

### FEATURES

- **HIGH ISOLATION VOLTAGE**  
BV: 5kV<sub>r.m.s.</sub> MIN
- **HIGH COLLECTOR TO EMITTER VOLTAGE**  
V<sub>CEO</sub>: 80 V MIN
- **HIGH CURRENT TRANSFER RATIO**  
CTR: 300% TYP
- **HIGH SPEED SWITCHING**  
t<sub>r</sub> = 3 μs, t<sub>f</sub> = 5 μs TYP
- **LOW COST**
- **ISOLATED CHANNELS PER EACH PACKAGE**

### DESCRIPTION

PS2501-1, -2, -4 and PS2501L-1, -2, -4 are optically coupled isolators containing a GaAs light emitting diode and an NPN silicon phototransistor. PS2501-1, -2, -4 are in a plastic DIP (Dual In-line Package) and PS2501L-1, -2, -4 are lead bending type (Gull-wing) for surface mount.

### APPLICATIONS

Interface circuit for various instrumentations and control equipments

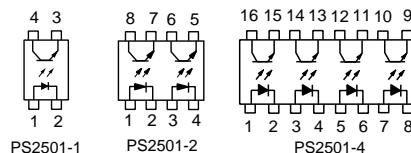
- AC LINE / DIGITAL LOGIC
- DIGITAL LOGIC / DIGITAL LOGIC
- TWISTED PAIR LINE RECEIVER
- TELEPHONE / TELEGRAPH LINE RECEIVER
- HIGH FREQUENCY POWER SUPPLY FEEDBACK CONTROL
- RELAY CONTACT MONITOR
- POWER SUPPLY MONITOR

### ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)

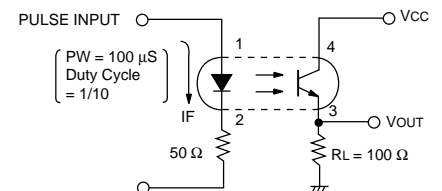
PART NUMBER			PS2501-1, -2, -4 PS2501L-1, -2, -4			
	SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX
Diode	V <sub>F</sub>	Forward Voltage, I <sub>F</sub> = 10 mA	V		1.17	1.4
	I <sub>R</sub>	Reverse Current, V <sub>R</sub> = 5 V	μA			5
	C	Junction Capacitance, V = 0, f = 1.0 MHz	pF		50	
Transistor	I <sub>CEO</sub>	Collector to Emitter Dark Current, V <sub>ce</sub> = 80 V, I <sub>F</sub> = 0	nA			100
	BV <sub>CEO</sub>	Collector to Emitter Breakdown Voltage, I <sub>c</sub> = 1 mA, I <sub>B</sub> = 0	V	40	60	
	BV <sub>EBO</sub>	Emitter to Collector Breakdown Voltage, I <sub>E</sub> = 100 μA, I <sub>B</sub> = 0	V	7	9	
Coupled	CTR	Current Transfer Ratio <sup>1</sup> , I <sub>F</sub> = 5 mA, V <sub>CE</sub> = 5 V	%	80	300	600
	V <sub>CE(sat)</sub>	Collector Saturation Voltage, I <sub>F</sub> = 10 mA, I <sub>c</sub> = 2 mA	V			0.3
	R <sub>1-2</sub>	Isolation Resistance, V <sub>IN-OUT</sub> = 1.0 kV	Ω	10 <sup>11</sup>		
	C <sub>1-2</sub>	Isolation Capacitance, V = 0, f = 1.0 MHz	pF		0.5	
	t <sub>r</sub>	Rise Time <sup>2</sup> , V <sub>CC</sub> = 10 V, I <sub>c</sub> = 2 mA, R <sub>L</sub> = 100 Ω	μs		3	
t <sub>f</sub>	Fall Time <sup>2</sup> , V <sub>CC</sub> = 10 V, I <sub>c</sub> = 2 mA, R <sub>L</sub> = 100 Ω	μs		5		

#### Notes:

- CTR rank (PS2501-1, PS2501L-1 only)
  - K: 300 to 600 %
  - L: 200 to 400 %
  - M: 80 to 240 %
  - D: 100 to 300 %
  - H: 80 to 160 %
  - W: 130 to 260 %
  - Q: 100 to 200%
  - N: 80 to 600 %



#### 2. Test Circuit for Switching



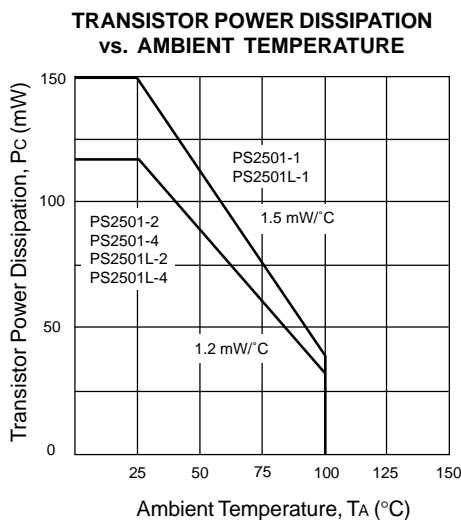
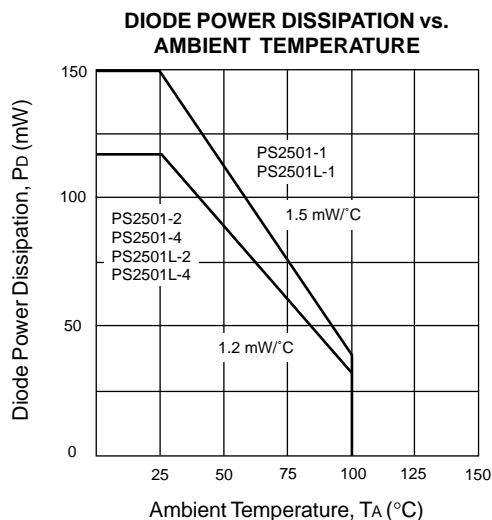
**ABSOLUTE MAXIMUM RATINGS<sup>1</sup>** (T<sub>A</sub> = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS	
			PS2501-1 PS2501L-1	PS2501-2,4 PS2501L-2, 4
<b>Diode</b>				
I <sub>F</sub>	Forward Current	mA	80	80
V <sub>R</sub>	Reverse Voltage	V	6	6
ΔP <sub>D</sub> /°C	Power Dissipation Derating	mW/°C	1.5	1.2
P <sub>D</sub>	Power Dissipation	mW/Ch	150	120
I <sub>F</sub> (PEAK)	Peak Forward Current (P <sub>W</sub> = 100 μs, Duty Cycle 1%)	A	1	1
<b>Transistor</b>				
V <sub>CEO</sub>	Collector to Emitter Voltage	V	80	80
V <sub>ECO</sub>	Emitter to Collector Voltage	V	7	7
I <sub>c</sub>	Collector Current	mA	50	50
ΔP <sub>c</sub> /°C	Power Dissipation Derating	mW/°C	1.5	1.2
P <sub>c</sub>	Power Dissipation	mW/Ch	150	120
<b>Coupled</b>				
BV	Isolation Voltage <sup>2</sup>	V <sub>r.m.s.</sub>	5000	5000
T <sub>STG</sub>	Storage Temperature	°C	-55 to +150	-55 to +150
T <sub>OPT</sub>	Operating Temperature	°C	-55 to +100	-55 to +100
T <sub>SOL</sub>	Lead Temperature (Soldering 10 s)	°C	260	260
P <sub>T</sub>	Total Power Dissipation	mW/Ch	250	200

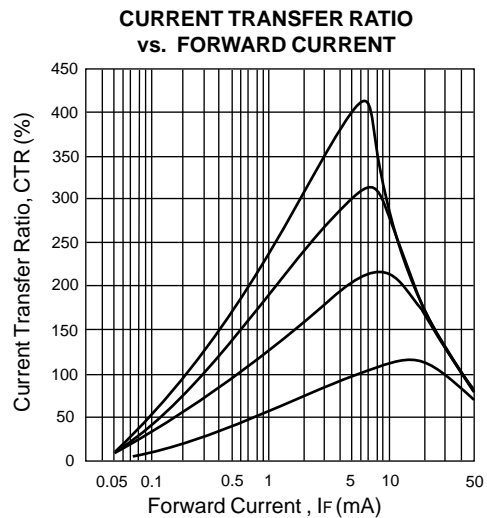
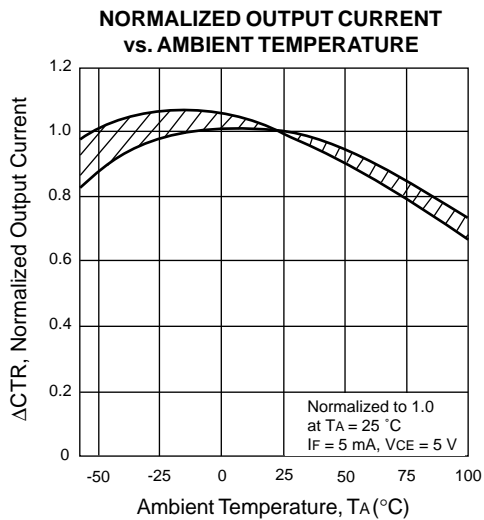
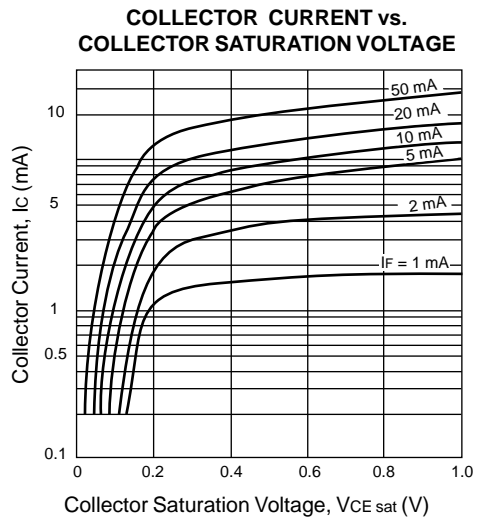
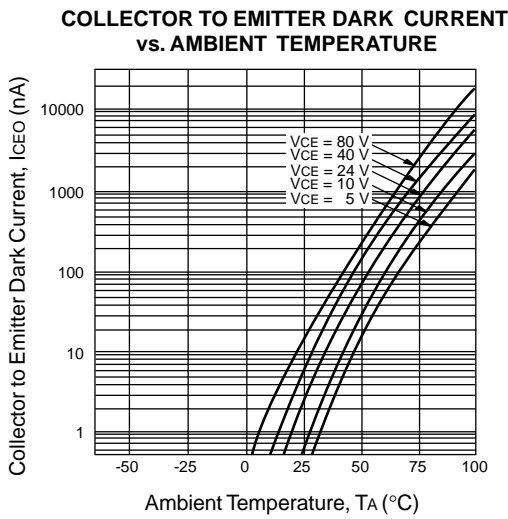
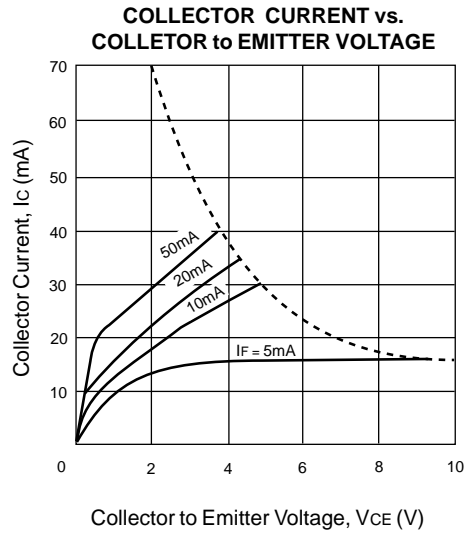
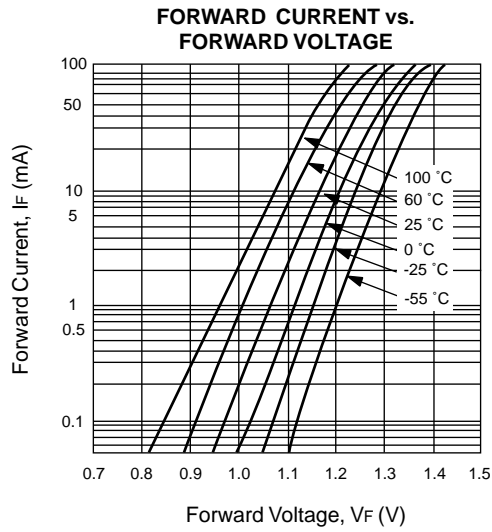
Notes:

1. Operation in excess of any one of these parameters may result in permanent damage.
2. AC voltage for 1 minute at T<sub>A</sub> = 25 °C, RH = 60 % between input and output.

**TYPICAL PERFORMANCE CURVES** (T<sub>A</sub> = 25 °C)

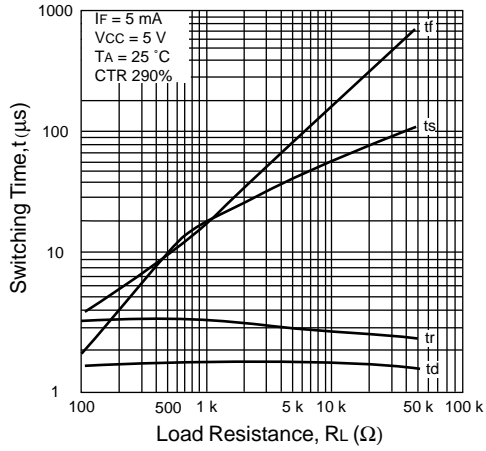


**TYPICAL PERFORMANCE CURVES** ( $T_A = 25^\circ\text{C}$ )

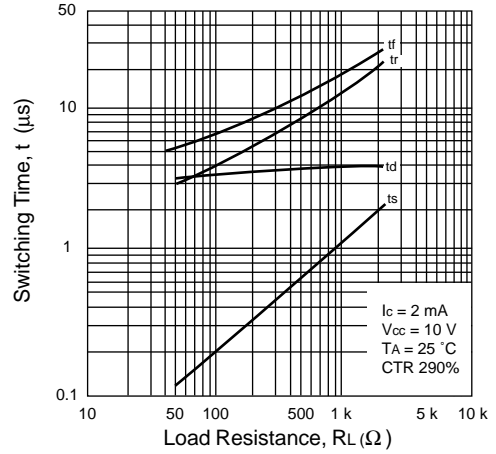


TYPICAL PERFORMANCE CURVES (TA = 25 °C)

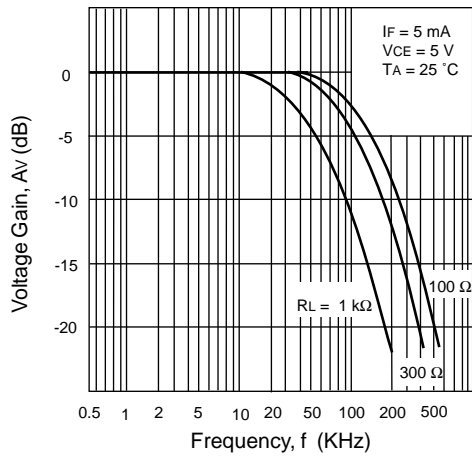
SWITCHING TIME vs. LOAD RESISTANCE



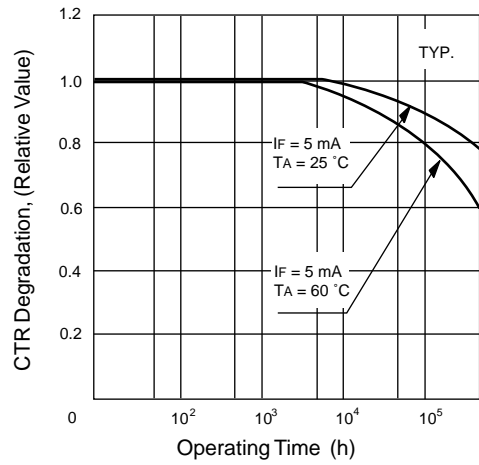
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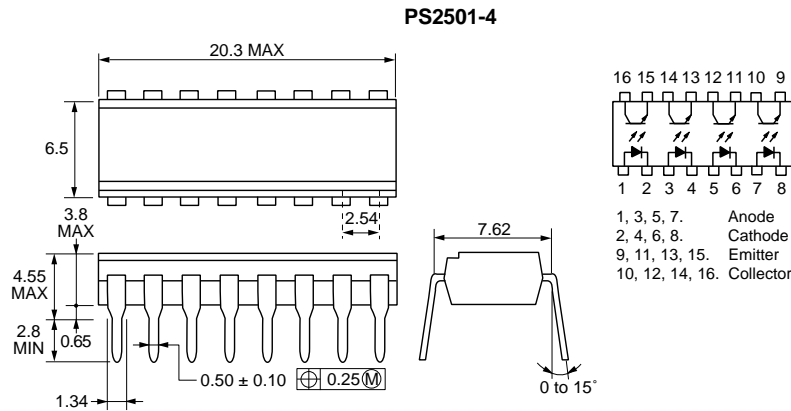
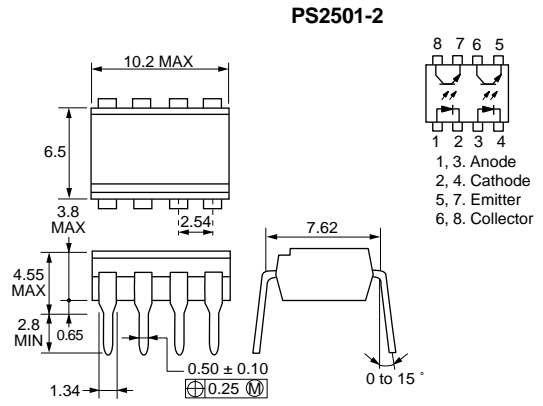
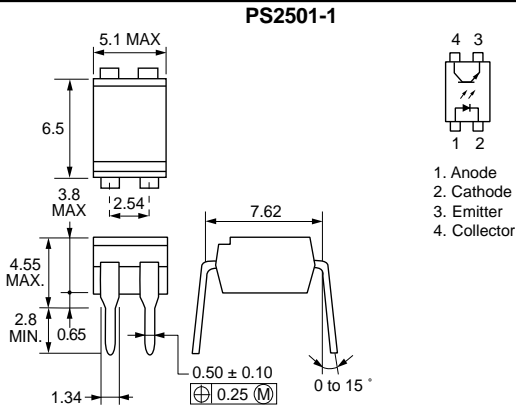
FREQUENCY RESPONSE



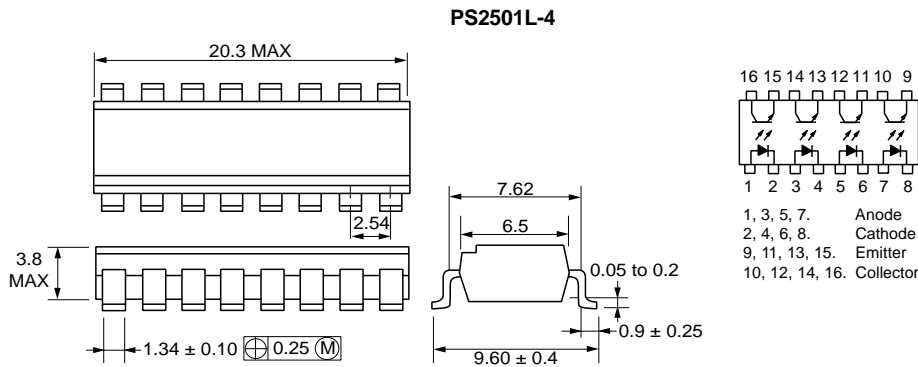
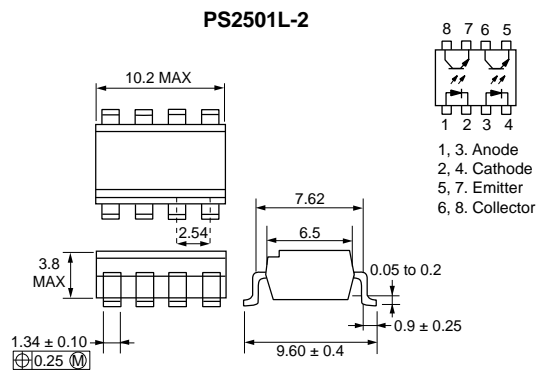
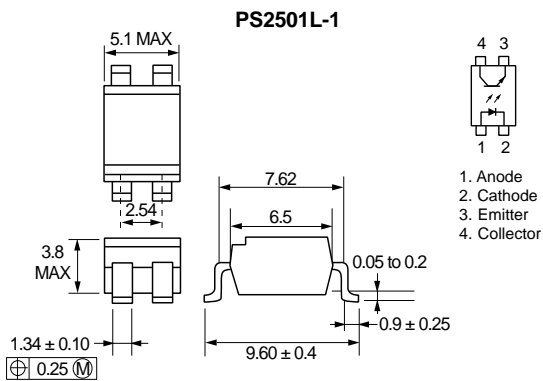
LONG TERM CTR DEGRADATION



**OUTLINE DIMENSIONS** (Units in mm) **DIP (Dual In-line Package)**



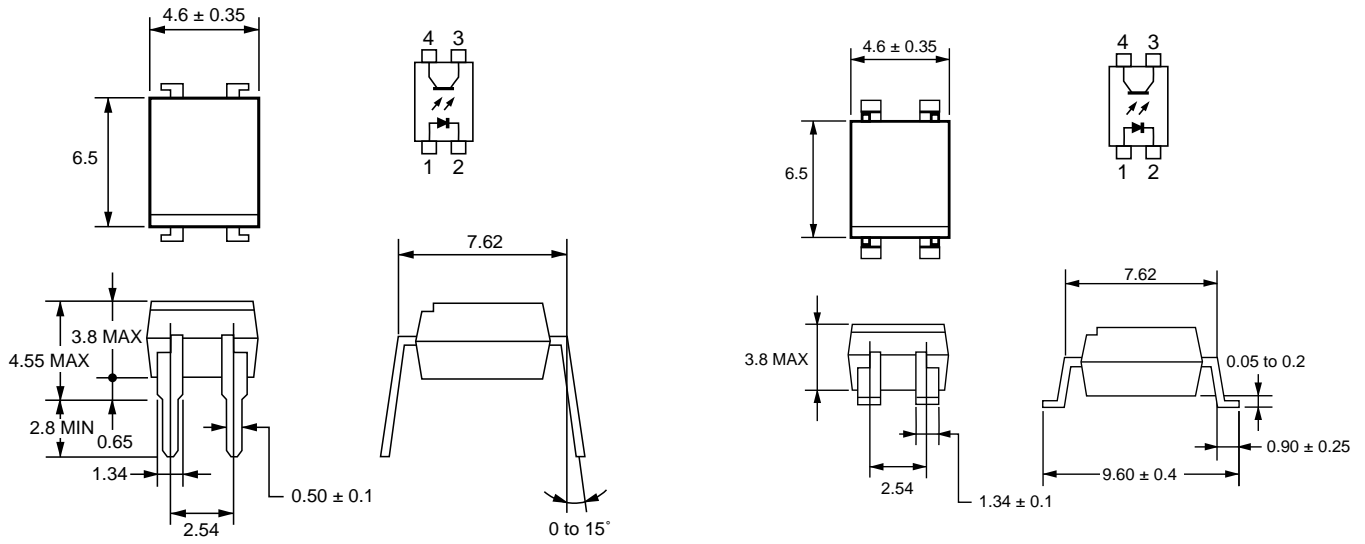
**OUTLINE DIMENSIONS** (Units in mm) **Lead Bending Type (Gull-wing)**



**OUTLINE DIMENSIONS** (Units in mm)

PS2501-1\*

PS2501L-1\*



\*These packages are manufactured using the new Phoenix manufacturing process, and are interchangeable with the standard PS2501-1 and PS2501L-1.