To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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RENESAS

PHOTO COUPLERS

S2401A-1,PS2401A-2,PS2401A-3,PS2401A-4

MULTI PHOTO COUPLER
HIGH ISOLATION VOLTAGE
SINGLE TRANSISTOR TYPE

—NEPOC SERIES—

DESCRIPTION

The PS2401A-1, -2, -3 and -4 series are optically coupled isolator containing a GaAs light emitting diode and an NPN silicon photo transistor. Each is mounted in a dual in-line package.

FEATURES

- Small package size
- Each isolated channels per package
- High isolation voltage — 5 000 V_{ac} Rating
- High transfer ratio — 300 % TYP.
- High speed switching — t_r, t_f = 3 μs TYP.
- Low cost

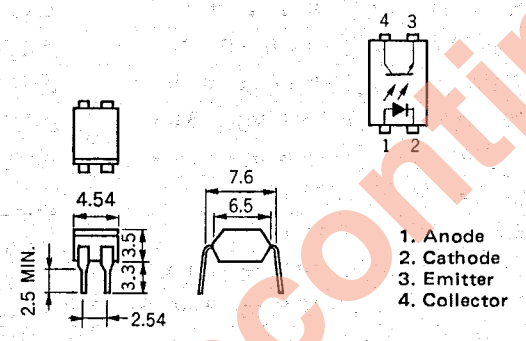
APPLICATIONS

Interface circuit for various instrumentations, control equipments.

- AC Line/Digital Logic ..... Isolate high voltage transients
- Digital Logic/Digital Logic ..... Eliminate spurious ground loops
- Twisted pair line receiver ..... Eliminate ground loop pick-up
- Telephone/Telegraph line receiver ... Isolate high voltage transients
- High Frequency Power Supply
  Feedback Control ..... Maintain floating ground
- Relay contact monitor ..... Isolate floating grounds and transients
- Power Supply Monitor ..... Isolate transients and ground systems

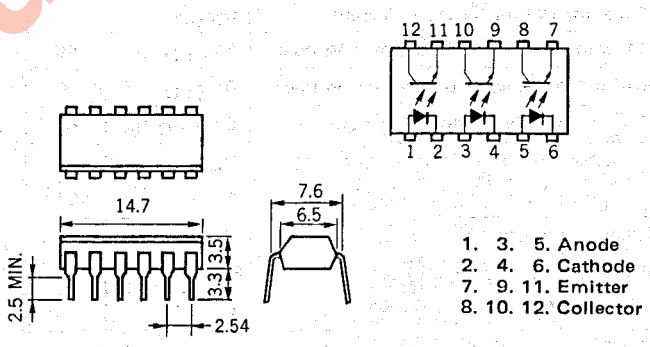
PACKAGE DIMENSIONS (Unit : mm)

PS2401A-1



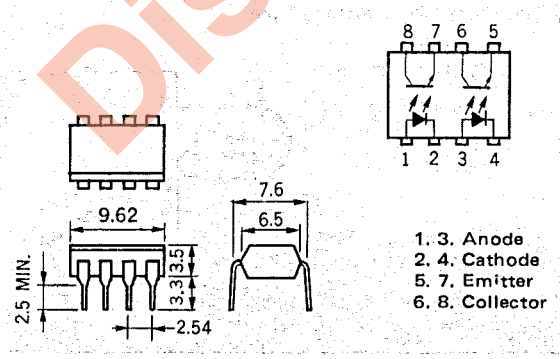
1. Anode
2. Cathode
3. Emitter
4. Collector

PS2401A-3



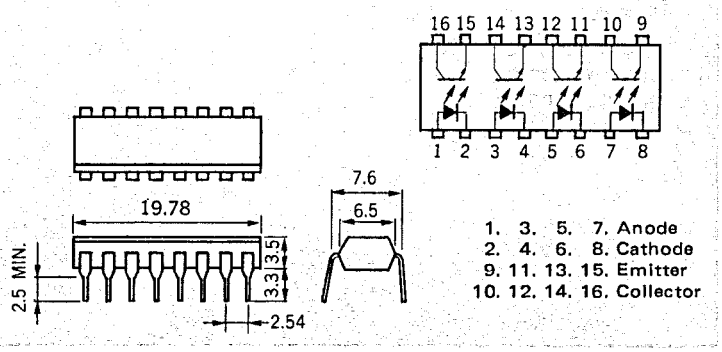
1. 3. 5. Anode
2. 4. 6. Cathode
7. 9. 11. Emitter
8. 10. 12. Collector

PS2401A-2



1. 3. Anode
2. 4. Cathode
5. 7. Emitter
6. 8. Collector

PS2401A-4



1. 3. 5. 7. Anode
2. 4. 6. 8. Cathode
9. 11. 13. 15. Emitter
10. 12. 14. 16. Collector

NEC Corporation

ABSOLUTE MAXIMUM RATINGS (T_a = 25 °C)

		(PS2401A-1)	(PS2401A-2, PS2401A-3, PS2401A-4)	
Diode				
Reverse Voltage	V_R	6.0	6.0	V
Forward Current (DC)	I_F	80	80	mA
Power Dissipation	P_D	150	120	mW/Unit
Peak Forward Current (300 μs, 2 % duty cycle)	$I_{F(peak)}$	3	3	A
Transistor				
Collector to Emitter Voltage	V_{CEO}	40	40	V
Emitter to Collector Voltage	V_{ECO}	7	7	V
Collector Current	I_C	100	100	mA
Power Dissipation	P_C	150	120	mW/Unit
Isolation Voltage * 1	BV	5000	5000	V_{ac}
Storage Temperature	T_{stg}	−55 to +150	−55 to +150	°C
Operating Temperature	T_{opt}	−55 to +100	−55 to +100	°C
Lead Temperature (Soldering 10 s)	T_{sol}	260	260	°C
Total Power Dissipation	P_T	250	200	mW/Unit

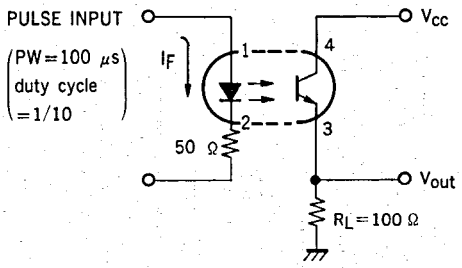
ELECTRICAL CHARACTERISTICS (T_a = 25 °C)

	CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Diode	Forward Voltage	V_F		1.1	1.4	V	I_F = 10 mA
	Reverse Current	I_R			5	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} = 10 V, I_F = 0
	Collector to Emitter Dark Current	I_{CEO}			100	nA	V_{CE} = 40 V, I_F = 0
	Collector to Emitter Breakdown Voltage	BV_{CEO}	40	60		V	I_C = 1 mA, I_B = 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)	80		600	%	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 AC voltage for 1 minute at T_a = 25 °C
RH = 60 %

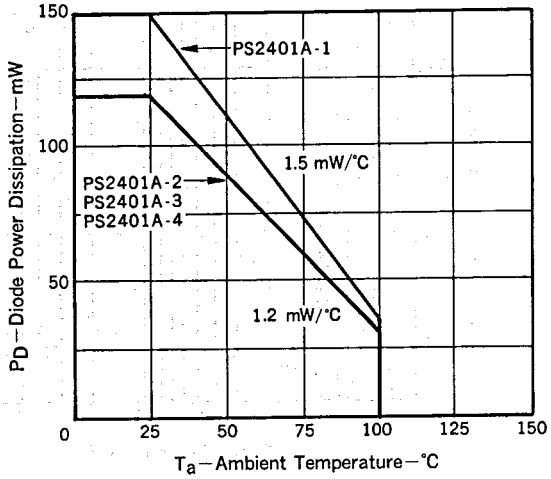
*2 CTR rank (Only PS2401A-1)
K: 300 % to 600 %
L: 200 % to 400 %
M: 80 % to 240 %

* 3 Test Circuit for Switching Time

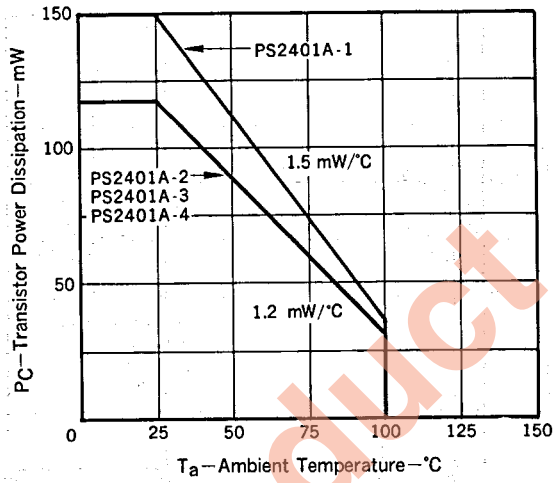


TYPICAL CHARACTERISTICS (T_a = 25°C)

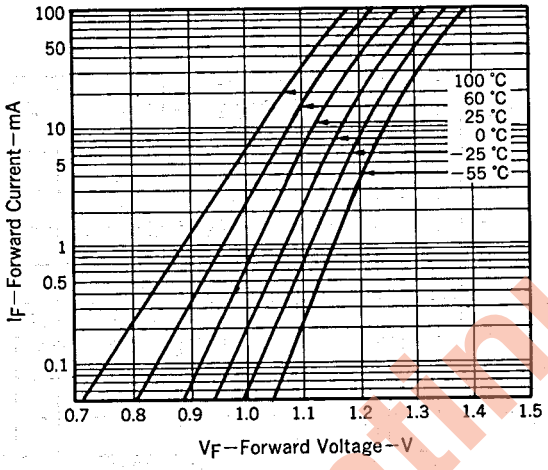
DIODE POWER DISSIPATION vs. AMBIENT TEMPERATURE



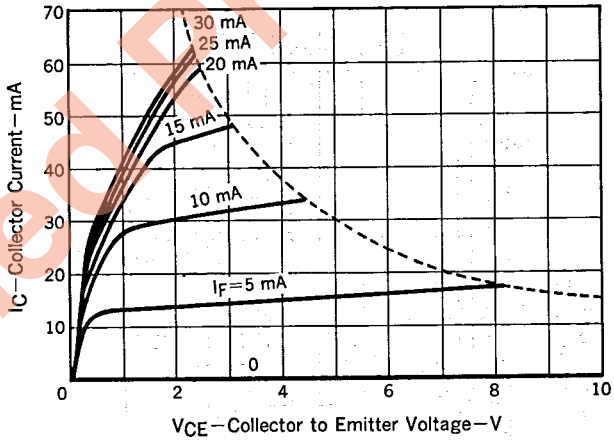
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



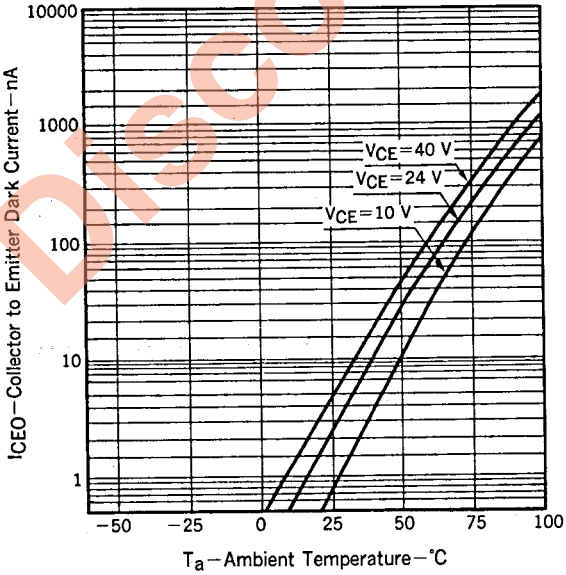
FORWARD CURRENT vs. FORWARD VOLTAGE



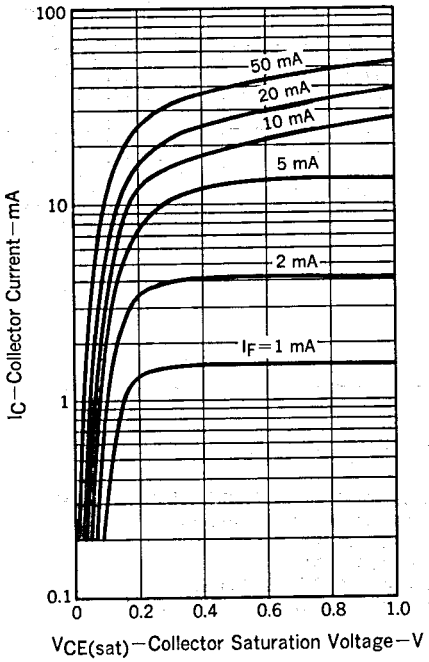
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



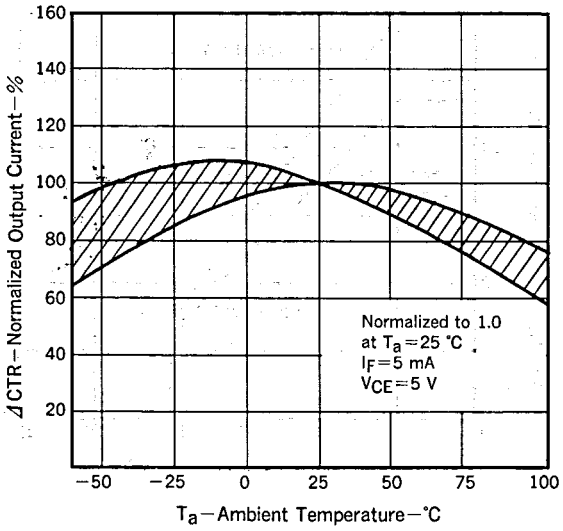
COLLECTOR TO EMITTER DARK CURRENT vs. AMBIENT TEMPERATURE



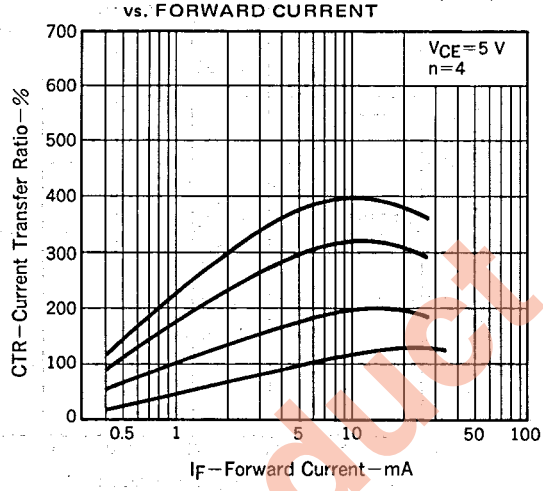
COLLECTOR CURRENT vs. COLLECTOR SATURATION VOLTAGE



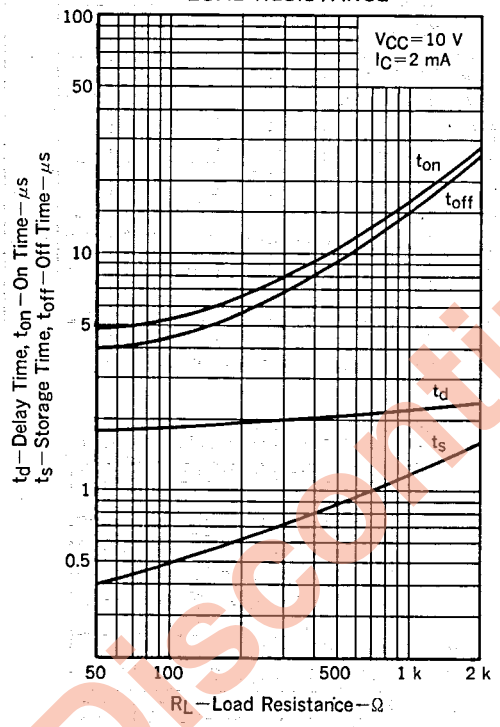
NORMALIZED OUTPUT CURRENT vs. AMBIENT TEMPERATURE



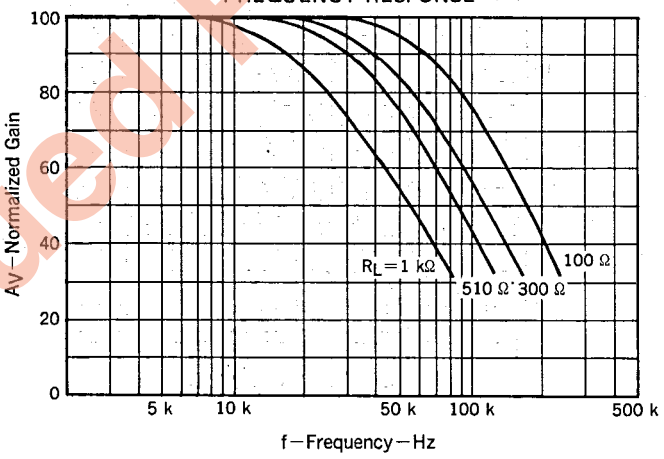
CURRENT TRANSFER RATIO (CTR) vs. FORWARD CURRENT



SWITCHING TIME vs. LOAD RESISTANCE



FREQUENCY RESPONSE



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