NEC

HIGH NOISE REDUCTION HIGH SPEED ANALOG OUTPUT 5 PIN SOP PHOTOCOUPLER

PS8701

FEATURES

- **HIGH ISOLATION VOLTAGE**
  BV: 2500 $V_{r.m.s.}$
- **HIGH SUPPLY VOLTAGE**
  V_{CC} = 35 V
- **HIGH COMMON MODE TRANSISENT IMMUNITY**
  C_{MH},C_{ML}: ±10 kV/μs MIN
- **HIGH SPEED RESPONSE**
  t_{PHL} = 0.8 μs MAX, t_{PLH} = 1.2 μs MAX
- **AVAILABLE IN TAPE AND REEL**
  PS8701-E3, E4, F3, F4

DESCRIPTION

PS8701 is a high speed (1mbps) optical isolator containing a GaAlAs LED on the input and a PIN photodiode/high speed amplifier transistor on the output. Its small package makes it ideal for high density circuits and applications.

APPLICATIONS

- **COMPUTERS AND PERIPHERALS**
- **HIGH SPEED MODEMS AND DAAS**
- **POWER SUPPLIES**
- **INVERTED CIRCUITS**
- **RELAY AND PULSE TRANSFORMER REPLACEMENTS**

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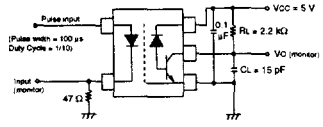
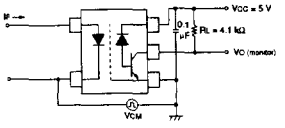
ELECTRICAL CHARACTERISTICS (T_A = 25°C)

PART NUMBER				PS8701		
	SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX
Diode	V_F	Forward Voltage, I_F = 16 mA	V		1.7	2.2
	I_R	Reverse Current, V_R = 3 V	μA			10
	$\Delta V_F/\Delta T$	Forward Voltage Temp. Coefficient, I_F = 16 mA	mV/°C		-1.6	
	C_t	Terminal Capacitance, V = 0 V, f = 1.0 MHz	pF		60	
Detector	$I_{OH(1)}$	High Level Output Current I_F = 0 mA, V_{CC} = V_O = 5.5 V	nA		3	500
	$I_{OH(2)}$	High Level Output Current I_F = 0 mA, V_{CC} = V_O = 30 V	μA			100
	V_{OL}	Low Level Output Voltage I_F = 16 mA, V_{CC} = 4.5 V, I_O = 1.2 mA	V		0.1	0.4
	I_{CCL}	Low Level Supply Current I_F = 16 mA, V_O = Open, V_{CC} = 30 V	μA		50	
	I_{CCH}	High Level Supply Current I_F = 0 mA, V_O = Open, V_{CC} = 30 V	μA		0.01	2
Coupled	CTR	Current Transfer Ratio, I_F= 16 mA, V_{CC} = 4.5 V, V_O = 0.4 V	%	15	20	35
	R_{I-O}	Isolation Resistance, V_{IN-OUT} = 1k VDC, RH = 40 ~ 60 %	Ω	10^{11}		
	C_{I-O}	Isolation Capacitance, V = 0, f = 1.0 MHz	pF		0.4	
	t_{PHL}	Propagation Delay Time, (High → Low) *1 I_F= 16 mA, V_{CC} = 5 V, R_L = 2.2 kΩ, C_L = 15 pF	μs		0.5	0.8
	t_{PLH}	Propagation Delay Time, (Low → High) *1 I_F= 16 mA, V_{CC} = 5 V, R_L = 2.2 kΩ, C_L = 15 pF	μs		0.6	1.2
	C_{MH}	Common Mode Transient Immunity at High Level Output *2 I_F= 0 mA, V_{CC} = 5 V, R_L = 4.1 kΩ, V_{CM} = 1.5 kV	kV/μs	10		
	C_{ML}	Common Mode Transient Immunity at Low Level Output *2 I_F= 16 mA, V_{CC} = 5 V, R_L = 4.1 kΩ, V_{CM} = 1.5 kV	kV/μs	-10		

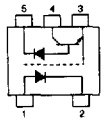
1. Test Circuit for Propagation Delay Time



2. Test Circuit for Common Mode Transient Immunity



3. Pin Connection (Top View)

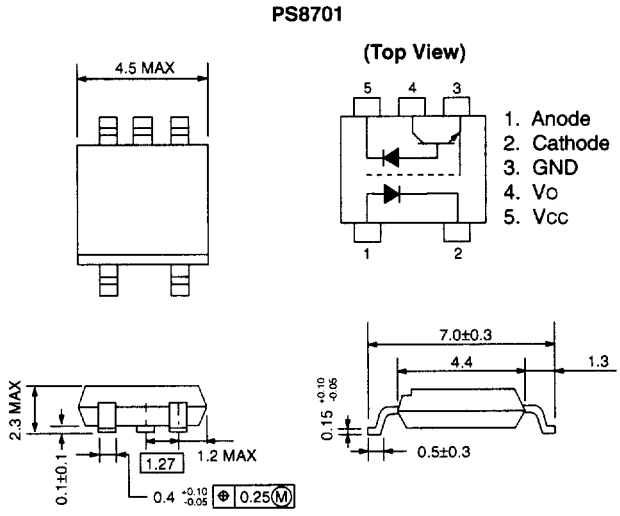


ABSOLUTE MAXIMUM RATINGS[1] (T_A = 25°C)

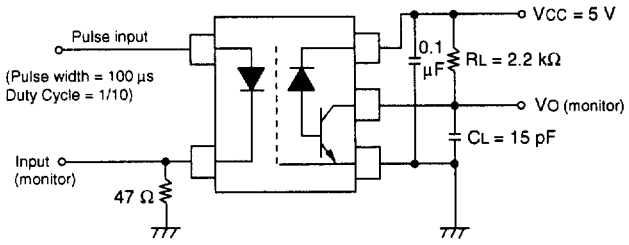
SYMBOLS	PARAMETERS	UNITS	RATING
Diode			
I_F	Forward Current	mA	25
V_R	Reverse Voltage	V	3.0
P_D	Power Dissipation	mW	45
Detector			
V_{CC}	Supply Voltage	V	35
V_O	Output Voltage	V	35
I_O	Output Current	mA	8.0
P_C	Power Dissipation	mW	100
Coupled			
BV	Isolation Voltage[2]	$V_{r.m.s.}$	2500
T_{STG}	Storage Temperature	°C	-55 to +125
T_A	Operating Ambient Temp.	°C	-55 to +100

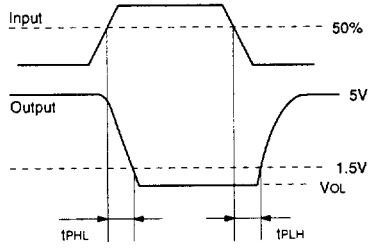
Notes:
1. Operation in excess of any one of these parameters may result in permanent damage.
2. AC voltage for one minute at T_A = 25°C, RH = 60% between input and output.

OUTLINE DIMENSIONS (Units in mm)



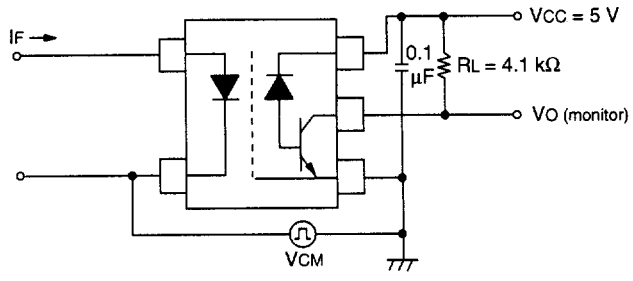
TEST CIRCUIT (Propagation Delay Time)

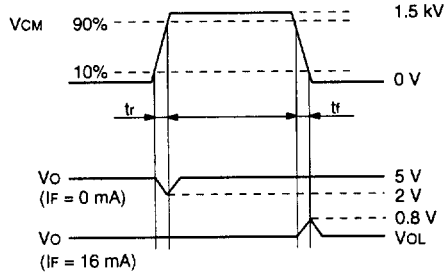




Notes:
1. C_L is approximately 15pF which includes probe and stray wiring capacitance.

TEST CIRCUIT (Common Mode Transient Immunity)

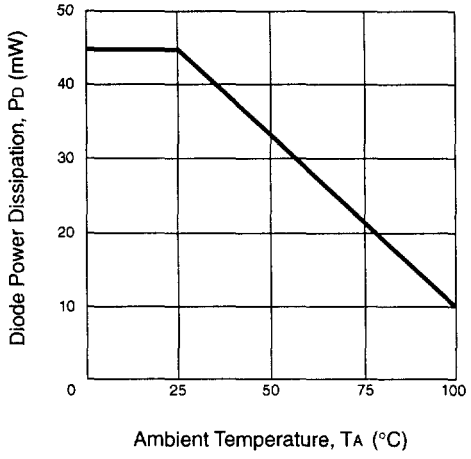




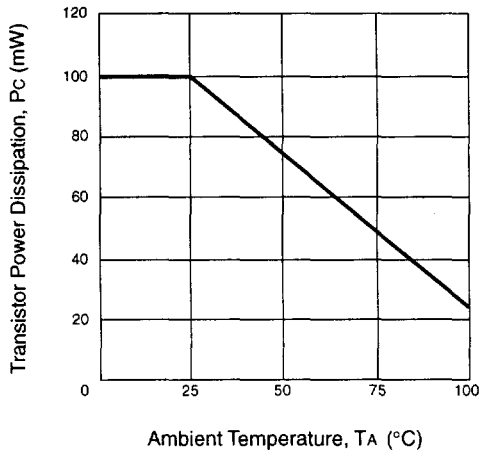
Usage Cautions:
1. When handling this product, precautions should be taken against static electricity.
2. A by-pass capacitor of ≥ 0.1 µF is used between Vcc and GND.

TYPICAL PERFORMANCE CURVES (T_A = 25 °C)

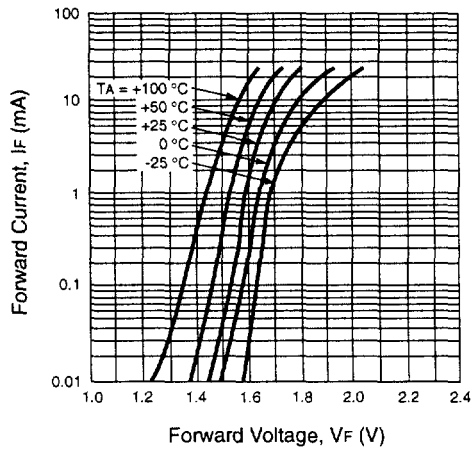
DIODE POWER DISSIPATION vs. AMBIENT TEMPERATURE



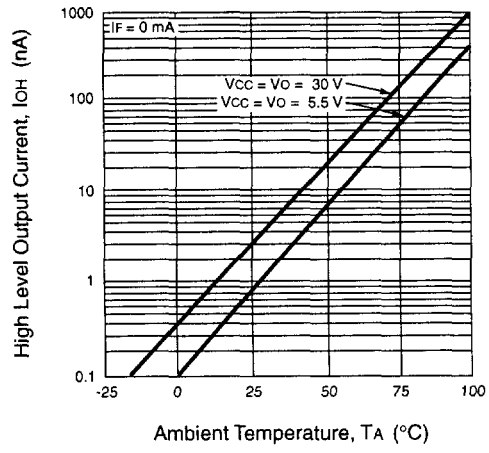
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



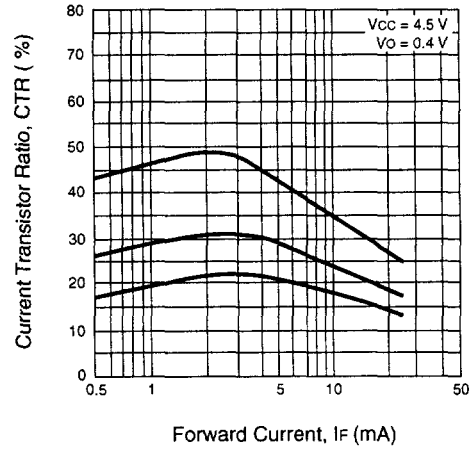
FORWARD CURRENT vs. FORWARD VOLTAGE



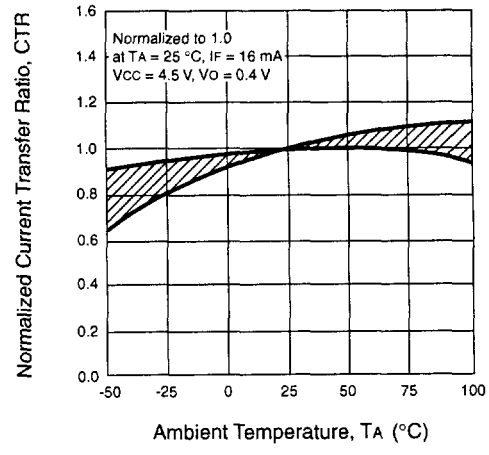
HIGH LEVEL OUTPUT CURRENT vs. AMBIENT TEMPERATURE



CURRENT TRANSFER RATIO vs. FORWARD CURRENT

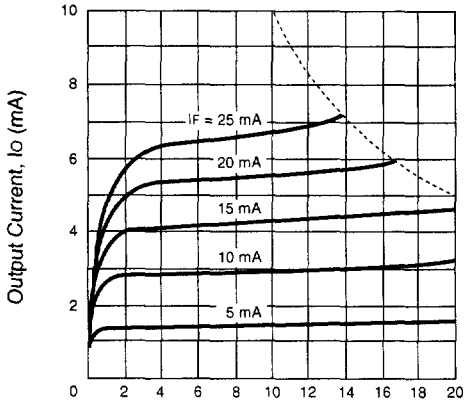


NORMALIZED CURRENT TRANSFER RATIO vs. AMBIENT TEMPERATURE

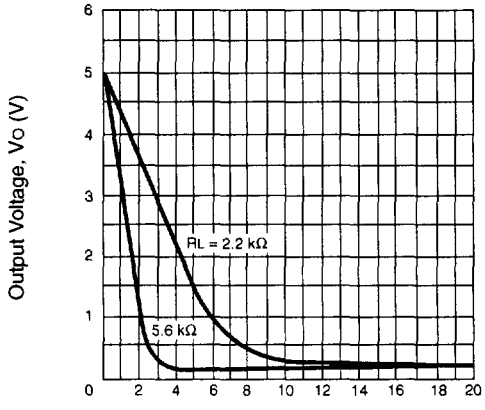


TYPICAL PERFORMANCE CURVES (T_A = 25 °C)

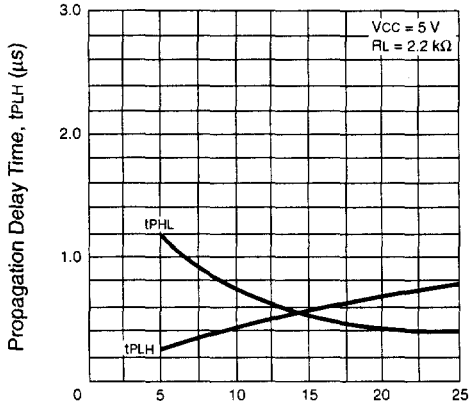
OUTPUT CURRENT vs. OUTPUT VOLTAGE



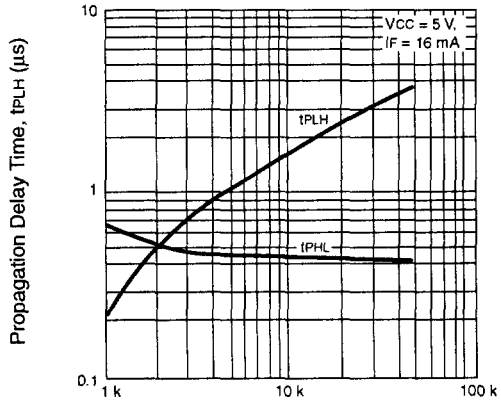
OUTPUT VOLTAGE vs. FORWARD CURRENT



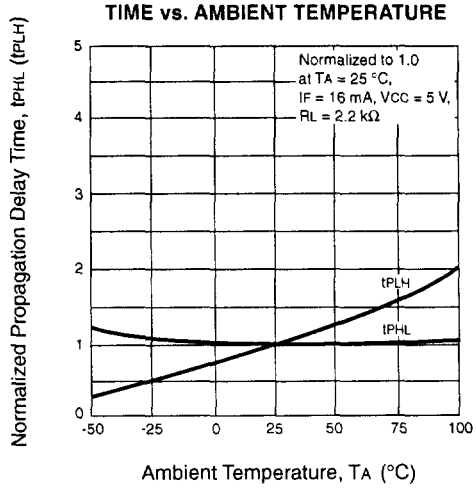
PROPAGATION DELAY TIME vs. FORWARD CURRENT



PROPAGATION DELAY TIME vs. LOAD RESISTANCE

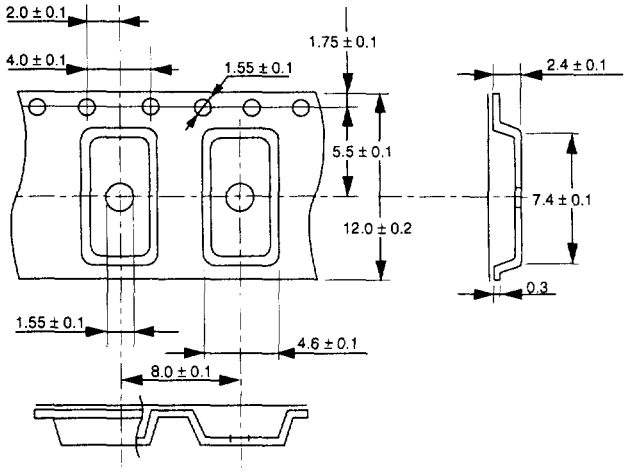


NORMALIZED PROPAGATION DELAY TIME vs. AMBIENT TEMPERATURE

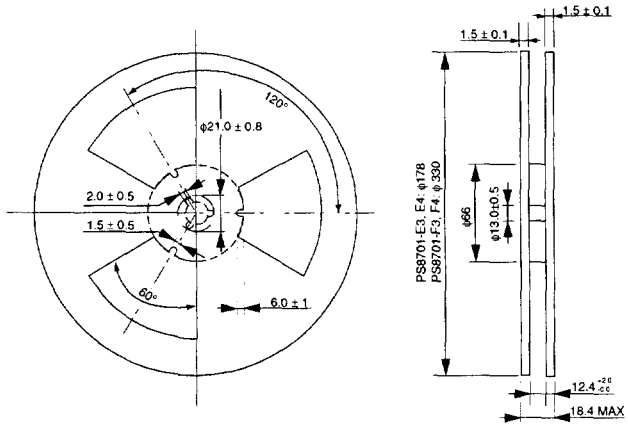


TAPING SPECIFICATIONS (Units in mm)

OUTLINE AND DIMENSIONS (TAPE)



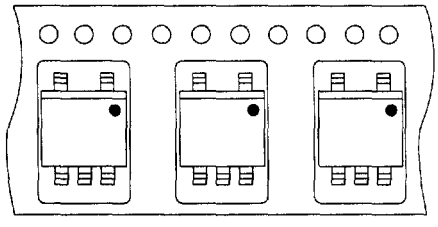
OUTLINE AND DIMENSIONS (REEL)



Notes:
1. Packing : PS8701-E3, E4 900 pcs/reel
PS8701-F3, F4 3500 pcs/reel

TAPE DIRECTION

PS8701-E3
PS8701-F3



PS8701-E4
PS8701-F4