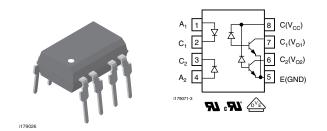
# High Speed Optocoupler, Dual Channel, 1 MBd, Transistor Output



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## DESCRIPTION

The SFH6325 and SFH6326 are dual channel optocouplers with a GaAlAs infrared emitting diode, optically coupled with an integrated photo detector which consists of a photo diode and a high-speed transistor in a DIP-8 plastic package. Signals can be transmitted between two electrically separated circuits up to frequencies of 2 MHz. The potential difference between the circuits to be coupled should not exceed the maximum permissible reference voltages.

## FEATURES

- Isolation test voltage, 5300 V<sub>RMS</sub>
- TTL compatible
- Bit rates: 1 MBit/s
- · High common mode transient immunity
- Bandwidth 2 MHz
- Open collector output
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC

## AGENCY APPROVALS

- UL1577, file no. E52744 system code H double protection
- cUL tested to CSA 22.2 bulletin 5A
- DIN EN 60747-5-2 (VDE0884)/DIN EN 60747-5-5 (pending), available with option 1

ORDERING INFORMATION					
S F H 6 3 2 PART NUMBER	#   -   X   0   #   #     PACKAGE OPTION	TAPE AND REEL	DIP-8 7.62 mm Option 7 > 0.7 mm	Option 6 10.16 mm Option 9 Option 9 Option 9 Option 10 Option 10 Option 10 Option 20 Option 20 Optio	
AGENCY CERTIFIED/PACKAGE	CTR (%)				
UL, cUL	≥7	≥ 19			
DIP-8	SFH6325	SFH6326			
DIP-8, 400 mil, option 6	-		SFH6326-X00	)6	
SMD-8, option 7	-		SFH6326-X007	T <sup>(1)</sup>	
SMD-8, option 9	SFH6325-X009T <sup>(1)</sup>		SFH6326-X009	T <sup>(1)</sup>	
VDE, UL, cUL	≥7		≥ 19		
DIP-8	-		SFH6326-X00	)1	
SMD-8, option 7	SFH6325-X017T	SFH6326-X017T <sup>(1)</sup>			

#### Note

• Additional options may be possible, please contact sales office.

<sup>(1)</sup> Also available in tubes; do not add T to end.

ABSOLUTE MAXIMUM RATINGS (T <sub>amb</sub> = 25 °C, unless otherwise specified)								
ARAMETER TEST CONDITION SYMBOL VALUE U								
INPUT								
Reverse voltage		V <sub>R</sub>	4.5	V				
Forward continuous current		I <sub>F</sub>	25	mA				
Peak forward current	t = 1 ms, duty cycle 50 %	I <sub>FM</sub>	50	mA				
Maximum surge forward current	t $\leq$ 1 $\mu$ s, 300 pulses/s	I <sub>FSM</sub>	1	A				
Derate linearly from 25 °C			0.6	mW/°C				
Power dissipation	T <sub>amb</sub> ≤ 70 °C	P <sub>diss</sub>	50	mW				

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Document Number: 83679

RoHS

COMPLIANT



ABSOLUTE MAXIMUM RATINGS (T <sub>amb</sub> = 25 °C, unless otherwise specified)									
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT					
OUTPUT	OUTPUT								
Supply voltage		VS	- 0.5 to 30	V					
Output voltage		Vo	- 0.5 to 25	V					
Collector output current		I <sub>CO</sub>	8	mA					
Derate linearly from 25 °C			1.33	mW/°C					
Power dissipation	$T_{amb} \le 70 \ ^{\circ}C$	P <sub>diss</sub>	50	mW					
COUPLER									
Isolation test voltage	t = 1 s	VISO	5300	V <sub>RMS</sub>					
Pollution degree (DIN VDE0109)			2						
Creepage distance			≥ 7	mm					
Clearance distance			≥ 7	mm					
Derate linearly from 25 °C			1.93	mW/°C					
Total package dissipation		P <sub>tot</sub>	145	mW					
Comparative tracking index per DIN IEC112/VDE0303 part 1, group Illa per DIN VDE6110			175						
Isolation resistance	$V_{IO} = 500 \text{ V}, \text{ T}_{amb} = 25 ^{\circ}\text{C}$	R <sub>IO</sub>	≥ 10 <sup>12</sup>	Ω					
Isolation resistance	$V_{IO} = 500 \text{ V}, \text{ T}_{amb} = 100 ^{\circ}\text{C}$	R <sub>IO</sub>	≥ 10 <sup>11</sup>	Ω					
Storage temperature range		T <sub>stg</sub>	- 55 to + 125	°C					
Ambient temperature range		T <sub>amb</sub>	- 55 to +100	°C					
Soldering temperature <sup>(1)</sup>	max. 10 s, dip soldering distance to seating plane ≥ 1.5 mm	T <sub>sld</sub>	260	°C					

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).

<b>ELECTRICAL CHARACTERISTICS</b> (T <sub>amb</sub> = 25 °C, unless otherwise specified)									
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT		
INPUT <sup>(1)</sup>									
Forward voltage	I <sub>F</sub> = 16 mA		V <sub>F</sub>		1.33	1.9	V		
Breakdown voltage	I <sub>R</sub> = 10 μΑ		V <sub>BR</sub>	4.5			V		
Reverse current	V <sub>R</sub> = 4.5 V		I <sub>R</sub>		0.5	10	μA		
Capacitance	$V_R = 0 V, f = 1 MHz$		Co		30		pF		
Temperature coefficient of forward voltage	I <sub>F</sub> = 16 mA		$\Delta V_F / \Delta T_{amb}$		- 1.7		mV/°C		
OUTPUT									
Logic low supply current	$I_F$ = 16 mA, $V_O$ = open, $V_{CC}$ = 4.5 V		I <sub>CCL</sub>		100	200	μA		
Supply current, logic high	$I_F = 0$ mA, $V_O =$ open, $V_{CC} = 15$ V		I <sub>CCH</sub>		0.01	4	μA		
	$I_F$ = 16 mA, $V_{CC}$ = 4.5 V, $I_O$ = 1.1 mA	SFH6325	V <sub>OL</sub>		0.1	0.5	V		
Logic low output voltage	$I_F$ = 16 mA, $V_{CC}$ = 4.5 V, $I_O$ = 3 mA	SFH6326	V <sub>OL</sub>		0.1	0.5	V		
Logic high output current	$I_F = 0 \text{ mA}, V_O = V_{CC} = 5.5 \text{ V}$		I <sub>OH</sub>		3	500	nA		
Logic high output current	$I_F = 0 \text{ mA}, V_O = V_{CC} = 15 \text{ V}$		I <sub>OH</sub>			50	μA		
Channel to channel <sup>(2)</sup> crosstalk	$I_F = 16 \text{ mA}, V_O = V_{CC} = 5.5 \text{ V}$		I <sub>OH-XT</sub>			500	nA		
COUPLER									
Capacitance (input to output)	f = 1 MHz		C <sub>IO</sub>		0.6		pF		

#### Notes

• 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.

<sup>(1)</sup> T<sub>amb</sub> = 0 °C to 70 °C, unless otherwise specified.

<sup>(2)</sup> To measure crosstalk, turn on the LED for channel 1 and the output current for channel 2 in logic high. Repeat for channel 2.



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## Vishay Semiconductors

<b>CURRENT TRANSFER RATIO</b> ( $T_{amb}$ = 25 °C, unless otherwise specified)								
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT	
$I_{\rm F} = 16  {\rm mA}, V_{\rm CC}$	I <sub>F</sub> = 16 mA, V <sub>CC</sub> = 4.5 V,	SFH6325	CTR	7	16		%	
Current transfer ratio	$V_{O} = 0.4 \text{ V},  \text{T}_{amb} = 25 ^{\circ}\text{C} \qquad \text{SFH6326}  \text{CTR}  19  35$		%					
	I <sub>F</sub> = 16 mA, V <sub>CC</sub> = 4.5 V,	SFH6325	CTR	5			%	
	$V_{O} = 0.5 V$ , $T_{amb} = 0 °C$ to 70 °C	SFH6326	CTR	15			%	

SWITCHING CHARACTERISTICS (T <sub>amb</sub> = 25 °C, unless otherwise specified)								
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT	
Libela ta Javu	$I_F$ = 16 mA, $V_{CC}$ = 5 V, $R_L$ = 4.1 k $\Omega$	SFH6325	t <sub>PHL</sub>		0.3	1.5	μs	
High to low	$I_F$ = 16 mA, $V_{CC}$ = 5 V, $R_L$ = 1.9 k $\Omega$	SFH6326	t <sub>PHL</sub>		0.2	0.3         1.5           0.2         0.8           0.6         1.5	μs	
Low to high	$I_F$ = 16 mA, $V_{CC}$ = 5 V, $R_L$ = 4.1 k $\Omega$	SFH6325	t <sub>PLH</sub>		0.6	1.5	μs	
	$I_{\text{F}}$ = 16 mA, $V_{\text{CC}}$ = 5 V, $R_{\text{L}}$ = 1.9 k $\Omega$	SFH6326	t <sub>PLH</sub>		0.5	0.8	μs	

<b>COMMON MODE TRANSIENT IMMUNITY</b> (T <sub>amb</sub> = 25 °C, unless otherwise specified)								
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT	
CMTI at logic high level output	$    I_{F} = 0 \text{ mA, } C_{CM} = 10 \text{ V}_{P\text{-}P}, \\     V_{CC} = 5 \text{ V, } R_{L} = 4.1 \text{ k}\Omega $	SFH6325	CM <sub>H</sub>		1000		V/µs	
	$    I_{\rm F} = 0 \mbox{ mA, } C_{\rm CM} = 10 \mbox{ V}_{\rm P-P}, \\    V_{\rm CC} = 5 \mbox{ V, } R_{\rm L} = 1.9 \mbox{ k} \Omega $	SFH6326	СМ <sub>Н</sub>		1000		V/µs	
	I <sub>F</sub> = 16 mA, C <sub>CM</sub> = 10 V <sub>P-P</sub> , V <sub>CC</sub> = 5 V, R <sub>L</sub> = 4.1 kΩ	SFH6325	CML		1000		V/µs	
CMTI at logic low level output	$\begin{split} I_{F} &= 16 \text{ mA, } C_{CM} = 10 \text{ V}_{P\text{-}P}, \\ V_{CC} &= 5 \text{ V, } R_{L} = 1.9 \text{ k}\Omega \end{split}$	SFH6326	CML		1000		V/µs	

TYPICAL CHARACTERISTICS (T<sub>amb</sub> = 25 °C, unless otherwise specified)

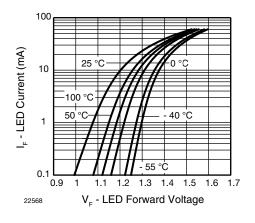


Fig. 1 - LED Forward Current vs. Forward Voltage

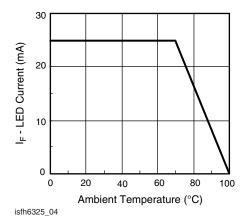


Fig. 2 - Permissible Forward LED Current vs. Temperature



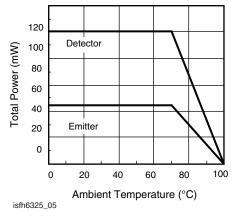


Fig. 3 - Permissible Power Dissipation vs. Temperature

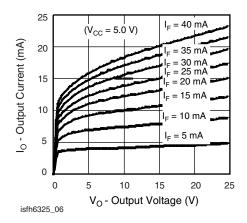


Fig. 4 - Output Current vs. Output Voltage

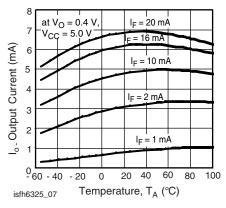


Fig. 5 - Output Current vs. Temperature

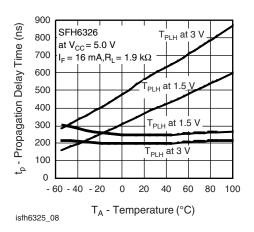


Fig. 6 - Propagation Delay vs. Ambient Temperature

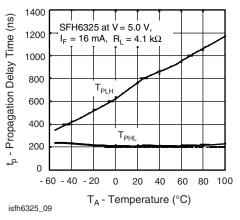


Fig. 7 - Propagation Delay vs. Ambient Temperature

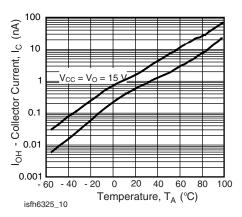


Fig. 8 - Logic High Output Current vs. Temperature

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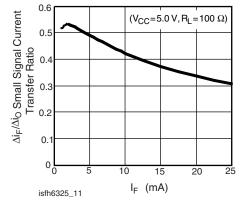
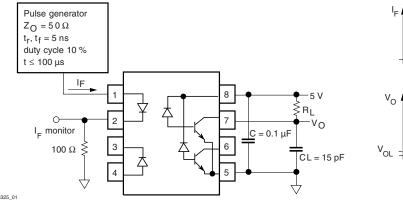
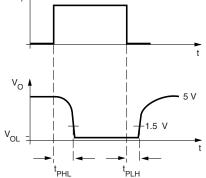


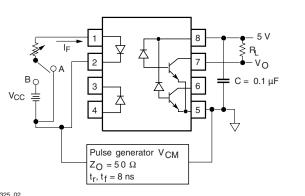
Fig. 9 - Small Signal Current Transfer Ratio vs. Input Current

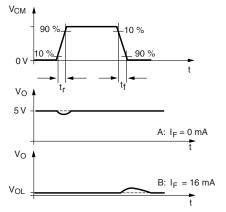




isfh6325 01

Fig. 10 - Switching Time and Test Circuit





isfh6325\_02

Fig. 11 - Waveform and Test Circuit for Common Mode Transient Immunity

5 For technical questions, contact: optocoupleranswers@vishay.com Document Number: 83679

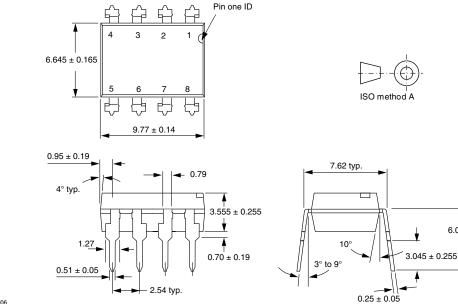
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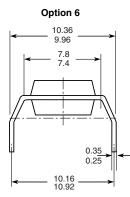
6.095 ± 0.255

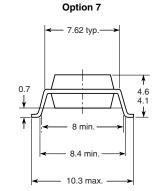
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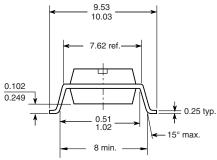
## **PACKAGE DIMENSIONS** in millimeters



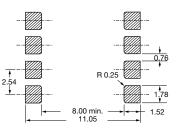
i178006

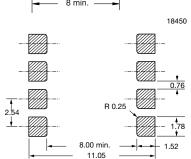






Option 9





## PACKAGE MARKING



#### Notes

- Only options 1 and 7 are reflected in the package marking.
- The VDE Logo is only marked on option1 parts.
- Tape and reel suffix (T) is not part of the package marking.

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