


#### 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 VACRMS**
- **High Collector-Emitter Voltage, VCEO=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

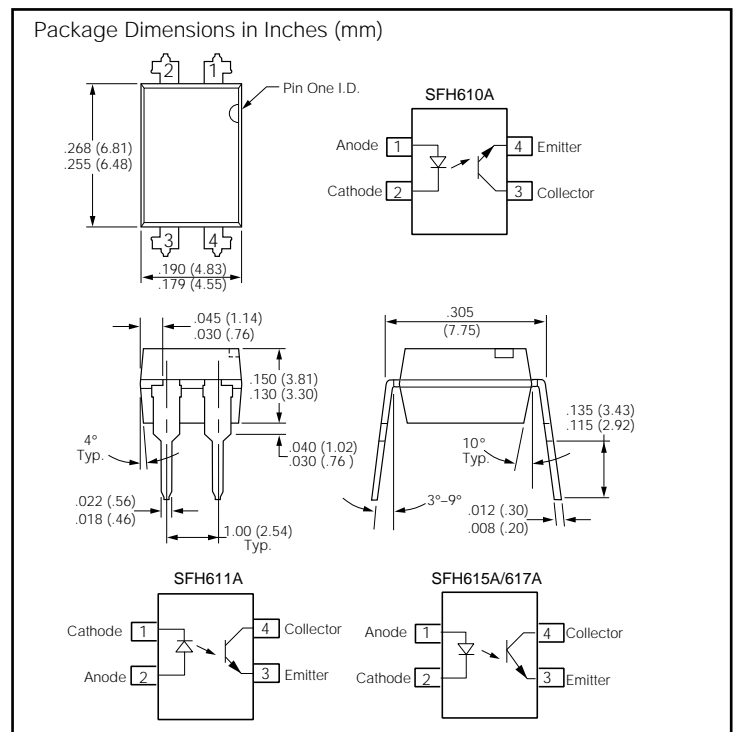
The SFH61XA features a high current transfer ratio, low coupling capacitance and high isolation voltage. These couplers have a GaAs infrared emitting diode emitter, which is optically coupled to a silicon planar phototransistor detector, and is incorporated in a plastic DIP-4 package.

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<sub>RMS</sub> or DC.

Specifications subject to change.



#### Maximum Ratings

##### Emitter

Reverse Voltage .....	6 V
DC Forward Current .....	60 mA
Surge Forward Current (t <sub>P</sub> ≤ 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 <sub>P</sub> ≤ 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 <sub>RMS</sub>
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 <sub>IO</sub> =500 V, T <sub>A</sub> =25°C .....	≥10 <sup>12</sup> Ω
V <sub>IO</sub> =500 V, T <sub>A</sub> =100°C .....	≥10 <sup>11</sup> 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 ( $T_A=25^\circ\text{C}$ )**

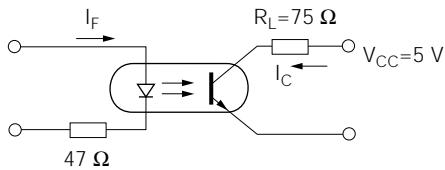
Description	Symbol		Unit	Condition
<b>Emitter (IR GaAs)</b>				
Forward Voltage	$V_F$	1.25 ( $\leq 1.65$ )	V	$I_F=60\text{ mA}$
Reverse Current	$I_R$	0.01 ( $\leq 10$ )	$\mu\text{A}$	$V_R=6\text{ V}$
Capacitance	$C_0$	13	pF	$V_R=0\text{ V}$ , $f=1\text{ MHz}$
Thermal Resistance	$R_{thJA}$	750	K/W	
<b>Detector (Si Phototransistor)</b>				
Capacitance	$C_{CE}$	5.2	pF	$V_{CE}=5\text{ V}$ , $f=1\text{ MHz}$
Thermal Resistance	$R_{thJA}$	500	K/W	
<b>Package</b>				
Collector-Emitter Saturation Voltage	$V_{CESAT}$	0.25 ( $\leq 0.4$ )	V	$I_F=10\text{ mA}$ , $I_C=2.5\text{ mA}$
Coupling Capacitance	$C_C$	0.4	pF	

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

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

**Switching Times (Typical)**

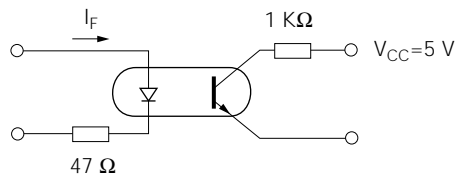
**Linear Operation (without saturation)**



$I_F=10\text{ mA}$ ,  $V_{CC}=5\text{ V}$ ,  $T_A=25^\circ\text{C}$

Load Resistance	$R_L$	75	$\Omega$
Turn-on Time	$t_{ON}$	3.0	$\mu\text{s}$
Rise Time	$t_R$	2.0	$\mu\text{s}$
Turn-off Time	$t_{OFF}$	2.3	$\mu\text{s}$
Fall Time	$t_F$	2.0	$\mu\text{s}$
Cut-off Frequency	$F_{CO}$	250	kHz

**Switching Operation (with saturation)**



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

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

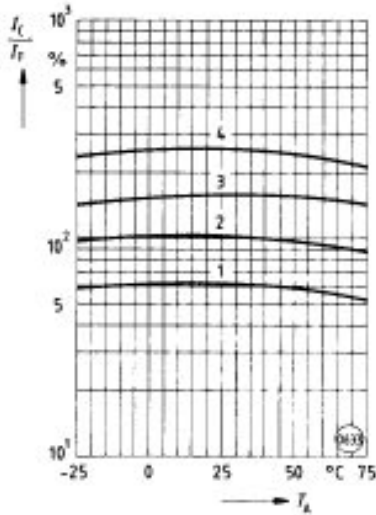


Figure 2. Output characteristics (typ.) Collector current vs. collector-emitter voltage  $T_A=25^\circ\text{C}$

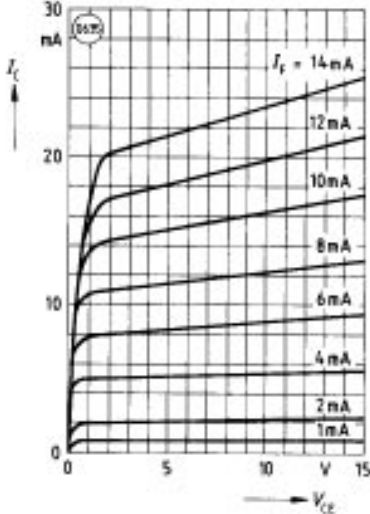


Figure 3. Diode forward voltage (typ.) vs. forward current

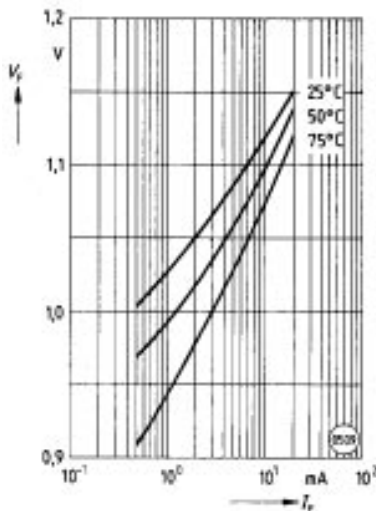


Figure 4. Transistor capacitance (typ.) vs. collector-emitter voltage  $T_A=25^\circ\text{C}$ ,  $f=1\text{ MHz}$

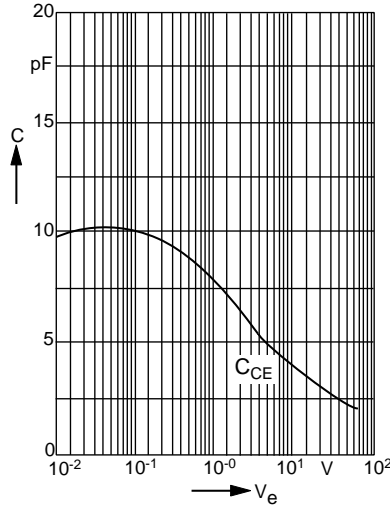


Figure 5. Permissible pulse handling capability. Forward current vs. pulse width Pulse cycle  $D=\text{parameter}$ ,  $T_A=25^\circ\text{C}$

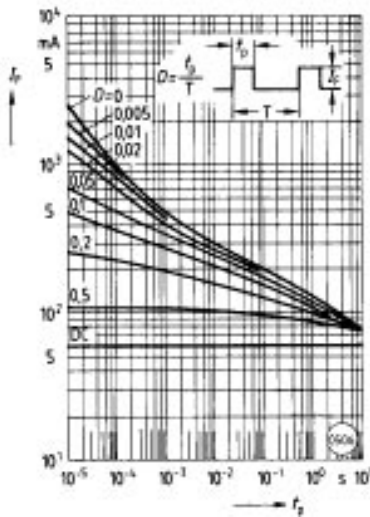


Figure 6. Permissible power dissipation vs. ambient temperature

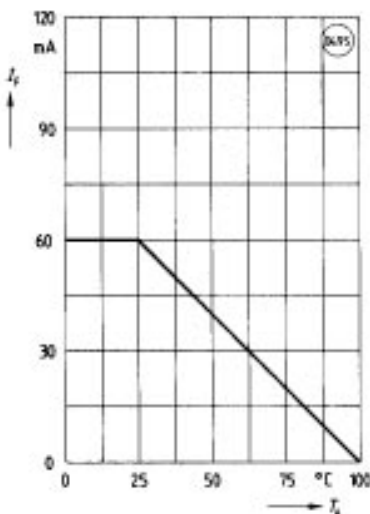


Figure 7. Permissible diode forward current vs. ambient temp.

