SFH615AA/AGB/AGR/ABM/ABL/AY/AB

5.3 kV TRIOS“ Optocoupler

High Reliability

FEATURES

- **Variety of Current Transfer Ratios at 5.0 mA**
  - **AA: 50–600%**
  - **AGB: 100–600%**
  - **AGR: 100–300%**
  - **ABM: 200–400%**
  - **ABL: 200–600%**
  - **AY: 50–150%**
  - **AB: 80–260%**
- **Low CTR Degradation**
- **Good CTR Linearity Depending on Forward Current**
- **Isolation Test Voltage, 5300 V_{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**

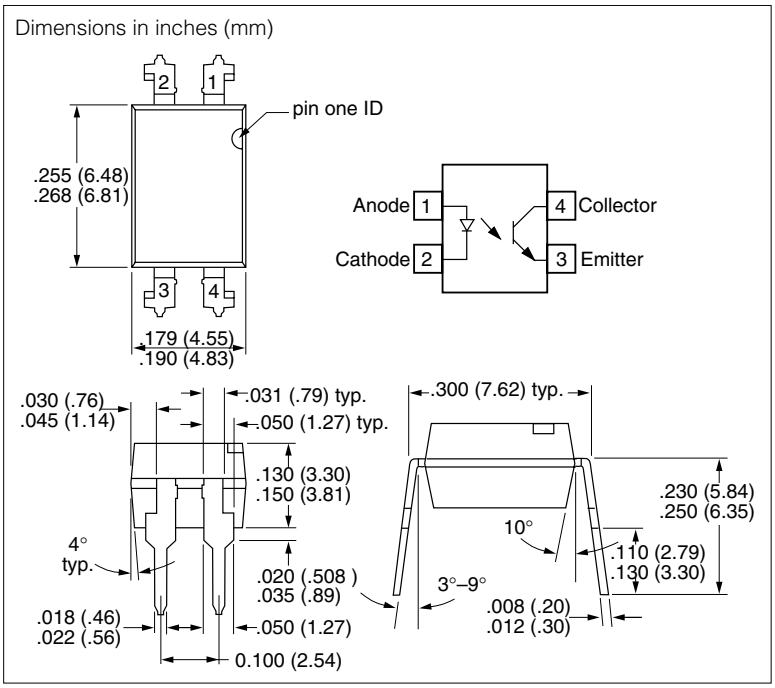
DESCRIPTION

The SFH615XXX features a large assortment of 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 lead 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.



Maximum Ratings

Emitter

Reverse Voltage ..... 6.0 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 ..... 7.0 V
Collector Current ..... 50 mA
Collector Current (t_P≤1.0 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 V_{RMS}
Creepage ..... ≥7.0 mm
Clearance ..... ≥7.0 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

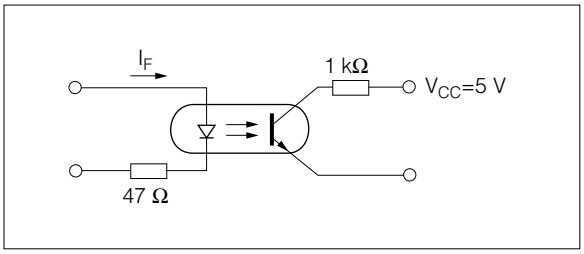
Table 1. Characteristics (T_A=25°C)

Parameter	Symbol	Value	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=6.0 V
Capacitance	C_0	13	pF	V_R=0 V, f=1.0 MHz
Thermal Resistance	R_{thJA}	750	K/W	—
Detector (Si Phototransistor)				
Capacitance	C_{CE}	5.2	pF	V_{CE}=5 V, f=1.0 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	—

Table 2. Current Transfer Ratio (I_C/I_F at V_{CE}=5.0 V) **and Collector-emitter Leakage Current**

Parameter	AA	AGB	AGR	ABM	ABL	AY	AB	Unit
I_C/ I_F (I_F=5.0 mA)	50–600	100–600	100–300	200–400	200–600	50–150	80–260	%
Collector-Emitter Leakage Current, I_{CEO}, V_{CEO}=10 V	10(≤100)	10(≤100)	10(≤100)	10(≤100)	10(≤100)	10(≤100)	10(≤100)	nA

Switching Operation (with saturation)



Parameter	Symbol	Value	Unit	Condition
Turn-on Time	t_{on}	2.0	µs	I_F=5.0 mA
Turn-off Time	t_{off}	25	µs	

Figure 1. Current Transfer Ratio (typical) vs. Temperature I_F=10 mA, V_{CE}=0.5 V

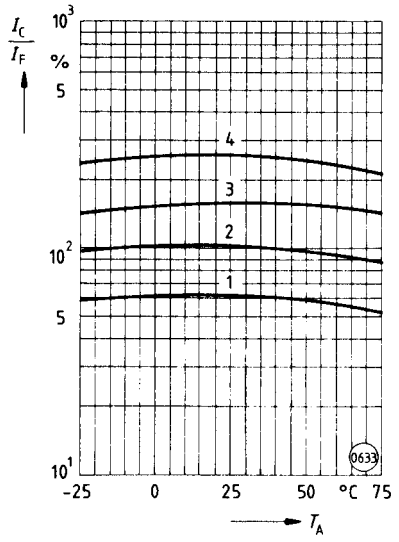


Figure 2. Transistor Capacitance (typical) vs. Collector-emitter Voltage T_A=25°C, f=1.0 MHz

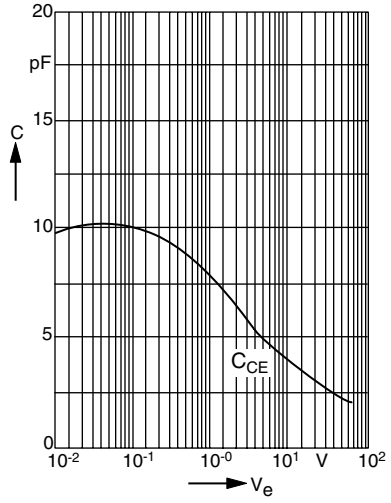


Figure 3. Permissible Diode Forward Current vs. Ambient Temperature

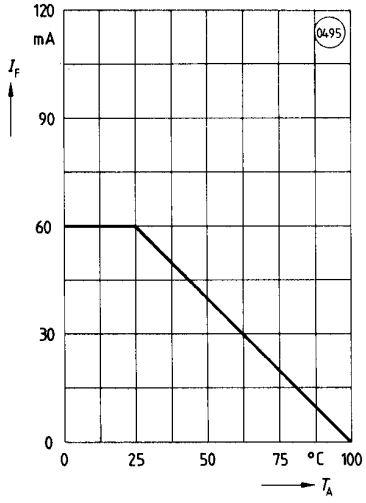


Figure 4. Output Characteristics (typical). Collector Current vs. Collector-emitter Voltage T_A=25°C

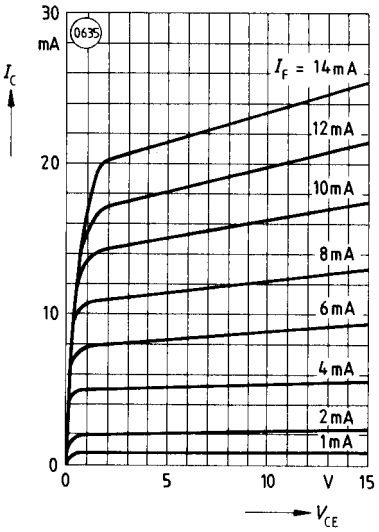


Figure 5. Permissible Pulse Handling Capability. Forward Current vs. Pulse-width Pulse cycle D=parameter, T_A=25°C

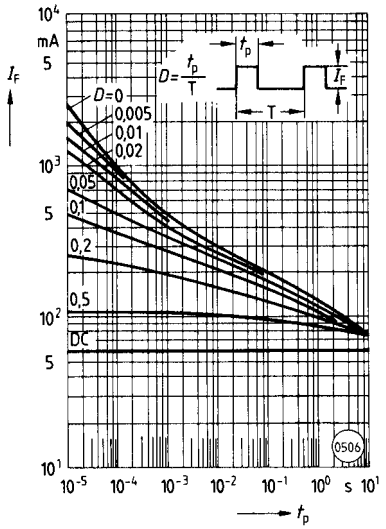


Figure 6. Diode Forward Voltage (typical) vs. Forward Current

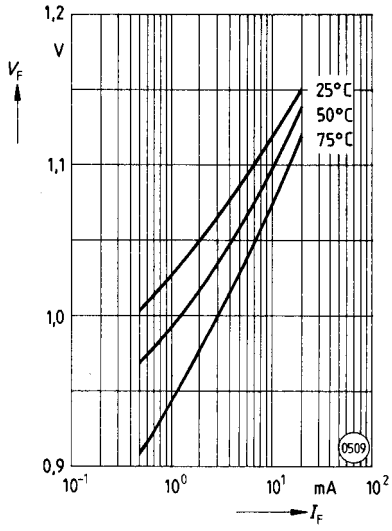


Figure 7. Permissible Power Dissipation vs. Ambient Temperature