NEC

LONG CREEPAGE TYPE HIGH ISOLATION VOLTAGE 6 PIN OPTOCOUPLER

PS2651
PS2651L2
PS2652
PS2652L2

FEATURES

- **HIGH ISOLATION VOLTAGE**
  BV: 5 k $V_{r.m.s.}$ MIN
- **LONG CREEPAGE AND CLEARANCE DISTANCE**
  8 mm MIN
- **HIGH COLLECTOR TO EMITTER VOLTAGE**
  V_{CEO}: 80 V MIN
- **HIGH SPEED SWITCHING**
  t_r = 3 µs, t_f = 5 µs TYP
- **HIGH CURRENT TRANSFER RATIO**
  CTR = 200% TYP
- **6 PIN DUAL IN-LINE PACKAGE**

DESCRIPTION

PS2651and PS2652 are optically coupled isolators containing a GaAs light emitting diode and an NPN silicon phototransistor in a plastic DIP (Dual In-Line Package). PS2651 has a base pin and PS2652 has no base pin. Creepage distance and clearance of leads are over 8 millimeters. PS2651L2 and PS2652L2 are lead bending type (Gull-wing) for surface mounting.

APPLICATIONS

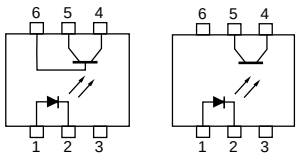
Interface circuit for various instrumentations and control equipment.

- **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)

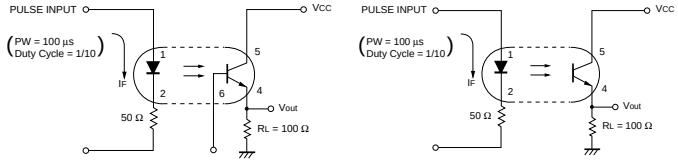
PART NUMBER				PS2651, PS2651L2, PS2652, PS2652L2		
	SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX
Diode	V_F	Forward Voltage, I_F = 10 mA	V		1.1	1.4
	I_R	Reverse Current, V_R = 5 V	µA			5
	C	Junction Capacitance, V = 0, f = 1.0 MHz	pF		30	
Transistor	I_{CEO}	Collector to Emitter Dark Current, V_{CE} = 80 V, I_F = 0	nA			100
	BV_{CEO}	Collector to Emitter Breakdown Voltage, I_C = 1 mA, I_B = 0	V	80		
	BV_{ECO}	Emitter to Collector Breakdown Voltage, I_E = 100 µA, I_B = 0	V	7		
Coupled	CTR	Current Transfer Ratio[1], I_F = 5 mA, V_{CE} = 5 V	%	50	200	400
	$V_{CE(sat)}$	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	Ω	10^{11}		
	C_{1-2}	Isolation Capacitance, V = 0, f = 1.0 MHz	pF		0.6	
	t_r	Rise Time[2], V_{CC} = 5 V, I_C = 2 mA	µs		3	
	t_f	Fall Time[2], V_{CC} = 5 V, I_C = 2 mA	µs		5	

1. CTR rank
   KD : 160 to 400 (%)
   LD : 80 to 240 (%)
   MD : 50 to 120 (%)



PS2651 PS2652

2. Test Circuit for Switching Time



PS2651 PS2652

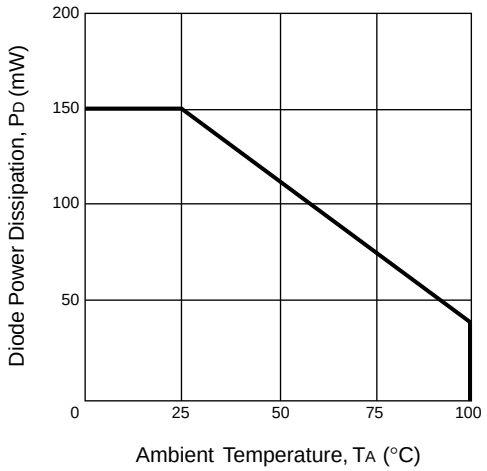
ABSOLUTE MAXIMUM RATINGS[1] (T_A = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
Diode			
V_R	Reverse Voltage	V	6
I_F	Forward Current	mA	80
P_D	Power Dissipation	mW	150
$I_{F\ (Peak)}$	Peak Forward Current PW = 100 µs, Duty Cycle 1%	A	1
Transistor			
V_{CEO}	Collector to Emitter Voltage	V	80
V_{ECO}	Emitter to Collector Voltage	V	7
I_C	Collector Current	mA	50
P_C	Power Dissipation	mW	150
Coupled			
BV	Isolation Voltage[2]	$V_{r.m.s.}$	5000
T_{STG}	Storage Temperature	°C	-55 to +150
T_{OP}	Operating Temperature	°C	-55 to +100

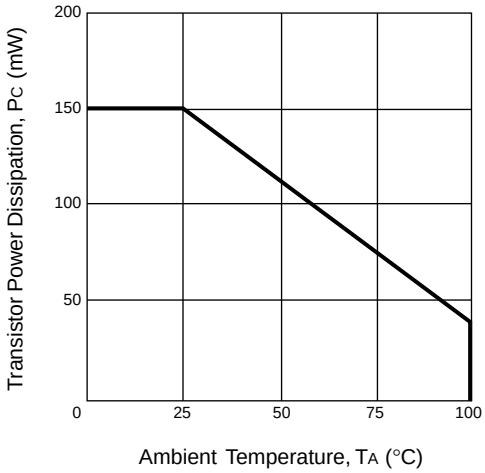
Notes:
1. Operation in excess of any one of these parameters may result in permanent damage.
2. AC voltage for 1 minute at T_A = 25 °C, RH = 60 % between input (Pin No. 1, 2, 3 Common) and output (Pin No. 4, 5, 6 Common).

TYPICAL PERFORMANCE CURVES (T_A = 25 °C)

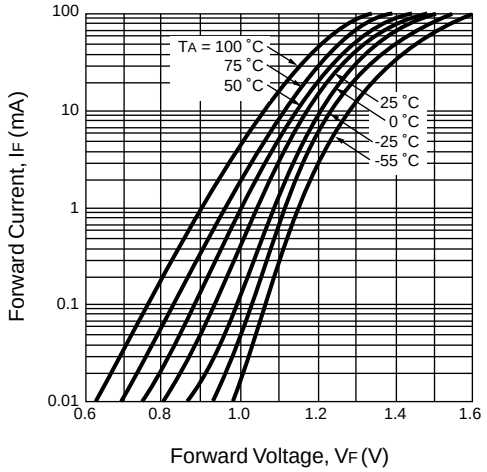
DIODE POWER DISSIPATION vs. AMBIENT TEMPERATURE



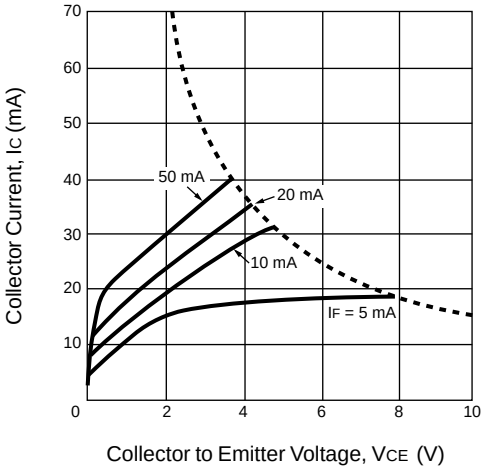
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



FORWARD CURRENT vs. FORWARD VOLTAGE

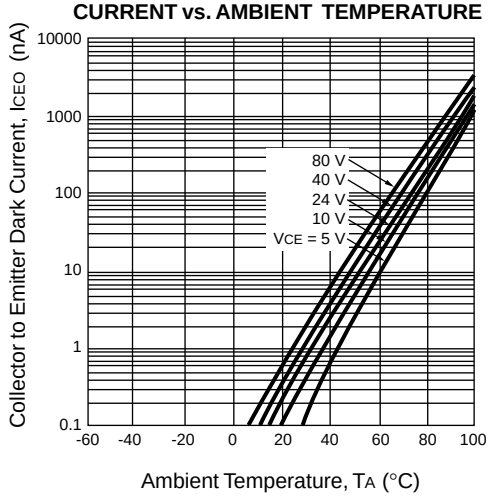


COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE

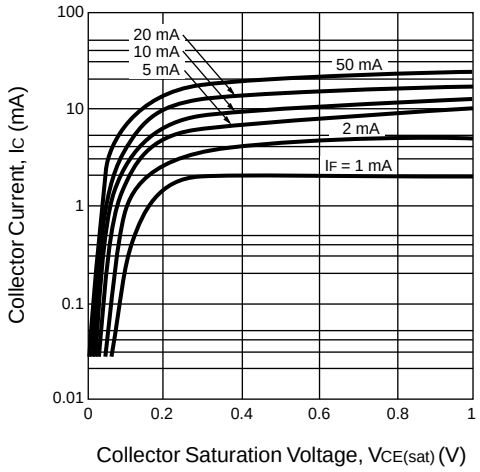


TYPICAL PERFORMANCE CURVES (T_A = 25 °C)

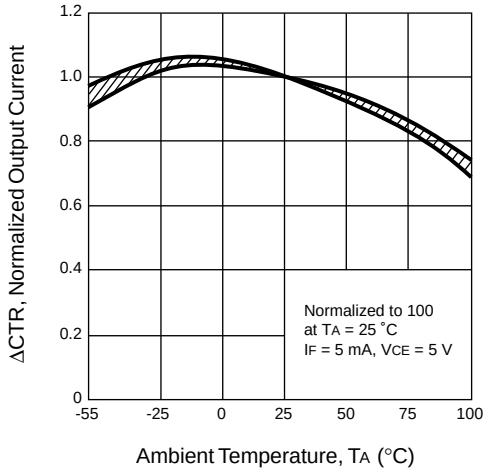
COLLECTOR TO EMITTER DARK CURRENT vs. AMBIENT TEMPERATURE



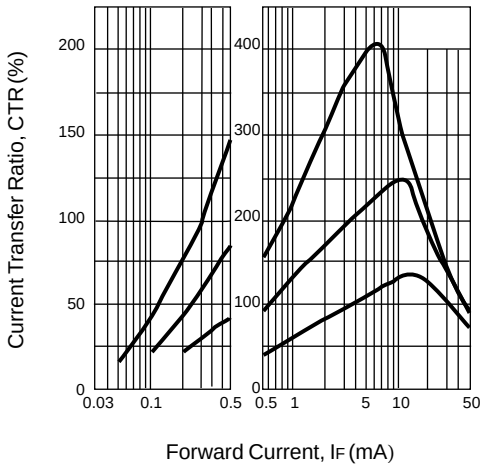
COLLECTOR CURRENT vs. COLLECTOR SATURATION VOLTAGE



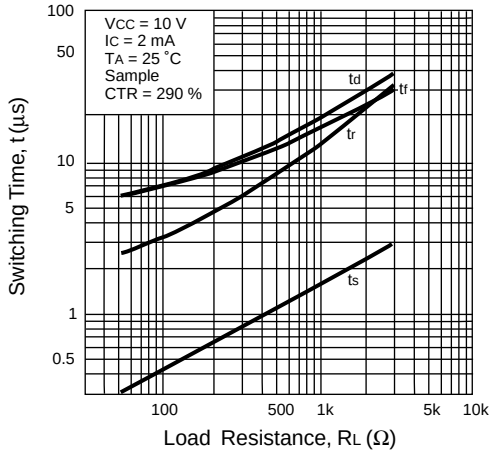
NORMALIZED OUTPUT CURRENT vs. AMBIENT TEMPERATURE



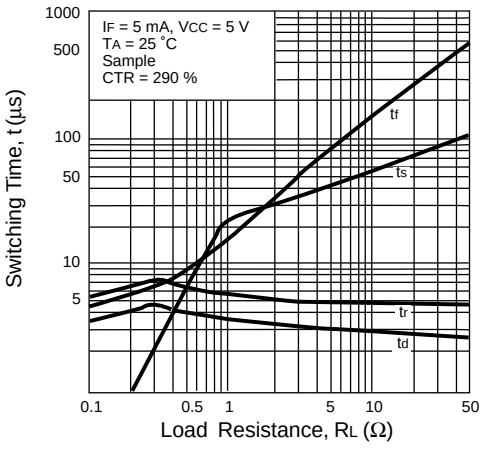
CURRENT TRANSFER RATIO (CTR) vs. FORWARD CURRENT



SWITCHING TIME vs. LOAD RESISTANCE

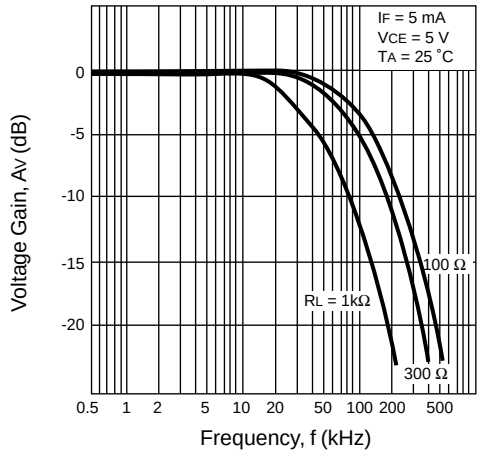


SWITCHING TIME vs. LOAD RESISTANCE

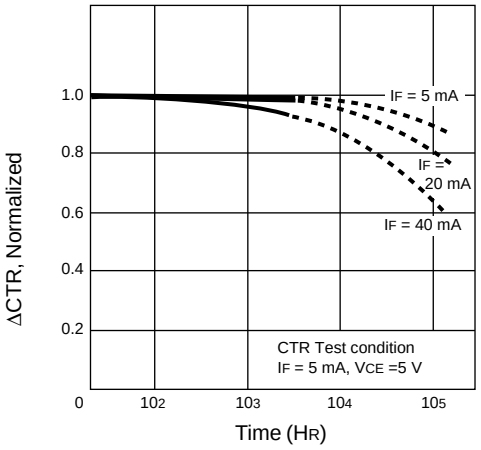


TYPICAL PERFORMANCE CURVES (T_A = 25 °C)

FREQUENCY RESPONSE

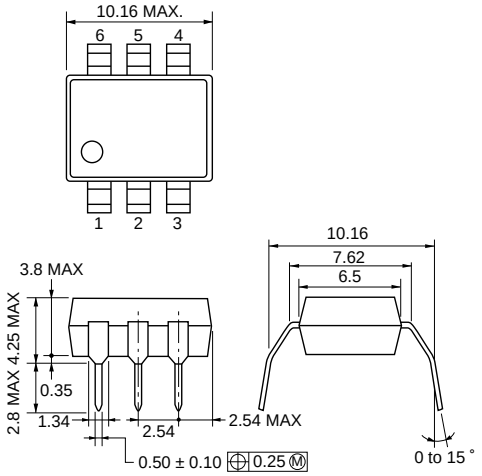


CTR DEGRADATION

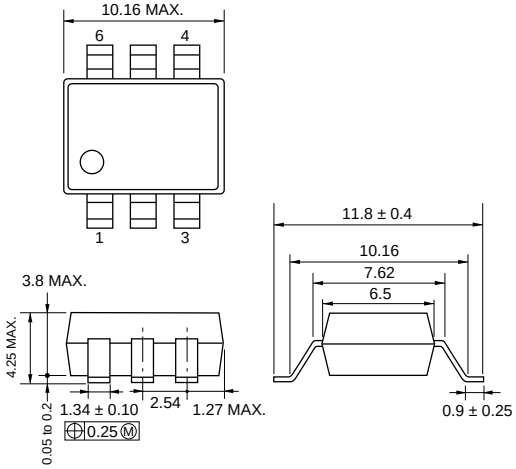


OUTLINE DIMENSIONS (Units in mm)

PS2651, PS2652

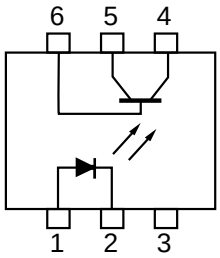


PS2651L2, PS2652L2



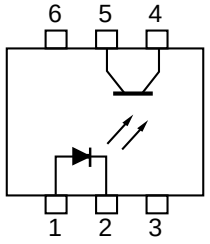
PIN CONNECTION (Top View)

PS2651, PS2651L2



1. Anode
2. Cathode
3. NC
4. Emitter
5. Collector
6. Base

PS2652, PS2652L2



1. Anode
2. Cathode
3. NC
4. Emitter
5. Collector
6. NC