NEC

HIGH ISOLATION VOLTAGE DARLINGTON TRANSISTOR TYPE SOP MULTI OPTOCOUPLER

PS2702-1
PS2702-2
PS2702-4

FEATURES

- **HIGH ISOLATION VOLTAGE**
  BV:3.75 k V r.m.s. MIN
- **SOP (SMALL OUT-LINE PACKAGE)**
- **ISOLATED CHANNELS PER EACH PACKAGE**
- **HIGH CURRENT TRANSFER RATIO**
  CTR: 200% MIN @ I_F = 1 mA, V_{CE} = 2 V
- **HIGH SPEED SWITCHING**
  t_r, t_f, = 200 µs TYP
- **TAPE AND REEL AVAILABLE**

DESCRIPTION

PS2702-1, -2, and -4 are optically coupled isolators containing a GaAs light emitting diode and an NPN silicon Darlington-connected phototransistor. Each is mounted in a plastic SOP (Small Outline 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.

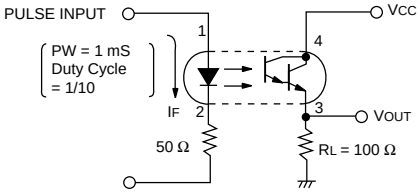
- **AC LINE/DIGITAL LOGIC**
- **DIGITAL LOGIC INTERFACE**
- **TWISTED PAIR LINE RECEIVER**
- **TELEPHONE/TELEGRAPH LINE RECEIVER**
- **HIGH FREQUENCY POWER SUPPLY FEEDBACK CONTROL**
- **RELAY CONTACT MONITOR**
- **POWER SUPPLY MONITOR**

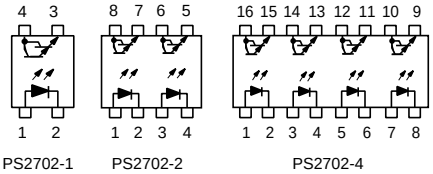
ELECTRICAL CHARACTERISTICS (T_A = 25°C)

PART NUMBER				PS2702-1, -2, -4		
SYMBOLS		PARAMETERS	UNITS	MIN	TYP	MAX
Diode	V_F	Forward Voltage, I_F = 5 mA	V		1.1	1.4
	I_R	Reverse Current, V_R = 5 V	µA			5
	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			400
Coupled	CTR	Current Transfer Ratio[1], I_F = 1 mA, V_{CE} = 2 V	%	200	2000	
	$V_{CE\ (sat)}$	Collector Saturation Voltage, I_F = 1 mA, I_C = 2 mA	V			1.0
	R_{1-2}	Isolation Resistance, V_{in-out} = 1.0 kV 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, RL = 100 Ω	µs		200	
	t_f	Fall Time [2], V_{CC} = 5 V, I_C = 2 mA, RL = 100 Ω	µs		200	

Notes:
1. CTR rank (PS2702-1 only)
   K: 2000 to (%)
   L: 700 to 3400 (%)
   M: 200 to 1000 (%)

2. Test Circuit for Switching Time





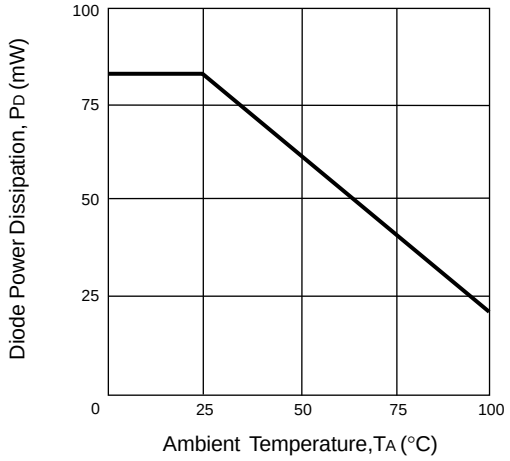
ABSOLUTE MAXIMUM RATINGS[1] (T_A = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS	
			PS2702 -1	PS2702 -2 PS2702-4
Diode				
I_F	Forward Current	mA	50	50
V_R	Reverse Voltage	V	6	6
PD	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	40	40
V_{ECO}	Emitter to Collector Voltage (I_E = 100µA, I_B = 0)	V	6	6
I_C	Collector Current	mA/Ch	200	160
P_C	Power Dissipation	mW/Ch	150	120
Coupled				
BV	Isolation Voltage [1]	$V_{r.m.s.}$	3750	3750
T_{STG}	Storage Temperature	°C	-55 to +150	-55 to +150
T_{OP}	Operating Temperature	°C	-55 to +100	-55 to +100

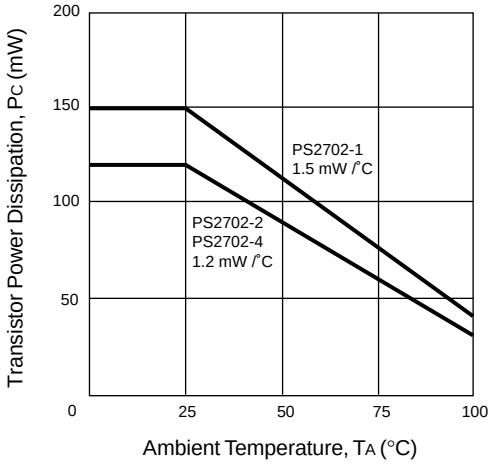
Notes:
1. Operation in excess of any one of these parameters may result in permanent damage.
2. AC voltage for 1 minute at T_A = 25 °C, RH = 60 % between input and ouput.

TYPICAL PERFORMANCE CURVES (T_A = 25°C)

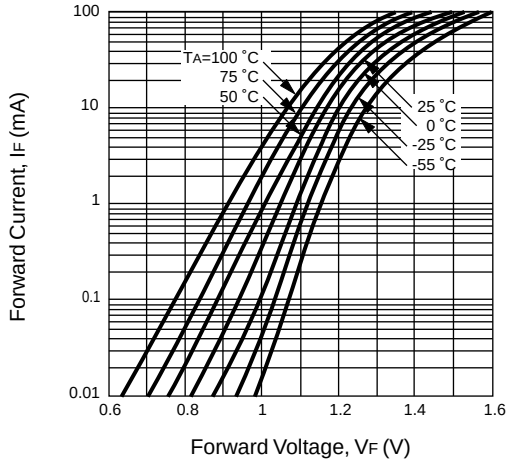
DIODE POWER DISSIPATION vs. AMBIENT TEMPERATURE



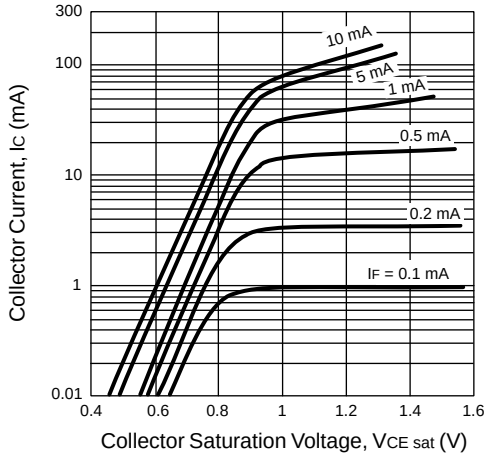
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



FORWARD CURRENT vs. FORWARD VOLTAGE

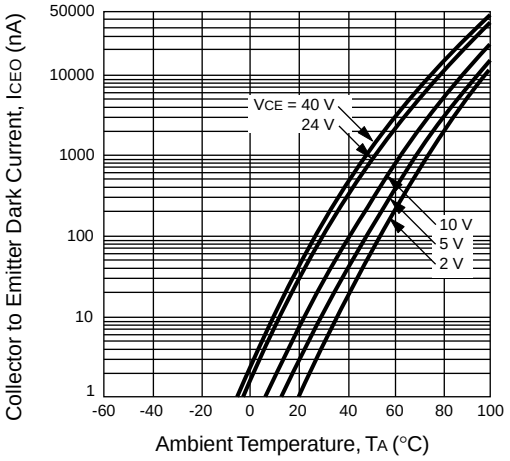


COLLECTOR CURRENT vs. COLLECTOR SATURATION VOLTAGE

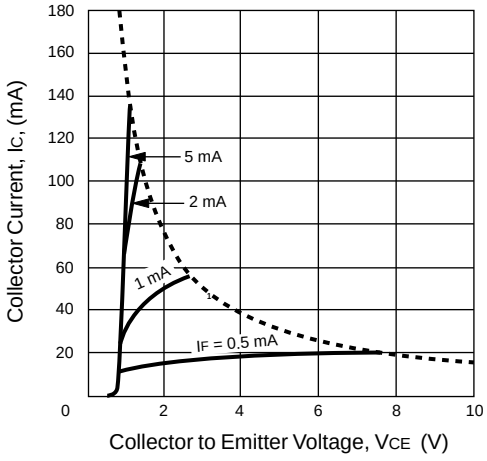


TYPICAL PERFORMANCE CURVES (T_A = 25°C)

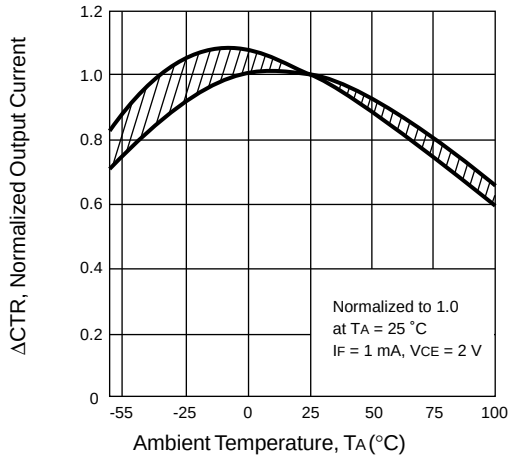
COLLECTOR TO EMITTER DARK CURRENT vs. AMBIENT TEMPERATURE



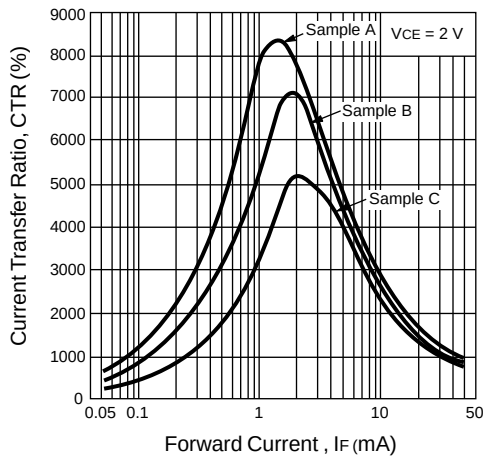
COLLECTOR CURRENT vs. COLLECTOR to EMITTER VOLTAGE



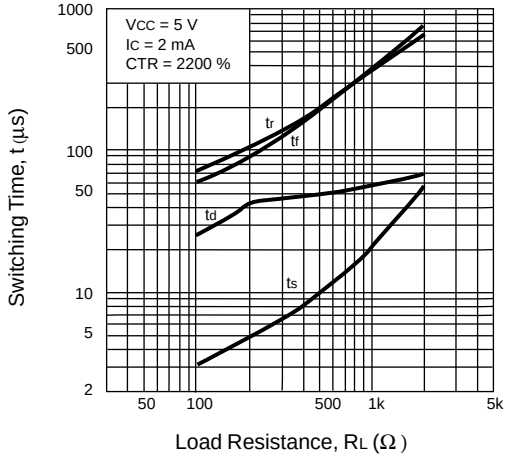
NORMALIZED OUTPUT CURRENT vs. AMBIENT TEMPERATURE



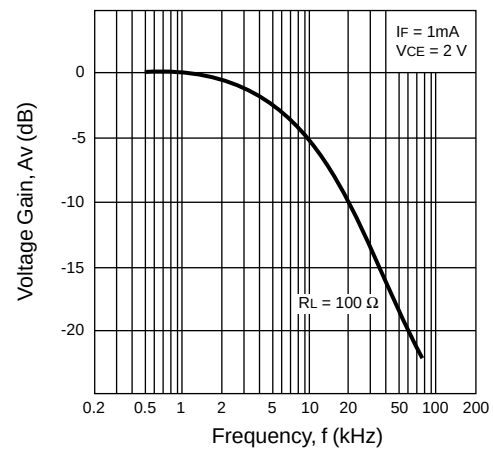
CURRENT TRANSFER RATIO vs. FORWARD CURRENT



SWITCHING TIME vs. LOAD RESISTANCE

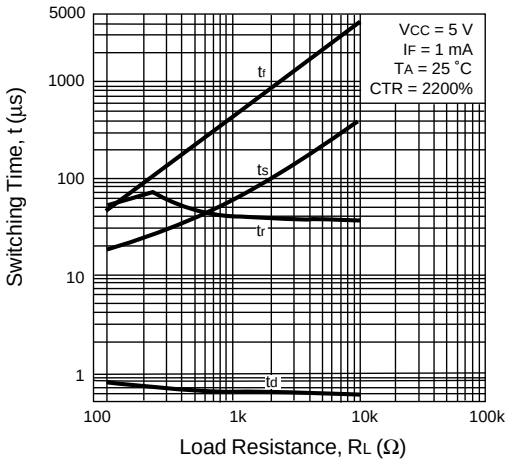


FREQUENCY RESPONSE

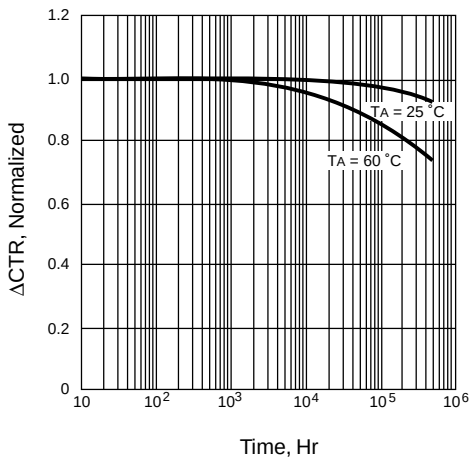


TYPICAL PERFORMANCE CURVES (TA = 25 °C)

SWITCHING TIME vs. LOAD RESISTANCE

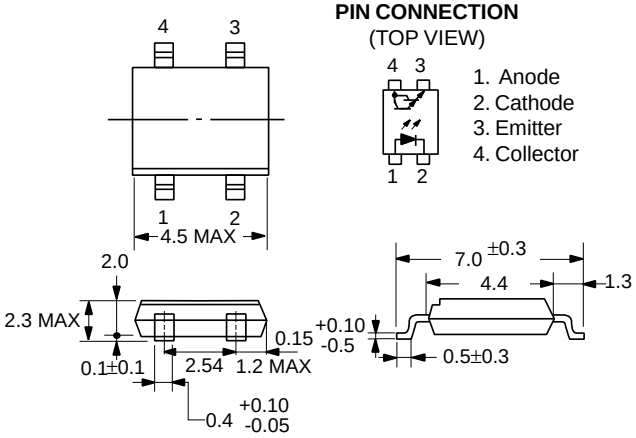


CTR DEGRADATION

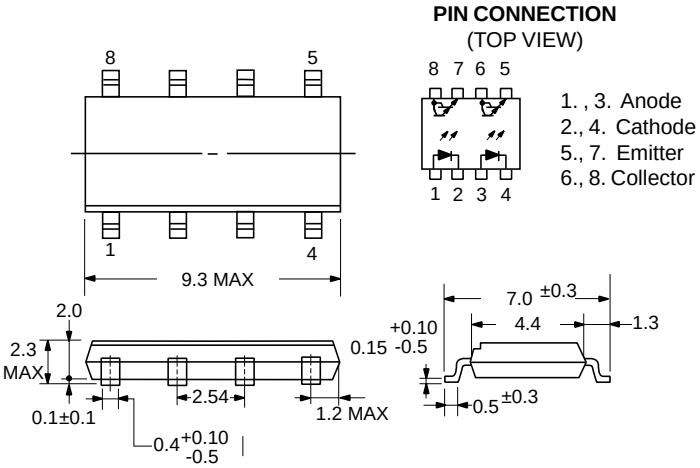


OUTLINE DIMENSIONS (Units in mm)

PS2702-1



PS2702-2



PS2702-4