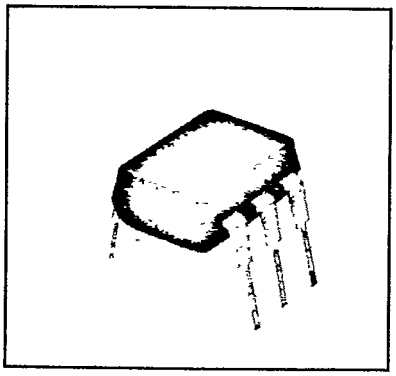
SIEMENS

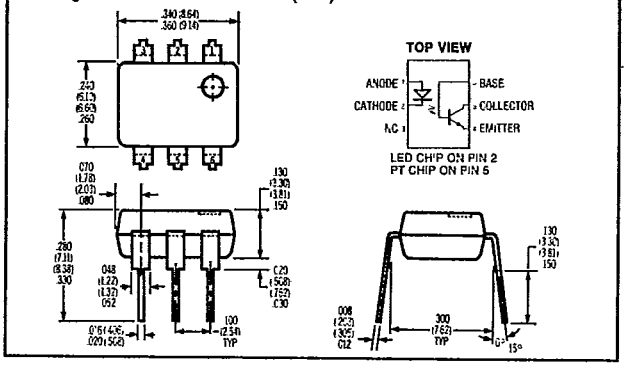
4N35/4N36/4N37

PHOTOTRANSISTOR OPTOCOUPLER

T-41-83



Package Dimensions in Inches (mm)



FEATURES

- High Current-Transfer-Ratio (100% Min)
- Standard Dual-In-Line
- 0.5 pF Coupling Capacitance
- Underwriters Lab Approval #E52744
- VDE Approvals 0883/6.80, 0804/1.83

DESCRIPTION

4N35, 4N36, 4N37 are optically coupled pairs employing a Gallium Arsenide infrared LED and a silicon NPN phototransistor. Signal information, including a DC level, can be transmitted by the device while maintaining a high degree of electrical isolation between input and output. The 4N35, 4N36, 4N37 can be used to replace relays and transformers in many digital interface applications, as well as analog applications such as CRT modulation.

Maximum Ratings

Gallium Arsenide LED
- Power Dissipation at 25°C ..... 100 mW
- Derate Linearly from 55°C ..... 1.33 mW/°C
- Continuous Forward Current ..... 60 mA
- Peak Reverse Voltage ..... 6.0 V

Detector (Silicon Phototransistor)
- Power Dissipation at 25°C ..... 300 mW
- Derate Linearly from 25°C ..... 4.0 mW/°C
- Collector-Emitter Breakdown Voltage (BV_{CEO}) .... 30 V
- Emitter-Collector Breakdown Voltage (BV_{ECO}) ..... 7 V
- Collector-Base Breakdown Voltage (BV_{CBO}) ..... 70 V

Package
- Isolation Test Voltage in Accordance with DIN57883/6.80 ..... 3750 VAC/5300 VDC
- Creepage Path ..... 8 mm min.
- Clearance Path ..... 7 mm min.
- Tracking Index According to VDE 0303 ..... KB100/A

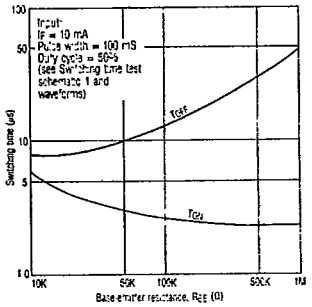
Storage Temperature* ..... -55 to +150°C
Operating Temperature* ..... -55 to +100°C
Lead Soldering Time at 260 °C* ..... 10 sec
Relative Humidity at 85°C 85%

Electrical Characteristics (T_{amb} = 25°C)

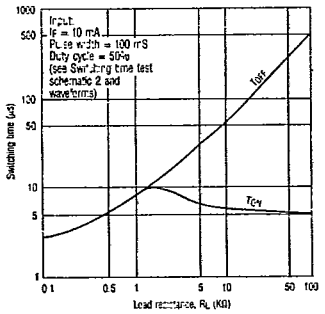
	Min	Typ	Max	Unit	Conditions
Gallium Arsenide LED					
Forward Voltage*		1.3	1.5	V	I_F = 10 mA
	0.9		1.7	V	I_F = 10 mA, T_A = -55°C
	0.7		1.4	V	I_F = 10 mA, T_A = 100°C
Reverse Current*		.1	10	µA	V_R = 6.0 V
Capacitance		100		pF	V_R = 0, f = 1 MHz
Phototransistor Detector					
H_{FE}	100	150			V_{CE} = 5.0 V, I_C = 100 µA
BV_{CEO}*	30			V	I_C = 1 mA
BV_{CEO}*	7			V	I_E = 100 µA
I_{CEO} (dark)		5	50	nA	V_{CE} = 10 V, I_F = 0
I_{CEO} (dark)*			500	µA	V_{CE} = 30 V, I_F = 0 TA = 100°C
BV_{CBO}*	70			V	I_C = 100 µA
Collector-Emitter Capacitance		2		pF	V_{CE} = 0
Coupled Characteristics					
DC Current Transfer Ratio*	100			%	I_F = 10 mA, T_A = 25°C V_{CE} = 10 V
DC Current Transfer Ratio*	40			%	I_F = 10 mA, V_{CE} = 10 V T_A = 55° to 100°C
Capacitance, Input to Output*		2.5		pF	f = 1.0 MHz
Resistance, Input to Output*		10^{11}		Ω	V_{IO} = 500 V
T_{ON}, T_{OFF}*			10	µs	I_C = 2 mA, R_E = 100 Ω V_{CC} = 10 V
Collector-Emitter Saturation Voltage $V_{CE(sat)}$*			0.3	V	I_F = 10 mA, I_C = 0.5 mA
Input to Output Isolation Current (Pulse Width = 8 m. sec)*					
4N35			100	µA	V_{IO} = 2500 VRMS
4N36			100	µA	V_{IO} = 1750 VRMS
4N37			100	µA	V_{IO} = 1050 VRMS
4N35/36/37 UL Qualified for	7500			VDC	

*Indicates JEDEC registered data.

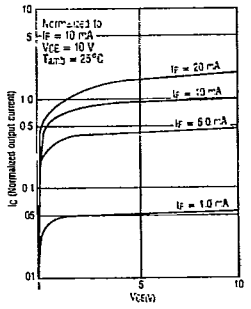
Typical switching characteristics versus base resistance
(Saturated operation)



Typical switching times versus load resistance



Collector current versus collector voltage



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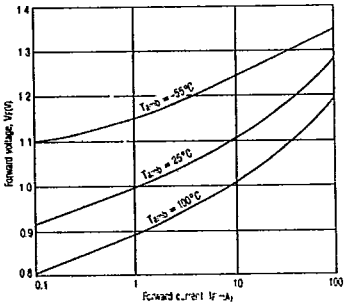
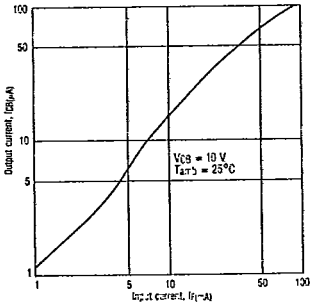
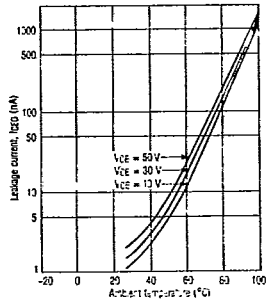
Typical forward voltage versus forward current



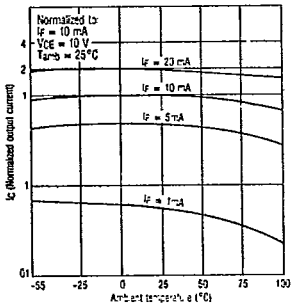
Typical output current (I_{CE}) versus input current



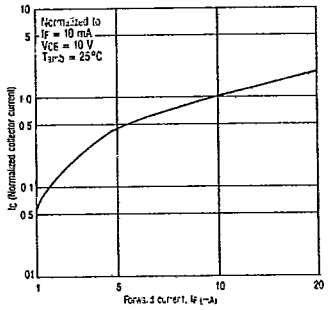
Typical leakage current versus ambient temperature



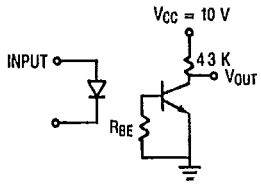
Output current versus temperature



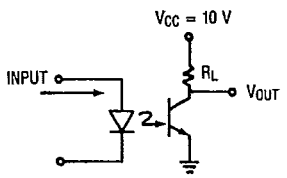
Collector current versus diode forward current



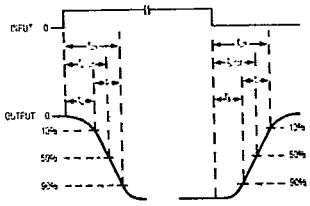
Switching time test schematic and waveforms



Switching time test schematic 1



Switching time test schematic 2



4N35/4N36/4N37

Optocouplers (Optoisolators)