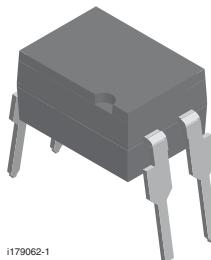
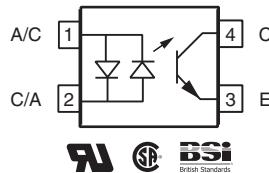


Optocoupler, Phototransistor Output, AC Input, 5300 V_{RMS}



i179062-1


RoHS
COMPLIANT

FEATURES

- High current transfer ratios
 - at 5 mA: 50 to 600 %
 - at 1.0 mA: 45 % typical (> 13)
- 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
- Temperature stable
- Low coupling capacitance
- End stackable, 0.100" (2.54 mm) spacing
- High common mode interference immunity (unconnected base)
- SMD option, see SFH620A, SFH6206 datasheet
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

AGENCY APPROVALS

- UL1577, file no. E52744 system code H, double protection
- CSA 93751
- BSI IEC 60950; IEC 60065
- VDE 0884-5, DIN EN 60747-5-5, available with option 1

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. This version complies with IEC 60950 (DIN VDE 0805) for reinforced insulation up to an operation voltage of 400 V_{RMS} or DC.

ORDERING INFORMATION

| | | | | | | | | | | | | | | | |
|--------------------------|-----------|---|---|---|---|---|----------------|---|---|---|---|---|---|------------------|--|
| S | F | H | 6 | 2 | 0 | A | x | x | - | X | 0 | 0 | 1 | DIP-4 7.62 mm | |
| PART NUMBER | | | | | | | | | | | | | | | |
| CTR (%) ± 5 mA | | | | | | | | | | | | | | | |
| AGENCY CERTIFIED/PACKAGE | | | | | | | | | | | | | | | |
| UL, CSA, BSI | 50 to 600 | | | | | | 100 to 600 | | | | | | | | |
| DIP-4 | SFH620AA | | | | | | SFH620AGB | | | | | | | | |
| VDE, UL, CSA, BSI | 50 to 600 | | | | | | 100 to 600 | | | | | | | | |
| DIP-4 | - | | | | | | SFH620AGB-X001 | | | | | | | | |

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)

| PARAMETER | TEST CONDITION | SYMBOL | VALUE | UNIT |
|---------------------------|-------------------------|-------------------|-------|------|
| INPUT | | | | |
| DC forward current | | I _F | ± 60 | mA |
| Surge forward current | t _p ≤ 1.0 µs | I _{FSM} | ± 2.5 | A |
| Total power dissipation | | P _{diss} | 100 | mW |
| OUTPUT | | | | |
| Collector emitter voltage | | V _{CE} | 70 | V |
| Emitter collector voltage | | V _{EC} | 7 | V |
| Collector current | | I _C | 50 | mA |
| | t _p ≤ 1.0 ms | I _C | 100 | mA |
| Power dissipation | | P _{diss} | 150 | mW |

| ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25^\circ\text{C}$, unless otherwise specified) | | | | |
|--|--|-----------|----------------|------------------|
| PARAMETER | TEST CONDITION | SYMBOL | VALUE | UNIT |
| COUPLER | | | | |
| Isolation test voltage between emitter and detector | | V_{ISO} | 5300 | V_{RMS} |
| Creepage distance | | | ≥ 7 | mm |
| Clearance distance | | | ≥ 7 | mm |
| Insulation thickness between emitter and detector | | | ≥ 0.4 | mm |
| Comparative tracking index per DIN IEC 112/VDE 0303 part 1 | | CTI | ≥ 175 | |
| Isolation resistance | $V_{IO} = 500 \text{ V}, T_{amb} = 25^\circ\text{C}$ | R_{IO} | $\geq 10^{12}$ | Ω |
| | $V_{IO} = 500 \text{ V}, T_{amb} = 100^\circ\text{C}$ | R_{IO} | $\geq 10^{11}$ | Ω |
| 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 ⁽¹⁾ | max. 10 s, dip soldering distance to seating plane $\geq 1.5 \text{ mm}$ | T_{sld} | 260 | $^\circ\text{C}$ |

Notes

- 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 ratings for extended periods of the time can adversely affect reliability.

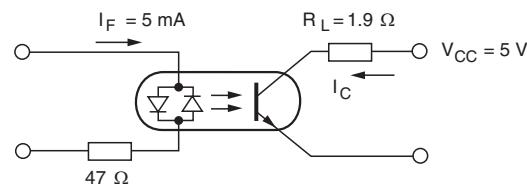
(1) Refer to reflow profile for soldering conditions for surface mounted devices (SMD). Refer to wave profile for soldering conditions for through hole devices (DIP).

| ELECTRICAL CHARACTERISTICS ($T_{amb} = 25^\circ\text{C}$, unless otherwise specified) | | | | | | | |
|--|---|-----------|-------------|------|------|------|------|
| PARAMETER | TEST CONDITION | PART | SYMBOL | MIN. | TYP. | MAX. | UNIT |
| INPUT | | | | | | | |
| Forward voltage | $I_F = \pm 60 \text{ mA}$ | | V_F | | 1.25 | 1.65 | V |
| Capacitance | $V_R = 0 \text{ V}, f = 1 \text{ MHz}$ | | C_O | | 50 | | pF |
| Thermal resistance | | | R_{thja} | | 750 | | K/W |
| OUTPUT | | | | | | | |
| Collector emitter capacitance | $V_{CE} = 5 \text{ V}, f = 1 \text{ MHz}$ | | C_{CE} | | 6.8 | | pF |
| Thermal resistance | | | R_{thja} | | 500 | | K/W |
| COUPLER | | | | | | | |
| Collector emitter saturation voltage | $I_F = \pm 10 \text{ mA}, I_C = 2.5 \text{ mA}$ | | 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 |

Note

- 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.

| CURRENT TRANSFER RATIO ($T_{amb} = 25^\circ\text{C}$, unless otherwise specified) | | | | | | | |
|--|--|-----------|--------|------|------|------|------|
| PARAMETER | TEST CONDITION | PART | SYMBOL | MIN. | TYP. | MAX. | UNIT |
| I_C/I_F | $I_F = \pm 5 \text{ mA}, V_{CE} = 5 \text{ V}$ | SFH620AA | CTR | 50 | | 600 | % |
| | | SFH620AGB | | 100 | | 600 | % |



isfh620aa_0

Fig. 1 - Switching Times (Typical Values)
Linear Operation (Saturated)

| SWITCHING CHARACTERISTICS ($T_{amb} = 25^{\circ}C$, unless otherwise specified) | | | | | | |
|--|---|-----------|------|------|------|------|
| PARAMETER | TEST CONDITION | SYMBOL | MIN. | TYP. | MAX. | UNIT |
| Turn-on time | $I_F = \pm 5 \text{ mA}, R_L = 1.9 \text{ k}\Omega, V_{CC} = 5 \text{ V}$ | t_{on} | | 2 | | μs |
| Turn-off time | $I_F = \pm 5 \text{ mA}, R_L = 1.9 \text{ k}\Omega, V_{CC} = 5 \text{ V}$ | t_{off} | | 25 | | μs |

| SAFETY AND INSULATION RATINGS | | | | | | |
|---|------------------------|--------|-------|-----------|------|------|
| PARAMETER | TEST CONDITION | SYMBOL | MIN. | TYP. | MAX. | UNIT |
| Climatic classification (according to IEC 68 part 1) | | | | 55/100/21 | | |
| Comparative tracking index | | CTI | 175 | | 399 | |
| V_{IOTM} | | | 10000 | | | V |
| V_{IORM} | | | 890 | | | V |
| P_{SO} | | | | | 400 | mW |
| I_{SI} | | | | | 275 | mA |
| T_{SI} | | | | | 175 | °C |
| Creepage distance | standard DIP-4 | | 7 | | | mm |
| Clearance distance | standard DIP-4 | | 7 | | | mm |
| Insulation thickness, reinforced rated | per IEC 60950 2.10.5.1 | | 0.4 | | | mm |

Note

- As per IEC 60747-5-5, this optocoupler is suitable for “safe electrical insulation” only within the safety ratings. Compliance with the safety ratings shall be ensured by means of protective circuits.

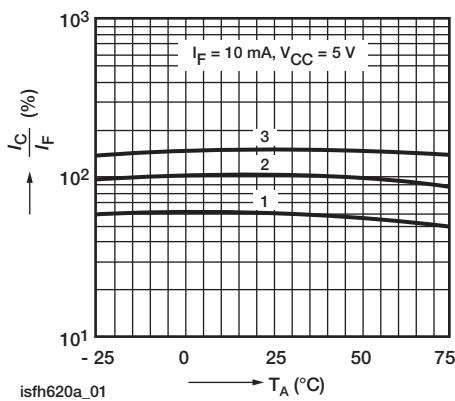
TYPICAL CHARACTERISTICS ($T_{amb} = 25^{\circ}C$, unless otherwise specified)


Fig. 2 - Current Transfer Ratio (CTR) vs. Temperature

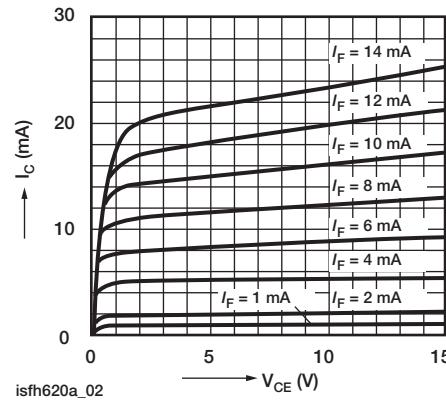


Fig. 3 - Output Characteristics (Typ.) Collector Current vs. Collector Emitter Voltage

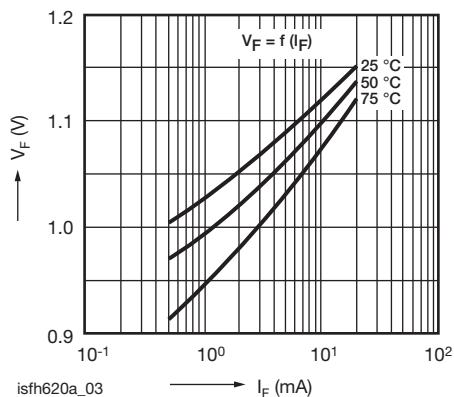


Fig. 4 - Diode Forward Voltage (Typ.) vs. Forward Current

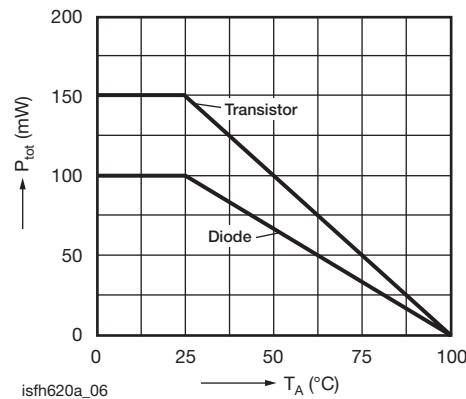


Fig. 7 - Permissible Power Dissipation vs. Ambient Temperature

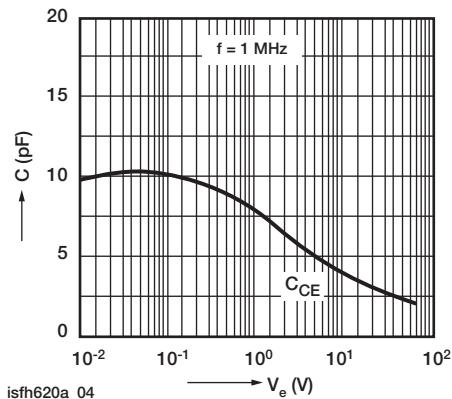


Fig. 5 - Transistor Capacitance (Typ.) vs. Collector Emitter Voltage

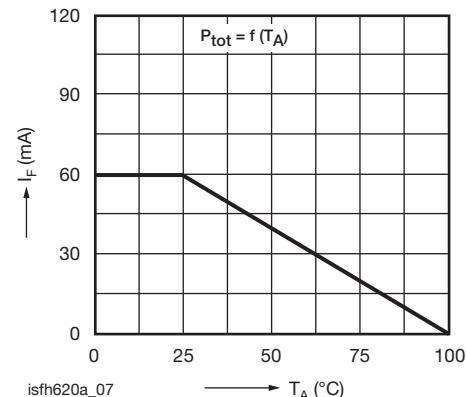


Fig. 8 - Permissible Diode Forward Current vs. Ambient Temperature

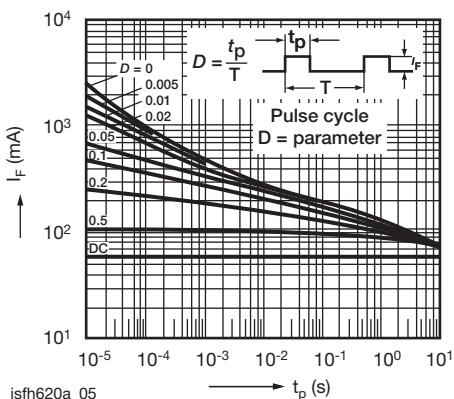
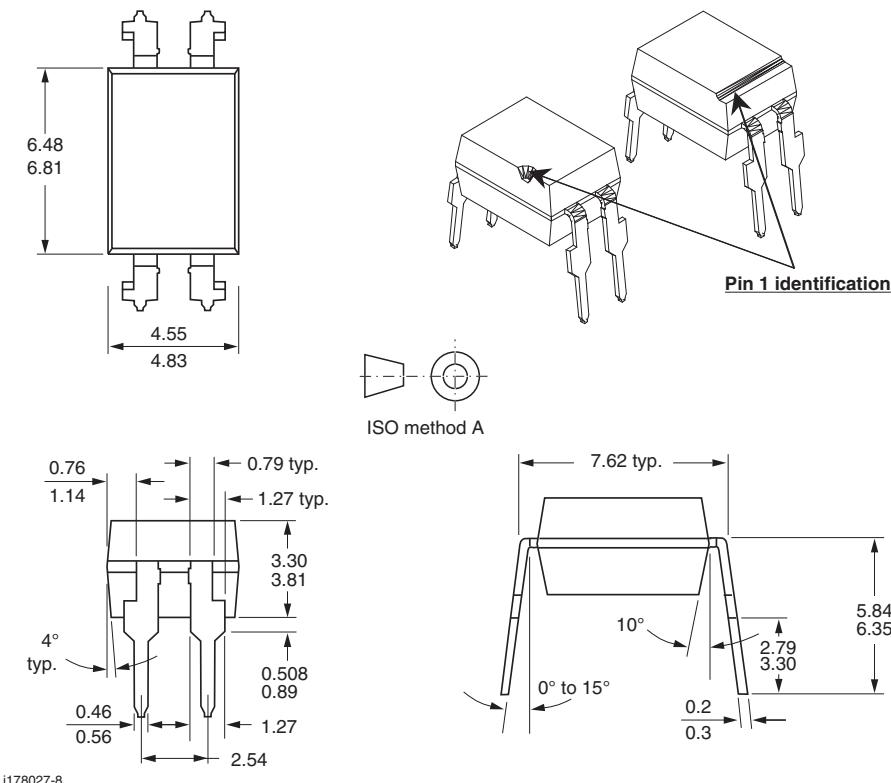
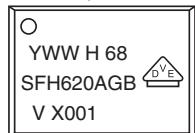


Fig. 6 - Permissible Pulse Handling Capability Forward Current vs. Pulse Width

PACKAGE DIMENSIONS in millimeters

PACKAGE MARKING (example of SFH620AGB-X001)

Note

- The VDE logo is only marked on option1 parts.

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