NEC Electronics Inc.

PS2401A-1/-2/-3/-4
MULTICHANNEL PHOTO COUPLER
HIGH ISOLATION VOLTAGE
SINGLE TRANSISTORS

NEPOC SERIES

Description

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

Features

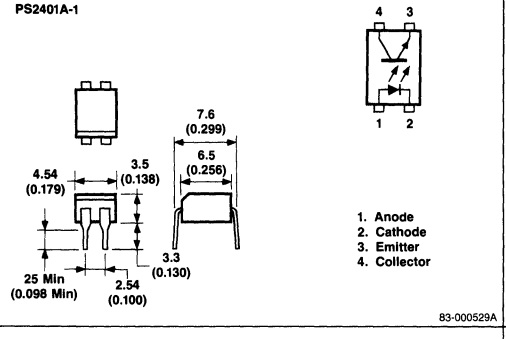
- ☐ Small package size
- ☐ Isolated channels
- ☐ High isolation voltage: 5000V_{AC} rating
- ☐ High transfer ratio: 300 % typ
- ☐ High speed switching: t_r, t_f = 3μs typ
- ☐ Low cost

Applications

- ☐ Interface circuit for various instrumentations, control equipment
- ☐ AC line digital logic: isolate high voltage transients
- ☐ 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

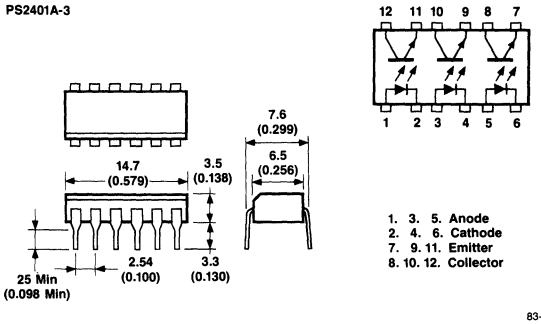
PS2401A-1



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

83-000529A

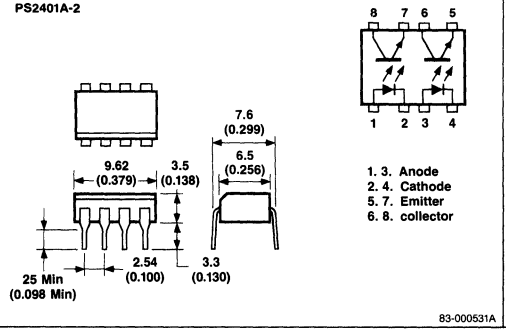
PS2401A-3



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

83-000530A

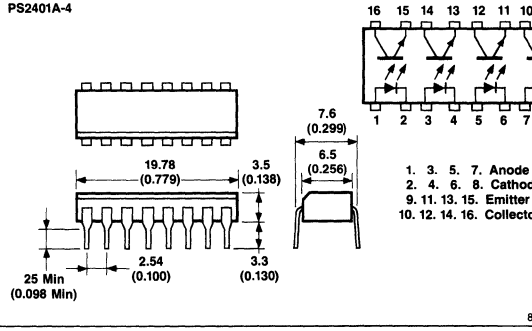
PS2401A-2



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

83-000531A

PS2401A-4



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

83-000532A

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Absolute Maximum Ratings
T_A = +25°C

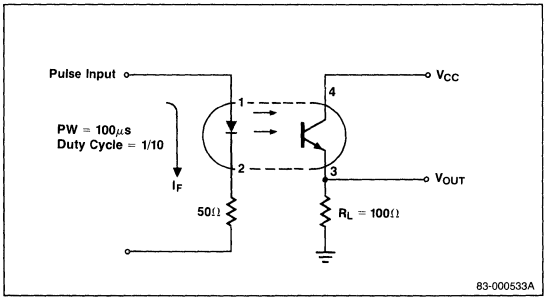
Diode	
Reverse Voltage, V_R	6.0V
Forward Current (DC), I_F	80mA
Power Dissipation, P_D	150mW
Peak Forward Current (300μs, 2% duty cycle), $I_{F\ (peak)}$	3A
Transistor	
Collector to Emitter Voltage, V_{CEO}	40V
Emitter to Collector Voltage, V_{ECO}	7V
Collector Current, I_C	100mA
Power Dissipation, P_D	150mW
Isolation Voltage[1], BV	5000V_{AC}
Storage Temperature, T_{STG}	−55°C to +150°C
Operating Temperature, T_{OPT}	−55°C to +100°C
Lead Temperature (Soldering 10s), T_{SOL}	260°C
Total Power Dissipation, P_T	250mW

Notes: 1. Measuring Conditions: AC voltage for 1 min at T_A = +25°C, RH = 60%.

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

3. Test circuit for switching time.

Test circuit for switching time



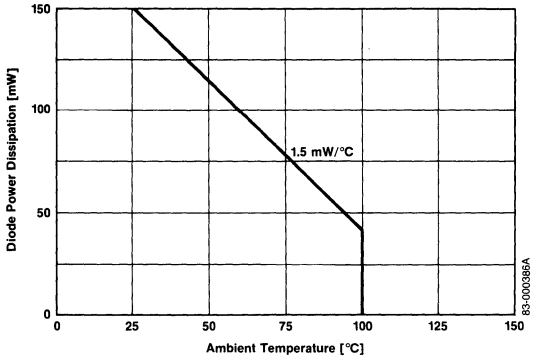
Electrical Characteristics
T_A = +25°C

Parameter	Symbol	Limits Min	Typ	Max	Unit	Test Conditions
Diode						
Forward Voltage	V_F		1.1	1.4	V	I_F = 10mA
Reverse Current	I_R			5	μA	V_R = 5V
Junction Capacitance	C		50		pF	V = 0, f = 1.0MHz
Transistor						
Collector to Emitter Dark Current	I_{CEO}			50	nA	V_{CE} = 10V, I_F = 0
Collector to Emitter Dark Current	I_{CEO}			100	nA	V_{CE} = 40V, I_F = 0
Collector to Emitter Breakdown Voltage	BV_{CEO}	40	60		V	I_C = 1mA, I_B = 0
Emitter to Collector Breakdown Voltage	BV_{ECO}	7	9		V	I_E = 100μA, I_B = 0
Coupled						
Current Transfer Ratio[2]	CTR (I_C/I_F)	80		600	%	I_F = 10mA, V_{CE} = 5.0V
Collector Saturation Voltage	$V_{CE(sat)}$			0.3	V	I_F = 10mA, I_C = 2.0mA
Isolation Resistance	R_{1-2}	10^{11}			Ω	V_{IN-OUT} = 1.0kV
Isolation Capacitance	C_{1-2}		0.5		pF	V = 0, f = 1.0MHz
Rise Time[3]	t_r		3		μs	V_{CC} = 10V, I_C = 2mA, R_L = 100Ω
Fall Time[3]	t_f		3		μs	V_{CC} = 10V, I_C = 2mA, R_L = 100Ω

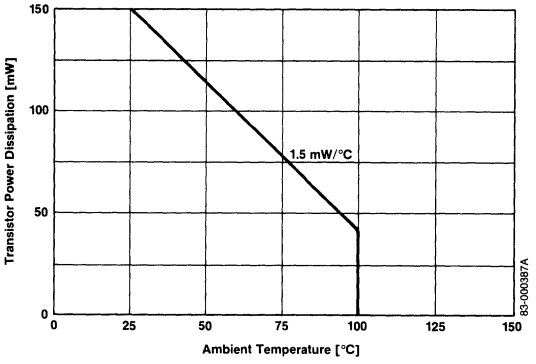
Typical Characteristics

T_A = +25°C

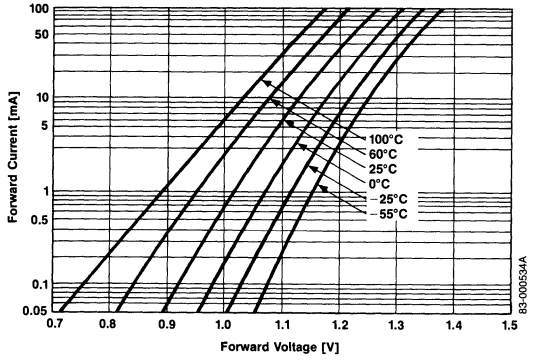
Diode Power Dissipation vs Ambient Temperature



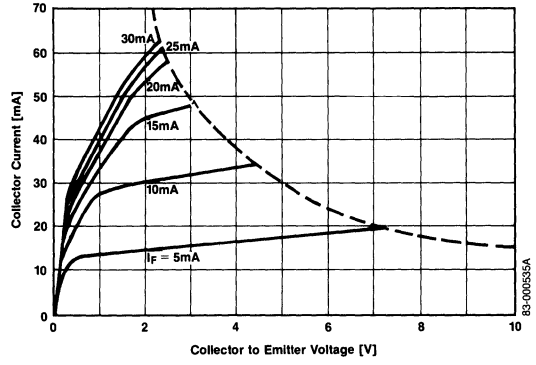
Transistor Power Dissipation vs Ambient Temperature



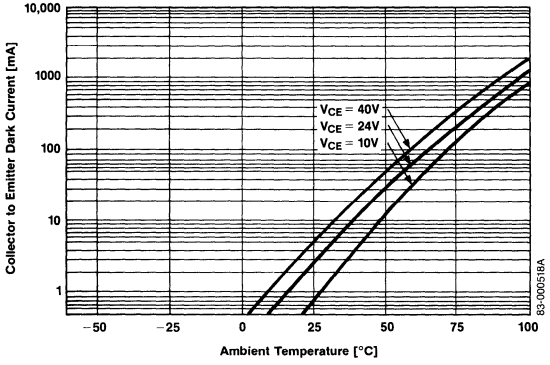
Forward Current vs Forward Voltage



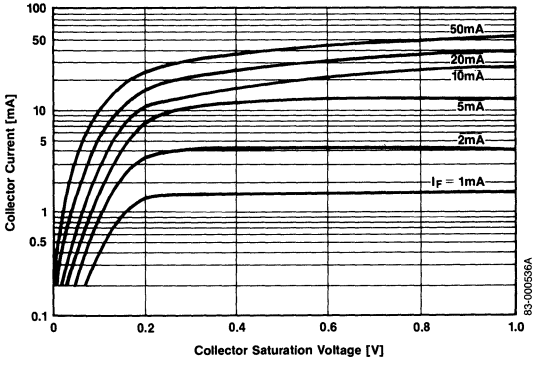
Collector Current vs Collector to Emitter Voltage



Collector to Emitter Dark Current vs Ambient Temperature



Collector Current vs Collector Saturation Voltage



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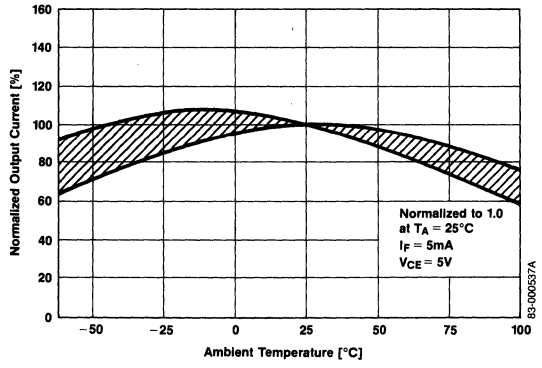
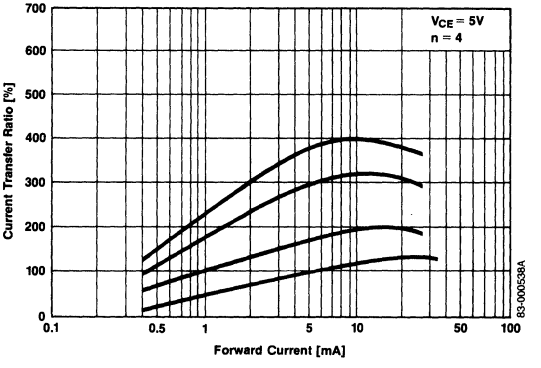
Typical Characteristics (cont)

T_A = +25°C

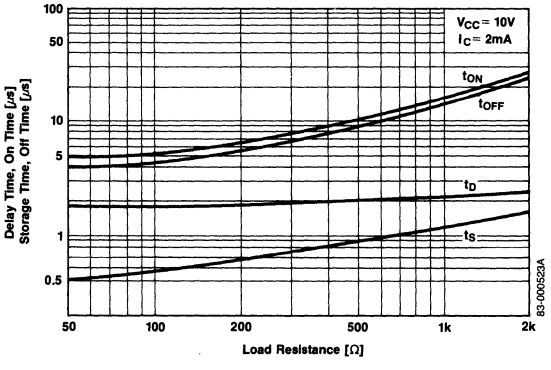
Normalized Output Current vs Ambient Temperature



Current Transfer Ratio (CTR) vs Forward Current



Switching Time vs Load Resistance



Frequency Response