CEL

NEC's HIGH ISOLATION VOLTAGE SOP MULTI PHOTOCOUPLER

PS2701-1

FEATURES

- **HIGH ISOLATION VOLTAGE**
  BV: 3.75 k $V_{r.m.s.}$
- **SOP (SMALL OUT-LINE PACKAGE)**
- **ISOLATED CHANNELS PER EACH PACKAGE**
- **HIGH SPEED SWITCHING**
  t_r = 3 μs TYP, t_f = 5 μs TYP
- **LOW COLLECTOR DARK CURRENT**
  I_{CEO}: 5 nA TYP @ T_A = 25 °C, V_{CE} = 40 V
- **TAPE AND REEL AVAILABLE**

DESCRIPTION

NEC's PS2701-1 is an optically coupled isolator containing a GaAs light emitting diode and a NPN silicon phototransistor. This device is mounted in a plastic SOP (Small Outline Package) for high density applications and has a shield effect to cut off ambient light.

APPLICATIONS

Interface circuit for various instrumentations and control equipment.

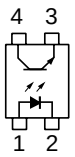
- **AC LINE/DIGITAL LOGIC**
- **DIGITAL LOGIC INTERFACE**
- **TWISTED PAIR LINE RECEIVER**
- **TELEPHONE/TELEGRAPH LINE RECEIVER**
- **HIGH FREQUENCY POWER SUPPLY FEEDBACK CONTROL**
- **RELAY CONTACT MONITOR**
- **POWER SUPPLY MONITOR**

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

PART NUMBER				PS2701-1		
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
	Ct	Terminal 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[1], I_F = 5 mA, V_{CE} = 5 V	%	50	100	300
	$V_{CE\ (sat)}$	Collector Saturation Voltage, I_F = 10 mA, I_C = 2 mA	V			0.3
	R_{I-O}	Isolation Resistance, V_{IN-OUT} = 1.0 k V_{DC}	Ω	10^{11}		
	C_{I-O}	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 Ω	μs		3	
	t_f	Fall Time[2], V_{CC} = 5 V, I_C = 2 mA, R_L = 100 Ω	μs		5	

Notes:

1. CTR rank
   L: 100 to 300 %
   M: 50 to 150 %
   P: 150 to 300%



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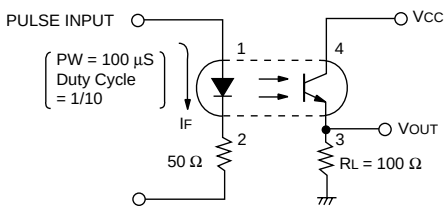
2. Test Circuit for Switching Time



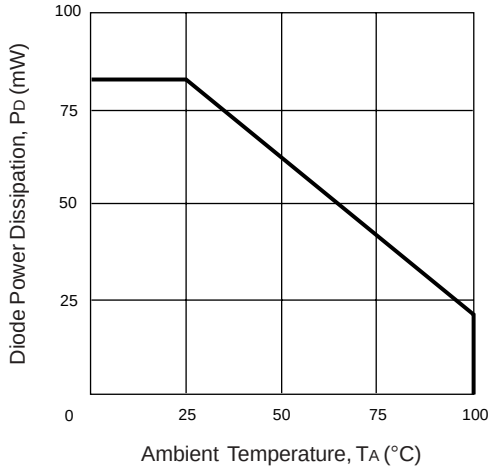
ABSOLUTE MAXIMUM RATINGS[1] (T_A = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
			PS2701-1
Diode			
I_F	Forward Current (DC)	mA	50
V_R	Reverse Voltage	V	6
P_D	Power Dissipation	mW/Ch	80
$I_{F\ (PEAK)}$	Peak Forward Current (PW = 100 μs, Duty Cycle 1%)	A	1
Transistor			
V_{CEO}	Collector to Emitter Voltage (I_C = 1mA, I_B = 0)	V	40
V_{ECO}	Emitter to Collector Voltage (I_E = 100μA, I_B = 0)	V	6
I_C	Collector Current	mA/Ch	80
P_C	Power Dissipation	mW/Ch	150
Coupled			
BV	Isolation Voltage[2]	$V_{r.m.s.}$	3750
T_{STG}	Storage Temperature	°C	-55 to +150
T_A	Operating Ambient Temperature	°C	-55 to +100

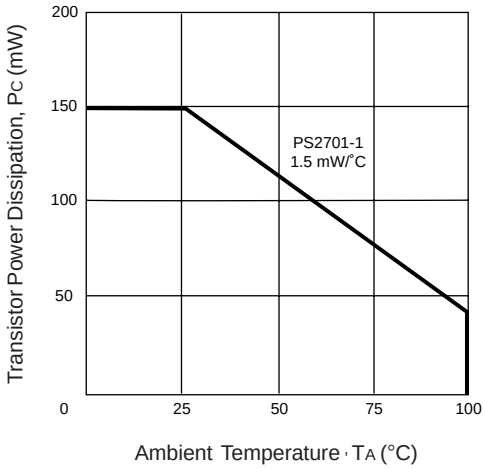
Notes:
1. Operation in excess of any one of these parameters may result in permanent damage.
2. AC voltage for 1 minute at T_A = 25 °C, RH = 60 % between input and ouput.

TYPICAL PERFORMANCE CURVES (T_A = 25 °C)

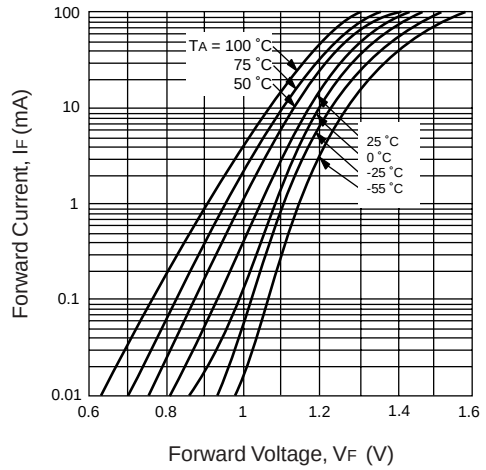
DIODE POWER DISSIPATION vs. AMBIENT TEMPERATURE



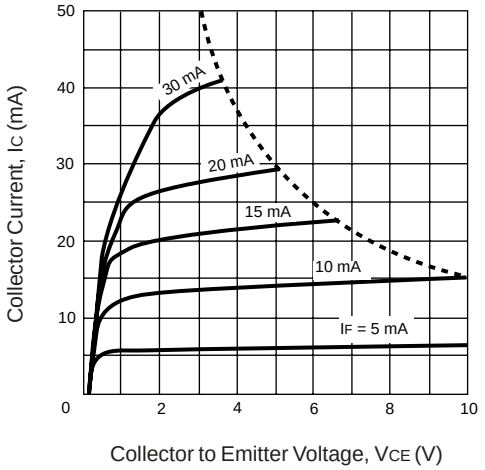
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



FORWARD CURRENT vs. FORWARD VOLTAGE

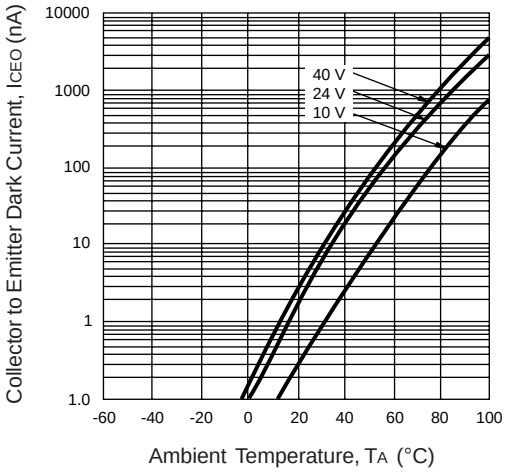


COLLECTOR CURRENT vs. COLLETOR TO EMITTER VOLTAGE

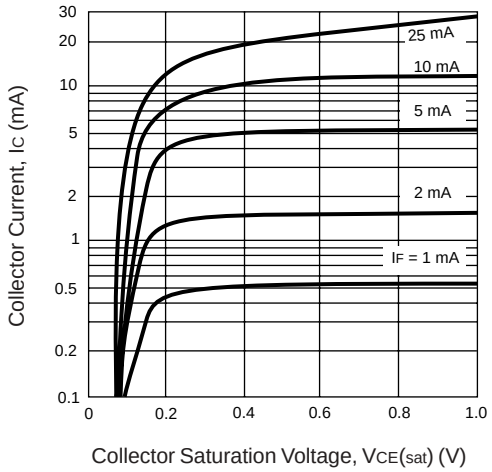


TYPICAL PERFORMANCE CURVES (T_A = 25 °C)

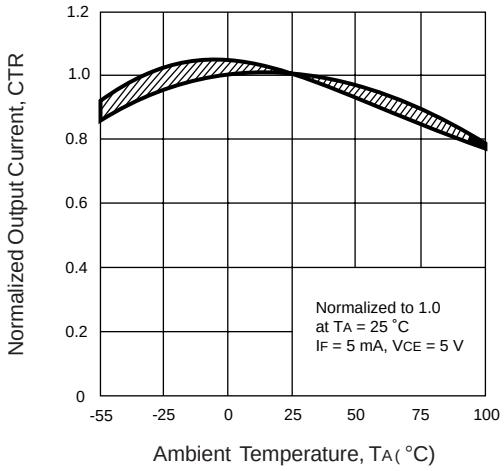
COLLECTOR TO EMITTER DARK CURRENT vs. AMBIENT TEMPERATURE



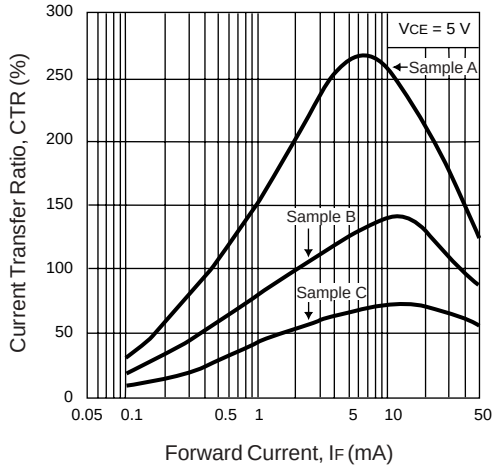
COLLECTOR CURRENT vs. COLLECTOR SATURATION VOLTAGE



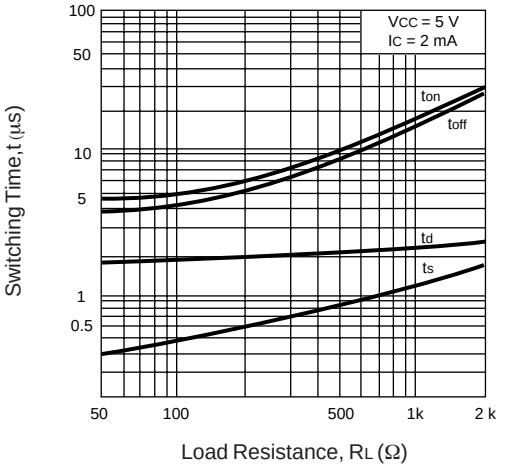
NORMALIZED OUTPUT CURRENT vs. AMBIENT TEMPERATURE



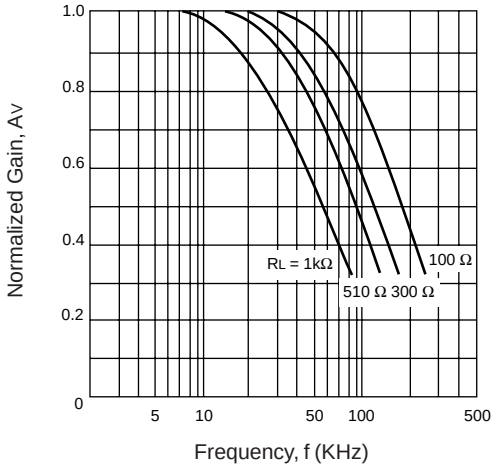
CURRENT TRANSFER RATIO vs. FORWARD CURRENT



SWITCHING TIME vs. LOAD RESISTANCE

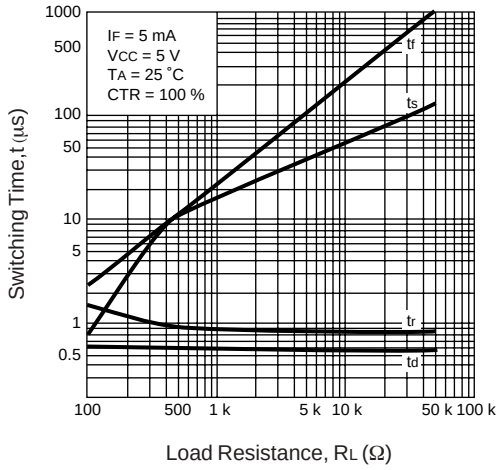


FREQUENCY RESPONSE

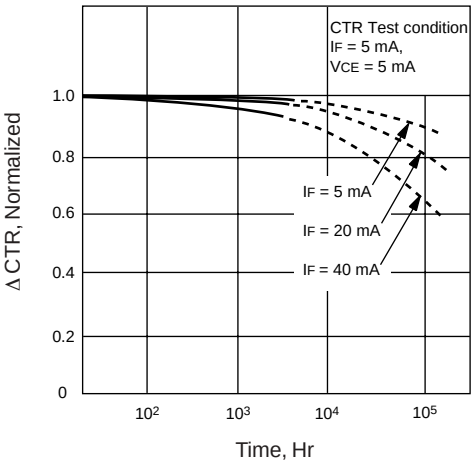


TYPICAL PERFORMANCE CURVES (T_A = 25 °C)

SWITCHING TIME vs. LOAD RESISTANCE



CTR DEGRADATION



OUTLINE DIMENSIONS (Units in mm)

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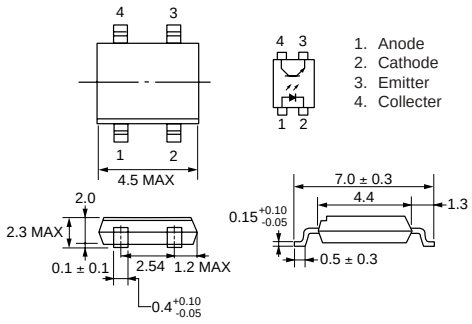
PIN CONNECTION
(Top View)



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.