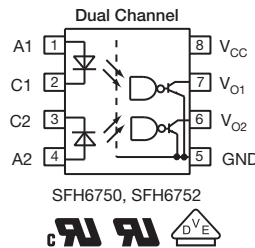
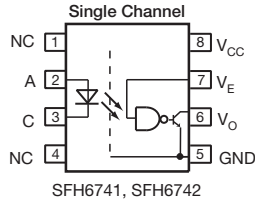
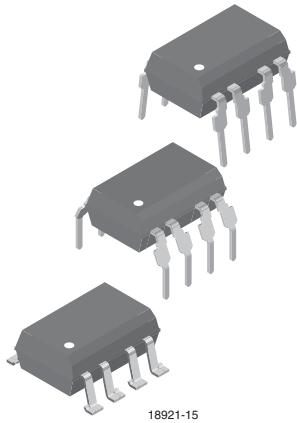


## High Speed Optocoupler, Single and Dual, 10 MBd



### FEATURES

- Choice of CMR performance of 10 kV/μs, 5 kV/μs, and 100 V/μs
- High speed: 10 MBd typical
- + 5 V CMOS compatibility
- Pure tin leads
- Guaranteed AC and DC performance over temperature: - 40 °C to + 100 °C temperature range
- Meets IEC 60068-2-42 (SO<sub>2</sub>) and IEC 60068-2-43 (H<sub>2</sub>S) requirements
- Low input current capability: 5 mA
- Compliant to RoHS Directive to 2002/95/EC and in accordance WEEE 2002/96/EC



**RoHS**  
COMPLIANT

### APPLICATIONS

- Microprocessor system interface
- PLC, ATE input/output isolation
- Computer peripheral interface
- Digital fieldbus isolation: CC-link, DeviceNet, profibus, SDS
- High speed A/D and D/A conversion
- AC plasma display panel level shifting
- Multiplexed data transmission
- Digital control power supply
- Ground loop elimination

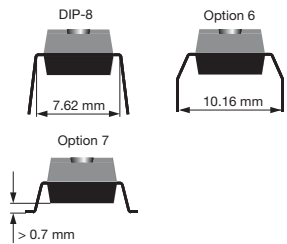
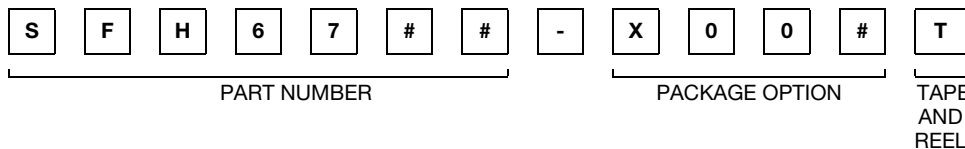
### AGENCY APPROVALS

- UL1577, file no. E52744 system code H, double protection
- cUL - file no. E52744, equivalent to CSA bulletin 5A
- DIN EN 60747-5-2 (VDE 0884)/ VDE available with option 1
- Reinforced insulation rating per IEC60950 2.10.5.1

### DESCRIPTION

The SFH674x and SFH675x are single channel 10 MBd optocouplers utilizing a high efficient input LED coupled with an integrated optical photodiode IC detector. The detector has an open drain NMOS-transistor output, providing less leakage compared to an open collector Schottky clamped transistor output. For the single channel type, an enable function on pin 7 allows the detector to be strobed. The internal shield provides a guaranteed common mode transient immunity of 5 kV/μs for the SFH6741 and 10 kV/μs for the SFH6742 and SFH6752.

### ORDERING INFORMATION



AGENCY CERTIFIED/PACKAGE	SINGLE CHANNEL		DUAL CHANNEL	
	CMR (kV/μs)		CMR (kV/μs)	
BSI, UL, cUL	5	10	0.1	10
DIP-8	-	-	-	-
DIP-8, 400 mil, option 6	-	SFH6742-X006	SFH6750-X006	-
SMD-8, option 7	SFH6741-X007T	-	-	SFH6752-X007T

### Note

- For additional information on the available options refer to Option Information.

# SFH6741, SFH6742, SFH6750, SFH6752



Vishay Semiconductors High Speed Optocoupler, Single and Dual,  
10 MBd

TRUTH TABLE (positive logic)		
LED	ENABLE	OUTPUT
On	H	L
Off	H	H
On	L	H
Off	L	H
On	NC	L
Off	NC	H

ABSOLUTE MAXIMUM RATINGS (T <sub>amb</sub> = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
<b>INPUT</b>				
Average forward current (single channel)		I <sub>F</sub>	20	mA
Average forward current (per channel for dual channel)		I <sub>F</sub>	15	mA
Reverse input voltage		V <sub>R</sub>	5	V
Enable input voltage (single channel)		V <sub>E</sub>	V <sub>CC</sub> + 0.5 V	V
Enable input current (single channel)		I <sub>E</sub>	5	mA
Surge current	t = 100 μs	I <sub>FSM</sub>	200	mA
<b>OUTPUT</b>				
Supply voltage		V <sub>CC</sub>	7	V
Output current		I <sub>O</sub>	50	mA
Output voltage		V <sub>O</sub>	7	V
Output power dissipation (single channel)		P <sub>diss</sub>	85	mW
Output power dissipation per channel (dual channel)		P <sub>diss</sub>	60	mW
<b>COUPLER</b>				
Storage temperature		T <sub>stg</sub>	- 55 to + 150	°C
Operating temperature		T <sub>amb</sub>	- 40 to + 100	°C
Lead solder temperature (single channel)	for 10 s		260	°C
Solder reflow temperature <sup>(1)</sup>	for 1 min		260	°C
Isolation test voltage	t = 1 s	V <sub>ISO</sub>	5300	V <sub>RMS</sub>

## Notes

- Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to absolute maximum ratings for extended periods of the time can adversely affect reliability.
- <sup>(1)</sup> Refer to reflow profile for soldering conditions for surface mounted devices (SMD). Refer to wave profile for soldering conditions for through hole devices (DIP).

RECOMMENDED OPERATING CONDITIONS					
PARAMETER	TEST CONDITION	SYMBOL	MIN.	MAX.	UNIT
Operating temperature		T <sub>amb</sub>	- 40	100	°C
Supply voltage		V <sub>CC</sub>	4.5	5.5	V
Input current low level		I <sub>FL</sub>	0	250	μA
Input current high level		I <sub>FH</sub>	5	15	mA
Logic high enable voltage		V <sub>EH</sub>	2	V <sub>CC</sub>	V
Logic low enable voltage		V <sub>EL</sub>	0	0.8	V
Output pull up resistor		R <sub>L</sub>	330	4K	Ω
Fanout	R <sub>L</sub> = 1 kΩ	N		5	-



# SFH6741, SFH6742, SFH6750, SFH6752

High Speed Optocoupler, Single and Dual, Vishay Semiconductors  
10 MBd

ELECTRICAL CHARACTERISTICS						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
<b>INPUT</b>						
Input forward voltage	$I_F = 10 \text{ mA}$	$V_F$	1	1.4	1.7	V
Reverse current	$V_R = 5 \text{ V}$	$I_R$		0.01	10	$\mu\text{A}$
Input capacitance	$f = 1 \text{ MHz}, V_F = 0 \text{ V}$	$C_i$		55		pF
<b>OUTPUT</b>						
High level supply current (single channel)	$V_E = 0.5 \text{ V}, I_F = 0 \text{ mA}$	$I_{CCH}$		4.1	7	mA
	$V_E = V_{CC}, I_F = 0 \text{ mA}$	$I_{CCH}$		3.3	6	mA
High level supply current (dual channel)	$I_F = 0 \text{ mA}$	$I_{CCH}$		6.9	12	mA
Low level supply current (single channel)	$V_E = 0.5 \text{ V}, I_F = 10 \text{ mA}$	$I_{CCL}$		4	7	mA
	$V_E = V_{CC}, I_F = 10 \text{ mA}$	$I_{CCL}$		3.3	6	mA
Low level supply current (dual channel)	$I_F = 10 \text{ mA}$	$I_{CCL}$		6.5	12	mA
High level output current	$V_E = 2 \text{ V}, V_O = 5.5 \text{ V}, I_F = 250 \mu\text{A}$	$I_{OH}$		0.002	1	$\mu\text{A}$
Low level output voltage	$V_E = 2 \text{ V}, I_F = 5 \text{ mA}, I_{OL} \text{ (sinking)} = 13 \text{ mA}$	$V_{OL}$		0.2	0.6	V
Input threshold current	$V_E = 2 \text{ V}, V_O = 5.5 \text{ V}, I_{OL} \text{ (sinking)} = 13 \text{ mA}$	$I_{TH}$		2.4	5	mA
High level enable current	$V_E = 2 \text{ V}$	$I_{EH}$		- 0.6	- 1.6	mA
Low level enable current	$V_E = 0.5 \text{ V}$	$I_{EL}$		- 0.8	- 1.6	mA
High level enable voltage		$V_{EH}$	2			V
Low level enable voltage		$V_{EL}$			0.8	V

### Note

- Minimum and maximum values are testing requirements. Typical values are characteristics of the device and are the result of engineering evaluation. Typical values are for information only and are not part of the testing requirements. All typicals at  $T_{amb} = 25 \text{ }^\circ\text{C}$ ,  $V_{CC} = 5.5 \text{ V}$ , unless otherwise specified.

SWITCHING CHARACTERISTICS						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Propagation delay time to high output level	$R_L = 350 \Omega, C_L = 15 \text{ pF}$	$t_{PLH}$	20	48	100	ns
Propagation delay time to low output level	$R_L = 350 \Omega, C_L = 15 \text{ pF}$	$t_{PHL}$	25	50	100	ns
Pulse width distortion	$R_L = 350 \Omega, C_L = 15 \text{ pF}$	$ t_{PHL} - t_{PLH} $		2.9	35	ns
Propagation delay skew	$R_L = 350 \Omega, C_L = 15 \text{ pF}$	$t_{PSK}$		8	40	ns
Output rise time (10 % to 90 %)	$R_L = 350 \Omega, C_L = 15 \text{ pF}$	$t_r$		23		ns
Output fall time (90 % to 10 %)	$R_L = 350 \Omega, C_L = 15 \text{ pF}$	$t_f$		7		ns
Propagation delay time of enable from $V_{EH}$ to $V_{EL}$	$R_L = 350 \Omega, C_L = 15 \text{ pF}, V_{EL} = 0 \text{ V}, V_{EH} = 3 \text{ V}$	$t_{ELH}$		12		ns
Propagation delay time of enable from $V_{EL}$ to $V_{EH}$	$R_L = 350 \Omega, C_L = 15 \text{ pF}, V_{EL} = 0 \text{ V}, V_{EH} = 3 \text{ V}$	$t_{EHL}$		11		ns

### Note

- Over recommended temperature ( $T_{amb} = - 40 \text{ }^\circ\text{C}$  to  $+ 100 \text{ }^\circ\text{C}$ ),  $V_{CC} = 5 \text{ V}$ ,  $I_F = 7.5 \text{ mA}$  unless otherwise specified. All typicals at  $T_{amb} = 25 \text{ }^\circ\text{C}$ ,  $V_{CC} = 5 \text{ V}$ .

# SFH6741, SFH6742, SFH6750, SFH6752



Vishay Semiconductors High Speed Optocoupler, Single and Dual, 10 MBd

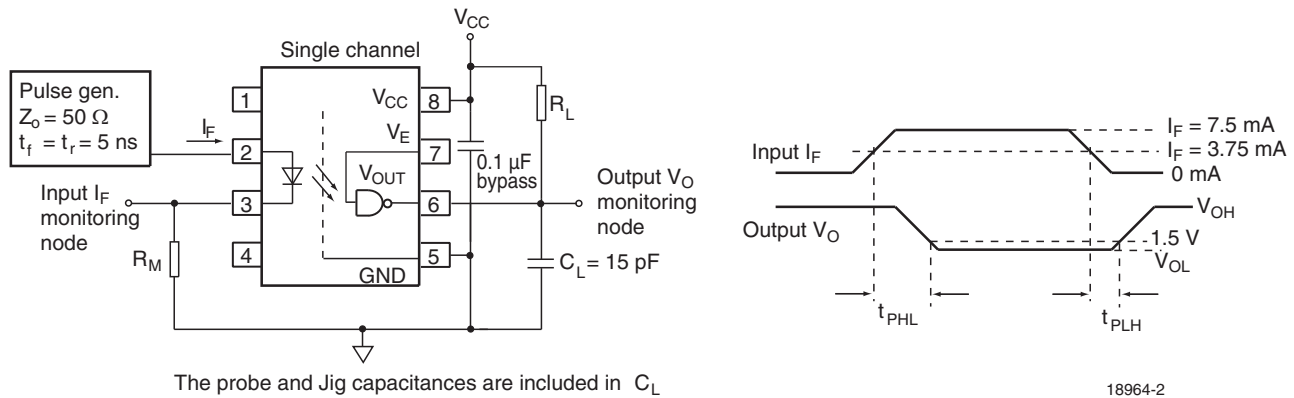


Fig. 1 - Single Channel Test Circuit for  $t_{PLH}$ ,  $t_{PHL}$ ,  $t_r$  and  $t_f$

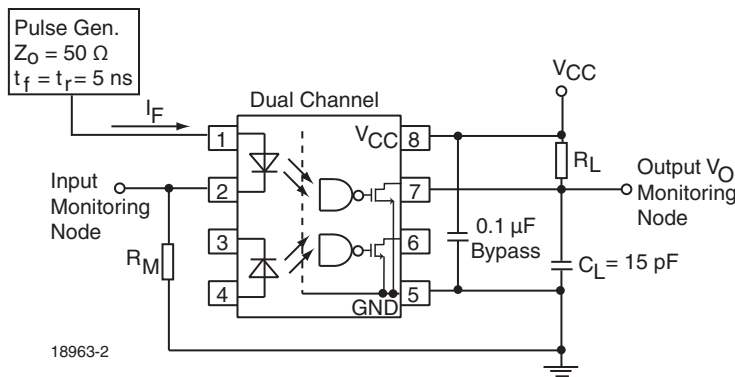


Fig. 2 - Dual Channel Test Circuit for  $t_{PLH}$ ,  $t_{PHL}$ ,  $t_r$  and  $t_f$

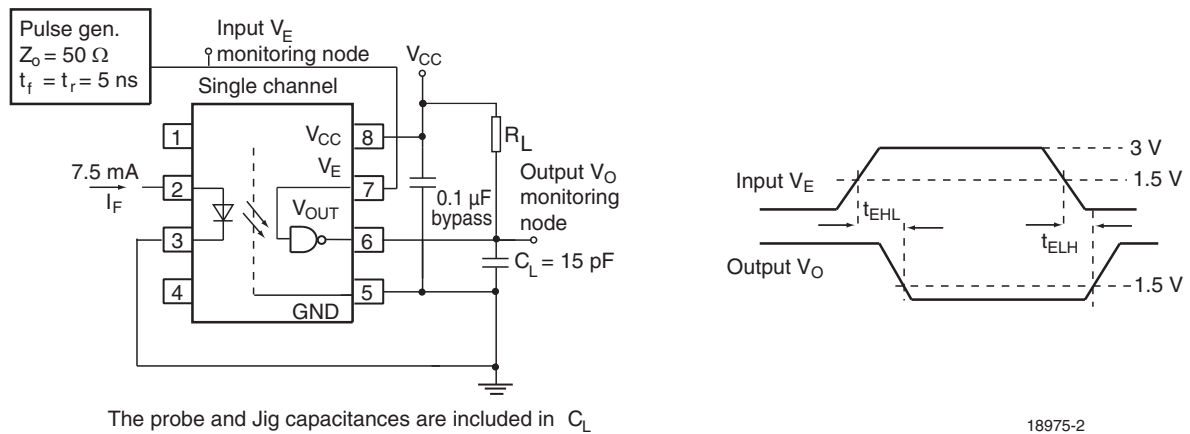


Fig. 3 - Single Channel Test Circuit for  $t_{EHL}$ , and  $t_{ELH}$



# SFH6741, SFH6742, SFH6750, SFH6752

High Speed Optocoupler, Single and Dual, Vishay Semiconductors  
10 MBd

COMMON MODE TRANSIENT IMMUNITY						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Common mode transient immunity (high)	$ V_{CM}  = 10\text{ V}$ , $V_{CC} = 5\text{ V}$ , $I_F = 0\text{ mA}$ , $V_{O(\min.)} = 2\text{ V}$ , $R_L = 350\ \Omega$ , $T_{\text{amb}} = 25\text{ }^\circ\text{C}$ (1)	$ CM_H $	100			V/ $\mu\text{s}$
	$ V_{CM}  = 50\text{ V}$ , $V_{CC} = 5\text{ V}$ , $I_F = 0\text{ mA}$ , $V_{O(\min.)} = 2\text{ V}$ , $R_L = 350\ \Omega$ , $T_{\text{amb}} = 25\text{ }^\circ\text{C}$ (2)	$ CM_H $	5000	10 000		V/ $\mu\text{s}$
	$ V_{CM}  = 1\text{ kV}$ , $V_{CC} = 5\text{ V}$ , $I_F = 0\text{ mA}$ , $V_{O(\min.)} = 2\text{ V}$ , $R_L = 350\ \Omega$ , $T_{\text{amb}} = 25\text{ }^\circ\text{C}$ (3)	$ CM_H $	10 000	15 000		V/ $\mu\text{s}$
	$ V_{CM}  = 10\text{ V}$ , $V_{CC} = 5\text{ V}$ , $I_F = 7.5\text{ mA}$ , $V_{O(\max.)} = 0.8\text{ V}$ , $R_L = 350\ \Omega$ , $T_{\text{amb}} = 25\text{ }^\circ\text{C}$ (1)	$ CM_L $	100			V/ $\mu\text{s}$
	$ V_{CM}  = 50\text{ V}$ , $V_{CC} = 5\text{ V}$ , $I_F = 7.5\text{ mA}$ , $V_{O(\max.)} = 0.8\text{ V}$ , $R_L = 350\ \Omega$ , $T_{\text{amb}} = 25\text{ }^\circ\text{C}$ (2)	$ CM_L $	5000	10 000		V/ $\mu\text{s}$
	$ V_{CM}  = 1\text{ kV}$ , $V_{CC} = 5\text{ V}$ , $I_F = 7.5\text{ mA}$ , $V_{O(\max.)} = 0.8\text{ V}$ , $R_L = 350\ \Omega$ , $T_{\text{amb}} = 25\text{ }^\circ\text{C}$ (3)	$ CM_L $	10 000	15 000		V/ $\mu\text{s}$

**Notes**

- (1) For SFH6750
- (2) For SFH6741
- (3) For SFH6742 and SFH6752

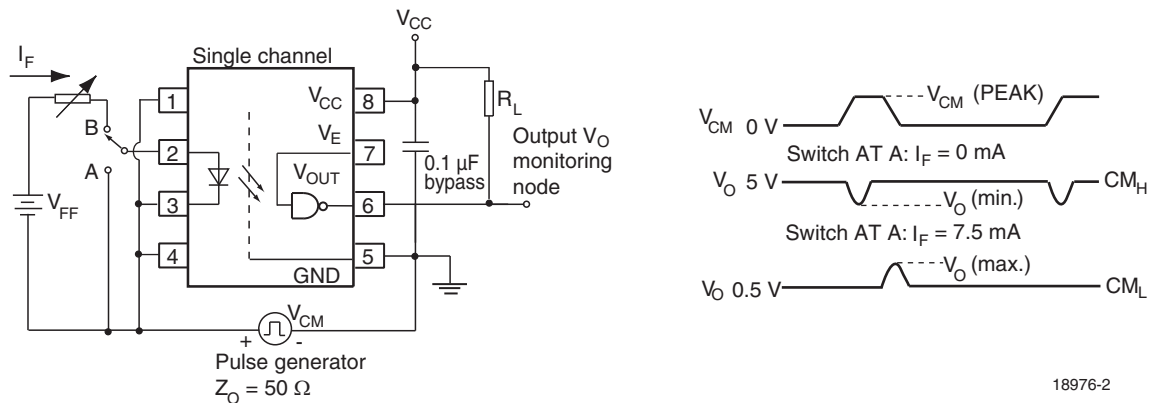


Fig. 4 - Single Channel Test Circuit for Common Mode Transient Immunity

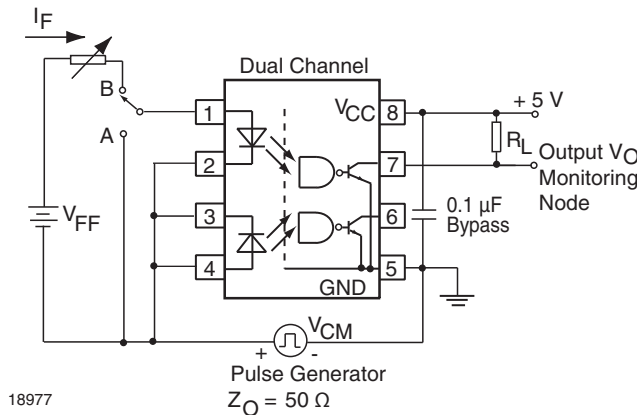


Fig. 5 - Dual Channel Test Circuit for Common Mode Transient Immunity

SAFETY AND INSULATION RATINGS						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Climatic classification	according to IEC 69 part 1			55/110/21		
Comparative tracking index		CTI	175		399	
Peak transient overvoltage		$V_{IOTM}$	8000			V
Peak insulation voltage		$V_{IORM}$	630			V
Safety rating - power output		$P_{SO}$			500	mW
Safety rating - input current		$I_{SI}$			300	mA
Safety rating - temperature		$T_{SI}$			175	°C
Creepage distance	Standard DIP-8		7			mm
Clearance distance	Standard DIP-8		7			mm
Creepage distance	400 mil DIP-8		8			mm
Clearance distance	400 mil DIP-8		8			mm
Insulation thickness, reinforced rated	per IEC60950.2.10.5.1		0.2			mm

**Note**

- As per IEC 60747-5-2, §7.4.3.8.1, this optocoupler is suitable for “safe electrical insulation” only within the safety ratings. Compliance with the safety ratings shall be ensured by means of protective circuits.

**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

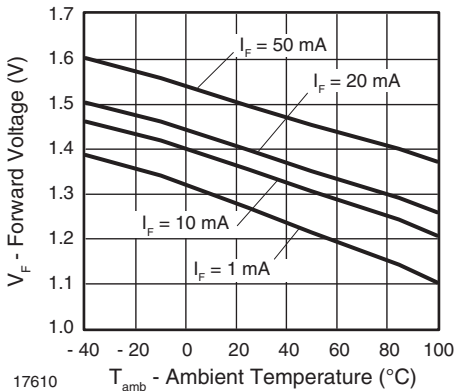


Fig. 6 - Forward Voltage vs. Ambient Temperature

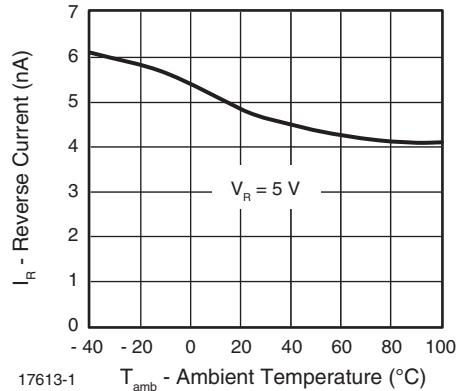


Fig. 8 - Reverse Current vs. Ambient Temperature

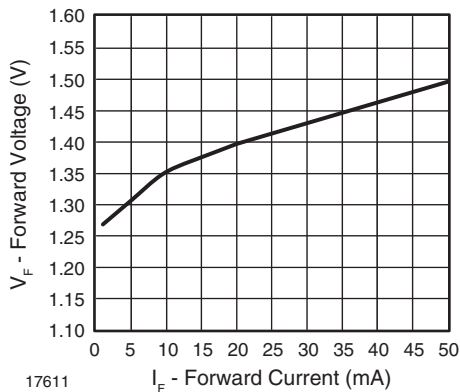


Fig. 7 - Forward Voltage vs. Forward Current

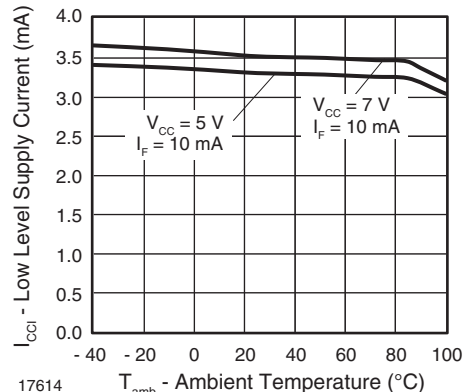


Fig. 9 - Low Level Supply Current vs. Ambient Temperature



# SFH6741, SFH6742, SFH6750, SFH6752

High Speed Optocoupler, Single and Dual, Vishay Semiconductors  
10 MBd

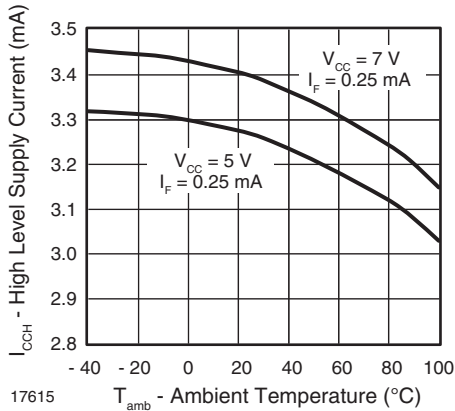


Fig. 10 - High Level Supply Current vs. Ambient Temperature

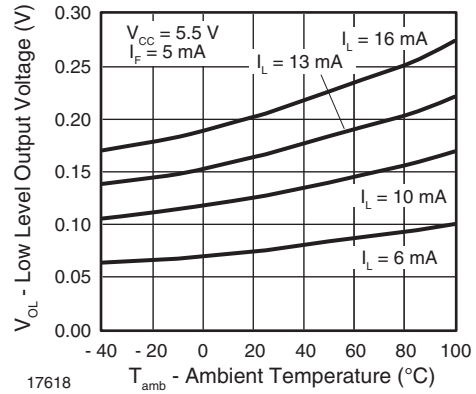


Fig. 13 - Low Level Output Voltage vs. Ambient Temperature

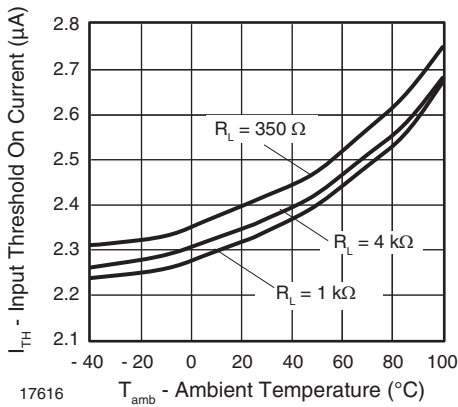


Fig. 11 - Input Threshold On Current vs. Ambient Temperature

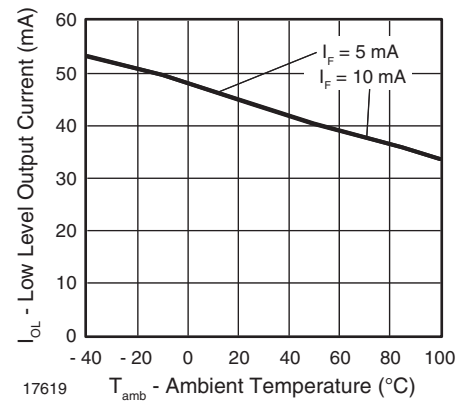


Fig. 14 - Low Level Output Current vs. Ambient Temperature

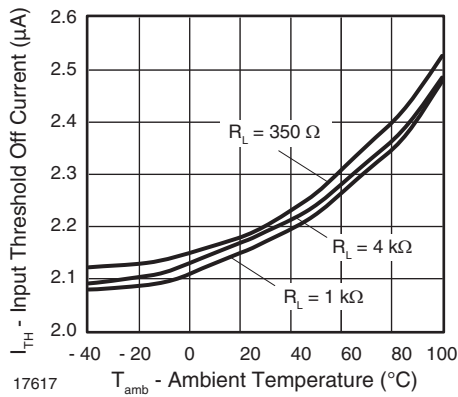


Fig. 12 - Input Threshold Off Current vs. Ambient Temperature

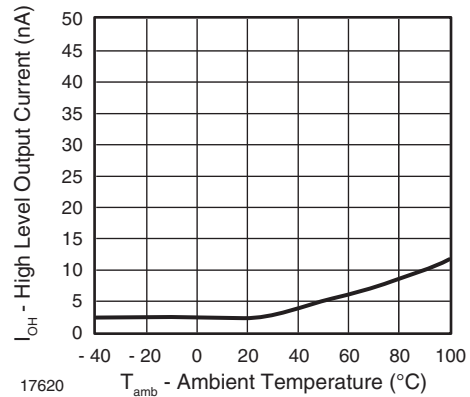


Fig. 15 - High Level Output Current vs. Ambient Temperature

# SFH6741, SFH6742, SFH6750, SFH6752



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10 MBd

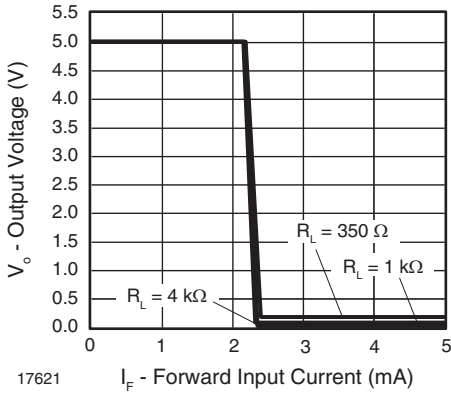


Fig. 16 - Output Voltage vs. Forward Input Current

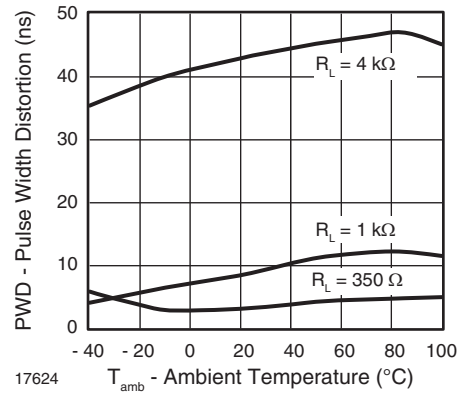


Fig. 19 - Pulse Width Distortion vs. Ambient Temperature

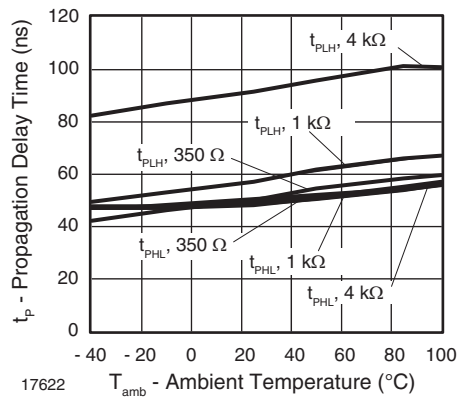


Fig. 17 - Propagation Delay vs. Ambient Temperature

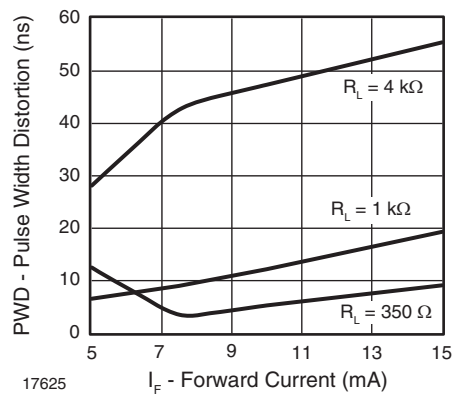


Fig. 20 - Pulse Width Distortion vs. Forward Current

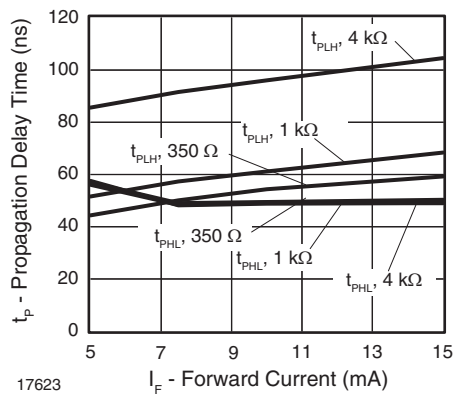


Fig. 18 - Propagation Delay vs. Forward Current

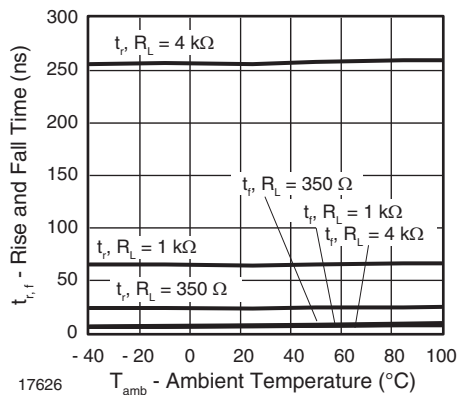


Fig. 21 - Rise and Fall Time vs. Ambient Temperature





# SFH6741, SFH6742, SFH6750, SFH6752

High Speed Optocoupler, Single and Dual, Vishay Semiconductors  
10 MBd

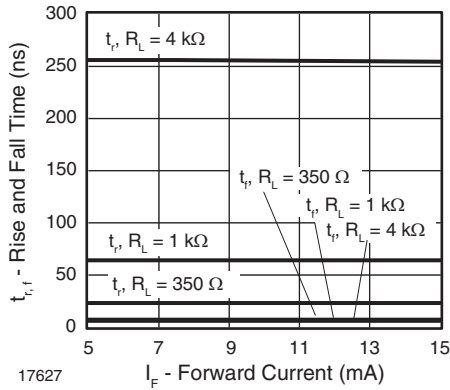


Fig. 22 - Rise and Fall Time vs. Forward Current

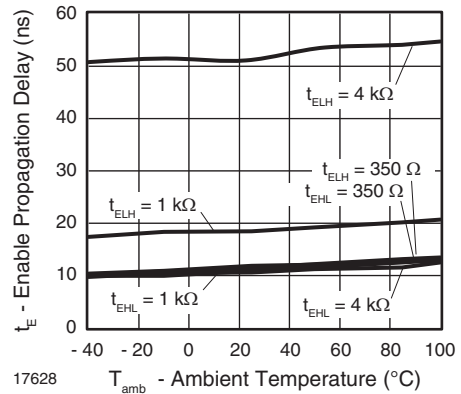
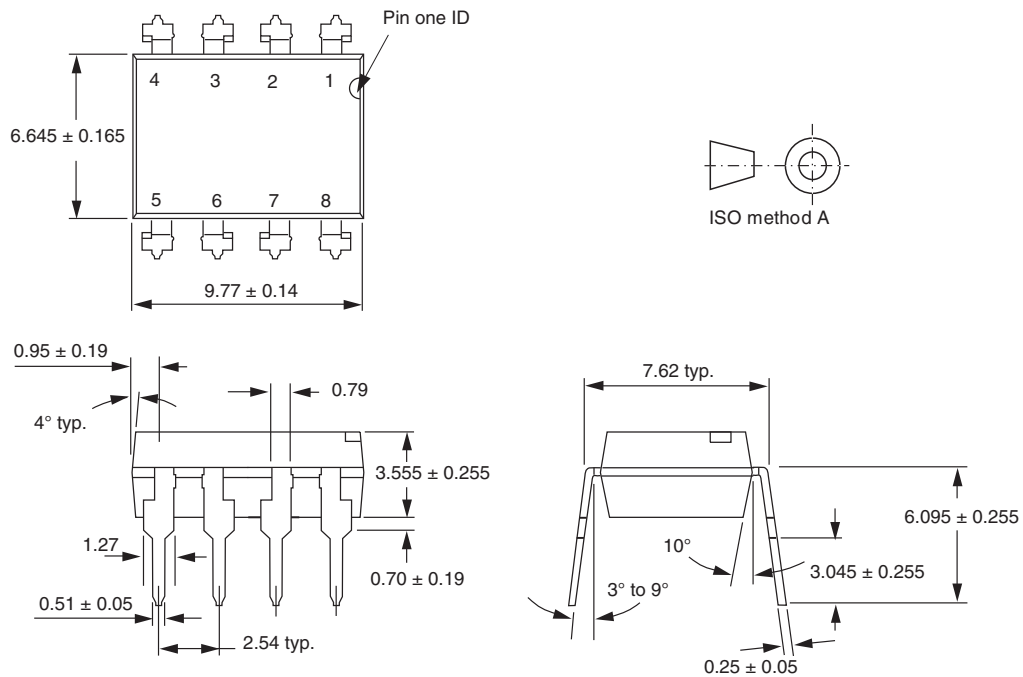


Fig. 23 - Enable Propagation Delay vs. Ambient Temperature

## PACKAGE DIMENSIONS in millimeters



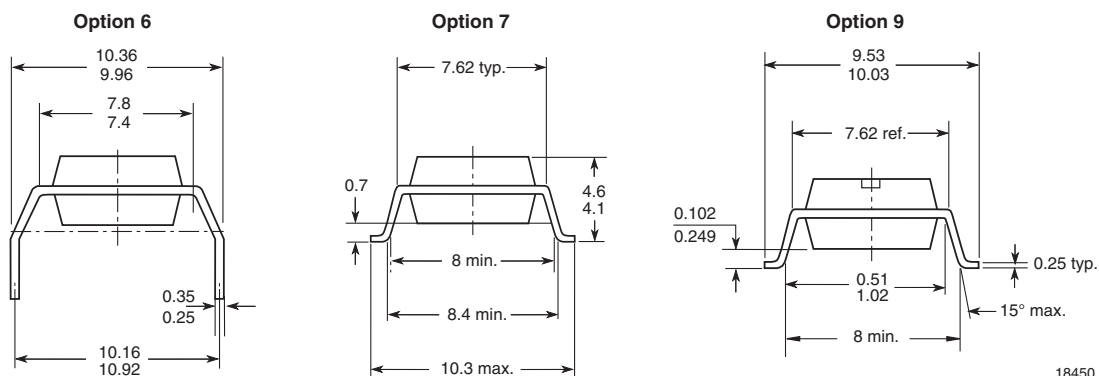
i178006

# SFH6741, SFH6742, SFH6750, SFH6752

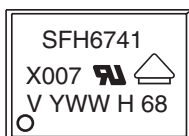


Vishay Semiconductors High Speed Optocoupler, Single and Dual,  
10 MBd

## PACKAGE DIMENSIONS in millimeters



## PACKAGE MARKING (for example)



### Notes

- Option 1 and VDE logos are only marked on option 1 parts.
- Tape and reel suffix (T) is not part of the package marking.



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