

HIGH ISOLATION VOLTAGE
HIGH COLLECTOR TO EMITTER VOLTAGE
SOP PHOTOCOUPLER**DESCRIPTION**

The PS2732 and PS2733 are optically coupled isolator containing a GaAs light emitting diode and an NPN silicon darlington-connected photo-transistor.

This is a plastic SOP (Small Out-line Package) for high density applications.

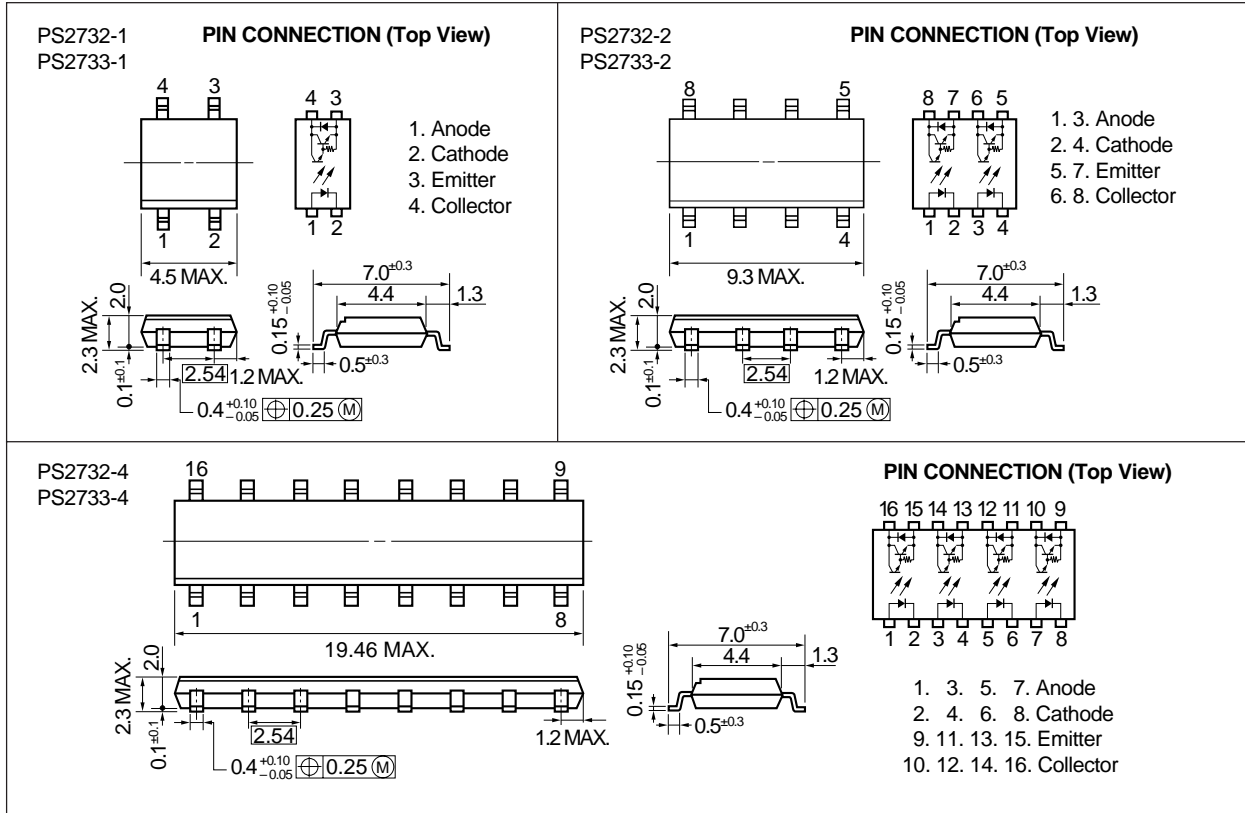
FEATURES

- High isolation voltage
(BV: 2.5 kV_{r.m.s.} MIN.)
- High collector to emitter voltage
(V_{CEO}: 300 V MIN. PS2732-1, -2, -4)
(V_{CEO}: 350 V MIN. PS2733-1, -2, -4)
- SOP (Small Out-line Package)
- Ultra high current transfer ratio
(CTR: 4 000 % TYP.)
- Taping product name (only -1 typ.)
(PS2732-1-E3, E4, F3, F4)
(PS2733-1-E3, E4, F3, F4)
- UL Approved (File No. E72422(S))
- VDE0884 Approved (Option)

ORDERING INFORMATION

PART NUMBER	PACKAGE	SAFETY STANDARD APPROVAL
PS2732-1	4 pin SOP	Standard specification products • UL Approved
PS2732-2	8 pin SOP	
PS2732-4	16 pin SOP	
PS2733-1	4 pin SOP	
PS2733-2	8 pin SOP	
PS2733-4	16 pin SOP	
PS2732-1-V	4 pin SOP	VDE0884 specification products (Option) • VDE Approved • UL Approved
PS2732-2-V	8 pin SOP	
PS2732-4-V	16 pin SOP	
PS2733-1-V	4 pin SOP	
PS2733-2-V	8 pin SOP	
PS2733-4-V	16 pin SOP	

PACKAGE DIMENSIONS (Unit: in millimeters)



ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

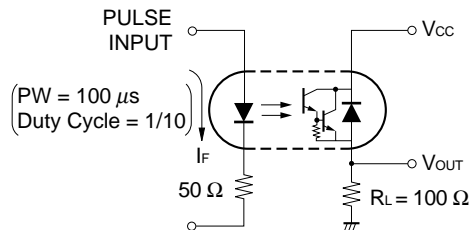
		PS2732-1, PS2733-1		PS2732-2, -4, PS2733-2, -4		
Diode						
Reverse Voltage	V _R	6		6		V
Forward Current	I _F	50		50		mA
Power Dissipation Derating	ΔP _D /°C	0.8		0.8		mW/°C
Power Dissipation	P _D	80		80		mW/Channel
Forward Current	I _{F (peak)}	1		1		A
(PW = 100 μs, Duty Cycle 1 %)						
Transistor						
Collector to Emitter Voltage	V _{CEO}	300	350	300	350	V
Collector Current	I _c	150		150		mA/Channel
Power Dissipation Derating	ΔP _C /°C	1.5		1.2		mW/°C
Power Dissipation	P _C	150		120		mW/Channel
Coupled						
Isolation Voltage *1)	BV		2 500			V _{r.m.s.}
Operating Temperature	T _{opt}		-55 to +100			°C
Storage Temperature	T _{stg}		-55 to +150			°C

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

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

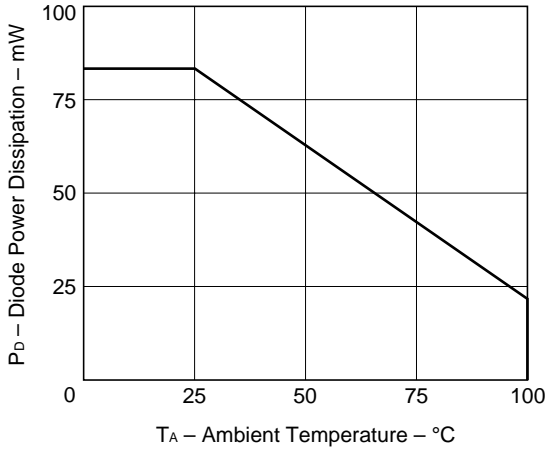
PARAMETER		SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Diode	Forward Voltage	V _F		1.15	1.4	V	I _F = 10 mA
	Reverse Current	I _R			5	μA	V _R = 5 V
	Junction Capacitance	C _t		30		pF	V = 0, f = 1.0 MHz
Transistor	Collector to Emitter Dark Current	I _{CEO}			400	nA	V _{CE} = 300 V, I _F = 0
Coupled	Current Transfer Ratio	CTR	1 500	4 000		%	I _F = 1 mA, V _{CE} = 2 V
	Collector Saturation Voltage	V _{CE(sat)}			1.0	V	I _F = 1 mA, I _c = 2 mA
	Isolation Resistance	R ₁₋₂	10 ¹¹			Ω	V _{in-out} = 1.0 kV _{DC}
	Isolation Capacitance	C ₁₋₂		0.4		pF	V = 0, f = 1.0 MHz
	Rise Time	*2) t _r		100		μs	V _{CC} = 5 V, I _c = 10 mA, R _L = 100 Ω
	Fall Time	*2) t _f		100		μs	V _{CC} = 5 V, I _c = 10 mA, R _L = 100 Ω

*2) Test Circuit for Switching Time

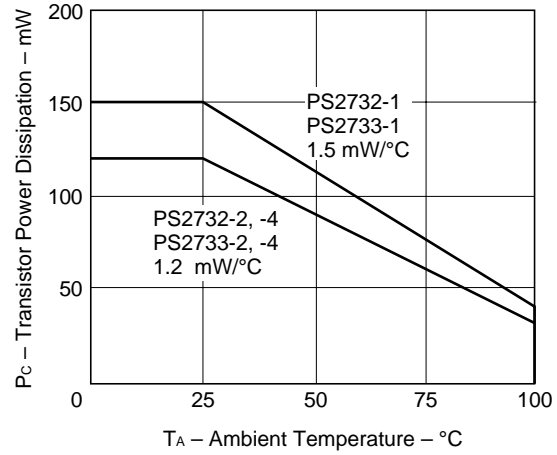


TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$)

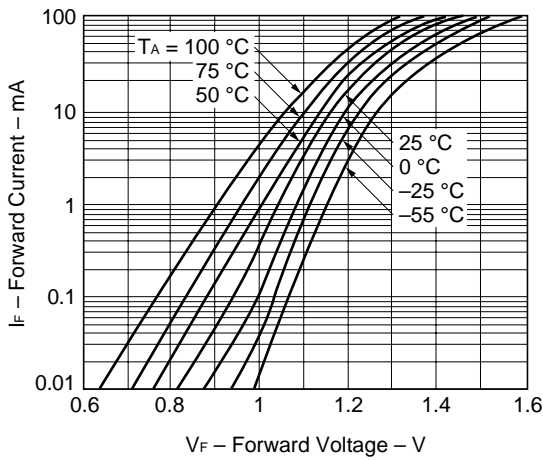
DIODE POWER DISSIPATION vs. AMBIENT TEMPERATURE



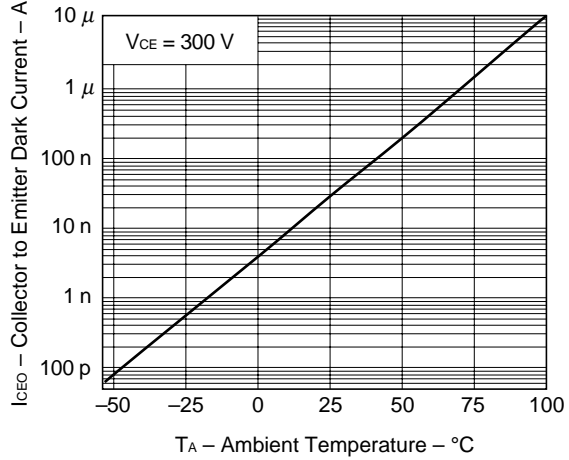
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



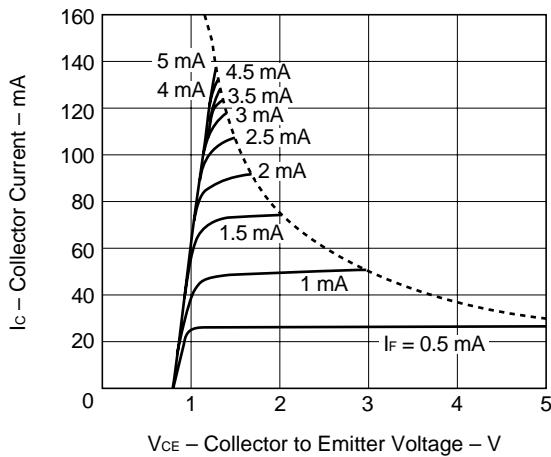
FORWARD CURRENT vs. FORWARD VOLTAGE



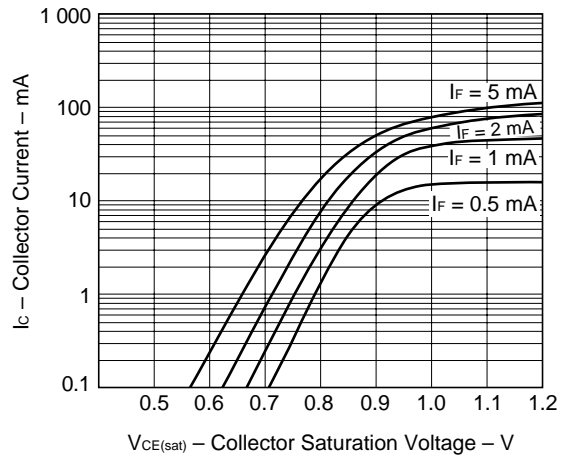
COLLECTOR TO EMITTER DARK CURRENT vs. AMBIENT TEMPERATURE

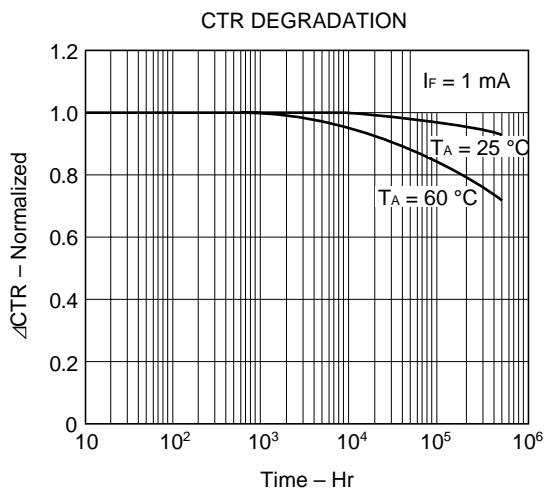
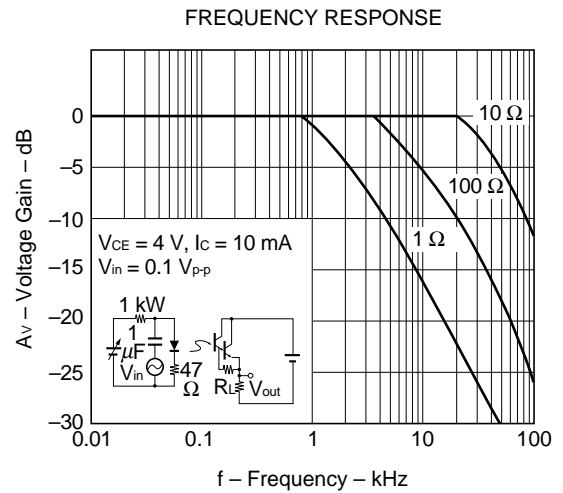
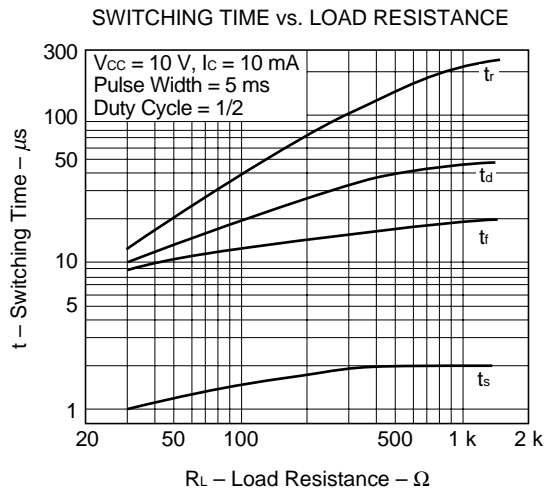
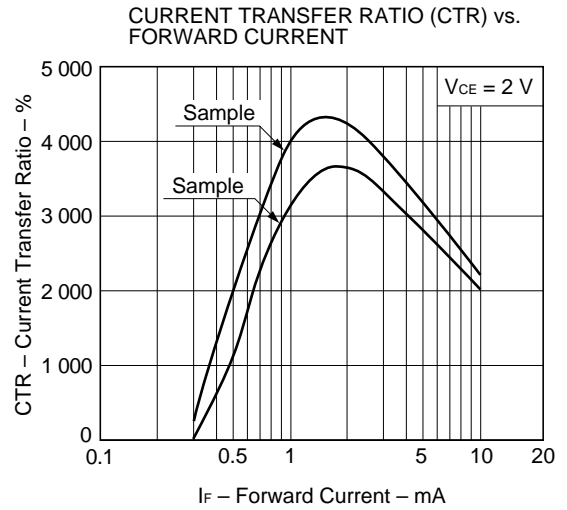
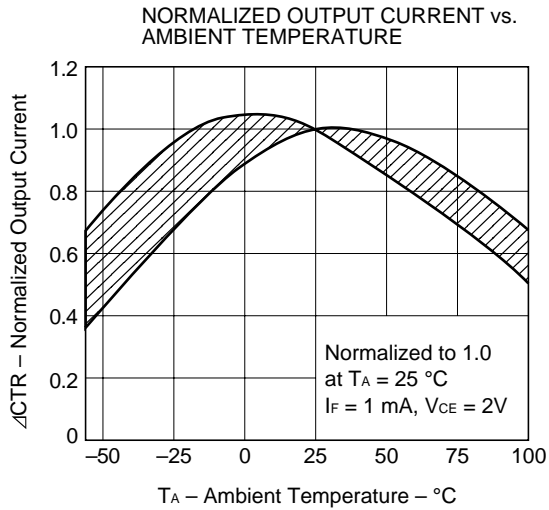


COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



COLLECTOR CURRENT vs. COLLECTOR SATURATION VOLTAGE





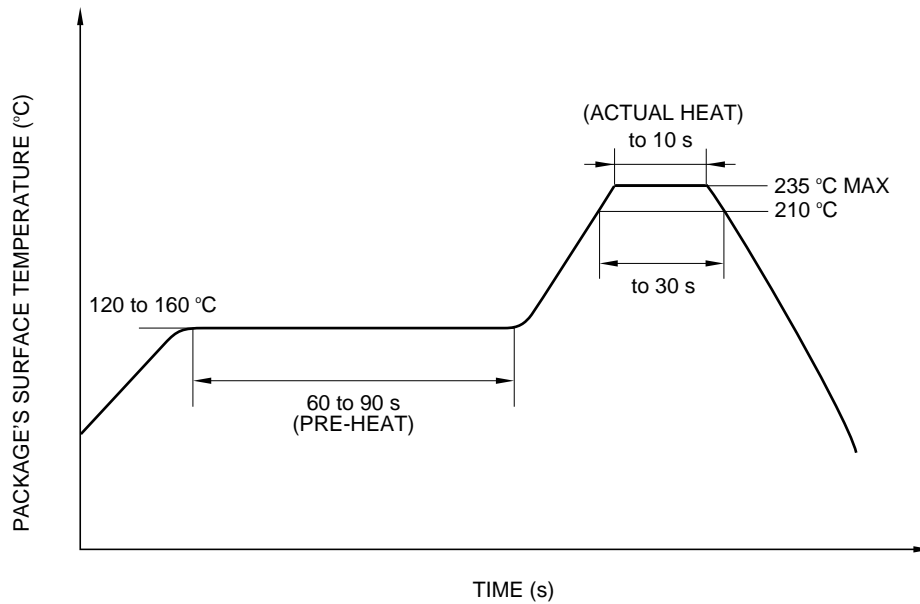
* The measurement of TYPICAL CHARACTERISTICS are only for reference, not guaranteed.

SOLDERING PRECAUTION

(1) Infrared reflow soldering

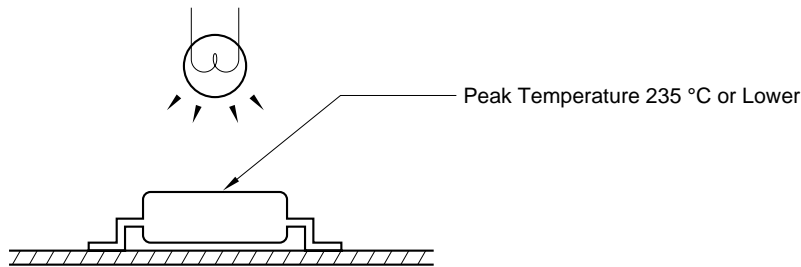
- Peak reflow temperature : 235 °C or below (Plastic surface temperature)
- Reflow time : 30 seconds or less (Time period during which the plastic surface temperature is 210 °C)
- Number of reflow processes: Three
- Flux : Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt % is recommended.)

INFRARED RAY REFLOW TEMPERATURE PROFILE



<NOTES>

- (1) Please avoid to be remove the residual flux by water after the first reflow processes.



(2) Dip soldering

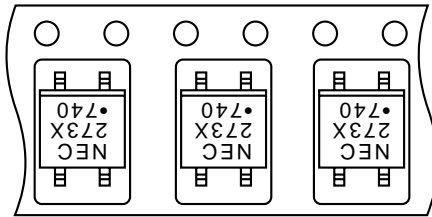
- Peak temperature : 260 °C or lower
- Time : 10 s or less
- Flux : Rosin-base flux

• **TAPING (Only PS2732-1, PS2733-1)**

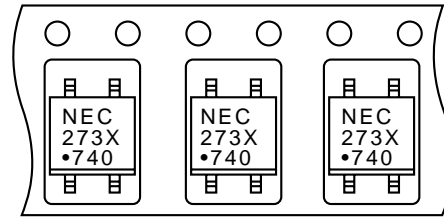
These conform to EIAJ "Electronic Parts Taping Size" (RC-1009B: Chip Type).

There are two types of taping according to the direction in which SOP photocouplers are stuck to the tape.

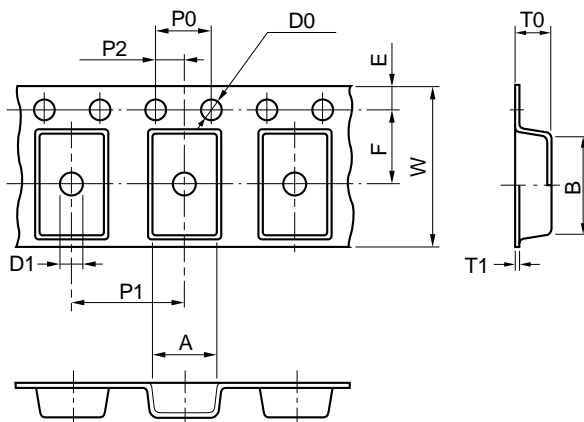
PS2732-1-E3, F3
PS2733-1-E3, F3



PS2732-1-E4, F4
PS2733-1-E4, F4

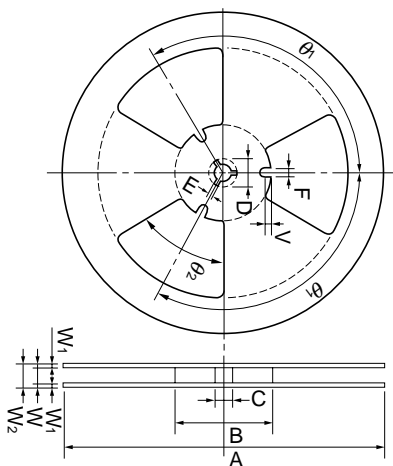


OUTLINE AND DIMENSIONS (:TAPE)



SYMBOL	RATINGS	Unit (mm)
A	4.6 ± 0.1	
B	7.4 ± 0.1	
D0	1.55 ± 0.1	
D1	1.55 ± 0.1	
E	1.75 ± 0.1	
F	5.5 ± 0.1	
P1	8 ± 0.1	
P0	4 ± 0.1	
P2	2 ± 0.1	
T0	2.4 ± 0.1	
T1	0.3	
W	12 ± 0.2	

OUTLINE AND DIMENSIONS (:REEL)



SYMBOL	RATINGS		Unit (mm)
	E3, E4	F3, F4	
A	178	330	
B	66		
C	13 ± 0.5		
D	21 ± 0.8		
E	2.0 ± 0.5		
F	1.5 ± 0.5		
V	6 ± 1		
W	12.4 ^{+2.0} ₋₀		
W1	1.5 ± 0.1		
W2	18.4 MAX.		
theta1	120°		
theta2	60°		

PACKING: 900 pieces/reel E3, E4
3 500 pieces/reel . . . F3, F4

SPECIFICATION OF VDE MARKS LICENSE DOCUMENT (VDE0884)

PARAMETER	SYMBOL	SPECK	UNIT
Application classification (DIN VDE 0109) for rated line voltages $\leq 150 V_{eff}$ for rated line voltages $\leq 300 V_{eff}$		IV III	
Climatic test class (DIN 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) $U_{pr} = 1.2 \times U_{IORM}, Pd < 5 pC$	U_{IORM} U_{pr}	710 850	V_{peak} V_{peak}
Test voltage (partial discharge, test procedure b for random test) $U_{pr} = 1.6 \times U_{IORM}, Pd < 5 pC$	U_{pr}	1140	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)		IIIa	
Storage temperature range	T_{stg}	-55 to +150	Cel
Operating temperature range	T_{amb}	-55 to +100	Cel
Isolation resistance, minimum value $U_{Io} = 500 V$ dc at 25 Cel $U_{Io} = 500 V$ dc at T_{amp} maximum at least 100 Cel	$R_{is min}$ $R_{is min}$	10^{12} 10^{11}	ohm ohm
Safety maximum ratings (maximum permissible in case of fault, see thermal derating curve) Package temperature Current (input current I_F , $Psi = 0$) Power (output or total power dissipation) Isolation resistance $U_{Io} = 500 V$ dc at 175 Cel (T_{si})	T_{si} I_{si} P_{si} $R_{is min}$	150 300 500 10^9	Cel mA mW ohm

[MOMO]

Caution

**The Great Care must be taken in dealing with the devices in this guide.
The reason is that the material of the devices is GaAs (Galium Arsenide), which is
designated as harmful substance according to the law concerned.
Keep the law concerned and so on, especially in case of removal.**

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Standard: Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots

Special: Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)

Specific: Aircrafts, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems or medical equipment for life support, etc.

The quality grade of NEC devices in “Standard” unless otherwise specified in NEC's Data Sheets or Data Books. If customers intend to use NEC devices for applications other than those specified for Standard quality grade, they should contact NEC Sales Representative in advance.

Anti-radioactive design is not implemented in this product.