

NEC

DATA SHEET

PHOTOCOUPLER PS2532-1,-2,-4,PS2532L-1,-2,-4

HIGH COLLECTOR TO EMITTER VOLTAGE
HIGH ISOLATION VOLTAGE
MULTI PHOTOCOUPLER SERIES

—NEPOC™ Series—

DESCRIPTION

The 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 phototransistor.

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

★ FEATURES

- High collector to emitter voltage ($V_{CEO} = 300\text{ V}$)
- High Isolation voltage $BV = 5\,000\text{ V r.m.s.}$: standard products
 $BV = 3\,750\text{ V r.m.s.}$: VDE0884 approved products (Option)
- High current transfer ratio ($CTR = 4\,000\%$ TYP.)
- High-speed switching ($t_r, t_f = 100\text{ }\mu\text{s}$ TYP.)
- Ordering number of taping product: PS2532L-1-E3, E4, F3, F4, PS2532L-2-E3, E4
- UL approved: File No. E72422 (S)
- BSI approved: No. 8221/8222
- NEMKO approved: No. 98101708
- SEMKO approved: No. 9824187/01-02
- DEMKO approved: No. 307863
- FIMKO approved: No. F1 11397
- VDE0884 approved (Option)

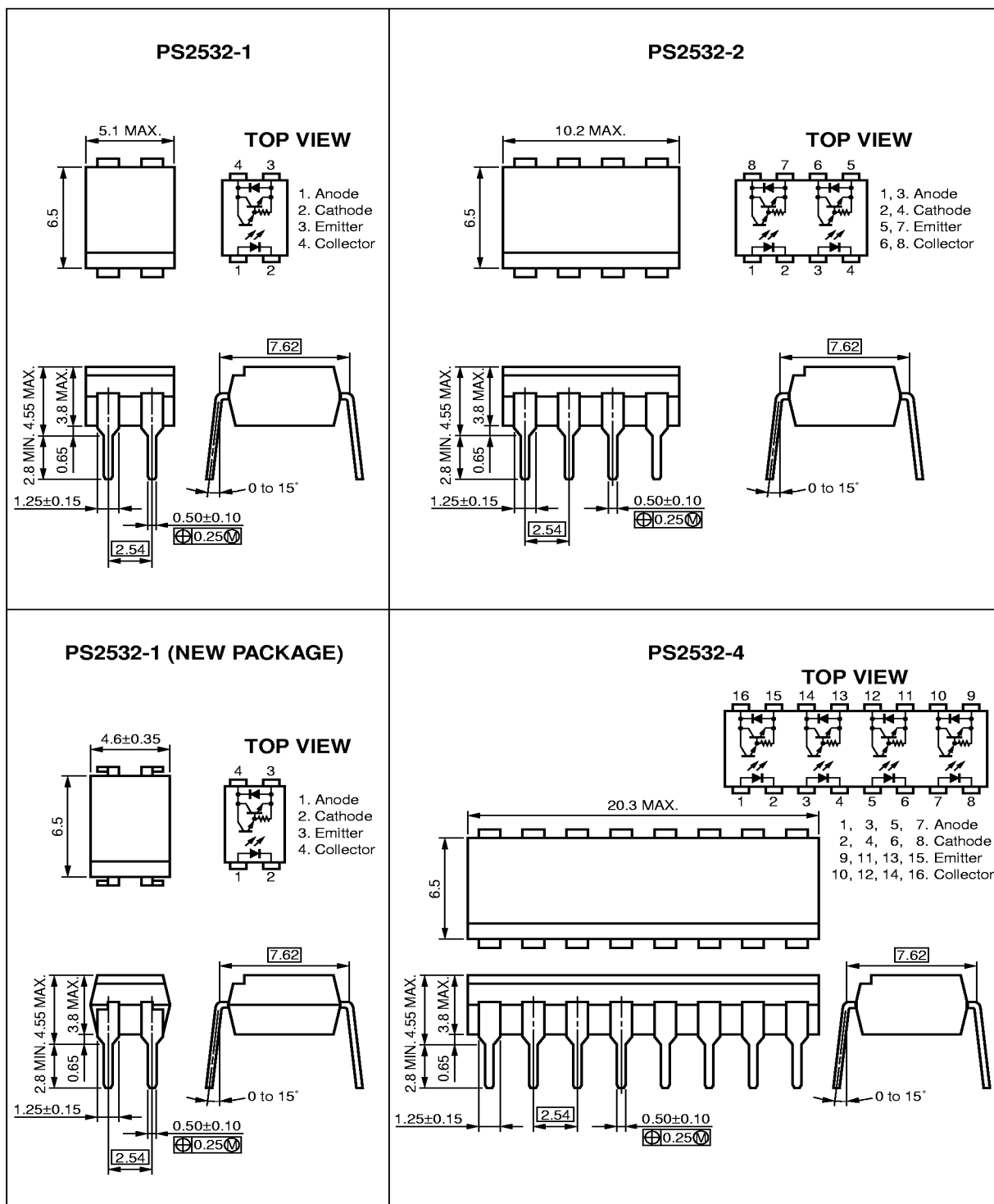
APPLICATIONS

- Telephone, Exchange equipment
- FAX/MODEM

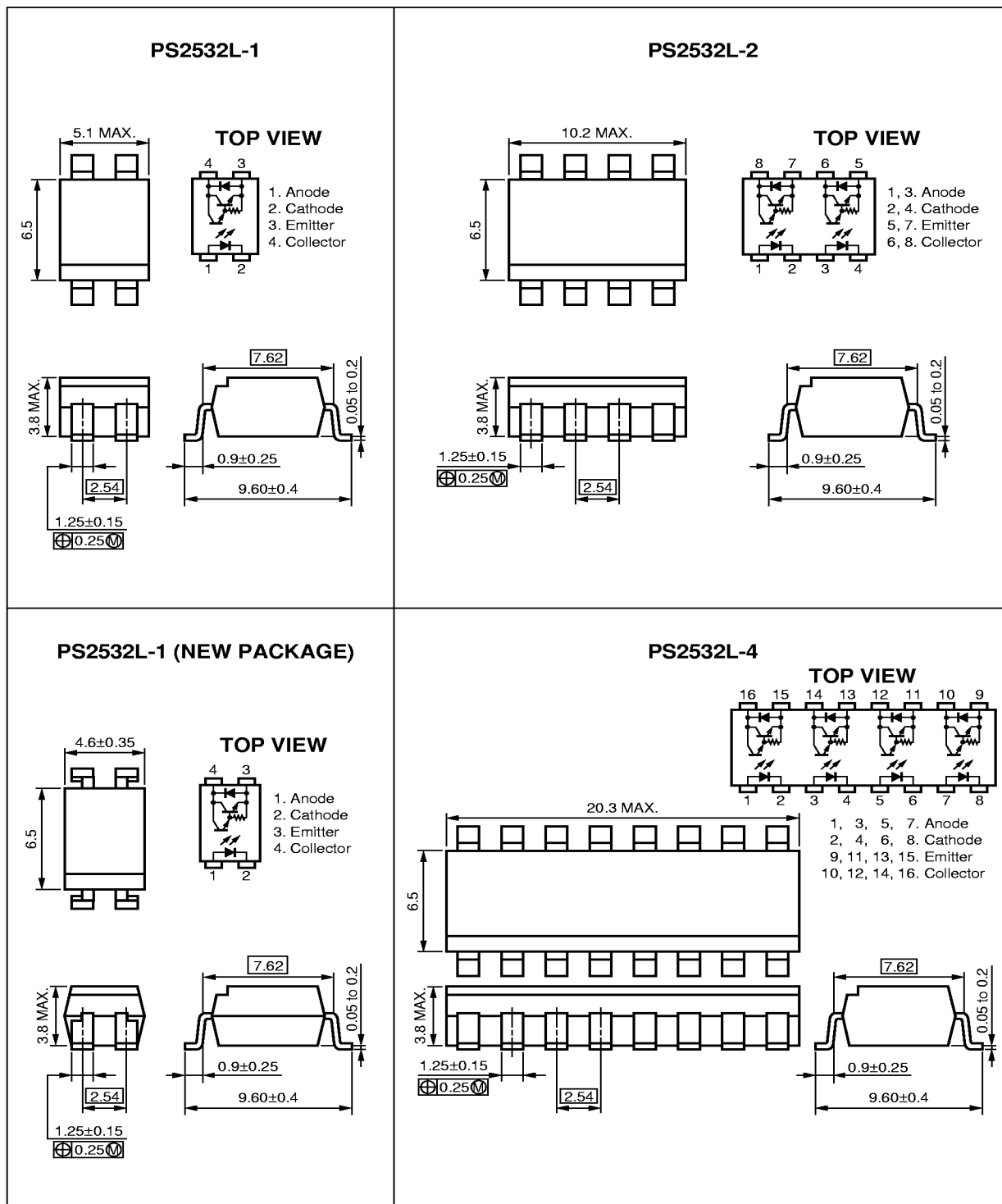
The information in this document is subject to change without notice.

★ PACKAGE DIMENSIONS (in millimeters)

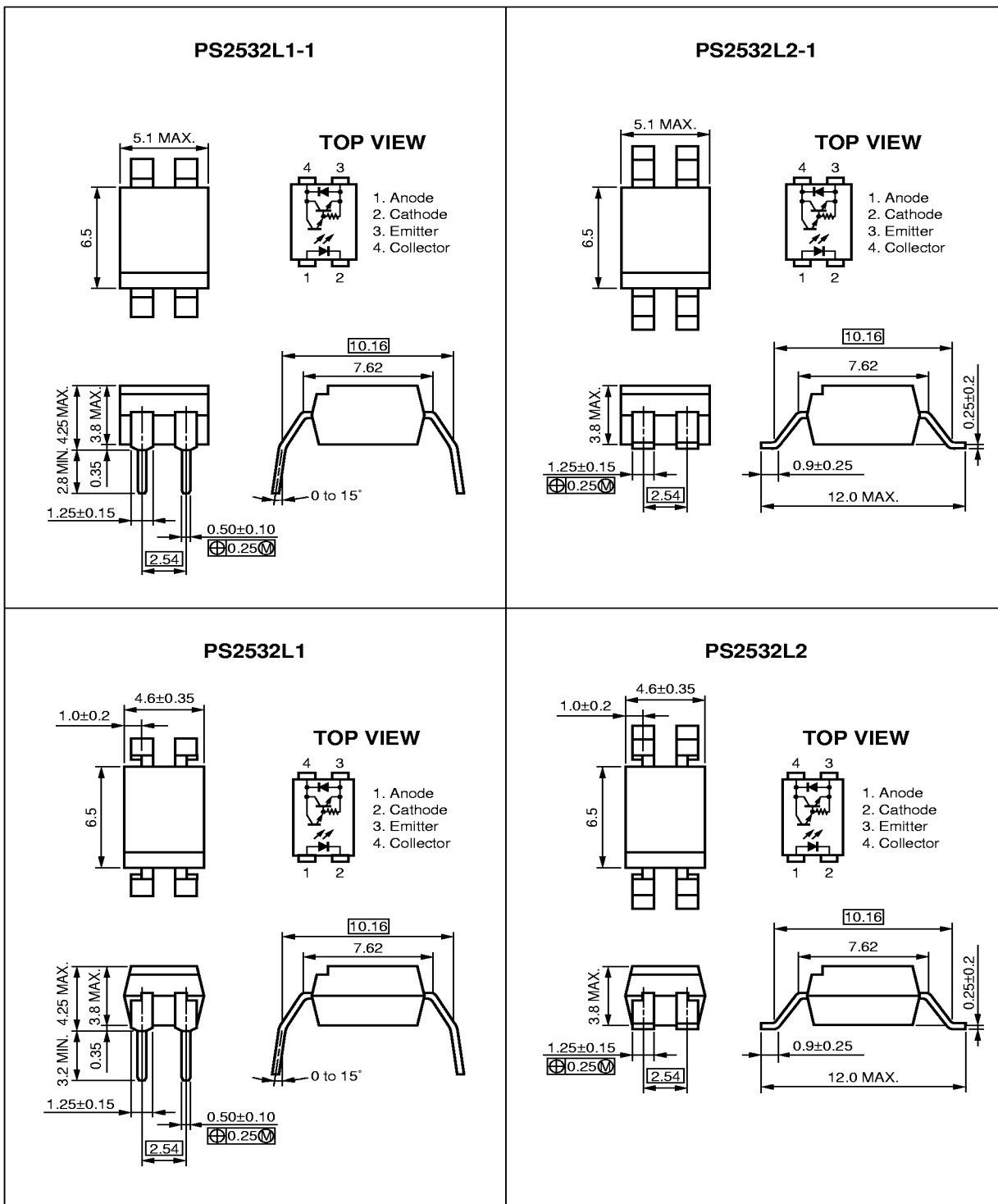
DIP type



Lead bending type



Lead bending type for long distance



★ **ORDERING INFORMATION**

Part Number	Package	Safety Standard Approval	Application Part Number ^{*1}
PS2532-1 PS2532L-1 PS2532L1-1 PS2532L2-1	4-pin DIP 4-pin DIP (lead bending surface mount) 4-pin DIP (for long distance) 4-pin DIP (for long distance surface mount)	Standard products (UL, BSI, NEMKO, SEMKO, DEMKO, FIMKO approved)	PS2532-1
PS2532-2 PS2532L-2	8-pin DIP 8-pin DIP (lead bending surface mount)		PS2532-2
PS2532-4 PS2532L-4	16-pin DIP 16-pin DIP (lead bending surface mount)		PS2532-4
PS2532-1-V PS2532L-1-V PS2532L1-1-V PS2532L2-1-V	4-pin DIP 4-pin DIP (lead bending surface mount) 4-pin DIP (for long distance) 4-pin DIP (for long distance surface mount)	VDE0884 approved products (Option)	PS2532-1
PS2532-2-V PS2532L-2-V	8-pin DIP 8-pin DIP (lead bending surface mount)		PS2532-2
PS2532-4-V PS2532L-4-V	16-pin DIP 16-pin DIP (lead bending surface mount)		PS2532-4

*1 As applying to Safety Standard, following part number should be used.

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

Parameter		Symbol	Ratings		Unit
			PS2532-1, PS2532L-1	PS2532-2, -4, PS2532L-2, -4	
Diode	Forward Current (DC)	I_F	80		mA
	Reverse Voltage	V_R	6		V
	Power Dissipation Derating	$\Delta P_D/^{\circ}\text{C}$	1.5	1.2	mW/ $^{\circ}\text{C}$
	Power Dissipation	P_D	150	120	mW/ch
	Peak Forward Current ^{*1}	I_{FP}	1		A
Transistor	Collector to Emitter Voltage	V_{CEO}	300		V
	Emitter to Collector Voltage	V_{ECO}	0.6		V
	Collector Current	I_C	150		mA/ch
	Power Dissipation Derating	$\Delta P_C/^{\circ}\text{C}$	3.0	2.4	mW/ $^{\circ}\text{C}$
	Power Dissipation	P_C	300	240	mW/ch
Isolation Voltage ^{*2}		BV	5 000 3 750 ^{*3}		Vr.m.s.
Operating Ambient Temperature		T_A	-55 to +100		$^{\circ}\text{C}$
Storage Temperature		T_{stg}	-55 to +150		$^{\circ}\text{C}$

*1 PW = 100 μs , Duty Cycle = 1 %

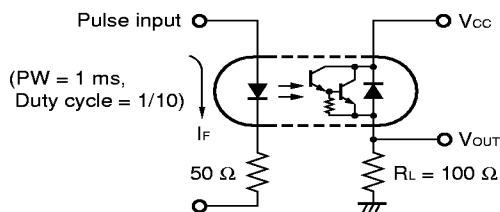
*2 AC voltage for 1 minute at $T_A = 25\text{ }^{\circ}\text{C}$, RH = 60 % between input and output

*3 VDE0884 approved products (Option)

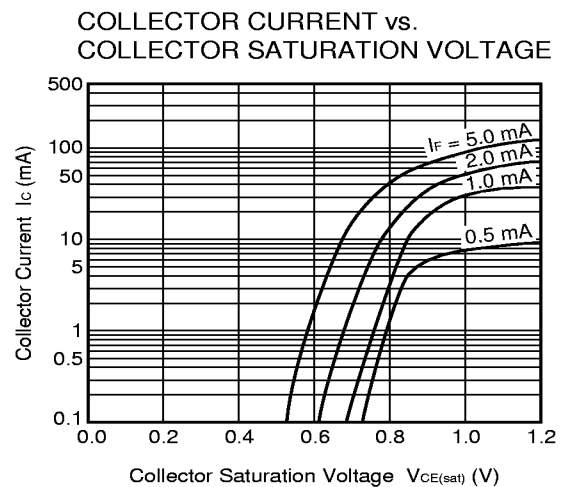
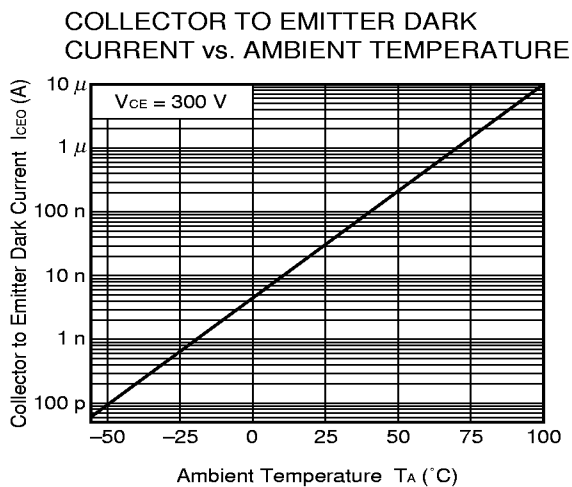
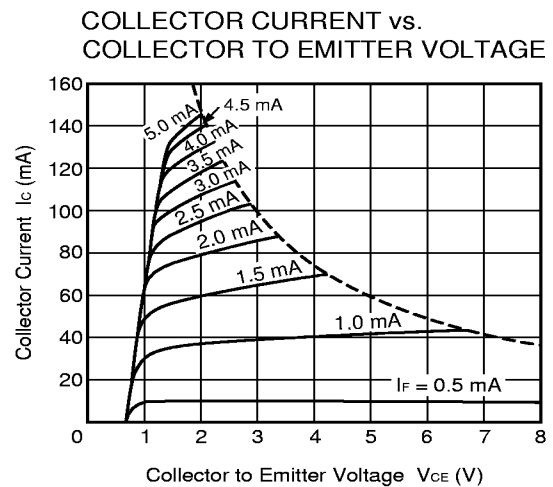
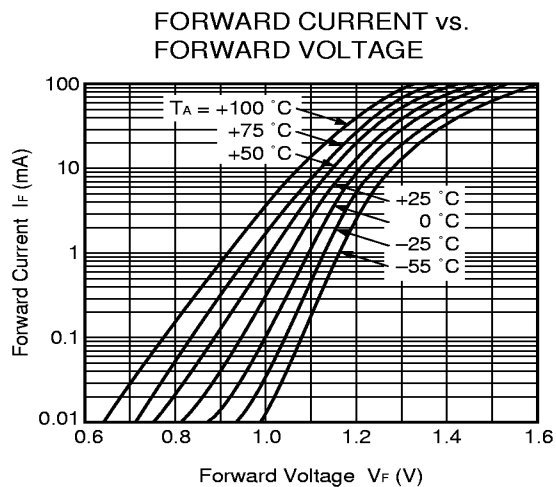
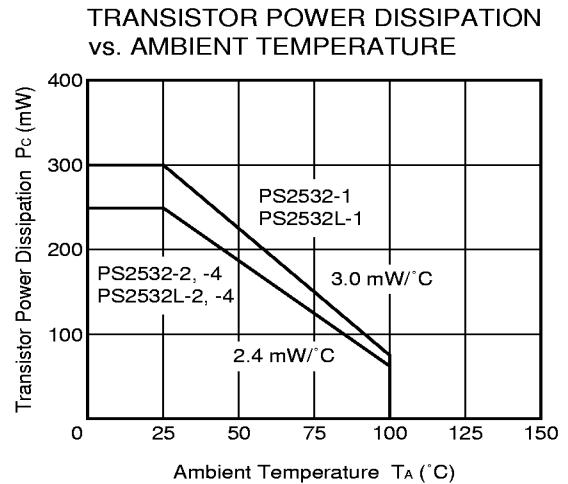
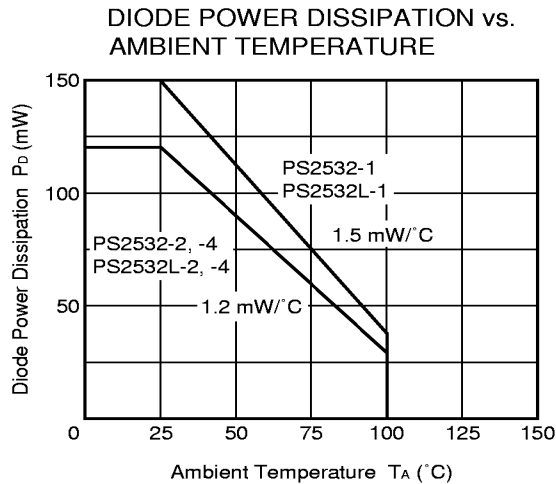
ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V_F	$I_F = 10\text{ mA}$		1.15	1.40	V
	Reverse Current	I_R	$V_R = 5\text{ V}$			5	μA
	Terminal Capacitance	C_t	$V = 0\text{ V}$, $f = 1.0\text{ MHz}$		30		pF
Transistor	Collector to Emitter Dark Current	I_{CEO}	$V_{CE} = 300\text{ V}$, $I_F = 0\text{ mA}$			400	nA
Coupled	Current Transfer Ratio (I_C/I_F)	CTR	$I_F = 1\text{ mA}$, $V_{CE} = 2\text{ V}$	1 500	4 000	6 500	%
	Collector Saturation Voltage	$V_{CE(sat)}$	$I_F = 1\text{ mA}$, $I_C = 2\text{ mA}$			1.0	V
	Isolation Resistance	R_{I-O}	$V_{I-O} = 1.0\text{ kV}_{DC}$	10^{11}			Ω
	Isolation Capacitance	C_{I-O}	$V = 0\text{ V}$, $f = 1.0\text{ MHz}$		0.6		pF
	Rise Time ^{*1}	t_r	$V_{CC} = 5\text{ V}$, $I_C = 10\text{ mA}$, $R_L = 100\text{ }\Omega$		100		μs
	Fall Time ^{*1}	t_f			100		

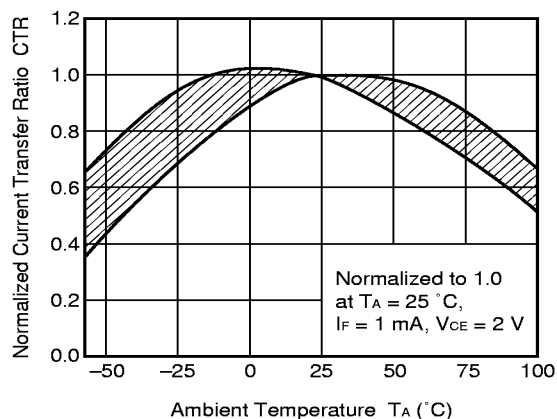
*1 Test circuit for switching time



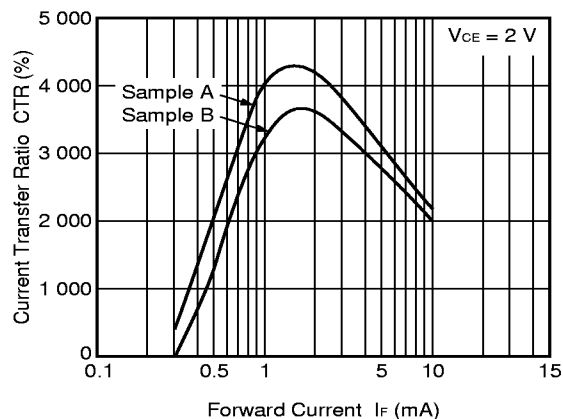
TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise specified)



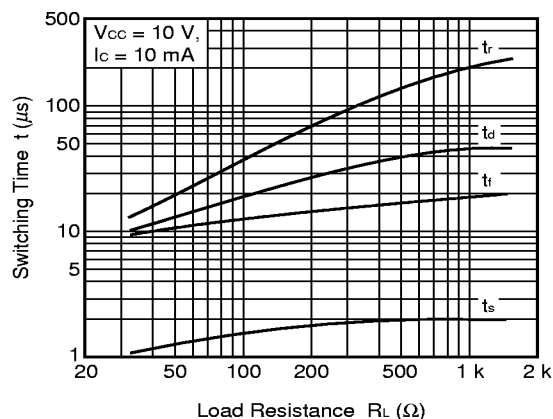
NORMALIZED CURRENT TRANSFER RATIO vs. AMBIENT TEMPERATURE



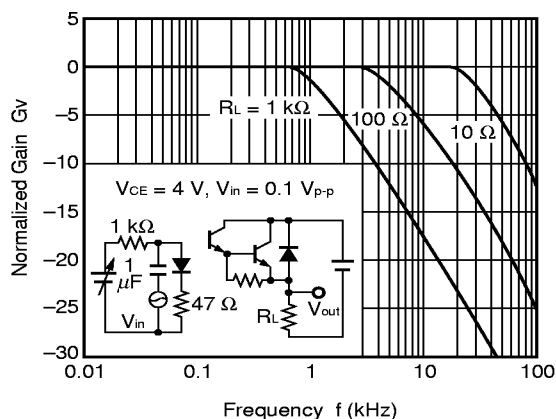
CURRENT TRANSFER RATIO vs. FORWARD CURRENT



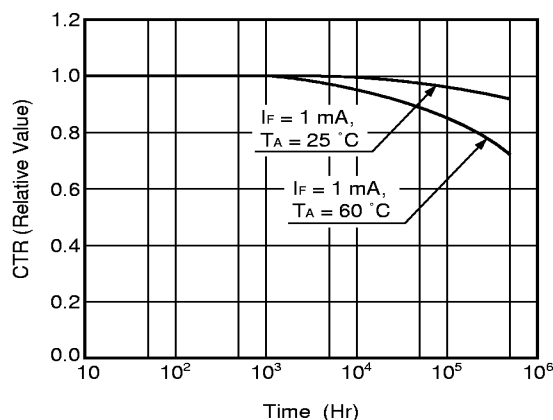
SWITCHING TIME vs. LOAD RESISTANCE



FREQUENCY RESPONSE



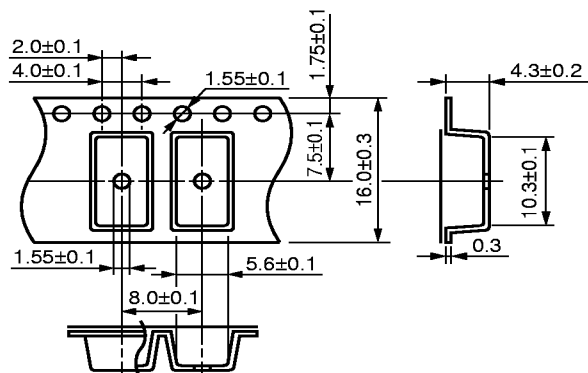
LONG TERM CTR DEGRADATION



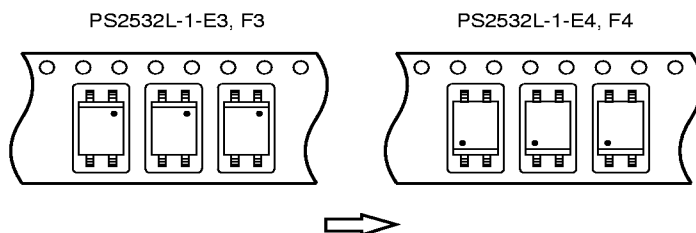
Remark The graphs indicate nominal characteristics.

TAPING SPECIFICATIONS (in millimeters)

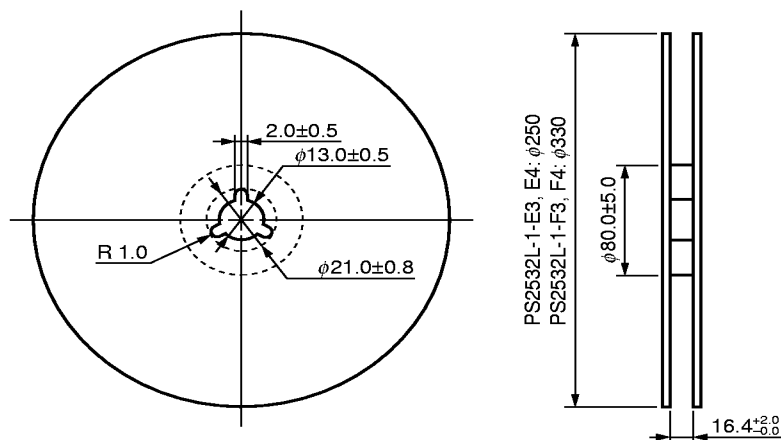
Outline and Dimensions (Tape)



Tape Direction

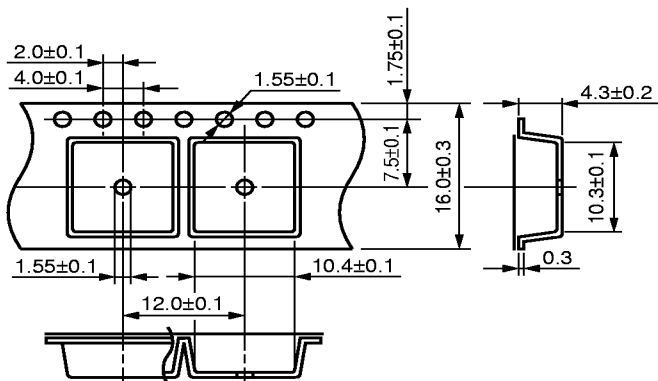


Outline and Dimensions (Reel)

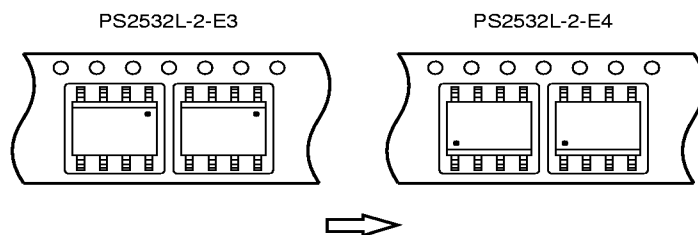


Packing: PS2532L-1-E3, E4 1 000 pcs/reel
PS2532L-1-F3, F4 2 000 pcs/reel

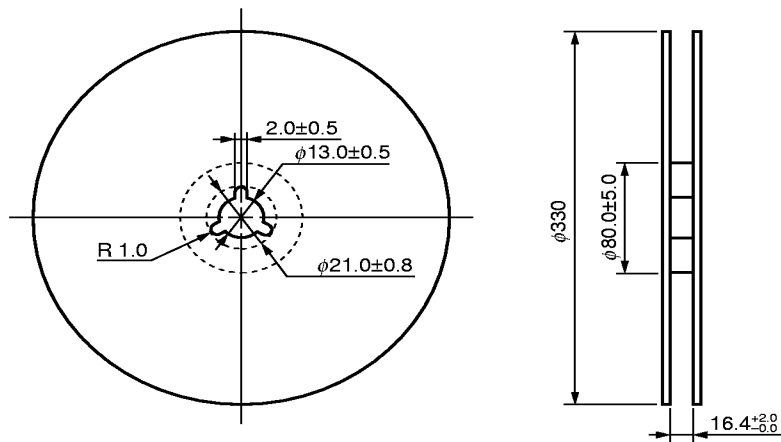
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)



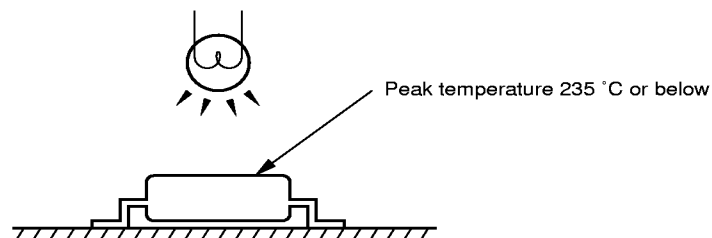
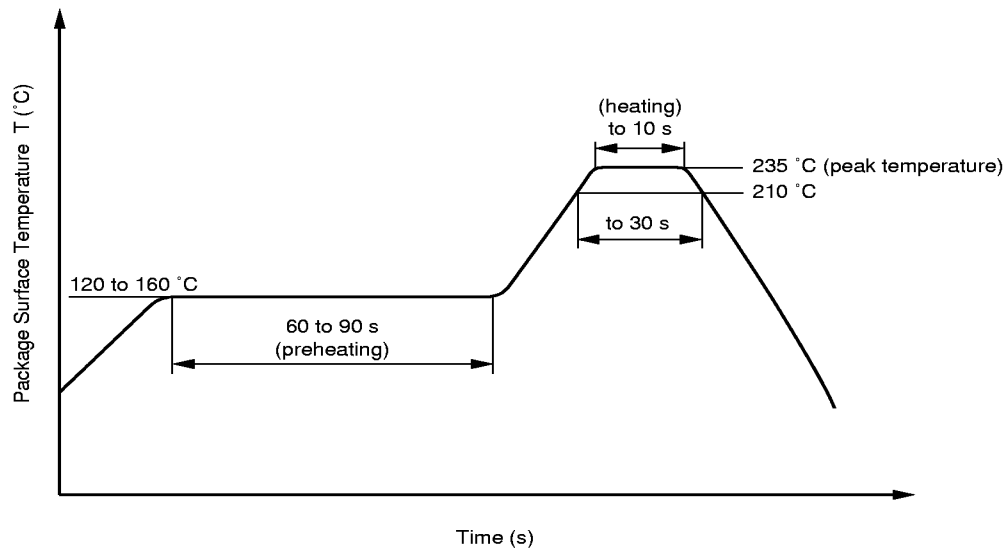
Packing: 1 000 pcs/reel

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



(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.)

(3) Cautions

- Fluxes Avoid removing the residual flux with freon-based and chlorine-based cleaning solvent.

SPECIFICATION OF VDE MARKS LICENSE DOCUMENT (VDE0884)

Parameter	Symbol	Spec	Unit
Application classification (DIN VDE 0109) for rated line voltages ≤ 300 Vr.m.s. for rated line voltages ≤ 600 Vr.m.s.		IV III	
Climatic test class (DIN IEC 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 VDE 0109)		2	
Clearance distance		> 7.0	mm
Creepage distance		> 7.0	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 $V_{IO} = 500$ V dc at T_A MAX. at least 100 °C	R_{is} MIN. R_{is} 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 $V_{IO} = 500$ V dc at $T_A = 175$ °C (T_{si})	T_{si} I_{si} P_{si} R_{is} MIN.	175 400 700 10^9	°C mA mW Ω

APPLICATION FOR TELEPHONE (EXAMPLE)

