

FEATURES

- **High Current Transfer Ratios**
SFH600-0, 40 to 80%
SFH600-1, 63 to 125%
SFH600-2, 100 to 200%
SFH600-3, 160 to 320%
- **Isolation Test Voltage (1 Sec.), 5300 VAC_{RMS}**
- **V_{CEsat} 0.25 (≤0.4) V, I_F=10 mA, I_C=2.5 mA**
- **High Quality Premium Device**
- **Long Term Stability**
- **Storage Temperature, -55° to +150°C**
- **Underwriters Lab File #E52744**
- **VDE 0884 Available with Option 1**

DESCRIPTION

The SFH600 is an optocoupler with a GaAs LED emitter which is optically coupled with a silicon planar phototransistor detector. The component is packaged in a plastic plug-in case, 20 AB DIN 41866.

The coupler transmits signals between two electrically isolated circuits. The potential difference between the circuits to be coupled is not allowed to exceed the maximum permissible insulating voltage.

Maximum Ratings

Emitter

Reverse Voltage	6 V
DC Forward Current	60 mA
Surge Forward Current (I _p =10 μs)	2.5 A
Total Power Dissipation	100 mW

Detector

Collector-Emitter Voltage	70 V
Emitter-Base Voltage	7 V
Collector Current	50 mA
Collector Current (t=1 ms)	100 mA
Power Dissipation	150 mW

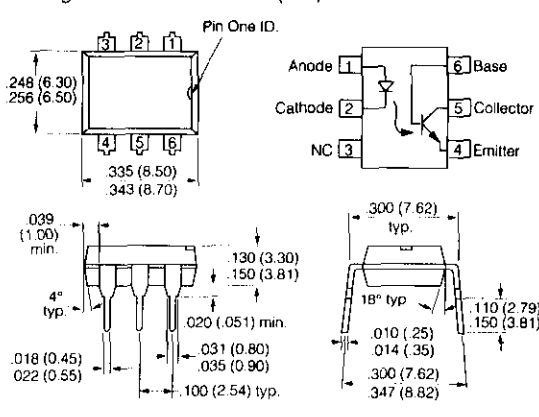
Package

Isolation Test Voltage (between emitter and detector referred to climate DIN 40046, part 2, Nov. 74) (t=1 sec.)	5300 VAC _{RMS}
Creepage	≥7 mm
Clearance	≥7 mm
Isolation Thickness between Emitter & Detector	≥0.4 mm
Comparative Tracking Index per DIN IEC 112/VDE0303, 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

Package

Storage Temperature Range	-55°C to +150°C
Ambient Temperature Range	-55°C to +100°C
Junction Temperature	100°C
Soldering Temperature (max. 10 s, dip soldering: distance to seating plane ≥1.5 mm)	260°C

Package Dimensions in Inches (mm)



Characteristics (T_A=25°C)

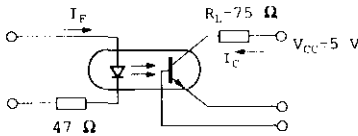
Emitter	Symbol	Unit	Condition
Forward Voltage	V _F	1.25 (≤1.65) V	I _F =60 mA
Breakdown Voltage	V _{BR}	≥6 V	I _R =10 μA
Reverse Current	I _R	0.01 (≤10) μA	V _R =6 V
Capacitance	C _O	25 pF	V _F =0 V, f=1 MHz
Thermal Resistance	R _{THJamb}	750 °C/W	
Detector	Symbol	Unit	Condition
Capacitance		pF	f=1 MHz
Collector-Emitter	C _{CE}	5.2	V _{CE} =5 V
Collector-Base	C _{CB}	6.5	V _{CB} =5 V
Emitter-Base	C _{EB}	9.5	V _{EB} =5 V
Thermal Resistance	R _{THJamb}	500 °C/W	
Package	Symbol	Unit	Condition
Collector-Emitter Saturation Voltage	V _{CEsat}	0.25 (≤0.4) V	I _F =10 mA, I _C =2.5 mA
Coupling Capacitance	C _{IO}	0.6 pF	V _{IO} =0, f=1 MHz

*TRIOS—Transparent IO Shield

Current Transfer Ratio and Collector-Emitter Leakage Current by dash number

	-0	-1	-2	-3	Unit
I_C/I_F at $V_{CE}=5\text{ V}$ ($I_F=10\text{ mA}$)	40-80	63-125	100-200	160-320	%
I_C/I_F at $V_{CE}=5\text{ V}$ ($I_F=1\text{ mA}$)	30 (>13)	45 (>22)	70 (>34)	90 (>56)	%
Collector-Emitter Leakage Current ($V_{CE}=10\text{ V}$) (I_{CEO})	2 (≤ 35)	2 (≤ 35)	2 (≤ 35)	5 (≤ 70)	nA

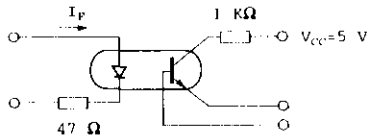
Linear Operation (without saturation)



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

Load Resistance	R_L	75	Ω
Turn-On Time	t_{ON}	3.2	μs
Rise Time	t_R	2.0	μs
Turn-Off Time	t_{OFF}	3.0	μs
Fall Time	t_f	2.5	μs
Cut-Off Frequency	F_{CO}	250	kHz

Switching Operation (with saturation)



Typical

	-0 ($I_F=20\text{ mA}$)	-1 and -2 ($I_F=10\text{ mA}$)	-3 ($I_F=5\text{ mA}$)	
Turn-On Time t_{ON}	3.7	4.5	5.8	μs
Rise Time t_R	2.5	3.0	4.0	μs
Turn-Off Time t_{OFF}	19	21	24	μs
Fall Time t_f	11	12	14	μs
V_{CESAT}	0.25 (≤ 0.4)			V

Figure 1. Current transfer ratio versus diode current ($T_A=25^\circ\text{C}$, $V_{CE}=5\text{ V}$)

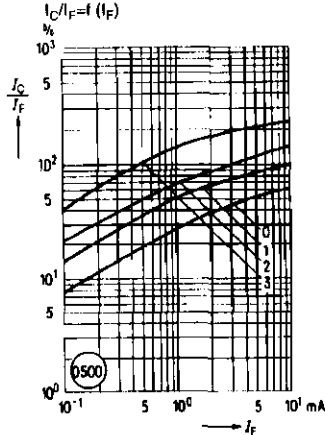


Figure 2. Current Transfer ratio versus diode current ($T_A=0^\circ\text{C}$, $V_{CE}=5\text{ V}$)

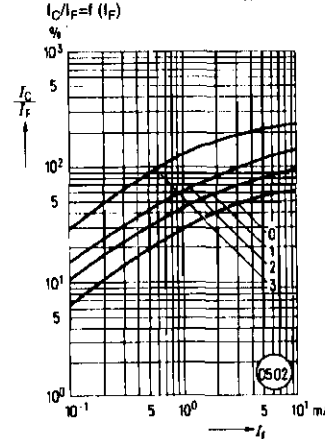


Figure 3. Current Transfer ratio versus diode current ($T_A=25^\circ\text{C}$, $V_{CE}=5\text{ V}$)

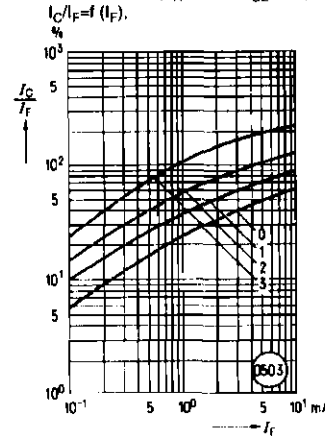


Figure 4. Current transfer ratio versus diode current ($T_A=50^\circ\text{C}$) $V_{CE}=5\text{ V}$
 $I_C/I_F=f(I_F)$

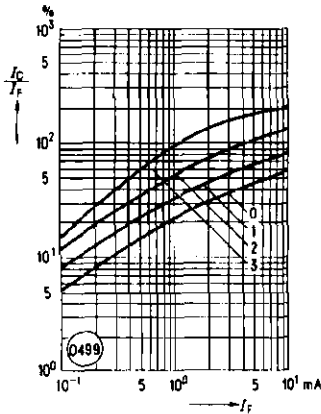


Figure 5. Current transfer ratio versus diode current ($T_A=75^\circ\text{C}$) $V_{CE}=5\text{ V}$
 $I_C/I_F=f(I_F)$

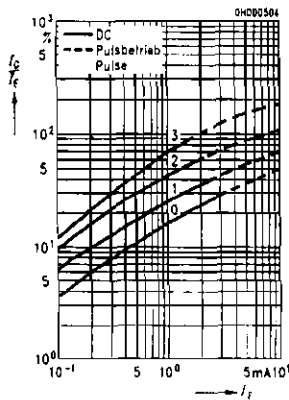


Figure 6. Current transfer ratio versus temperature ($I_F=10\text{ mA}$, $V_{CE}=5\text{ V}$)
 $I_C/I_F=f(T)$

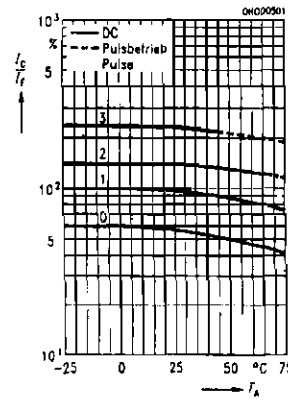


Figure 7. Transistor characteristics (HFE ≈ 550)
SFH600-2, -3 $I_C=f(V_{CE})$ ($T_A=25^\circ\text{C}$, $I_F=0$)

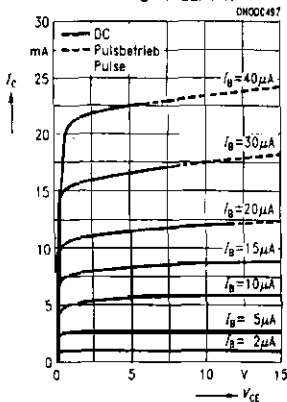


Figure 8. Output characteristics
SFH600-2, -3 ($T_A=25^\circ\text{C}$) $I_C=f(I_F)$

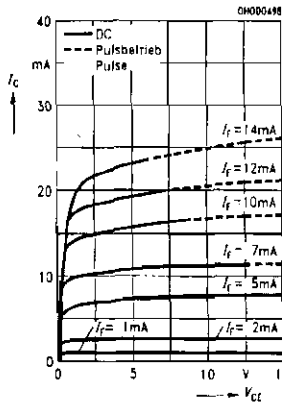


Figure 9. Forward voltage $V_F=f(I_F)$

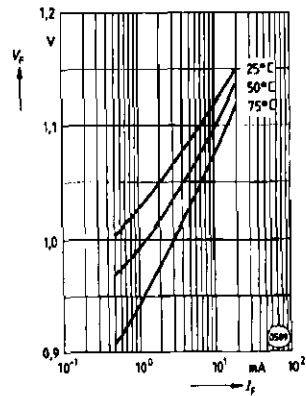


Figure 10. Collector emitter off-state current $I_{CEO}=f(V, T)$ ($T_A=25^\circ\text{C}$, $I_F=0$)

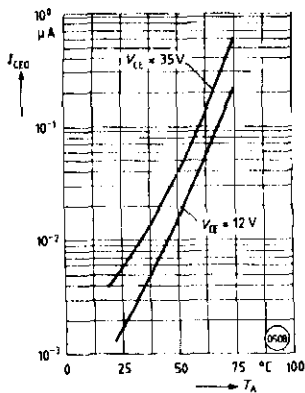


Figure 11. Saturation voltage versus collector current and modulation depth
SFH600-0 $V_{CEsat}=f(I_C)$ ($T_A=25^\circ\text{C}$)

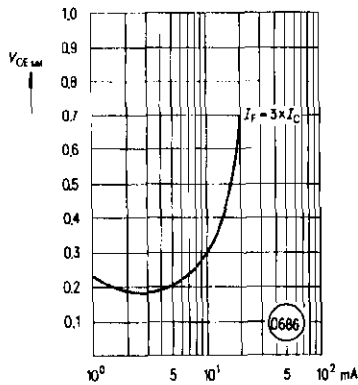


Figure 12. Saturation voltage versus collector current and modulation depth
SFH600-1 $V_{CEsat}=f(I_C)$ ($T_A=25^\circ\text{C}$)

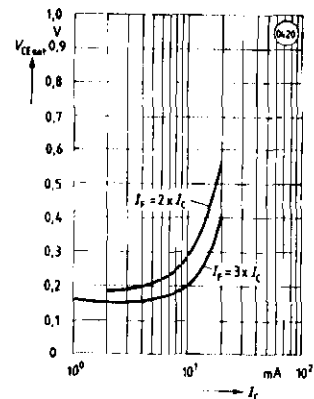


Figure 13. Saturation voltage versus collector current and modulation depth SFH600-2 $V_{CEsat}=f(I_C)$ ($T_A=25^\circ\text{C}$)

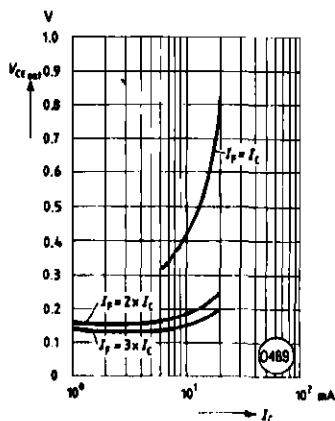


Figure 14. Saturation voltage versus collector current and modulation depth SFH600-3 $V_{CEsat}=f(I_C)$ ($T_A=25^\circ\text{C}$)

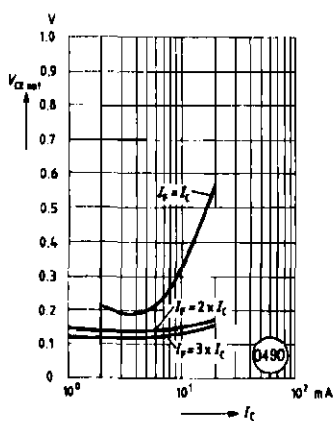


Figure 15. Permissible pulse load $D=\text{parameter}$, $T_A=25^\circ\text{C}$, $I_F=f(I_p)$

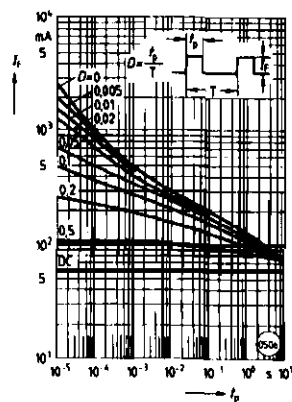


Figure 16. Permissible power dissipation for transistor and diode $P_{tot}=f(T_A)$

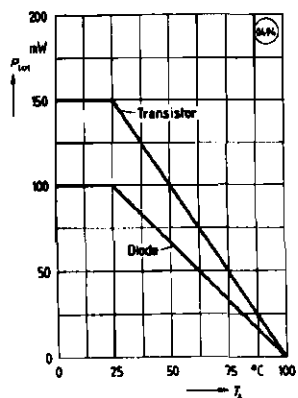


Figure 17. Permissible forward current diode $P_{tot}=f(T_A)$

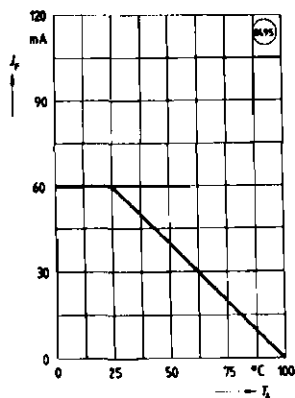


Figure 18. Transistor capacitance $C=f(V_C)$ ($T_A=25^\circ\text{C}$, $f=1\text{ MHz}$)

