SFH6325/6

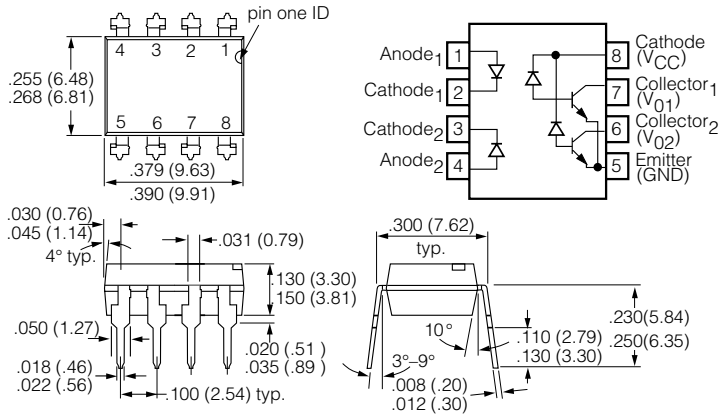
High-Speed Dual Optocoupler

Preliminary

FEATURES

- **Isolation Test Voltage: 5300 V_{RMS}**
- **TTL Compatible**
- **Bit Rates: 1.0 MBit/s**
- **High Common-Mode Transient Immunity**
- **Bandwidth 2.0 MHz**
- **Open-Collector Output**
- **Field-Effect Stable by TRIOS**
- **Underwriters Lab File #E52744**

Dimensions in inches (mm)



Description

The SFH6325/6326 are dual channel optocouplers with a GaAlAs infrared emitting diode, optically coupled with an integrated photodetector which consists of a photodiode and a high-speed transistor in a DIP-8 plastic package.

Signals can be transmitted between two electrically separated circuits up to frequencies of 2.0 MHz. The potential difference between the circuits to be coupled is not allowed to exceed the maximum permissible reference voltages.

Maximum Ratings T_A=25°C

Emitter (each channel)

Reverse Voltage ..... 4.5 V
Continuous Forward Current ..... 25 mA
Peak Forward Current
(t=1 ms, duty cycle 50%) ..... 50 mA
Maximum Surge Forward Current
(t≤1 µs, 300 pulses/s) ..... 1.0 A
Derate Linearly from 25°C ..... 0.6 mW/°C
Total Power Dissipation (T_A≤70°C) ..... 45 mW

Detector (each channel)

Supply Voltage .....–0.5 to 15 V
Output Voltage..... –0.5 to 15 V
Collector Output Current ..... 8.0 mA
Derate Linearly from 25°C ..... 1.33 mW/°C
Total Power Dissipation (T_A≤70°C) ..... 100 mW

Package

Isolation Test Voltage (t=1 sec.) ..... 5300 V_{RMS}
Pollution Degree (DIN VDE 0109) 2
Creepage..... ≥7.0 mm
Clearance ..... ≥7.0 mm
Derate Linearly from 25°C ..... 1.93 mW/°C
Total Package Dissipation at 25°C T_A ..... 145 mW
Comparative Tracking Index per
DIN IEC112/VDE 0303 part 1,
Group IIIa per DIN VDE 6110.....175
Isolation Resistance
V_{IO}=500 V, T_A=25°C .....≥10^{12} Ω
V_{IO}=500 V, T_A=100°C .....≥10^{11} Ω
Storage Temperature Range .... –55°C to +125°C
Ambient Temperature Range ... –55°C to +100°C
Soldering Temperature
(max. 10 s, DIP soldering:
distance to seating plane ≥1.5 mm)..... 260°C

Characteristics (T_A=0–70°C unless otherwise specified)

Parameter	Sym.	Min.	Typ.	Max.	Unit	Condition
Emitter						
Forward Voltage	V_F	—	1.6	1.9	V	I_F=16 mA, T_A=25°C
Breakdown Voltage	V_{BR}	4.5	—	—	V	I_R=10 µA
Reverse Current	I_R	—	0.5	10	µA	V_R=4.5 V
Capacitance	C_O	—	125	—	pF	V_R=0 V, f=1.0 MHz
Temperature Coefficient of Forward Voltage	$\Delta V_F / \Delta T_A$	—	–1.7	—	mV/°C	I_F=16 mA
Detector						
Supply Current Logic Low	I_{CCL}	—	150	400	µA	I_F=16 mA, V_O=open, V_{CC}=4.5 V
Supply Current Logic High	I_{CCH}	—	0.01	4.0	µA	I_F=0 mA, V_O=open, V_{CC}=15 V
Logic Low Output Voltage						
SFH6325	V_{OL}	—	0.1	0.5	V	I_F=16 mA, V_{CC}=4.5 V, I_O=1.1 mA, T_A=25°C
SFH6326						I_F=16 mA, V_{CC}=4.5 V, I_O=3.0 mA, T_A=25°C
Logic High Output Current	I_{OH}	—	3.0	500	nA	I_F=0 mA, T_A=25°C V_O =V_{CC}=5.5 V
		—	—	50	µA	I_F=0 mA, V_O =V_{CC}=15 V
Channel to channel[1] Crosstalk	I_{OH-XT}	—	—	500	nA	I_F=16 mA, T_A=25°C V_O =V_{CC}=5.5 V
Package						
Coupling Capacitance Input-Output	C_{IO}	—	0.6	—	pF	f=1.0 MHz
Current Transfer Ratio						
SFH6325 SFH6326	CTR CTR	7.0 19	16 35	—	%	I_F=16 mA, V_{CC}=4.5 V, V_O=0.4 V, T_A=25°C
SFH6325 SFH6326	CTR CTR	5.0 15	—	—	% %	I_F=16 mA, V_{CC}=4.5 V, V_O=0.5 V

Note: 1. To measure crosstalk, turn on the LED for channel 1 and measure the output current for channel 2 in logic high. Repeat for channel 2.

Switching Delay Time Characteristics

I_F=16 mA, V_{CC}=5.0 V, T_A=25°C

Parameter	Sym.	Min.	Typ.	Max.	Unit	Condition
High–Low						
SFH6325	t_{PHL}	—	0.3	1.5	µs	R_L=4.1 kΩ
SFH6326			0.2	0.8		R_L=1.9 kΩ
Low–High						
SFH6325	t_{PLH}	—	0.6	1.5	µs	R_L=4.1 kΩ
SFH6326			0.5	0.8		R_L=1.9 kΩ

Common-Mode Transient Immunity

V_{CM}=10 V_{P-P}, V_{CC}=5.0 V, T_A=25°C

Parameter	Sym.	Min.	Typ.	Max.	Unit	Condition
CMTI at Logic High Level Output						
SFH6325	CM_H	—	1000	—	V/µs	I_F=0 mA, R_L=4.1 kΩ
SFH6326						I_F=0 mA, R_L=1.9 kΩ
CMTI at Logic Low Level Output						
SFH6325	CM_L	—	1000	—	V/µs	I_F=16 mA, R_L=4.1 kΩ
SFH6326						I_F=16 mA, R_L=1.9 kΩ

Figure 1. Switching Time and Test Circuit

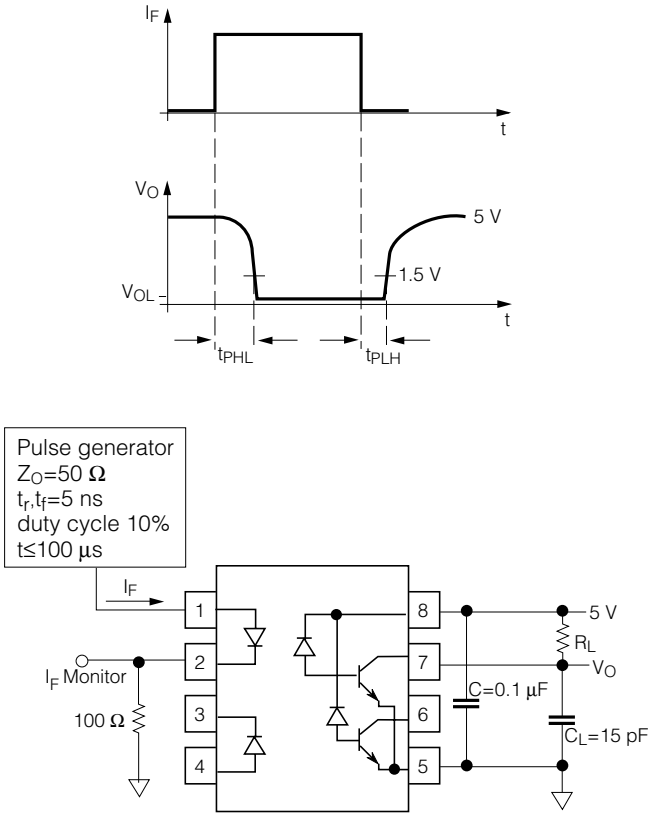


Figure 2. Waveform and Test Circuit for Common-Mode Transient Immunity

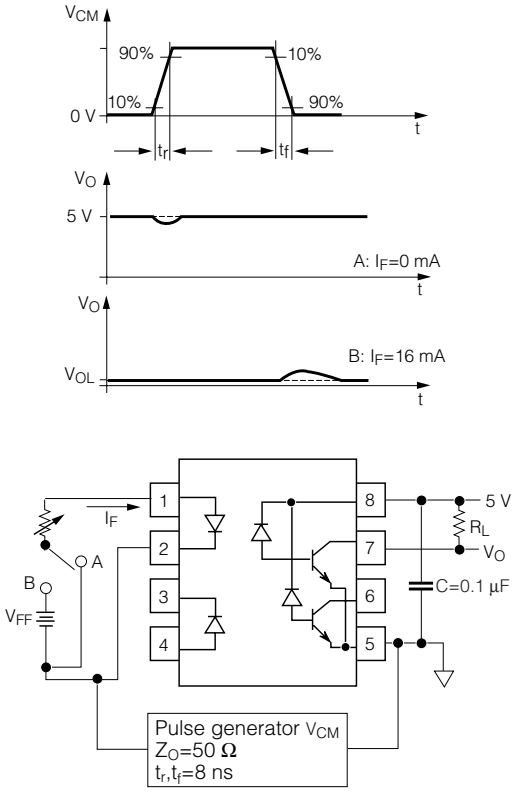


Figure 3. Forward Current vs. Forward Voltage T_A=25°C

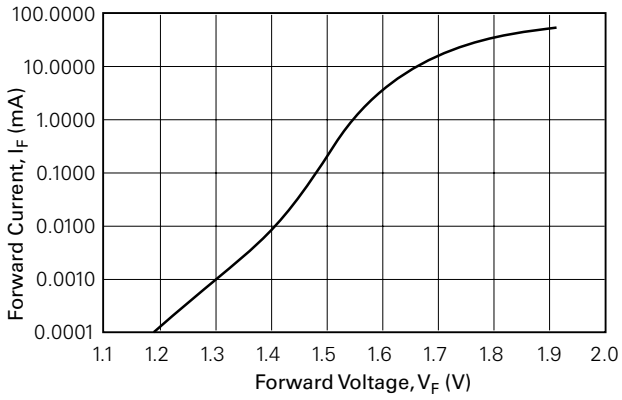


Figure 4. SFH6326 Collector Current vs. Forward Current at V_{CC}=5.0 V, V_O=0.4 V, T_A=25°C

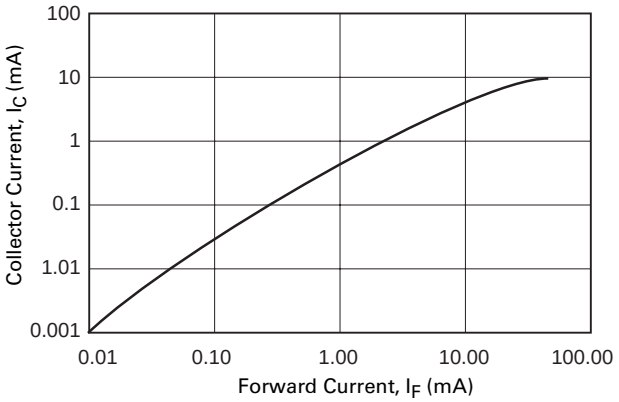


Figure 5. SFH6326 Current transfer ratio (normalized) vs. Forward Current

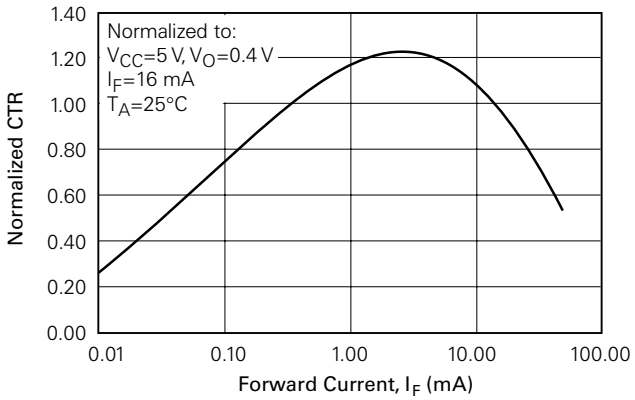


Figure 6. SFH6326 Current Transfer Ratio (normalized) vs. Ambient Temperature

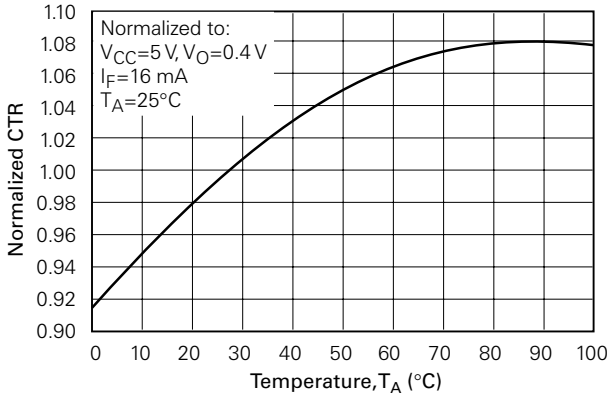


Figure 7. Output Current vs. Output Voltage
T_A=25°C, V_{CC}=5.0 V

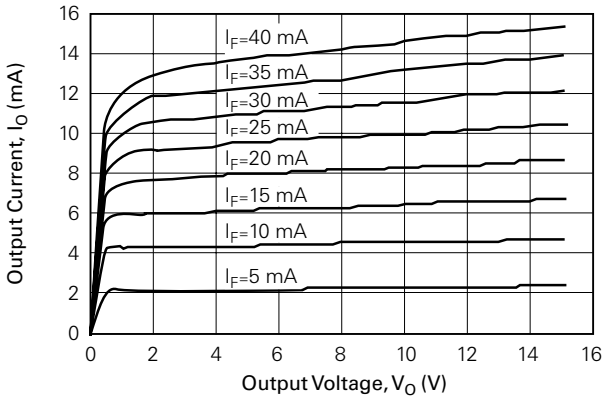


Figure 8. Output Current (high) vs. Ambient Temperature
I_F=0

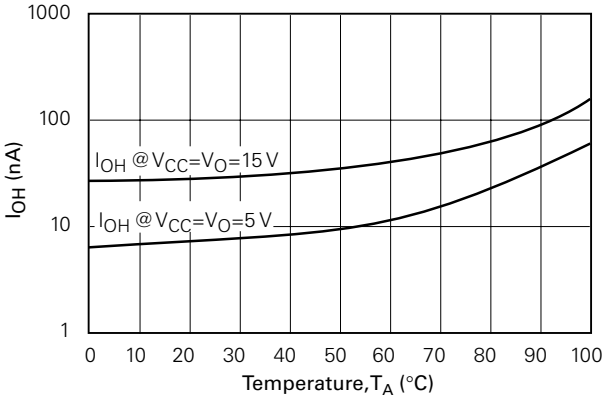


Figure 9. Output Current High Cross-talk (I_{0H-XT}) vs. Ambient Temperature