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Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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HIGH ISOLATION VOLTAGE SINGLE TRANSISTOR TYPE MULTI PHOTO COUPLER SERIES

— NEPOC SERIES —

DESCRIPTION

PS2561-1, -2, -3, -4 and PS2561L-1, -2, -3, -4 are optically coupled isolators containing a GaAs light emitting diode and an NPN silicon photo transistor.

PS2561-1, -2, -3, -4 are in a plastic DIP (Dual In-line Package) and PS2561L-1, -2, -3, -4 are lead bending type (Gull-wing) for surface mount.

FEATURES

- High isolation voltage (BV: 5 kV_{r.m.s.} MIN.)
- High collector to emitter voltage (V_{CEO}: 80 V MIN.)
- High current transfer ratio (CTR: 200 % TYP.)
- High speed switching (t_r = 3 μs, t_f = 10 μs TYP.)
- Low cost
- Each isolated channels per package

APPLICATIONS

Interface circuit for various instrumentations, control equipments.

- AC Line/Digital Logic Isolate high voltage transients
- Digital Logic/Digital Logic Eliminate spurious ground loops
- Twisted pair line receiver Eliminate ground loop pick-up
- Telephone/Telegraph line receiver Isolate high voltage transients
- High Frequency Power Supply Feedback Control Maintain floating ground
- Relay Contact Monitor Isolate floating grounds and transients
- Power Supply Monitor Isolate transients and ground systems

SPECIFICATION OF VDE MARKS LICENSE DOCUMENT (VDE0884)

- Applied test class 55/150/21
- Leakage Current (CTI) KB 100/A
- Creepage distance > 7 mm
- Air clearance > 7 mm
- Isolation distance > 0.4 mm
- Applied test voltage DC5 300 V or AC3 750 V
- Reference voltage according to VDE0110b table4 DC450 V or AC380 V
- Isolation group C

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

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

		(PS2561-1) (PS2561L-1)	(PS2561-2, 3, 4) (PS2561L-2, 3, 4)	
Diode				
Reverse Voltage	V_R	6	6	V
Forward Current (DC)	I_F	80	80	mA
Power Dissipation	P_D	150	120	mW/Channel
Peak Forward Current (PW = 100 μs , Duty Cycle 1 %)	$I_F(\text{Peak})$	1	1	A
Transistor				
Collector to Emitter Voltage	V_{CEO}	80	80	V
Emitter to Collector Voltage	V_{ECO}	7	7	V
Collector Current	I_C	80	80	mA
Power Dissipation	P_C	150	120	mW/Channel
Coupled				
Isolation Voltage *1)	BV	5000	5000	$V_{r.m.s.}$
Storage Temperature	T_{stg}	-55 to +150	-55 to +150	$^\circ\text{C}$
Operating Temperature	T_{opt}	-55 to +100	-55 to +100	$^\circ\text{C}$
Lead Temperature (Soldering 10 s)	T_{sol}	260	260	$^\circ\text{C}$
Total Power Dissipation	P_T	250	200	mW/Channel

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

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

	CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Diode	Forward Voltage	V_F		1.1	1.4	V	$I_F = 10\text{ mA}$
	Reverse Current	I_R			5	μA	$V_R = 5\text{ V}$
	Junction Capacitance	C		50		pF	$V = 0$, $f = 1.0\text{ MHz}$
Transistor	Collector to Emitter Dark Current	I_{CEO}			100	nA	$V_{CE} = 40\text{ V}$, $I_F = 0$
	Collector to Emitter Breakdown Voltage	BV_{CEO}	40	60		V	$I_C = 1\text{ mA}$, $I_B = 0$
	Emitter to Collector Breakdown Voltage	BV_{ECO}	7	9		V	$I_E = 100\text{ }\mu\text{A}$, $I_B = 0$
Coupled	Current Transfer Ratio *2)	CTR	80	200	400	%	$I_F = 5\text{ mA}$, $V_{CE} = 5\text{ V}$
	Collector Saturation Voltage	$V_{CE(\text{sat})}$			0.3	V	$I_F = 10\text{ mA}$, $I_C = 2\text{ mA}$
	Isolation Resistance	R_{1-2}	10^{11}			Ω	$V_{in-out} = 1.0\text{ kV}$
	Isolation Capacitance	C_{1-2}		0.5		pF	$V = 0$, $f = 1.0\text{ MHz}$
	Rise Time *3)	t_r		3		μs	$V_{CC} = 10\text{ V}$, $I_C = 2\text{ mA}$, $R_L = 100\text{ }\Omega$
	Fall Time *3)	t_f		5		μs	$V_{CC} = 10\text{ V}$, $I_C = 2\text{ mA}$, $R_L = 100\text{ }\Omega$

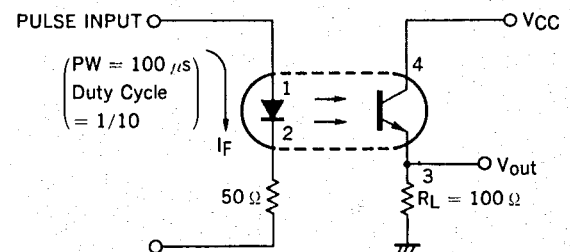
*2) CTR rank (only PS2561-1, PS2561L-1)

L : 200 to 400 (%)

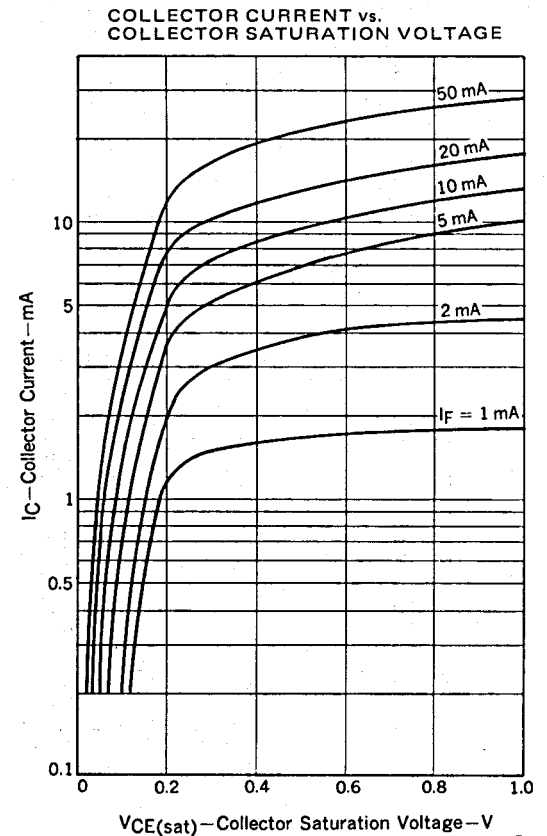
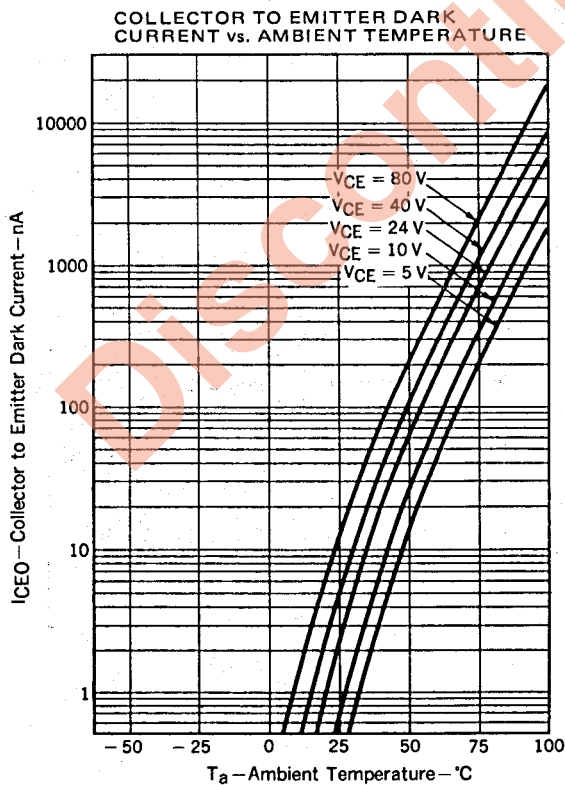
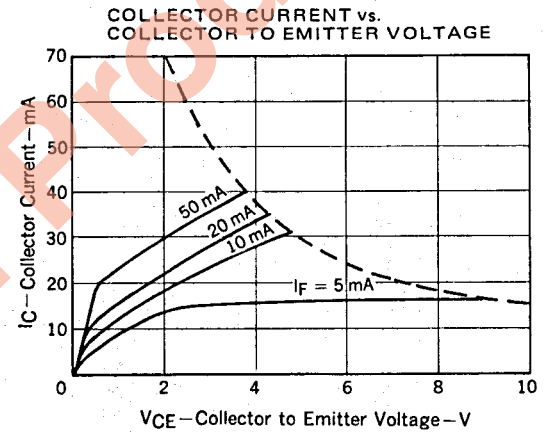
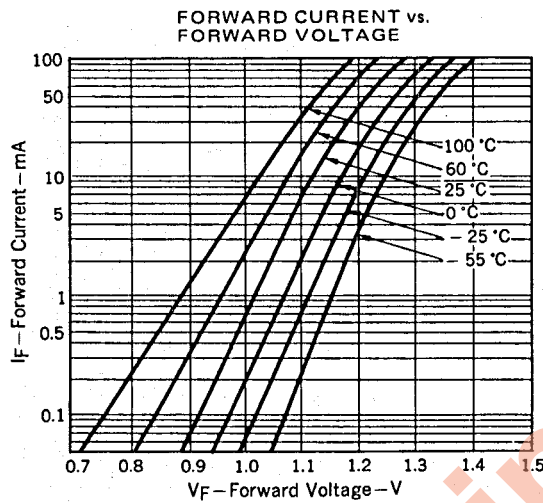
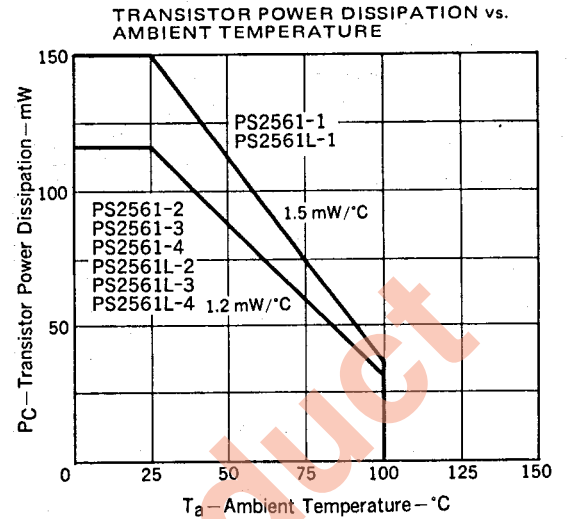
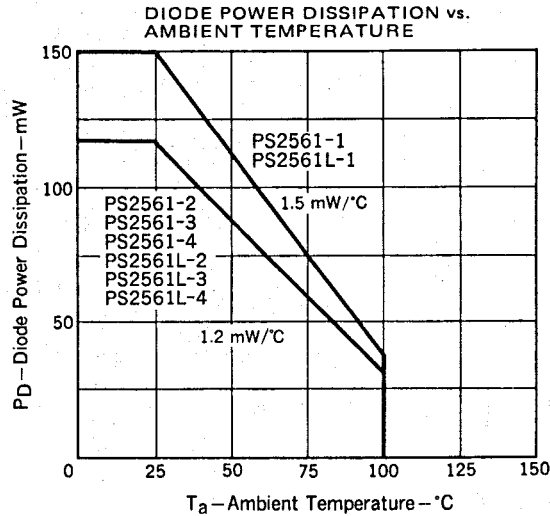
D : 100 to 300 (%)

M : 80 to 240 (%)

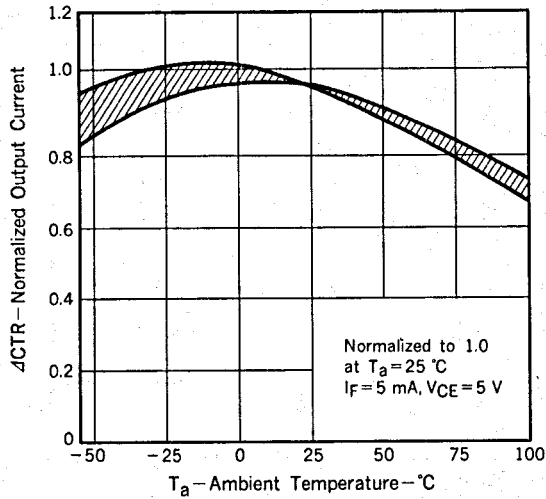
*3) Test Circuit for Switching Time



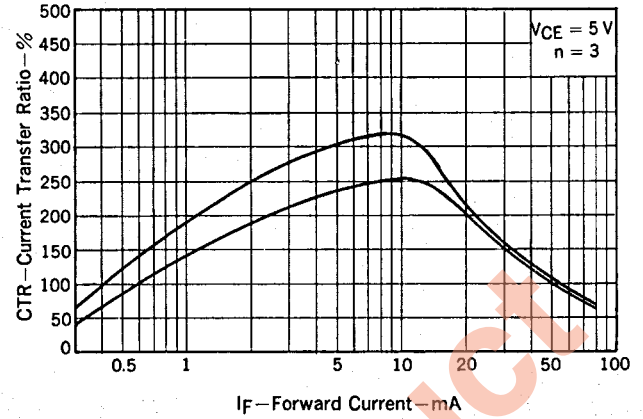
TYPICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)



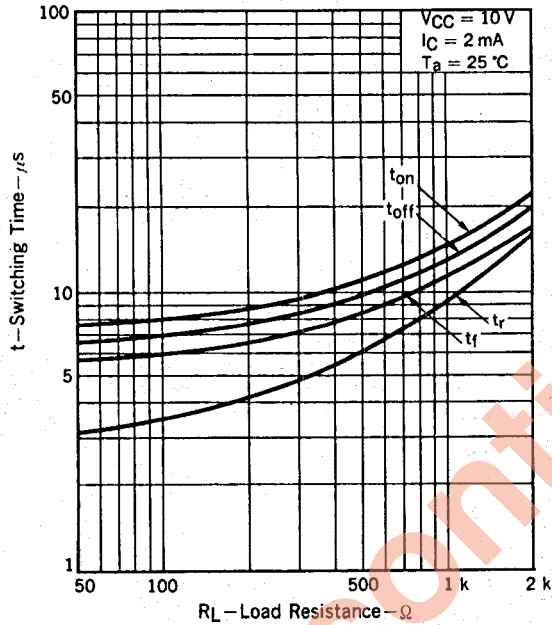
NORMALIZED OUTPUT CURRENT vs. AMBIENT TEMPERATURE



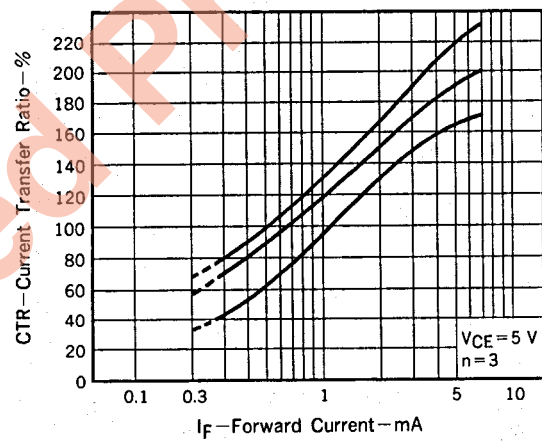
CURRENT TRANSFER RATIO (CTR) vs. FORWARD CURRENT



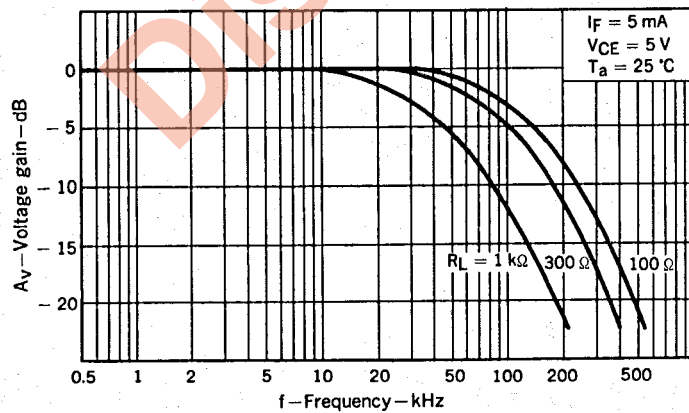
SWITCHING TIME vs. LOAD RESISTANCE



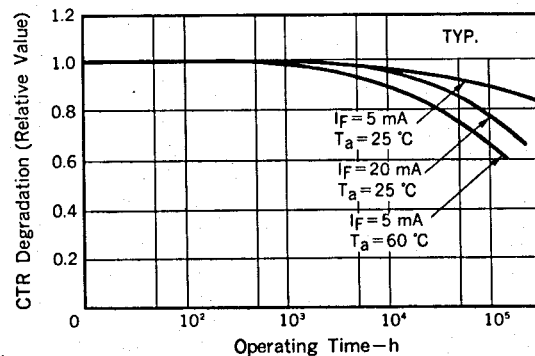
CURRENT TRANSFER RATIO (CTR) vs. FORWARD CURRENT



FREQUENCY RESPONSE



LONG TERM CTR DEGRADATION

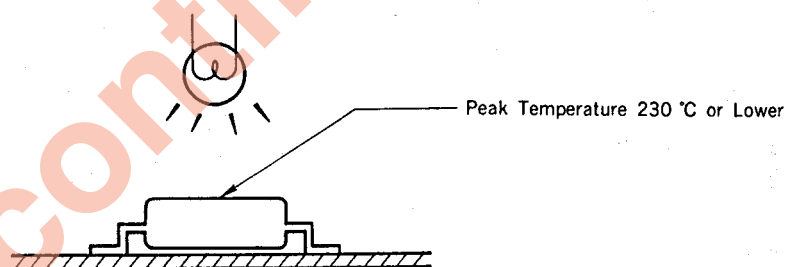
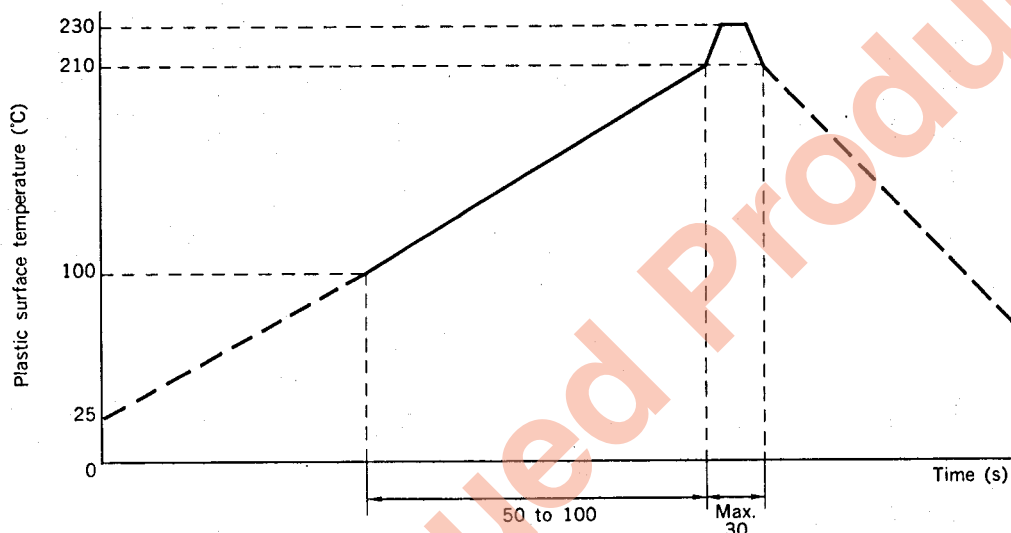


SOLDERING PRECAUTION

(1) Infrared reflow soldering

- Peak temperature : 230 °C or lower (plastic surface)
- Time : 30 s or less
(Time during plastic surface temperature overs 210 °C)
- No. of reflow times : 1
- Flux : Rosin-base flux

Reflow Temperature Profile



(2) Dip soldering

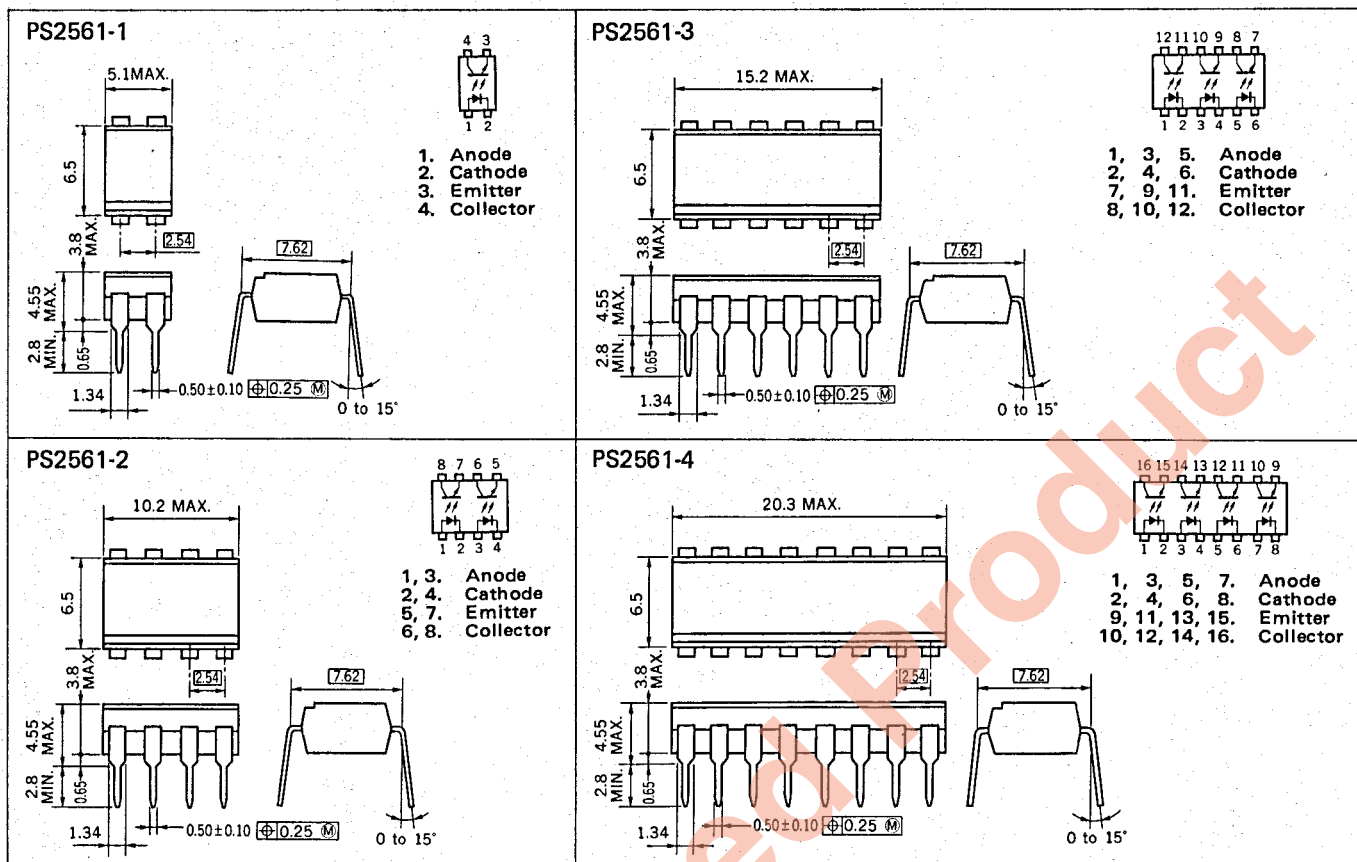
- Peak temperature : 260 °C or lower
- Time : 10 s or less
- Flux : Rosin-base flux

PS2560 FAMILY

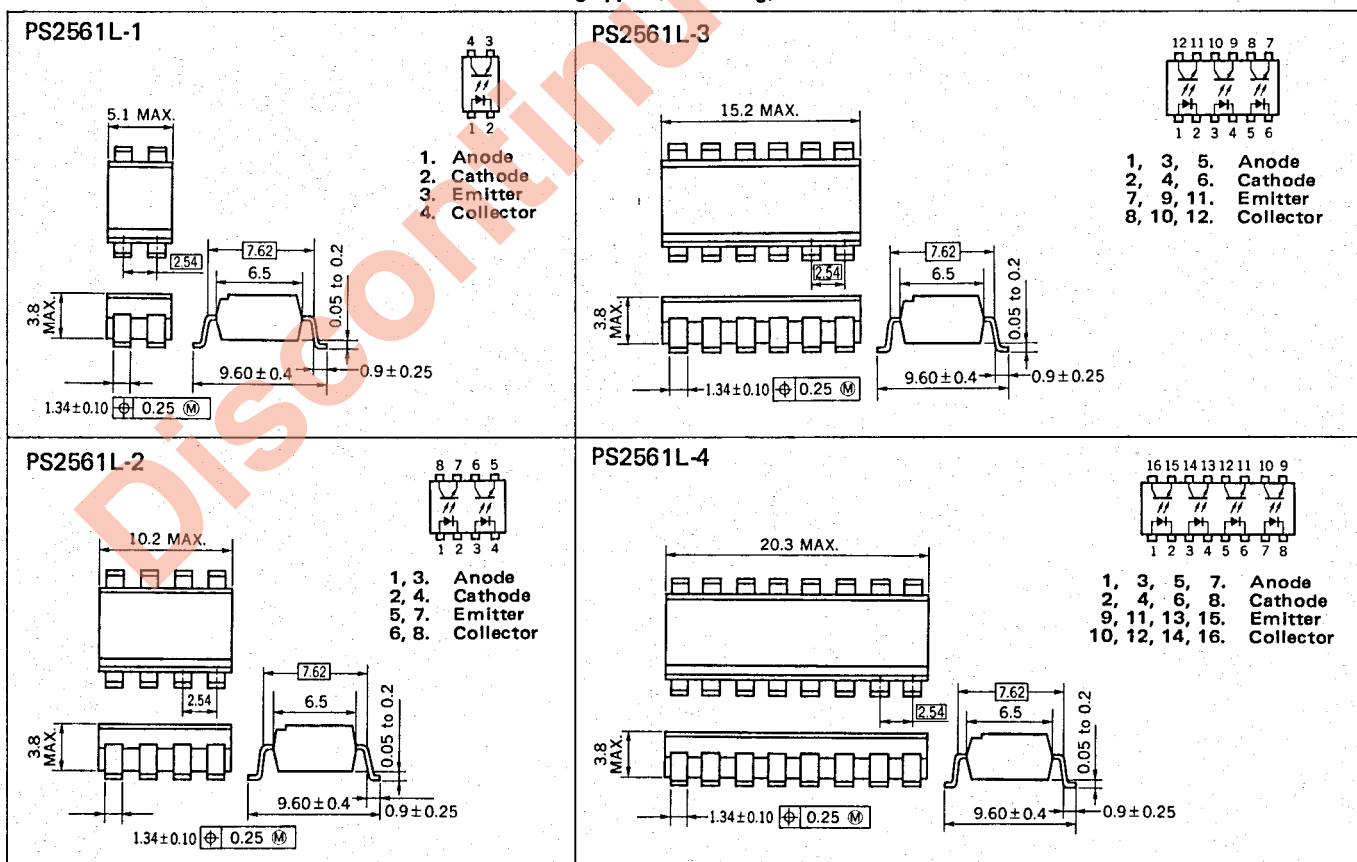
Feature Type Number	High Isolation Voltage	Function	High V _{CEO} (MIN.)	High CTR (TYP.)	High Speed switching (TYP.)
PS2561-1, -2, -3, -4 PS2561L-1, -2, -3, -4	5 000 V _{r.m.s.}	(Unidirectional) input	80 V	200 %	$t_r = 3 \mu s, t_f = 5 \mu s$
PS2562-1, -2, -3, -4 PS2562L-1, -2, -3, -4			40 V	2 000 %	$t_r, t_f = 100 \mu s$
PS2565-1, -2, -3, -4 PS2565L-1, -2, -3, -4		AC input (Bidirectional input)	80 V	300 %	$t_r = 3 \mu s, t_f = 5 \mu s$
PS2566-1, -2, -3, -4 PS2566L-1, -2, -3, -4			40 V	2 000 %	$t_r, t_f = 100 \mu s$

Discontinued Product

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



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



[MEMO]

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