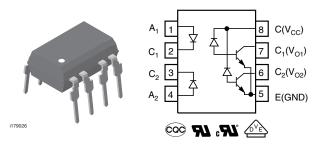


## High Speed Optocoupler, Dual Channel, 1 MBd, Transistor Output



#### **LINKS TO ADDITIONAL RESOURCES**





#### **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
- Material categorization: for definitions of compliance please see <a href="https://www.vishay.com/doc?99912">www.vishay.com/doc?99912</a>





#### RoHS COMPLIANT

#### **AGENCY APPROVALS**

- UL / cUL 1577
- DIN EN 60747-5-5 (VDE 0884-5)
- CQC

ORDERING INFORMATION		
S F H 6 3 2  PART NUMBER	# - X 0 # # PACKAGE OPTION	TAPE AND REEL    Option 7   Option 9
AGENCY CERTIFIED / PACKAGE	CTR	(%)
UL, cUL, CQC	≥ 7	≥ 19
SMD-8, option 7	-	SFH6326-X007T <sup>(1)</sup>
SMD-8, option 9	SFH6325-X009T	SFH6326-X009T <sup>(1)</sup>
VDE, UL, cUL, CQC	≥ 7	≥ 19
DIP-8	-	SFH6326-X001
SMD-8, option 7	SFH6325-X017T	SFH6326-X017T <sup>(1)</sup>

#### Notes

- · Additional options may be possible, please contact sales office
- (1) Also available in tubes; do not add T to end

<b>ABSOLUTE MAXIMUM RATINGS</b> (T <sub>amb</sub> = 25 °C, unless otherwise specified)										
PARAMETER	TEST CONDITION	NDITION SYMBOL VALUE UNI								
INPUT										
Reverse voltage		$V_R$	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 ≤ 1 µs, 300 pulses/s	I <sub>FSM</sub>	1	Α						
Derate linearly from 25 °C			0.6	mW/°C						
Power dissipation	T <sub>amb</sub> ≤ 70 °C	P <sub>diss</sub>	50	mW						

Rev. 1.9, 15-Nov-2021 **1** Document Number: 83679



#### www.vishay.com

## Vishay Semiconductors

ABSOLUTE MAXIMUM RATINGS				1
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
OUTPUT				
Supply voltage		Vs	-0.5 to 30	V
Output voltage		$V_{O}$	-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 <sub>amb</sub> ≤ 70 °C	P <sub>diss</sub>	50	mW
COUPLER				
Isolation test voltage	t = 1 min	V <sub>ISO</sub>	5300	V <sub>RMS</sub>
Pollution degree (DIN VDE0109)			2	
Creepage distance			≥8	mm
Clearance distance			≥8	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	
In elektron versieken en	V <sub>IO</sub> = 500 V, T <sub>amb</sub> = 25 °C	R <sub>IO</sub>	≥ 10 <sup>12</sup>	Ω
Isolation resistance	V <sub>IO</sub> = 500 V, T <sub>amb</sub> = 100 °C	R <sub>IO</sub>	≥ 10 <sup>11</sup>	Ω
Storage temperature range		T <sub>stg</sub>	-55 to +150	°C
Ambient temperature range		T <sub>amb</sub>	-55 to +100	°C
Soldering temperature (1)	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
- (2) Refer to reflow profile for soldering conditions for surface mounted devices (SMD). Refer to wave profile for soldering conditions for through hole devices (DIP)

ELECTRICAL CHARACTERISTICS								
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT	
PUT								
Forward voltage	I <sub>F</sub> = 16 mA		$V_{F}$		1.33	1.9	V	
Breakdown voltage	I <sub>R</sub> = 10 μA		$V_{BR}$	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	
Logic low output voltage	$I_F = 16 \text{ mA}, V_{CC} = 4.5 \text{ V}, I_O = 1.1 \text{ mA}$	SFH6325	$V_{OL}$		0.1	0.5	V	
Logic low output voltage	$I_F = 16 \text{ mA}, V_{CC} = 4.5 \text{ V}, I_O = 3 \text{ mA}$	SFH6326	$V_{OL}$		0.1	1.9	V	
Logic high output ourrent	$I_F = 0 \text{ mA}, V_O = V_{CC} = 5.5 \text{ V}$		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 (1) 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

- T<sub>amb</sub> = 0 °C to 70 °C, unless otherwise specified, typical values T<sub>amb</sub> = 25 °C
- 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
- (1) To measure crosstalk, turn on the LED for channel 1 and the output current for channel 2 in logic high. Repeat for channel 2



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

<b>SWITCHING CHARACTERISTICS</b> (T <sub>amb</sub> = 25 °C, unless otherwise specified)								
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT	
High to low	$I_F = 16 \text{ mA}, V_{CC} = 5 \text{ V}, R_L = 4.1 \text{ k}\Omega$	SFH6325	t <sub>PHL</sub>		0.3	1.5	μs	
	$I_F = 16 \text{ mA}, V_{CC} = 5 \text{ V}, R_L = 1.9 \text{ k}\Omega$	SFH6326	t <sub>PHL</sub>		0.2	0.8	μs	
Low to high	$I_F = 16 \text{ mA}, V_{CC} = 5 \text{ V}, R_L = 4.1 \text{ k}\Omega$	SFH6325	t <sub>PLH</sub>		0.6	1.5	μs	
Low to High	$I_F = 16 \text{ mA}, V_{CC} = 5 \text{ V}, R_L = 1.9 \text{ k}\Omega$	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	
ONT of head with the standard of	$I_F = 0 \text{ mA, } C_{CM} = 10 \text{ V}_{P-P},$ $V_{CC} = 5 \text{ V, } R_L = 4.1 \text{ k}\Omega$	SFH6325	CM <sub>H</sub>		1000		V/µs	
CMTI at logic high level output	$I_F = 0 \text{ mA, } C_{CM} = 10 \text{ V}_{P-P},$ $V_{CC} = 5 \text{ V, } R_L = 1.9 \text{ k}\Omega$	SFH6326	CM <sub>H</sub>		1000		V/µs	
CMTI at logic low level output	$I_F = 16$ mA, $C_{CM} = 10$ $V_{P-P}$ , $V_{CC} = 5$ V, $R_L = 4.1$ k $\Omega$	SFH6325	CM <sub>L</sub>		1000		V/µs	
Civiti at logic low level output	$I_F = 16$ mA, $C_{CM} = 10$ $V_{P-P}$ , $V_{CC} = 5$ V, $R_L = 1.9$ k $\Omega$	SFH6326	CM <sub>L</sub>		1000		V/µs	

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

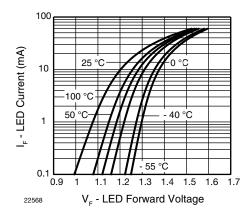


Fig. 1 - LED Forward Current vs. Forward Voltage

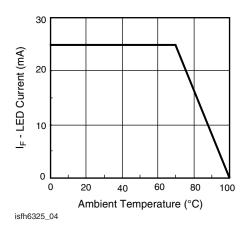


Fig. 2 - Permissible Forward LED Current vs. Temperature

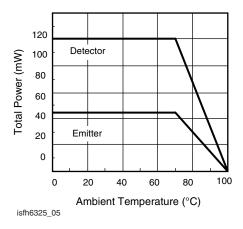


Fig. 3 - Permissible Power Dissipation vs. Temperature

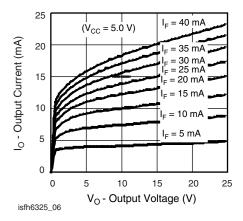


Fig. 4 - Output Current vs. Output Voltage

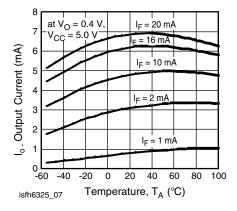


Fig. 5 - Output Current vs. Temperature

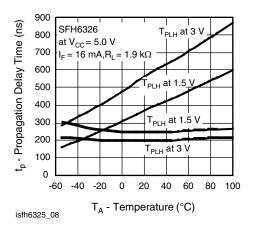


Fig. 6 - Propagation Delay vs. Ambient Temperature

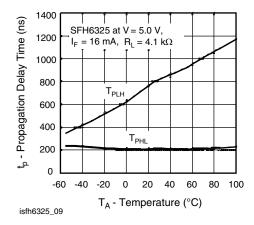


Fig. 7 - Propagation Delay vs. Ambient Temperature

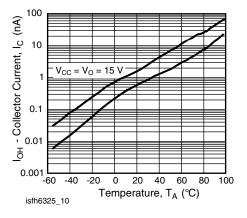


Fig. 8 - Logic High Output Current vs. Temperature

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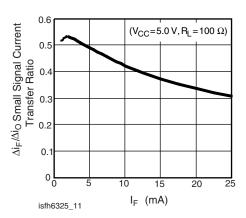


Fig. 9 - Small Signal Current Transfer Ratio vs. Input Current

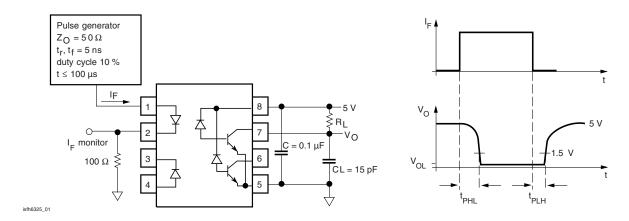


Fig. 10 - Switching Time and Test Circuit

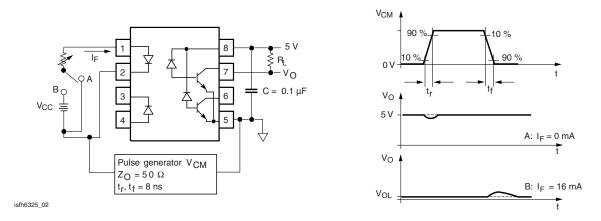
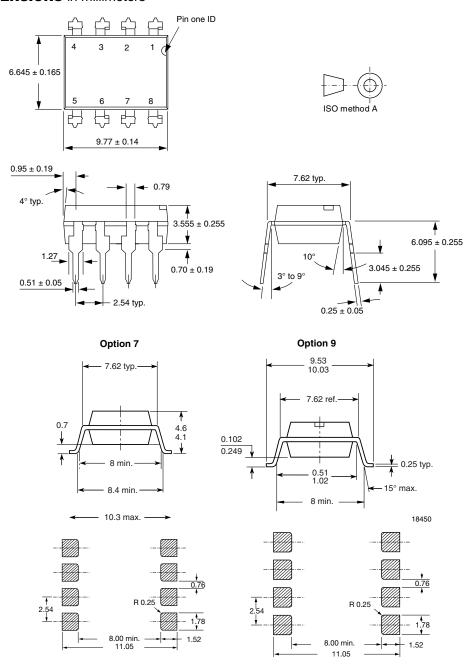


Fig. 11 - Waveform and Test Circuit for Common Mode Transient Immunity

#### **PACKAGE DIMENSIONS** in millimeters



#### **PACKAGE MARKING (Example)**



#### Notes

- 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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