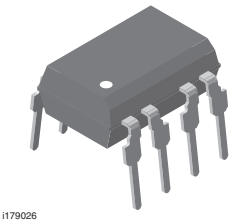
High Speed Optocoupler, Dual Channel, 1 MBd, Transistor Output



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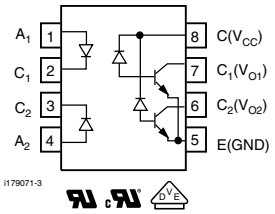


FEATURES

- Isolation test voltage, 5300 V_{RMS}
- 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

Pb-free

e3

RoHS COMPLIANT

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.

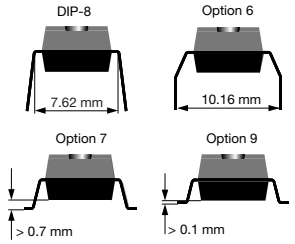
AGENCY APPROVALS

- 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	#	-	X	0	#	#	T

PART NUMBER — PACKAGE OPTION — TAPE AND REEL



AGENCY CERTIFIED/PACKAGE	CTR (%)	
UL, cUL	**≥ 7**	**≥ 19**
DIP-8	SFH6325	SFH6326
DIP-8, 400 mil, option 6	-	SFH6326-X006
SMD-8, option 7	-	SFH6326-X007T (1)
SMD-8, option 9	SFH6325-X009T (1)	SFH6326-X009T (1)
VDE, UL, cUL	**≥ 7**	**≥ 19**
DIP-8	-	SFH6326-X001
SMD-8, option 7	SFH6325-X017T	SFH6326-X017T (1)

Note

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

(1) Also available in tubes; do not add T to end.

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
INPUT				
Reverse voltage		V_R	4.5	V
Forward continuous current		I_F	25	mA
Peak forward current	t = 1 ms, duty cycle 50 %	I_{FM}	50	mA
Maximum surge forward current	t ≤ 1 µs, 300 pulses/s	I_{FSM}	1	A
Derate linearly from 25 °C			0.6	mW/°C
Power dissipation	T_{amb} ≤ 70 °C	P_{diss}	50	mW

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
OUTPUT				
Supply voltage		V_S	- 0.5 to 30	V
Output voltage		V_O	- 0.5 to 25	V
Collector output current		I_{CO}	8	mA
Derate linearly from 25 °C			1.33	mW/°C
Power dissipation	$T_{amb} \leq 70$ °C	P_{diss}	50	mW
COUPLER				
Isolation test voltage	t = 1 s	V_{ISO}	5300	V_{RMS}
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_{tot}	145	mW
Comparative tracking index per DIN IEC112/VDE0303 part 1, group IIIa per DIN VDE6110			175	
Isolation resistance	V_{IO} = 500 V, T_{amb} = 25 °C	R_{IO}	$\geq 10^{12}$	Ω
	V_{IO} = 500 V, T_{amb} = 100 °C	R_{IO}	$\geq 10^{11}$	Ω
Storage temperature range		T_{stg}	- 55 to + 125	°C
Ambient temperature range		T_{amb}	- 55 to +100	°C
Soldering temperature (1)	max. 10 s, dip soldering distance to seating plane ≥ 1.5 mm	T_{sld}	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.

(1) 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 (T_{amb} = 25 °C, unless otherwise specified)							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
INPUT (1)							
Forward voltage	I_F = 16 mA		V_F		1.33	1.9	V
Breakdown voltage	I_R = 10 µA		V_{BR}	4.5			V
Reverse current	V_R = 4.5 V		I_R		0.5	10	µA
Capacitance	V_R = 0 V, f = 1 MHz		C_O		30		pF
Temperature coefficient of forward voltage	I_F = 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_{CCL}		100	200	µA
Supply current, logic high	I_F = 0 mA, V_O = open, V_{CC} = 15 V		I_{CCH}		0.01	4	µA
Logic low output voltage	I_F = 16 mA, V_{CC} = 4.5 V, I_O = 1.1 mA	SFH6325	V_{OL}		0.1	0.5	V
	I_F = 16 mA, V_{CC} = 4.5 V, I_O = 3 mA	SFH6326	V_{OL}		0.1	0.5	V
Logic high output current	I_F = 0 mA, V_O = V_{CC} = 5.5 V		I_{OH}		3	500	nA
	I_F = 0 mA, V_O = V_{CC} = 15 V		I_{OH}			50	µA
Channel to channel (2) crosstalk	I_F = 16 mA, V_O = V_{CC} = 5.5 V		I_{OH-XT}			500	nA
COUPLER							
Capacitance (input to output)	f = 1 MHz		C_{IO}		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.

(1) T_{amb} = 0 °C to 70 °C, unless otherwise specified.

(2) 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_{amb} = 25 °C, unless otherwise specified)							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Current transfer ratio	I_F = 16 mA, V_{CC} = 4.5 V, V_O = 0.4 V, T_{amb} = 25 °C	SFH6325	CTR	7	16		%
		SFH6326	CTR	19	35		%
	I_F = 16 mA, V_{CC} = 4.5 V, V_O = 0.5 V, T_{amb} = 0 °C to 70 °C	SFH6325	CTR	5			%
		SFH6326	CTR	15			%

SWITCHING CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
High to low	I_F = 16 mA, V_{CC} = 5 V, R_L = 4.1 kΩ	SFH6325	t_{PHL}		0.3	1.5	µs
	I_F = 16 mA, V_{CC} = 5 V, R_L = 1.9 kΩ	SFH6326	t_{PHL}		0.2	0.8	µs
Low to high	I_F = 16 mA, V_{CC} = 5 V, R_L = 4.1 kΩ	SFH6325	t_{PLH}		0.6	1.5	µs
	I_F = 16 mA, V_{CC} = 5 V, R_L = 1.9 kΩ	SFH6326	t_{PLH}		0.5	0.8	µs

COMMON MODE TRANSIENT IMMUNITY (T_{amb} = 25 °C, unless otherwise specified)							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
CMTI at logic high level output	I_F = 0 mA, C_{CM} = 10 V_{P-P}, V_{CC} = 5 V, R_L = 4.1 kΩ	SFH6325	CM_H		1000		V/µs
	I_F = 0 mA, C_{CM} = 10 V_{P-P}, V_{CC} = 5 V, R_L = 1.9 kΩ	SFH6326	CM_H		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 kΩ	SFH6325	CM_L		1000		V/µs
	I_F = 16 mA, C_{CM} = 10 V_{P-P}, V_{CC} = 5 V, R_L = 1.9 kΩ	SFH6326	CM_L		1000		V/µs

TYPICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

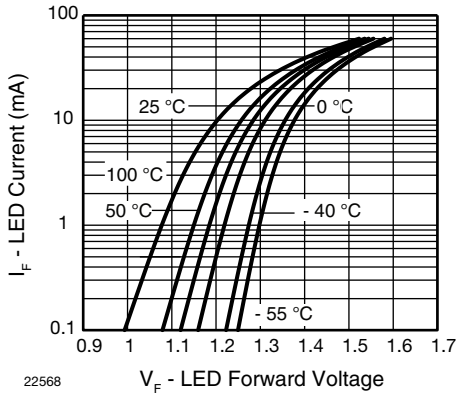


Fig. 1 - LED Forward Current vs. Forward Voltage

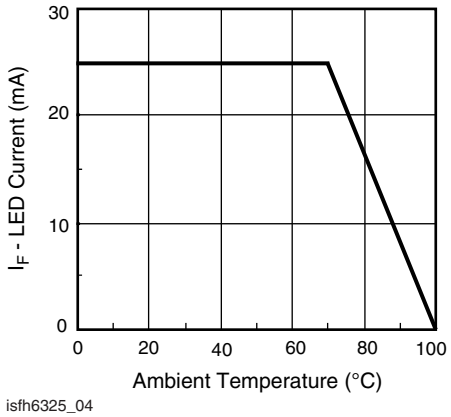


Fig. 2 - Permissible Forward LED Current vs. Temperature

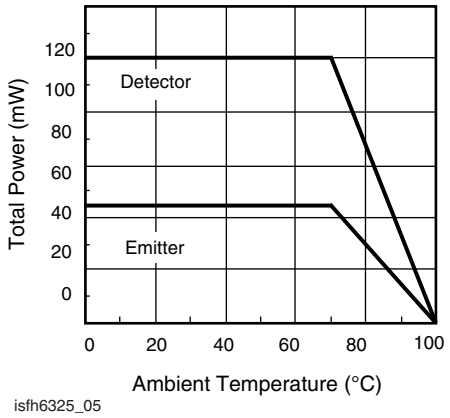


Fig. 3 - Permissible Power Dissipation vs. Temperature

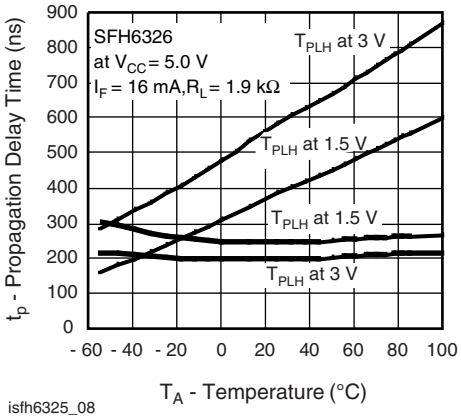


Fig. 6 - Propagation Delay vs. Ambient Temperature

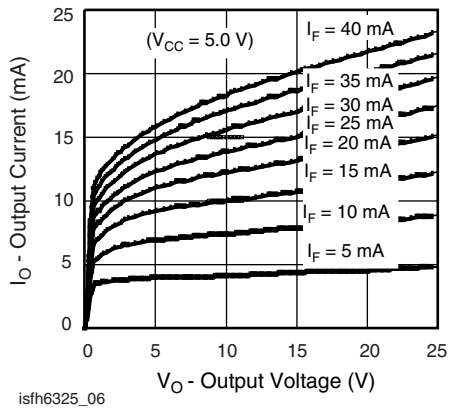


Fig. 4 - Output Current vs. Output Voltage

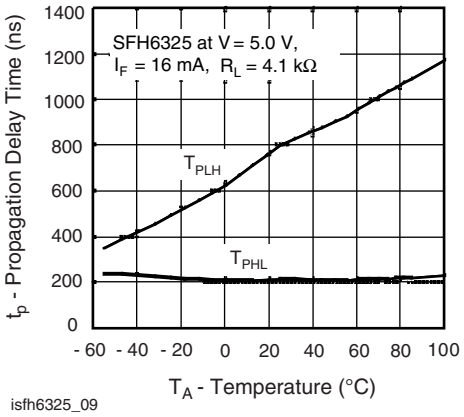


Fig. 7 - Propagation Delay vs. Ambient Temperature

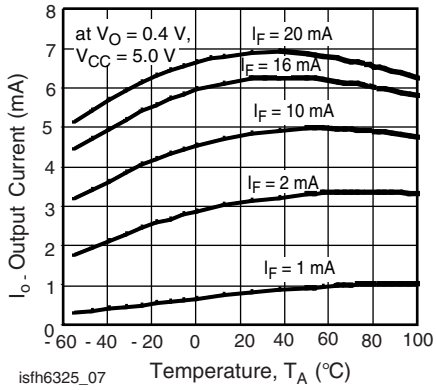


Fig. 5 - Output Current vs. Temperature

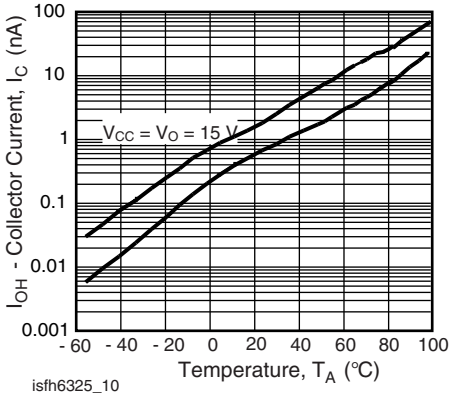


Fig. 8 - Logic High Output Current vs. Temperature

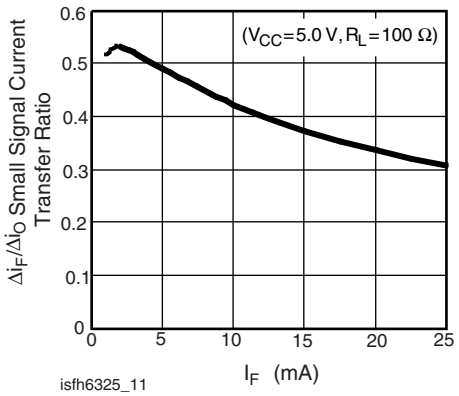


Fig. 9 - Small Signal Current Transfer Ratio vs. Input Current

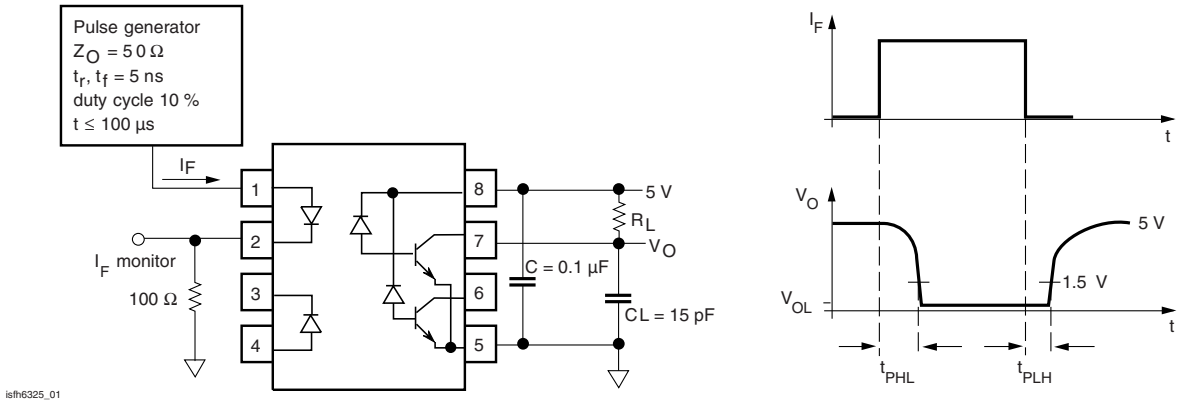


Fig. 10 - Switching Time and Test Circuit

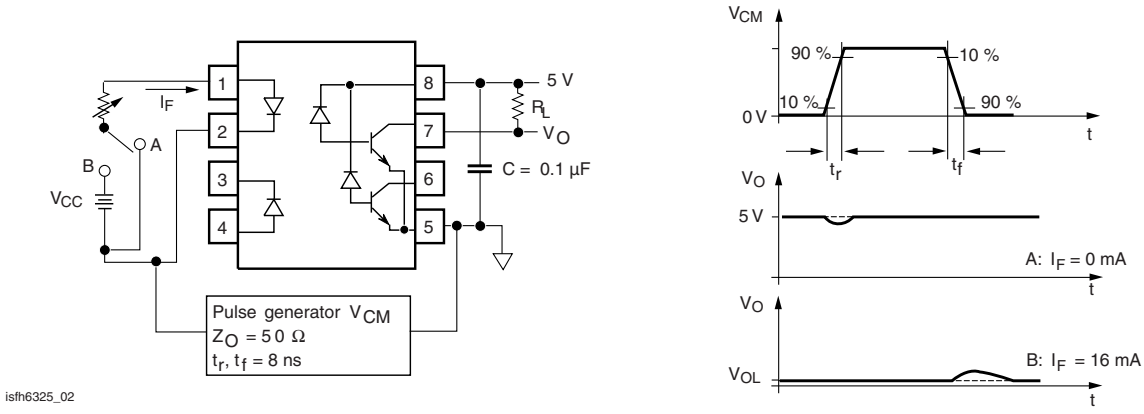
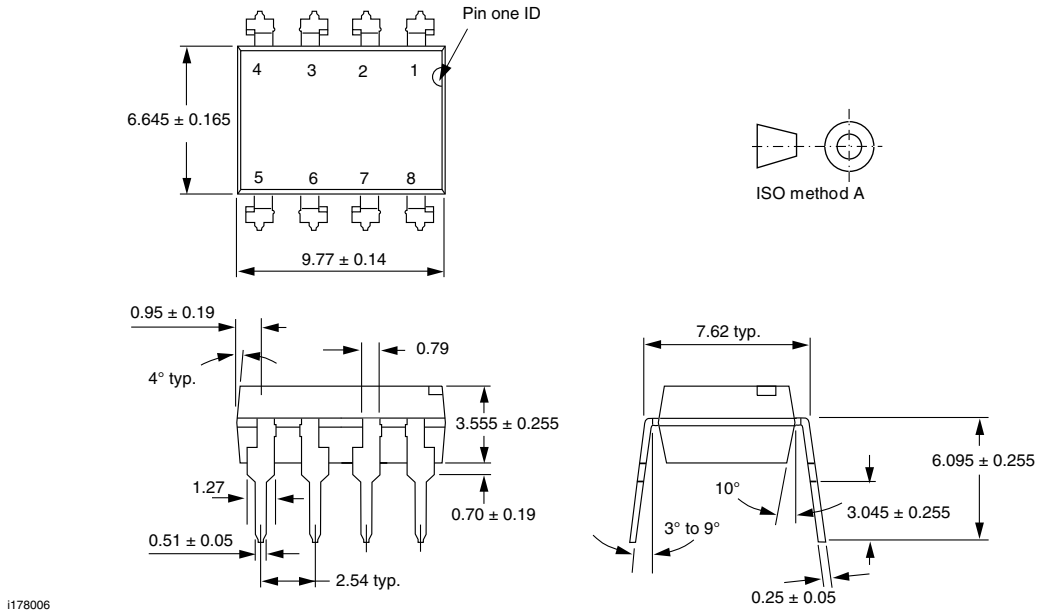
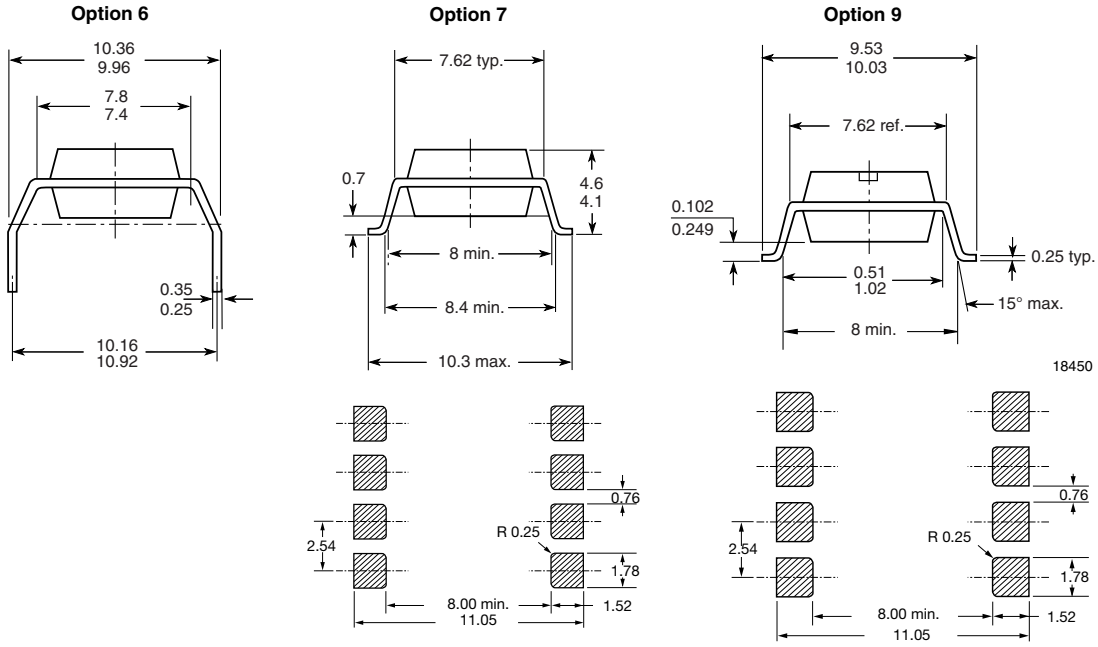


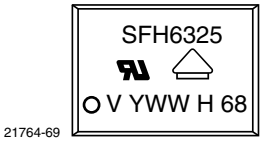
Fig. 11 - Waveform and Test Circuit for Common Mode Transient Immunity

PACKAGE DIMENSIONS in millimeters





PACKAGE MARKING



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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