, $P_d < 5$ pC	U_{pr}	1 140	V_{peak}
Highest permissible overvoltage	U_{TR}	4 000	V_{peak}
Degree of pollution (DIN VDE 0109)		2	
Clearance distance		> 5	mm
Creepage distance		> 5	mm
Comparative tracking index (DIN IEC 112/VDE 0303 part 1)	CTI	175	
Material group (DIN VDE 0109)		III a	
Storage temperature range	T_{stg}	-55 to +150	°C
Operating temperature range	T_A	-55 to +100	°C
Isolation resistance, minimum value $V_{IO} = 500$ V dc at $T_A = 25$ °C $V_{IO} = 500$ V dc at T_A MAX. at least 100 °C	Ris MIN. Ris MIN.	10^{12} 10^{11}	Ω Ω
Safety maximum ratings (maximum permissible in case of fault, see thermal derating curve) Package temperature Current (input current I_F , $P_{si} = 0$) Power (output or total power dissipation) Isolation resistance $V_{IO} = 500$ V dc at $T_A = 175$ °C (T_{si})	T_{si} I_{si} P_{si} Ris MIN.	150 300 500 10^9	°C mA mW Ω

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M8E 00.4-0110

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► For further information, please contact

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