

HIGH COLLECTOR TO EMITTER VOLTAGE 4, 16-PIN SSOP PHOTOCOUPLER

—NEPOC Series—

DESCRIPTION

The PS2832-1, -4 and PS2833-1, -4 are optically coupled isolators containing a GaAs light emitting diode and an NPN silicon darlington-connected phototransistor.

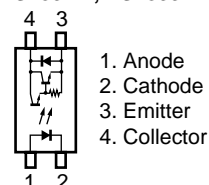
The package is a Shrink SOP (Small Outline Package) type for high density mounting applications.

FEATURES

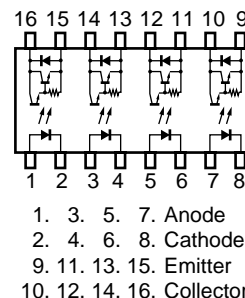
- High collector to emitter voltage ($V_{CEO} = 300\text{ V}$: PS2832-1, -4)
($V_{CEO} = 350\text{ V}$: PS2833-1, -4)
- Small and thin package (4, 16-pin SSOP, Pin pitch 1.27 mm)
- High isolation voltage ($BV = 2\,500\text{ V r.m.s.}$)
- High current transfer ratio ($CTR = 2\,000\%$ TYP.)
- Ordering number of tape product: PS2832-1-F3, F4, PS2832-4-F3, F4
PS2833-1-F3, F4, PS2833-4-F3, F4
- <R> • Safety standards: PS2832-1, -4
 - UL approved: No. E72422
 - BSI approved: No. 8315, 8316
 - CSA approved: No. CA 101391
 - DIN EN60747-5-2 (VDE0884 Part2) approved
No. 40008905 (Option)
- PS2833-1, -4
 - UL approved: No. E72422
 - CSA approved: No. CA 101391
 - DIN EN60747-5-2 (VDE0884 Part2) approved
No. 40008905 (Option)

PIN CONNECTION (Top View)

PS2832-1, PS2833-1



PS2832-4, PS2833-4

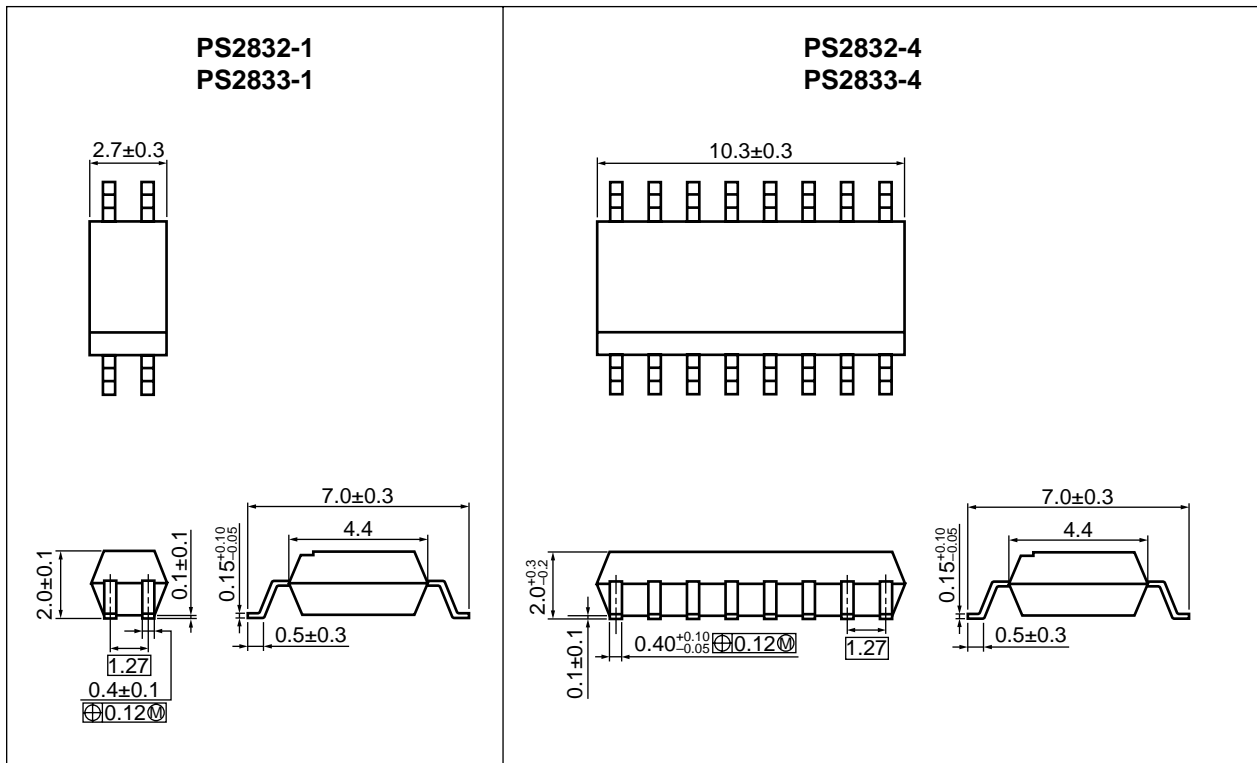


APPLICATIONS

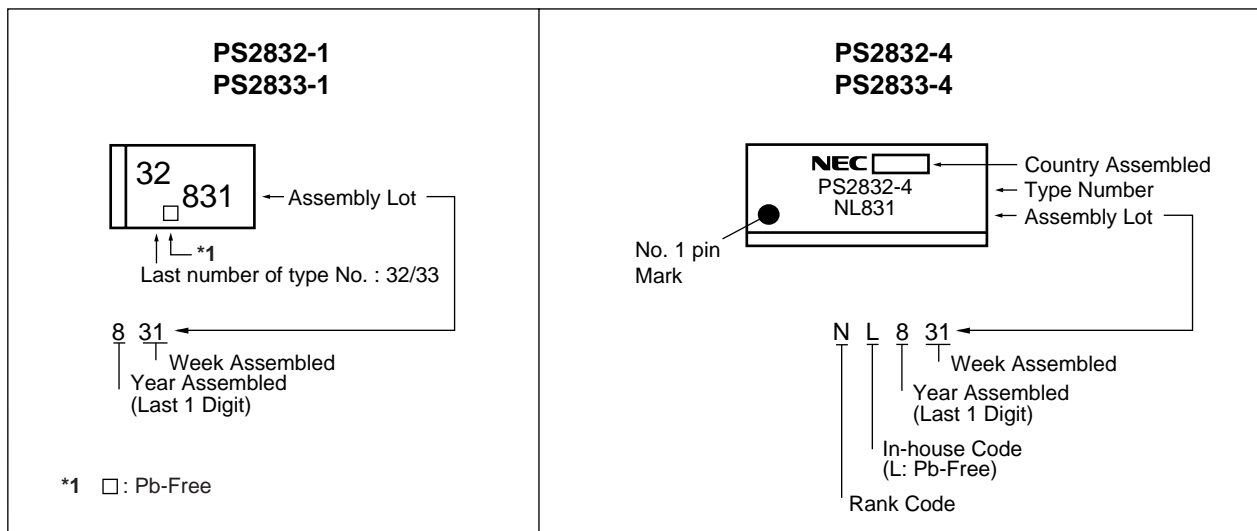
- Hybrid IC
- Telephone/Telegraph Receiver
- FAX

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PACKAGE DIMENSIONS (UNIT: mm)



<R> MARKING EXAMPLE



<R> ORDERING INFORMATION

Part Number	Order Number	Solder Plating Specification	Packing Style	Safety Standard Approval	Application Part Number ^{*1}
PS2832-1	PS2832-1-A	Pb-Free	50 pcs (Tape 50 pcs cut)	Standard products (UL, BSI, CSA approved)	PS2832-1
PS2832-1-F3	PS2832-1-F3-A		Embossed Tape 3 500 pcs/reel		
PS2832-1-F4	PS2832-1-F4-A				
PS2832-4	PS2832-4-A		Magazine Case 45 pcs		PS2832-4
PS2832-4-F3	PS2832-4-F3-A		Embossed Tape 2 500 pcs/reel		
PS2832-4-F4	PS2832-4-F4-A				
PS2832-1-V	PS2832-1-V-A		50 pcs (Tape 50 pcs cut)	DIN EN60747-5-2 (VDE0884 Part2) Approved (Option)	PS2832-1
PS2832-1-V-F3	PS2832-1-V-F3-A		Embossed Tape 3 500 pcs/reel		
PS2832-1-V-F4	PS2832-1-V-F4-A				
PS2832-4-V	PS2832-4-V-A		Magazine Case 45 pcs		PS2832-4
PS2832-4-V-F3	PS2832-4-V-F3-A		Embossed Tape 2 500 pcs/reel		
PS2832-4-V-F4	PS2832-4-V-F4-A				
PS2833-1	PS2833-1-A		50 pcs (Tape 50 pcs cut)	Standard products (UL, CSA approved)	PS2833-1
PS2833-1-F3	PS2833-1-F3-A		Embossed Tape 3 500 pcs/reel		
PS2833-1-F4	PS2833-1-F4-A				
PS2833-4	PS2833-4-A		Magazine Case 45 pcs		PS2833-4
PS2833-4-F3	PS2833-4-F3-A		Embossed Tape 2 500 pcs/reel		
PS2833-4-F4	PS2833-4-F4-A				
PS2833-1-V	PS2833-1-V-A		50 pcs (Tape 50 pcs cut)	DIN EN60747-5-2 (VDE0884 Part2) Approved (Option)	PS2833-1
PS2833-1-V-F3	PS2833-1-V-F3-A		Embossed Tape 3 500 pcs/reel		
PS2833-1-V-F4	PS2833-1-V-F4-A				
PS2833-4-V	PS2833-4-V-A		Magazine Case 45 pcs		PS2833-4
PS2833-4-V-F3	PS2833-4-V-F3-A		Embossed Tape 2 500 pcs/reel		
PS2833-4-V-F4	PS2833-4-V-F4-A				

*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
			PS2832-1	PS2833-1	PS2832-4	PS2833-4	
Diode	Forward Current (DC)	I _F	50				mA/ch
	Reverse Voltage	V _R	6				V
	Power Dissipation Derating	ΔP _b /°C	0.6		0.8		mW/°C
	Power Dissipation	P _D	60		80		mW/ch
	Peak Forward Current ^{*1}	I _{FP}	1				A/ch
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	60				mA/ch
	Power Dissipation Derating	ΔP _c /°C	1.2				mW/°C
	Power Dissipation	P _C	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 $T_A = 25^\circ\text{C}$, RH = 60% between input and output.

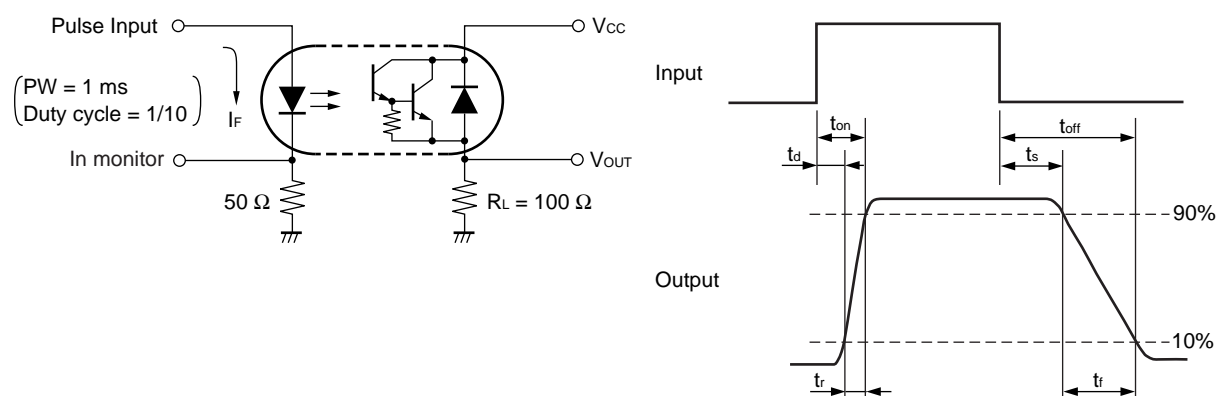
Pins 1-2 shorted together, 3-4 shorted together (PS2832-1, PS2833-1).

Pins 1-8 shorted together, 9-16 shorted together (PS2832-4, PS2833-4).

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

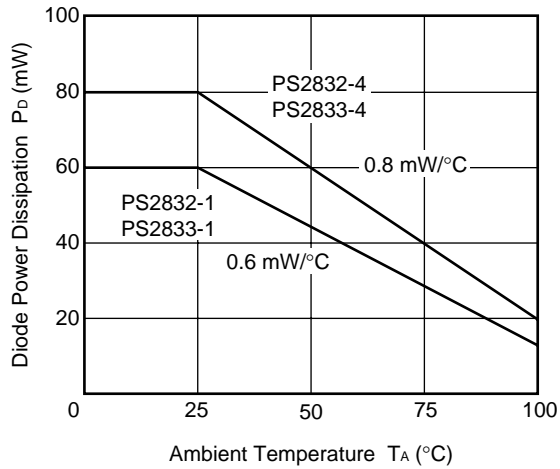
Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V_F	$I_F = 10\text{ mA}$		1.2	1.4	V
	Reverse Current	I_R	$V_R = 5\text{ V}$			5	μA
	Terminal Capacitance	C_t	$V = 0\text{ V}, f = 1\text{ MHz}$		15		pF
Transistor	Collector to Emitter Dark Current	I_{CEO}	$I_F = 0\text{ mA}, V_{CE} = 300\text{ V}$			400	nA
Coupled	Current Transfer Ratio (I_C/I_F)	CTR	$I_F = 1\text{ mA}, V_{CE} = 2\text{ V}$	400	2 000	4 500	%
	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	$V_{CC} = 5\text{ V}, I_C = 10\text{ mA}, R_L = 100\text{ }\Omega$		20		μs
	Fall Time ^{*1}	t_f			5		

<R> *1 Test circuit for switching time

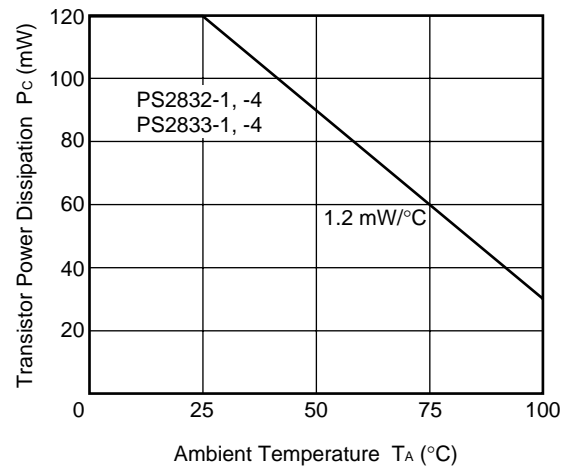


TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise specified)

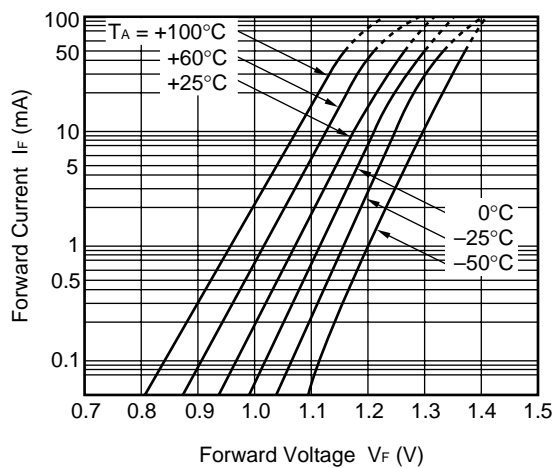
DIODE POWER DISSIPATION vs. AMBIENT TEMPERATURE



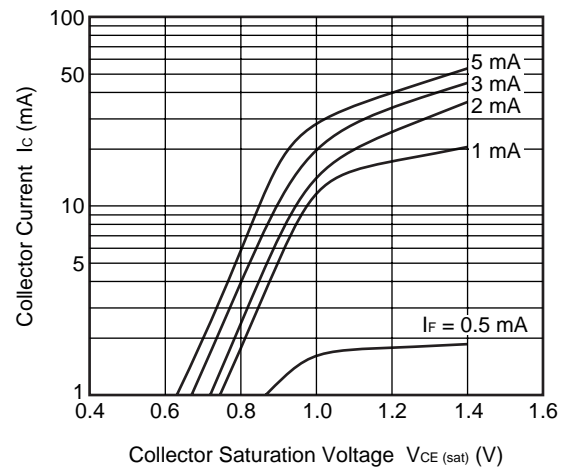
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



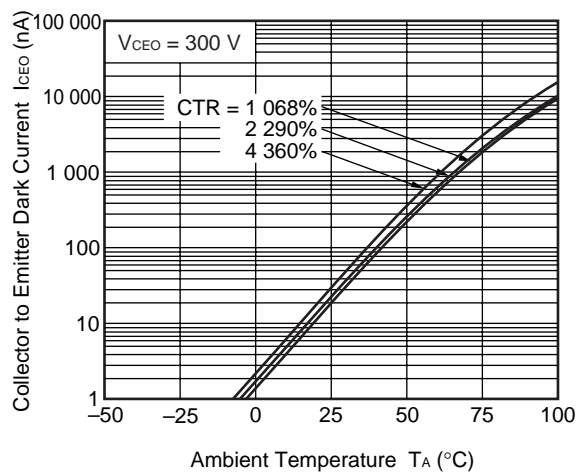
FORWARD CURRENT vs. FORWARD VOLTAGE



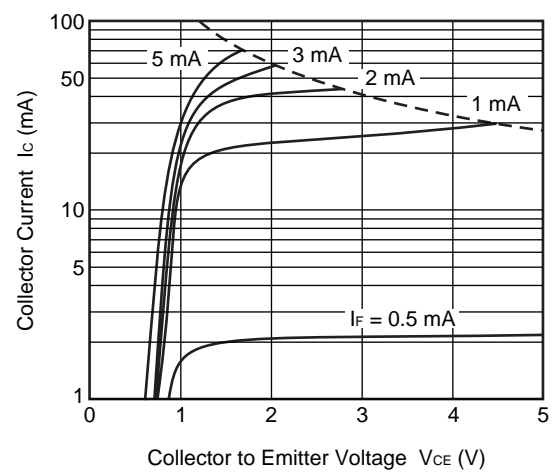
COLLECTOR CURRENT vs. COLLECTOR SATURATION VOLTAGE



COLLECTOR TO EMITTER DARK CURRENT vs. AMBIENT TEMPERATURE

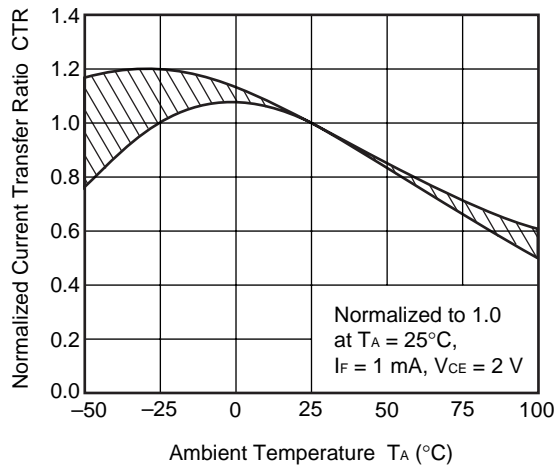


COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE

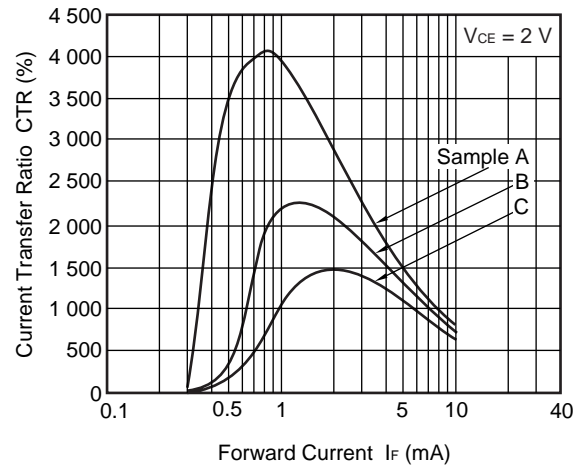


Remark The graphs indicate nominal characteristics.

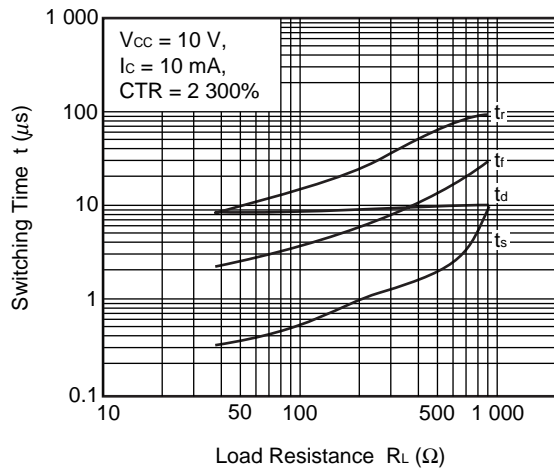
NORMALIZED CURRENT TRANSFER RATIO vs. AMBIENT TEMPERATURE



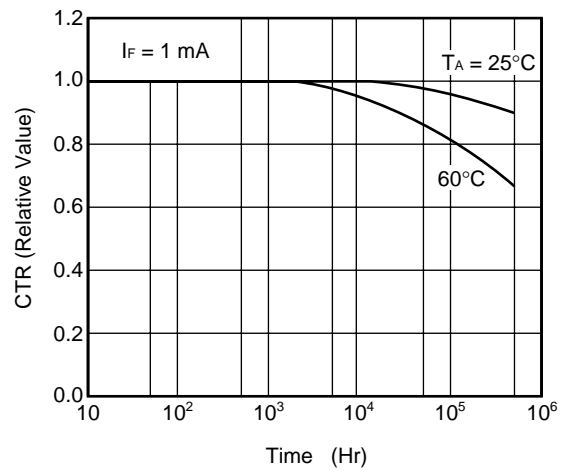
CURRENT TRANSFER RATIO vs. FORWARD CURRENT



SWITCHING TIME vs. LOAD RESISTANCE



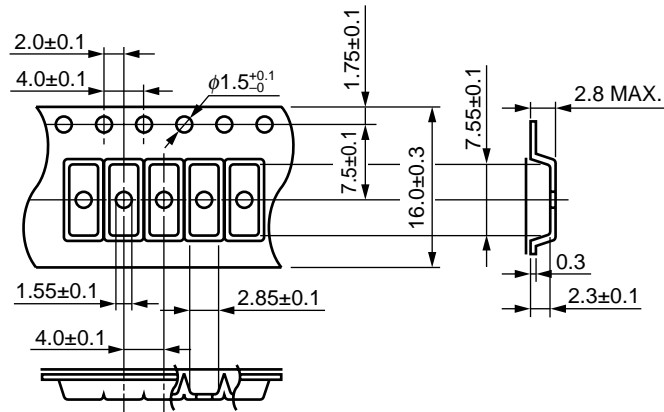
LONG TERM CTR DEGRADATION



Remark The graphs indicate nominal characteristics.

TAPING SPECIFICATIONS (UNIT: mm)

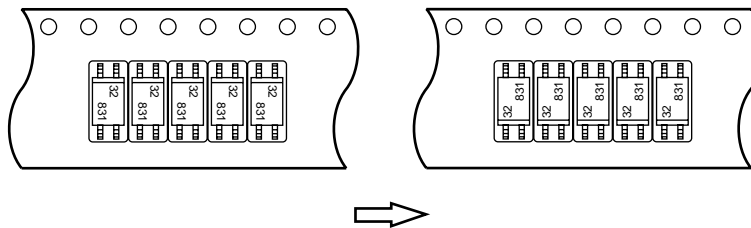
Outline and Dimensions (Tape)



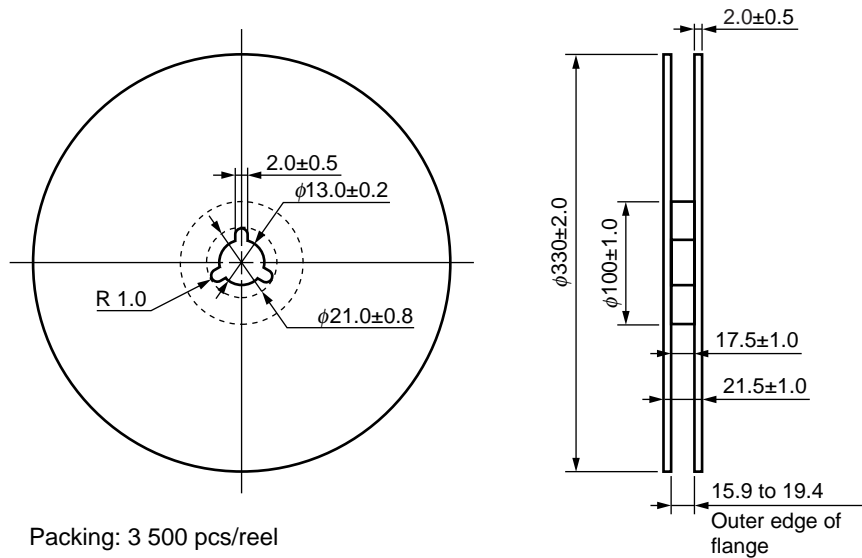
Tape Direction

PS2832-1-F3
PS2833-1-F3

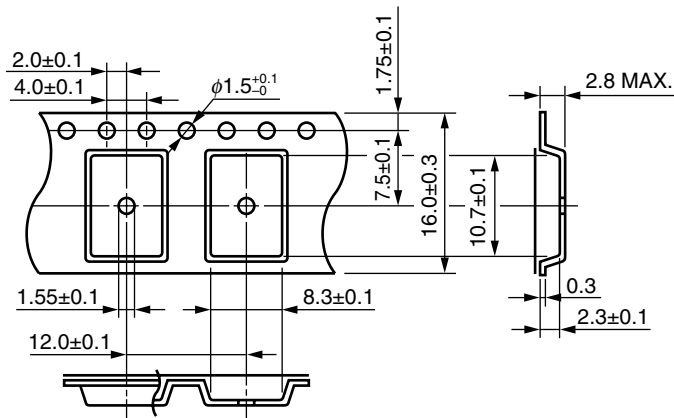
PS2832-1-F4
PS2833-1-F4



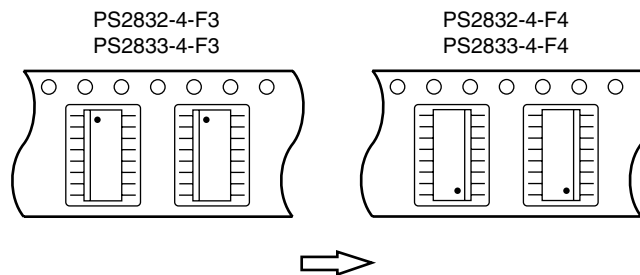
Outline and Dimensions (Reel)



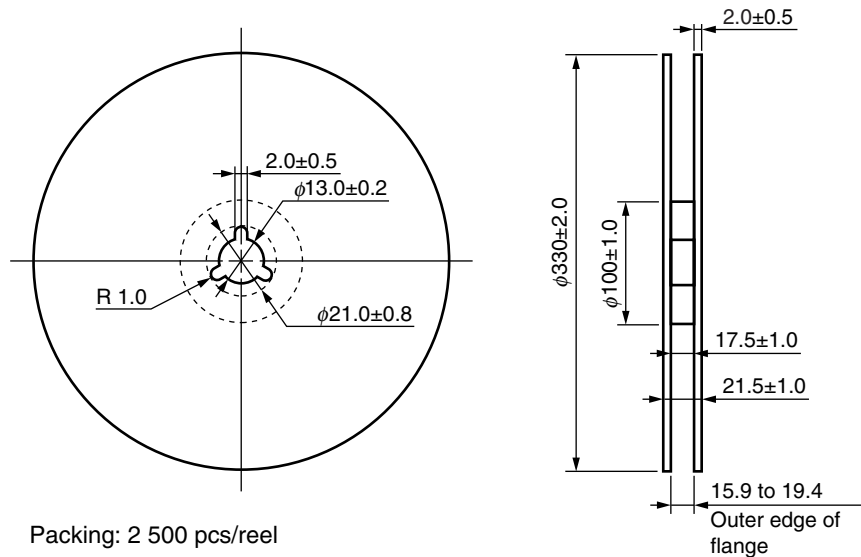
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)



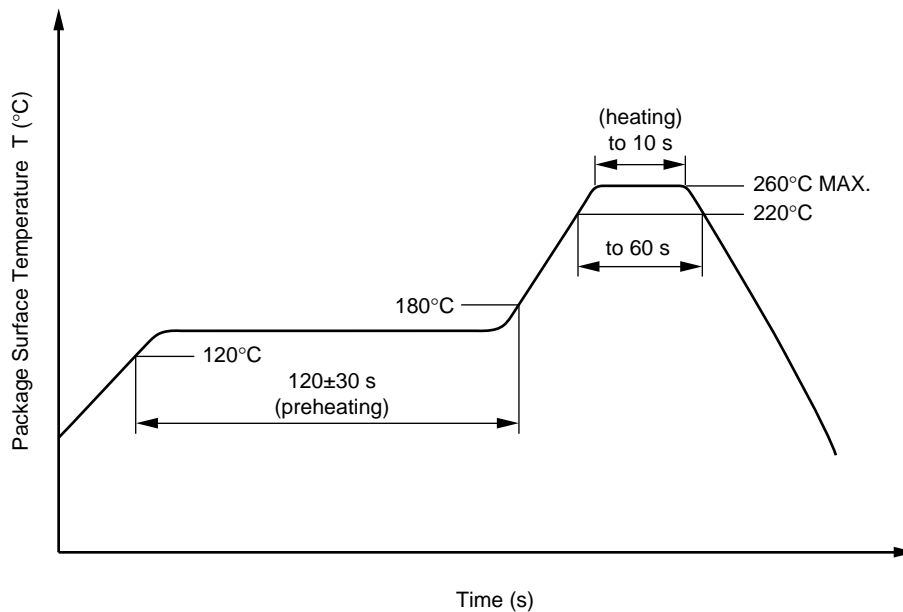
NOTES ON HANDLING

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.

<R> SPECIFICATION OF VDE MARKS LICENSE DOCUMENT

Parameter	Symbol	Spec.	Unit
Climatic test class (IEC 60068-1/DIN EN 60068-1)		55/100/21	
Dielectric strength maximum operating isolation voltage Test voltage (partial discharge test, procedure a for type test and random test) $U_{pr} = 1.5 \times U_{IORM}$, $P_d < 5 \text{ pC}$	U_{IORM} U_{pr}	705 1 058	V_{peak} V_{peak}
Test voltage (partial discharge test, procedure b for all devices) $U_{pr} = 1.875 \times U_{IORM}$, $P_d < 5 \text{ pC}$	U_{pr}	1 322	V_{peak}
Highest permissible overvoltage	U_{TR}	6 000	V_{peak}
Degree of pollution (DIN EN 60664-1 VDE0110 Part 1)		2	
Clearance distance		>5.0	mm
Creepage distance		>5.0	mm
Comparative tracking index (IEC 60112/DIN EN 60112 (VDE 0303 Part 11))	CTI	175	
Material group (DIN EN 60664-1 VDE0110 Part 1)		III a	
Storage temperature range	T_{stg}	-55 to +150	°C
Operating temperature range	T_A	-55 to +100	°C
Isolation resistance, minimum value $V_{IO} = 500 \text{ V dc}$ at $T_A = 25^\circ\text{C}$ $V_{IO} = 500 \text{ V dc}$ at $T_A \text{ MAX.}$ at least 100°C	$R_{is \text{ MIN.}}$ $R_{is \text{ MIN.}}$	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 $V_{IO} = 500 \text{ V dc}$ at $T_A = T_{si}$	T_{si} I_{si} P_{si} $R_{is \text{ MIN.}}$	150 300 500 10^9	°C mA mW Ω

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M8E 02.11-1

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.