



High Speed Optocoupler, 5 MBd

DESCRIPTION

This 5 MBd family is an industry standard optocoupler with a high efficient LED as input and an integrated photo detector as output. The detector incorporates a Schmitt-Trigger stage to improve noise immunity. The detector output is 3-state, totem pole or open collector.

Their PSPICE models are written from device characterization data for simulation. All symbols are in the symbol library file VSH_OPTO_5M.olb. All model data are in the PSPICE model library file VSH_OPTO_5M.lib.

This document is intended as a guideline of simulating with provided models and does not constitute as commercial product, neither a substitute to datasheet.

PART	MODEL DESCRIPTION	SYMBOL FILE	MODEL FILE
SFH6700, SFH6719	Three state V _O : pin 7 V _E : pin 6	<p>U1 VSH_OPTO_5M.olb (1)</p>	VSH_OPTO_5M.lib
SFH6701, SFH6711, SFH6720, SFH6721	Totem pole V _O : pin 7	<p>U2 VSH_OPTO_5M.olb (1)</p>	VSH_OPTO_5M.lib
SFH6702, SFH6712	Totem pole V _O : pin 6	<p>U3 VSH_OPTO_5M.olb (1)</p>	VSH_OPTO_5M.lib
SFH6705	Open collector V _O : pin 6 need pull-up resistor (1)	<p>U4 VSH_OPTO_5M.olb (1)</p>	VSH_OPTO_5M.lib

Note

(1) Applicable only with OrCAD16.3 or higher versions.

RECOMMENDED USE OF THE MODEL

- This model is designed only for use at 25 °C and should be used as is.
- This model has been created and tested with OrCAD version 16.3.
- The olb file (symbol) is not down-compatible. Users of the earlier versions need to create the symbols on their platform and associate with relative PSPICE model data.

TRUTH TABLE (positive logic)			
PART	LED	ENABLE (V_E)	OUTPUT (V_O) ⁽¹⁾
SFH6700, SFH6719	On	H	Z
	Off	H	Z
	On	L	H
	Off	L	L
SFH6701, SFH6702, SFH6711, SFH6720, SFH6721, SFH6712, SFH6705 ⁽¹⁾	On	-	H
	Off	-	L

Note
⁽¹⁾ SFH6705 with external pull-up resistor

SIMULATED PARAMETERS ($T_{amb} = 25\text{ }^\circ\text{C}$, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	DATA	UNIT
COUPLER				
Input threshold current	$V_{CC} = 5\text{ V}$	I_{Fon}	1.6	mA
Input current hysteresis	$V_{CC} = 5\text{ V}$, $I_{HYS} = I_{Fon} - I_{Foff}$	I_{HYS}	0.1	mA
SWITCHING				
Propagation delay time to high output level ⁽²⁾	$I_{Fon} = 3\text{ mA}$, $C_L = 15\text{ pF}$ ⁽¹⁾	t_{pLH}	200	ns
Propagation delay time to low output level ⁽²⁾		t_{pHL}	200	ns

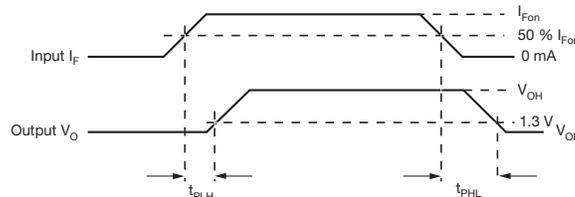
Notes
⁽¹⁾ SFH6705 with pull-up resistor $R_L = 390\ \Omega$
⁽²⁾ See fig. 1 and timing simulation setup on page 3.


Fig. 1 - Switching Times

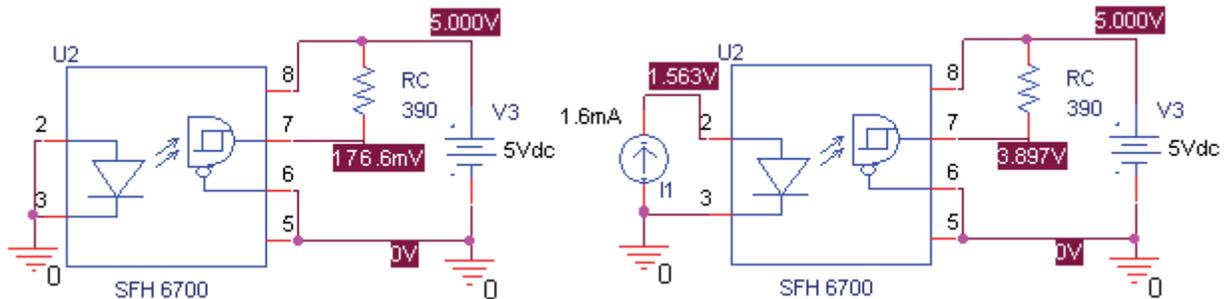
EXAMPLE SIMULATION PLOTS USING OrCAD


Fig. 2 - Simulation Setup for DC Characteristics of SFH6700

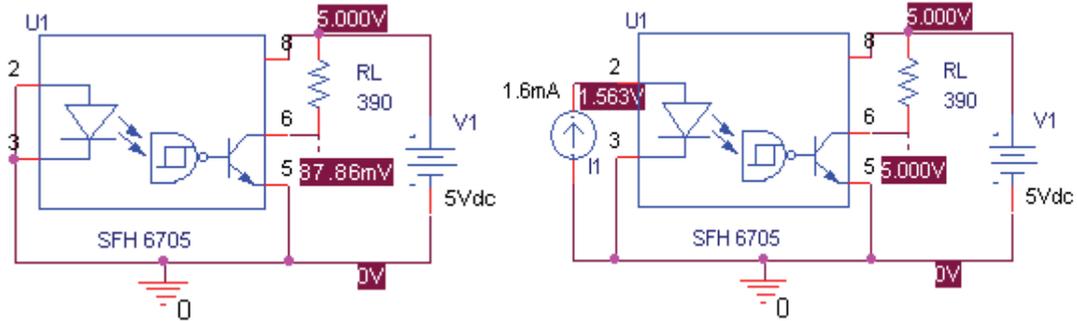


Fig. 3 - Simulation Setup for DC Characteristics of SFH6705

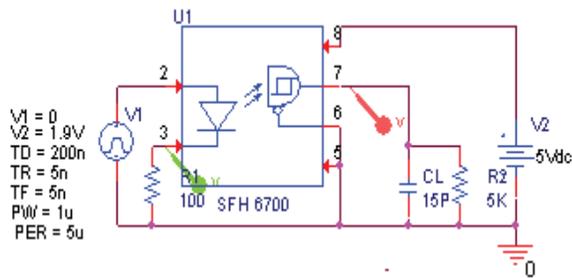


Fig. 4 - Timing Simulation Setup of SFH6700
($V_{CC} = 5\text{ V}$, $I_F = 3\text{ mA}$, $C_L = 15\text{ pF}$)

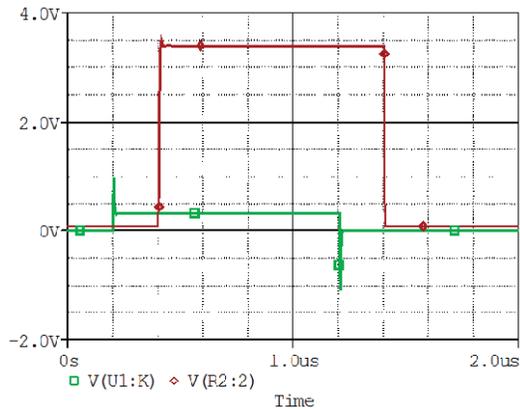


Fig. 5 - Timing Simulation Output of SFH6700

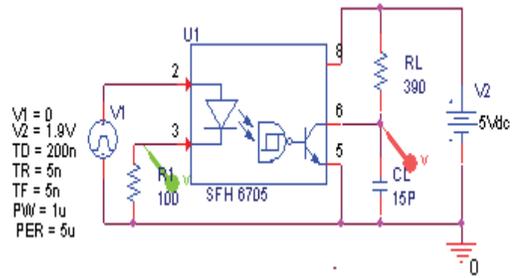


Fig. 6 - Timing Simulation Setup of SFH6705
($V_{CC} = 5\text{ V}$, $I_F = 3\text{ mA}$, $R_L = 390\ \Omega$)

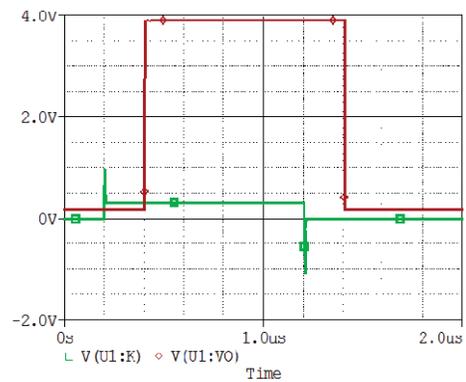


Fig. 7 - Timing Simulation Output of SFH6705