

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 SFH6106/16/56 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.

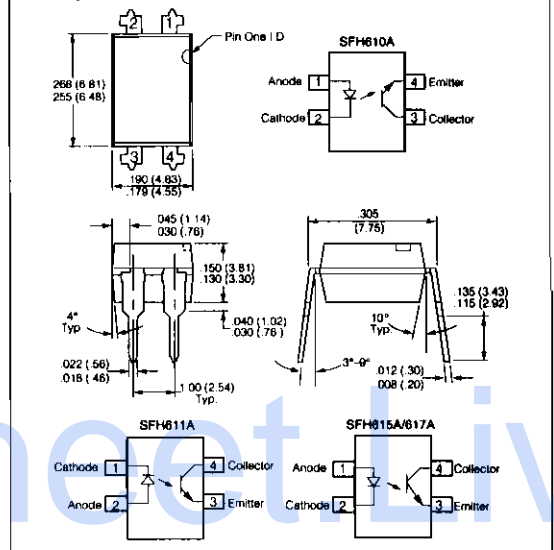
The coupling devices are designed for signal transmission between two electrically separated circuits.

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.

Package Dimensions in Inches (mm)



Maximum Ratings

Emitter

Reverse Voltage	6 V
DC Forward Current	60 mA
Surge Forward Current ($t_p \leq 10 \mu s$)	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 ($t_p \leq 1 ms$)	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	≥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)

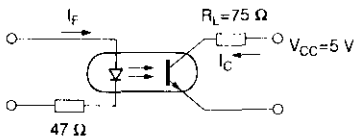
Description	Symbol		Unit	Condition
Emitter (IR GaAs)				
Forward Voltage	V _F	1.25 (≤1.65)	V	I _F =60 mA
Reverse Current	I _R	0.01 (≤10)	μA	V _R =6 V
Capacitance	C _D	13	pF	V _R =0 V, f=1 MHz
Thermal Resistance	R _{thJA}	750	K/W	
Detector (Si Phototransistor)				
Capacitance	C _{CE}	5.2	pF	V _{CE} =5 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)

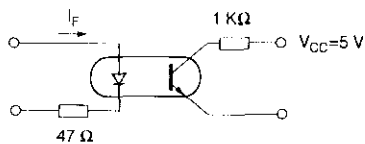
Linear Operation (without saturation)



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

$I_F = 10 \text{ mA}$, $V_{CE} = 0.5 \text{ V}$

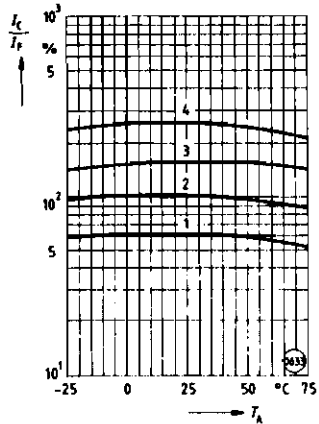


Figure 4. Transistor capacitance (typ.) vs. collector-emitter voltage
 $T_A = 25^{\circ}\text{C}$, $f = 1 \text{ MHz}$

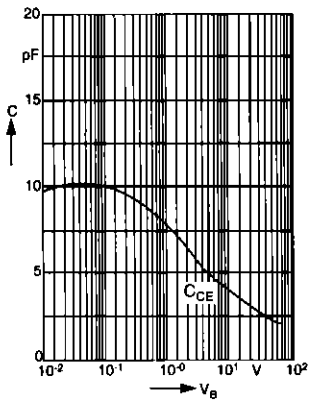


Figure 7. Permissible diode forward current vs. ambient temp.

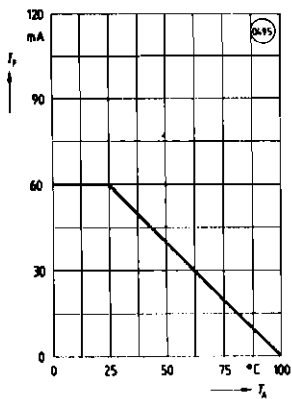


Figure 2. Output characteristics (typ.) Collector current vs. collector-emitter voltage

$T_A = 25^{\circ}\text{C}$

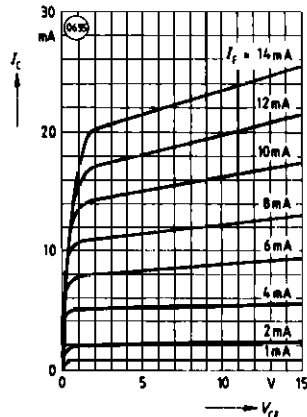


Figure 5. Permissible pulse handling capability. Fwd. current vs. pulse width
 Pulse cycle $D = \text{parameter}$, $T_A = 25^{\circ}\text{C}$

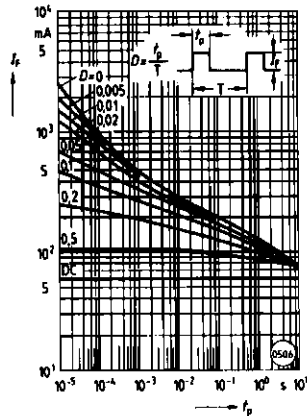


Figure 3. Diode forward voltage (typ.) vs. forward current

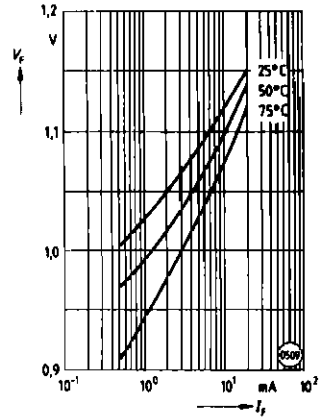


Figure 6. Permissible power dissipation vs. ambient temp.

