NEC

HIGH ISOLATION VOLTAGE DARLINGTON TRANSISTOR TYPE 6 PIN OPTOCOUPLER

PS2603
PS2603L
PS2604
PS2604L

FEATURES

- **HIGH ISOLATION VOLTAGE**
  BV: 5 k $V_{r.m.s.}$ MIN
- **HIGH SPEED SWITCHING**
  t_r, t_f = 100 µs TYP
- **ULTRA HIGH CURRENT TRANSFER RATIO**
  CTR: 300% TYP

DESCRIPTION

PS2603, PS2604 ,PS2603L and PS2604L are optically coupled isolators containing a GaAs light emitting diode and an NPN silicon Darlington-connected phototransistor. PS2603 and PS2604 are in a plastic DIP (Dual In-line Package). PS2603L and PS2604L are lead bending type (Gull-wing) for surface mount. PS2603 and PS2603L have a base pin, PS2604 and PS2604L have no base pin.

APPLICATIONS

Interface circuit for various instrumentations and control equipment.

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

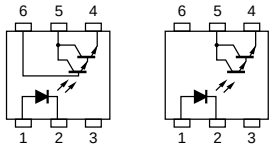
ELECTRICAL CHARACTERISTICS (T_A = 25°C)

PART NUMBER				PS2603, PS2603L, PS2604, PS2604L		
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} = 40 V, I_F = 0	nA			400
	BV_{CEO}	Collector to Emitter Breakdown Voltage, I_C = 1 mA, I_B = 0	V	40		
	BV_{ECO}	Emitter to Collector Breakdown Voltage, I_E = 100 µA, I_B = 0	V	6		
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 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} = 10 V, I_C = 10 mA	µs		100	
	t_f	Fall Time [2], V_{CC} = 10 V, I_C = 10 mA	µs		100	

Notes:

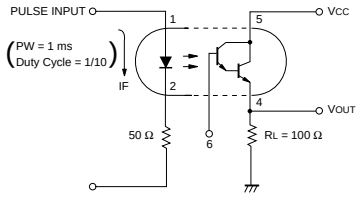
1. CTR Rank
   KD : 2000 to %
   LD : 700 to 3400 %
   MD : 200 to 1000 %

2. Test Circuit for Switching Time

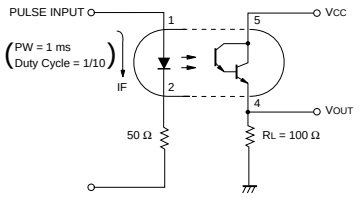


PS2603

PS2604



PS2603



PS2604

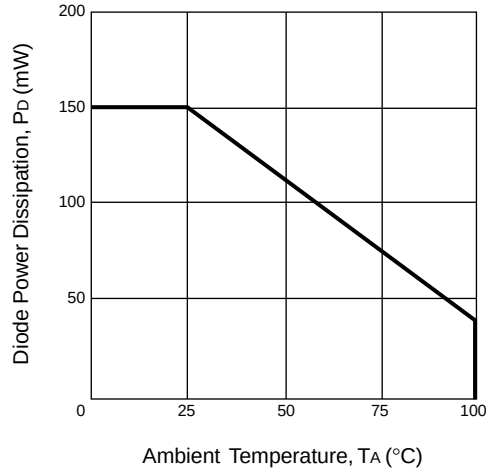
ABSOLUTE MAXIMUM RATINGS[1] (T_A = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
Diode			
V_R	Reverse Voltage	V	6
I_F	Forward Current (DC)	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	40
V_{ECO}	Emitter to Collector Voltage	V	6
I_C	Collector Current	mA	200
P_C	Power Dissipation	mW	200
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

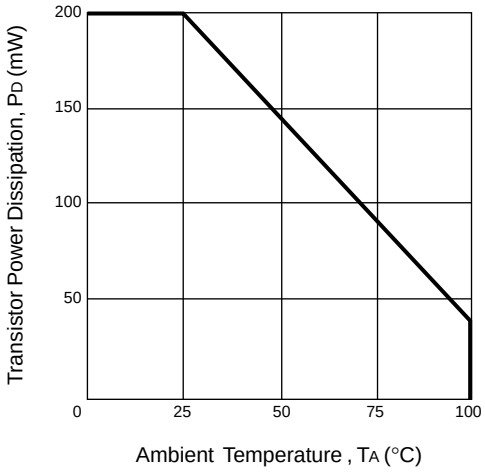
Notes
1. Operation in excess of any one of these parameters may result in permanent damage.
2. AC voltage for 1 minute at T_A = 25° C, RH = 60% between input (Pin No. 1, 2, 3 Common) and output (Pin No. 4, 5, 6 Common).

TYPICAL PERFORMANCE CURVES (T_A = 25°)

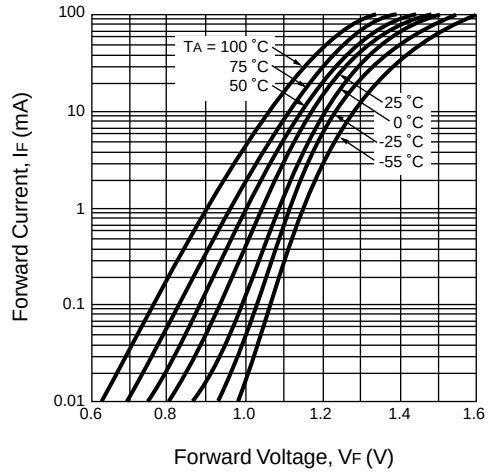
DIODE POWER DISSIPATION vs. AMBIENT TEMPERATURE



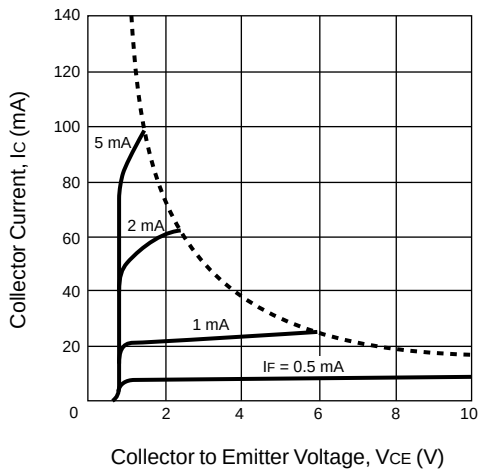
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



FORWARD CURRENT vs. FORWARD VOLTAGE

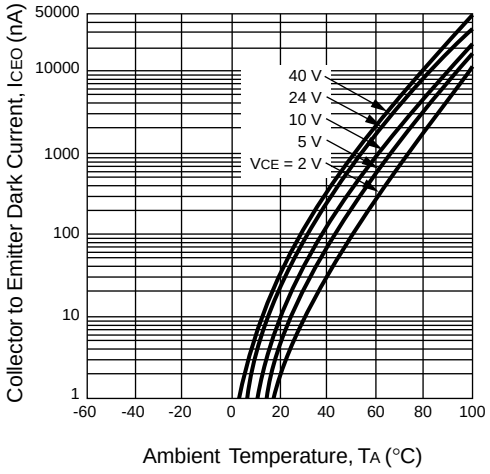


COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE

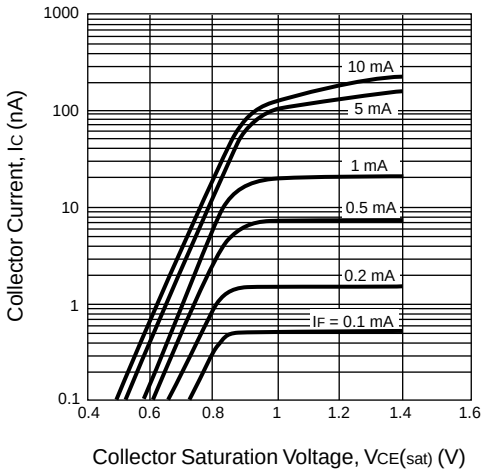


TYPICAL PERFORMANCE CURVES (T_A = 25°)

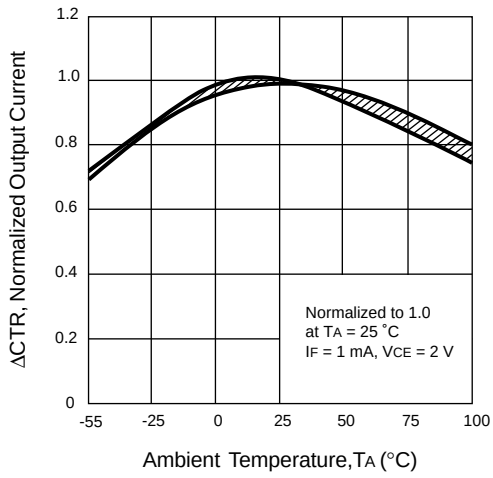
COLLECTOR TO EMITTER DARK CURRENT vs. AMBIENT TEMPERATURE



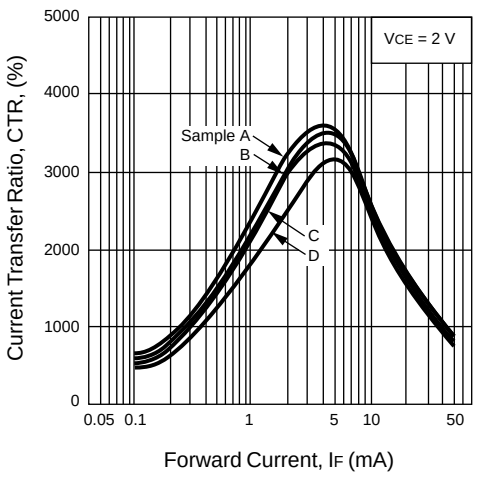
COLLECTOR CURRENT vs. COLLECTOR SATURATION VOLTAGE



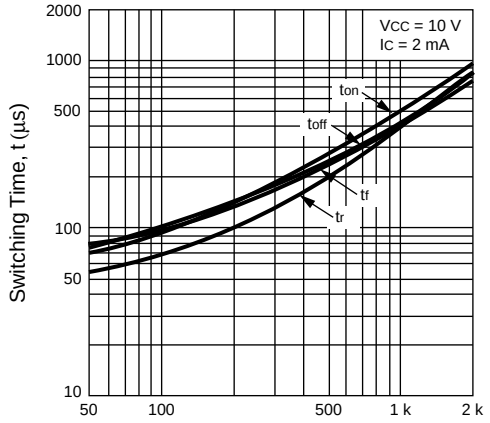
NORMALIZED OUTPUT CURRENT vs. AMBIENT TEMPERATURE



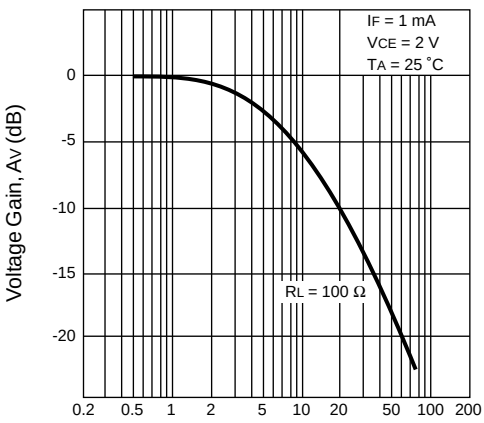
CURRENT TRANSFER RATIO (CTR) vs. FORWARD CURRENT



SWITCHING TIME vs. LOAD RESISTANCE

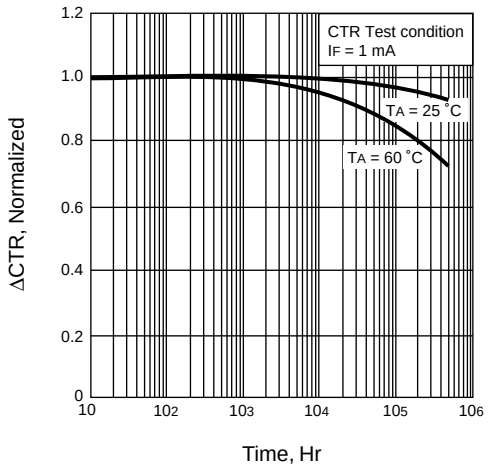


FREQUENCY RESPONSE



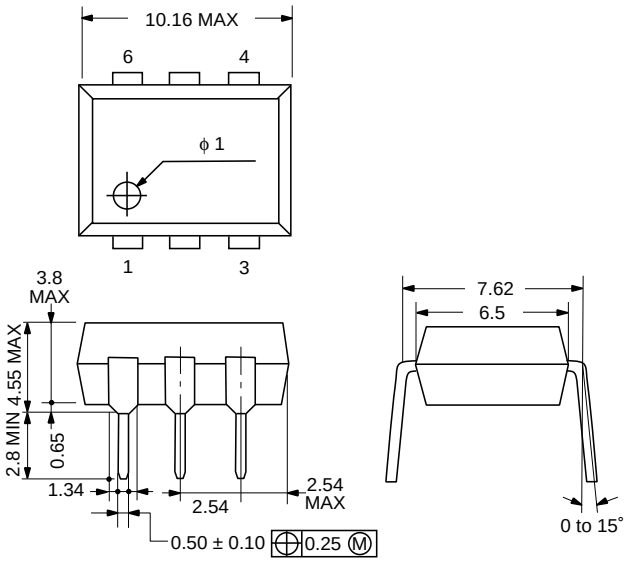
TYPICAL PERFORMANCE CURVES (T_A = 25°)

CTR DEGRADATION

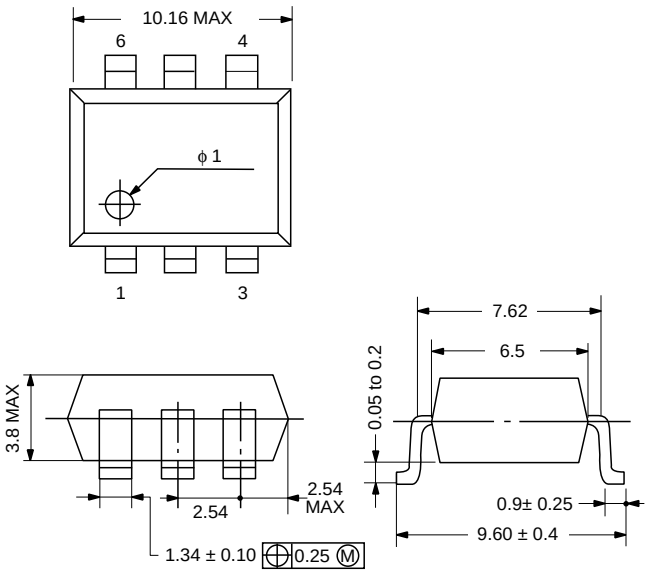


OUTLINE DIMENSIONS (Units in mm)

PS2603, PS2604

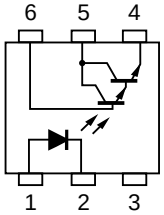


PS2603L, PS2604L



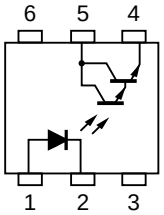
PIN CONNECTIONS (Top View)

PS2603, PS2603L



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

PS2604, PS2604L



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