SFH619A

Photodarlington
High Collector–emitter Voltage Optocoupler

FEATURES

- **Very High Current Transfer Ratio, 1000% Min.**
- **High Collector–emitter Voltage (V_{CEO}=300 V)**
- **High Isolation Test Voltage, 5300 V_{RMS}**
- **Standard Plastic DIP-4 Package**
- **Compatible with Toshiba TLP627**
- **Underwriters Lab File #E52744**

DESCRIPTION

The SFH619A is optically coupled isolators with a Gallium Arsenide infrared LED and a silicon photodarlington sensor. Switching can be achieved while maintaining a high degree of isolation between driving and load circuits. These optocouplers can be used to replace reed and mercury relays with advantages of long life, high speed switching and elimination of magnetic fields.

Maximum Ratings T_A=25°C

Emitter

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

Detector

Collector-emitter Breakdown Voltage, BV_{CEO} ..... 300 V
Emitter-collector Breakdown Voltage, BV_{ECO} ..... 0.3 V
Collector (load) Current ..... 125 mA
Derate Linearly from 25°C ..... 2.00 mW/°C
Power Dissipation at 25°C ..... 150 mW

Package

Derate Linearly from 25°C ..... 3.33 mW/°C
Total Power Dissipation at 25°C ..... 250 mW
Isolation Test Voltage (t=1 s) ..... 5300 V_{RMS}
(between emitter and detector, Standard Climate: 23°C/50% RH, DIN 50014)
Creepage ..... ≥7.0 mm
Clearance ..... ≥7.0 mm
Isolation Resistance
V_{IO}=500 V/25°C ..... $\geq 10^{12}\ \Omega$
V_{IO}=500 V/100°C ..... $\geq 10^{11}\ \Omega$
Storage Temperature ..... –55°C to +150°C
Operating Temperature ..... –55°C to +100°C
Soldering Temperature (max. 10 s, DIP soldering: distance to seating plane ≥1.5 mm) ..... 260°C

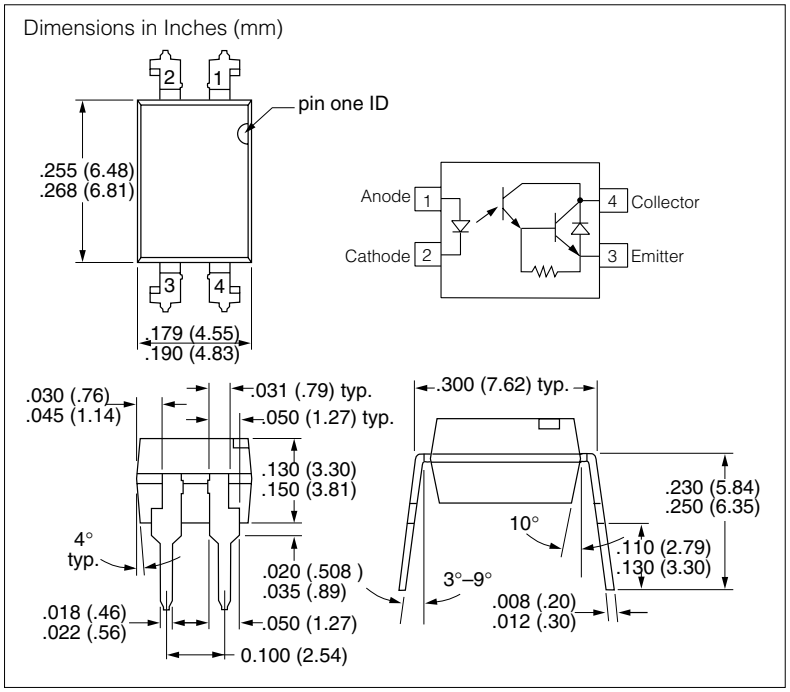

Table 1. Electrical Characteristics (T_A=25°C, unless otherwise specified)

Parameter	Sym.	Min.	Typ.	Max.	Unit	Condition
Emitter						
Forward Voltage	V_F	—	1.2	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
Detector						
Breakdown Voltage Collector–emitter	BV_{CEO}	300	—	—	V	I_{CE}=100 µA
Breakdown Voltage Emitter–collector	BV_{ECO}	0.3	—	—	V	I_{EC}=100 µA
Collector–emitter Dark Current	I_{CEO}	—	10	200	nA	V_{CE}=200 V, T_A=25°C
			—	20	µA	V_{CE}=200 V, T_A=100°C
Capacitance Collector–emitter	C_{CE}	—	39	—	pF	V_{CE}=0 V, f=1.0 MHz

Electrical Characteristics T_A=25°C (continued)

Parameter	Sym.	Min.	Typ.	Max.	Unit	Condition
Package						
Current Transfer Ratio	CTR	1000	—	—	%	I_F=1.0 mA, V_{CE}=1.0 V
Collector–Emitter Saturation Voltage	V_{CEsat}	—	—	1.0	V	I_F=1.0 mA, I_C=10 mA,
		0.3	—	1.2	V	I_F=10 mA, I_C=100 mA
Coupling Capacitance	C_C	—	0.6	—	pF	V_{I-0}=0 V, f=1.0 MHz
Rise Time	t_r	—	3.5	—	µs	V_{CC}=10 V, I_C=10 mA R_L=100 Ω
Fall Time	t_f	—	14.5	—		
Turn On Time	t_{on}	—	4.5	—		
Turn Off Time	t_{off}	—	29.0	—		
Rise Time	t_r	—	1.0	—	µs	V_{CC}=10 V, I_F=16 mA R_L=180 Ω
Fall Time	t_f	—	20.5	—		
Turn On Time	t_{on}	—	1.5	—		
Turn Off Time	t_{off}	—	53.5	—		

Figure 1. Switching Waveform and Switching Schematic

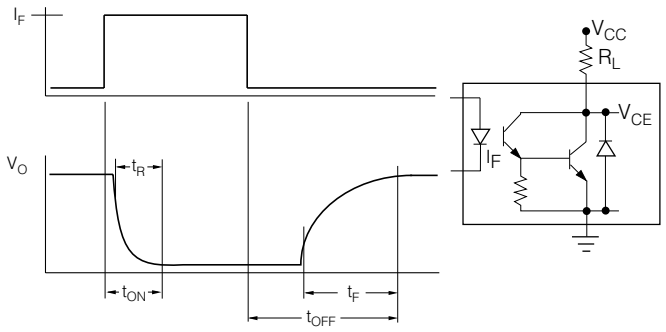

Figure 3. Collector Current (mA) vs. Forward Current (mA) at 25°C

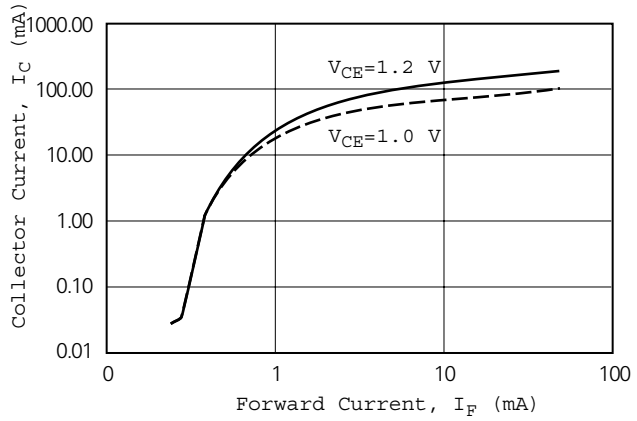

Figure 2. Forward Current (mA) vs. Forward Voltage (V) at 25°C

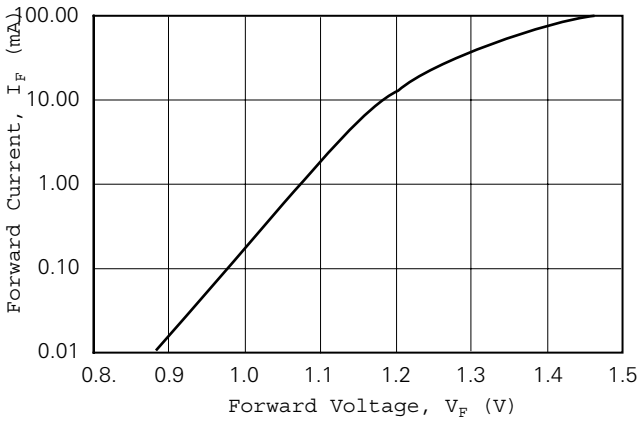

Figure 4. Collector Current (mA) vs. Forward Current (mA) at V_{CE}=1.0 V

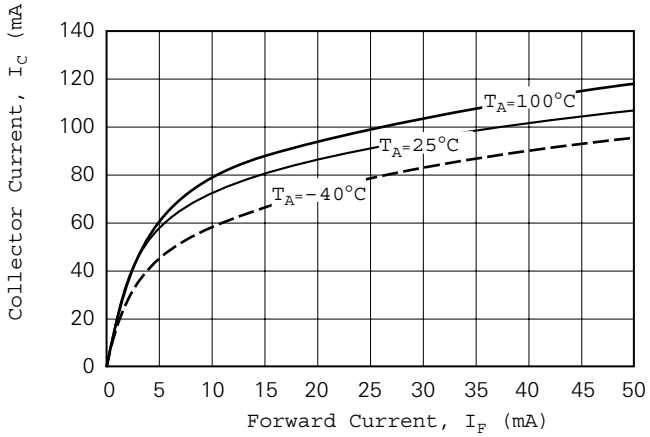

Figure 5. Collector Current vs. Temperature at V_{CE}=1.0 V

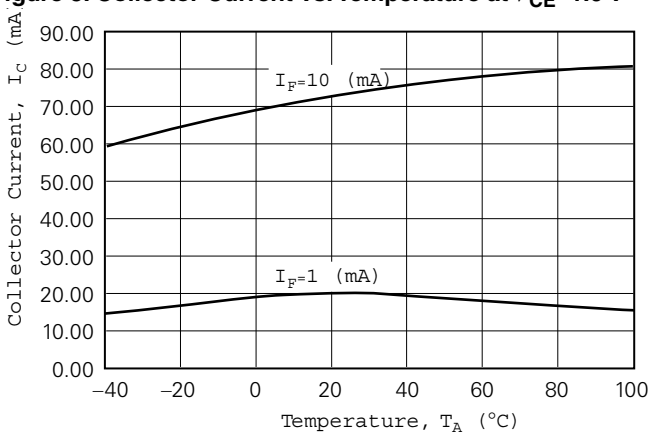

Figure 6. Collector Current (mA) vs. Collector–emitter Voltage (V) at 25°C

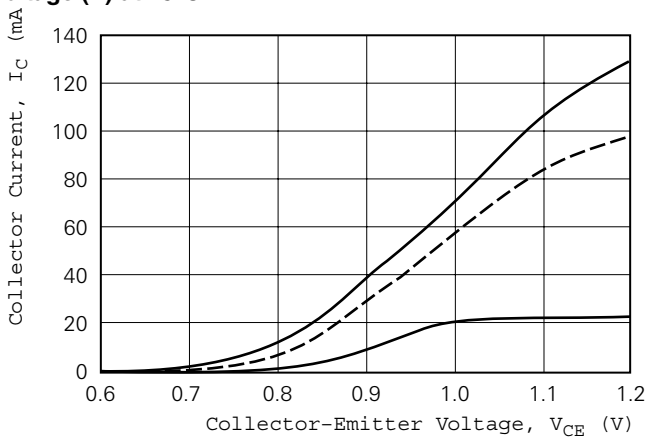

Figure 7. Collector–emitter Dark Current (nA) vs. Temperature vs. Collector–emitter Voltage (V)

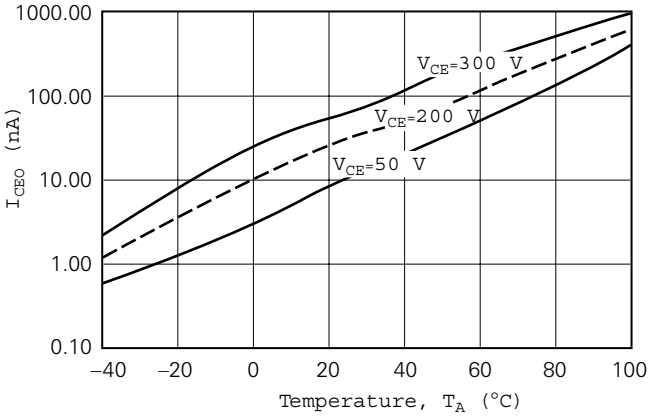

Figure 8. CTR vs. Forward Current (mA) at 25°C

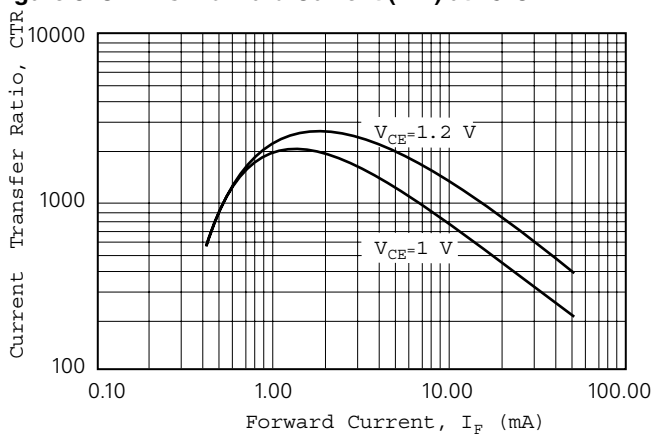

Figure 9. Normalized CTR vs. Temperature at V_{CE}=1.0 V

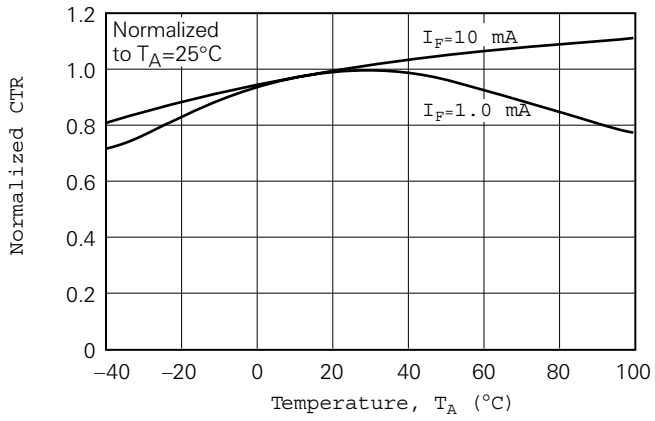

Figure 10. Time Switching vs. Load Resistor at I_F=16 mA, V_{CC}=10 V at 25°C