


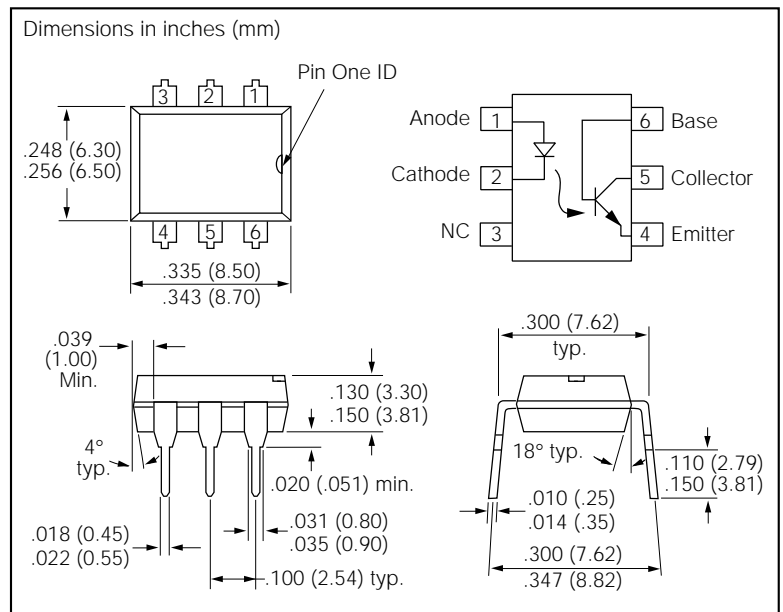
#### FEATURES

- **Very High CTR at  $I_F=1$  mA,  $V_{CE}=0.5$  V**
  - SFH608-2, 63-125%
  - SFH608-3, 100-200%
  - SFH608-4, 160-320%
  - SFH608-5, 250-500%
- **Specified Minimum CTR at  $I_F=0.5$  mA,  $V_{CE}=1.5$  V:  $\geq 32\%$  (typ. 120%)**
- **Good CTR Linearity with Forward Current**
- **Low CTR Degradation**
- **High Collector-Emitter Voltage  $V_{CEO}=55$  V**
- **Isolation Test Voltage: 5300 VAC<sub>RMS</sub>**
- **Low Current Input**
- **Low Coupling Capacitance**
- **High Common Mode Transient Immunity**
- **Phototransistor Optocoupler in 6 Pin DIP Package**
- **Field Effect Stable: TRIOS\***
-  **VDE 0884 Available with Option 1**
- **Underwriters Lab File #E52744**
- **Applications**
  - Telecommunications
  - Industrial Controls
  - Office Machines
  - Microprocessor System Interfaces

#### DESCRIPTION

The SFH 608 is an optocoupler designed for high current transfer ratio at low input currents with the output transistor saturated. This makes the device ideal for low current switching applications. The SFH608 is packaged in a six pin plastic DIP.

\***TRIOS—TR**ansparent **IO**n **S**hield



#### Maximum Ratings ( $T_A=25^\circ\text{C}$ )

##### Emitter

Reverse Voltage	6 V
DC Forward Current	50 mA
Surge Forward Current ( $t_p \leq 10 \mu\text{s}$ )	2.5 A
Total Power Dissipation	70 mW

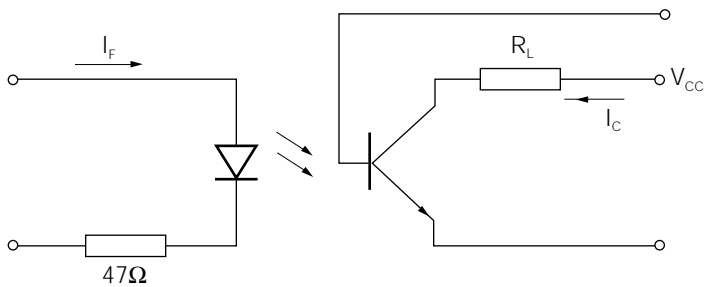
##### Detector

Collector-Emitter Voltage	55 V
Collector-Base Voltage	55 V
Emitter-Base Voltage	7 V
Collector Current	50 mA
Surge Collector Current ( $t_p \leq 1$ ms)	100 mA
Total Power Dissipation	150 mW
Isolation Test Voltage (between emitter and detector, refer to climate DIN 40046 part 2 Nov. 74) ( $t=1$ sec.)	5300 VAC <sub>RMS</sub>
Creepage	$\geq 7$ mm
Clearance	$\geq 7$ mm
Comparative Tracking Index	
per DIN IEC 112/VDE 0303, part1	175
Isolation Resistance	
$V_{IO}=500$ V, $T_A=25^\circ\text{C}$	$\geq 10^{12} \Omega$
$V_{IO}=500$ V, $T_A=100^\circ\text{C}$	$\geq 10^{11} \Omega$
Storage Temperature Range	$-55^\circ\text{C}$ to $+150^\circ\text{C}$
Operating Temperature Range	$-55^\circ\text{C}$ to $+100^\circ\text{C}$
Junction Temperature	$100^\circ\text{C}$
Soldering Temperature (max. 10 sec., dip soldering: distance to seating plane $\geq 1.5$ mm)	$260^\circ\text{C}$

**Characteristics** ( $T_A=25^\circ\text{C}$ , unless otherwise specified)

	Symbol	Typ	Unit	Condition
<b>Emitter</b>				
Forward Voltage	$V_F$	1.1 ( $\leq 1.5$ )	V	$I_F=5\text{ mA}$
Reverse Voltage	$V_R$	( $\geq 6$ )	V	$I_R=10\ \mu\text{A}$
Reverse Current	$I_R$	0.01 ( $\leq 10$ )	$\mu\text{A}$	$V_R=6\text{ V}$
Capacitance	$C_O$	25	pF	$V_R=0\text{ V}$ , $f=1\text{ MHz}$
Thermal Resistance	$R_{thJA}$	1070	K/W	
<b>Detector</b>				
Voltage, Collector-Emitter	$V_{CEO}$	$\geq 55$	V	$I_{CE}=10\ \mu\text{A}$
Voltage, Emitter-Base	$V_{BEO}$	$\geq 7$	V	$I_{EB}=10\ \mu\text{A}$
Capacitance	$C_{CE}$	10	pF	$V_{CE}=5\text{ V}$ , $f=1\text{ MHz}$
Capacitance	$C_{CB}$	16	pF	$V_{CE}=5\text{ V}$ , $f=1\text{ MHz}$
Capacitance	$C_{EB}$	10	pF	$V_{CE}=5\text{ V}$ , $f=1\text{ MHz}$
Thermal Resistance	$R_{thJA}$	500	K/W	
<b>Package</b>				
Coupling Capacitance	$C_C$	0.60	pF	
Coupling Transfer Ratio SFH 608-2	$I_C/I_F$	63-125	%	$I_F=1\text{ mA}$ , $V_{CE}=0.5\text{ V}$
SFH 608-3	$I_C/I_F$	75 ( $\geq 32$ )	%	$I_F=0.5\text{ mA}$ , $V_{CE}=1.5\text{ V}$
SFH 608-4	$I_C/I_F$	100-200	%	$I_F=1\text{ mA}$ , $V_{CE}=0.5\text{ V}$
SFH 608-5	$I_C/I_F$	120 ( $\geq 50$ )	%	$I_F=0.5\text{ mA}$ , $V_{CE}=1.5\text{ V}$
		160-320	%	$I_F=1\text{ mA}$ , $V_{CE}=0.5\text{ V}$
		200 ( $\geq 80$ )	%	$I_F=0.5\text{ mA}$ , $V_{CE}=1.5\text{ V}$
		250-500	%	$I_F=1\text{ mA}$ , $V_{CE}=0.5\text{ V}$
		300 ( $\geq 125$ )	%	$I_F=0.5\text{ mA}$ , $V_{CE}=1.5\text{ V}$
Saturation Voltage, Collector-Emitter SFH 608-2	$V_{CEsat}$	0.25 ( $\leq 0.4$ )	V	$I_C=0.32\text{ mA}$ , $I_F=1\text{ mA}$
SFH 608-3	$V_{CEsat}$	0.25 ( $\leq 0.4$ )	V	$I_C=0.5\text{ mA}$ , $I_F=1\text{ mA}$
SFH 608-4	$V_{CEsat}$	0.25 ( $\leq 0.4$ )	V	$I_C=0.8\text{ mA}$ , $I_F=1\text{ mA}$
SFH 608-5	$V_{CEsat}$	0.25 ( $\leq 0.4$ )	V	$I_C=1.25\text{ mA}$ , $I_F=1\text{ mA}$
Leakage Current, Collector-Emitter	$I_{CEO}$	10 ( $\leq 200$ )	nA	$V_{CE}=10\text{ V}$

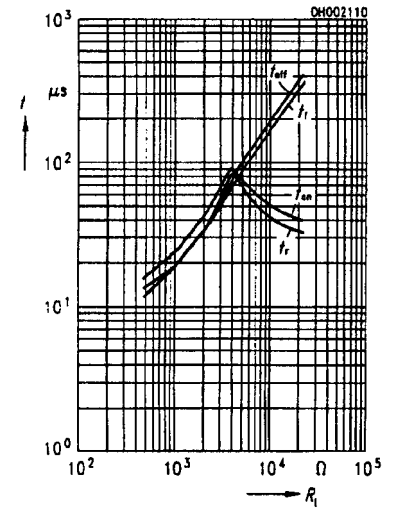
**Figure 1. Schematic**



$I_C=2\text{ mA}$  (to adjust by  $I_F$ ),  $R_L=100\ \Omega$ ,  $T_A=25^\circ\text{C}$ ,  $V_{CC}=5\text{ V}$

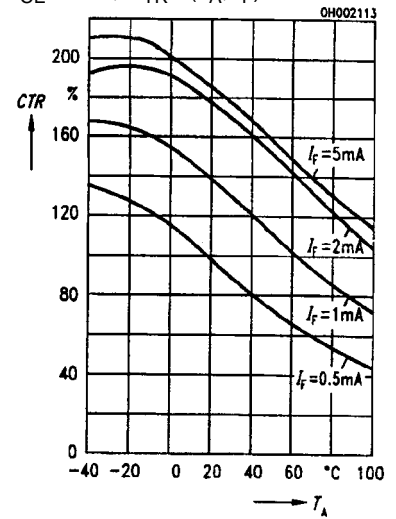
Description	Symbol	Values	Unit
Turn-On Time	$t_{ON}$	8	$\mu\text{S}$
Rise Time	$t_R$	5	$\mu\text{S}$
Turn-Off Time	$t_{OFF}$	7.5	$\mu\text{S}$
Fall Time	$t_F$	7	$\mu\text{S}$

**Figure 2. Switching times**  $T_A=25^\circ\text{C}$ ,  $I_F=1\text{ mA}$ ,  $V_{CC}=5\text{ V}$ ,  $t_{ON}$ ,  $t_R$ ,  $t_{OFF}$ ,  $t_F=f(R_L)$



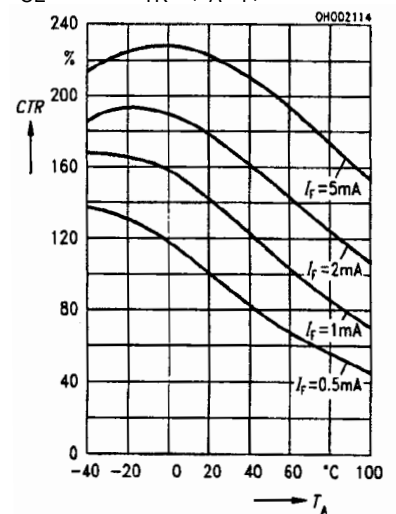
**Figure 3. Current transfer ratio (typ.)**

$V_{CE}=0.5\text{ V}$ ,  $C_{TR}=f(T_A, I_F)$

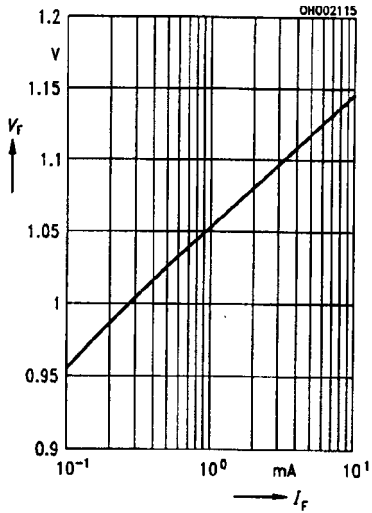


**Figure 4. Current transfer ratio (typ.)**

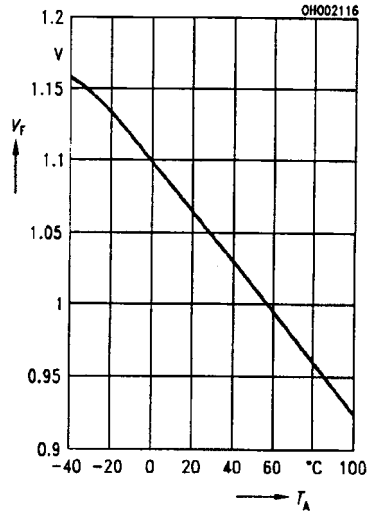
$V_{CE}=1.5\text{ V}$ ,  $C_{TR}=f(T_A, I_F)$



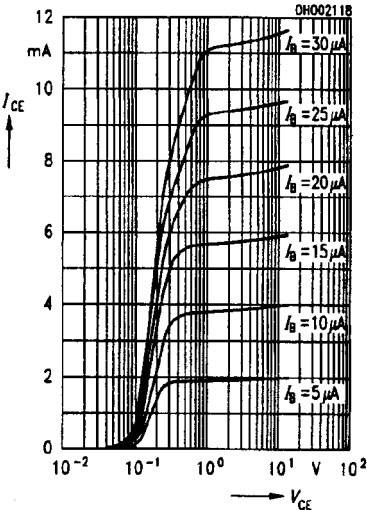
**Figure 5. Diode forward voltage (typ.)**  
 $T_A=25^\circ\text{C}$ ,  $V_F=f(I_F)$



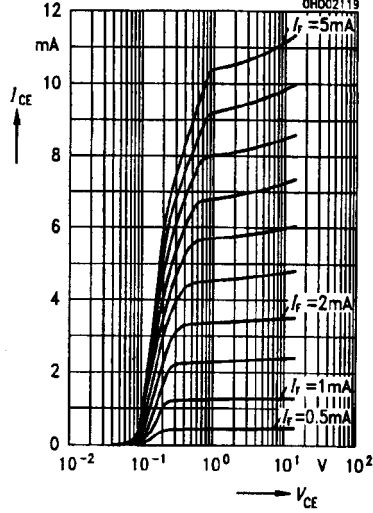
**Figure 6. Diode forward voltage (typ.)**  
 $I_F=1\text{ mA}$ ,  $V_F=f(T_A)$



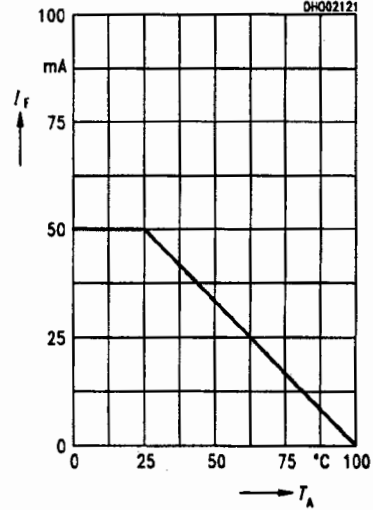
**Figure 7. Output characteristics (typ.)**  
 $T_A=25^\circ\text{C}$ ,  $I_{CE}=f(V_{CE}, I_B)$



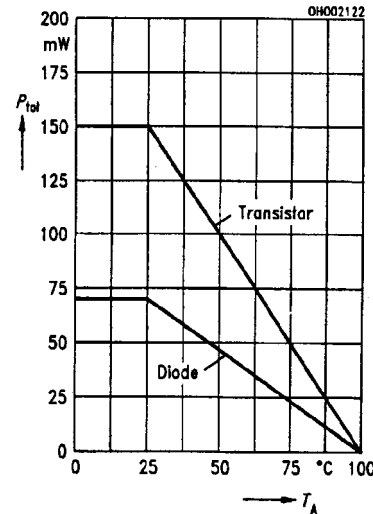
**Figure 8. Output characteristics (typ.)**  
 $T_A=25^\circ\text{C}$ ,  $I_{CE}=f(V_{CE}, I_F)$



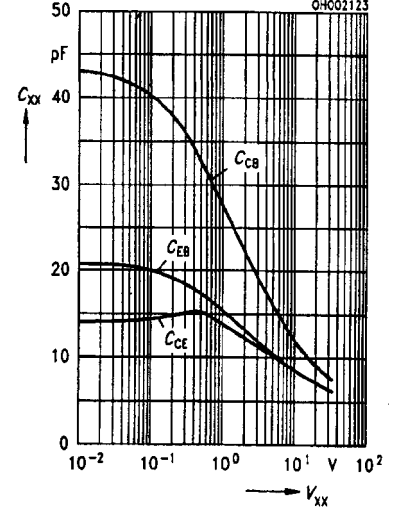
**Figure 9. Permissible forward current diode**  
 $I_F=f(T_A)$



**Figure 10. Permissible power dissipation**  
 $P_{TOT}=f(T_A)$



**Figure 11. Transistor capacitance (typ.)**  
 $T_A=25^\circ\text{C}$ ,  $f=1\text{ MHz}$ ,  $C_{CE}=f(V_{CE})$   
 $C_{CB}=f(V_{CB})$ ,  $C_{EB}=f(V_{EB})$



**Figure 12. Collector-emitter leakage current**  
 $I_F=0$ ,  $V_{CE}=10\text{ V}$ ,  $I_{CEO}=f(T_A)$

