



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**

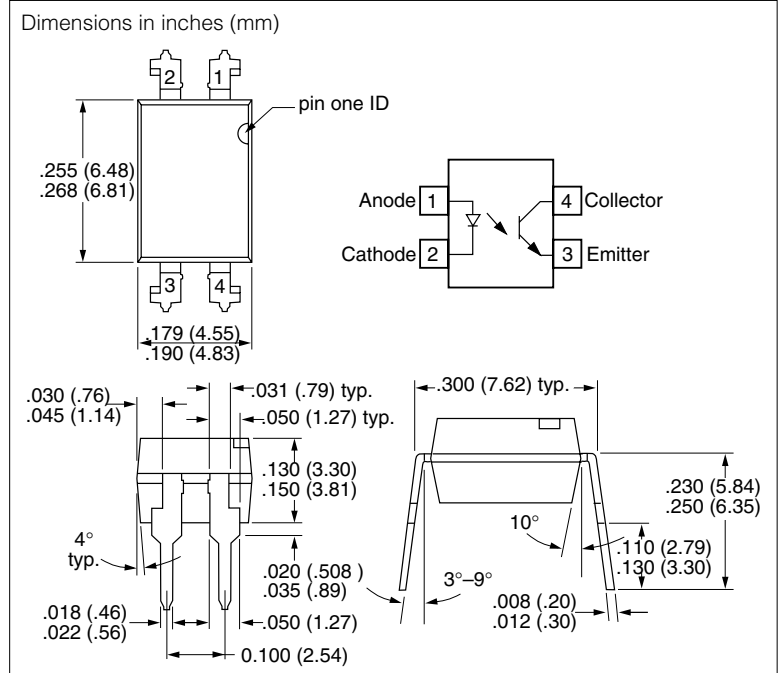
DESCRIPTION

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

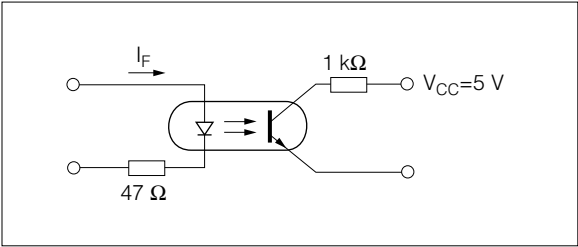
Table 1. Characteristics ($T_A=25^{\circ}\text{C}$)

Parameter	Symbol	Value	Unit	Condition
Emitter (IR GaAs)				
Forward Voltage	V_F	1.25(≤ 1.65)	V	$I_F=60\text{ mA}$
Reverse Current	I_R	0.01(≤ 10)	μA	$V_R=6.0\text{ V}$
Capacitance	C_0	13	pF	$V_R=0\text{ V}$, $f=1.0\text{ MHz}$
Thermal Resistance	R_{thJA}	750	K/W	—
Detector (Si Phototransistor)				
Capacitance	C_{CE}	5.2	pF	$V_{CE}=5\text{ V}$, $f=1.0\text{ MHz}$
Thermal Resistance	R_{thJA}	500	K/W	—
Package				
Collector-Emitter Saturation Voltage	V_{CEsat}	0.25(≤ 0.4)	V	$I_F=10\text{ mA}$, $I_C=2.5\text{ mA}$
Coupling Capacitance	C_C	0.4	pF	—

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

Parameter	AA	AGB	AGR	ABM	ABL	AY	AB	Unit
I_C/I_F ($I_F=5.0\text{ mA}$)	50–600	100–600	100–300	200–400	200–600	50–150	80–260	%
Collector-Emitter Leakage Current, I_{CEO} , $V_{CEO}=10\text{ V}$	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	$I_F=5.0\text{ mA}$
Turn-off Time	t_{off}	25	μs	

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

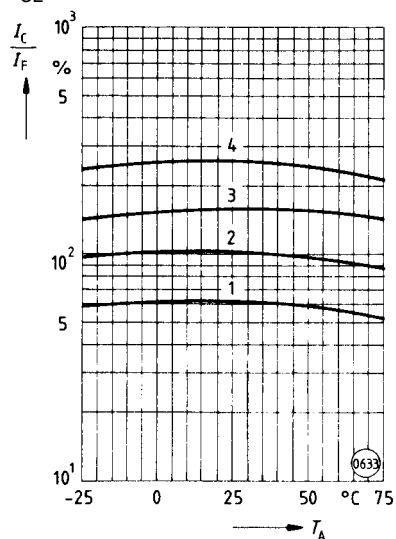


Figure 2. Transistor Capacitance (typical) vs. Collector-emitter Voltage $T_A=25^\circ\text{C}$, $f=1.0\text{ MHz}$

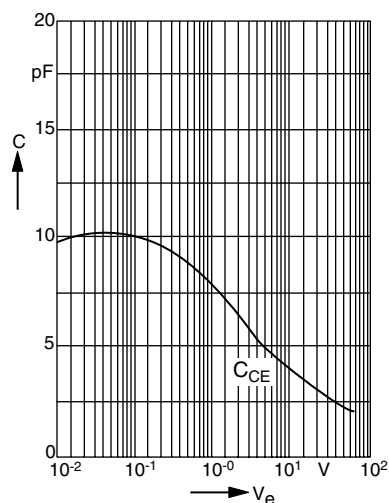


Figure 3. Permissible Diode Forward Current vs. Ambient Temperature

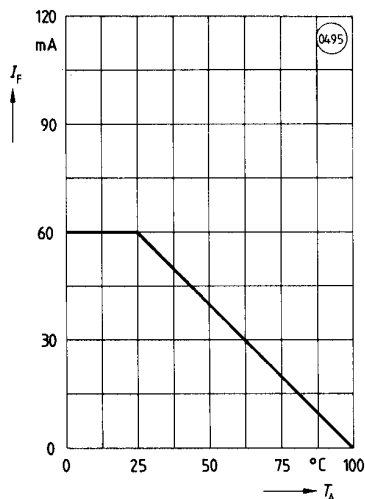


Figure 4. Output Characteristics (typical). Collector Current vs. Collector-emitter Voltage $T_A=25^\circ\text{C}$

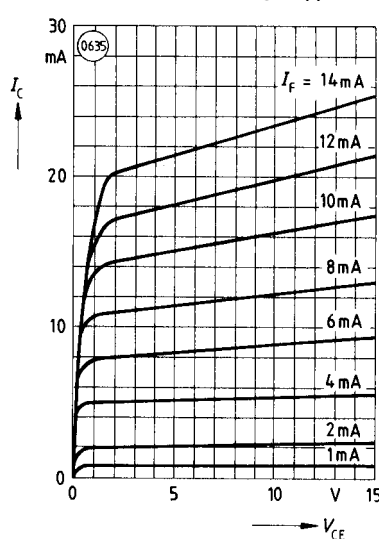


Figure 5. Permissible Pulse Handling Capability. Forward Current vs. Pulse-width Pulse cycle D=parameter, $T_A=25^\circ\text{C}$

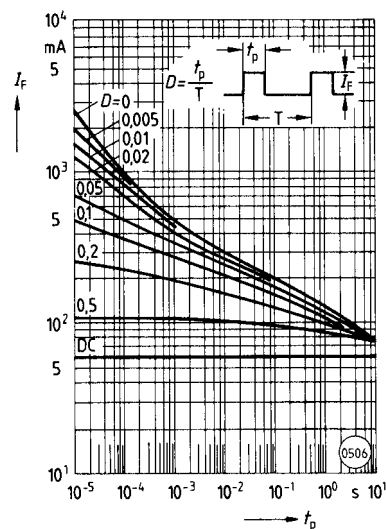


Figure 6. Diode Forward Voltage (typical) vs. Forward Current

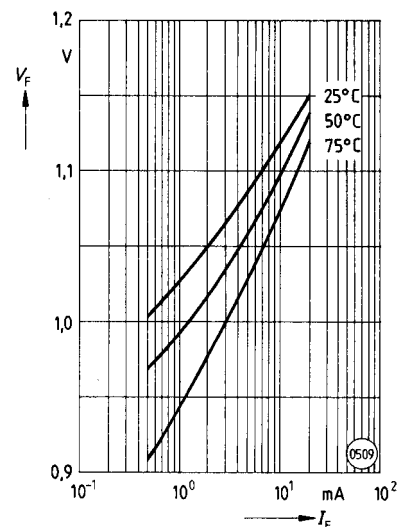


Figure 7. Permissible Power Dissipation vs. Ambient Temperature

