

PHOTOCOUPLER **PS2732-1,PS2733-1**

-NEPOC Series-

HIGH COLLECTOR TO EMITTER VOLTAGE SOP MULTI PHOTOCOUPLER

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 Vr.m.s.)
- High collector to emitter voltage (VcEo = 300 V: PS2732-1)

(VCEO = 350 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
- UL approved: File No. E72422 (S)
- VDE0884 approved (Option)

APPLICATIONS

- Hybrid IC
- · Telephone/Telegraph Receiver
- FAX

ORDERING INFORMATION (Solder Contains Lead)

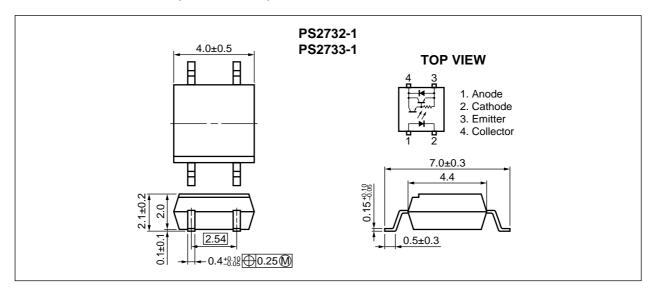
Part Number	Package	Safety Standard Approval	
PS2732-1, PS2733-1	4-pin SOP	Standard products	
		UL approved	
PS2732-1-V, PS2733-1-V	4-pin SOP	VDE0884 approved products (Option)	

ORDERING INFORMATION (Pb-Free)

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

The information in this document is subject to change without notice. Before using this document, please confirm that this is the latest version.

★ PACKAGE DIMENSIONS (in millimeters)



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

Parameter		Symbol	Ratings		Unit
			PS2732-1	PS2733-1	
Diode	Forward Current (DC)	lF	50		mA
	Reverse Voltage	VR	6		٧
	Power Dissipation Derating	⊿P₀/°C	0.8		mW/°C
	Power Dissipation	Po	80		mW
	Peak Forward Current*1	IFP	1		Α
Transistor	Collector to Emitter Voltage	Vceo	300	350	٧
	Emitter to Collector Voltage	VECO	0.	0.3	
	Collector Current	Ic	150		mA
	Power Dissipation Derating	⊿Pc/°C	1.5		mW/°C
	Power Dissipation	Pc	150		mW
Isolation Vo	oltage ^{*2}	BV	BV 2 500		Vr.m.s.
Operating A	perating Ambient Temperature T _A -55 to +100		+100	°C	
Storage Te	Storage Temperature		-55 to +150		°C

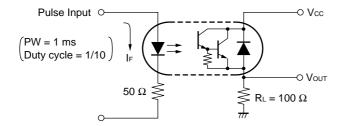
^{*1} PW = 100 μ s, Duty Cycle = 1 %

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

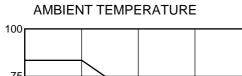
ELECTRICAL CHARACTERISTICS (TA = 25 °C)

	Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	VF	I _F = 10 mA		1.15	1.4	V
	Reverse Current	lr	V _R = 5 V			5	μА
	Terminal Capacitance	Ct	V = 0 V, f = 1 MHz		30		pF
Transistor	Collector to Emitter Dark Current	Iceo	$I_F = 0$ mA, $V_{CE} = 300$ V			400	nA
Coupled	Current Transfer Ratio (Ic/IF)	CTR	IF = 1 mA, VcE = 2 V	1 500	4 000		%
	Collector Saturation Voltage	VCE (sat)	I _F = 1 mA, I _C = 2 mA			1.0	V
	Isolation Resistance	R _{I-O}	Vi-o = 1 kVpc	10 ¹¹			Ω
	Isolation Capacitance	C _{I-O}	V = 0 V, f = 1 MHz		0.4		pF
	Rise Time *1	tr	$Vcc = 5 \text{ V}, \text{ Ic} = 10 \text{ mA}, \text{ RL} = 100 \Omega$		100		μS
	Fall Time *1	t f			100		

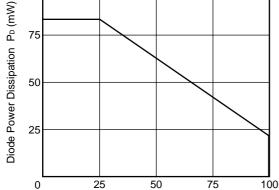
*1 Test circuit for switching time



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

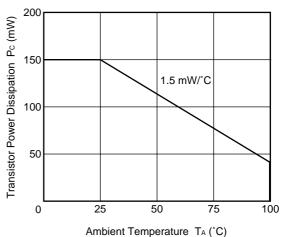


DIODE POWER DISSIPATION vs.

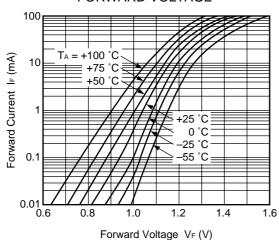


Ambient Temperature TA (°C)

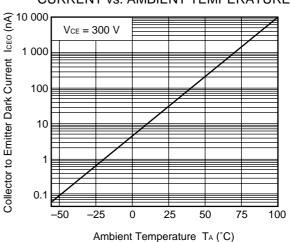
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



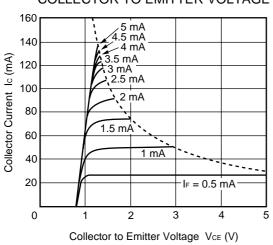
FORWARD CURRENT vs. FORWARD VOLTAGE



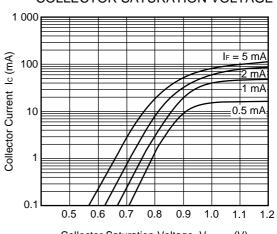
COLLECTOR TO EMITTER DARK
CURRENT vs. AMBIENT TEMPERATURE



COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE

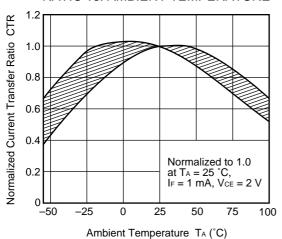


COLLECTOR CURRENT vs.
COLLECTOR SATURATION VOLTAGE



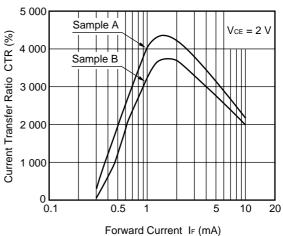
Collector Saturation Voltage VCE (sat) (V)

NORMALIZED CURRENT TRANSFER RATIO vs. AMBIENT TEMPERATURE

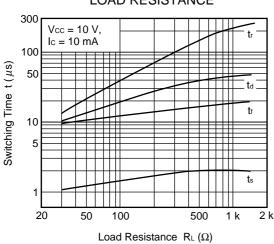


FORWARD CURRENT

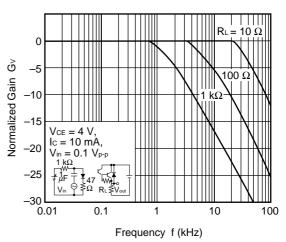
CURRENT TRANSFER RATIO vs.



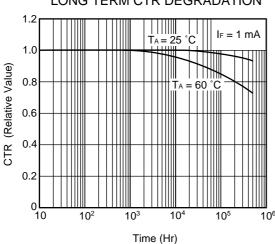
SWITCHING TIME vs. LOAD RESISTANCE



FREQUENCY RESPONSE

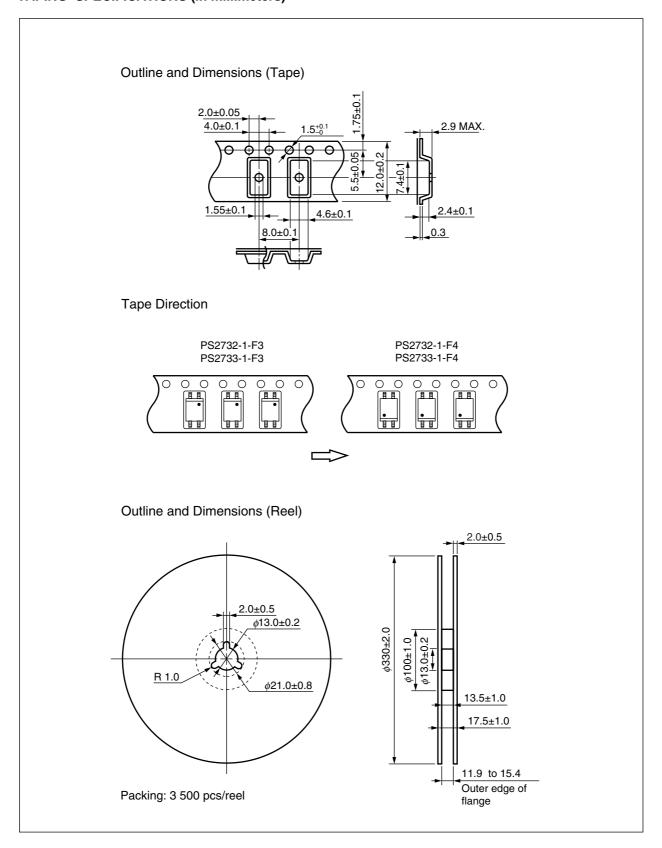


LONG TERM CTR DEGRADATION



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

★ TAPING SPECIFICATIONS (in millimeters)



★ NOTES ON HANDLING

1. Recommended soldering conditions

(1) Infrared reflow soldering

• Peak reflow temperature 260°C or below (package surface temperature)

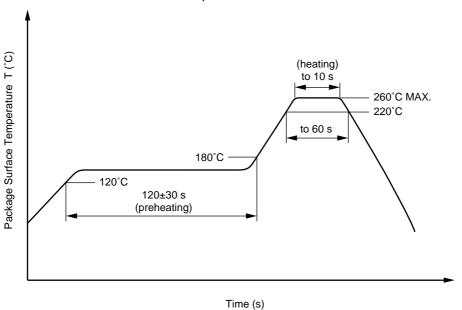
Time of peak reflow temperature
 Time of temperature higher than 220°C
 60 seconds or less

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) 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 side may enter the on state, even if the voltage is within the absolute maximum ratings.

★ 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.		IV	
for rated line voltages \leq 300 Vr.m.s.		III	
Climatic test class (DIN IEC 68 Teil 1/09.80)		55/100/21	
Dielectric strength			
Maximum operating isolation voltage	UIORM	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 all devices test) $U_{pr} = 1.6 \times U_{IORM}, P_d < 5 \; pC$	Upr	1 140	V _{peak}
Highest permissible overvoltage	Utr	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)	СТІ	175	
Material group (DIN VDE 0109)		III a	
Storage temperature range	T _{stg}	-55 to +150	°C
Operating temperature range	TA	-55 to +100	°C
Isolation resistance, minimum value			
Vio = 500 V dc at T _A = 25 °C	Ris MIN.	10 ¹²	Ω
Vio = 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 IF, 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



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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)		on contained devices	
Lead (Pb)	< 1000 PPM	0 PPM -A 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.

Important Information and Disclaimer: Information provided by CEL on its website or in other communications concerting the substance content of its products represents knowledge and belief as of the date that it is provided. CEL bases its knowledge and belief on information provided by third parties and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. CEL has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. CEL and CEL suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall CEL's liability arising out of such information exceed the total purchase price of the CEL part(s) at issue sold by CEL to customer on an annual basis.

See CEL Terms and Conditions for additional clarification of warranties and liability.