

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_{CEO}: 80 V MIN
- **HIGH CURRENT TRANSFER RATIO**
CTR: 300% TYP
- **HIGH SPEED SWITCHING**
t_r = 3 μs, t_f = 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**

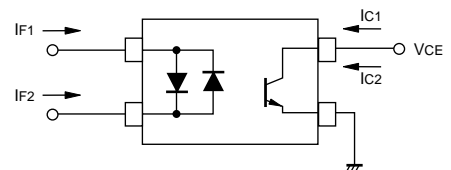
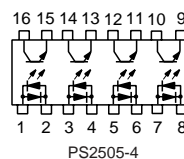
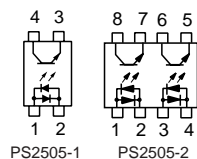
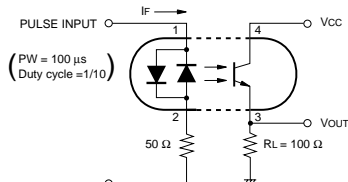
ELECTRICAL CHARACTERISTICS (T_A = 25°C)

PART NUMBER			PS2505-1, -2, -4 PS2505L-1, -2, -4			
SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX	
Diode	V _F	Forward Voltage, I _F = ±10 mA	V	1.17	1.4	
	C	Junction Capacitance, V = 0, f = 1.0 MHz	pF	100		
Transistor	I _{CEO}	Collector to Emitter Dark Current, V _{ce} = 80 V, I _F = 0	nA		100	
	BV _{CEO}	Collector to Emitter Breakdown Voltage, I _c = 1 mA, I _B = 0	V	40	60	
	BV _{ECO}	Emitter to Collector Breakdown Voltage, I _E = 100 μA, I _B = 0	V	7	9	
Coupled	CTR	Current Transfer Ratio, I _F = ±5 mA, V _{CE} = 5 V	%	80	300	600
	V _{CE (sat)}	Collector Saturation Voltage, I _F = ±10 mA, I _c = 2 mA	V			0.3
	R 1-2	Isolation Resistance, V _{in-out} = 1.0 kV	Ω	10 ¹¹		
	C 1-2	Isolation Capacitance, V = 0, f = 1.0 MHz	pF		0.5	
	t _r	Rise Time 1, V _{CC} = 10 V, I _c = 2 mA, R _L = 100 Ω	μs		3	
	t _f	Fall Time 1, V _{CC} = 10 V, I _c = 2 mA, R _L = 100 Ω	μs		5	
CTR ₁ /CTR ₂	CTR ² Ratio, I _F = 5 mA, V _{CE} = 5 V		0.3	1.0	3.0	

Notes:

1. Test Circuit for Switching Time

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



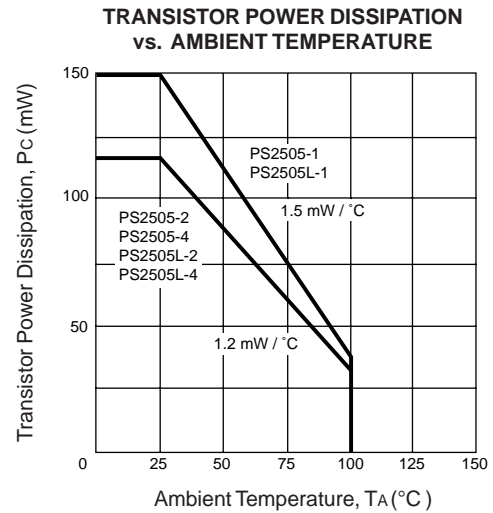
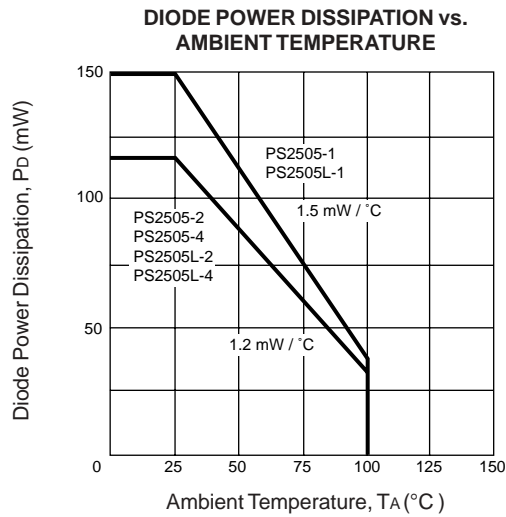
ABSOLUTE MAXIMUM RATINGS¹ (T_A = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS	
			PS2505-1 PS2505L-1	PS2505-2,4 PS2505L-2, 4
Diode				
I _F	Forward Current	mA	80	80
P _D	Power Dissipation	mW/Ch	150	120
I _F (PEAK)	Peak Forward Current (PW = 100 μs, Duty Cycle 1%)	A	1	1
Transistor				
V _{CEO}	Collector to Emitter Voltage	V	80	80
V _{ECO}	Emitter to Collector Voltage	V	7	7
I _C	Collector Current	mA	50	50
P _C	Power Dissipation	mW/Ch	150	120
Coupled				
BV	Isolation Voltage ²	V.r.m.s.	5000	5000
T _{STG}	Storage Temperature	°C	-55 to +150	-55 to +150
T _{OPT}	Operating Temperature	°C	-55 to +100	-55 to +100
T _{SOL}	Lead Temperature (Soldering 10 s)	°C	260	260
P _T	Total Power Dissipation	mW/Ch	250	200

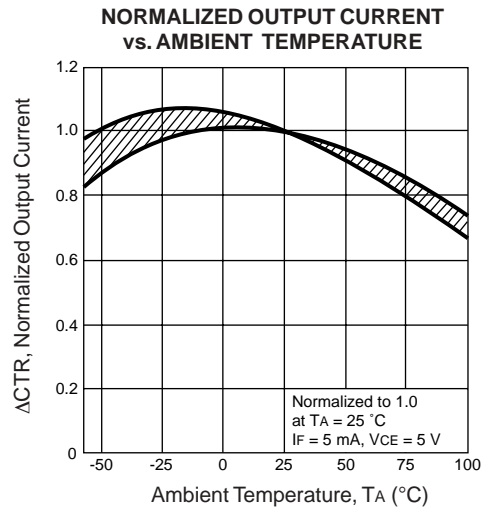
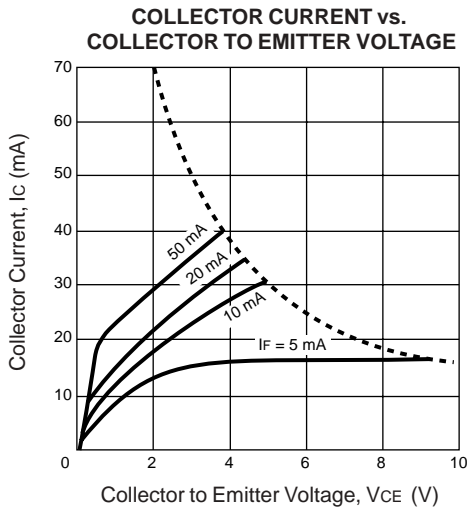
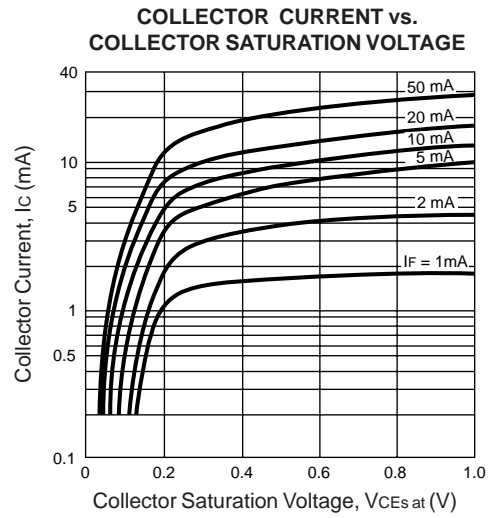
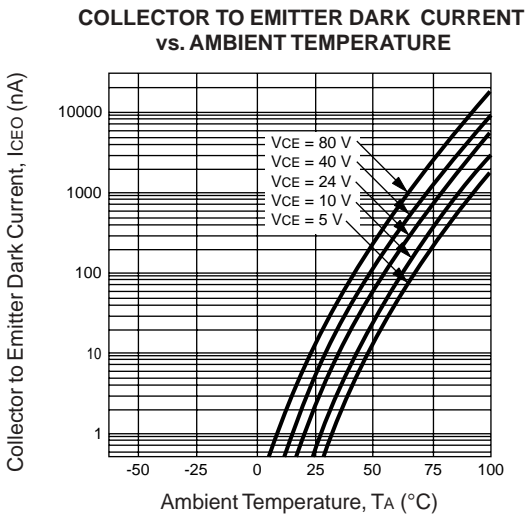
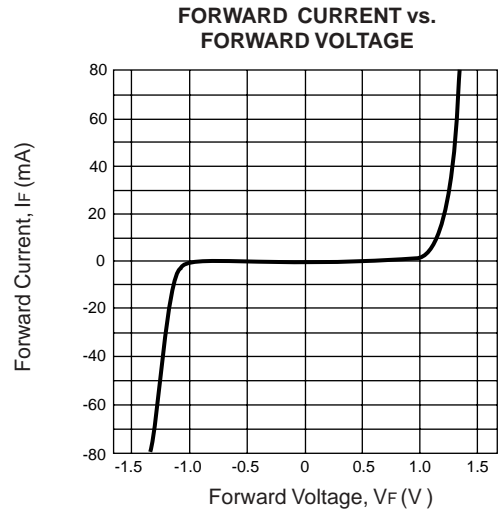
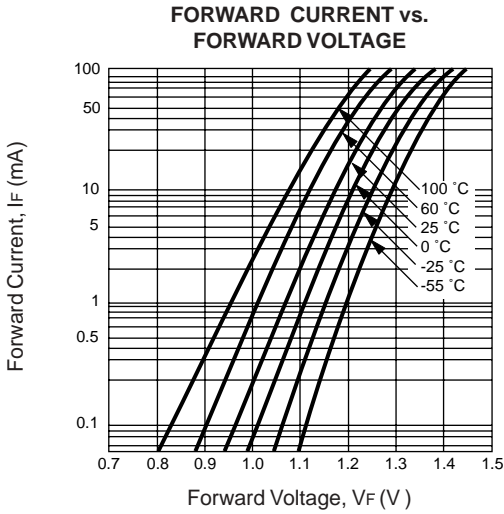
Notes:

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

TYPICAL PERFORMANCE CURVES (T_A = 25° C)

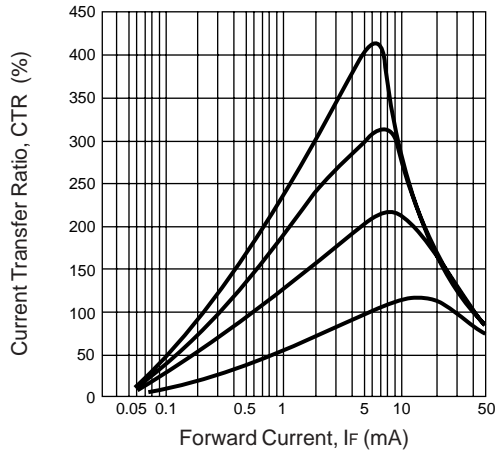


TYPICAL PERFORMANCE CURVES (TA = 25 °C)

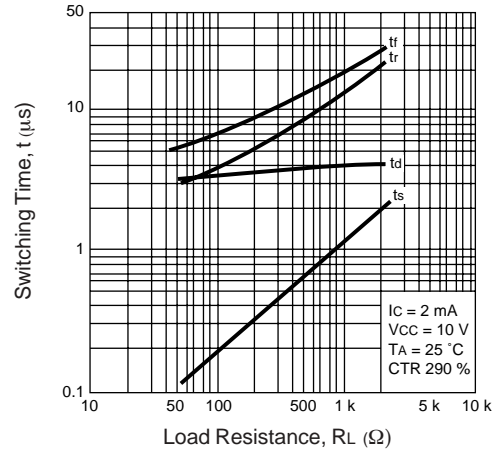


TYPICAL PERFORMANCE CURVES ($T_A = 25^\circ\text{C}$)

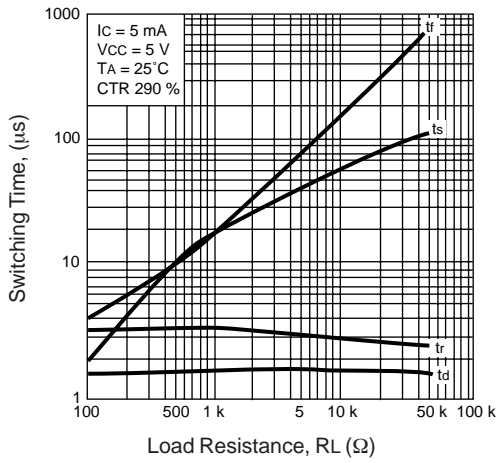
**CURRENT TRANSFER RATIO (CTR)
vs. FORWARD CURRENT**



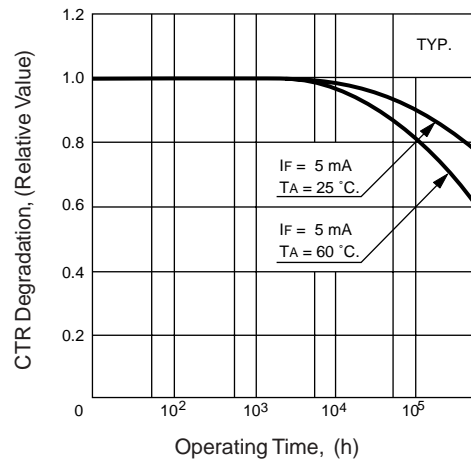
**SWITCHING TIME vs.
LOAD RESISTANCE**



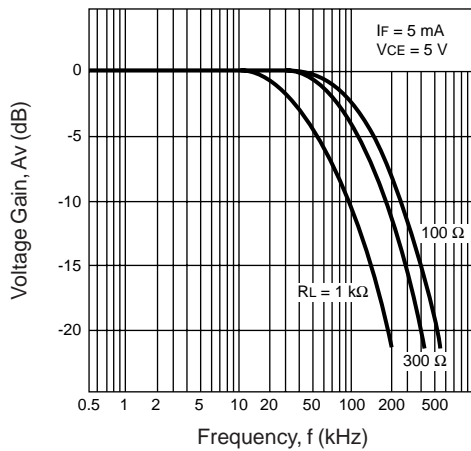
**SWITCHING TIME vs.
LOAD RESISTANCE**



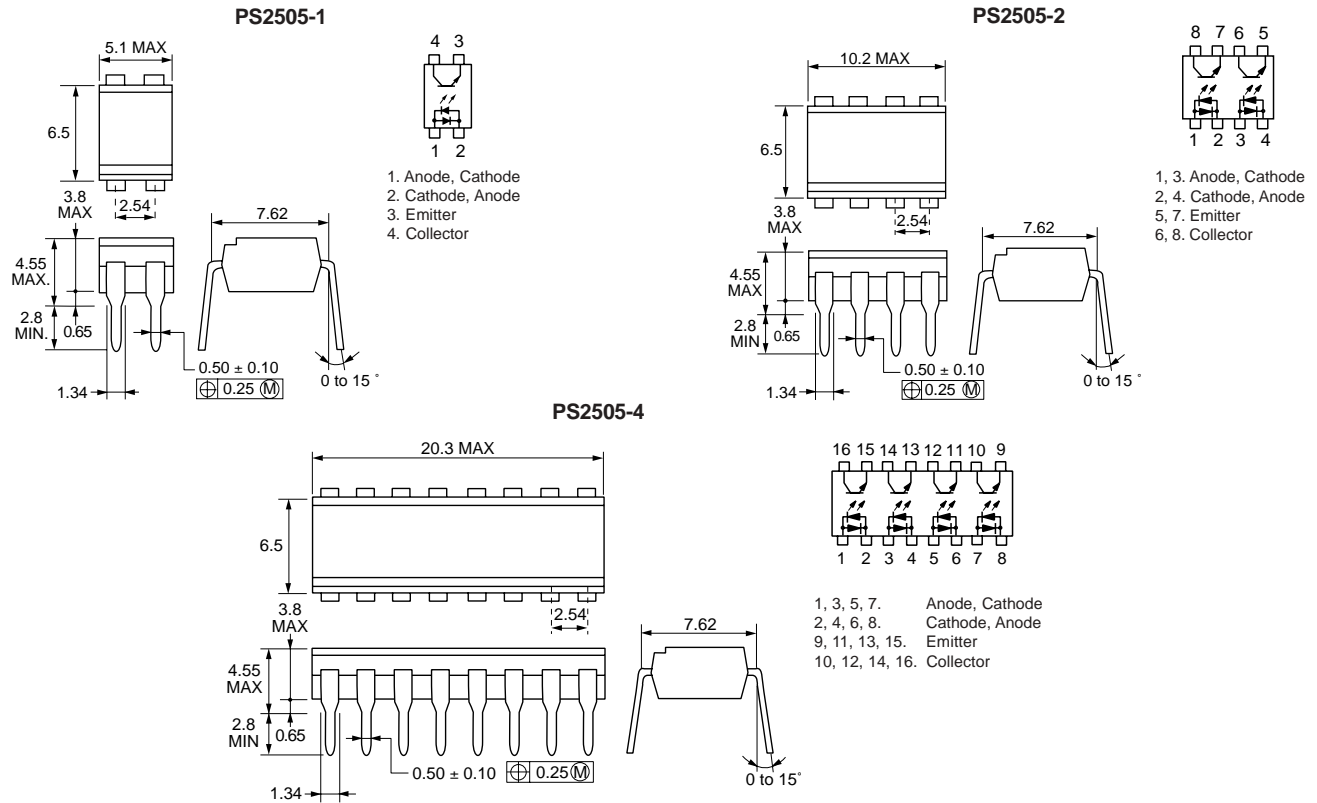
LONG TERM CTR DEGRADATION



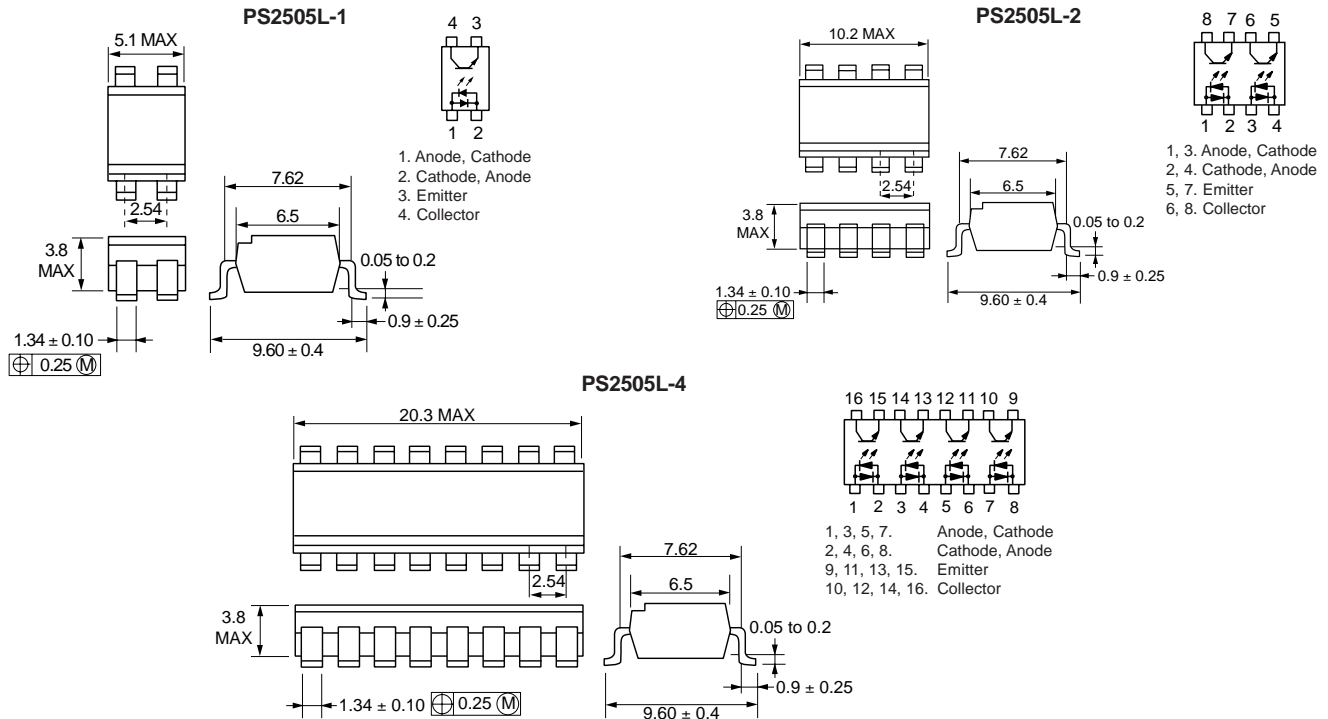
FREQUENCY RESPONSE



OUTLINE DIMENSIONS (Units in mm)



OUTLINE DIMENSIONS (Units in mm)



Life Support Applications

These NEC products are not intended for use in life support devices, appliances, or systems where the malfunction of these products can reasonably be expected to result in personal injury. The customers of CEL using or selling these products for use in such applications do so at their own risk and agree to fully indemnify CEL for all damages resulting from such improper use or sale.

EXCLUSIVE NORTH AMERICAN AGENT FOR **NEC** RF, MICROWAVE & OPTOELECTRONIC SEMICONDUCTORS

CEL CALIFORNIA EASTERN LABORATORIES • Headquarters • 4590 Patrick Henry Drive • Santa Clara, CA 95054-1817 • (408) 988-3500 • Telex 34-6393 • FAX (408) 988-0279
 DATA SUBJECT TO CHANGE WITHOUT NOTICE

Internet: <http://WWW.CEL.COM>

07/08/2002