

## HIGH ISOLATION VOLTAGE AC INPUT RESPONSE TYPE MULTI PHOTOCOUPLER SERIES

PS2505-1, -2, -4  
PS2505L-1, -2, -4

### FEATURES

- **HIGH ISOLATION VOLTAGE**  
BV: 5 kVr.m.s. 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**
- **AC INPUT RESPONSE**

### DESCRIPTION

PS2505-1, -2, and -4 and PS2505L-1, -2, and -4 are optically coupled isolators containing a GaAs light emitting diode and an NPN silicon phototransistor. PS2505-1, -2, and -4 are in a plastic DIP (Dual In-line Package) and PS2505-1, -2, and -4 are in a 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**
- **SEQUENCE CONTROLLERS**
- **SYSTEMS APPLICATIONS, MEASURING INSTRUMENTS**

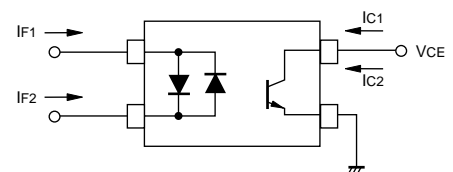
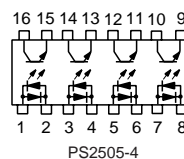
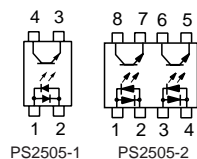
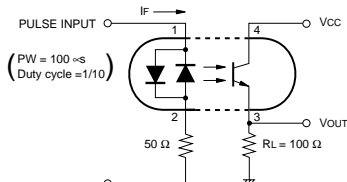
### ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)

PART NUMBER			PS2505-1, -2, -4 PS2505L-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	
	C	Junction Capacitance, V = 0, f = 1.0 MHz	pF	100		
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>ECO</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, 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 1-2	Isolation Resistance, V <sub>in-out</sub> = 1.0 kV	Ω	10 <sup>11</sup>		
	C 1-2	Isolation Capacitance, V = 0, f = 1.0 MHz	pF		0.5	
	t <sub>r</sub>	Rise Time 1, 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 1, V <sub>CC</sub> = 10 V, I <sub>c</sub> = 2 mA, R <sub>L</sub> = 100 Ω	μs		5	
CTR <sub>1</sub> /CTR <sub>2</sub>	CTR <sup>2</sup> Ratio, I <sub>F</sub> = 5 mA, V <sub>CE</sub> = 5 V		0.3	1.0	3.0	

Notes:

1. Test Circuit for Switching Time

$$2. CTR_1 = \frac{I_{C1}}{I_{F1}}, CTR_2 = \frac{I_{C2}}{I_{F2}}$$



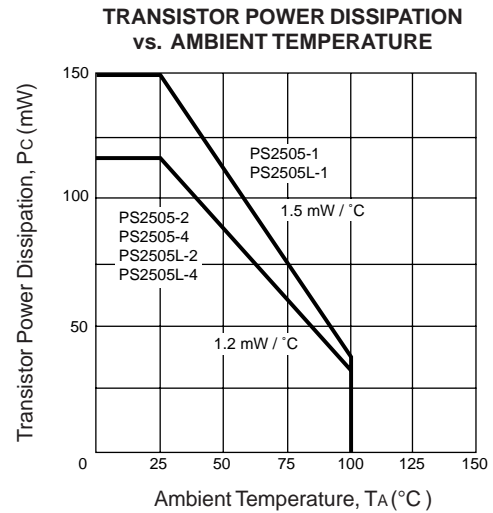
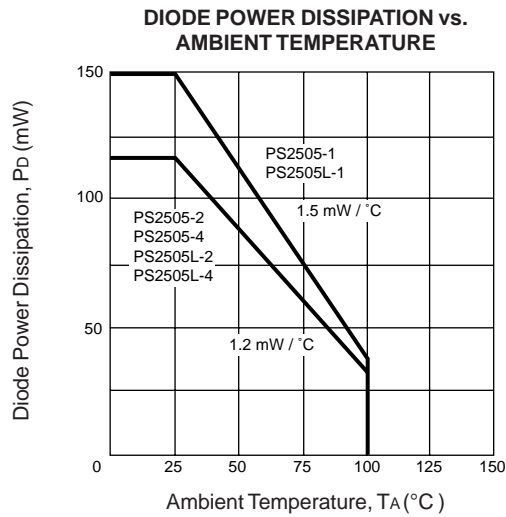
**ABSOLUTE MAXIMUM RATINGS<sup>1</sup>** (T<sub>A</sub> = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS	
			PS2505-1 PS2505L-1	PS2505-2,4 PS2505L-2, 4
Diode				
I <sub>F</sub>	Forward Current	mA	80	80
P <sub>D</sub>	Power Dissipation	mW/Ch	150	120
I <sub>F</sub> (PEAK)	Peak Forward Current (PW = 100 μs, Duty Cycle 1%)	A	1	1
Transistor				
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
P <sub>C</sub>	Power Dissipation	mW/Ch	150	120
Coupled				
BV	Isolation Voltage <sup>2</sup>	V.r.m.s.	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

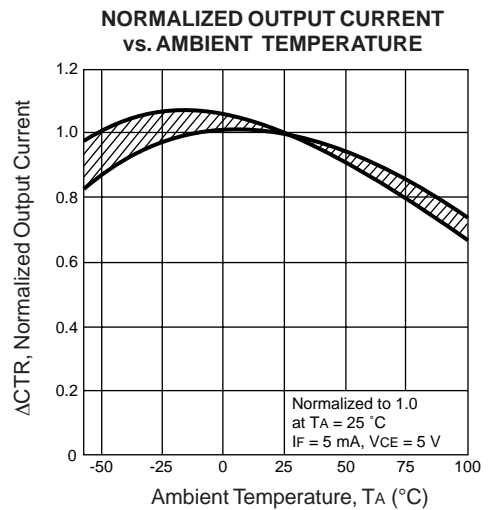
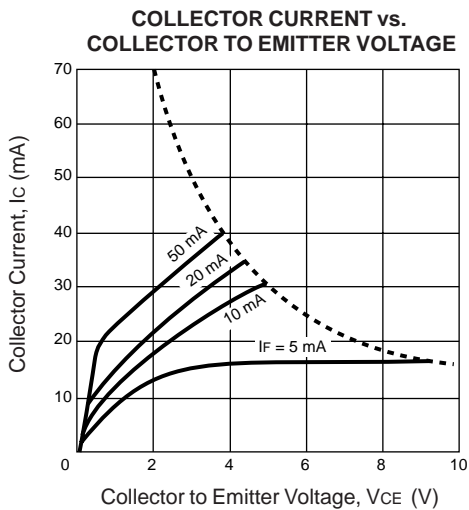
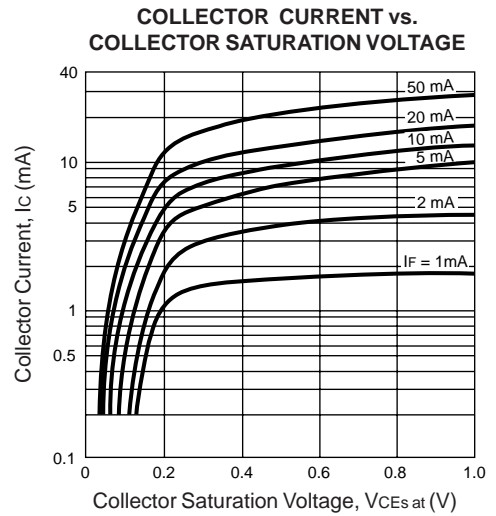
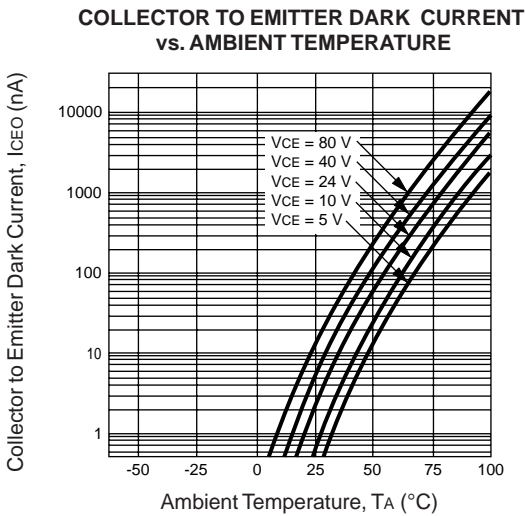
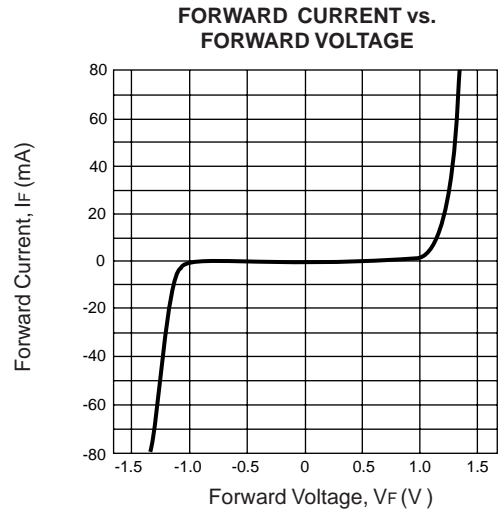
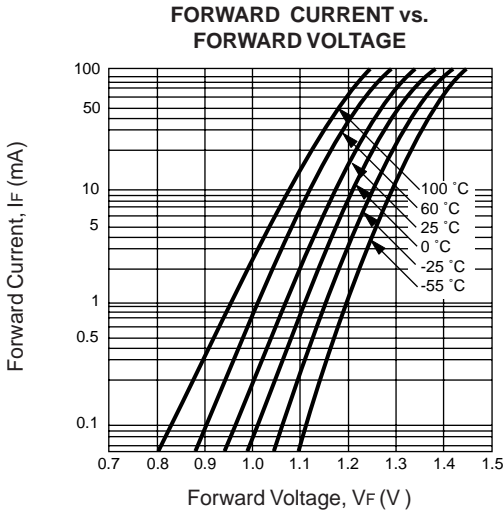
Notes:

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)

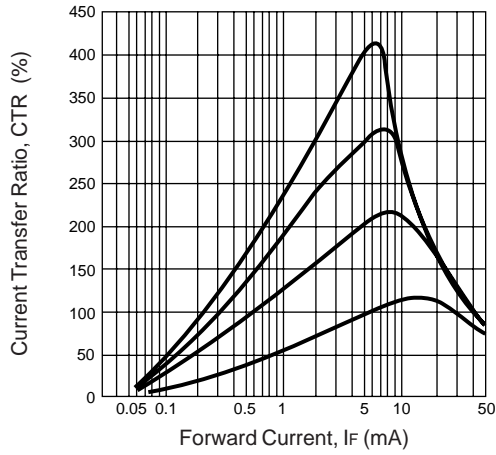


TYPICAL PERFORMANCE CURVES (TA = 25 °C)

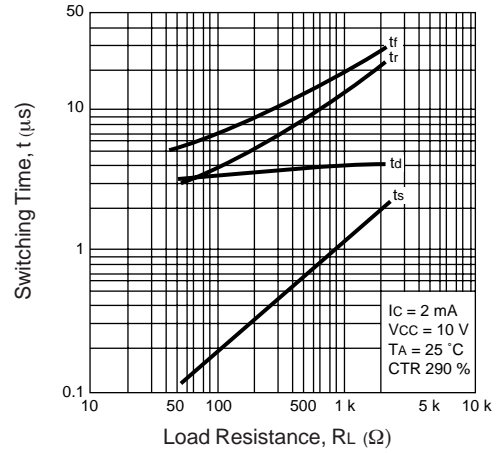


**TYPICAL PERFORMANCE CURVES** ( $T_A = 25^\circ\text{C}$ )

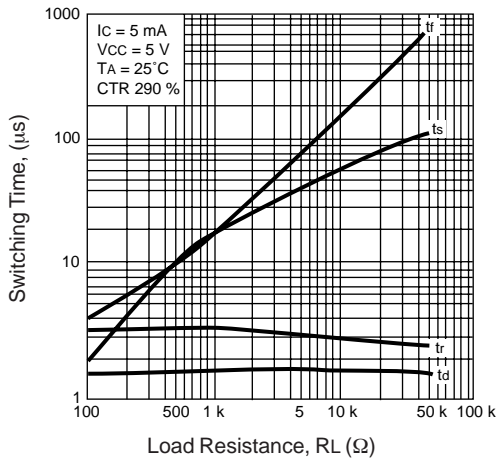
**CURRENT TRANSFER RATIO (CTR)  
vs. FORWARD CURRENT**



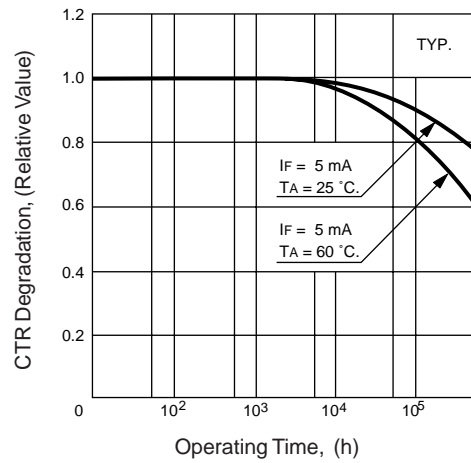
**SWITCHING TIME vs.  
LOAD RESISTANCE**



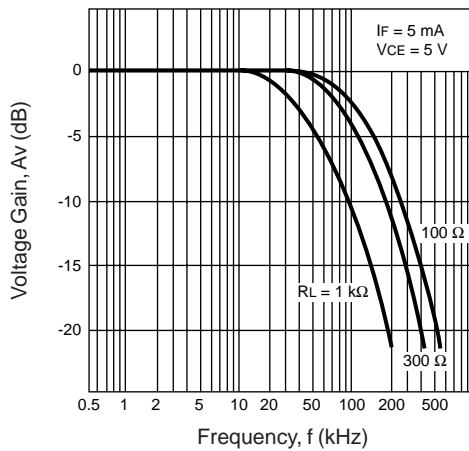
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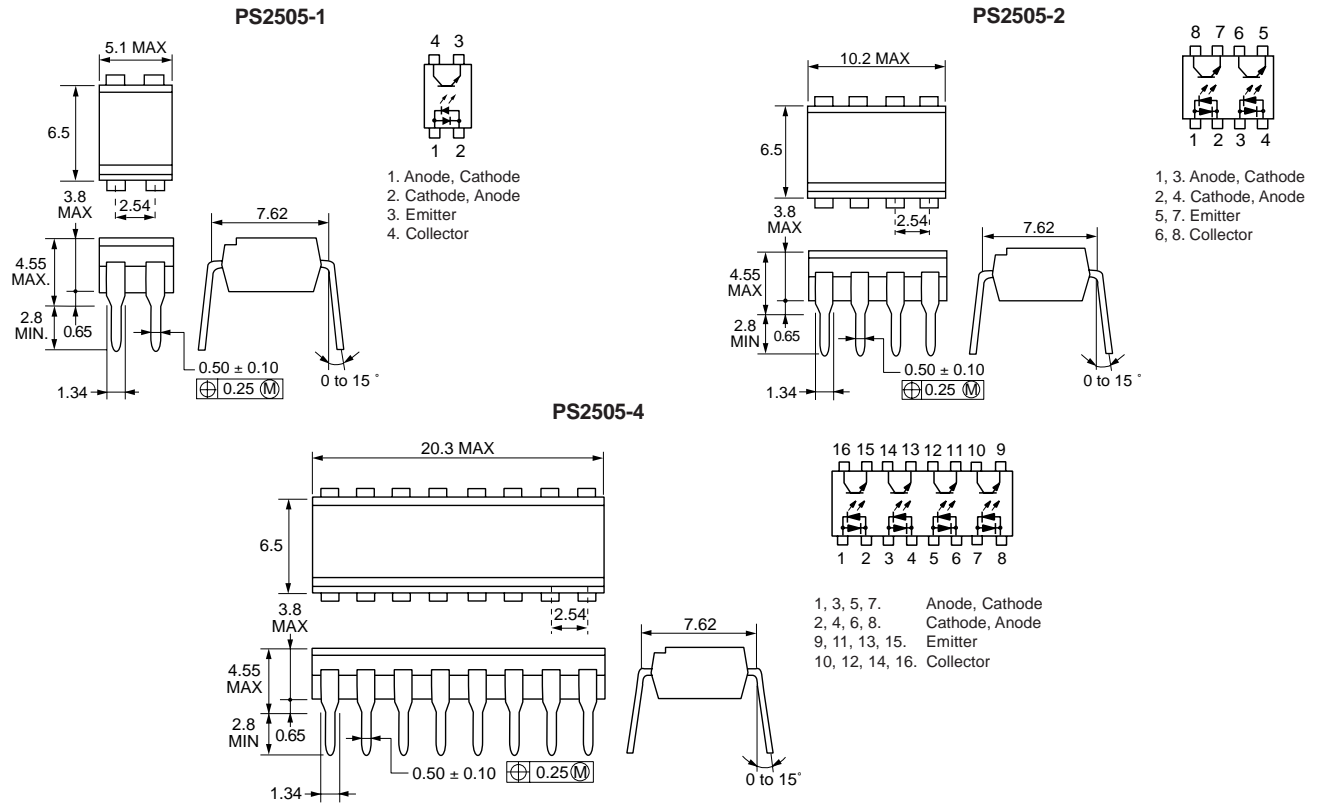
**LONG TERM CTR DEGRADATION**



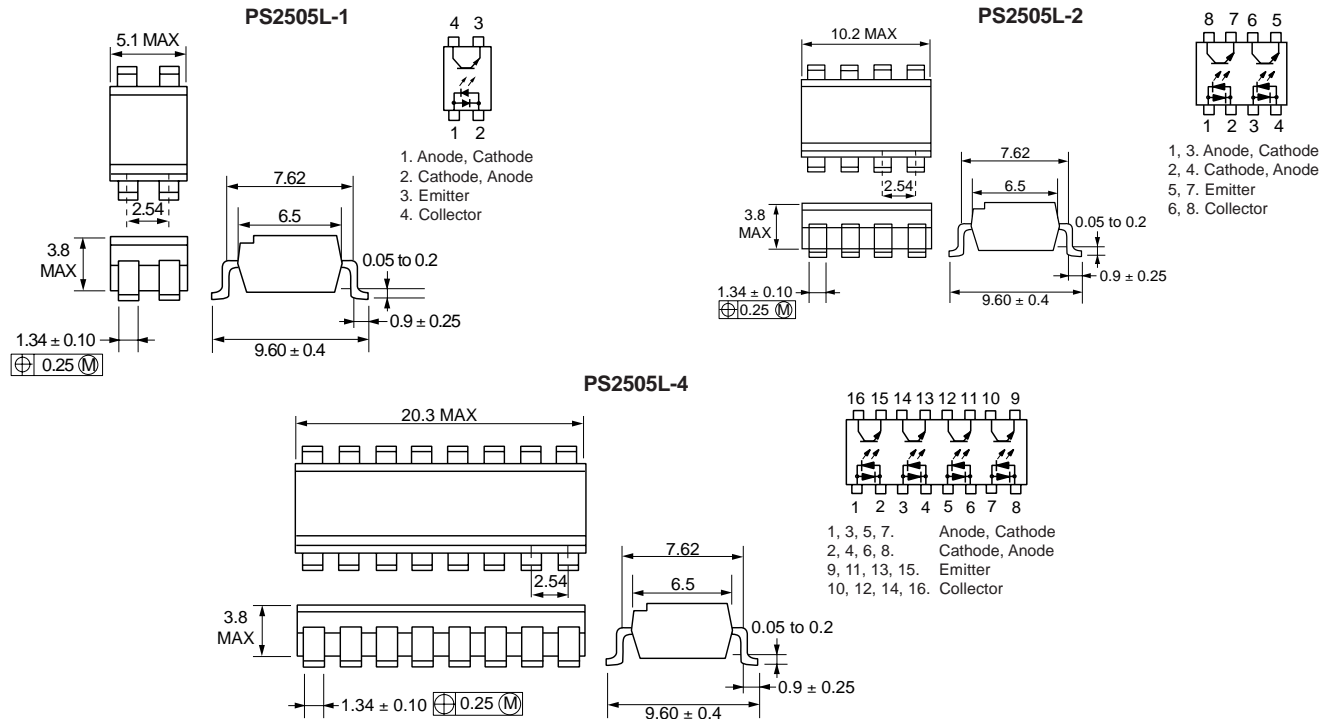
**FREQUENCY RESPONSE**



**OUTLINE DIMENSIONS** (Units in mm)



**OUTLINE DIMENSIONS** (Units in mm)



**Life Support Applications**

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