SIEMENS

SFH6106
SFH6116
SFH6156
SFH6186
SFH6206
SFH6286

5.3 kV TRIOS® HIGH RELIABILITY OPTOCOUPLERS

FEATURES

- **SMD Versions of SFH610, 611, 615, 618, 620, 628**
- **Available on Tape and Reel– To Order Use Suffix "T"**
- **TRIOS — Transparent IOn Shield**

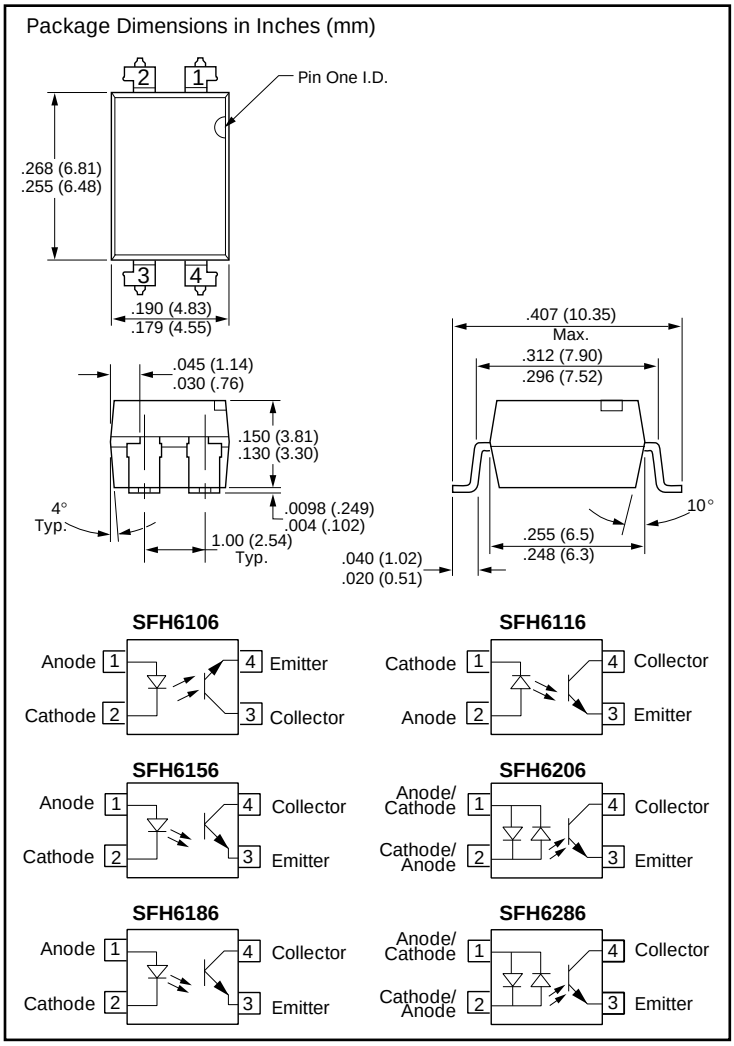
DESCRIPTION

The SFH6106, 6116, 6156, 6186, 6206, 6286 families of optocouplers are lead bent for SMD applications. They are electrically equilvalent to the SFH610, 611, 615, 618, 620, and 628 families of optocouplers.

CROSS REFERENCE

SMD	Thru-hole	
	New Designs	Not for New Design
SFH6106-1 SFH6106-2 SFH6106-3 SFH6106-4	SFH610A-1 SFH610A-2 SFH610A-3 SFH610A-4	SFH610-1 SFH610-2 SFH610-3 SFH610-4
SFH6116-1 SFH6116-2 SFH6116-3 SFH6116-4	SFH611A-1 SFH611A-2 SFH611A-3 SFH611A-4	SFH611-1 SFH611-2 SFH611-3 SFH611-4
SFH6156-1 SFH6156-2 SFH6156-3 SFH6156-4	SFH615A-1 SFH615A-2 SFH615A-3 SFH615A-4	SFH615-1 SFH615-2 SFH615-3 SFH615-4
SFH6186-2 SFH6186-3 SFH6186-4 SFH6186-5	SFH618A-2 SFH618A-3 SFH618A-4 SFH618A-5	SFH618-2 SFH618-3 SFH618-4 SFH618-5
SFH6206-1 SFH6206-2 SFH6206-3	SFH620A-1 SFH620A-2 SFH620A-3	SFH620-1 SFH620-2 SFH620-3
SFH6286-2 SFH6286-3 SFH6286-4	SFH628A-2 SFH628A-3 SFH628A-4	SFH628-2 SFH628-3 SFH628-4

Package Dimensions in Inches (mm)



SIEMENS

SFH620A

5.3 kV TRIOS® OPTOCOUPLER
AC VOLTAGE INPUT

FEATURES

- **High Current Transfer Ratios**
  at 10 mA: 40–320%
  at 1 mA: 45% typical (>13)
- **Low CTR Degradation**
- **Good CTR Linearity Depending on Forward Current**
- **Isolation 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 SFH6206 Data Sheet**

DESCRIPTION

The SFH620A 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.

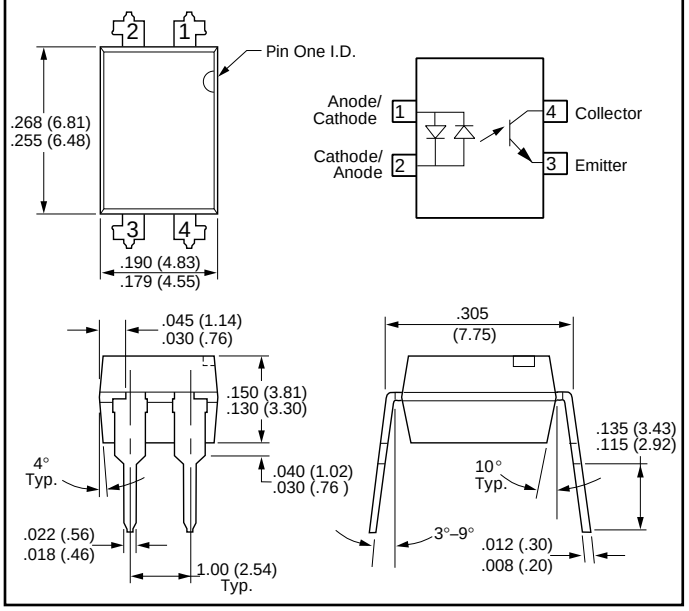
The coupling devices are designed for signal transmission between two electrically separated circuits.

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≤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 ..... ≥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)

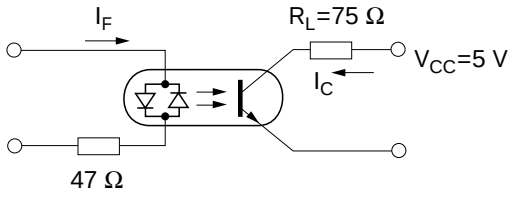
Description	Symbol		Unit	Condition
Emitter				
Forward Voltage	V_F	1.25 (≤1.65)	V	I_F=±60 mA
Capacitance	C_0	50	pF	V_R=0 V, f=1 MHz
Thermal Resistance	R_{thJA}	750	K/W	
Detector				
Capacitance	C_{CE}	6.8	pF	V_{CE}=5 V, f=1 MHz
Thermal Resistance	R_{thJA}	500	K/W	
Package				
Collector-Emitter Saturation Voltage	V_{CESAT}	0.25 (≤0.4)	V	I_F=10 mA, I_C=2.5 mA
Coupling Capacitance	C_C	0.2	pF	

Note: 1. Still air, coupler soldered to PCB or base.

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

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

Switching Times
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

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

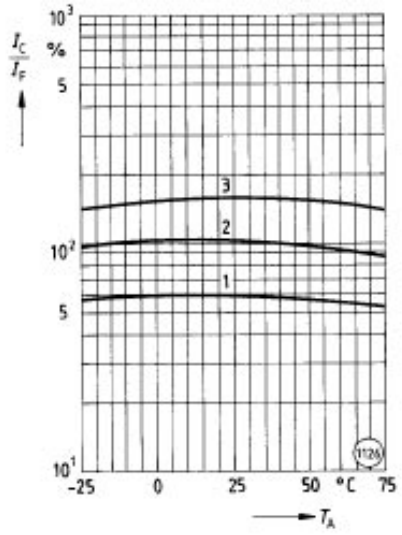


Figure 2. Output characteristics (typ.) Collector current vs. collector-emitter voltage T_A=25°C

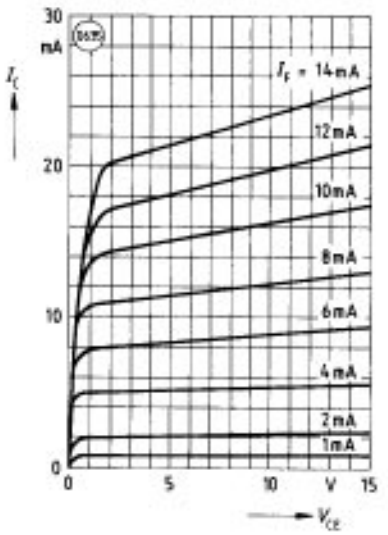


Figure 3. Diode forward voltage (typ.) vs. forward current

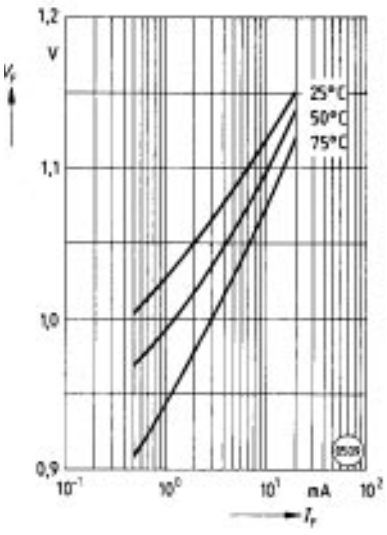


Figure 4. Transistor capacitance (typ.) vs. collector-emitter voltage
T_A=25°C, f=1 MHz

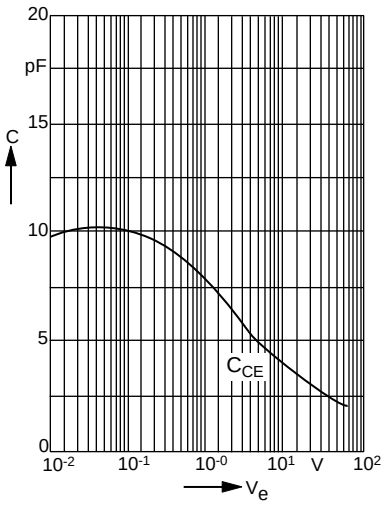


Figure 5. Permissiable pulse handling capability. Fwd. current vs. pulse width Pulse cycle D=parameter, T_A=25°C

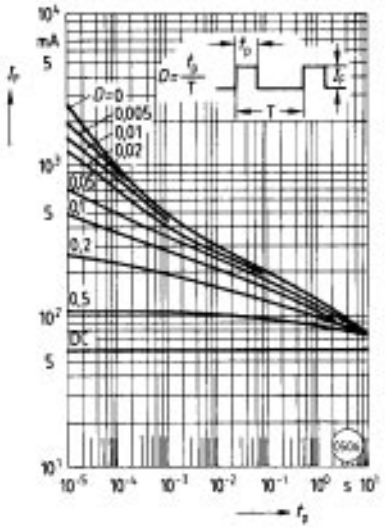


Figure 6. Permissible power dissipation vs. ambient temp.

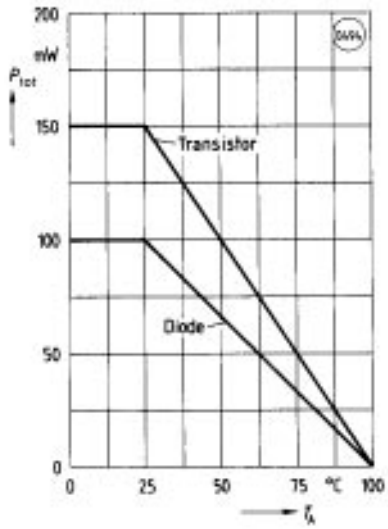


Figure 7. Permissible diode forward current vs. ambient temp.