

HIGH COLLECTOR TO EMITTER VOLTAGE DARLINGTON TRANSISTOR TYPE MULTI PHOTO COUPLER SERIES

– NEPOC SERIES –

DESCRIPTION

PS2532-1, -2, -4 and PS2532L-1, -2, -4 are optically coupled isolators containing a GaAs light emitting diode and an NPN silicon darlington connected photo transistor.

PS2532-1, -2, -4 are in a plastic DIP (Dual In-line Package) and PS2532L-1, -2, -4 are lead bending type (Gull-wing) for surface mount.

FEATURES

- High isolation voltage
5 000 V_{r.m.s.}: normal speck products
3 750 V_{r.m.s.}: VDE0884 speck products (option*)
- High collector to emitter voltage (V_{CEO}: 300 V MIN.)
- Ultra High current transfer ratio (CTR: 1 500 % MIN.)
- High speed switching (t_r, t_f = 100 μs TYP.)
- Taping Product name (PS2532L-1-E3, E4, F3, F4)
(PS2532L-2-E3, E4)
- UL recognized [File No. E72422 (S)]
- VDE0884 recognized (option)

APPLICATIONS

- AC Line/Digital Line
- Telephone/Telegraph Receiver
- FAX

ORDERING INFORMATION

ORDER CODE	PACKAGE	SAFETY STANDARD APPROVAL
PS2532-1 PS2532-2 PS2532-4	4 pin DIP 8 pin DIP 16 pin DIP	Normal specks products • UL Approved
PS2532L-1 PS2532L-2 PS2532L-4	4 pin DIP (Lead bending type) 8 pin DIP (Lead bending type) 16 pin DIP (Lead bending type)	
PS2532L1-1, PS2532L2-1 PS2532L1-2, PS2532L2-2	Lead bending type 4 pin DIP (for long distance) 8 pin DIP (for long distance)	
PS2532-1-V PS2532-2-V PS2532-4-V	4 pin DIP 8 pin DIP 16 pin DIP	VDE0884 specks products • VDE Approved
PS2532L-1-V PS2532L-2-V PS2532L-4-V	4 pin DIP (Lead bending type) 8 pin DIP (Lead bending type) 16 pin DIP (Lead bending type)	
PS2532L1-1-V, PS2532L2-1-V PS2532L1-2-V, PS2532L2-2-V	Lead bending type 4 pin DIP (for long distance) 8 pin DIP (for long distance)	

ABSOLUTE MAXIMUM RATINGS ($T_A = 25\text{ }^{\circ}\text{C}$)

(PS2532-1) (PS2532-2, -4)
(PS2532L-1) (PS2532L-2, -4)

Diode

Reverse Voltage	V_R	6	6	V
Forward Current (DC)	I_F	80	80	mA
Power Dissipation Derating	$\Delta P_D/^{\circ}\text{C}$	1.5	1.2	mW/ $^{\circ}\text{C}$
Power Dissipation	P_D	150	120	mW/Channel
Peak Forward Current ($PW = 100\text{ }\mu\text{s}$, Duty Cycle 1 %)	$I_{F(\text{Peak})}$	1	1	A

Transistor

Collector to Emitter Voltage	V_{CEO}	300	300	V
Emitter to Collector Voltage	V_{ECO}	0.6	0.6	V
Power Dissipation Derating	$\Delta P_C/^{\circ}\text{C}$	3.0	2.4	mW/ $^{\circ}\text{C}$
Collector Current	I_C	150	150	mA
Power Dissipation	P_C	300	240	mW/Channel

Coupled

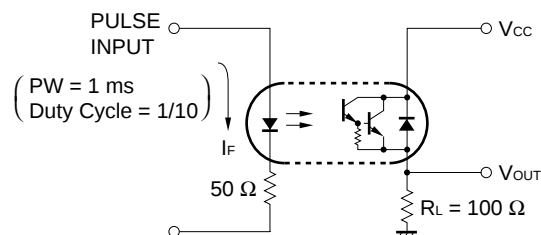
Isolation Voltage*1 (Normal Speck Products)	BV	5 000	$V_{r.m.s.}$
Isolation Voltage*1 (VDE0884 Speck Products)	BV	3 750	$V_{r.m.s.}$
Storage Temperature	T_{stg}	-55 to +150	$^{\circ}\text{C}$
Operating Temperature	T_{opt}	-55 to +100	$^{\circ}\text{C}$
Lead Temperature (Soldering 10 s)	T_{sol}	260	$^{\circ}\text{C}$

*1 AC voltage for 1 minute at $T_A = 25\text{ }^{\circ}\text{C}$, RH = 60 % between input and output.

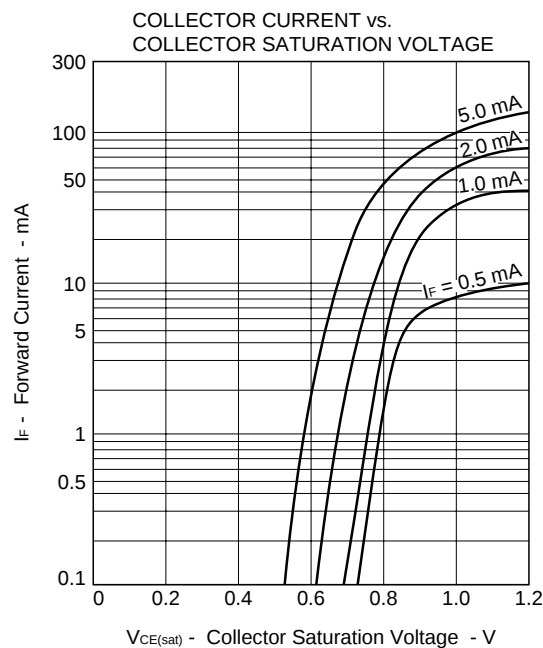
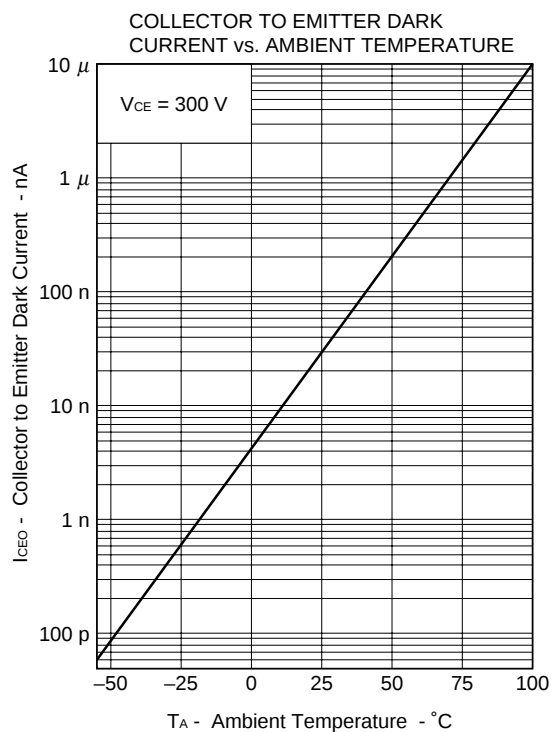
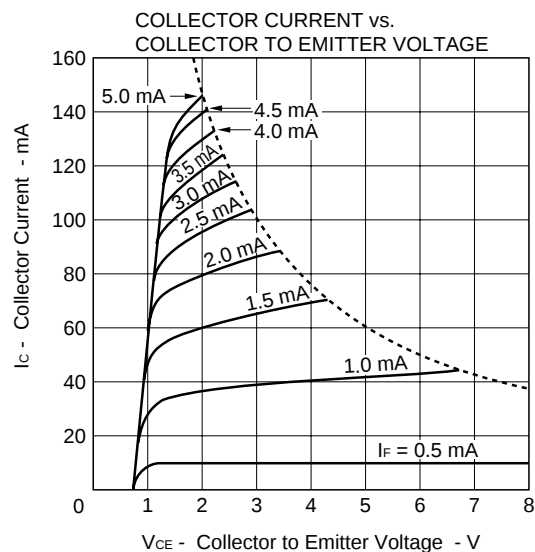
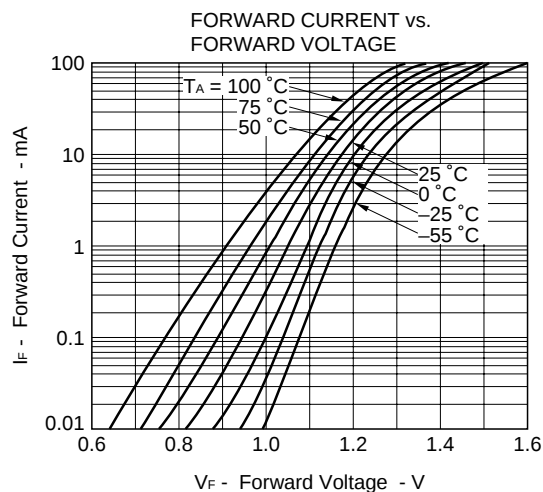
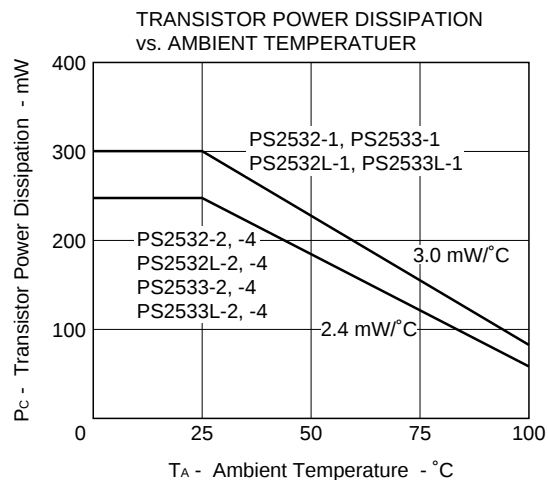
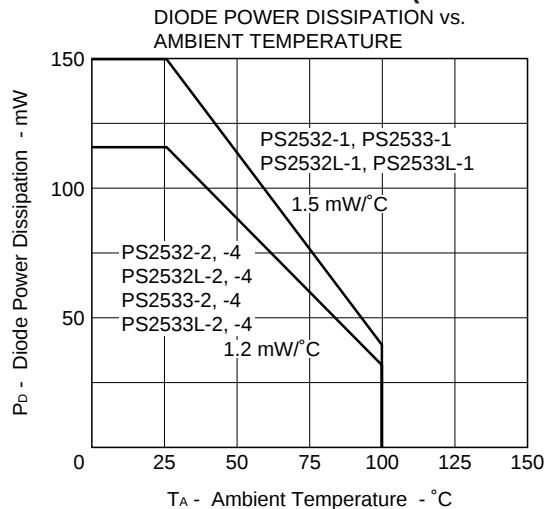
ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$)

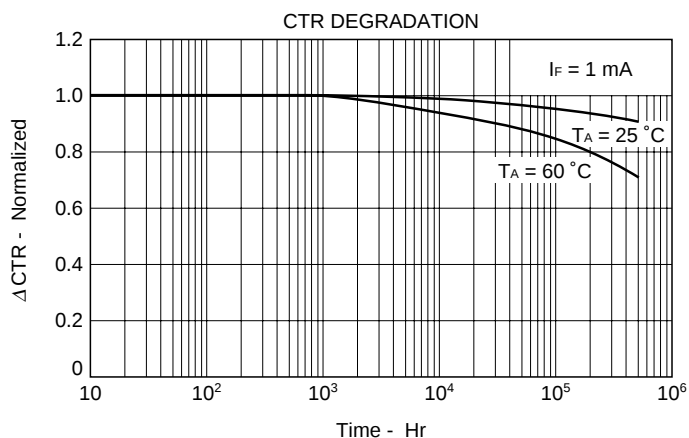
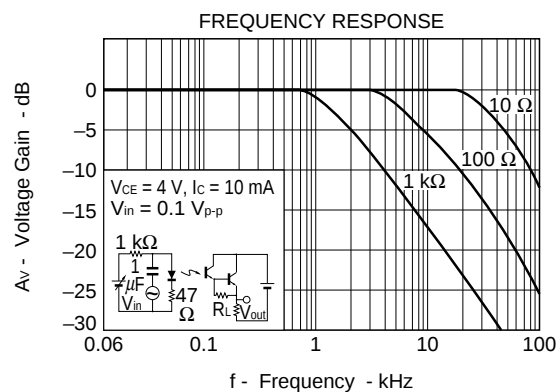
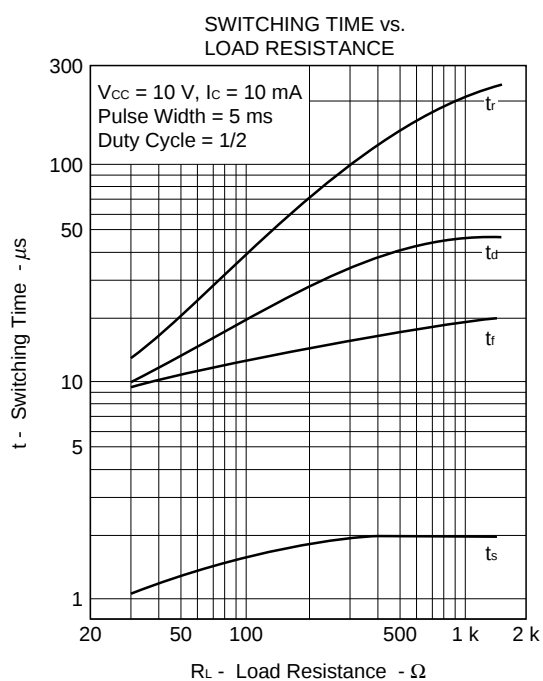
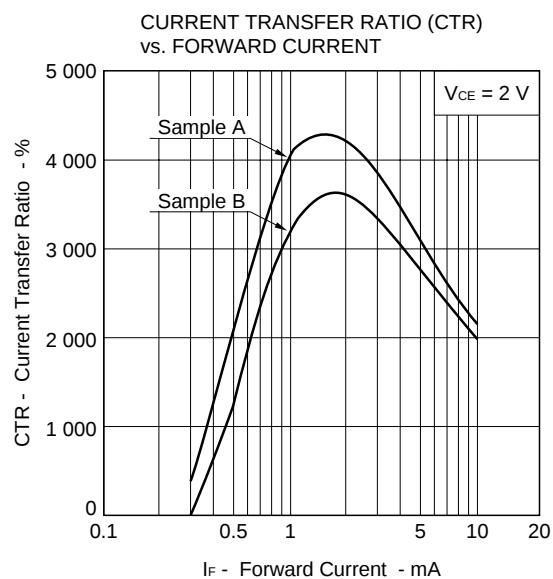
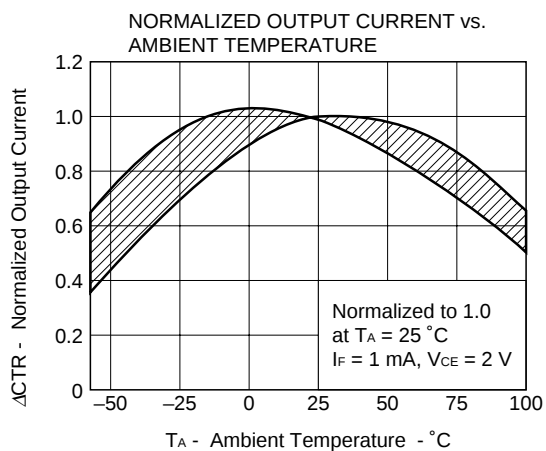
CHARACTERISTIC		SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Diode	Forward Voltage	V_F		1.15	1.4	V	$I_F = 10\text{ mA}$
	Reverse Current	I_R			5	μA	$V_R = 5\text{ V}$
	Junction Capacitance	C		30		pF	$V = 0$, $f = 1.0\text{ MHz}$
Transistor	Collector to Emitter Dark Current	I_{CEO}			400	nA	$V_{CE} = 300\text{ V}$, $I_F = 0$
Coupled	Current Transfer Ratio	CTR	1 500	4 000	6 500	%	$I_F = 1\text{ mA}$, $V_{CE} = 2\text{ V}$
	Collector Saturation Voltage	$V_{CE(\text{sat})}$			1.0	V	$I_F = 1\text{ mA}$, $I_C = 2\text{ mA}$
	Isolation Resistance	R_{1-2}	10^{11}			Ω	$V_{in-out} = 1.0\text{ kV}_{DC}$
	Isolation Capacitance	C_{1-2}		0.6		pF	$V = 0$, $f = 1.0\text{ MHz}$
	Rise Time*2	t_r		100		μs	$V_{CC} = 5\text{ V}$, $I_C = 10\text{ mA}$
	Fall Time*2	t_f		100		μs	$V_{CC} = 5\text{ V}$, $I_C = 10\text{ mA}$

*2 Test Circuit for Switching Time



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



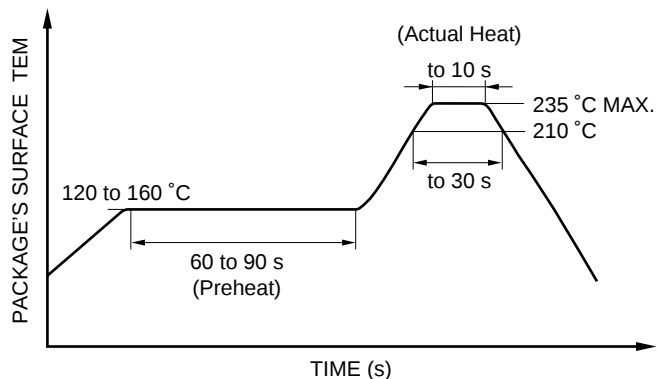


SOLDERING PRECAUTION

(1) Infrared reflow soldering

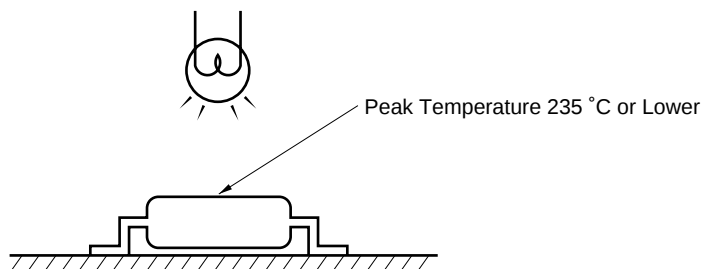
- Peak temperature : 235 °C or lower (plastic surface)
- Time : 30 s or less
(Time during plastic surface temperature overs 210 °C)
- No. of reflow times: They
- Flux : Rosin-base flux

INFRARED RAY REFLOW TEMPERATURE PROFILE



<NOTES>

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



(2) Dip soldering

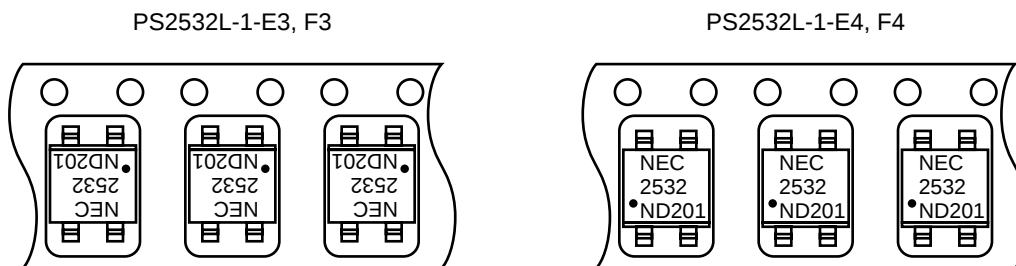
- Peak temperature: 260 °C or lower
- Time : 10 s or less
- Flux : Rosin-base flux

SPECIFICATION OF VDE MARKS LICENSE DOCUMENT (VDE0884)

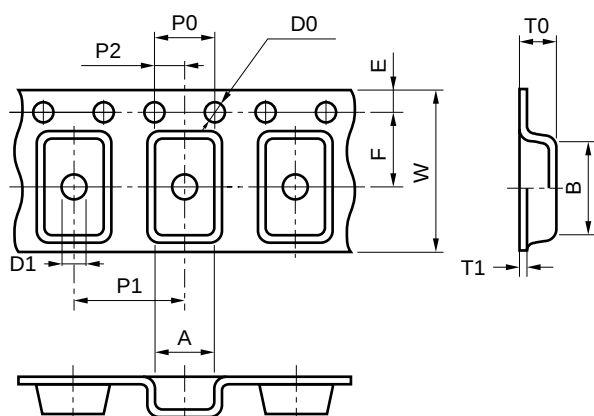
PARAMETER	SYMBOL	SPECK	UNIT
Application classification (DIN VDE0109) for rated line voltages $\leq 300 V_{eff}$ for rated line voltages $\leq 600 V_{eff}$		IV III	
Climatic test class (DIN 68 Teil 1/09.80)		55/100/21	
Dielectric strength maximum operating isolation voltage. Test voltage (partial discharge, test procedure a for type test and random test) $U_{pr} = 1.2 \times U_{IORM}$, $P_d < 5 pC$	U_{IORM} U_{pr}	890 1 068	V_{peak} V_{peak}
Test voltage (partial discharge, test procedure b for random test) $U_{pr} = 1.6 \times U_{IORM}$, $P_d < 5 pC$	U_{pr}	1 424	V_{peak}
Highest permissible overvoltage	U_{TR}	6 000	V_{peak}
Degree of pollution (DIN VDE0109)		2	
Clearance distance		> 7.0	mm
Creepage distance		> 7.0	mm
Comparative tracking index (DIN IEC 112/VDE0303 part 1)	CTI	175	
Material group (DIN VDE0109)		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 $T_{amp \text{ maximum}}$ at least 100 Cel	$R_{is \text{ min}}$ $R_{is \text{ min}}$	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 , $P_{si} = 0$) Power (output or total power dissipation) Isolation resistance $U_{IO} = 500 V$ dc at 175 Cel (T_{si})	T_{si} I_{si} P_{si} $R_{is \text{ min}}$	175 400 700 10^9	Cel mA mW ohm

- 4 PIN DIP Type (Lead bending; -1 channel) Taping

1. TAPING DIRECTION



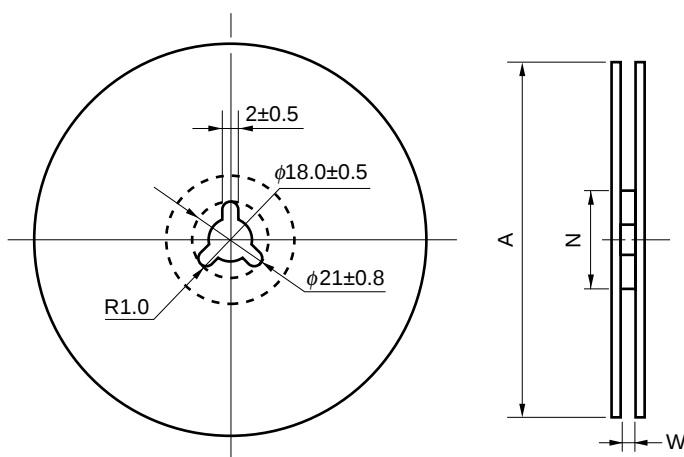
2. OUTLINE AND DIMENSIONS (;TYPE)



Unit: mm

SYMBOL	RATINGS
A	5.6 ± 0.1
B	10.3 ± 0.1
D0	1.55 ± 0.1
D1	1.55 ± 0.1
E	1.75 ± 0.1
F	7.5 ± 0.1
P0	4 ± 0.1
P1	8 ± 0.1
P2	2 ± 0.1
T0	4.3 ± 0.2
T1	0.3
W	16 ± 0.3

3. OUTLINE AND DIMENSIONS (;REEL)



Unit: mm

SYMBOL	RATINGS	
A	E3, E4	F3, F4
	φ250	φ330
N	φ80 ± 5.0	
W	16.4 ^{+2.0} ₋₀	

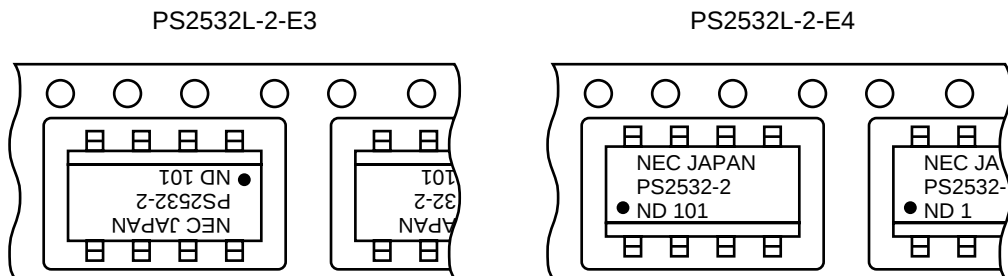
4. PACKING

E3, E4; 1 000 pieces/reel

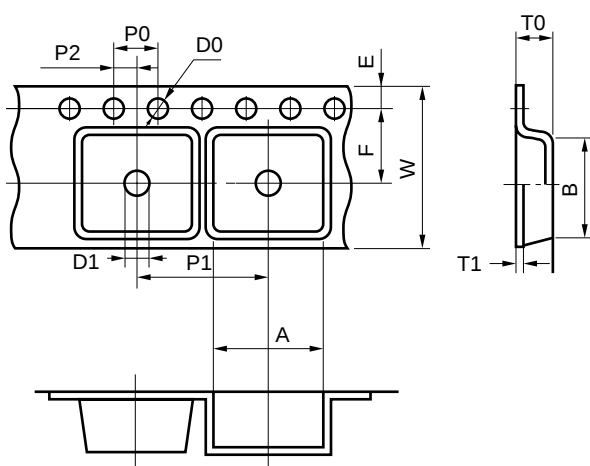
F3, F4; 2 000 pieces/reel

- 8 PIN DIP Type (Lead bending; -2 channel) Taping

1. TAPING DIRECTION



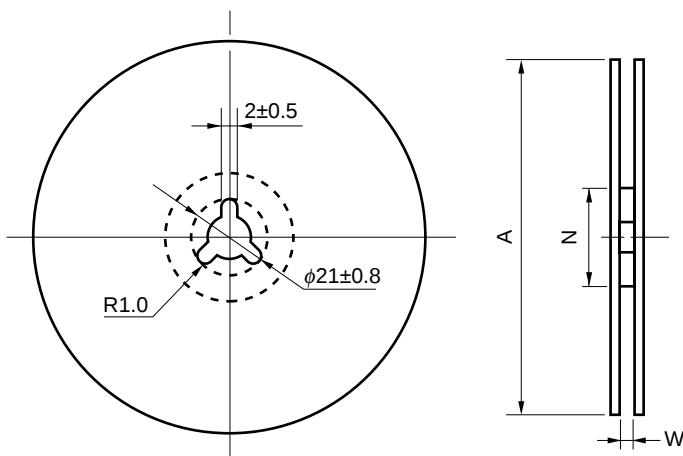
2. OUTLINE AND DIMENSIONS (TYPE)



Unit: mm

SYMBOL	RATINGS
A	10.7 ± 0.1
B	10.3 ± 0.1
D0	1.55 ± 0.1
D1	1.55 ± 0.1
E	1.75 ± 0.1
F	7.5 ± 0.1
P0	4.0 ± 0.1
P1	12.0 ± 0.1
P2	2.0 ± 0.1
T0	4.3 ± 0.2
T1	0.3
W	16 ± 0.3

3. OUTLINE AND DIMENSIONS (REEL)



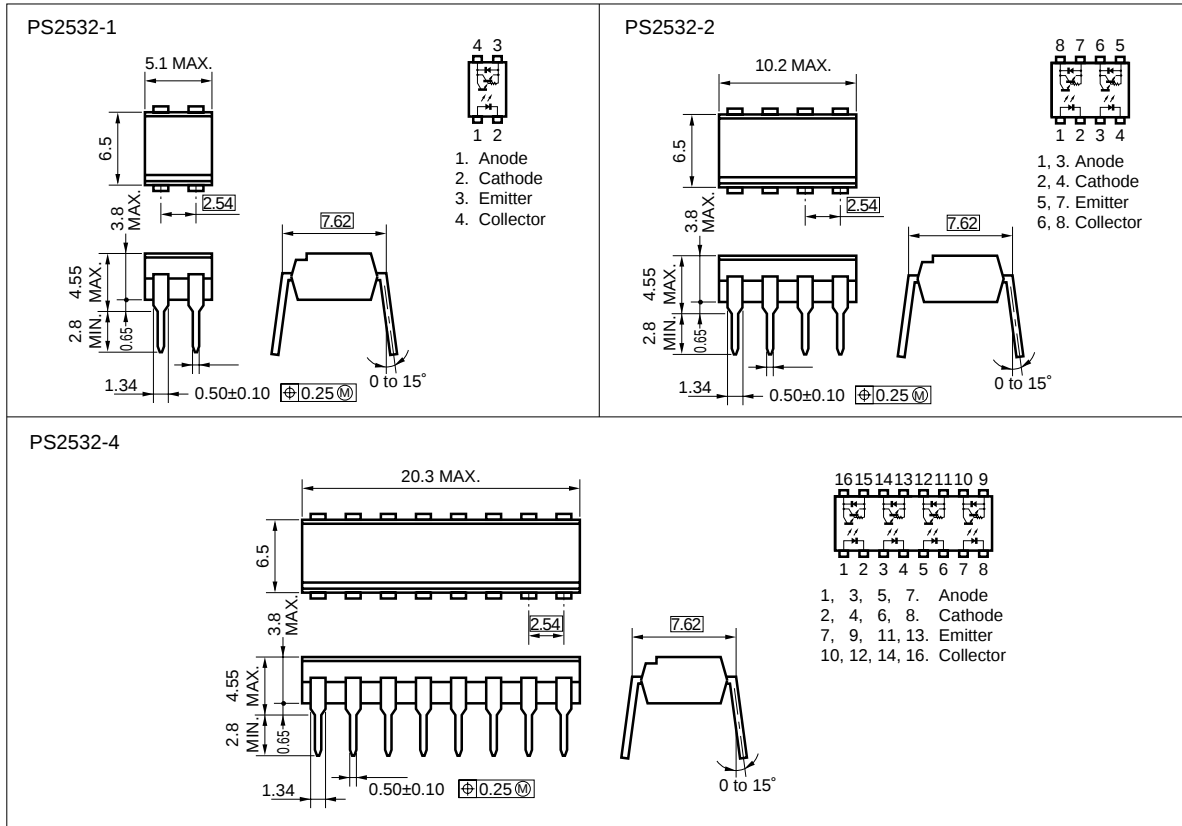
Unit: mm

SYMBOL	RATINGS
A	330
N	80 ± 5.0
W	16.4 ^{+2.0} ₋₀

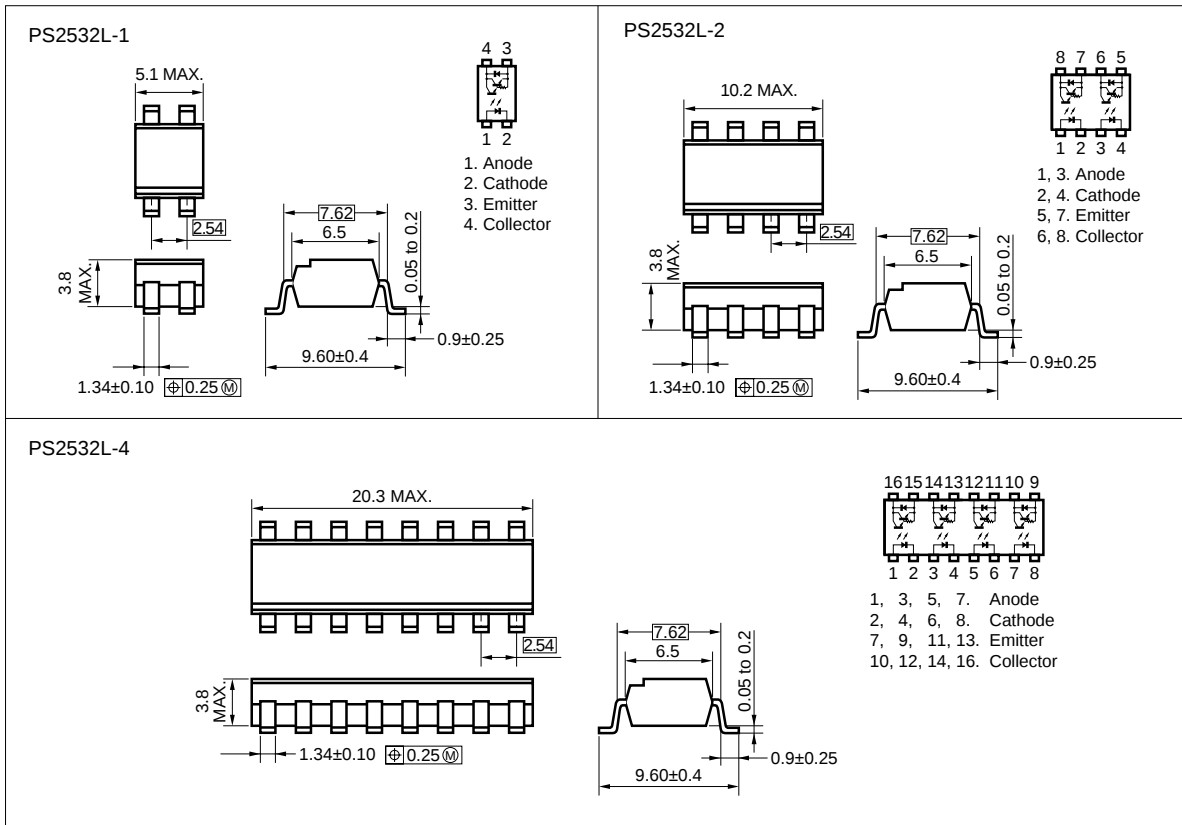
4. PACKING

E3, E4; 1 000 pieces/reel

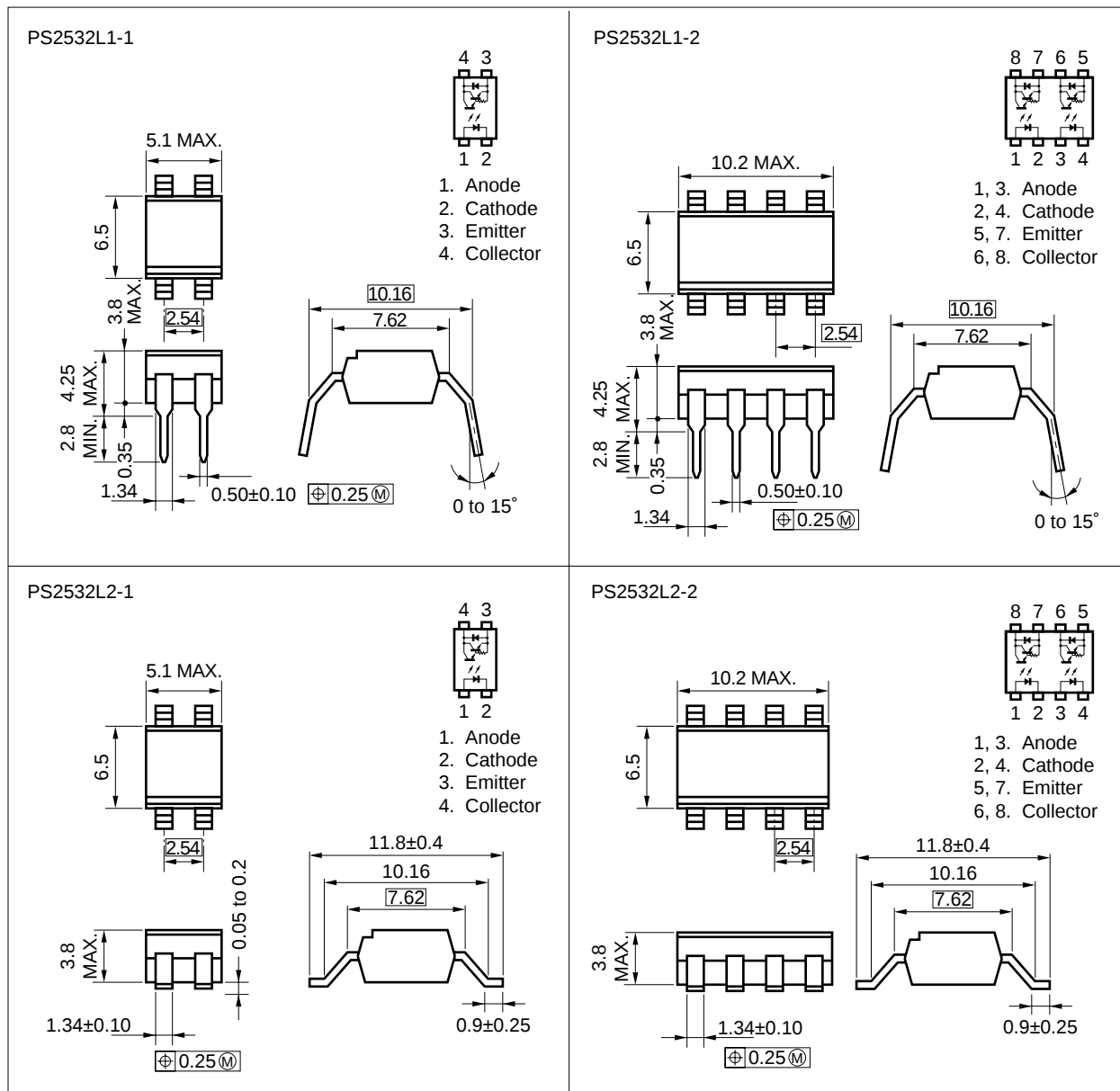
PACKAGE DIMENSIONS (Unit: mm) DIP (Dual In-line Package)



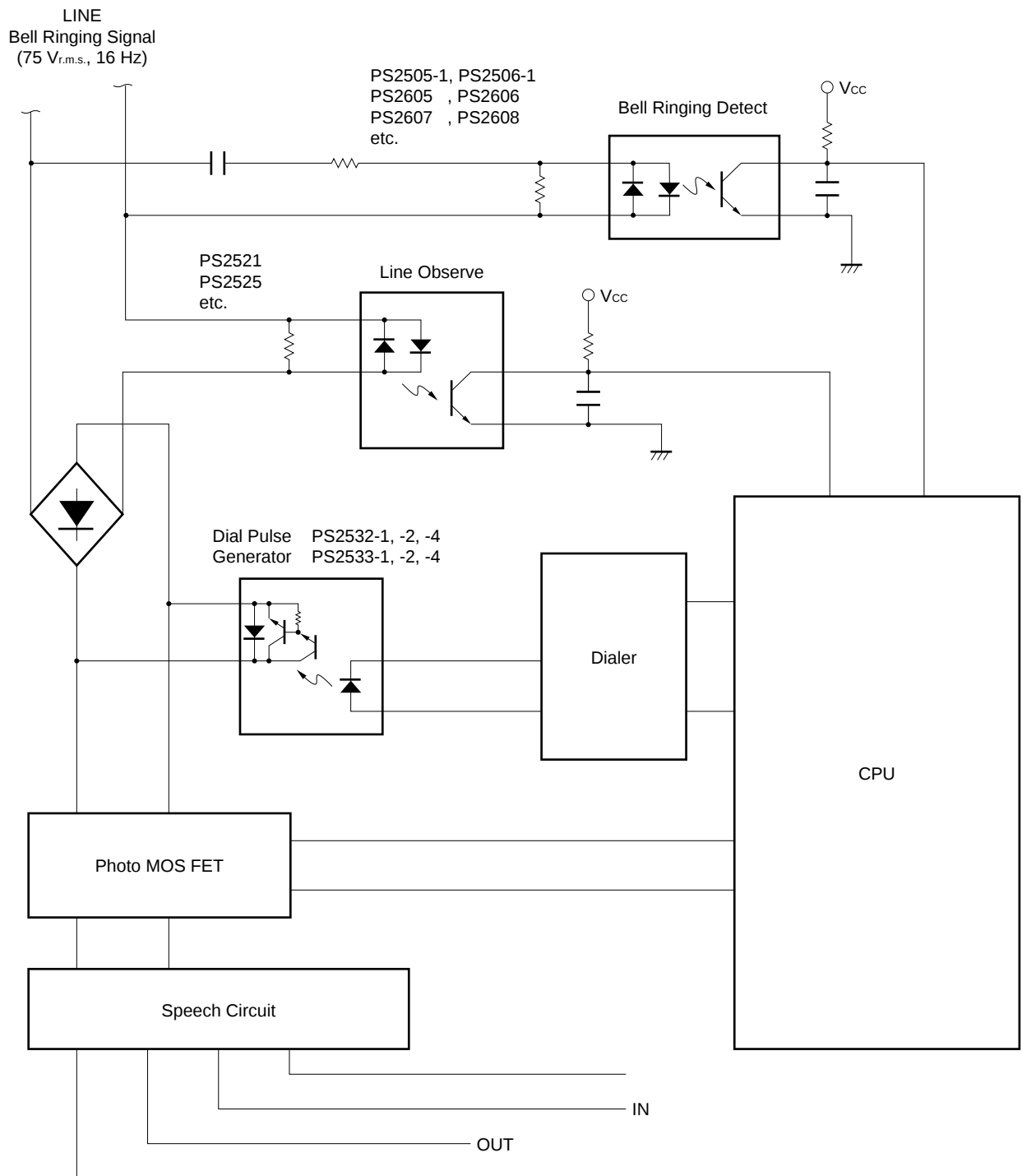
PACKAGE DIMENSIONS (Unit: mm) Lead Bending type (Gull-wing)



PACKAGE DIMENSIONS (Unit: mm) Lead bending type (for Long distance)



APPLICATION FOR TELEPHONE (EXAMPLE)



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 (Gallium 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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NEC devices are classified into the following three quality grades:

"Standard", "Special", and "Specific". The Specific quality grade applies only to devices developed based on a customer designated "quality assurance program" for a specific application. The recommended applications of a device depend on its quality grade, as indicated below. Customers must check the quality grade of each device before using it in a particular application.

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 is "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 an NEC sales representative in advance.

Anti-radioactive design is not implemented in this product.