NEC
ELECTRON DEVICE

PHOTO COUPLER
PS2003B

PHOTO COUPLER

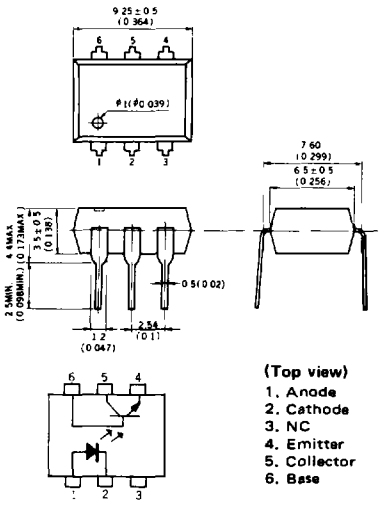
– NEPOC SERIES –

DESCRIPTION

The PS2003B is an optically coupled isolator containing a GaAs light emitting diode and an NPN silicon photo transistor.

PACKAGE DIMENSIONS

in millimeters (inches)



(Top view)
1. Anode
2. Cathode
3. NC
4. Emitter
5. Collector
6. Base

FEATURES

- High isolation voltage — $2500V_{DC}$ Rating
- High transfer ratio — 20% MIN.
- High speed switching — t_r, t_f = 5.0 μs TYP.
- Economical, compact, Dual In-Line Plastic Package

APPLICATIONS

- Interface circuit for various instrumentations, control equipments.
- Chopper circuits.
- Computer and peripheral manufactures.
- Pulse transformer.
- Data communication equipment.

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Diode			
Reverse Voltage	V_R	5.0	V
Forward Current	I_F	40	mA
Power Dissipation	P_D	100	mW
Transistor			
Collector to Emitter Voltage	V_{CEO}	30	V
Collector Current	I_C	50	mA
Power Dissipation	P_C	150	mW
Isolation Voltage*1	BV	2500	V_{DC}
Storage Temperature	T_{stg}	-55 to +125	°C
Operating Temperature	T_{opt}	-55 to +100	°C

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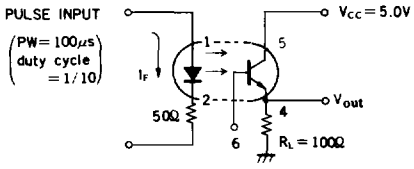
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

	CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Diode	Forward Voltage	V_F		1.1	1.4	V	I_F = 20 mA
	Reverse Current	I_R			20	μA	V_R = 4.0 V
	Junction Capacitance	C		40		pF	V = 0, f = 1.0 MHz
Transistor	Collector to Emitter Dark Current	I_{CEO}			200	nA	V_{CE} = 10 V, I_F = 0
	DC Current Gain	h_{FE}		700			I_C = 4.0 mA, V_{CE} = 5.0 V
Coupled	Current Transfer Ratio	CTR(I_C/I_F)	20			%	I_F = 20 mA, V_{CE} = 5.0 V
	Collector Saturation Voltage	$V_{CE(sat)}$			0.3	V	I_F = 20 mA, I_C = 2.0 mA
	Isolation Resistance	R_{1-2}	10^{11}			Ω	V_{in-out} = 1.0 kV
	Isolation Capacitance	C_{1-2}		0.8		pF	V = 0, f = 1.0 MHz
	Rise Time	t_r		5.0		μs	V_{CC} = 5.0 V, I_F = 20 mA, R_L = 100Ω *2
	Fall Time	t_f		5.0		μs	V_{CC} = 5.0 V, I_F = 20 mA, R_L = 100Ω *2

* 1 Measuring Condition

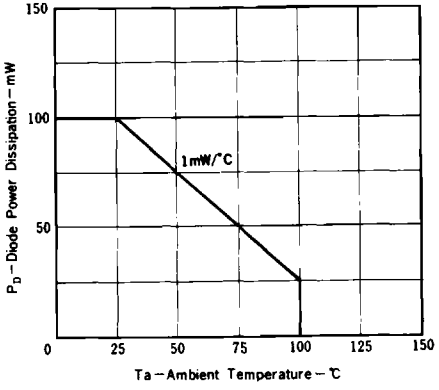
DC or AC voltage for 1 minute at Ta = 25°C,
RH = 60%
Between input (pin No. 1, 2 and No. 3 Common)
and output (pin No. 4, 5 and No. 6 Common)

* 2 Test Circuit for Switching Time

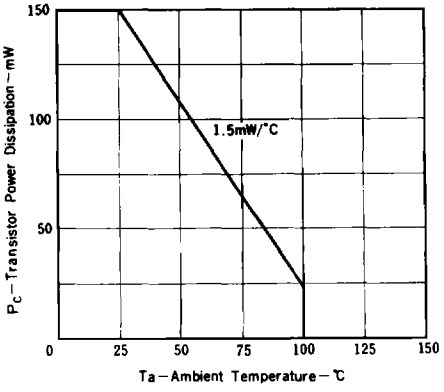


TYPICAL CHARACTERISTICS (Ta = 25°C)

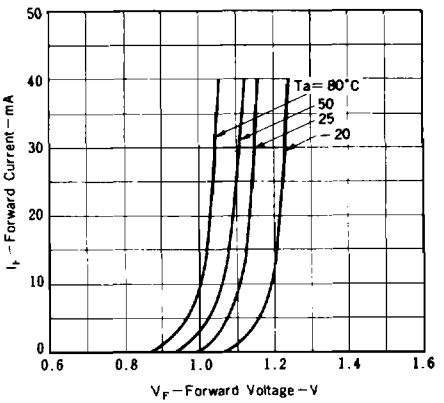
DIODE POWER DISSIPATION vs. AMBIENT TEMPERATURE



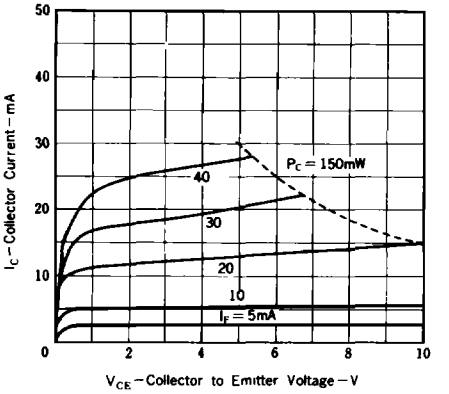
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



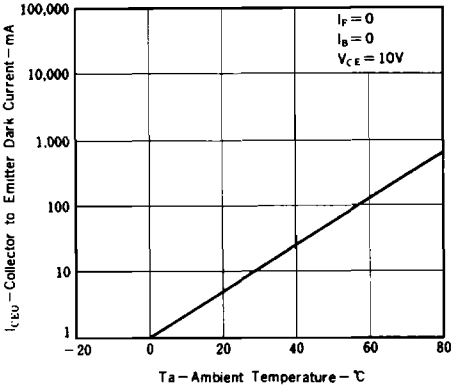
FORWARD CURRENT vs.
FORWARD VOLTAGE



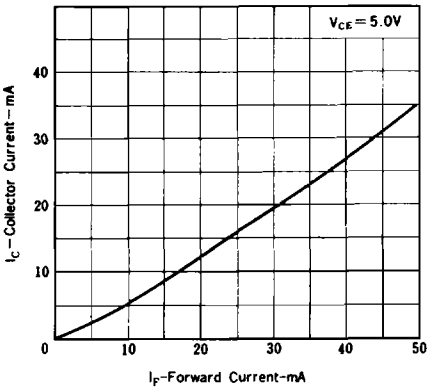
COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE



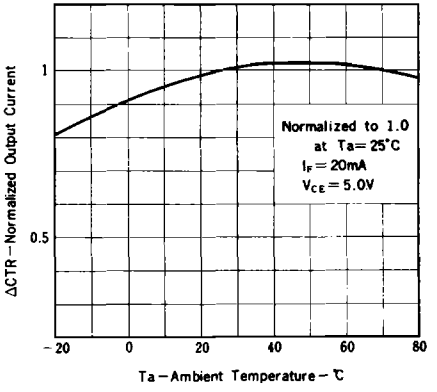
COLLECTOR TO EMITTER DARK CURRENT
vs. AMBIENT TEMPERATURE



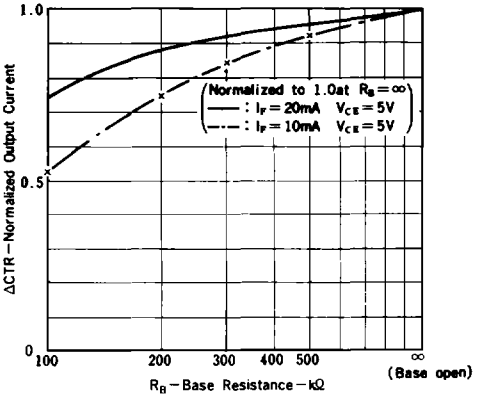
COLLECTOR CURRENT vs.
FORWARD CURRENT



NORMALIZED OUTPUT CURRENT vs.
AMBIENT TEMPERATURE



NORMALIZED OUTPUT CURRENT vs.
BASE RESISTANCE



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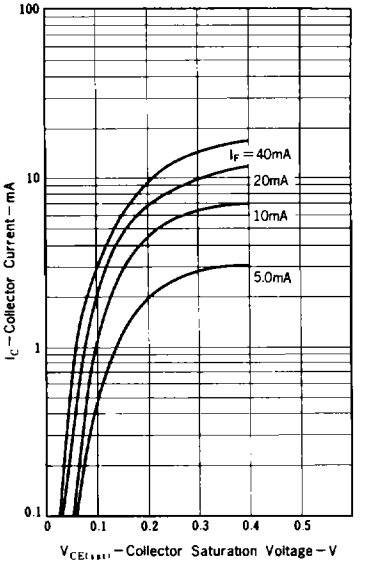
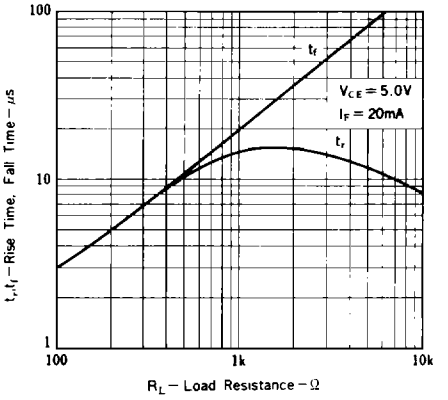
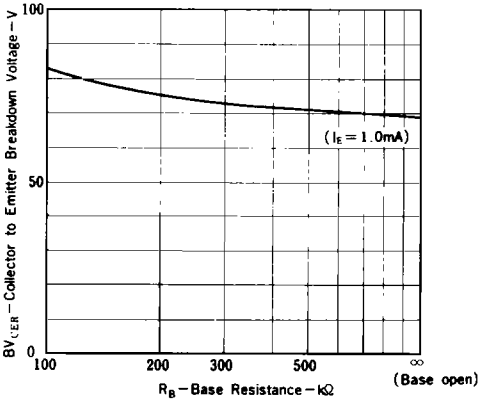
COLLECTOR CURRENT vs.
COLLECTOR SATURATION VOLTAGE



SWITCHING TIME vs.
LOAD RESISTANCE



COLLECTOR TO EMITTER BREAKDOWN
VOLTAGE vs. BASE RESISTANCE



FREQUENCY RESPONSE