

SFH610-2X, SFH610-3X, SFH610-4X  
SFH610-2, SFH610-3, SFH610-4



**LOW INPUT CURRENT  
PHOTOTRANSISTOR  
OPTICALLY COUPLED ISOLATORS**

**APPROVALS**

- UL recognised, File No. E91231
- 'X' SPECIFICATION APPROVALS**
- VDE 0884 in 3 available lead form : -  
- STD  
- G form  
- SMD approved to CECC 00802

**DESCRIPTION**

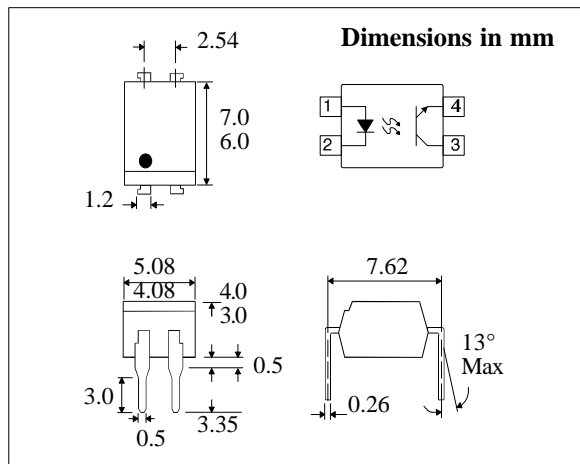
The SFH610 series of optically coupled isolators consist of infrared light emitting diodes and NPN silicon photo transistors in space efficient dual in line plastic packages.

**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  $1\text{mA } I_F$
- High Current Transfer Ratios  
(63-320% at 10mA, 22% min at 1mA)
- High Isolation Voltage ( $5.3\text{kV}_{\text{RMS}}, 7.5\text{kV}_{\text{PK}}$ )
- High  $BV_{\text{CEO}}$  (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 \_\_\_\_\_  $-55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$   
Operating Temperature \_\_\_\_\_  $-55^{\circ}\text{C}$  to  $+100^{\circ}\text{C}$   
Lead Soldering Temperature  
(1/16 inch (1.6mm) from case for 10 secs)  $260^{\circ}\text{C}$

**INPUT DIODE**

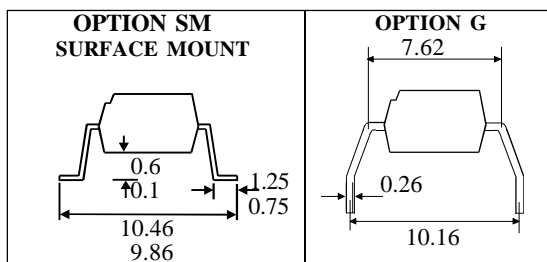
Forward Current \_\_\_\_\_ 50mA  
Reverse Voltage \_\_\_\_\_ 6V  
Power Dissipation \_\_\_\_\_ 70mW

**OUTPUT TRANSISTOR**

Collector-emitter Voltage  $BV_{\text{CEO}}$  \_\_\_\_\_ 70V  
Emitter-collector Voltage  $BV_{\text{ECO}}$  \_\_\_\_\_ 6V  
Power Dissipation \_\_\_\_\_ 150mW

**POWER DISSIPATION**

Total Power Dissipation \_\_\_\_\_ 200mW  
(derate linearly  $2.67\text{mW}/^{\circ}\text{C}$  above  $25^{\circ}\text{C}$ )



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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	$I_F = 50\text{mA}$
	Reverse Voltage ( $V_R$ )	6			V	$I_R = 10\mu\text{A}$
	Reverse Current ( $I_R$ )			10	$\mu\text{A}$	$V_R = 6\text{V}$
Output	Collector-emitter Breakdown ( $BV_{CEO}$ ) ( Note 2 )	70			V	$I_C = 1\text{mA}$
	Emitter-collector Breakdown ( $BV_{ECO}$ )	6			V	$I_E = 100\mu\text{A}$
	Collector-emitter Dark Current ( $I_{CEO}$ ) SFH610-2 SFH610-3,4			50 100	nA nA	$V_{CE} = 10\text{V}$
Coupled	Current Transfer Ratio (CTR) (Note 2)	SFH610-2	63	125	%	$10\text{mA } I_F, 5\text{V } V_{CE}$
		SFH610-3	100	200	%	
		SFH610-4	160	320	%	
		SFH610-2	22		%	
	SFH610-3	34		%		
	SFH610-4	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 7500			$V_{RMS}$ $V_{PK}$	See note 1 See note 1	
Input-output Isolation Resistance $R_{ISO}$	$5 \times 10^{10}$			$\Omega$	$V_{IO} = 500\text{V}$ (note 1)	

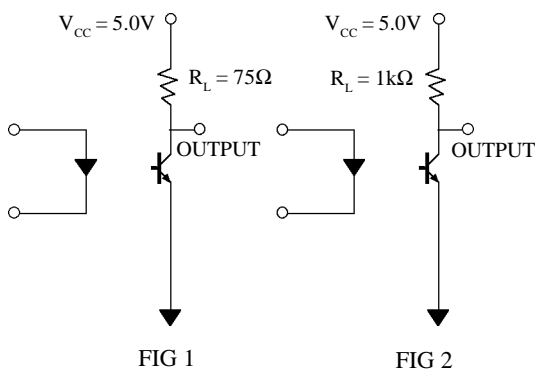
Note 1 Measured with input leads shorted together and output leads shorted together.

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

**SWITCHING CHARACTERISTICS**

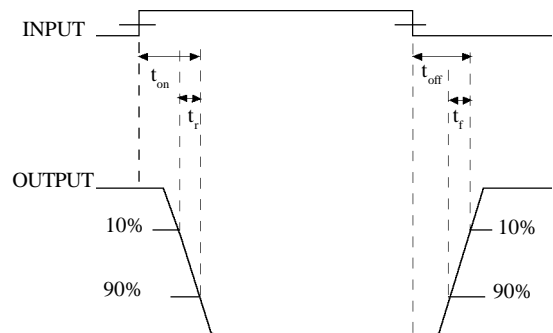
1. Linear Operation (without saturation) Fig 1.  
 $I_F = 10\text{mA}$ ,  $V_{CC} = 5\text{V}$ ,  $R_L = 75\Omega$

			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

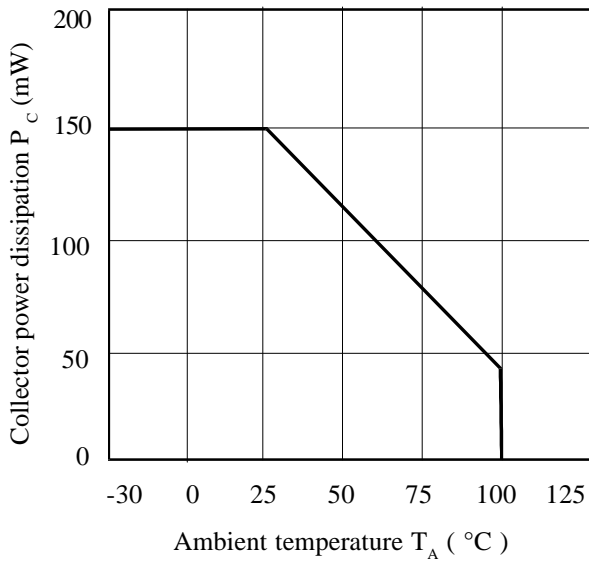


2. Switching Operation (with saturation) Fig 2  
 $V_{CC} = 5\text{V}$ ,  $R_L = 1\text{k}\Omega$

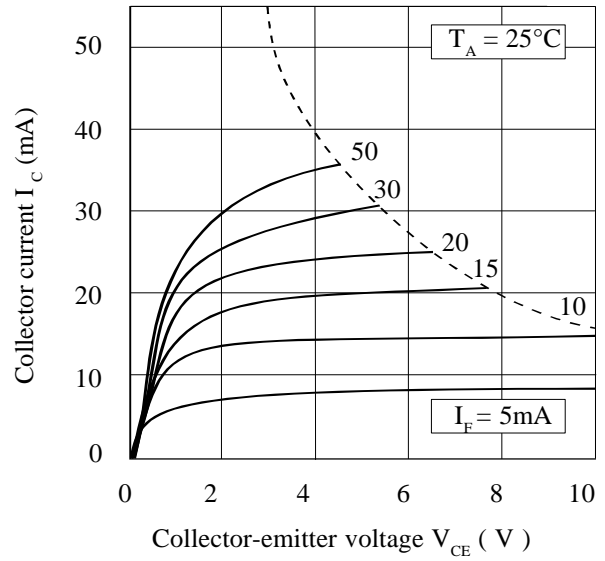
GROUP	-1 ( $I_F = 20\text{mA}$ )	-2 and -3 ( $I_F = 10\text{mA}$ )	-4 ( $I_F = 5\text{mA}$ )	UNITS	
Turn-on Time	$t_{on}$	3.0	4.2	6.0	$\mu\text{s}$
Rise Time	$t_r$	2.0	3.0	4.6	$\mu\text{s}$
Turn-off Time	$t_{off}$	18	23	25	$\mu\text{s}$
Fall Time	$t_f$	11	14	15	$\mu\text{s}$
$V_{CESAT}$				$\leq 0.4$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



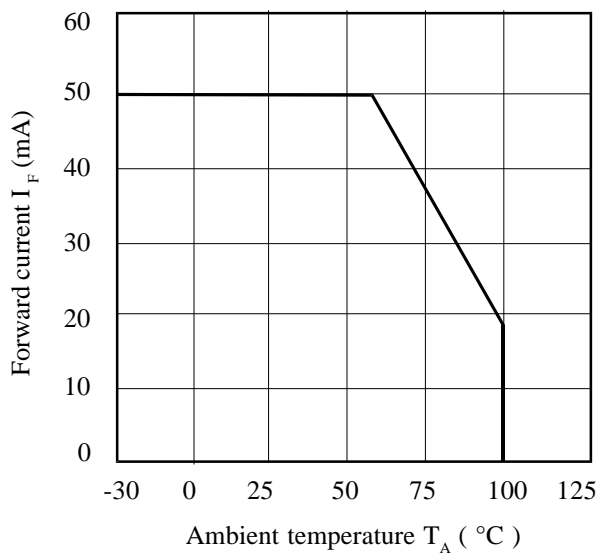
**Collector Power Dissipation vs. Ambient Temperature**



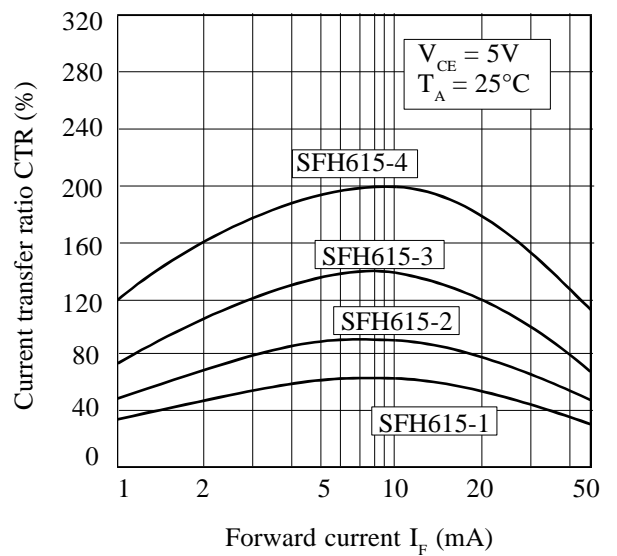
**Collector Current vs. Collector-emitter Voltage (normalised to SFH615-3)**



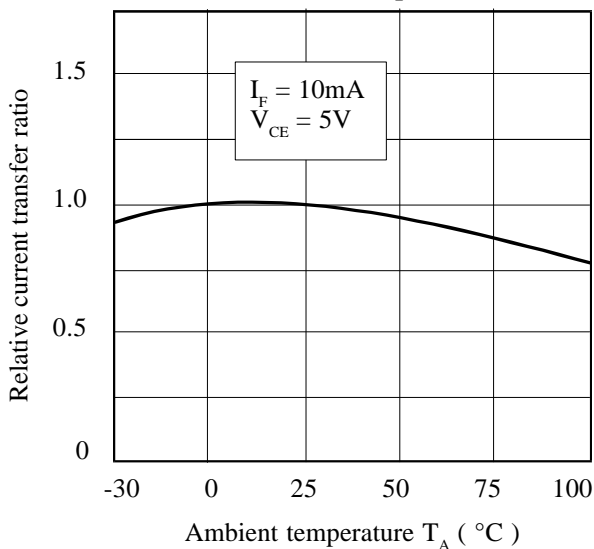
**Forward Current vs. Ambient Temperature**



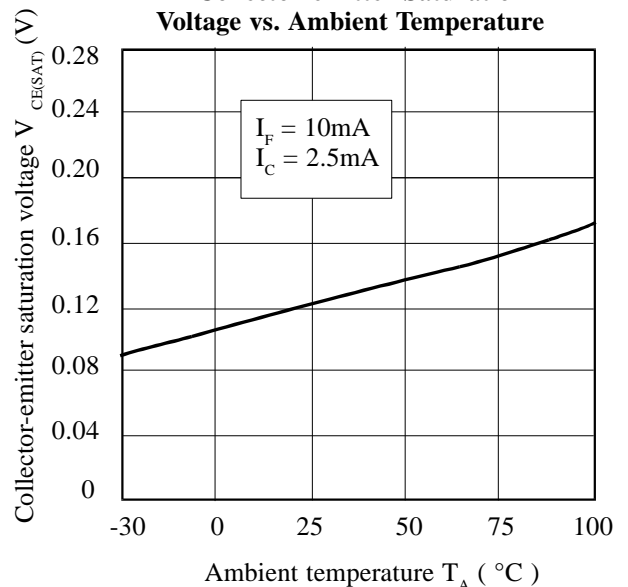
**Current Transfer Ratio vs. Forward Current**



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



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



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