

FEATURES

- High Current Transfer Ratios
at 10 mA: 40-320%
at 1 mA: 60% 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*
- 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

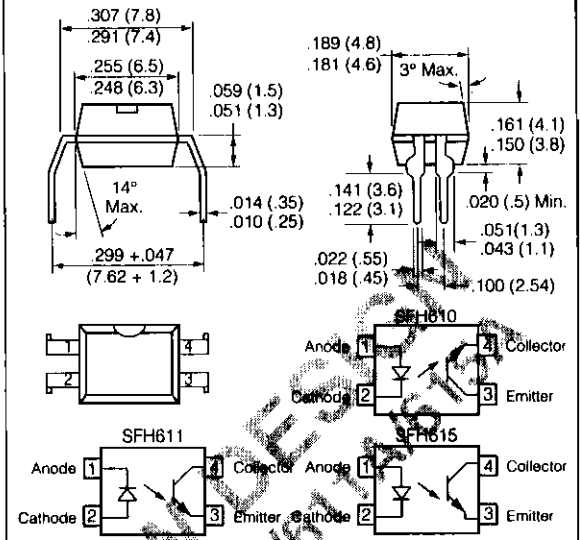
SFH 610/611/615 are optically coupled isolators that feature a high current transfer ratio, low coupling capacitance and high isolation voltage. They have a GaAs infrared emitting diode emitter, which is optically coupled to a silicon planar phototransistor detector. The component is incorporated in a plastic plug-in DIP-4 package.

The coupling devices are designed for signal transmission between two electrically separated circuits. The potential difference between the circuits to be coupled must not exceed the maximum permissible reference voltages.

The couplers are end-stackable with 2.54 mm spacing and are successor types for optocouplers in metal cases. The SFH610/611/615 differ in their arrangement of the terminal pins. Therefore multicouplers can easily be implemented and conventional multicouplers can be replaced.

*Transparent IO Shield

Package Dimensions in Inches (mm)



Maximum Ratings

Emitter	
Reverse Voltage	6 V
DC Forward Current	60 mA
Surge Forward Current (t ≤ 10 μs)	2.5 A
Total Power Dissipation	100 mW

Detector

Collector-Emitter Voltage	70 V
Collector Current	50 mA
Collector Current (t ≤ 1 ms)	100 mA
Total Power Dissipation	150 mW

Package

Insulation 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
Insulation Thickness between Emitter and Detector	≥ 0.8 mm
Comparative Tracking Index per DIN IEC 112/VDE 0303, 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°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

Notes:

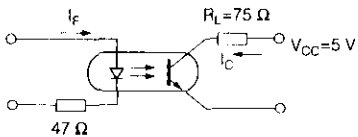
1. Dip soldering minimum clearance from bottom edge of package, 1.5 mm. Special soldering conditions apply when through-contacted circuit boards are used. Request appropriate specification.

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

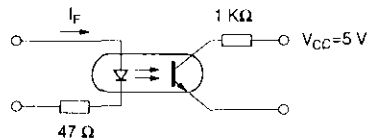
Emitter		Symbol	Units	Condition
Forward Voltage	V_F	1.25 (≤ 1.65)	V	$I_F=60\text{ mA}$
Breakdown Voltage	V_{BR}	(≥ 6)	V	$I_R=10\ \mu\text{A}$
Reverse Current	I_R	0.01 (≤ 10)	μA	$V_R=6\text{ V}$
Capacitance	C_0	25	pF	$V_R=0\text{ V}, f=1\text{ MHz}$
Thermal Resistance	R_{THJA}	750	K/W	
Detector				
Capacitance	C_{CE}	6.8	pF	$V_{CE}=5\text{ V}, f=1\text{ MHz}$
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	0.2	pF	

Current Transfer Ratio (I_C/I_F at $V_{CE}=5\text{ V}$) and Collector-Emitter Leakage Current by dash number

	-1	-2	-3	-4	
I_C/I_F ($I_F=10\text{ mA}$)	40-80	63-125	100-200	160-320	%
I_C/I_F ($I_F=1\text{ mA}$)	30 (>13)	45 (>22)	70 (>34)	90 (>56)	%
Collector-Emitter Leakage Current ($V_{CE}=10\text{ V}$) (I_{CEO})	2 (≤ 50)	2 (≤ 50)	5 (≤ 100)	5 (≤ 100)	nA

Switching Times
Linear Operation (without saturation)

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

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

Switching Operation (with saturation)


	-1 ($I_F=20\text{ mA}$)	-2 and -3 ($I_F=10\text{ mA}$)	-4 ($I_F=5\text{ mA}$)	
Turn-On Time t_{ON}	3.0	4.2	6.0	μs
Rise Time t_R	2.0	3.0	4.6	μs
Turn-Off Time t_{OFF}	18	23	25	μs
Fall Time t_f	11	14	15	μs