

SFH615A-1, SFH615A-2,
SFH615A-3, SFH615A-4



**LOW INPUT CURRENT
PHOTOTRANSISTOR
OPTICALLY COUPLED ISOLATORS**

APPROVALS

- UL recognised, File No. E91231

DESCRIPTION

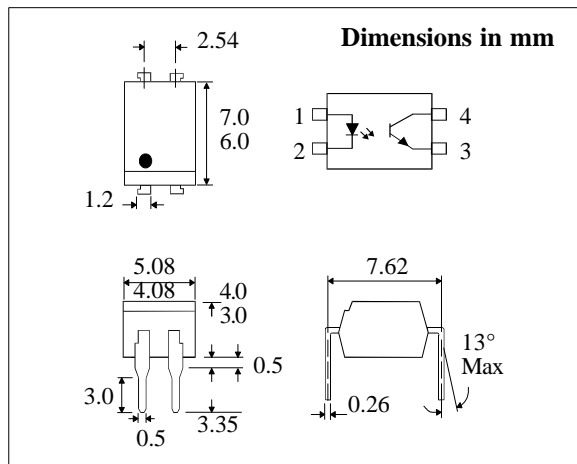
The SFH615A series of optically coupled isolators consist of infrared light emitting diodes and NPN silicon photo transistors in space efficient dual in line plastic packages.

FEATURES

- Options :-
10mm lead spread - add G after part no.
Surface mount - add SM after part no.
Tape&reel - add SMT&R after part no.
- Low input current 1mA I_F
- High Current Transfer Ratios (40-320% at 10mA, 13% min at 1mA)
- High Isolation Voltage (5.3kV_{RMS}, 7.5kV_{PK})
- High BV_{CEO} (70V min)
- All electrical parameters 100% tested
- Custom electrical selections available

APPLICATIONS

- Computer terminals
- Industrial systems controllers
- Measuring instruments
- Signal transmission between systems of different potentials and impedances



**ABSOLUTE MAXIMUM RATINGS
(25°C unless otherwise specified)**

| | |
|---|------------------|
| Storage Temperature | -55°C to + 125°C |
| Operating Temperature | -55°C to + 100°C |
| Lead Soldering Temperature (1/16 inch (1.6mm) from case for 10 secs) | 260°C |

INPUT DIODE

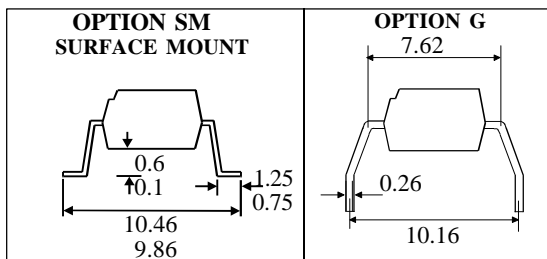
| | |
|-------------------|------|
| Forward Current | 50mA |
| Reverse Voltage | 6V |
| Power Dissipation | 70mW |

OUTPUT TRANSISTOR

| | |
|--------------------------------------|-------|
| Collector-emitter Voltage BV_{CEO} | 70V |
| Emitter-collector Voltage BV_{ECO} | 6V |
| Power Dissipation | 150mW |

POWER DISSIPATION

| | |
|--|-------|
| Total Power Dissipation | 200mW |
| (derate linearly 2.67mW/°C above 25°C) | |



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ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ Unless otherwise noted)

| PARAMETER | | MIN | TYP | MAX | UNITS | TEST CONDITION |
|---|---|-----------|-----|----------|---------------------------------|---|
| Input | Forward Voltage (V_F) | | | 1.65 | V | $I_F = 50\text{mA}$ $I_R = 10\mu\text{A}$ $V_R = 6\text{V}$ |
| | Reverse Voltage (V_R) | 6 | | | V | |
| | Reverse Current (I_R) | | | 10 | μA | |
| Output | Collector-emitter Breakdown (BV_{CEO}) (Note 2) | 70 | | | V | $I_C = 1\text{mA}$ $I_E = 100\mu\text{A}$ $V_{CE} = 10\text{V}$ |
| | Emitter-collector Breakdown (BV_{ECO}) | 6 | | | V | |
| | Collector-emitter Dark Current (I_{CEO}) SFH615A-1,2 | | | 50 | nA | |
| | SFH615A-3,4 | | | 100 | nA | |
| Coupled | Current Transfer Ratio (CTR) (Note 2) | SFH615A-1 | 40 | 80 | % | $10\text{mA } I_F, 5\text{V } V_{CE}$ |
| | | SFH615A-2 | 63 | 125 | % | |
| | | SFH615A-3 | 100 | 200 | % | |
| | | SFH615A-4 | 160 | 320 | % | |
| | | SFH615A-1 | 13 | | % | $1\text{mA } I_F, 5\text{V } V_{CE}$ |
| | | SFH615A-2 | 22 | | % | |
| | | SFH615A-3 | 34 | | % | |
| | | SFH615A-4 | 56 | | % | |
| | Collector-emitter Saturation Voltage V_{CESAT} | | | 0.4 | V | $10\text{mA } I_F, 2.5\text{mA } I_C$ |
| | Input to Output Isolation Voltage V_{ISO} | 5300 | | | V_{RMS} | See note 1 |
| | 7500 | | | V_{PK} | See note 1 | |
| Input-output Isolation Resistance R_{ISO} | 5×10^{10} | | | Ω | $V_{IO} = 500\text{V}$ (note 1) | |

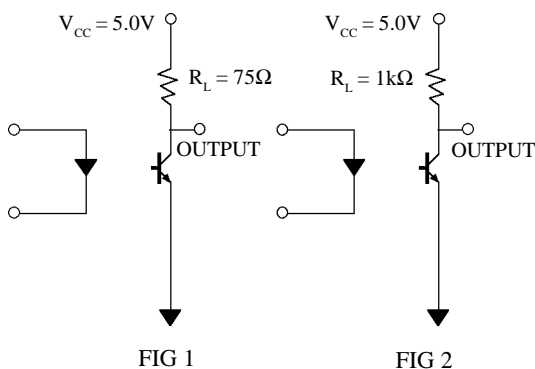
Note 1 Measured with input leads shorted together and output leads shorted together.

Note 2 Special Selections are available on request. Please consult the factory.

SWITCHING CHARACTERISTICS

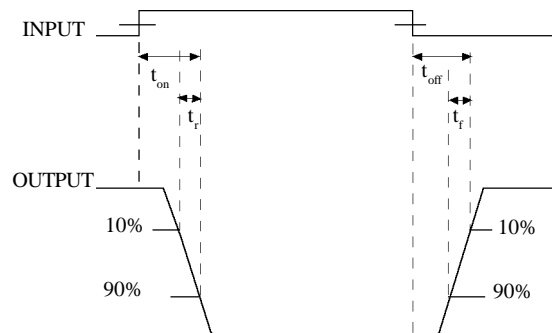
1. Linear Operation (without saturation) Fig 1.
 $I_F = 10\text{mA}$, $V_{CC} = 5\text{V}$, $R_L = 75\Omega$

| | | | UNITS |
|-------------------|-----------|-----|---------------|
| 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 |

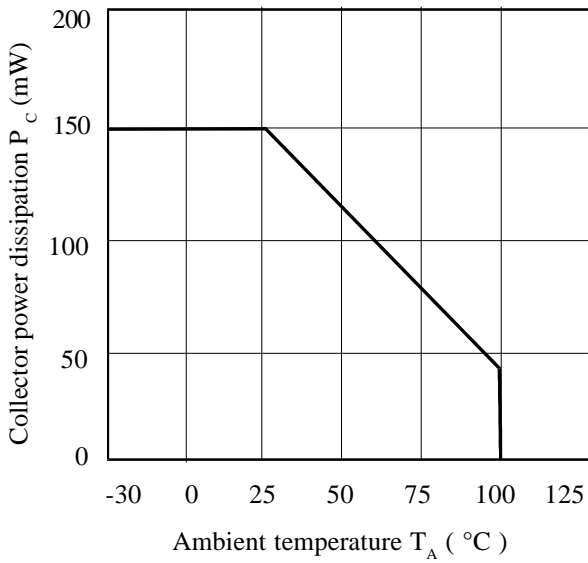


2. Switching Operation (with saturation) Fig 2
 $V_{CC} = 5\text{V}$, $R_L = 1\text{k}\Omega$

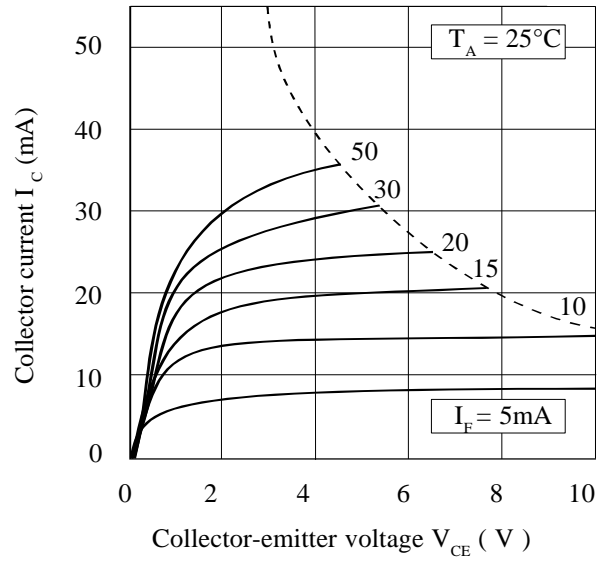
| GROUP | -1 ($I_F=20\text{mA}$) | -2 and -3 ($I_F=10\text{mA}$) | -4 ($I_F=5\text{mA}$) | UNITS | |
|---------------|-----------------------------|------------------------------------|----------------------------|------------|---------------|
| Turn-on Time | t_{on} | 3.0 | 4.2 | 6.0 | μs |
| Rise Time | 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 |
| V_{CESAT} | | | | ≤ 0.4 | V |



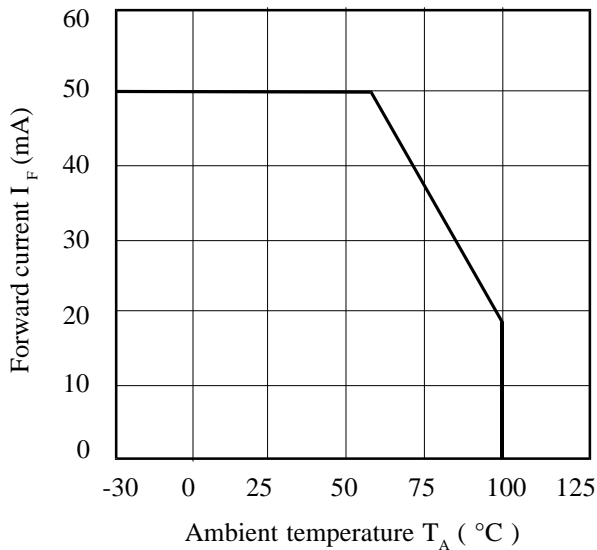
Collector Power Dissipation vs. Ambient Temperature



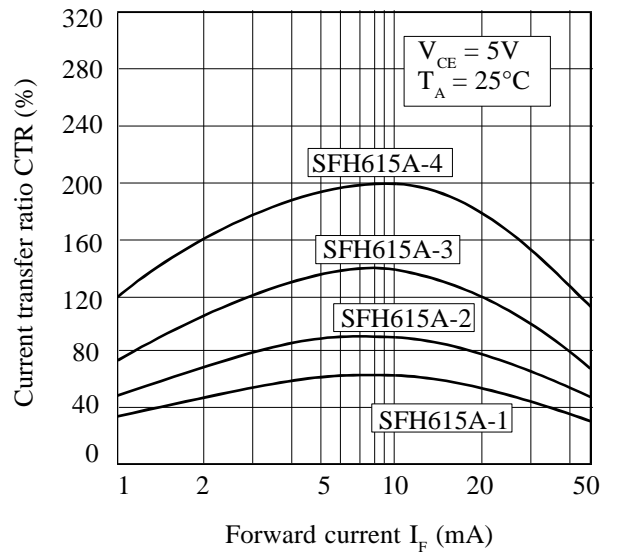
Collector Current vs. Collector-emitter Voltage (normalised to SFH615A-3)



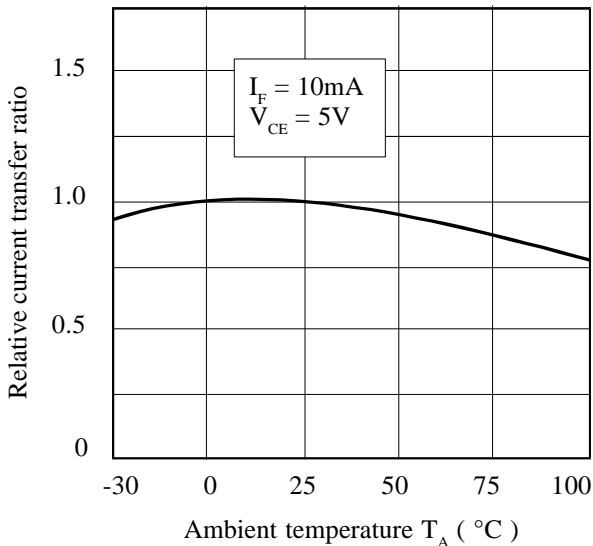
Forward Current vs. Ambient Temperature



Current Transfer Ratio vs. Forward Current



Relative Current Transfer Ratio vs. Ambient Temperature



Collector-emitter Saturation Voltage vs. Ambient Temperature

