DATA SHEET

NEC

PHOTOCOUPLER

PS2732-1,-2,-4, PS2733-1,-2,-4

HIGH COLLECTOR TO EMITTER VOLTAGE SOP MULTI PHOTOCOUPLER

–NEPOC™ Series–

DESCRIPTION

The PS2732-1, -2, -4 and PS2733-1, -2, -4 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 Vr.m.s.)
- High collector to emitter voltage (V_{CEO} = 300 V: PS2732-1, -2, -4)
  (V_{CEO} = 350 V: PS2733-1, -2, -4)
- SOP (Small Outline Package) type
- High current transfer ratio (CTR = 4 000 % TYP.)
- Ordering number of taping product (only 1-channel type) : PS2732-1-E3, E4, F3, F4, PS2733-1-E3, E4, F3, F4
- UL approved: File No. E72422 (S)
- VDE0884 approved (Option)

★ APPLICATIONS

- Hybrid IC
- Telephone/Telegraph Receiver
- FAX

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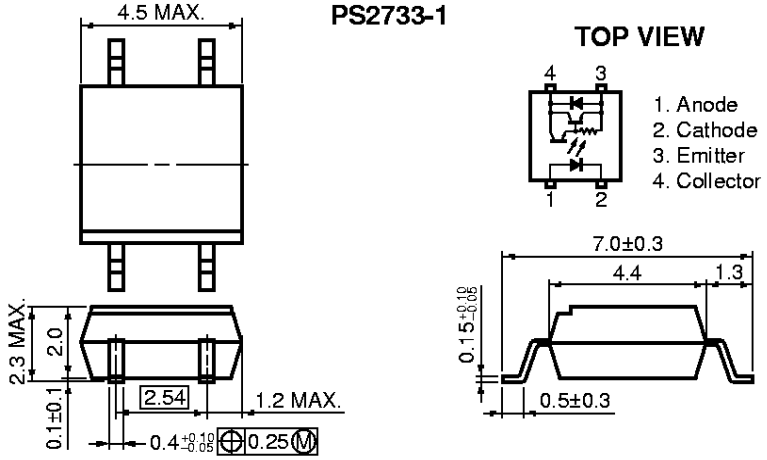
Printed in Japan

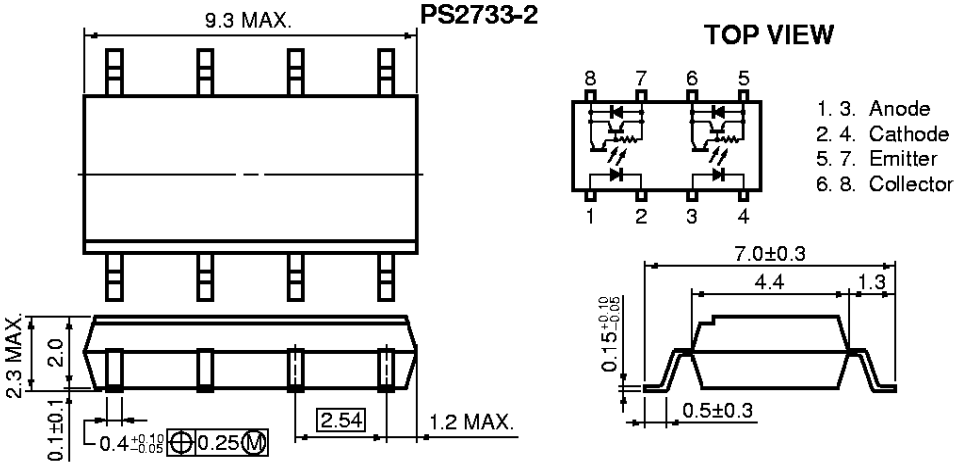
The mark ★ shows major revised points.

PACKAGE DIMENSIONS (in millimeters)

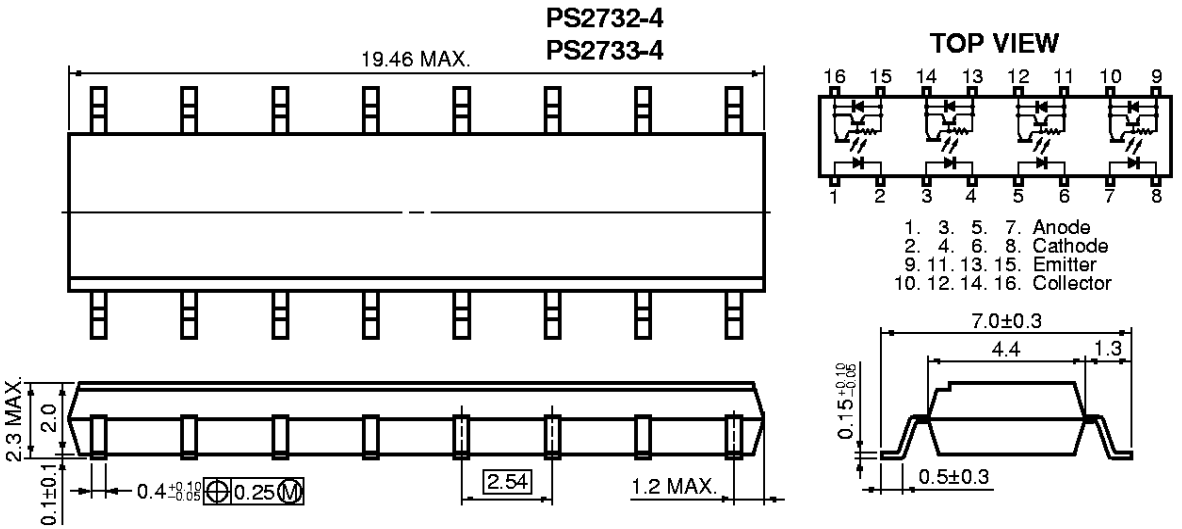
PS2732-1
PS2733-1



PS2732-2
PS2733-2



PS2732-4
PS2733-4



ORDERING INFORMATION

Part Number	Package	Safety Standard Approval
PS2732-1, PS2733-1	4-pin SOP	Standard products • UL approved
PS2732-2, PS2733-2	8-pin SOP	
PS2732-4, PS2733-4	16-pin SOP	
PS2732-1-V, PS2733-1-V	4-pin SOP	VDE0884 approved products (Option)
PS2732-2-V, PS2733-2-V	8-pin SOP	
PS2732-4-V, PS2733-4-V	16-pin SOP	

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C, unless otherwise specified)

Parameter		Symbol	Ratings				Unit
			PS2732-1	PS2733-1	PS2732-2,-4	PS2733-2,-4	
Diode	Forward Current (DC)	I_F	50				mA
	Reverse Voltage	V_R	6				V
	Power Dissipation Derating	$\Delta P_D/°C$	0.8				mW/°C
	Power Dissipation	P_D	80				mW/ch
	Peak Forward Current*1	I_{FP}	1				A
Transistor	Collector to Emitter Voltage	V_{CEO}	300	350	300	350	V
★	Emitter to Collector Voltage	V_{ECO}	0.3				V
	Collector Current	I_C	150				mA/ch
	Power Dissipation Derating	$\Delta P_C/°C$	1.5		1.2		mW/°C
	Power Dissipation	P_C	150		120		mW/ch
Isolation Voltage*2		BV	2 500				Vr.m.s.
Operating Ambient Temperature		T_A	–55 to +100				°C
Storage Temperature		T_{stg}	–55 to +150				°C

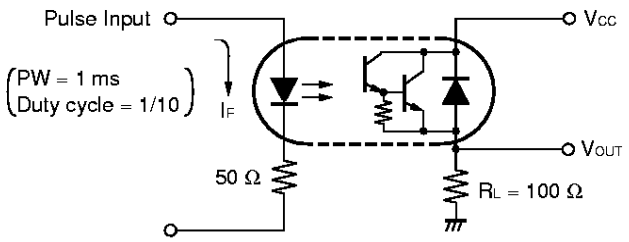
*1 PW = 100 μs, Duty Cycle = 1 %

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

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

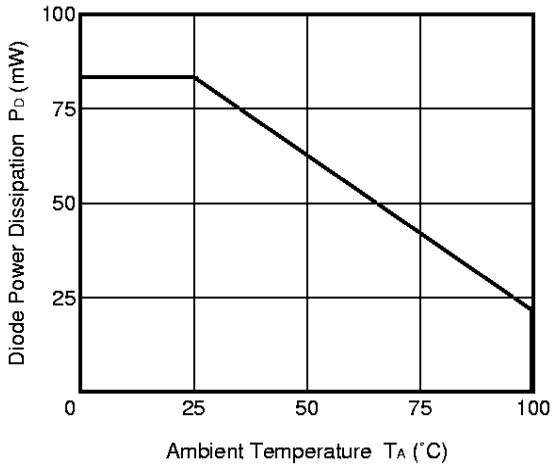
Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V_F	I_F = 10 mA		1.15	1.4	V
	Reverse Current	I_R	V_R = 5 V			5	μA
	Terminal Capacitance	C_t	V = 0 V, f = 1 MHz		30		pF
Transistor	Collector to Emitter Current	I_{CEO}	I_F = 0 mA, V_{CE} = 300 V			400	nA
Coupled	Current Transfer Ratio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

*1 Test circuit for switching time

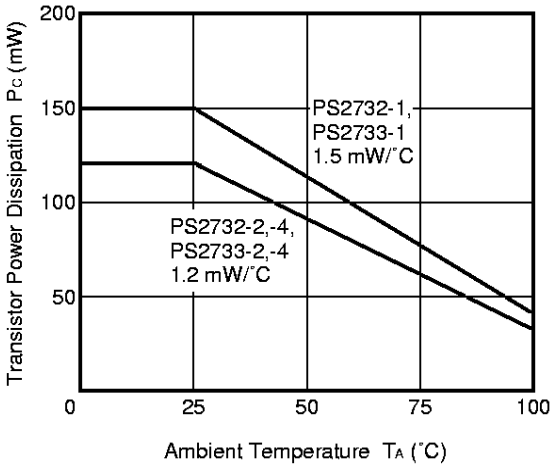


TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise specified)

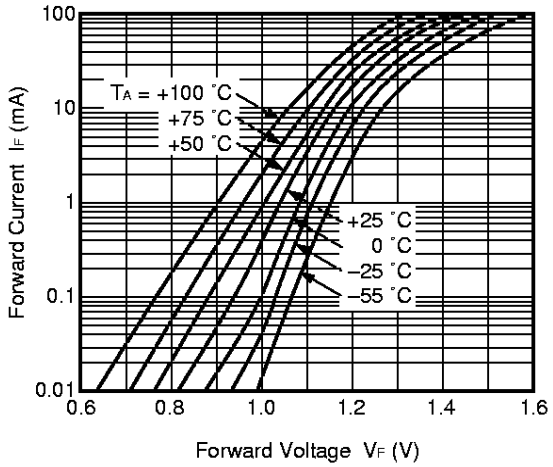
DIODE POWER DISSIPATION vs. AMBIENT TEMPERATURE



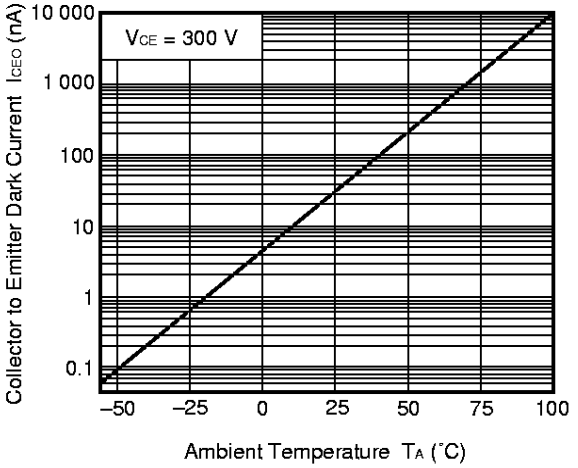
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



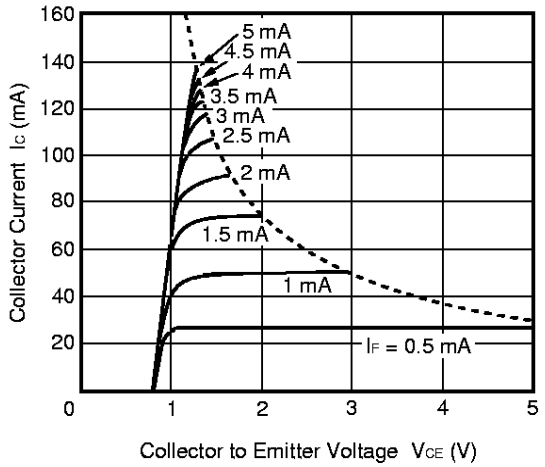
FORWARD CURRENT vs. FORWARD VOLTAGE



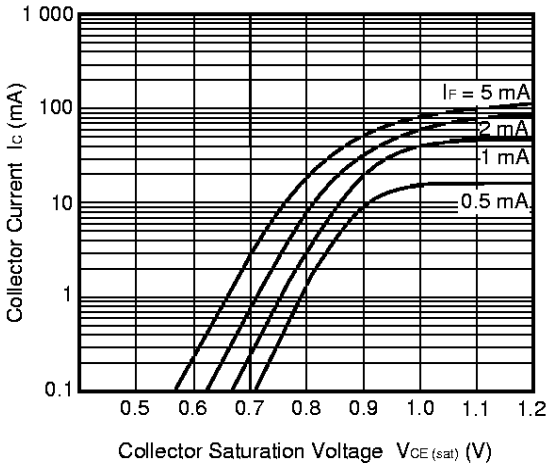
COLLECTOR TO EMITTER DARK CURRENT vs. AMBIENT TEMPERATURE



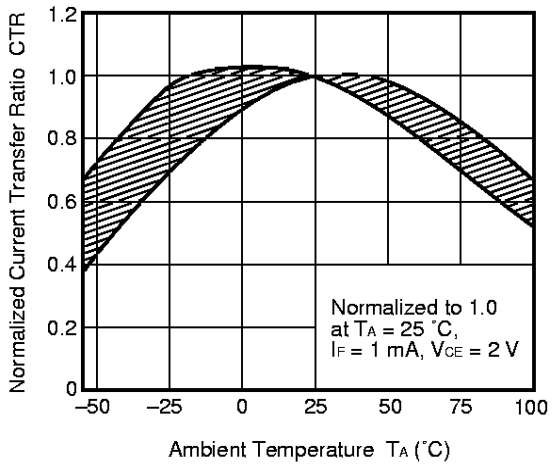
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



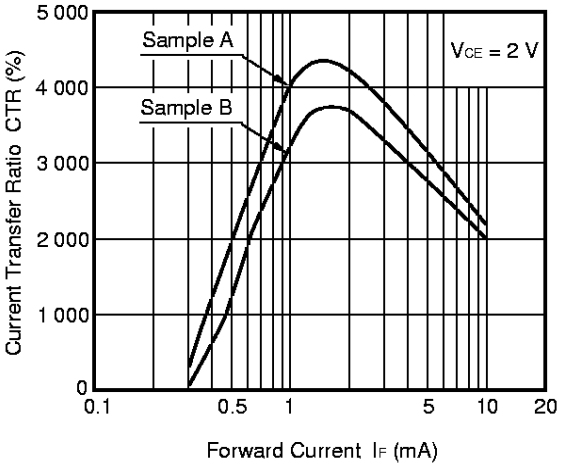
COLLECTOR CURRENT vs. COLLECTOR SATURATION VOLTAGE



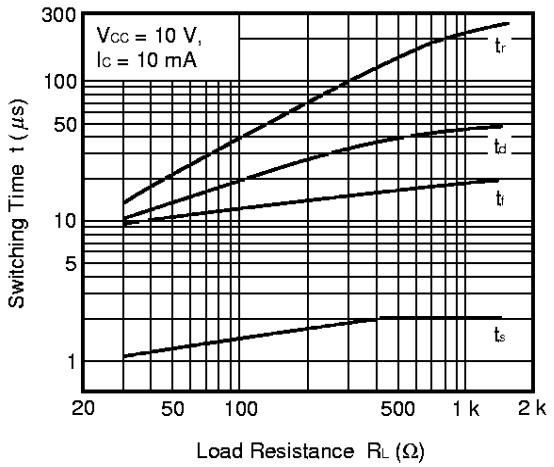
NORMALIZED CURRENT TRANSFER RATIO vs. AMBIENT TEMPERATURE



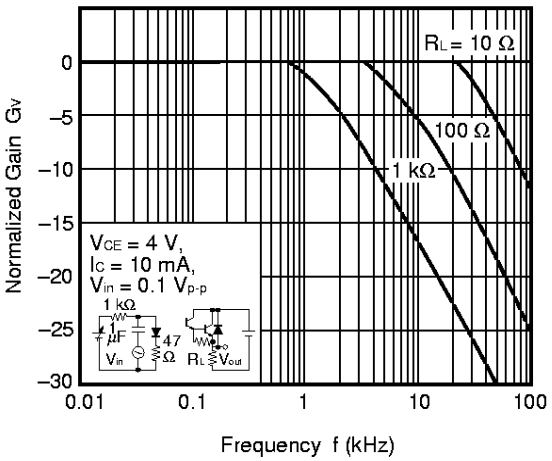
CURRENT TRANSFER RATIO vs. FORWARD CURRENT



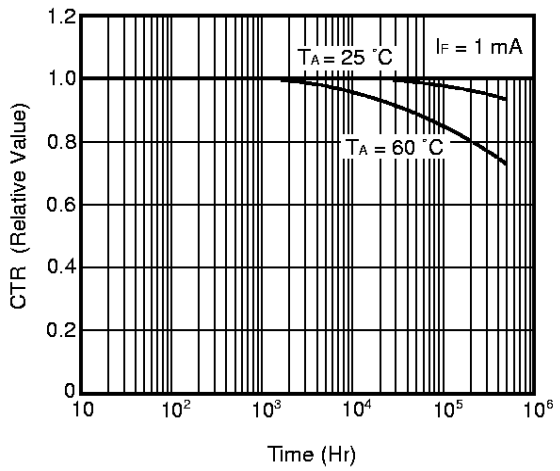
SWITCHING TIME vs. LOAD RESISTANCE



FREQUENCY RESPONSE



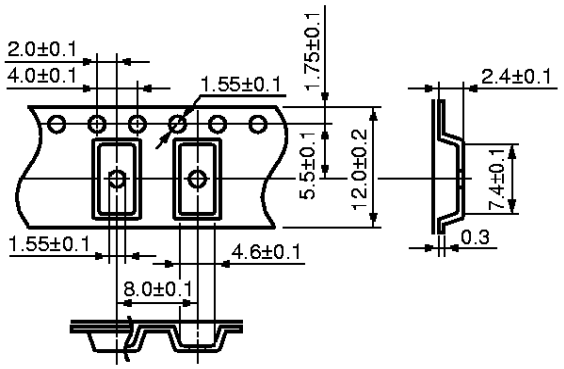
LONG TERM CTR DEGRADATION



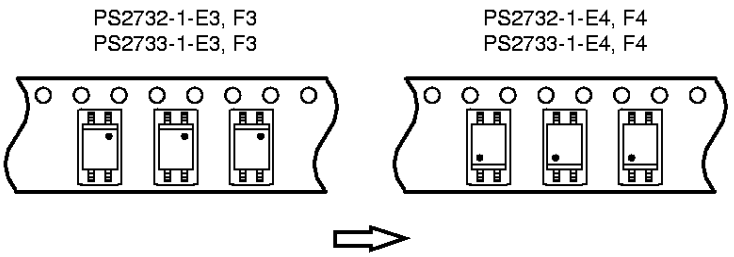
Remark The measurement of TYPICAL CHARACTERISTICS are only for reference, not guaranteed.

★ **TAPING SPECIFICATIONS (in millimeters)**

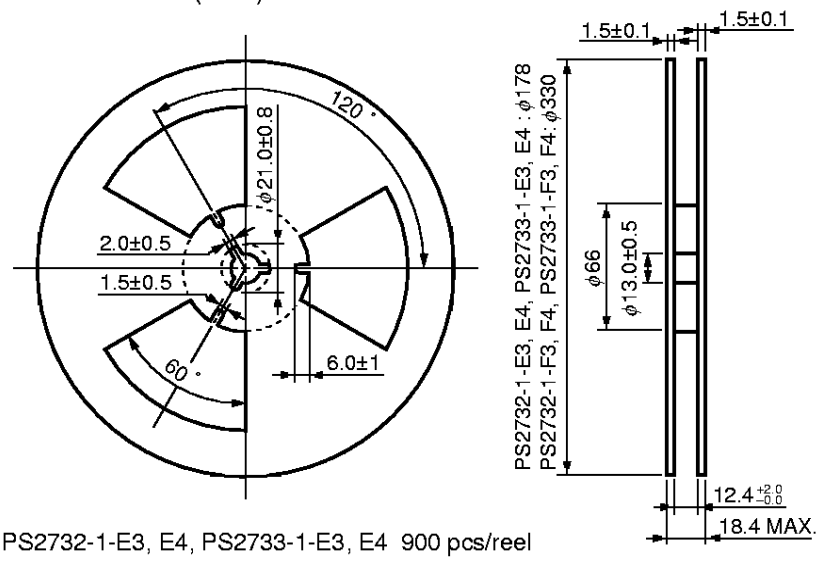
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)



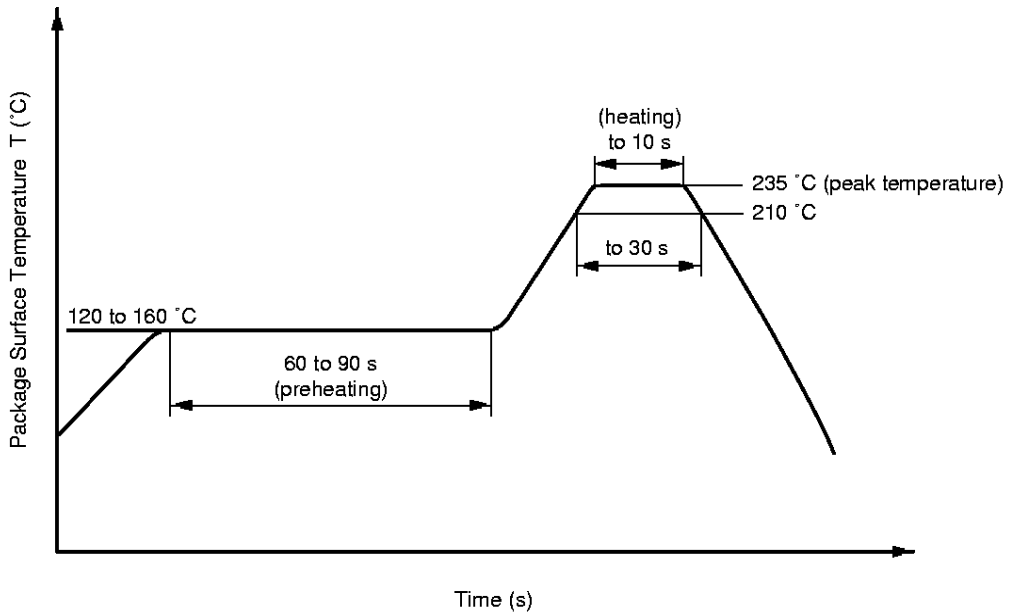
Packing: PS2732-1-E3, E4, PS2733-1-E3, E4 900 pcs/reel
PS2732-1-F3, F4, PS2733-1-F3, F4 3 500 pcs/reel

★ RECOMMENDED SOLDERING CONDITIONS

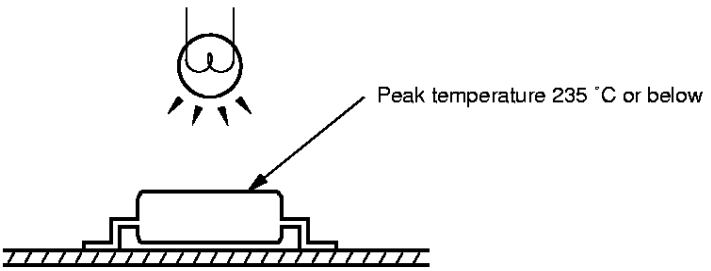
(1) Infrared reflow soldering

- Peak reflow temperature — 235 °C (package surface temperature)
- Time of temperature higher than 210 °C — 30 seconds or less
- 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



Caution Please avoid to removed the residual flux by water after the first reflow processes.



(2) Dip soldering

- Temperature — 260 °C or below (molten solder temperature)
- Time — 10 seconds or less
- Number of times — One
- Flux — Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt % is recommended.)

SPECIFICATION OF VDE MARKS LICENSE DOCUMENT (VDE0884)

Parameter	Symbol	Speck	Unit
Application classification (DIN VDE 0109)			
for rated line voltages ≤ 150 Vr.m.s.		IV	
for rated line voltages ≤ 300 Vr.m.s.		III	
Climatic test class (DIN IEC 68 Teil 1/09.80)		55/100/21	
Dielectric strength			
Maximum operating isolation voltage	U_{IORM}	710	V_{peak}
Test voltage (partial discharge test, procedure a for type test and random test)	U_{pr}	850	V_{peak}
$U_{pr} = 1.2 \times U_{IORM}$, $P_d < 5$ pC			
Test voltage (partial discharge test, procedure b for random 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	Ris MIN.	10^{12}	Ω
V_{IO} = 500 V dc at T_A MAX. at least 100 °C	Ris MIN.	10^{11}	Ω
Safety maximum ratings (maximum permissible in case of fault, see thermal derating curve)			
Package temperature	Tsi	150	°C
Current (input current I_F, Psi = 0)	Isi	300	mA
Power (output or total power dissipation)	Psi	500	mW
Isolation resistance			
V_{IO} = 500 V dc at T_A = 175 °C (Tsi)	Ris MIN.	10^9	Ω

[MEMO]

[MEMO]

CAUTION

Within this device there exists GaAs (Gallium Arsenide) material which is a harmful substance if ingested. Please do not under any circumstances break the hermetic seal.

NEPOC is a trademark of NEC Corporation.

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