

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

### Features

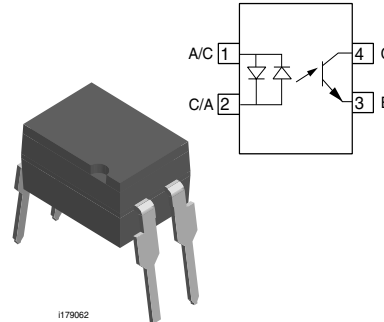
- High Current Transfer Ratios
- at 5 mA: 50-600 %
- at 1.0 mA: 45 % typical (> 13)
- Low CTR Degradation
- Good CTR Linearity Depending on Forward Current
- Isolation Test Voltage, 5300 V<sub>RMS</sub>
- High Collector-emitter Voltage, V<sub>CEO</sub> = 70 V
- Low Saturation Voltage
- Fast Switching 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

$T_{amb} = 25\text{ }^{\circ}\text{C}$ , 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   | $t_p \leq 10\text{ }\mu\text{s}$ | $I_{FSM}$  | $\pm 2.5$ | 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   | $V_{IO} = 500\text{ V}$ , $T_{amb} = 25\text{ }^{\circ}\text{C}$              | $R_{IO}$  | $\geq 10^{12}$ | $\Omega$           |
|  | $V_{IO} = 500\text{ V}$ , $T_{amb} = 100\text{ }^{\circ}\text{C}$             | $R_{IO}$  | $\geq 10^{11}$ | $\Omega$           |
| 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<br>distance to seating plane<br>$\geq 1.5\text{ mm}$ | $T_{sld}$ | 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

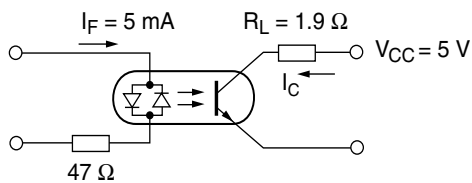
| Parameter                     | Test condition                                 | Symbol     | Min | Typ. | Max | Unit |
|-------------------------------|--|------------|-----|------|-----|------|
| Collector-emitter capacitance | $V_{CE} = 5.0\text{ V}$ , $f = 1.0\text{ MHz}$ | $C_{CE}$   |     | 6.8  |     | 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 ( $T_{amb} = 25^\circ\text{C}$ unless otherwise specified)

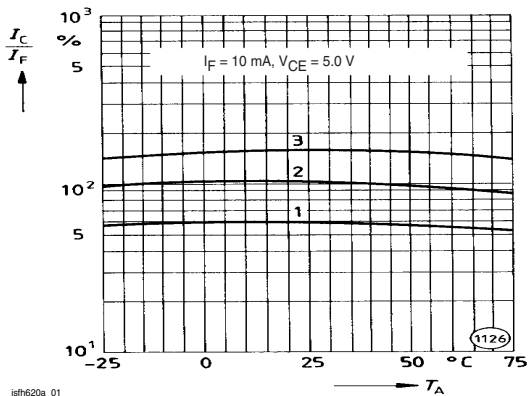


Figure 2. Current Transfer Ratio (CTR) vs. Temperature

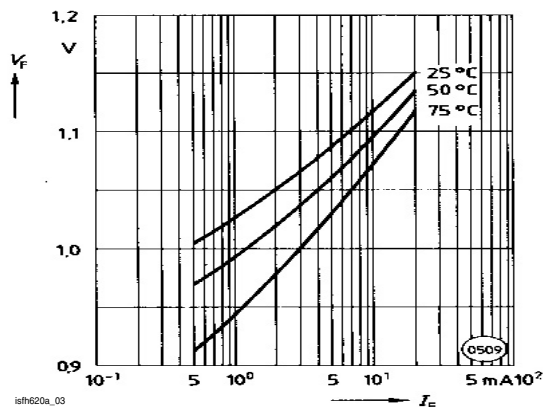


Figure 4. Diode Forward Voltage (typ.) vs. Forward Current

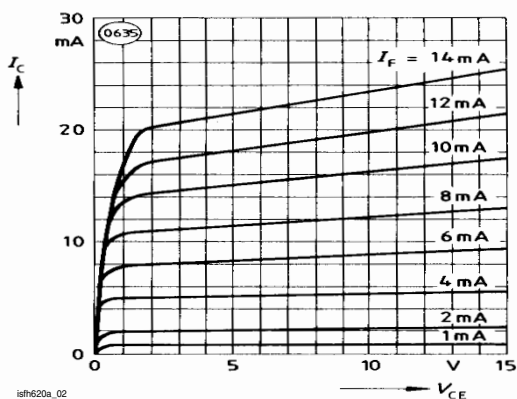


Figure 3. Output Characteristics (typ.) Collector Current vs. Collector-Emitter Voltage

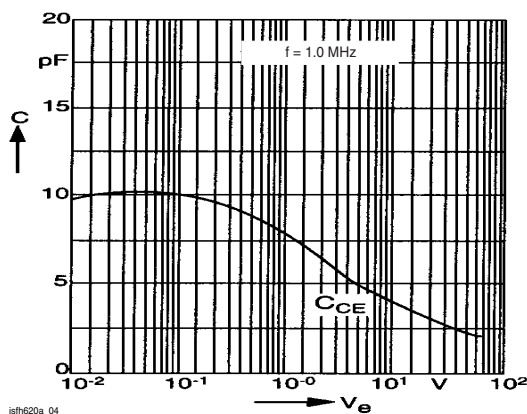


Figure 5. Transistor Capacitance (typ.) vs. Collector-Emitter Voltage

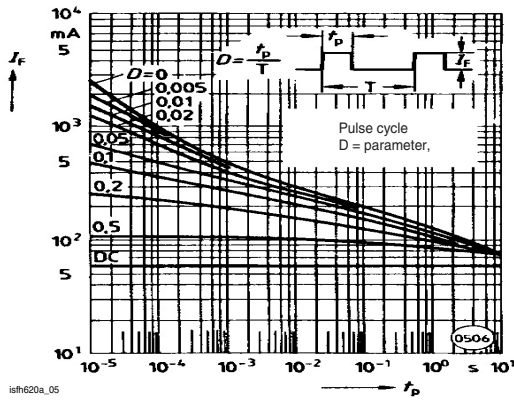


Figure 6. Permissible Pulse Handling Capability Forward Current vs. Pulse Width

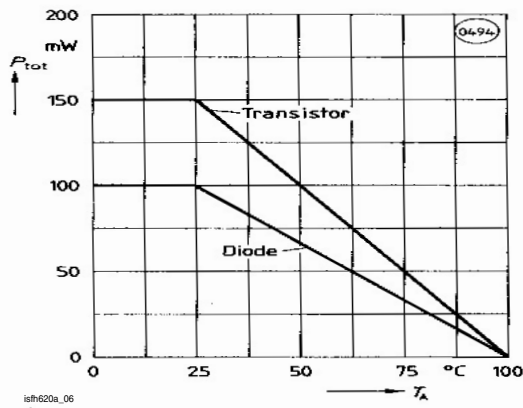


Figure 7. Permissible Power Dissipation vs. Ambient Temperature

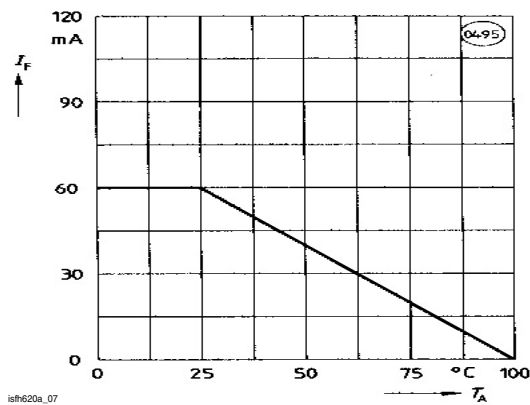


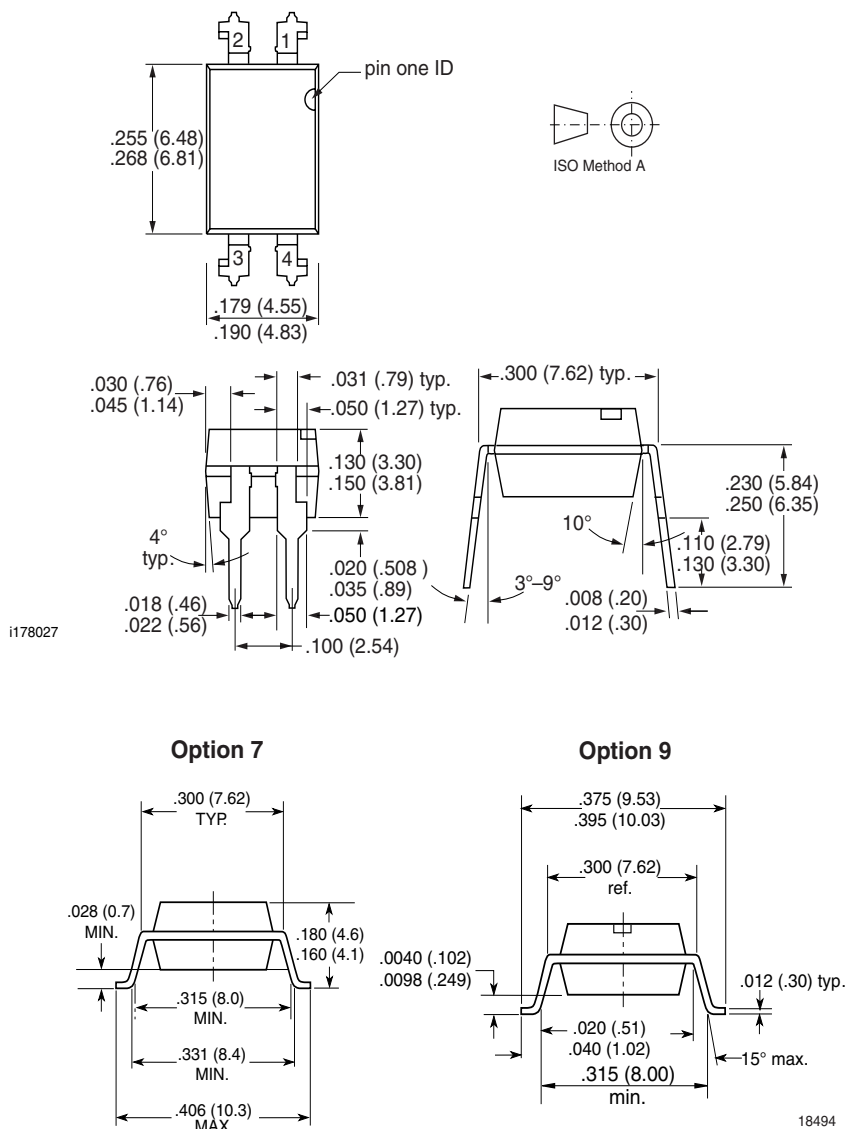
Figure 8. Permissible Diode Forward Current vs. Ambient Temperature

# SFH620AA/ SFH620AGB



Vishay Semiconductors

## Package Dimensions in Inches (mm)





## Ozone Depleting Substances Policy Statement

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3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

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- Изготовление тестовой платы монтаж и пусконаладочные работы.



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