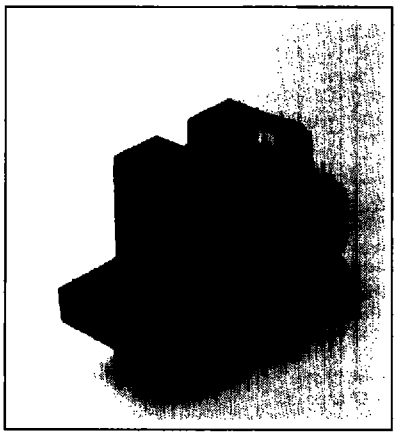
SIEMENS

SFH 910

DIFFERENTIAL PHOTO INTERRRUPTER WITH COUNTING PULSE & DIRECTION RECOGNITION



FEATURES

- **Counting Mechanism**
- **Movement Direction Display**
- **Slot Width: 1.26_0 (3.2 mm)**
- **Maximum Output Current I_{OL}: 20 mA**
- **Switching Times t_R, t_F: 0.3 µs**
- **96 Slot Code Wheel Available (Part Number 2004-9053)**

DESCRIPTION

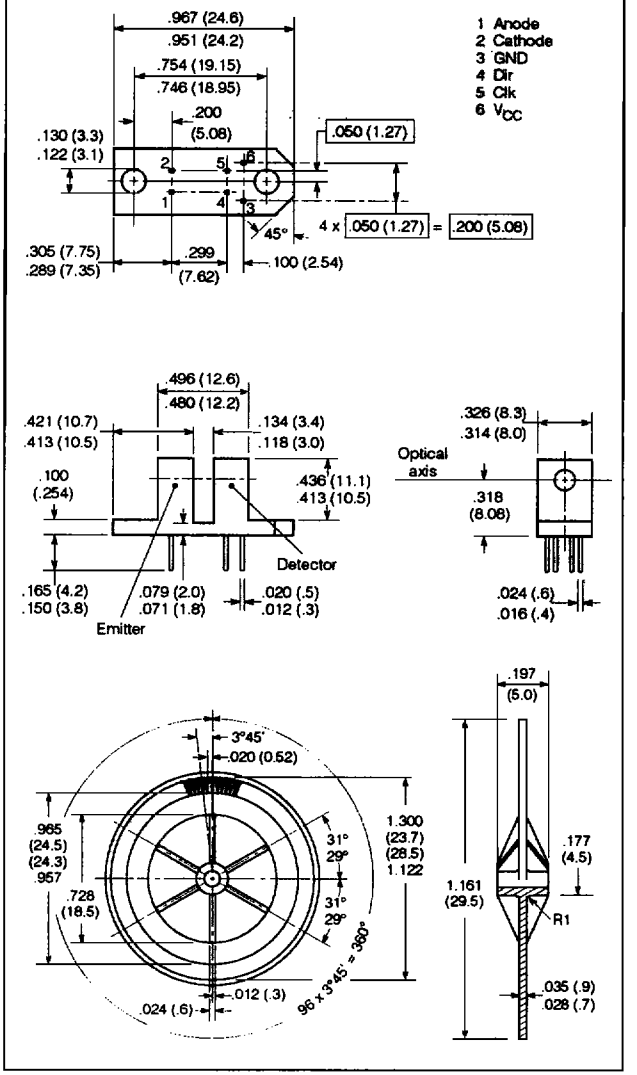
The SFH 910 is a differential photo interrupter with daylight-suppression filter and spherical lens, operating in the infrared range.

A GaAlAs IRED is used as an emitter.

The receiver circuit consists of two narrow photodiodes, next to each other, with amplifiers and Schmitt triggers, and a logic which produces a counting pulse signal and a directional signal. The width of the counting pulse remains constant. The counting pulse (Z) and the directional recognition (R) outputs are open NPN collectors, which are TTL-compatible.

The SFH 910 is used to encode mechanical shaft rotational speed and direction. The Differential Photo Interrupter will accept code wheels with slot widths as small as 0.033" (0.85 mm). An optional 96 slot code wheel as described in the data sheet is available.

Package Dimensions in Inches (mm)



Infrared Emitters

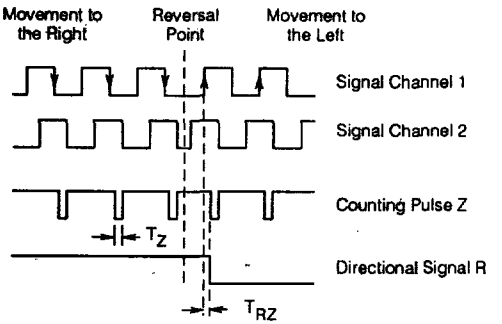
Maximum Ratings (T_A=25° C)

Emitter (GaAs IRED)
Reverse Voltage (V_R) ..... 5 V
Forward Current (I_F) T_A=55°C ..... 50 mA
Surge Current (I_{FSM}) ..... 1 A
Total Power Dissipation (P_{TOT}) T_A=55°C ..... 85 mW

Detector (Detector IC)
Supply Voltage (V_{CC}) ..... 4 to 18 V
Output Current, Output/Low (I_{OL}) ..... 20 mA
Output Voltage, Output/High (V_{OH}) ..... 16 V
Total Power Dissipation (P_{TOT}) T_A=25°C ..... 200 mW

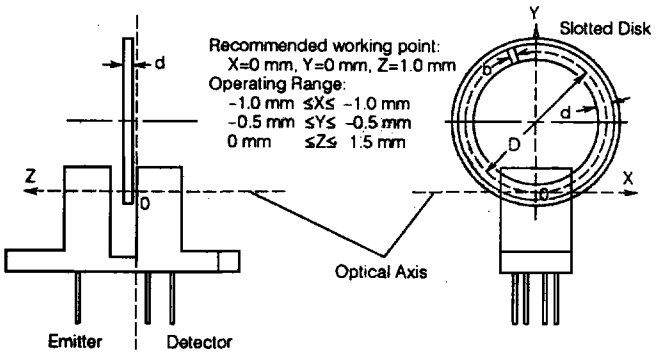
Photo Interrupter
Operating Temperature (T_{OP}) ..... –20° to +85°C
Storage Temperature (T_{STG}) ..... –40 to +100°C
Junction Temperature (T_J) ..... +100°C
Soldering Temperature (1 mm soldering distance from the case bottom: t≤5 s ..... 260°C

Pulse Diagram



Channels 1 and 2 represent the out-of-phase signals after the Schmitt triggers (see block diagram). This diagram is for reference only and can't be verified by using the output pins of the device.

Positioning of the slotted disk within the photo interrupter



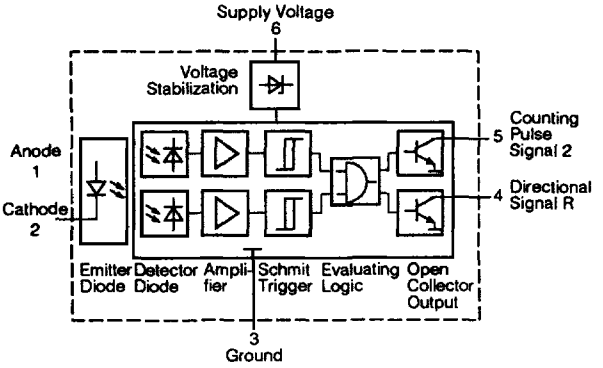
Number of slots on the slotted disk n = 96
Thickness of the slotted disk d = .031" (0.8 mm)
Width of the slot center b = .015" (0.38 mm)
Slot length l = .079" (2.0 mm)
Diameter of the slotted disk (from slot center to slot center) D = 1.043" (26.50 mm)

Characteristics (T_A=25°C)

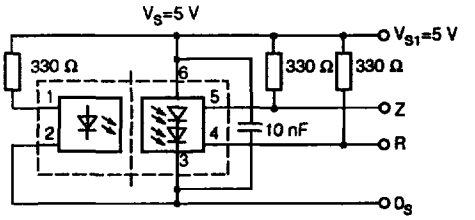
Parameter	Symbol	Value	Unit
Emitter (GaAs IRED)			
Forward Voltage (I_F=20 mA)	V_F	1.3 (≤1.6)	V
Breakdown Voltage (I_R=10 µA)	V_{BR}	(≥5)	V
Reverse Current (V_R=5 V)	I_R	0.01 (≤10)	µA
Capacitance (V_R=0 V, f=1 MHz)	C_0	25	pF
Thermal Resistance	R_{thJA}	500	K/W
Detector (Detector IC)			
Supply Voltage	V_{CC}	4.5 to 16	V
Supply Current (V_{CC}=5 V, Outputs Open)	I_S	5 (≤10)	mA
Output Voltage (Counting Pulse) (I_{OLZ}=16 mA, V_{CC}=5 V, I_F=10 mA)	V_{OLZ}	.2 (≤.4)	V
Output Voltage (Direction) (I_{OLR}=16 mA, V_{CC}=5 V, I_F=10 mA)	V_{OLR}	.2 (≤.4)	V
Output Current[2] (Counting Pulse) (V_{OHZ}=V_{CC}=16 V, I_F=0)	I_{OHZ}	.01 (≤10)	µA
Output Current[2] (Direction) (V_{OHR}=V_{CC}=16 V, I_F=0)	I_{OHR}	.01 (≤10)	µA
Thermal Resistance	R_{thJA}	375	K/W
Photo Interrupter			
Operating Range	I_F	20 ±5	mA
Rise Time, Fall Time (R_L=280 Ω, V_S=V_{S1}=5 V; I_F=20 mA)	t_R, t_F	.3	µs
Counting Pulse Width	T_Z	10 (≤20)	µs
Delay Time (Change of Direction/Counting Pulse)	T_{RZ}	1	µs
Hysteresis of Schmitt Triggers	P_H	25	%

1. All characteristics have been measured by means of a slotted disk, as described previously.
2. Without ambient light.

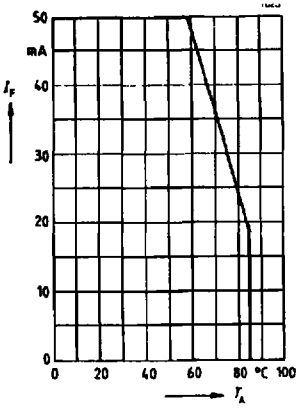
Block Diagram



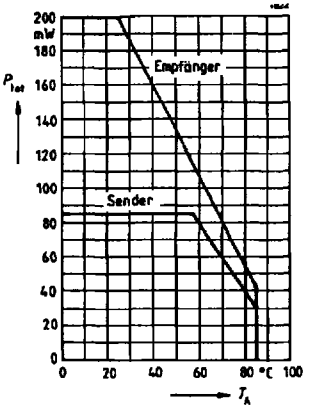
Application



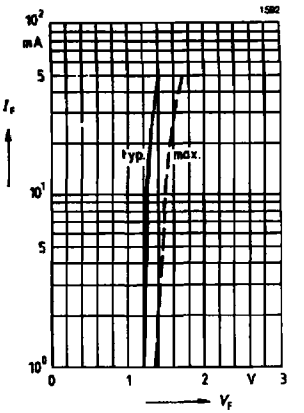
Maximum permissible forward current (Emitter) $I_F=f(T_A)$



Permissible power dissipation $P_{TOT}=f(T_A)$



Forward current $I_F=f(V_F)$



Forward voltage $V_F/V_{F25}=f(T_A)$