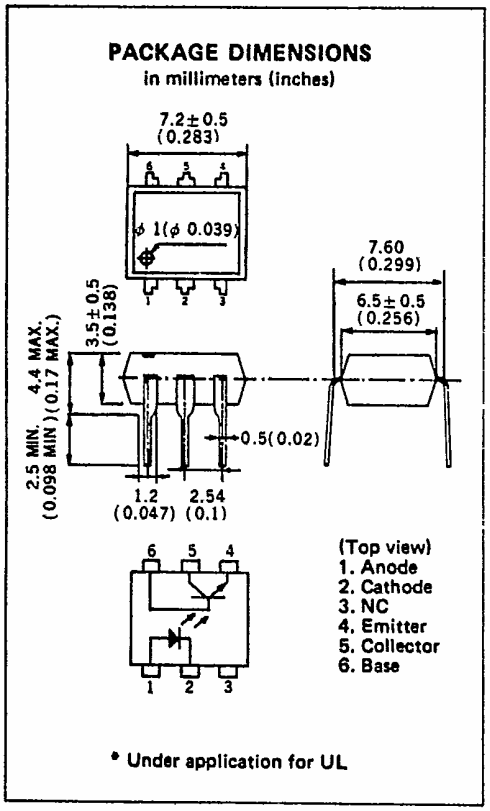
PHOTO COUPLER
PS2021

PHOTO COUPLER
(High Isolation Voltage)
Single Transistor

—NEPOC SERIES—

DESCRIPTION

The PS2021 is an optically coupled isolator containing a GaAs light emitting diode and an NPN silicon photo transistor.



FEATURES

- Small package — 7.2 x 6.5 x 3.5 mm
- High isolation voltage — 4 000 V_{AC} Rating
- High transfer ratio — 50 % MIN.
- High speed switching — t_r, t_f = 3 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 euqipment.

ABSOLUTE MAXIMUM RATINGS (Ta = 25 °C)

Diode			
Reverse Voltage	V_R	5.0	V
Forward Current (DC)	I_F	80	mA
Power Dissipation	P_D	150	mW
Peak Forward Current (300 μs, 2 % duty cycle)	$I_{F(peak)}$	3	A
Transistor			
Collector to Emitter Voltage	V_{CEO}	40	V
Collector to Base Voltage	V_{CBO}	70	V
Emitter to Collector Voltage	V_{ECO}	7	V
Collector Current	I_C	100	mA
Power Dissipation	P_C	150	mW
Isolation Voltage * 1	BV	4000	V_{AC}
Storage Temperature	T_{stg}	−55 to +150	°C
Operating Temperature	T_{opt}	−55 to +100	°C
Lead Temperature (Soldering 10 s)		260	°C
Total Power Dissipation	P_T	250	mW

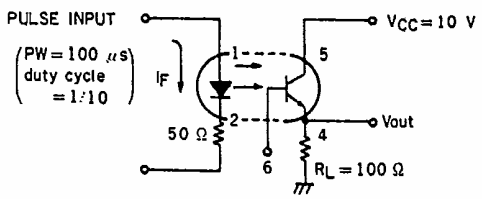
ELECTRICAL CHARACTERISTICS (Ta = 25 °C)

	CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Diode	Forward Voltage	V_F		1.1	1.4	V	I_F = 10 mA
	Forward Voltage	V_F		1.2	1.5	V	I_F = 50 mA
	Reverse Current	I_R			10	μA	V_R = 5 V
	Junction Capacitance	C		50		pF	V = 0, f = 1.0 MHz
Transistor	Collector to Emitter Dark Current	I_{CEO}			50	nA	V_{CE} = 10V, I_F = 0
	DC Current Gain	h_{FE}		700			I_C = 2 mA, V_{CE} = 5.0 V
	Collector to Emitter Breakdown Voltage	BV_{CEO}	40	60		V	I_C = 1 mA, I_B = 0
	Collector to Base BreakdownVoltage	BV_{CBO}	70	120		V	I_C = 100 μA, I_E = 0
	Emitter to Collector Breakdown Voltage	BV_{ECO}	7	9		V	I_E = 100 μA, I_B = 0
Coupled	Current Transfer Ratio *2	CTR (I_C/I_F)	50			%	I_F = 10 mA, V_{CE} = 5.0 V
	Collector Saturation Voltage	V_{CE} (sat)			0.3	V	I_F = 10 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}		0.5		pF	V = 0, f = 1.0 MHz
	Rise Time *3	t_r		3		μs	V_{CC} = 10 V, I_C = 2 mA, R_L = 100 Ω
	Fall Time *3	t_f		3		μs	V_{CC} = 10 V, I_C = 2 mA, R_L = 100 Ω

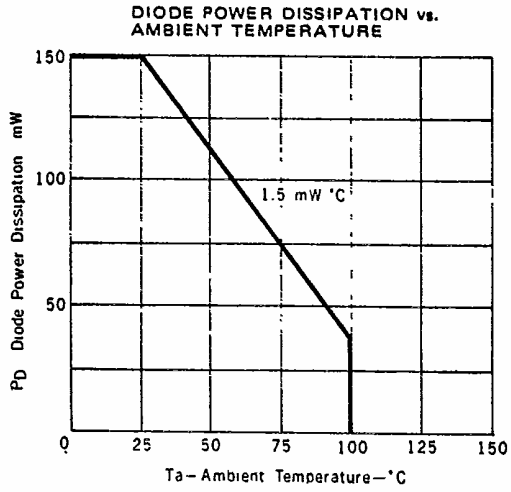
* 1 Measuring Condition
DC or AC voltage for 1 minute at Ta = 25 °C,
RH = 60 %
Between input (pin No. 1, 2 and No. 3 Common)
and output (pin No. 4, 5 and No. 6 Common)

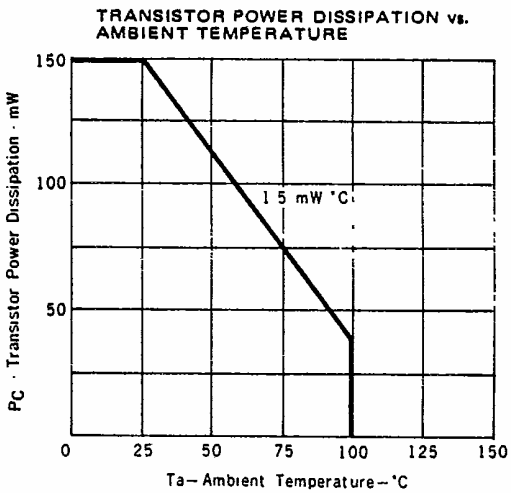
* 2 CTR rank
K: 150 %~300 %
L: 90 %~180 %
M: 50 %~110 %

* 3 Test Circuit for Switching Time

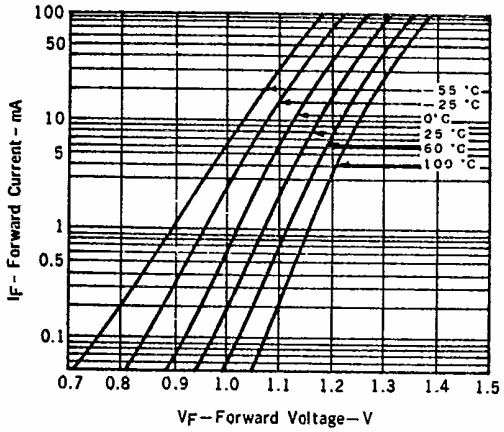


TYPICAL CHARACTERISTICS (Ta = 25 °C)

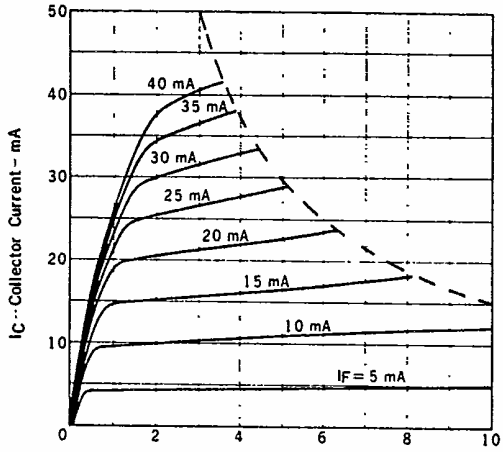




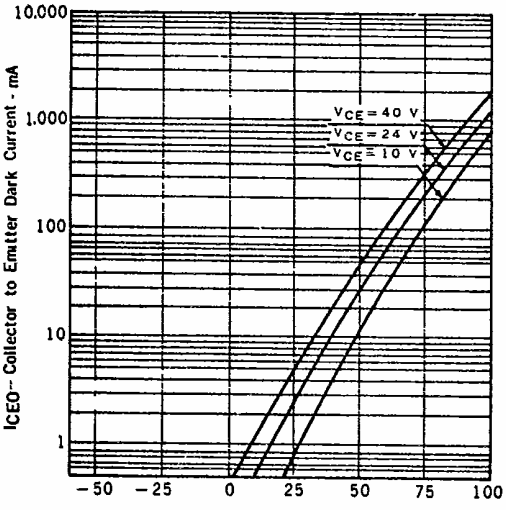
FORWARD CURRENT vs.
FORWARD VOLTAGE



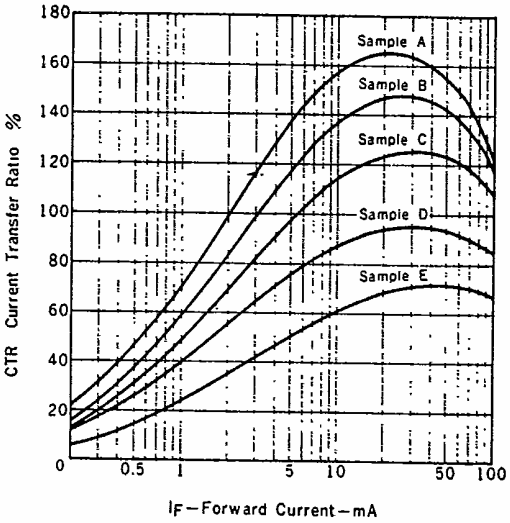
COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE



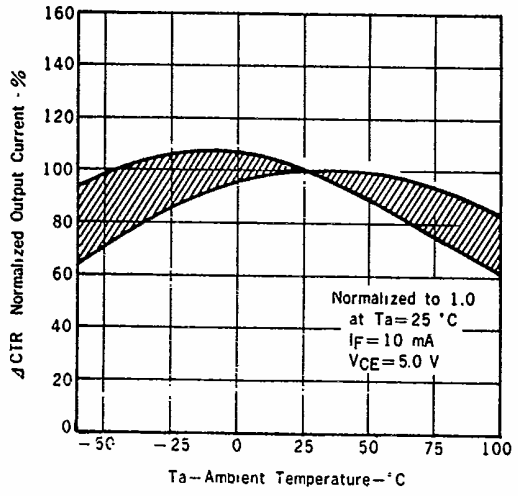
COLLECTOR TO EMITTER DARK CURRENT
vs. AMBIENT TEMPERATURE



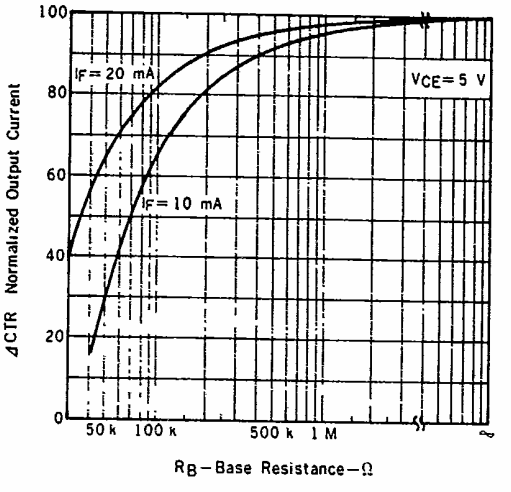
CURRENT TRANSFER RATIO vs.
FORWARD CURRENT



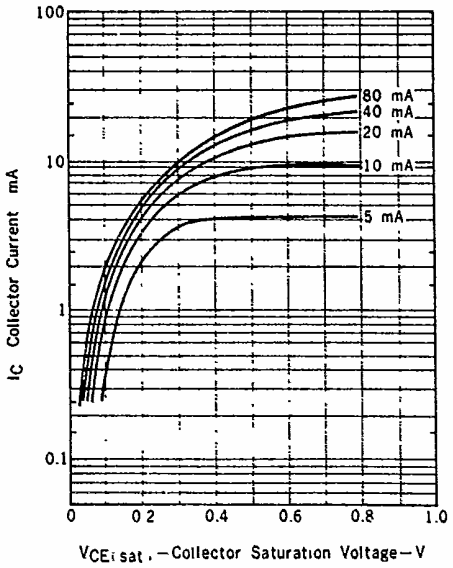
NORMALIZED OUTPUT CURRENT vs.
AMBIENT TEMPERATURE



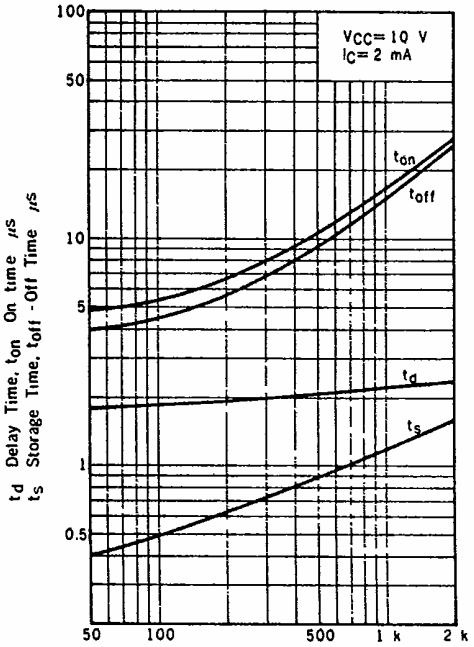
NORMALIZED OUTPUT CURRENT vs.
BASE RESISTANCE (TYPICAL)



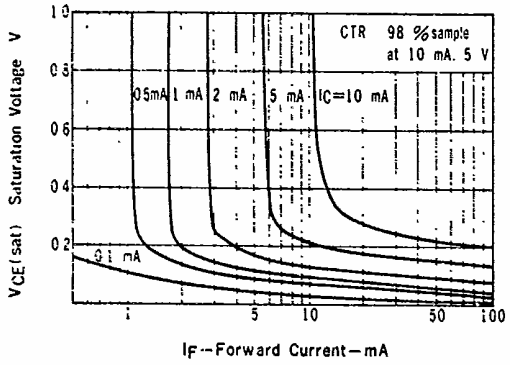
COLLECTOR CURRENT vs.
COLLECTOR SATURATION VOLTAGE



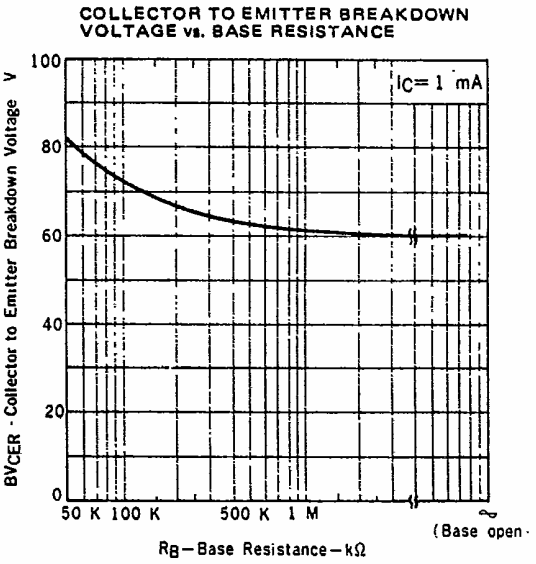
SWITCHING TIME vs.
LOAD RESISTANCE



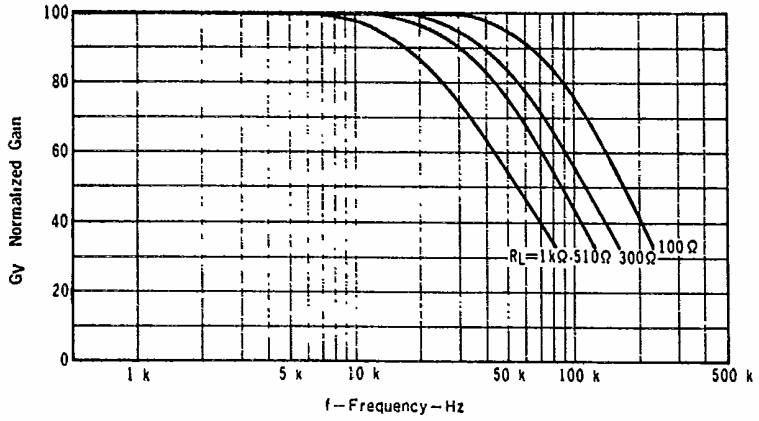
SATURATION VOLTAGE vs.
FORWARD CURRENT



COLLECTOR TO EMITTER BREAKDOWN
VOLTAGE vs. BASE RESISTANCE



FREQUENCY RESPONSE



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