NEC

HIGH ISOLATION VOLTAGE AC INPUT, HIGH COLLECTOR VOLTAGE SOP MULTI PHOTOCOUPLER

PS2707-1
PS2707-2
PS2707-4

FEATURES

- **HIGH ISOLATION VOLTAGE**
  BV: 3.75 k $V_{r.m.s.}$ MIN
- **SOP (SMALL OUT-LINE PACKAGE)**
- **ISOLATED CHANNELS PER EACH PACKAGE**
- **AC INPUT RESPONSE**
- **HIGH COLLECTOR TO EMITTER VOLTAGE**
  V_{CEO}: 120 V MIN
- **HIGH SPEED SWITCHING**
  t_r, t_f = 10 µs TYP
- **TAPING PRODUCT NUMBER (ONLY -1 TYPE)**
  PS2707-1-E3, F3

DESCRIPTION

The PS2707-1,-2 and -4 are optically coupled isolators containing a GaAs light emitting diode and a NPN silicon phototransistor. Each is mounted in a plastic SOP (Small Out-Line Package) for high density applications. This package has a shield effect to cut off ambient light.

APPLICATIONS

Interface circuit for various instrumentations and control equipment.

- **AC LINE/DIGITAL LOGIC**
- **DIGITAL LOGIC INTERFACE**
- **TWISTED PAIR LINE RECEIVER**
- **TELEPHONE/TELEGRAPH LINE RECEIVER**
- **SEQUENCE CONTROLLERS**
- **SYSTEMS APPLICATIONS, MEASURING INSTRUMENTS**

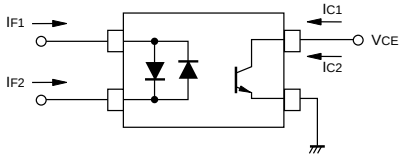
ELECTRICAL CHARACTERISTICS (T_A = 25°C)

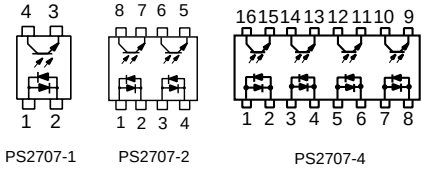
PART NUMBER				PS2707-1, -2, -4		
	SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX
Diode	V_F	Forward Voltage, I_F = ±5 mA	V		1.1	1.4
	C	Junction Capacitance, V = 0, f = 1.0 MHz	pF		30	
Transistor	I_{CEO}	Collector to Emitter Dark Current, V_{CE} = 40 V, I_F = 0	nA			100
Coupled	CTR	Current Transfer Ratio, I_F = ±5 mA, V_{CE} = 5 V	%	50	150	400
		I_F = ±1 mA, V_{CE} = 5 V	%	10	80	
	CTR_1/CTR_2	CTR Ratio[1], I_F = ±5 mA, V_{CE} = 5 V		0.3	1.0	3.0
	$V_{CE(sat)}$	Collector Saturation Voltage, I_F = ±10 mA, I_C = 2 mA	V			0.3
	R_{1-2}	Isolation Resistance, V_{in-out} = 1.0 k V_{DC}	Ω	10^{11}		
	C_{1-2}	Isolation Capacitance, V = 0, f = 1.0 MHz	pF		0.4	
	t_r	Rise Time[2], V_{CC} = 5 V, I_C = 2 mA, R_L = 100 kΩ	µs		10	
	t_f	Fall Time[2], V_{CC} = 5 V, I_C = 2 mA, R_L = 100 kΩ	µs		10	

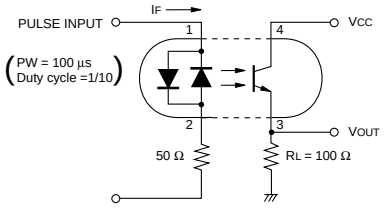
Notes:

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

2. Test Circuit for Switching Time







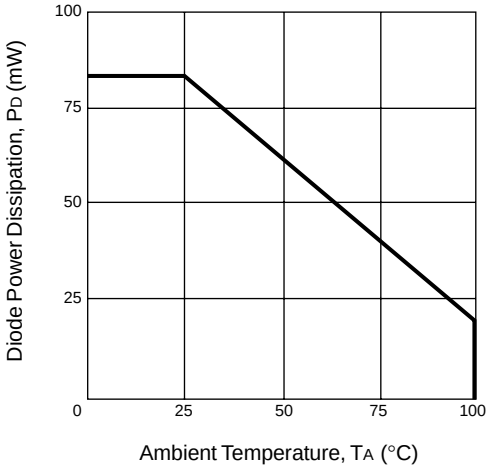
ABSOLUTE MAXIMUM RATINGS[1] (T_A = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS	
Diode			PS2707-1	PS2707-2,-4
I_F	Forward Current (DC)	mA	±50	±50
P_D	Power Dissipation	mW/Ch	80	80
$I_{F(PEAK)}$	Peak Forward Current PW = 100 µs, Duty Cycle 1%	A	±1	±1
Transistor				
V_{CEO}	Collector to Emitter Voltage (I_C = ImA, I_B = 0)	V	120	120
V_{ECO}	Emitter to Collector Voltage (I_E = 100µA, I_B = 0)	V	6	6
I_C	Collector Current	mA/Ch	30	30
P_C	Power Dissipation	mW/Ch	150	120
Coupled				
BV	Isolation Voltage[2]	$V_{r.m.s.}$	3750	3750
T_{STG}	Storage Temperature	°C	-55 to +150	-55 to +150
T_{OP}	Operating Temperature	°C	-50 to +100	-55 to +100

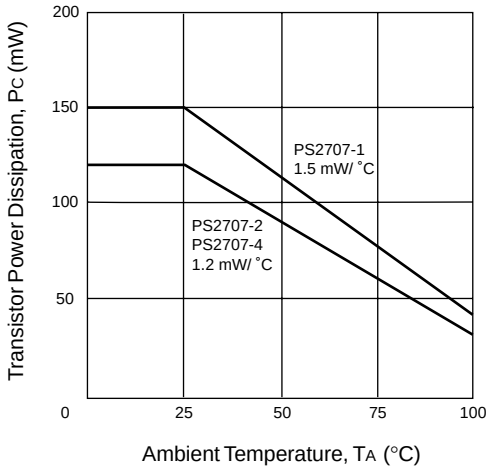
Notes:
1. Operation in excess of any one of these parameters may result in permanent damage.
2. AC voltage for 1 minute at T_A = 25 °C, RH = 60 % between input and output.

TYPICAL PERFORMANCE CURVES (T_A = 25 °C)

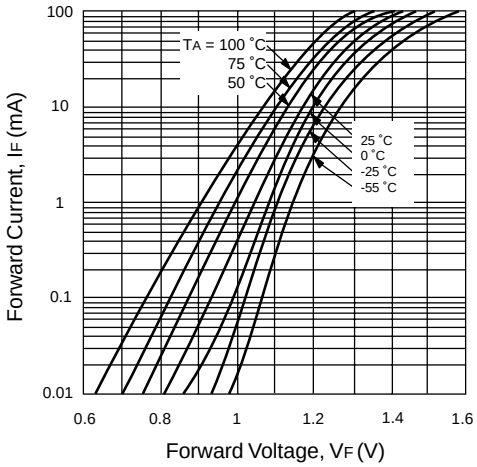
DIODE POWER DISSIPATION vs. AMBIENT TEMPERATURE



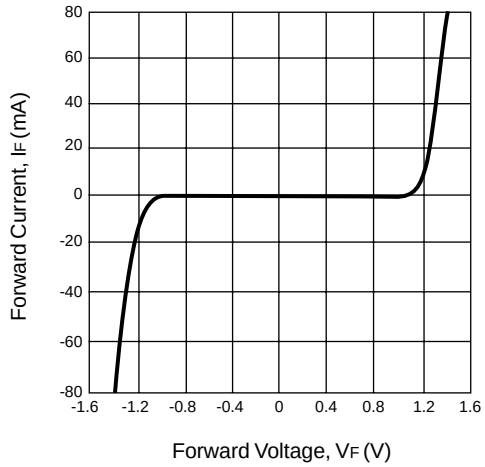
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



FORWARD CURRENT vs. FORWARD VOLTAGE

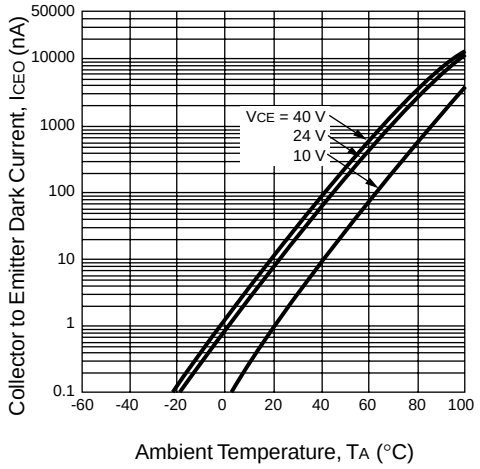


FORWARD CURRENT vs. FORWARD VOLTAGE

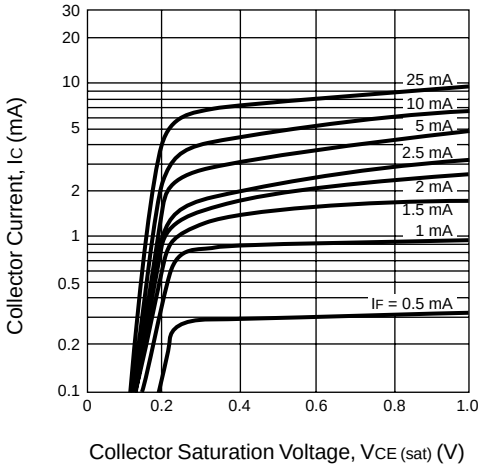


TYPICAL PERFORMANCE CURVES (T_A = 25 °C)

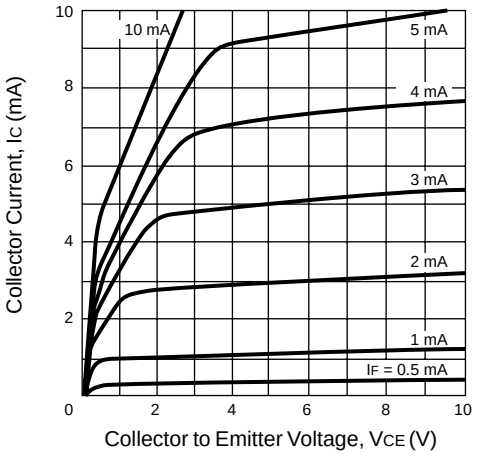
COLLECTOR TO EMITTER DARK CURRENT vs. AMBIENT TEMPERATURE



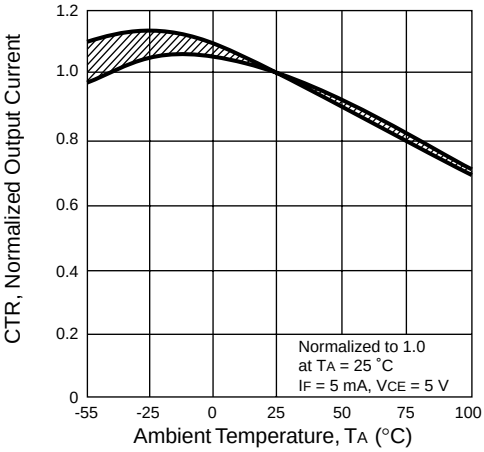
COLLECTOR CURRENT vs. COLLECTOR SATURATION VOLTAGE



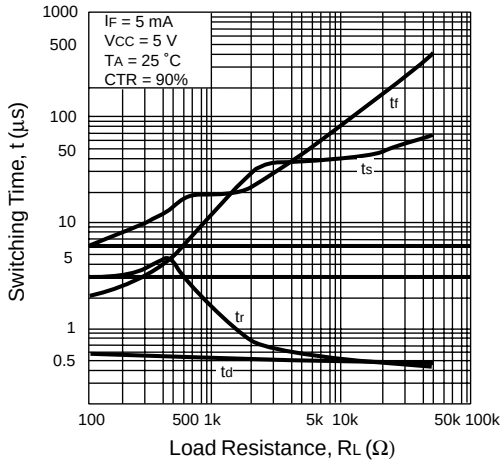
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



NORMALIZED OUTPUT CURRENT vs. AMBIENT TEMPERATURE

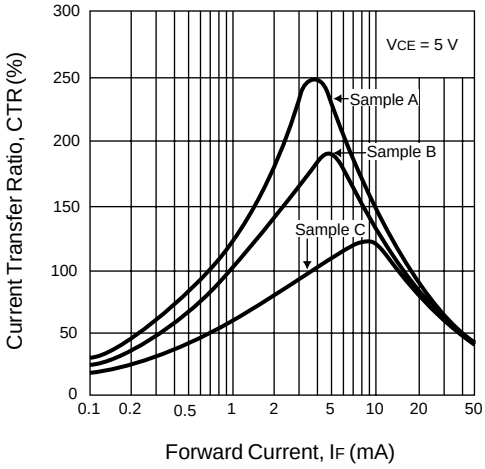


SWITCHING TIME vs. LOAD RESISTANCE

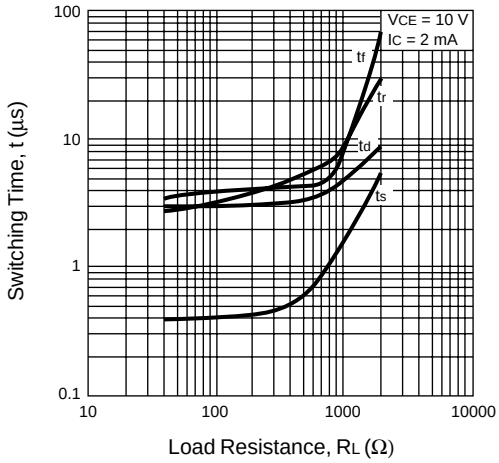


TYPICAL PERFORMANCE CURVES (T_A = 25 °C)

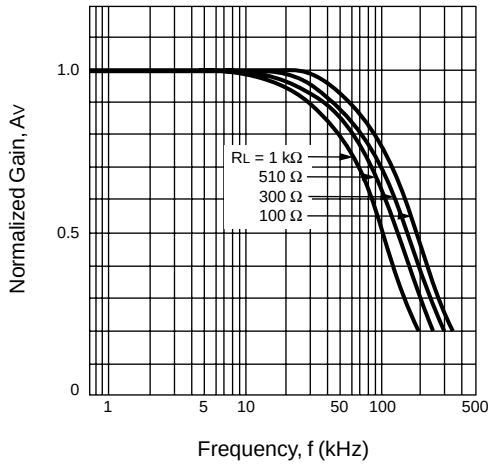
CURRENT TRANSFER RATIO (CTR) vs. FORWARD CURRENT



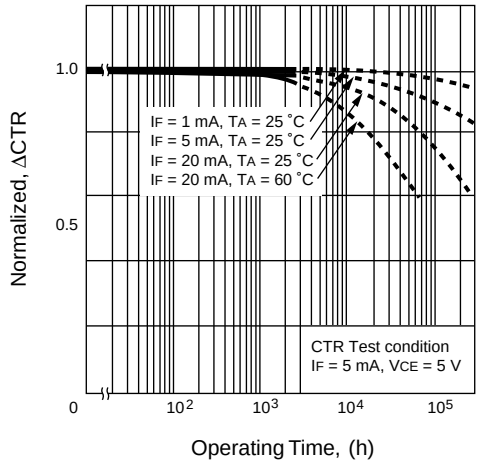
SWITCHING TIME vs. LOAD RESISTANCE



FREQUENCY RESPONSE

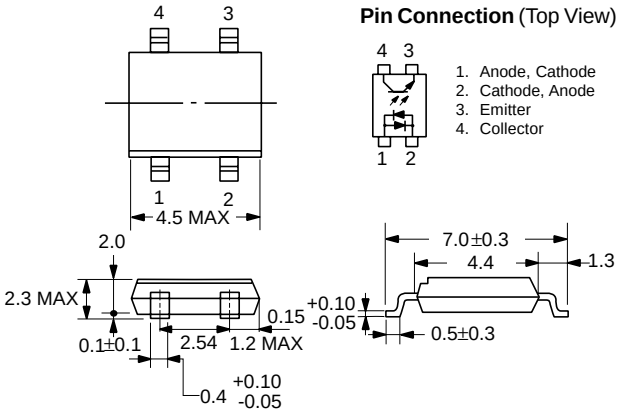


LONG TERM CTR DEGRADATION



OUTLINE DIMENSIONS (Units in mm)

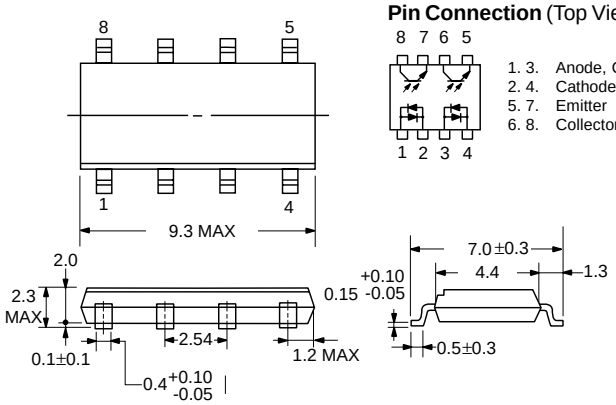
PS2707-1



Pin Connection (Top View)

1. Anode, Cathode
2. Cathode, Anode
3. Emitter
4. Collector

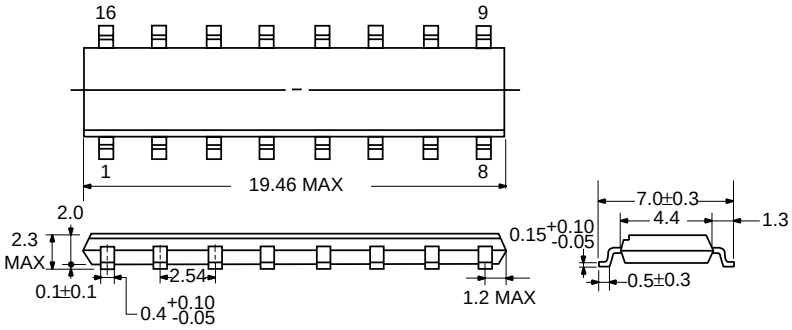
PS2707-2



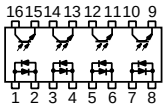
Pin Connection (Top View)

1. 3. Anode, Cathode
2. 4. Cathode, Anode
5. 7. Emitter
6. 8. Collector

PS2707-4



Pin Connection (Top View)



1. 3. 5. 7.	Anode, Cathode
2. 4. 6. 8.	Cathode, Anode
9. 11. 13. 15.	Emitter
10. 12. 14. 16.	Collector