

SFH600-0, SFH600-1, SFH600-2, SFH600-3, SFH600-4  
 SFH601-1, SFH601-2, SFH601-3, SFH601-4, SFH601-5  
 SFH609-1, SFH609-2, SFH609-3, SFH609-4, SFH609-5



**OPTICALLY COUPLED  
 ISOLATOR  
 PHOTOTRANSISTOR OUTPUT**

**APPROVALS**

- UL recognised, File No. E91231
- 'X' SPECIFICATION APPROVALS
  - VDE 0884 in 3 available lead forms :-
    - STD
    - G form
    - SMD approved to CECC 00802
 Excludes SFH609-4,-5
  - Certified to EN60950 by the following Test Bodies :-
    - Nemko - Certificate No. P01102465
    - Fimko - Certificate No. FI18162
    - Semko - Reference No. 0202041/01-25
    - Demko - Certificate No. 311161-01
 Excludes SFH600-0, 601-2, 609-4,-5
  - BSI approved - Certificate No. 8001

**DESCRIPTION**

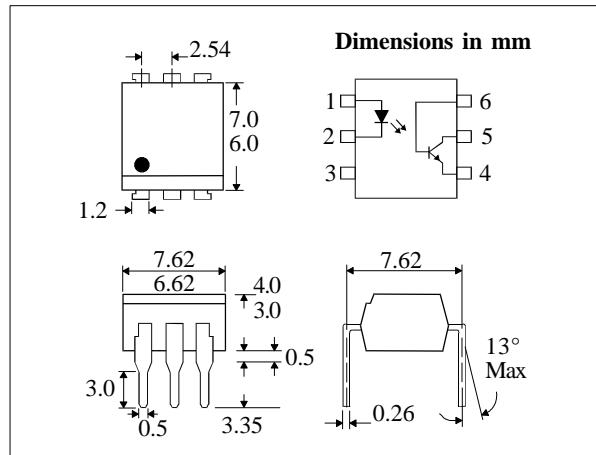
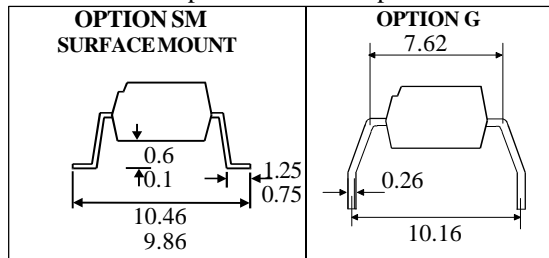
The SFH600-, SFH601-, SFH609-\_ series of optically coupled isolators consist of an infrared light emitting diode and a NPN silicon photo transistor in a standard 6 pin dual in line plastic package.

**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.
- High  $BV_{CEO}$  (70V, 90V, 100V min)
- High Isolation Voltage (5.3kV<sub>RMS</sub>, 7.5kV<sub>PK</sub>)
- All electrical parameters 100% tested
- Custom electrical selections available

**APPLICATIONS**

- DC motor controllers
- 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 + 150°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 \_\_\_\_\_ 60mA  
 Reverse Voltage \_\_\_\_\_ 6V  
 Power Dissipation \_\_\_\_\_ 105mW

**OUTPUT TRANSISTOR**

Collector-emitter Voltage  $BV_{CEO}$   
 SFH600-0,1,2,3,4 \_\_\_\_\_ 70V  
 SFH601-1,2,3,4,5 \_\_\_\_\_ 100V  
 SFH609-1,2,3,4,5 \_\_\_\_\_ 90V  
 Collector-base Voltage  $BV_{CBO}$   
 SFH600-0,1,2,3,4 \_\_\_\_\_ 70V  
 SFH601-1,2,3,4,5 \_\_\_\_\_ 100V  
 SFH609-1,2,3,4,5 \_\_\_\_\_ 90V  
 Emitter-collector Voltage  $BV_{ECO}$  \_\_\_\_\_ 6V  
 Power Dissipation \_\_\_\_\_ 160mW

**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 ( $V_F$ )		1.2	1.65	V	$I_F = 60\text{mA}$
	Reverse Current ( $I_R$ )			10	$\mu\text{A}$	$V_R = 6\text{V}$
Output	Collector-emitter Breakdown ( $BV_{CEO}$ ) SFH600-0, 1, 2, 3, 4	70			V	$I_C = 1\text{mA}$ ( Note 2 )
	SFH601-1, 2, 3, 4, 5	100			V	
	SFH609-1, 2, 3, 4, 5	90			V	
	Collector-base Breakdown ( $BV_{CBO}$ ) SFH600-0, 1, 2, 3, 4	70			V	$I_C = 100\mu\text{A}$
	SFH601-1, 2, 3, 4, 5	100			V	
	SFH609-1, 2, 3, 4, 5	90			V	
	Emitter-collector Breakdown ( $BV_{ECO}$ )	6			V	$I_E = 100\mu\text{A}$
	Collector-emitter Dark Current ( $I_{CEO}$ )			50	nA	$V_{CE} = 10\text{V}$
Coupled	Current Transfer Ratio (CTR) (Note 2)					
	SFH600-0, SFH601-1, SFH609-1	40		80	%	$10\text{mA } I_F, 5\text{V } V_{CE}$
	SFH600-1, SFH601-2, SFH609-2	63		125	%	$10\text{mA } I_F, 5\text{V } V_{CE}$
	SFH600-2, SFH601-3, SFH609-3	100		200	%	$10\text{mA } I_F, 5\text{V } V_{CE}$
	SFH600-3, SFH601-4, SFH609-4	160		320	%	$10\text{mA } I_F, 5\text{V } V_{CE}$
	SFH600-4, SFH601-5, SFH609-5	200		400	%	$10\text{mA } I_F, 5\text{V } V_{CE}$
	SFH600-0, SFH601-1, SFH609-1	13			%	$1\text{mA } I_F, 5\text{V } V_{CE}$
	SFH600-1, SFH601-2, SFH609-2	22			%	$1\text{mA } I_F, 5\text{V } V_{CE}$
	SFH600-2, SFH601-3, SFH609-3	34			%	$1\text{mA } I_F, 5\text{V } V_{CE}$
	SFH600-3, SFH601-4, SFH609-4	56			%	$1\text{mA } I_F, 5\text{V } V_{CE}$
	SFH600-4, SFH601-5, SFH609-5	68			%	$1\text{mA } I_F, 5\text{V } V_{CE}$
	Collector-emitter Saturation Voltage $V_{CE(SAT)}$			0.4	V	$10\text{mA } I_F, 2.5\text{mA}$
	Input to Output Isolation Voltage $V_{ISO}$	5300			$V_{RMS}$	See note 1
		7500			$V_{PK}$	See note 1
Input-output Isolation Resistance $R_{ISO}$	$5 \times 10^{10}$			$\Omega$	$V_{IO} = 500\text{V}$ (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.

**TYPICAL 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	$\mu\text{s}$
Rise Time $t_r$	2.0	$\mu\text{s}$
Turn-off Time $t_{off}$	2.3	$\mu\text{s}$
Fall Time $t_f$	2.0	$\mu\text{s}$
Cut-off Frequency $F_{CO}$	250	kHz

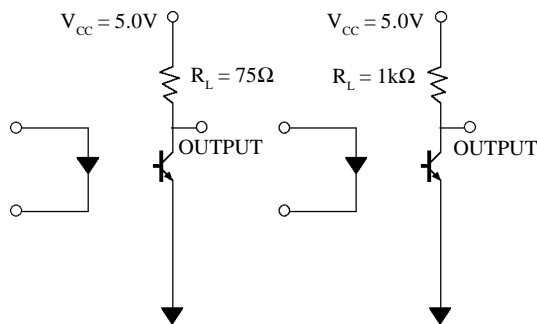


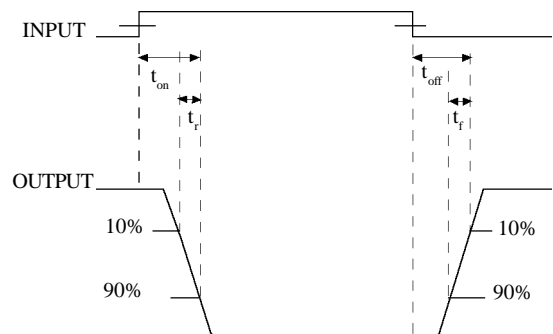
FIG 1

FIG 2

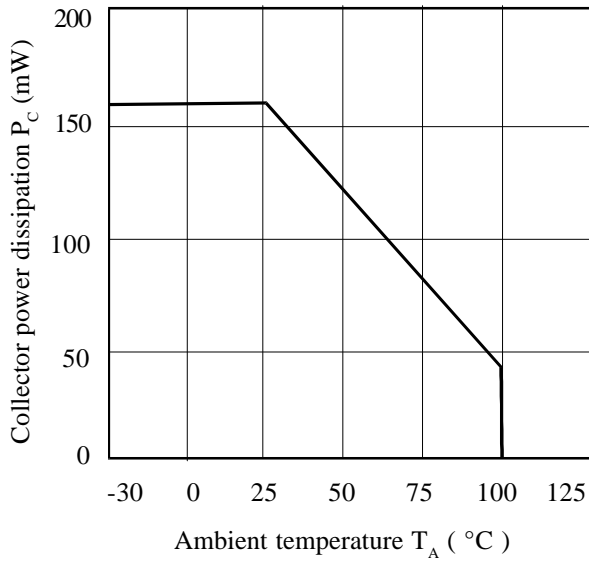
2. Switching Operation (with saturation) Fig 2

$V_{CC} = 5\text{V}, R_L = 1\text{k}\Omega$

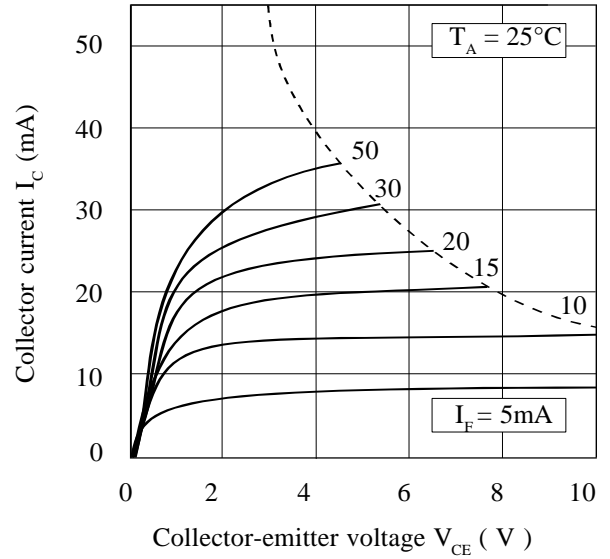
GROUP	600-0 601/9-1 ( $I_F = 20\text{mA}$ )	600-1&2 601/9-2&3 ( $I_F = 10\text{mA}$ )	600-3 601/9-4&5 ( $I_F = 5\text{mA}$ )	UNITS
Turn-on Time $t_{on}$	3.0	4.2	6.0	$\mu\text{s}$
Rise Time $t_r$	2.0	3.0	4.6	$\mu\text{s}$
Turn-off Time $t_{off}$	18	23	25	$\mu\text{s}$
Fall Time $t_f$	11	14	15	$\mu\text{s}$
$V_{CESAT}$	$\leq 0.4$			V



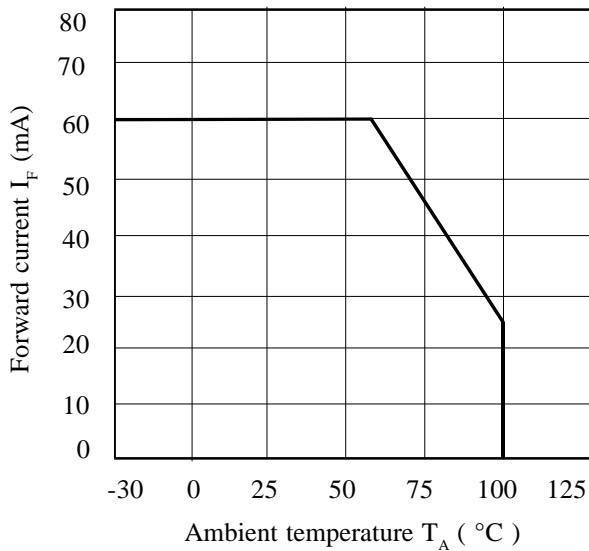
**Collector Power Dissipation vs. Ambient Temperature**



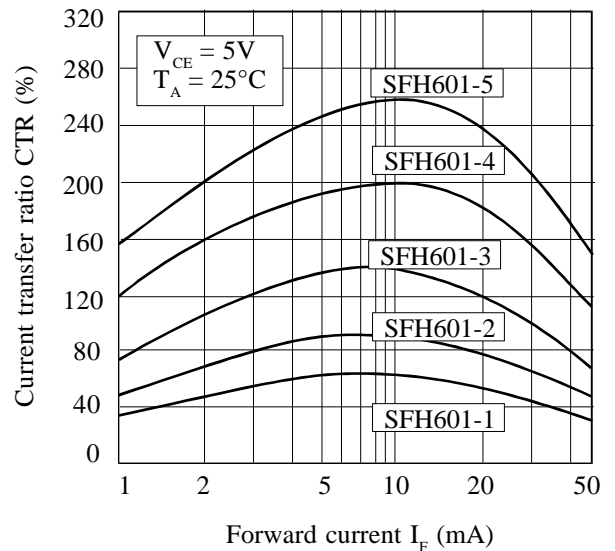
**Collector Current vs. Collector-emitter Voltage (normalised to SFH601-3)**



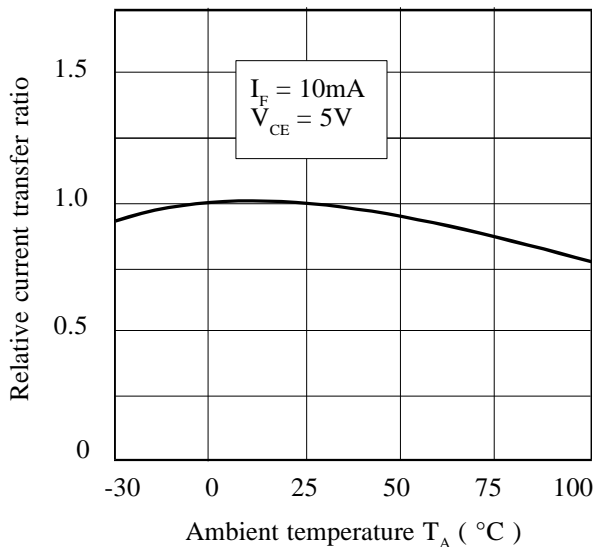
**Forward Current vs. Ambient Temperature**



**Current Transfer Ratio vs. Forward Current**



**Relative Current Transfer Ratio vs. Ambient Temperature**



**Collector-emitter Saturation Voltage vs. Ambient Temperature**

