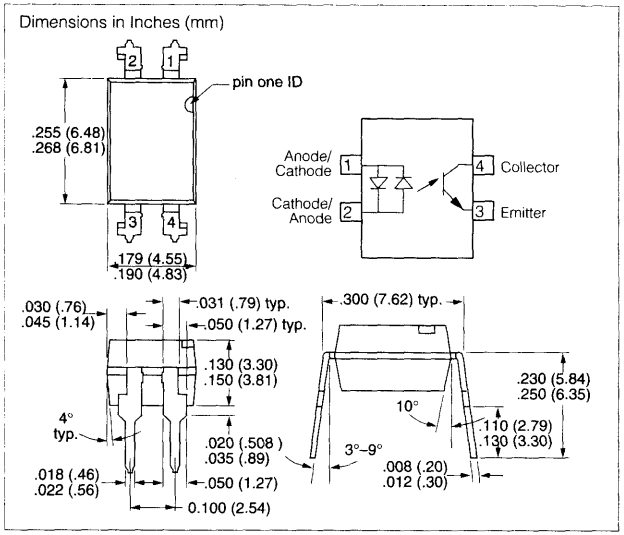
SFH620A

5.3 kV TRIOS® Optocoupler
AC Voltage Input

FEATURES

- **High Current Transfer Ratios**
  - **at 10 mA: 40–320%**
  - **at 1.0 mA: 45% typical (>13)**
- **Low CTR Degradation**
- **Good CTR Linearity Depending on Forward Current**
- **Isolation Test Voltage, 5300 V_{RMS}**
- **High Collector-emitter Voltage, V_{CEO}=70 V**
- **Low Saturation Voltage**
- **Fast Switching Times**
- **Field-effect Stable by TRIOS (TRansparent IOn Shield)**
- **Temperature Stable**
- **Low Coupling Capacitance**
- **End-Stackable, .100" (2.54 mm) Spacing**
- **High Common-Mode Interference Immunity (Unconnected Base)**
- **Underwriters Lab File #52744**
- **VDE 0884 Available with Option 1**
- **SMD Option, See SFH6206 Data Sheet**



DESCRIPTION

The SFH620A features a high current transfer ratio, low coupling capacitance 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.

The couplers are end-stackable with 2.54 mm lead spacing.

Creepage and clearance distances of >8.0 mm are achieved with option 6. This version complies with IEC 950 (DIN VDE 0805) for reinforced insulation up to an operation voltage of 400 V_{RMS} or DC.

Maximum Ratings

Emitter

Reverse Voltage ..... 6.0 V
DC Forward Current ..... ±60 mA
Surge Forward Current ($t_P \leq 10$ µs) ..... ±2.5 A
Total Power Dissipation ..... 100 mW

Detector

Collector-emitter Voltage ..... 70 V
Emitter-collector Voltage ..... 7.0 V
Collector Current ..... 50 mA
Collector Current ($t_P \leq 1.0$ ms) ..... 100 mA
Total Power Dissipation ..... 150 mW

Package

Isolation Test Voltage between Emitter and Detector, refer to Climate DIN 40046, part 2, Nov. 74 ..... 5300 V_{RMS}
Creepage ..... ≥7.0 mm
Clearance ..... ≥7.0 mm
Insulation Thickness between Emitter and Detector ..... ≥0.4 mm
Comparative Tracking Index per DIN IEC 112/VDE0 303, part 1 175
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

Characteristics (T_A=25°C)

Description	Symbol		Unit	Condition
Emitter				
Forward Voltage	V_F	1.25 (≤1.65)	V	I_F=±60 mA
Capacitance	C_0	50	pF	V_R=0 V, f=1.0 MHz
Thermal Resistance	R_{thJA}	750	K/W	—
Detector				
Capacitance	C_{CE}	6.8	pF	V_{CE}=5.0 V, f=1.0 MHz
Thermal Resistance	R_{thJA}	500	K/W	—
Package				
Collector-emitter Saturation Voltage	V_{CEsat}	0.25 (≤0.4)	V	I_F=10 mA, I_C=2.5 mA
Coupling Capacitance	C_C	0.2	pF	—

Note: Still air, coupler soldered to PCB or base.

Current Transfer Ratio (I_C/I_F at V_{CE}=5.0 V) **and Collector-emitter Leakage Current by Dash Number**

Description	-1	-2	-3	
I_C/I_F (I_F=±10 mA)	40–125	63–200	100–320	%
I_C/I_F (I_F=±10 mA)	30 (>13)	45 (>22)	70 (>34)	%
Collector-emitter Leakage Current, I_{CEO} V_{CE}=10 V	2.0 (≤50)	2.0 (≤50)	5.0 (≤100)	nA

Figure 1. Current Transfer Ratio (typ.) vs. Temperature
I_F=10 mA, V_{CE}=5.0 V

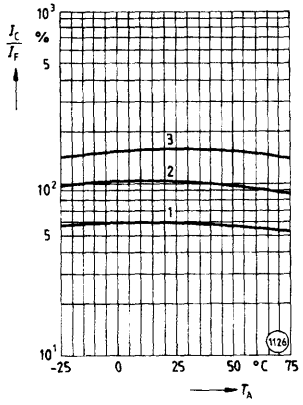


Figure 2. Output Characteristics (typ.) Collector Current vs. Collector-emitter Voltage T_A=25°C

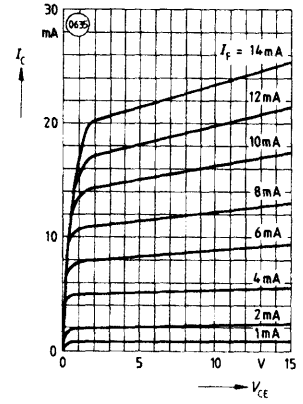


Figure 3. Diode Forward Voltage (typ.) vs. Forward Current

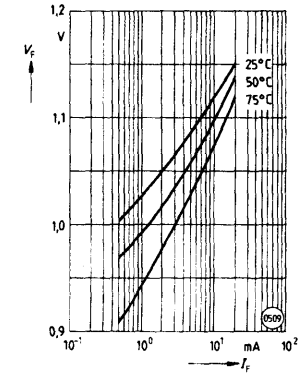


Figure 4. Transistor Capacitance (typ.) vs. Collector-emitter Voltage
T_A=25°C, f=1.0 MHz

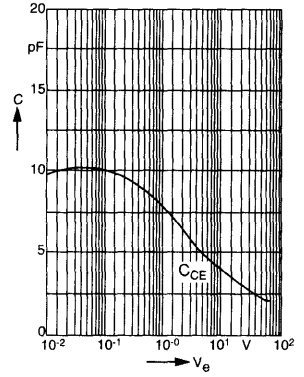


Figure 5. Permissible Pulse Handling Capability. Fwd. Current vs. Pulse Width
Pulse cycle D=parameter, T_A=25°C

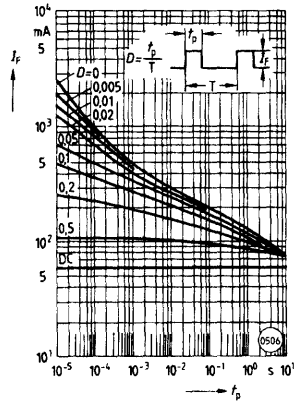


Figure 6. Permissible Power Dissipation vs. Ambient Temperature

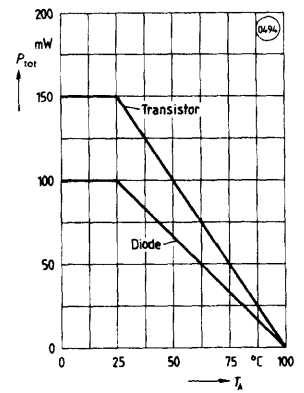


Figure 7. Permissible Diode Forward Current vs. Ambient Temperature

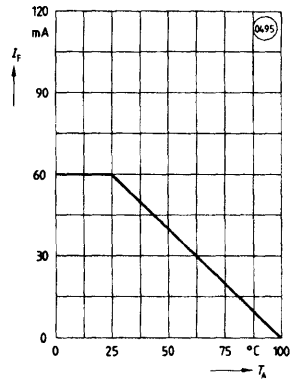
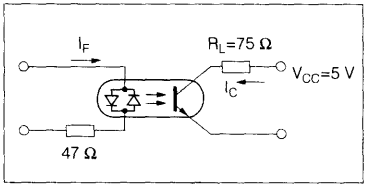


Figure 8. Switching Times
Linear Operation (without saturation)



I_F=10 mA, V_{CC}=5.0 V, T_A=25°C

Load Resistance	R_L	75	Ω
Turn-on Time	t_{on}	3.0	µs
Rise Time	t_r	2.0	µs
Turn-off Time	t_{off}	2.3	µs
Fall Time	t_r	2.0	µs
Cut-off Frequency	F_{CO}	250	kHz