

FEATURES

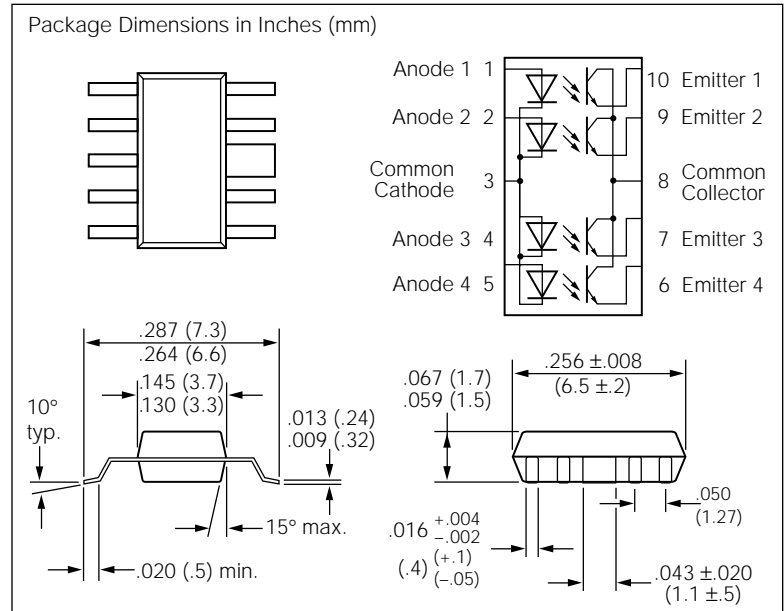
- Transistor Optocoupler in SOT223 Package
- End Stackable, 1.27 mm Spacing
- Low Current Input
- Very High CTR, 150% Typical at $I_F=1$ mA, $V_{CE}=0.5$ V
- Good CTR Linearity Versus Forward Current
- Minor CTR Degradation
- Field Effect Stable by TRIOS® (TRansparent IO n Shield)
- High Collector-Emitter Voltage, $V_{CEO}=70$ V
- Low Coupling Capacitance
- High Common Mode Transient Immunity
- Isolation Test Voltage: 2500 VDC

APPLICATIONS

- Telecommunication
- SMT
- PCMCIA
- Instrumentation

DESCRIPTION

The SFH6941 is a four channel mini-optocoupler suitable for high density packaged PCB application. It has a minimum of 2500 VDC isolation from input to output. The device consists of four phototransistors as detectors. Each channel is individually controlled. The optocoupler is housed in a SOT223 package. All the cathodes of the input LEDs and all the collectors of the output transistors are commoned enabling a pin count reduction from 16 pins to 10 pins—a significant space savings as compared to four channels that are electrically isolated individually.



Absolute Maximum Ratings

Emitter(GaAlAs)

Reverse Voltage	3 V
DC Forward Current	5 mA
Surge Forward Current ($t_p \leq 10 \mu s$)	100 mA
Total Power Dissipation	10 mW

Detector (Si Phototransistor)

Collector-Emitter Voltage	70 V
Emitter-Collector Voltage	7 V
Collector Current	10 mA
Surge Collector Current ($t_p < 1$ ms)	20 mA
Total Power Dissipation	20 mW

Package Insulation

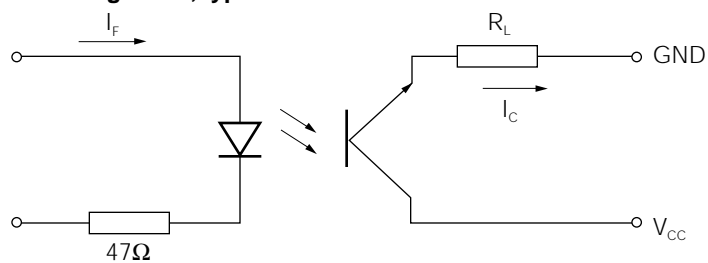
Isolation Test Voltage (between emitter and detector, refer to climate DIN 40046, part 2, Nov. 74)	2500 VDC
Creepage	≥ 4 mm
Clearance	≥ 4 mm
Comparative Tracking Index per DIN IEC 112/VDE0303, part 1	175
Isolation Resistance	
$V_{IO}=100$ V, $T_A=25^\circ C$	$\geq 10^{11} \Omega$
$V_{IO}=100$ V, $T_A=100^\circ C$	$\geq 10^{10} \Omega$
Storage Temperature Range	-55 to +150°C
Ambient Temperature Range	-55 to +100°C
Junction Temperature	100°C
Soldering Temperature ($t=10$ sec. max.)	260°C
Dip soldering plus reflow soldering processes	

Characteristics ($T_A=25^\circ\text{C}$, unless otherwise specified)

Description	Symbol	Min.	Typ.	Max.	Unit
Emitter (IR GaAs)					
Forward Voltage, $I_F=5\text{ mA}$	V_F		1.25		V
Reverse Current, $V_R=3\text{ V}$	I_R		0.01	10	μA
Capacitance, $V_R=0\text{ V}$, $f=1\text{ MHz}$	C_0		5		pF
Thermal Resistance	R_{thJA}		1000		$^\circ\text{K/W}$
Detector (Si Phototransistor)					
Collector-Emitter Voltage, $I_{CE}=10\ \mu\text{A}$	V_{CEO}	70			V
Emitter-Collector Voltage, $I_{EC}=10\ \mu\text{A}$	V_{ECO}	7			V
Capacitance, $V_{CE}=5\text{ V}$, $f=1\text{ MHz}$	C_{CE}		6		pF
Thermal Resistance	R_{thJA}		500		$^\circ\text{K/W}$
Package					
Coupling Capacitance	C_C		1		pF

Description	Symbol	Values			Unit
		-3	-4	-5	
Coupling Transfer Ratio $I_F=1\text{ mA}$, $V_{CE}=0.5\text{ V}$ $I_F=0.5\text{ mA}$, $V_{CE}=1.5\text{ V}$	I_C/I_F I_C/I_F	100–200 120 (≥ 50)	160–320 200 (≥ 80)	250–500 300 (≥ 125)	%
Collector-Emitter Saturation Voltage $I_F=1\text{ mA}$	V_{CEsat}	0.25 (≤ 0.4) ($I_C=0.5\text{ mA}$)	0.25 (≤ 0.4) ($I_C=0.8\text{ mA}$)	0.25 (≤ 0.4) ($I_C=1.25\text{ mA}$)	V
Collector-Emitter Leakage Current $V_{CE}=10\text{ V}$	I_{CEO}	50	50	50	nA

Switching times, typical



Description	Symbol	Values	Unit	Test Conditions
Turn-on Time	t_{on}	3	μs	$I_F=2\text{ mA}$ $R_L=100\ \Omega$ $T_A=25^\circ\text{C}$ $V_{CC}=5\text{ V}$
Rise Time	t_r	2.6		
Turn-off Time	t_{off}	3.1		
Fall Time	t_f	2.8		

Figure 1. LED current versus LED voltage $V_F=f(I_F)$

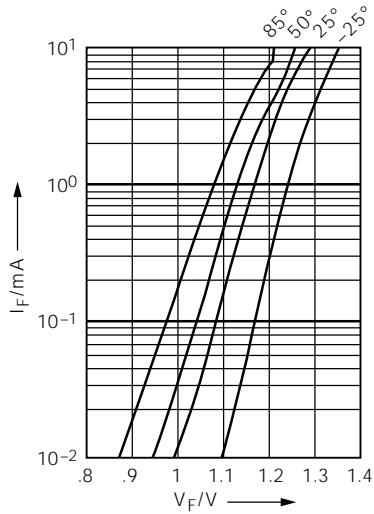


Figure 2. Saturated current transfer ratio normalized to $I_F=1$ mA, $NC-TR=f(I_F)$

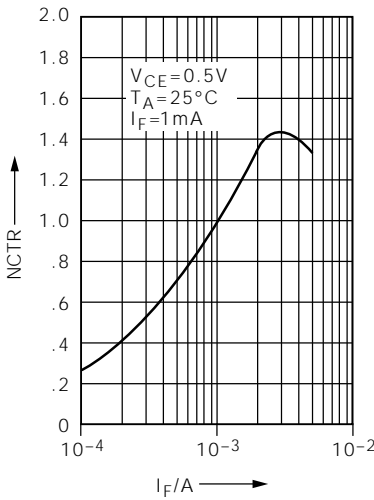


Figure 3. Non-saturated current transfer ratio normalized to $I_F=1$ mA, $NC-TR=f(I_F)$

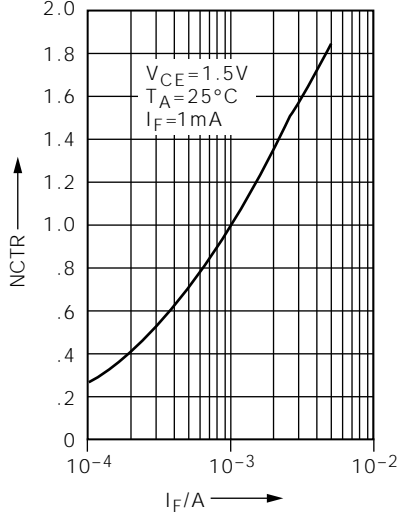


Figure 4. Transistor output characteristics $T_A=25^\circ\text{C}$, $I_{CE}=f(V_{CE}, I_F)$

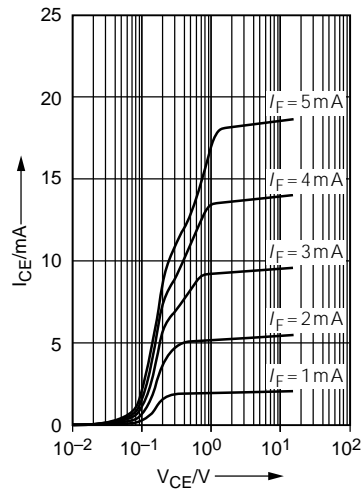


Figure 5. Transistor capacitance (typ.) $T_A=25^\circ\text{C}$, $f=1\text{MHz}$, $C_{CE}=f(V_{CE})$

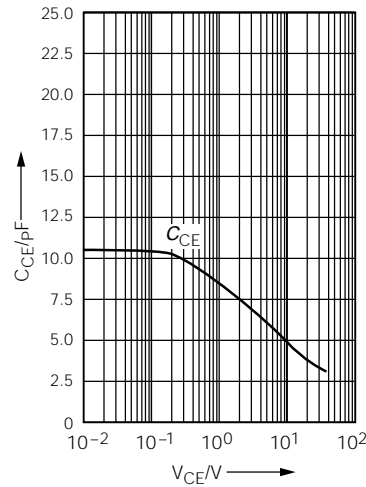


Figure 6. Collector-emitter leakage current (typ.) $I_F=0$, $T_A=25^\circ\text{C}$, $I_{CE0}=f(V_{CE})$

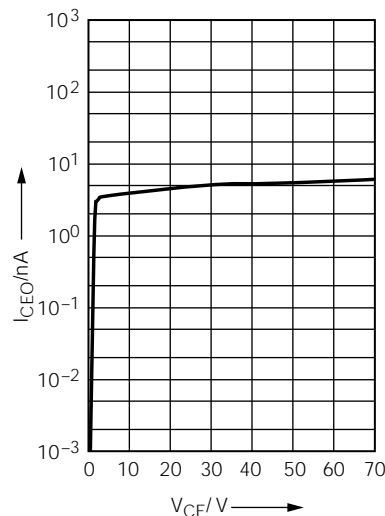


Figure 7. Permissible forward current diode $I_F=f(T_A=25^\circ\text{C})$

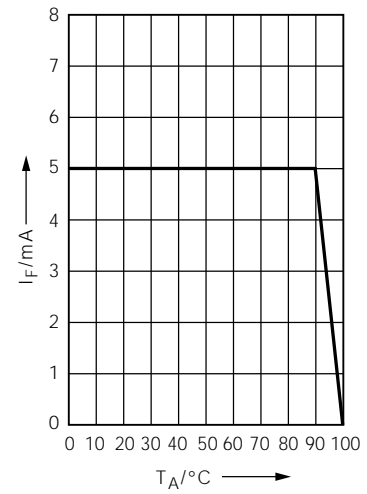


Figure 8. Permissible power dissipation $P_{tot}=f(T_A)$

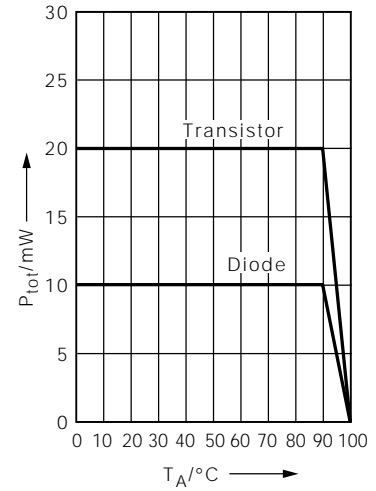


Figure 9. $T_A=25^\circ\text{C}$, $I_F=1$ mA, $V_{CC}=5$ V, t_{on} , t_r , t_{off} , $t_t=f(R_L)$

