Optoelectronic Devices

Order code	Manufacturer code	Description
58-0510	Q62703-N208	SFH610-A2 SINGLE OPTOISOLATOR
58-0512	Q68000-A8933	SFH615-A3 SINGLE OPTOISOLATOR

Revision A
04/07/2003

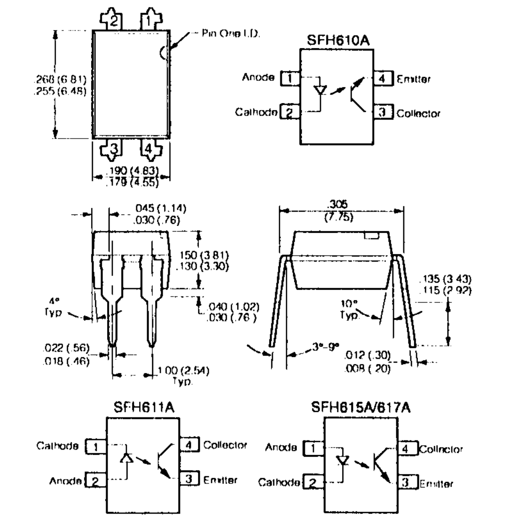
Sales: 01206 751166
Sales@rapidelec.co.uk
Technical: 01206 835555
Tech@rapidelec.co.uk
Fax: 01206 7551188
www.rapidelectronics.co.uk

SIEMENS

SFH610A/611A/615A/617A

5.3 kV TRIOS® OPTOCOUPLER HIGH RELIABILITY

Package Dimensions in Inches (mm)



FEATURES

- **High Current Transfer Ratios**
  at 10 mA: 40–320%
  at 1 mA: 60% typical (>13)
- **Low CTR Degradation**
- **Good CTR Linearity Depending on Forward Current**
- **Withstand Test Voltage, 5300 VAC_{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 SFH6106T/16/56T Data Sheet

DESCRIPTION

The SFH61XA 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 spacing.

Creepage and clearance distances of >8 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.

Specifications subject to change.

Maximum Ratings

Emitter

Reverse Voltage .... 6 V
DC Forward Current .... 60 mA
Surge Forward Current (t_P≤10 µs) .... 2.5 A
Total Power Dissipation .... 100 mW

Detector

Collector-Emitter Voltage .... 70 V
Emitter-Collector Voltage .... 7 V
Collector Current .... 50 mA
Collector Current (t_P≤1 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 VAC_{RMS}
Creepage .... ≥7 mm
Clearance .... ≥7 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 .... $\geq 10^{12}\ \Omega$
V_{IO}=500 V, T_A=100°C .... $\geq 10^{11}\ \Omega$
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

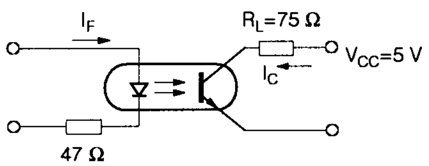
Characteristics (T_A=25°C)

Description	Symbol		Unit	Condition
Emitter (IR GaAs)				
Forward Voltage	V_F	1.25 (≤1.65)	V	I_F=60 mA
Reverse Current	I_R	0.01 (≤10)	µA	V_R=6 V
Capacitance	C_0	13	pF	V_R=0 V, f=1 MHz
Thermal Resistance	R_{thJA}	750	K/W	
Detector (Si Phototransistor)				
Capacitance	C_{CE}	5.2	pF	V_{CE}=5 V, f=1 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	0.4	pF	

Current Transfer Ratio (I_C/I_F at V_{CE}=5 V) **and Collector-Emitter Leakage Current by Dash Number**

Description	-1	-2	-3	-4	
I_C/I_F (I_F=10 mA)	40–80	63–125	100–200	160–320	%
I_C/I_F (I_F=1 mA)	30 (>13)	45 (>22)	70 (>34)	90 (>56)	%
Collector-Emitter Leakage Current, I_{CEO} V_{CE}=10 V	2 (≤50)	2 (≤50)	5 (≤100)	5 (≤100)	nA

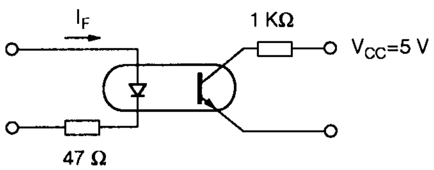
Switching Times (Typical)
Linear Operation (without saturation)



I_F=10 mA, V_{CC}=5 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_F	2.0	µs
Cut-off Frequency	F_{CO}	250	kHz

Switching Operation (with saturation)



		-1 I_F=20 mA	-2 and -3 I_F=10 mA	-4 I_F=5 mA	
Turn-on Time	t_{ON}	3.0	4.2	6.0	µs
Rise Time	t_R	2.0	3.0	4.6	µs
Turn-off Time	t_{OFF}	18	23	25	µs
Fall Time	t_F	11	14	15	µs

Figure 1. Current transfer ratio (typ.) vs. temperature
I_F=10 mA, V_{CE}=0.5 V

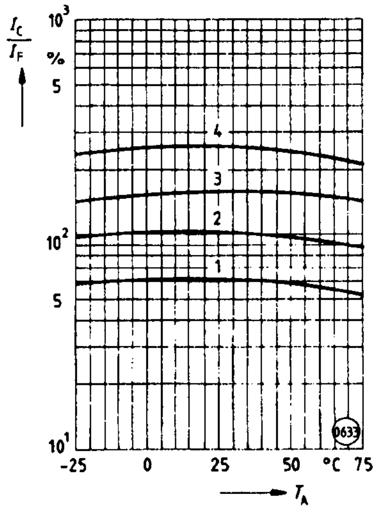


Figure 2. Output characteristics (typ.) Collector current vs. collector-emitter voltage T_A=25°C

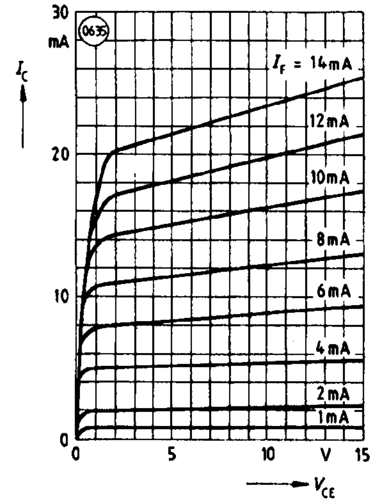


Figure 3. Diode forward voltage (typ.) vs. forward current

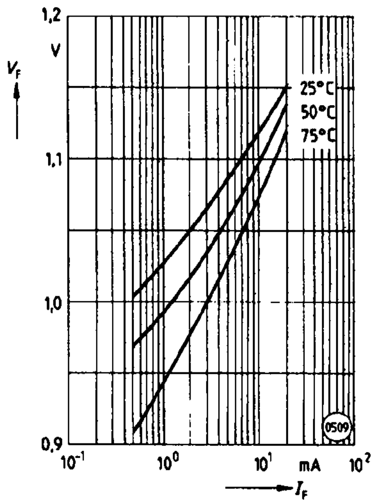


Figure 4. Transistor capacitance (typ.) vs. collector-emitter voltage
T_A=25°C, f=1 MHz

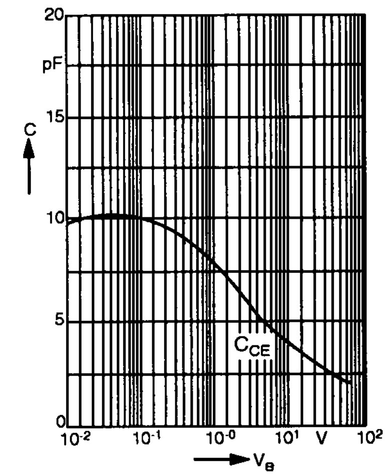


Figure 5. Permissiable pulse handling capability. Fwd. current vs. pulse width Pulse cycle D=parameter, T_A=25°C

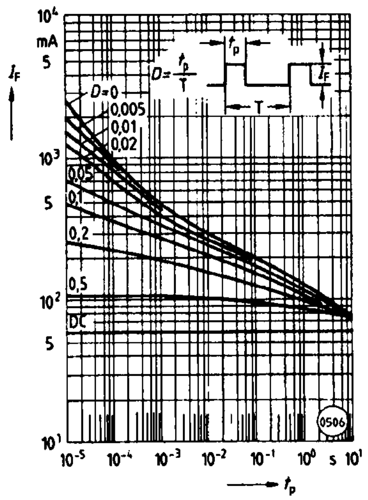


Figure 6. Permissible power dissipation vs. ambient temp.

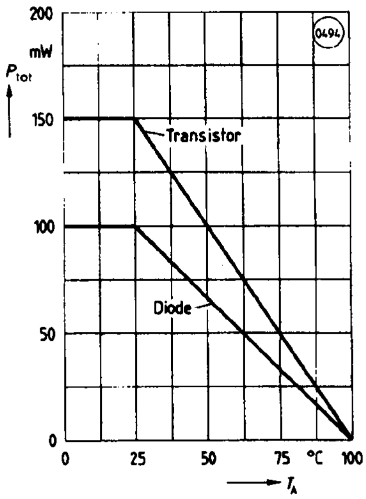


Figure 7. Permissible diode forward current vs. ambient temp.