



NEC's HIGH ISOLATION VOLTAGE SOP PHOTOCOUPLER

PS2701A-1

FEATURES

- **HIGH ISOLATION VOLTAGE**
BV: 3.75 k V_{r.m.s.}
- **SOP (SMALL OUT-LINE PACKAGE)**
- **HIGH SPEED SWITCHING**
 $t_r = 5 \mu\text{s}$ TYP, $t_f = 7 \mu\text{s}$ TYP
- **ORDERING NUMBER OF TAPING PRODUCT**
PS2701A-1-F3, F4

DESCRIPTION

NEC's PS2701A-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

- HYBRID IC
- MEASURING INSTRUMENTS
- POWER SUPPLY
- TELEPHONE/TELEGRAPH LINE RECEIVER
- PROGRAMMABLE LOGIC CONTROLLERS

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

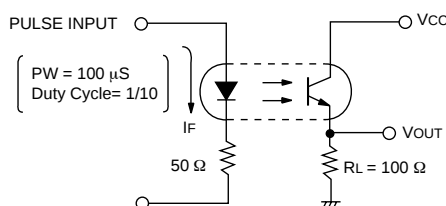
PART NUMBER			PS2701A-1		
SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX
Diode	V _F	Forward Voltage, I _F = 5 mA	V	1.2	1.4
	I _R	Reverse Current, V _R = 5 V	μA		5
	C _t	Terminal Capacitance, V = 0, f = 1 MHz	pF	10	
Transistor	I _{CEO}	Collector to Emitter Current, I _F = 0 mA, V _{CE} = 70	nA		100
Coupled	CTR	Current Transfer Ratio ¹ , I _F = 5 mA, V _{CE} = 5 V	%	50	300
	V _{CE} (sat)	Collector Saturation Voltage, I _F = 10 mA, I _C = 2 mA	V	0.13	0.3
	R _{I-O}	Isolation Resistance, V _{IN-OUT} = 1 k V _{DC}	Ω	10 ¹¹	
	C _{I-O}	Isolation Capacitance, V = 0, f = 1 MHz	pF	0.4	
	t _r	Rise Time ² , V _{CC} = 5 V, I _C = 2 mA, R _L = 100 Ω	μs	5	
	t _f	Fall Time ² , V _{CC} = 5 V, I _C = 2 mA, R _L = 100 Ω	μs	7	

Notes:

1. CTR rank

N: 50 to 300 %
P: 150 to 300%
L: 100 to 300 %
M: 50 to 150 %

2. Test Circuit for Switching Time

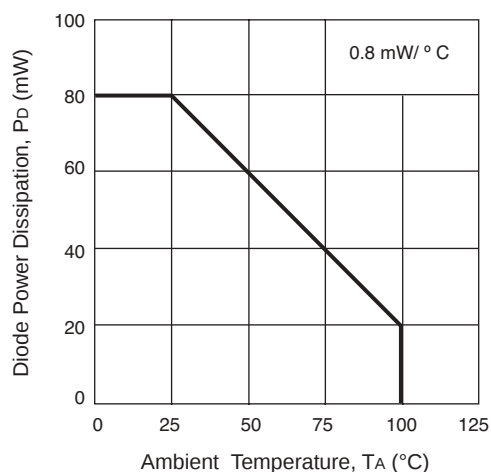
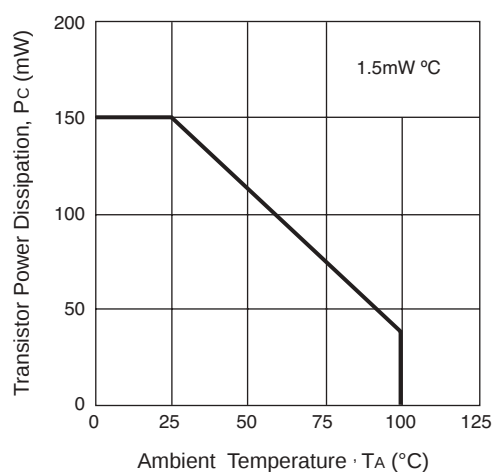
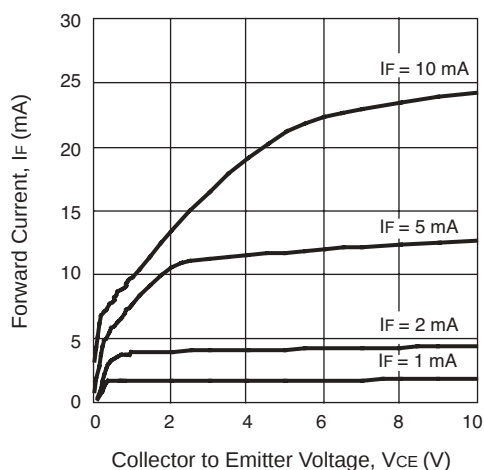
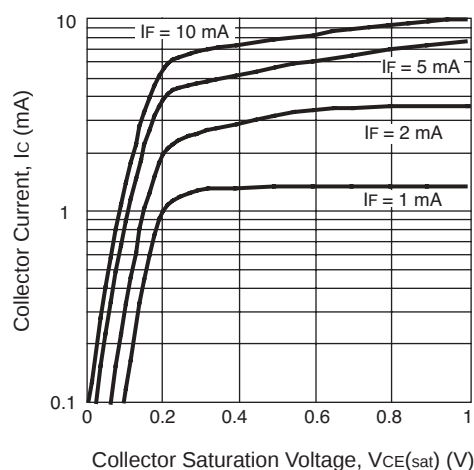


ABSOLUTE MAXIMUM RATINGS¹ ($T_A = 25^\circ\text{C}$)

SYMBOLS	PARAMETERS	UNITS	RATINGS PS2701A-1
Diode			
I_F	Forward Current (DC)	mA	30
V_R	Reverse Voltage	V	6
$\Delta P_D/^\circ\text{C}$	Power Dissipation Derating	mW/Ch	0.8
P_D	Power Dissipation	mW	80
$I_{F P}$	Peak Forward Current (PW = 100 μs , Duty Cycle 1%)	A	0.5
Transistor			
V_{CEO}	Collector to Emitter Voltage ($I_C = 1\text{mA}$, $I_B = 0$)	V	70
V_{ECO}	Emitter to Collector Voltage ($I_E = 100\mu\text{A}$, $I_B = 0$)	V	5
I_C	Collector Current	mA	30
$\Delta P_C/^\circ\text{C}$	Power Dissipation Derating	mW/°C	1.5
P_C	Power Dissipation	mW	150
Coupled			
BV	Isolation Voltage ²	V _{r.m.s.}	3750
T_{STG}	Storage Temperature	°C	-55 to +150
T_A	Operating Ambient	°C	-55 to +100

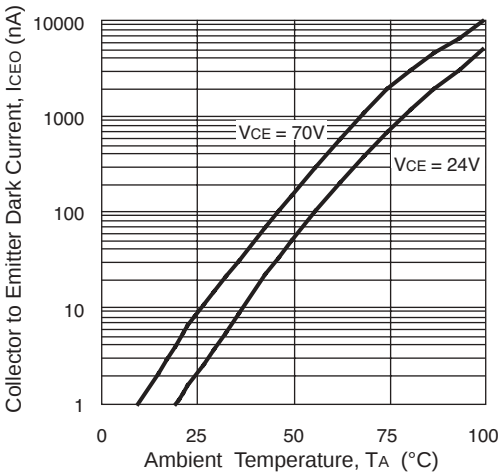
Notes:

- Operation in excess of any one of these parameters may result in permanent damage.
- AC voltage for 1 minute at $T_A = 25^\circ\text{C}$, RH = 60 % between input and output.

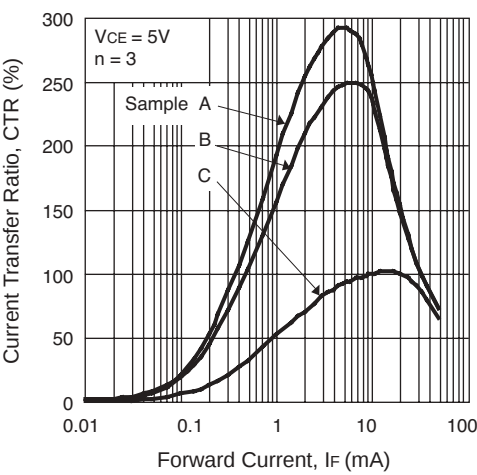
TYPICAL PERFORMANCE CURVES ($T_A = 25^\circ\text{C}$)**DIODE POWER DISSIPATION vs.
AMBIENT TEMPERATURE****TRANSISTOR POWER DISSIPATION
vs. AMBIENT TEMPERATURE****COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE****COLLECTOR CURRENT vs.
COLLECTOR SATURATION VOLTAGE**

TYPICAL PERFORMANCE CURVES (TA = 25 °C)

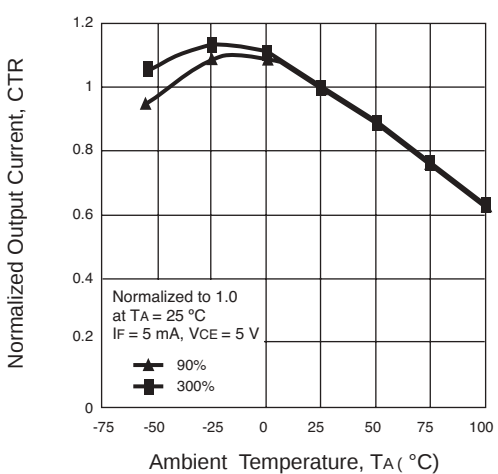
COLLECTOR TO EMITTER DARK CURRENT vs. AMBIENT TEMPERATURE



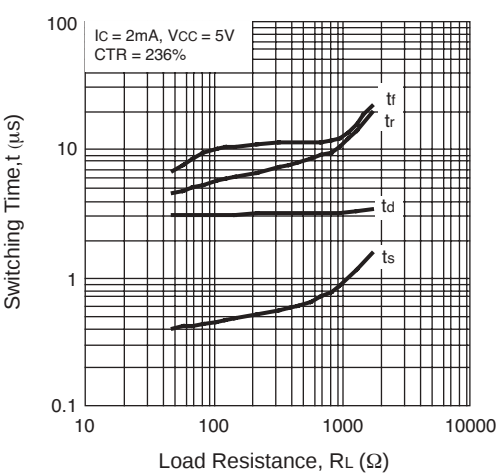
CURRENT TRANSFER RATIO vs. FORWARD CURRENT



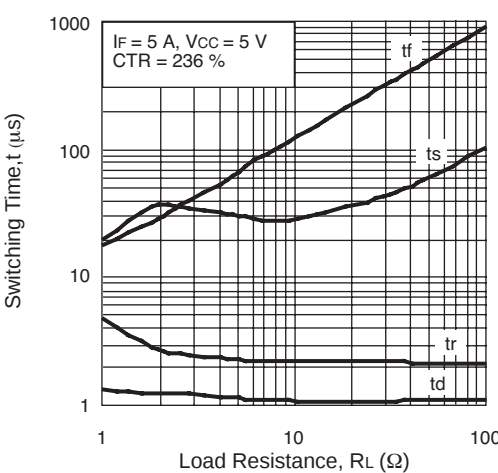
NORMALIZED CURRENT TRANSFER RATIO vs. AMBIENT TEMPERATURE



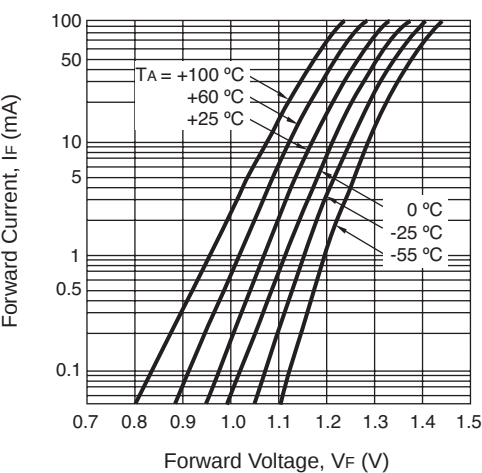
SWITCHING TIME vs. LOAD RESISTANCE



SWITCHING TIME vs. LOAD RESISTANCE

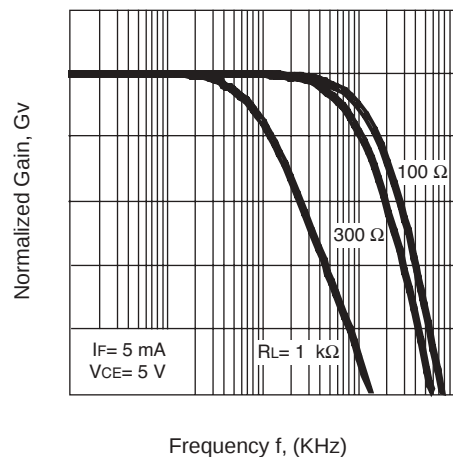


FORWARD CURRENT vs. FORWARD VOLTAGE

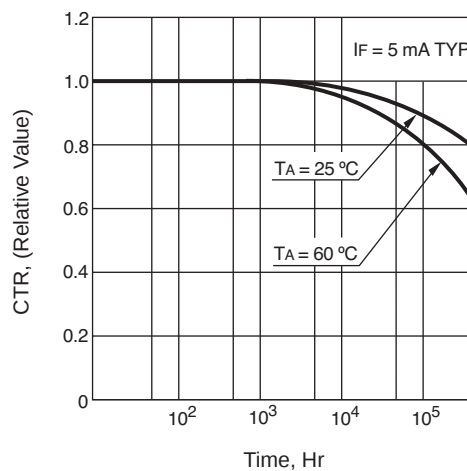


TYPICAL PERFORMANCE CURVES (TA = 25 °C)

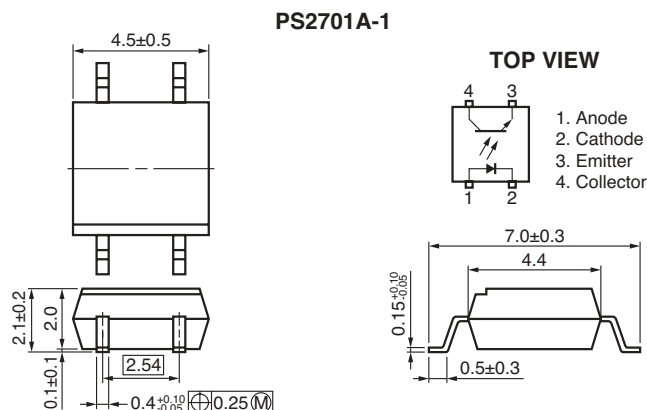
FREQUENCY RESPONSE



LONG TERM CTR DEGRADATION



OUTLINE DIMENSIONS (Units in mm)



ORDERING INFORMATION

PART NUMBER	PACKAGE	PACKAGE STYLE
PS2701A-1	Magazine case 100 pcs	PS2701A-1
PS2701A-1-F3	Embossed Tape 3500 pcs/reel	PS2701A-1
PS2701A-1-F4		
PS2701A-1-V	Magazine case 100 pcs	
PS2701A-1-V-F3	Embossed Tape 3500 pcs/reel	
PS2701A-1-V-F4		

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.

CEL California Eastern Laboratories, Your source for NEC RF, Microwave, Optoelectronic, and Fiber Optic Semiconductor Devices.

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