SFH614A

High Collector-Emitter Voltage Phototransistor Optocoupler

FEATURES

- **High Isolation Test Voltage, 5300 V_{RMS}**
- **High Collector-Emitter Voltage, V_{CEO}=300 V**
- **Standard Plastic DIP-4 Package**
- **Underwriters Lab File #E52744**

DESCRIPTION

The SFH614A features a high collector-emitter voltage and high isolation voltage. These couplers have a GaAs infrared emitting diode emitter, which is optically coupled to a silicon planar phototransistor detector, and is incorporated in a plastic DIP-4 package.

The coupling devices are designed for signal transmission between two electrically separated circuits.

Maximum Ratings

Emitter

Reverse Voltage ..... 6.0 V
DC Forward Current ..... 60 mA
Surge Forward Current (t_P≤10 µs) ..... 2.5 A
Derate Linearly from 25°C ..... 1.33 mW/°C
Total Power Dissipation ..... 100 mW

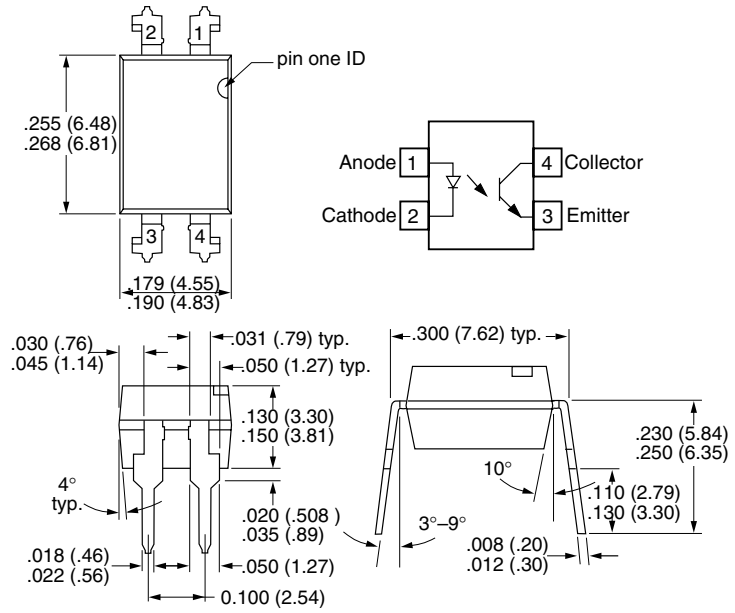
Detector

Collector-Emitter Voltage ..... 300 V
Emitter-Collector Voltage ..... 7.0 V
Collector Current ..... 50 mA
Collector Current (t_P≤1.0 ms) ..... 100 mA
Derate Linearly from 25°C ..... 2.00 mW/°C
Total Power Dissipation ..... 150 mW

Package

Derate Linearly from 25°C ..... 3.33 mW/°C
Total Power Dissipation ..... 250 mW
Isolation Test Voltage between input and output, climate acc. to IEC 60068-1:1988 (t=1.0 s) ..... 5300 V_{RMS}
Creepage Distance ..... ≥7.0 mm
Clearance ..... ≥7.0 mm
Insulation Thickness between Emitter and Detector ..... ≥0.4 mm
Comparative Tracking Index acc. to DIN IEC 112/VDE 0303, part 1:06-84 ..... ≥175
Isolation Resistance
V_{IO}=500 V, T_A=25°C ..... ≥10^{12} Ω
V_{IO}=500 V, T_A=100°C ..... ≥10^{11} Ω
Storage Temperature Range ..... –55 to +150°C
Ambient Temperature Range ..... –55 to +100°C
Junction Temperature ..... 100°C
Soldering Temperature (max. 10 s, dip soldering: distance to seating plane ≥1.5 mm) ..... 260°C

Dimensions in inches (mm)



Electrical Characteristics T_A=25°C unless otherwise specified

Description	Sym.	Min.	Typ.	Max.	Unit	Condition
Emitter						
Forward Voltage	V_F	—	1.15	1.5	V	I_F=10 mA
Reverse Current	I_R	—	0.02	10	µA	V_R=6.0 V
Capacitance	C_O	—	14	—	pF	V_R=0 V, f=1.0 MHz
Detector						
Breakdown Voltage Collector–Emitter	BV_{CEO}	300	—	—	V	$I_{CE=}$100 µA
Breakdown Voltage Emitter–Collector	BV_{ECO}	7.0	—	—	V	$I_{EC=}$10 µA
Collector–Emitter Dark Current	I_{CEO}	—	15	1.0	µA	V_{CE}=200 V
Capacitance Collector–Emitter	C_{CE}	—	8.0	—	pF	V_{CE}=10 V, f=1.0 MHz
Package						
Current Transfer Ratio	CTR	50	—	—	%	I_F=10 mA, V_{CE}=10 V
Collector-Emitter Saturation Voltage	V_{CEsat}	—	—	0.3	V	I_F=20 mA, I_C=1.0 mA
Coupling Capacitance	C_C	—	0.5	—	pF	V_{I-O}=0 V, f=1.0 MHz
Turn on Time	t_{on}	—	6.0	—	µs	V_{CE}=2.0 V, I_C=2.0 mA, R_L=100 Ω
Turn off Time	t_{off}	—	6	—	µs	
Rise Time	t_r	—	3.0	10	µs	V_{CE}=2.0 V, I_C=2.0 mA, R_L=100 Ω
Fall Time	t_f	—	5.0	12	µs	

Figure 1. Forward Current vs. Forward Voltage, T_A=25°C

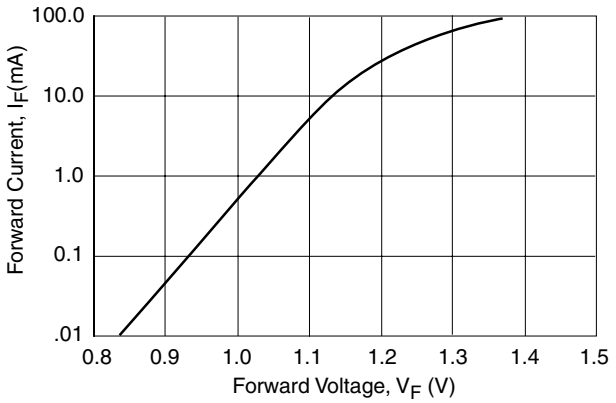


Figure 2. Collector-emitter Dark Current vs. Collector-emitter Voltage

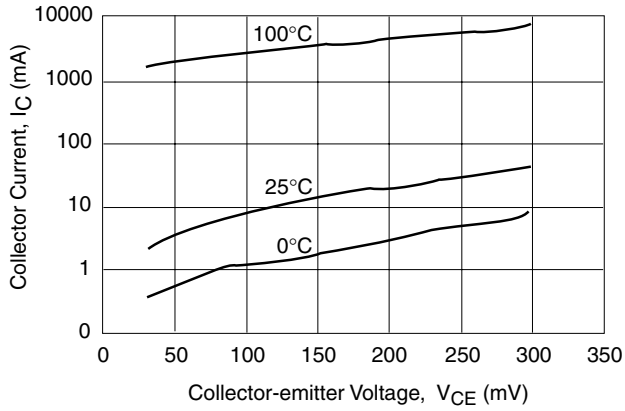


Figure 3. Collector Current vs. Collector-emitter Voltage at I_F=20 mA

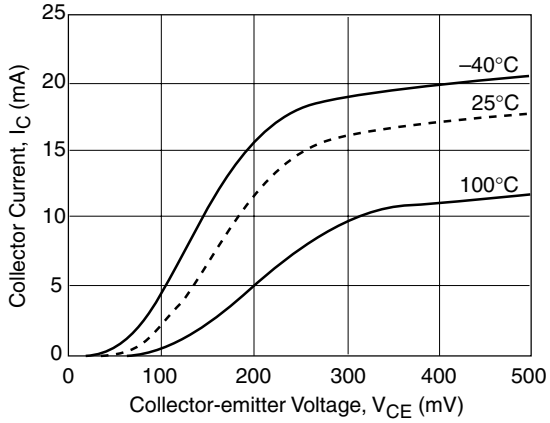


Figure 4. Collector Current vs. Collector-emitter Voltage at I_F=10 mA

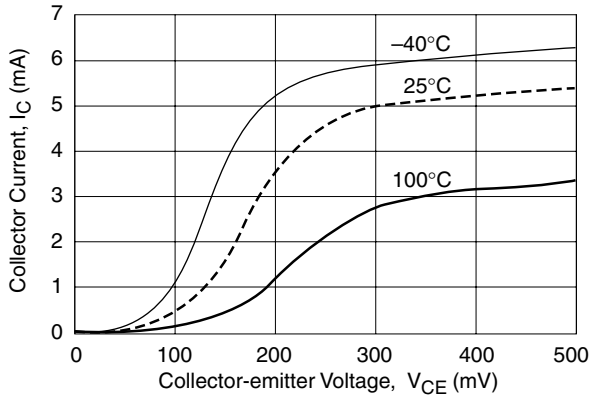


Figure 5. Switching Time vs. Load Resistance at I_C=2.0 mA, V_{CE}=2.0 V, T_A=25°C

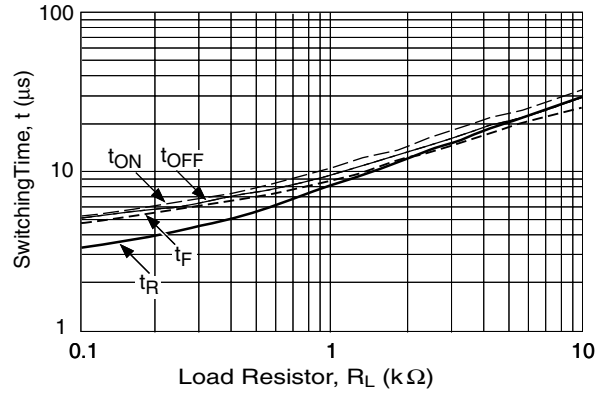


Figure 6. Switching Timing Waveforms

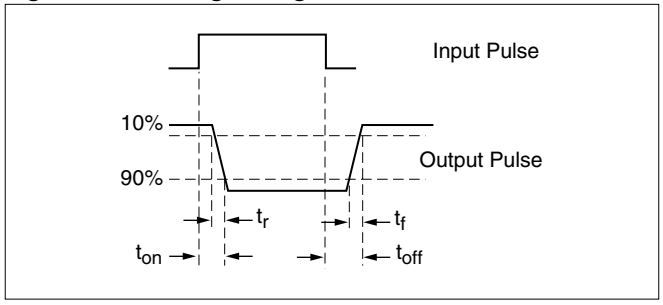


Figure 7. Switching Schematic