

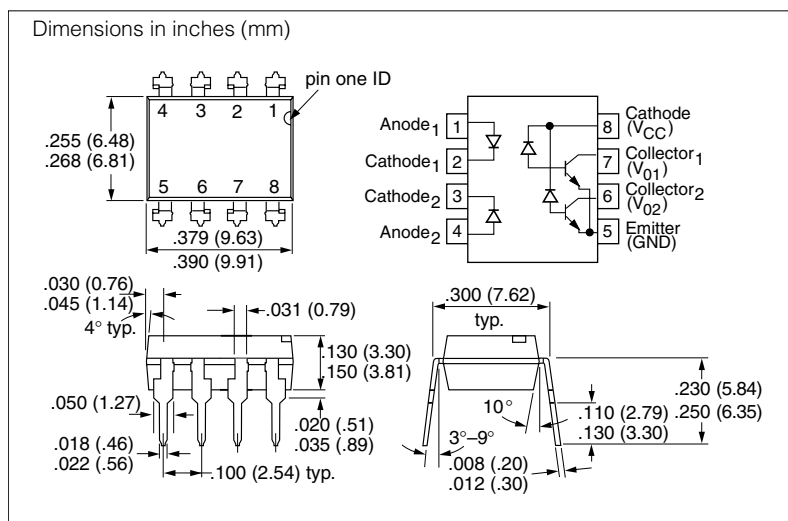
FEATURES

- **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 IO n 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.


Maximum Ratings, $T_A=25^\circ\text{C}$
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 ($t\leq 1.0$ μs , 300 pulses/s)	1.0 A
Derate Linearly from 25°C	0.6 mW/ $^\circ\text{C}$
Total Power Dissipation ($T_A\leq 70^\circ\text{C}$)	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/ $^\circ\text{C}$
Total Power Dissipation ($T_A\leq 70^\circ\text{C}$)	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/ $^\circ\text{C}$
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, $T_A=25^\circ\text{C}$	$\geq 10^{12}$ Ω
$V_{IO}=500$ V, $T_A=100^\circ\text{C}$	$\geq 10^{11}$ Ω
Storage Temperature Range	-55°C to $+125^\circ\text{C}$
Ambient Temperature Range	-55°C to $+100^\circ\text{C}$
Soldering Temperature (max. 10 s, DIP soldering: distance to seating plane ≥ 1.5 mm)	260°C

Characteristics ($T_A=0-70^{\circ}\text{C}$ 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		ΔV _F /ΔT _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

$I_F=16\text{ mA}$, $V_{CC}=5.0\text{ V}$, $T_A=25^{\circ}\text{C}$

Parameter	Sym.	Min.	Typ.	Max.	Unit	Condition
High-Low						
SFH6325	t_{PHL}	—	0.3	1.5	μs	$R_{\text{L}}=4.1\text{ k}\Omega$
SFH6326			0.2	0.8		$R_{\text{L}}=1.9\text{ k}\Omega$
Low-High						
SFH6325	t_{PLH}	—	0.6	1.5	μs	$R_{\text{L}}=4.1\text{ k}\Omega$
SFH6326			0.5	0.8		$R_{\text{L}}=1.9\text{ k}\Omega$

Common-Mode Transient Immunity

$V_{CM}=10\text{ V}_{P-P}$, $V_{CC}=5.0\text{ V}$, $T_A=25^{\circ}\text{C}$

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

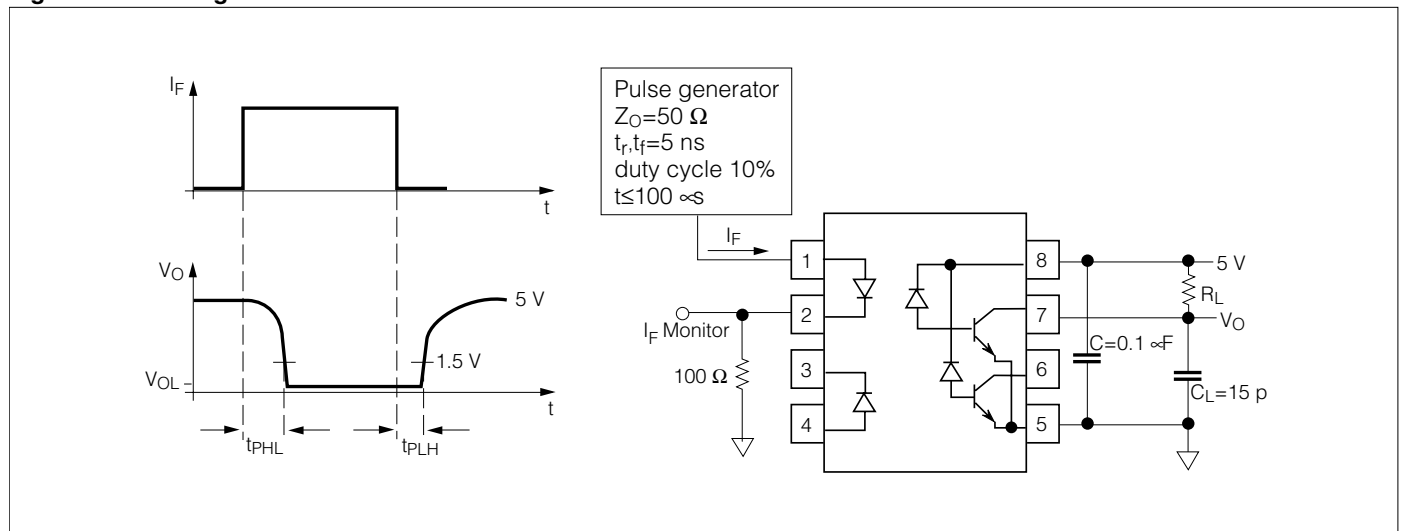


Figure 2. Waveform and Test Circuit for Common-mode Transient Immunity

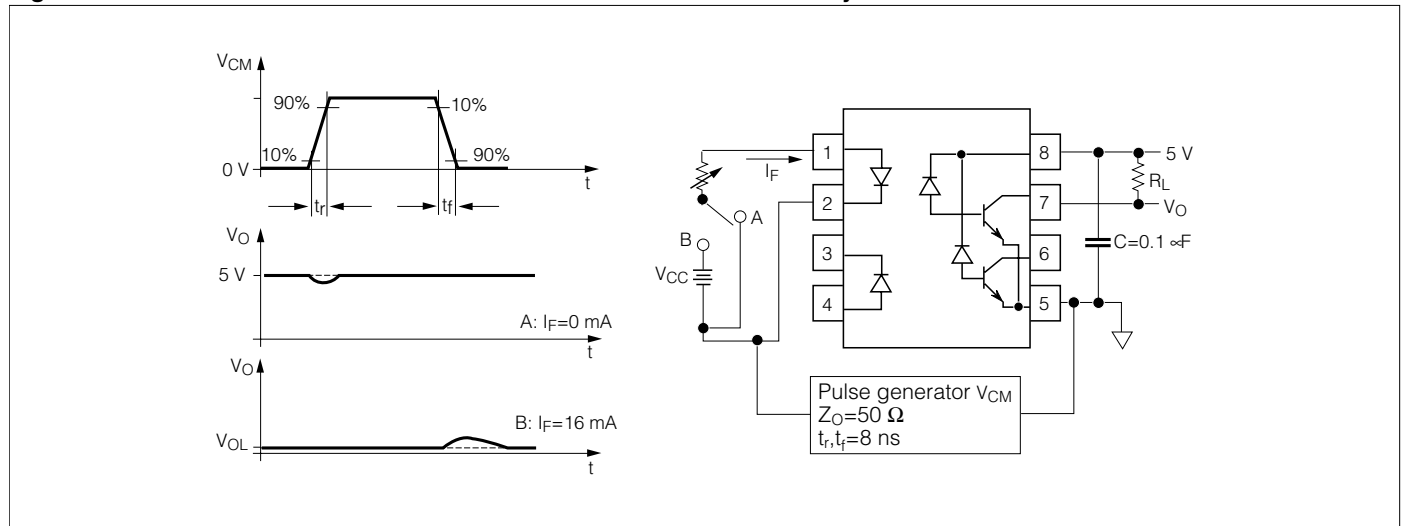


Figure 3. LED forward current vs. forward voltage

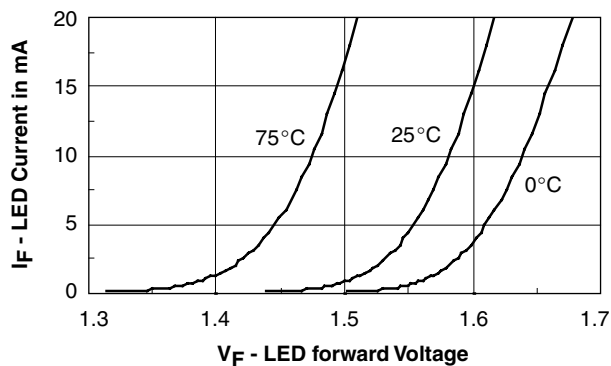


Figure 4. Permissible forward LED current vs. temperature

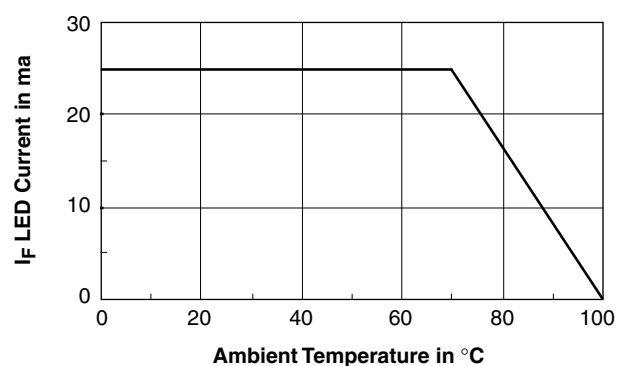


Figure 5. Permissible power dissipation vs. temperature

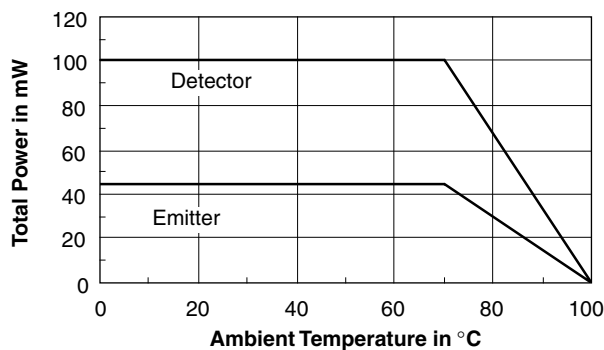


Figure 6. Output Current vs. Output Voltage
($T_A=25^\circ\text{C}$, $V_{CC}=5.0\text{ V}$)

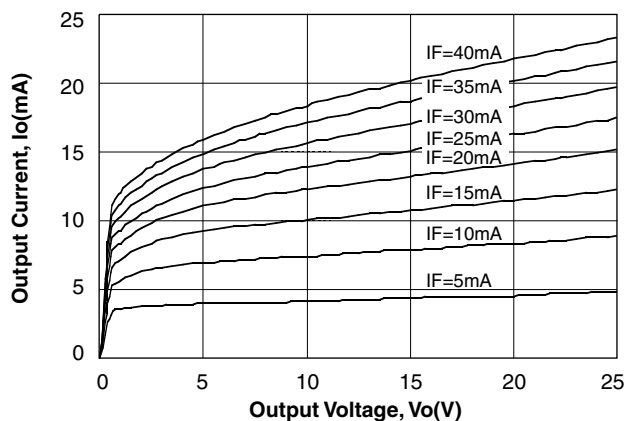


Figure 7. Output Current vs. Temperature
@ $V_O=0.4\text{ V}$, $V_{CC}=5.0$

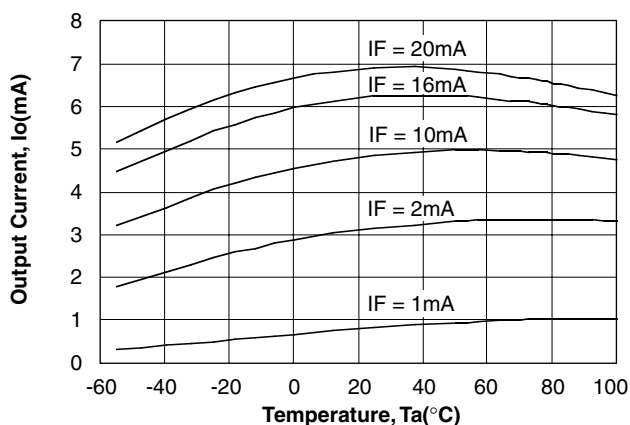


Figure 8. Propagation Delay vs. Temperature-SFH6326
@ $V_{CC}=5.0\text{ V}$, $I_F=16\text{ mA}$, $R_L=1.9\text{ k}\Omega$

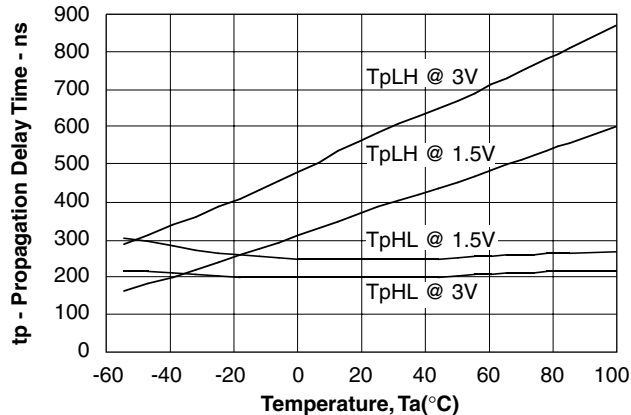


Figure 9. Propagation Delay vs. Temperature-SFH6325
@ $V_{CC}=5.0\text{ V}$, $I_F=16\text{ mA}$, $R_L=4.1\text{ k}\Omega$

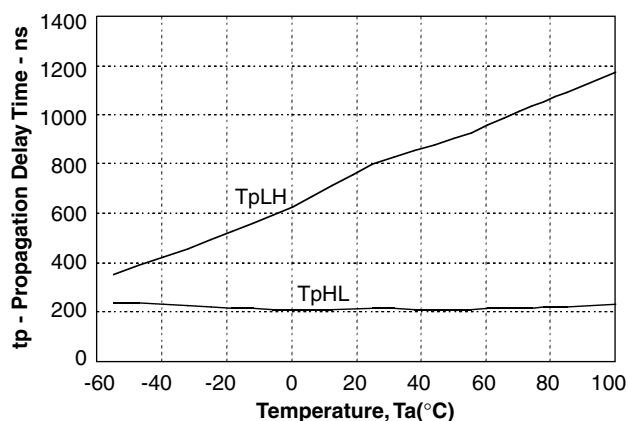


Figure 10. Logic High Output Current vs. Temperature

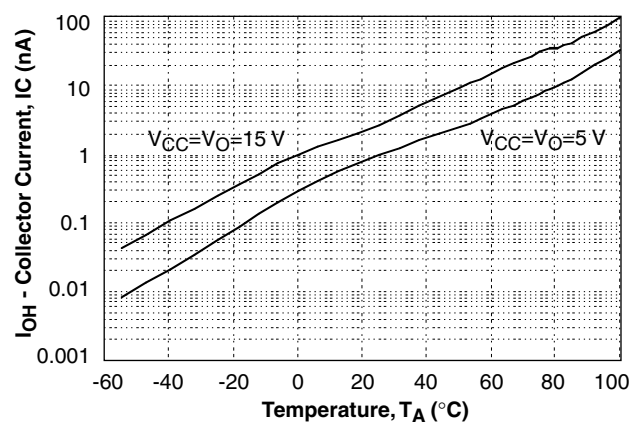


Figure 11. Small Signal Current Transfer Ratio vs. Quiescent Input Current ($V_{CC}=5.0\text{ V}$, $R_L=100\ \Omega$)

