

## Optocoupler, AC Input, 5300 V<sub>RMS</sub>

### Features

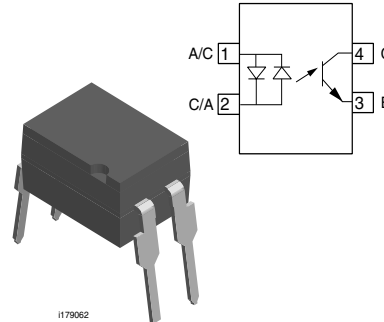
- High Current Transfer Ratios
- at 5 mA: 50-600 %
- at 1.0 mA: 45 % typical (> 13)
- Low CTR Degradation
- Good CTR Linearity Depending on Forward Current
- Isolation Test Voltage, 5300 V<sub>RMS</sub>
- High Collector-emitter Voltage, V<sub>CEO</sub> = 70 V
- Low Saturation Voltage
- Fast Switching Times
- Temperature Stable
- Low Coupling Capacitance
- End-stackable, .100"(2.54 mm) Spacing
- High Common-mode Interference Immunity (Unconnected Base)
- SMD Option, See SFH620A/SFH6206 Data Sheet
- Lead-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

### Agency Approvals

- UL1577, File No. E52744 System Code H or J, Double Protection
- DIN EN 60747-5-2 (VDE0884)  
DIN EN 60747-5-5 pending  
Available with Option 1
- CSA 93751
- BSI IEC60950 IEC60065

### Description

The SFH620AA/ SFH620AGB 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 lead spacing.

Creepage and clearance distances of > 8.0 mm are achieved with option 6. This version complies with IEC 60950 (DIN VDE 0805) for reinforced insulation up to an operation voltage of 400 V<sub>RMS</sub> or DC.

### Order Information

Part	Remarks
SFH620AA	CTR 50 - 600 %, DIP-4
SFH620AGB	CTR 100 - 600 %, DIP-4
SFH620AA-X009	CTR 50 - 600 %, SMD-4 (option 9)
SFH620AGB-X007	CTR 100 - 600 %, SMD-4 (option 7)
SFH620AGB-X009	CTR 100 - 600 %, SMD-4 (option 9)

For additional information on the available options refer to Option Information.

### Absolute Maximum Ratings

$T_{amb} = 25\text{ °C}$ , unless otherwise specified

Stresses in excess of the absolute Maximum Ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to absolute Maximum Rating for extended periods of the time can adversely affect reliability.

### Input

Parameter	Test condition	Symbol	Value	Unit
Reverse voltage		$V_R$	6.0	V
DC Forward current		$I_F$	$\pm 60$	mA
Surge forward current	$t_p \leq 10\ \mu\text{s}$	$I_{FSM}$	$\pm 2.5$	A
Total power dissipation		$P_{diss}$	100	mW

### Output

Parameter	Test condition	Symbol	Value	Unit
Collector-emitter voltage		$V_{CE}$	70	V
Emitter-collector voltage		$V_{EC}$	7.0	V
Collector current		$I_C$	50	mA
	$t_p \leq 1.0\ \text{ms}$	$I_C$	100	mA
Power dissipation		$P_{diss}$	150	mW

### Coupler

Parameter	Test condition	Symbol	Value	Unit
Isolation test voltage (between emitter and detector, refer to climate DIN 40046, part 2, Nov. 74)		$V_{ISO}$	5300	$V_{RMS}$
Creepage			$\geq 7.0$	mm
Clearance			$\geq 7.0$	mm
Insulation thickness between emitter and detector			0.4	mm
Comparative tracking index per DIN IEC 112/VDE0 303, part 1			175	
Isolation resistance	$V_{IO} = 500\ \text{V}, T_{amb} = 25\text{ °C}$	$R_{IO}$	$\geq 10^{12}$	$\Omega$
	$V_{IO} = 500\ \text{V}, T_{amb} = 100\text{ °C}$	$R_{IO}$	$\geq 10^{11}$	$\Omega$
Storage temperature		$T_{stg}$	- 55 to + 150	$^{\circ}\text{C}$
Ambient temperature		$T_{amb}$	- 55 to + 100	$^{\circ}\text{C}$
Junction temperature		$T_j$	100	$^{\circ}\text{C}$
Soldering temperature	max. 10 s. Dip Soldering distance to seating plane $\geq 1.5\ \text{mm}$	$T_{sld}$	260	$^{\circ}\text{C}$

## Electrical Characteristics

$T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified

Minimum and maximum values are testing requirements. Typical values are characteristics of the device and are the result of engineering evaluation. Typical values are for information only and are not part of the testing requirements.

### Input

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Forward voltage	$I_F = \pm 60\text{ mA}$	$V_F$		1.25	1.65	V
Capacitance	$V_R = 0\text{ V}$ , $f = 1.0\text{ MHz}$	$C_O$		50		pF
Thermal resistance		$R_{thja}$		750		K/W

### Output

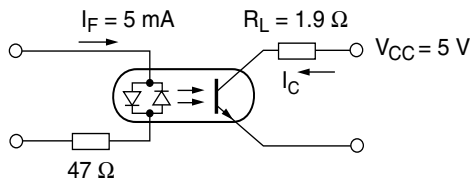
Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Collector-emitter capacitance	$V_{CE} = 5.0\text{ V}$ , $f = 1.0\text{ MHz}$	$C_{CE}$		6.8		pF
Thermal resistance		$R_{thja}$		500		K/W

### Coupler

Parameter	Test condition	Part	Symbol	Min	Typ.	Max	Unit
Collector-emitter saturation voltage	$I_F = 10\text{ mA}$ , $I_C = 2.5\text{ mA}$		$V_{CEsat}$		0.25	0.4	V
Coupling capacitance			$C_C$		0.2		pF
Collector-emitter leakage current	$V_{CE} = 10\text{ V}$	SFH620AA	$I_{CEO}$		10	100	nA
		SFH620AGB	$I_{CEO}$		10	100	nA

### Current Transfer Ratio

Parameter	Test condition	Part	Symbol	Min	Typ.	Max	Unit
$I_C/I_F$	$I_F = \pm 5\text{ mA}$ , $V_{CE} = 5.0\text{ V}$	SFH620AA			50-600		%
		SFH620AGB			100-600		%



isfh620aa\_0

Figure 1. Switching Times (Typical Values) Linear Operation (saturated)

## Switching Characteristics

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Turn-on time	$I_F = 5 \text{ mA}$ , $R_L = 1.9 \text{ K}\Omega$ , $V_{CC} = 5 \text{ V}$	$t_{on}$		2.0		$\mu\text{s}$
Turn-off time	$I_F = 5 \text{ mA}$ , $R_L = 1.9 \text{ K}\Omega$ , $V_{CC} = 5 \text{ V}$	$t_{off}$		25		$\mu\text{s}$

## Typical Characteristics ( $T_{amb} = 25 \text{ }^\circ\text{C}$ unless otherwise specified)

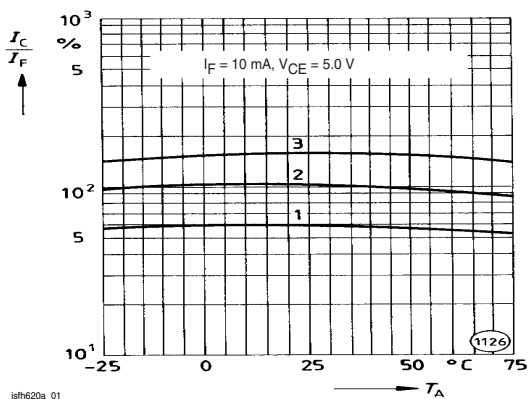


Figure 2. Current Transfer Ratio (CTR) vs. Temperature

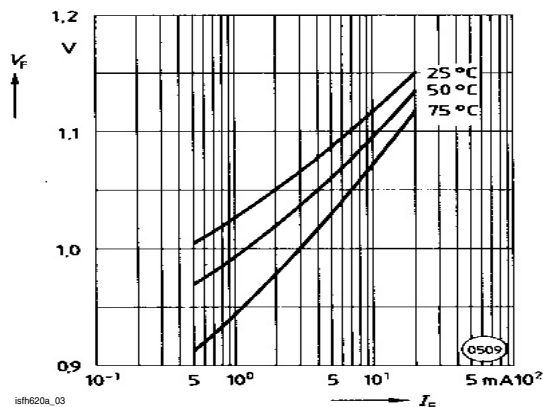


Figure 4. Diode Forward Voltage (typ.) vs. Forward Current

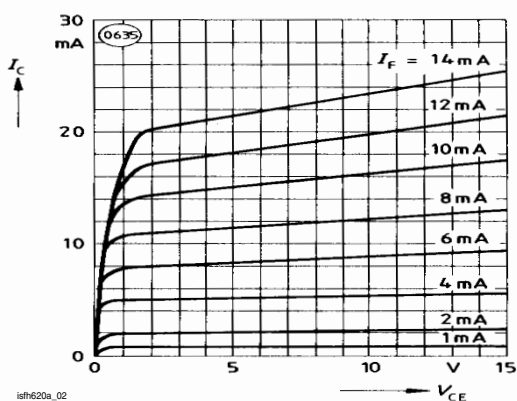


Figure 3. Output Characteristics (typ.) Collector Current vs. Collector-Emitter Voltage

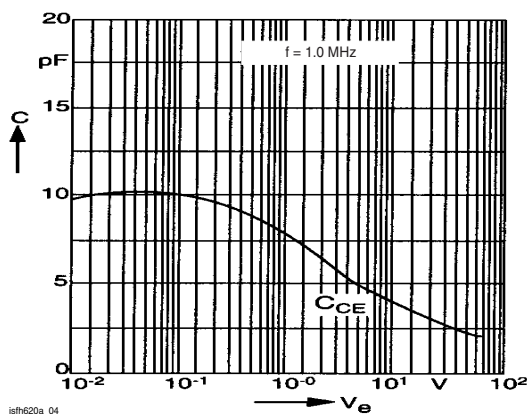


Figure 5. Transistor Capacitance (typ.) vs. Collector-Emitter Voltage

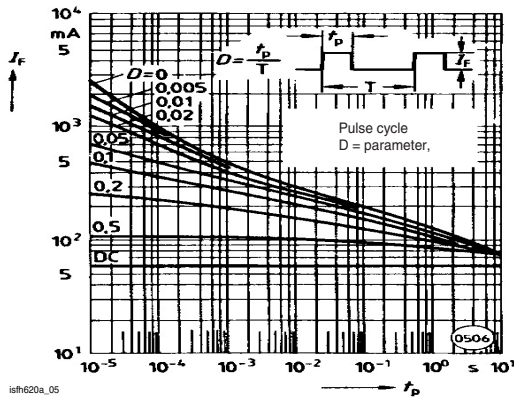


Figure 6. Permissible Pulse Handling Capability Forward Current vs. Pulse Width

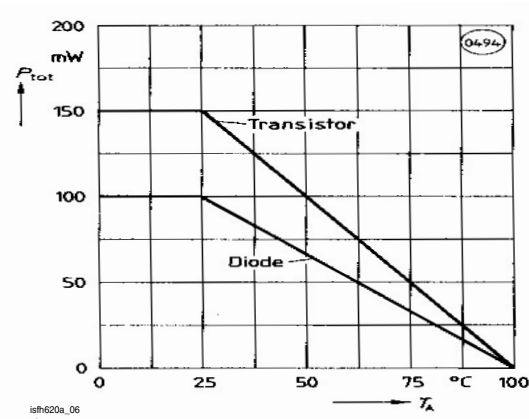


Figure 7. Permissible Power Dissipation vs. Ambient Temperature

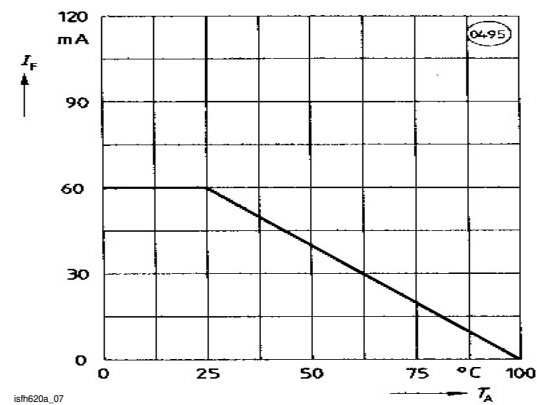


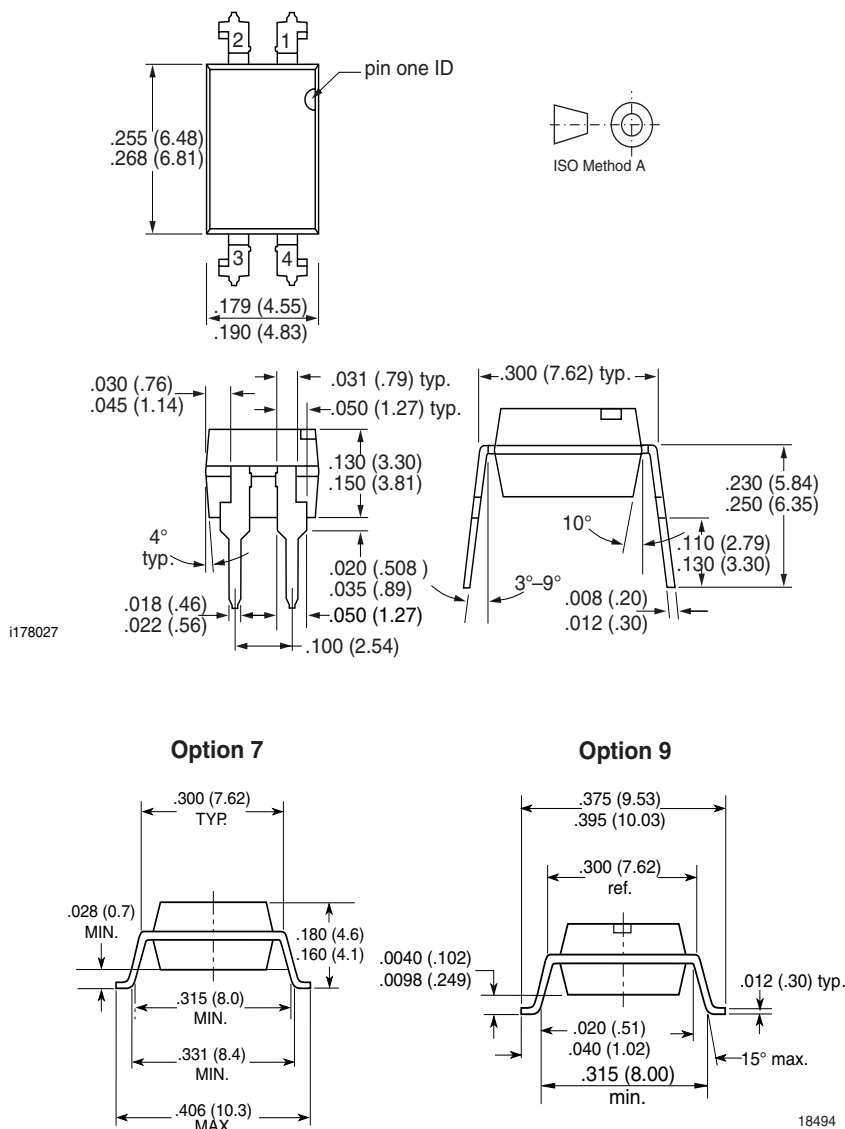
Figure 8. Permissible Diode Forward Current vs. Ambient Temperature

# SFH620AA/ SFH620AGB



Vishay Semiconductors

## Package Dimensions in Inches (mm)





## Ozone Depleting Substances Policy Statement

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1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

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