



## 1 Mbd High Speed Optocoupler SPICE Model 6N136, 6N1136, SFH6136, SFH6316T, SFH6343T

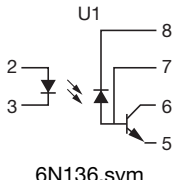
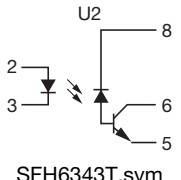
### DESCRIPTION

The 1 Mbd high speed optocoupler consists of a GaAlAs infrared emitting diode, optically coupled with an integrated photo detector and a high speed transistor. The open collector output function allows circuit designers to adjust the load conditions when interfacing with different logic systems such as TTL, CMOS, etc. Their SPICE models have been created from device characterization data and were tested with NI Multisim simulation program. All SYM and PRZ files are Multisim version 11.

For NI Multisim 11 Power Pro edition users, import the component packed file VSH\_1M.prz into your user or corporate database with the tool Database Manager.

For other editions, create components using the provided symbol and model data with the tool Component Wizard.

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	COMPONENT PACKED FILE
6N136 6N1136 SFH6136 SFH6316T	Single channel with Base connection		6N136.cir	VSH_1M.prz
SFH6343T	Single channel		SFH6343T.cir	

### RECOMMENDED USE OF THE MODEL

This model is designed only for use at 25 °C.

SIMULATED PARAMETERS ( $T_{amb} = 25\text{ °C}$ , unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	DATA	UNIT
INPUT				
Input forward voltage	$I_F = 16\text{ mA}$	$V_F$	1.36	V
COUPLER				
Logic low output voltage	$I_F = 16\text{ mA}$ , $V_{CC} = 4.5\text{ V}$ , $I_O = 3\text{ mA}$	$V_{OL}$	0.25	V
Current transfer ratio	$I_F = 16\text{ mA}$ , $V_O = 0.4\text{ V}$	CTR	28	%
SWITCHING				
Propagation delay time to logic low at output <sup>(1)</sup>	$V_{CC} = 5\text{ V}$ , $I_F = 16\text{ mA}$ , $R_L = 1.9\text{ k}\Omega$	$t_{pHL}$	0.4	$\mu\text{s}$
Propagation delay time to logic high at output <sup>(1)</sup>	$V_{CC} = 5\text{ V}$ , $I_F = 16\text{ mA}$ , $R_L = 1.9\text{ k}\Omega$	$t_{pHL}$	0.6	$\mu\text{s}$

#### Note

<sup>(1)</sup> See fig. 1 and timing simulation setup on page 3.

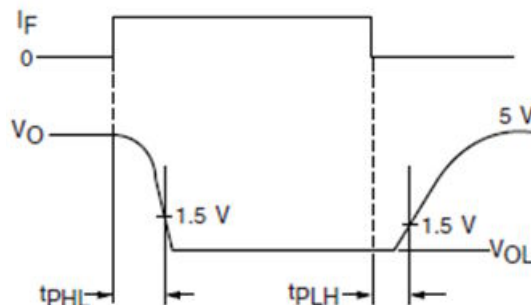


Fig. 1 - Switching Times

## EXAMPLE SIMULATION PLOTS MULTISIM 11

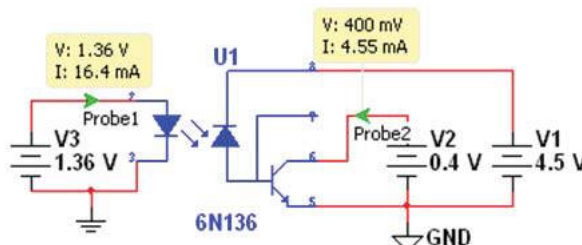


Fig. 2 - Simulation Setup for the Following DC Curves

Fig. 4 - Simulation of CTR vs. Forward Voltage ( $V_O = 0.4$  V)

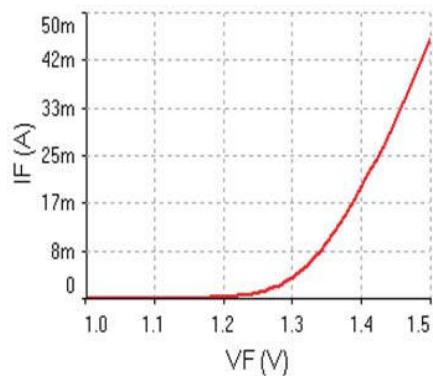


Fig. 3 - Simulation of Input Forward Current vs. Forward Voltage

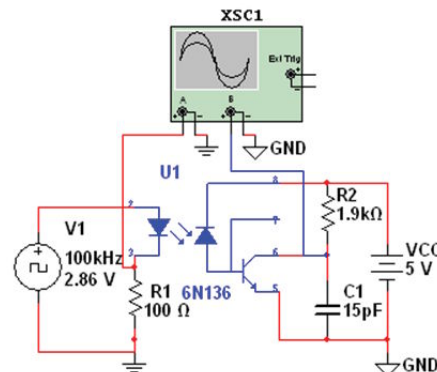


Fig. 5 - Timing Simulation Setup  
( $V_{CC} = 5$  V,  $I_F = 16$  mA,  $R_L = 1.9$  k $\Omega$ ,  $C_L = 15$  pF)

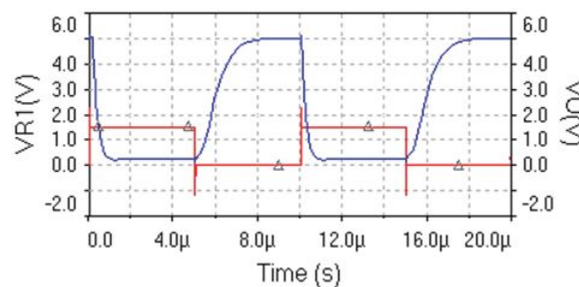
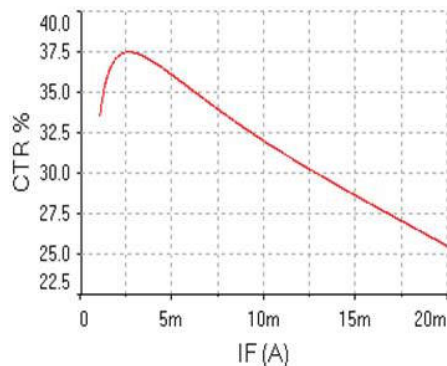


Fig. 6 - Timing Simulation Output