SFH6325
SFH6326
High-Speed Dual Optocoupler

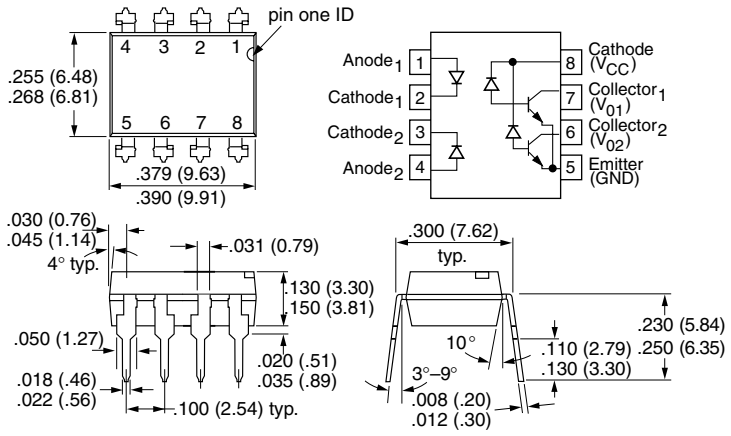
FEATURES
- **Isolation Test Voltage: 5300 V_{RMS}**
- **TTL Compatible**
- **Bit Rates: 1.0 MBit/s**
- **High Common-mode Transient Immunity**
- **Bandwidth 2.0 MHz**
- **Open-Collector Output**
- **Field-effect Stable by TRIOS (TRansparent IOn Shield)**
- **Underwriters Lab File #E52744**

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.

Dimensions in inches (mm)



Maximum Ratings, T_A=25°C

Emitter (each channel)

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

Detector (each channel)

Supply Voltage ..... –0.5 to 30 V
Output Voltage ..... –0.5 to 25 V
Collector Output Current ..... 8.0 mA
Derate Linearly from 25°C ..... 1.33 mW/°C
Total Power Dissipation (T_A≤70°C) ..... 50 mW

Package

Isolation Test Voltage (t=1.0 s) ..... 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}	—	100	200	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

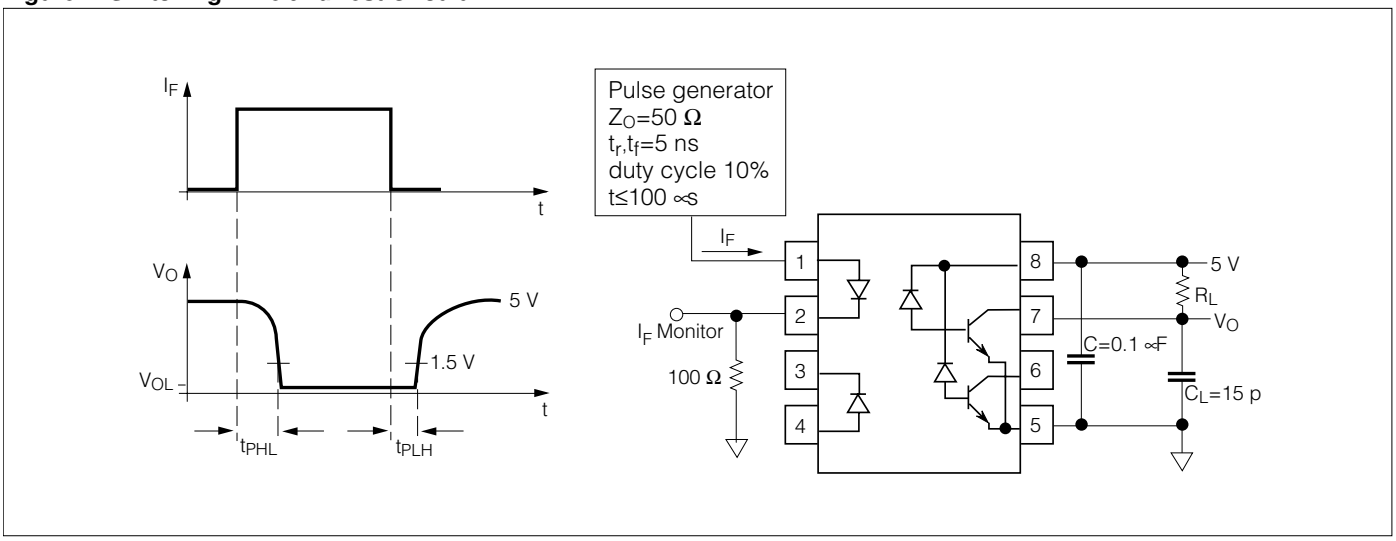


Figure 2. Waveform and Test Circuit for Common-mode Transient Immunity

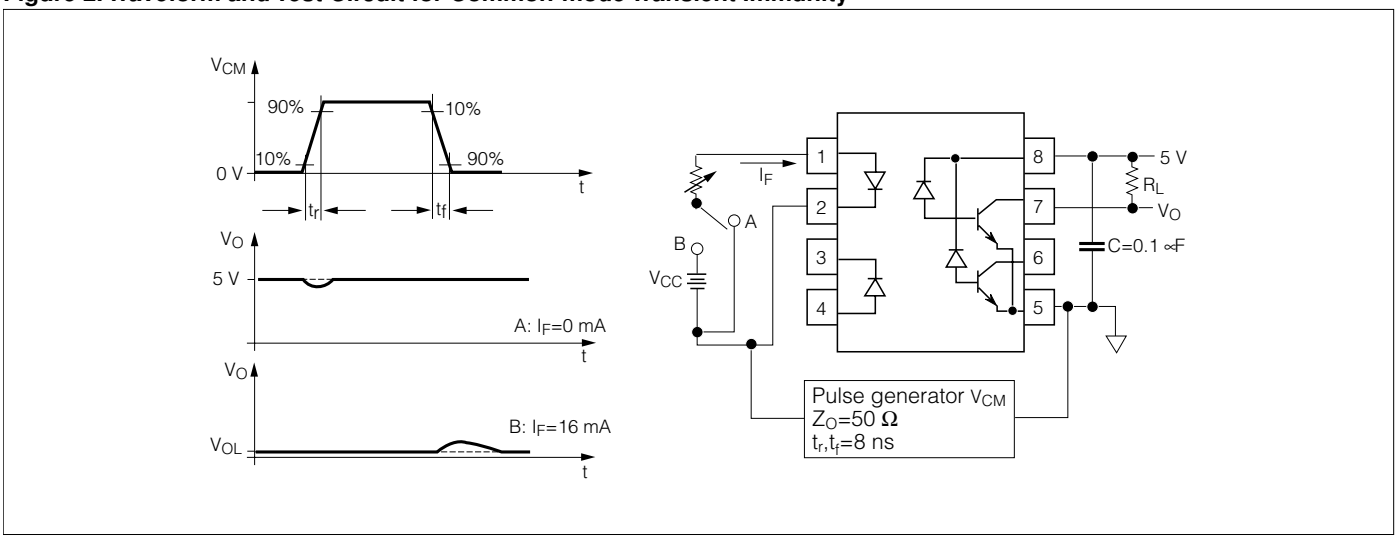


Figure 3. LED forward current vs. forward voltage

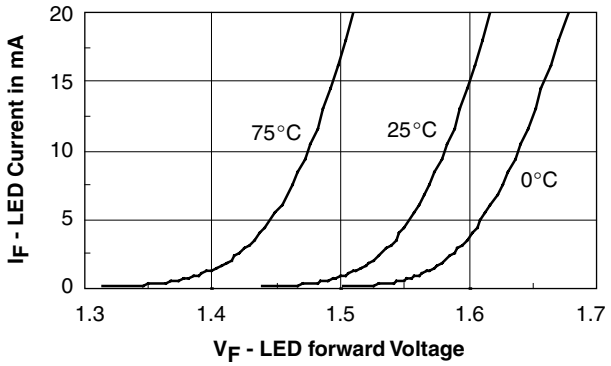


Figure 4. Permissible forward LED current vs. temperature

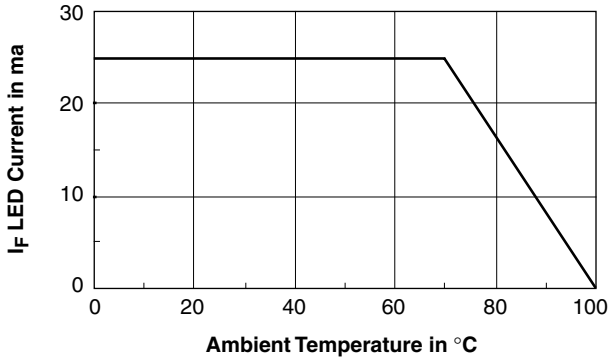


Figure 5. Permissible power dissipation vs. temperature

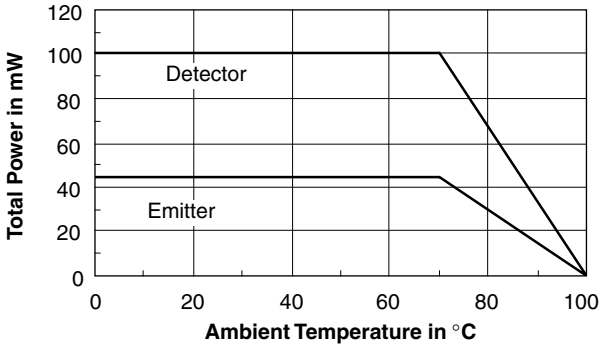


Figure 6. Output Current vs. Output Voltage
(T_A=25°C, V_{CC}=5.0 V)

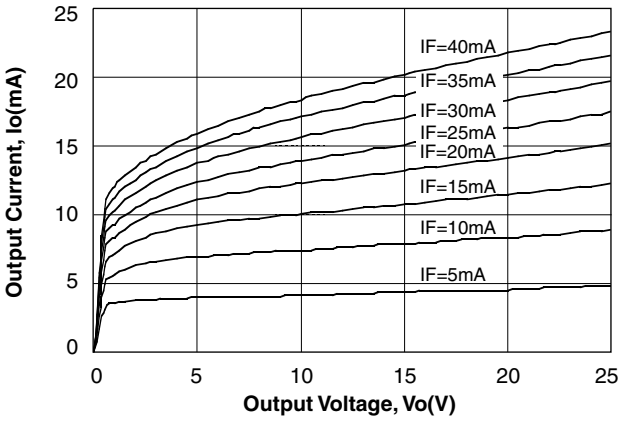


Figure 7. Output Current vs. Temperature
@ V_O=0.4 V, V_{CC}=5.0

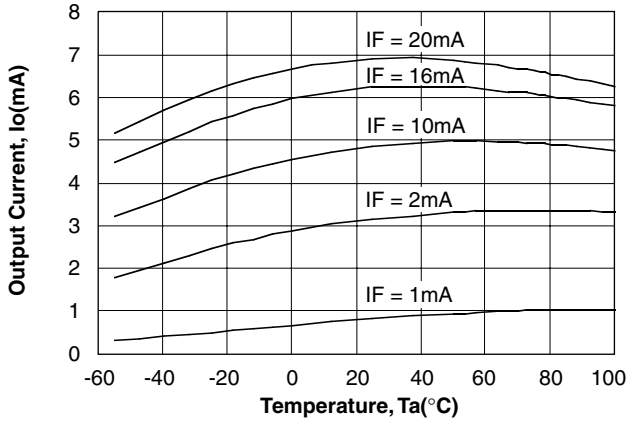


Figure 8. Propagation Delay vs. Temperature-SFH6326
@ V_{CC}=5.0 V, I_F=16 mA, R_L=1.9 kΩ

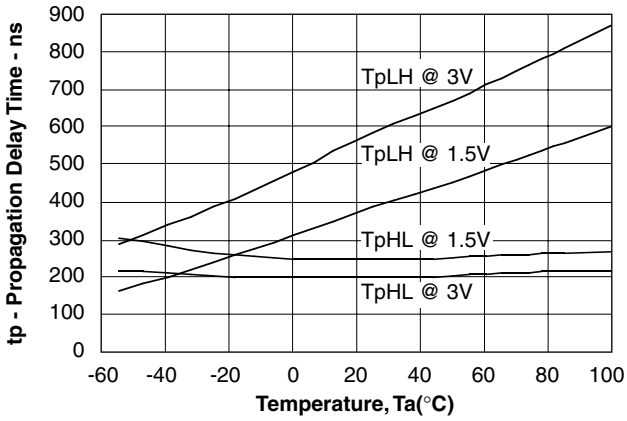


Figure 9. Propagation Delay vs. Temperature-SFH6325
@ V_{CC}=5.0 V, I_F=16 mA, R_L=4.1 kΩ

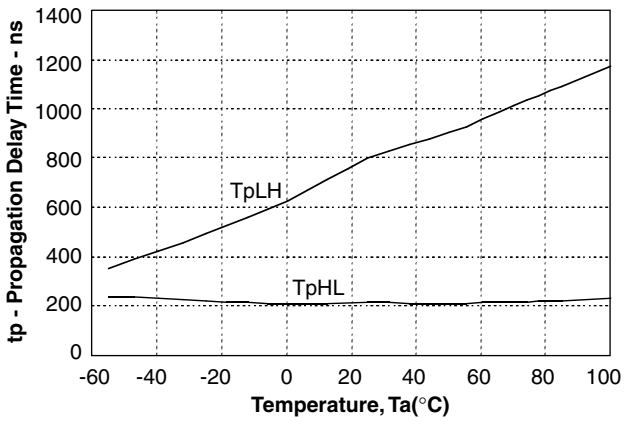


Figure 10. Logic High Output Current vs. Temperature

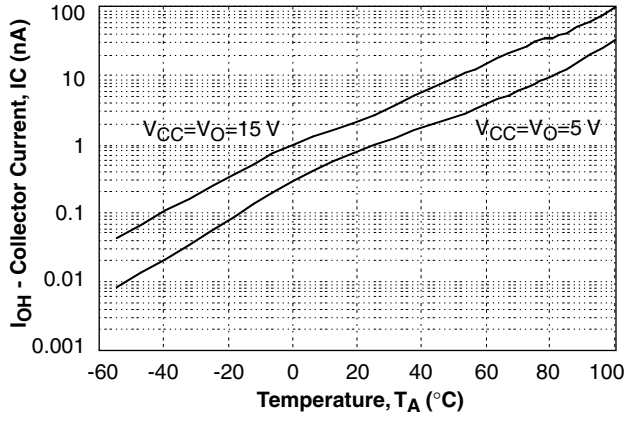


Figure 11. Small Signal Current Transfer Ratio vs. Quiescent Input Current (V_{CC}=5.0 V, R_L=100 Ω)