

Gabellichtschranke mit Schmitt-Trigger IC Slotted Interrupter with Schmitt-Trigger-IC

SFH 9340
SFH 9341



Wesentliche Merkmale

- Kompaktes Gehäuse
- IR-Sender: GaAs (950 nm)
- Empfänger: Schmitt-Trigger IC
- Empfänger: Tageslichtsperrfilter
- SFH 9340: Ausgang active low
- SFH 9341: Ausgang active high
- Einschaltstrom: typ. 0.6 mA

Anwendungen

- Optischer Schalter
- Pulsformer
- Zähler

Features

- Compact Type
- IR-emitter: GaAs (950 nm)
- Detector: Schmitt-Trigger IC
- Detector: Daylight-Cutoff Filter
- SFH 9340: Output active low
- SFH 9341: Output active high
- Threshold current: typ. 0.6 mA

Applications

- Optical threshold switch
- Pulseformer
- Counter

Typ Type	Bestellnummer Ordering Code	Gehäuse Package
SFH 9340	Q62702-P5120	Polykarbonat Plastikgehäuse.
SFH 9341	Q62702-P5121	Senderseite durch Buchstaben „E“, Empfängerseite durch Buchstaben „S“ gekennzeichnet. Polycarbonate plastic material housing. Emitter side marked with letter “E”, Detector/Sensor side marked with letter “S”.

Grenzwerte ($T_A = 25\text{ °C}$)**Maximum Ratings**

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Sender (GaAs-Diode) Emitter (GaAs diode)			
Sperrspannung Reverse voltage	V_R	5	V
Durchlassstrom Forward current	I_F (DC)	60	mA
Stoßstrom ($t_p \leq 10\ \mu\text{s}$, $D = 0$) Surge current	I_{FSM}	1	A
Verlustleistung Power dissipation	P_{tot}	100	mW
Wärmewiderstand Thermal resistance	R_{thJA}	280	K/W

Empfänger (Schmitt-Trigger IC)**Detector** (Schmitt-Trigger IC)

Versorgungsspannung Supply voltage	V_{CC}	- 0.5 ... + 20	V
Ausgangsspannung Output voltage	V_{OUT}	- 0.5 ... + 20	V
Ausgangsstrom ($T_A = 25\text{ °C}$) Output current	I_O	50	mA
Verlustleistung Power dissipation	P_{tot}	150	mW

Gabellichtschranke**Slotted Interrupter**

Lagertemperatur Storage temperature range	T_{stg}	- 40 ... + 85	°C
Betriebstemperatur Operating temperature range	T_{op}	- 40 ... + 85	°C
Elektrostatische Entladung Electrostatic discharge	ESD	2	kV

Kennwerte ($T_A = 25\text{ °C}$)

Characteristics

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Sender (GaAs-Diode)			
Emitter (GaAs diode)			
Durchlassspannung ($I_F = 20\text{ mA}$, $t_p = 20\text{ ms}$) Forward voltage	V_F	1.2 (< 1.4)	V
Sperrstrom ($V_R = 3\text{ V}$) Reverse current	I_R	0.01 (< 1)	μA
Kapazität ($V_R = 0\text{ V}$, $f = 1\text{ MHz}$) Capacitance	C_0	16	pF
Wellenlänge der Strahlung Wavelength of peak emission	λ_{peak}	950	nm

Empfänger (Schmitt-Trigger IC) (wenn nicht anders angegeben, $V_{CC} = 5\text{ V}$)

Detector (Schmitt-Trigger IC) (unless otherwise specified, $V_{CC} = 5\text{ V}$)

Ausgangsspannung „High“ Output voltage “High” $I_O = 0$, $V_{CC} = 4.5 - 18\text{ V}$	V_{OH}	$V_{CC} (> 4.0)$	V	
Ausgangsspannung „Low“ Output voltage “Low” $I_O = 16\text{ mA}$	V_{OL}	0.15 (< 0.4)	V	
Stromaufnahme Supply current $V_{CC} = 5\text{ V}$ $V_{CC} = 18\text{ V}$	I_{CC}	3.5 (< 5) 5.0	mA	
Anstiegszeit 10% bis 90% Rise time 10% to 90% $R_L = 280\ \Omega$, $I_F = 4\text{ mA}$, $\lambda = 950\text{ nm}$	t_r	SFH 9340	SFH 9341	ns
		20	30	
Abfallzeit 90% bis 10% Fall time 90% to 10% $R_L = 280\ \Omega$, $I_F = 4\text{ mA}$, $\lambda = 950\text{ nm}$	t_f	SFH 9340	SFH 9341	ns
		10	20	
Ausgangsverzögerungszeit Propagation delay time “ON” $R_L = 280\ \Omega$, $I_F = 4\text{ mA}$, $\lambda = 950\text{ nm}$	t_{ON}	1	μs	
Ausgangsverzögerungszeit Propagation delay time “OFF” $R_L = 280\ \Omega$, $I_F = 4\text{ mA}$, $\lambda = 950\text{ nm}$	t_{OFF}	2	μs	

Kennwerte ($T_A = 25\text{ °C}$)

Characteristics (cont'd)

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
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Gabellichtschranke (wenn nicht anders angegeben, $V_{CC} = 5\text{ V}$)Slotted Interrupter (unless otherwise specified: $V_{CC} = 5\text{ V}$)

Schaltswelle Threshold current "ON"	$I_{F, ON}$	typ. 0.6 (< 2.0)	mA
Schaltswelle Threshold current "OFF"	$I_{F, OFF}$	0.36 (> 0.05)	mA
Hysterese Hysteresis	$I_{F, OFF} / I_{F, ON}$	0.6 (0.5 ... 0.9)	–

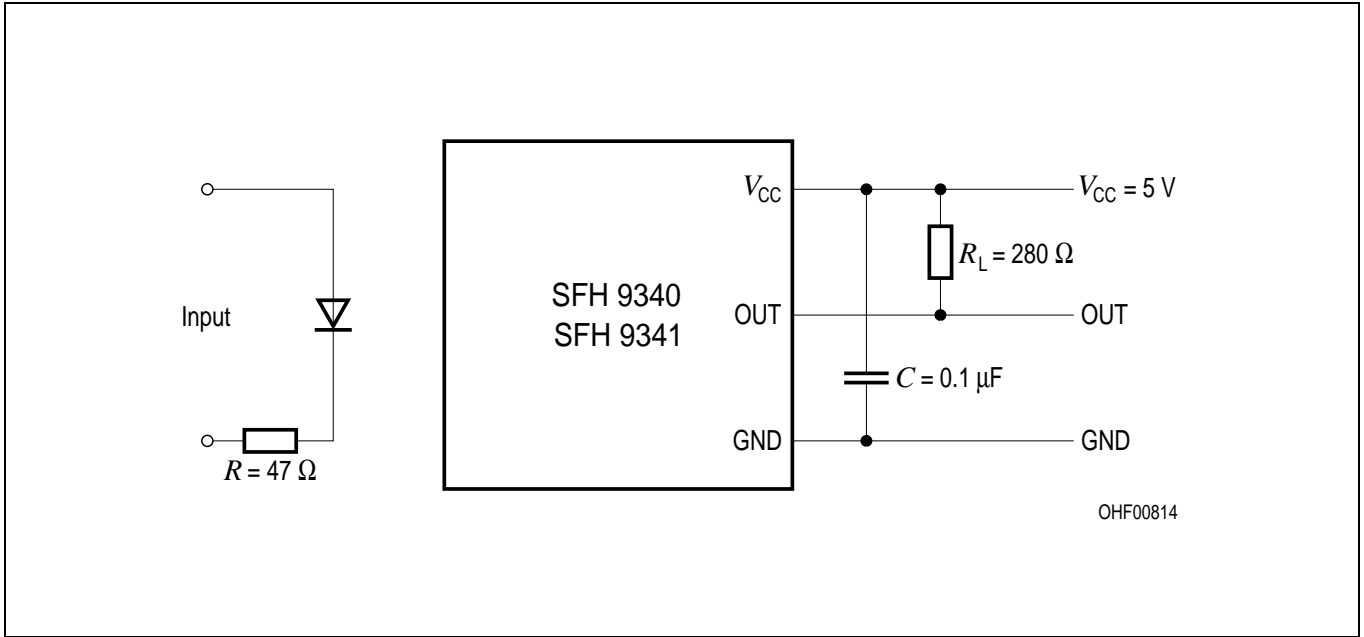
Zulässiger Arbeitsbereich Detektor (Schmitt-Trigger IC)

Operating Conditions Detector (Schmitt-Trigger IC)

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Versorgungsspannung Supply voltage	V_{CC}	4 ... 18	V
Ausgangsstrom Output current	I_O	< 16	mA

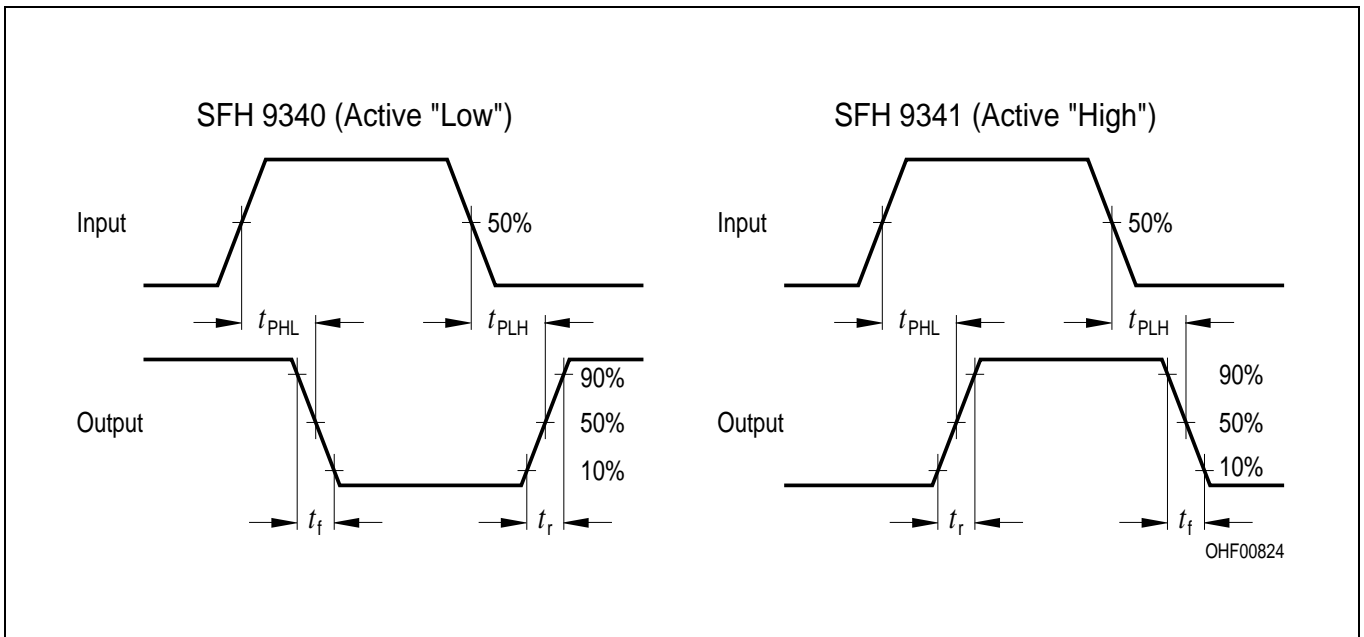
Zur Stabilisierung der Versorgung wird ein Stützkondensator (angeschlossen zwischen V_{CC} und GND) von typ. 0,1 μF empfohlen.

A bypass capacitor, 0.1 μF typical, connected between V_{CC} and GND is recommended in order to stabilize power supply line.



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Figure 1 Test Circuit for Switching and Response Time

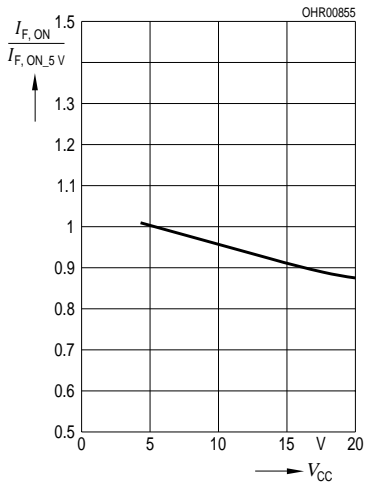


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Figure 2 Switching Time Definitions

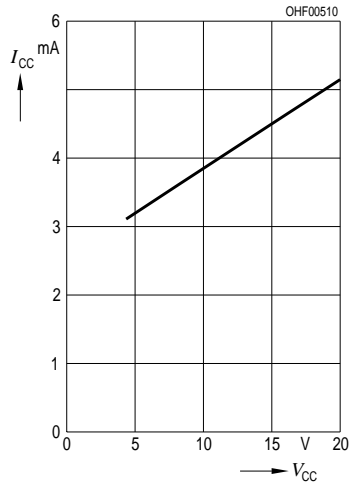
Relative Threshold

$$I_{F, ON} / I_{F, ON (V_{CC} = 5 V)} = f(V_{CC})$$



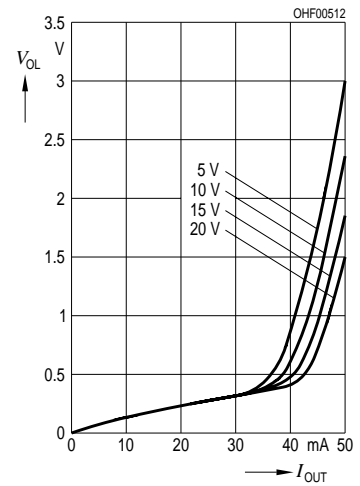
Supply Current

$$I_{CC} = f(V_{CC})$$



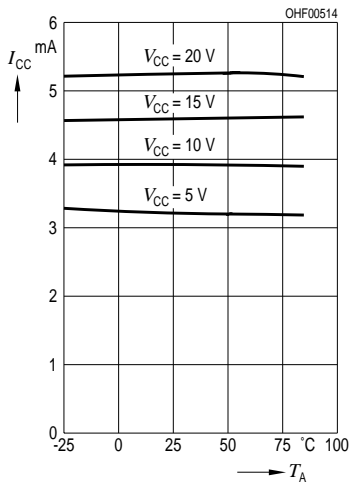
Output Voltage

$$V_{OL} = f(I_{OUT}, V_{CC})$$



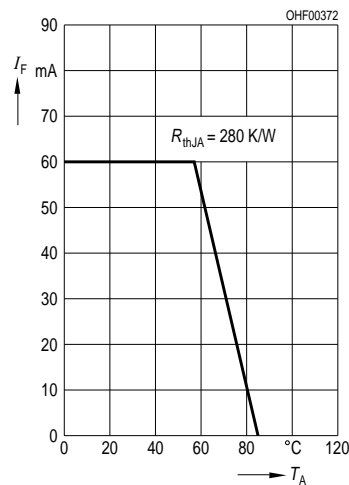
Supply Current vs. Ambient Temperature

$$I_{CC} = f(T_A, V_{CC})$$



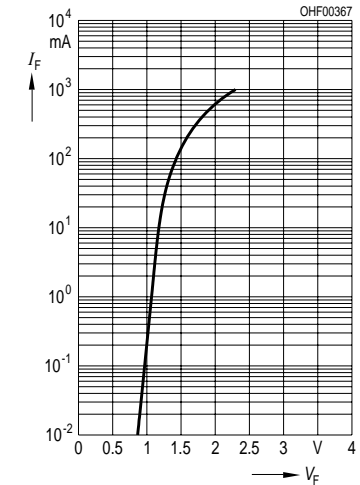
Max. Permissible Forward Current

$$I_F = f(T_A)$$

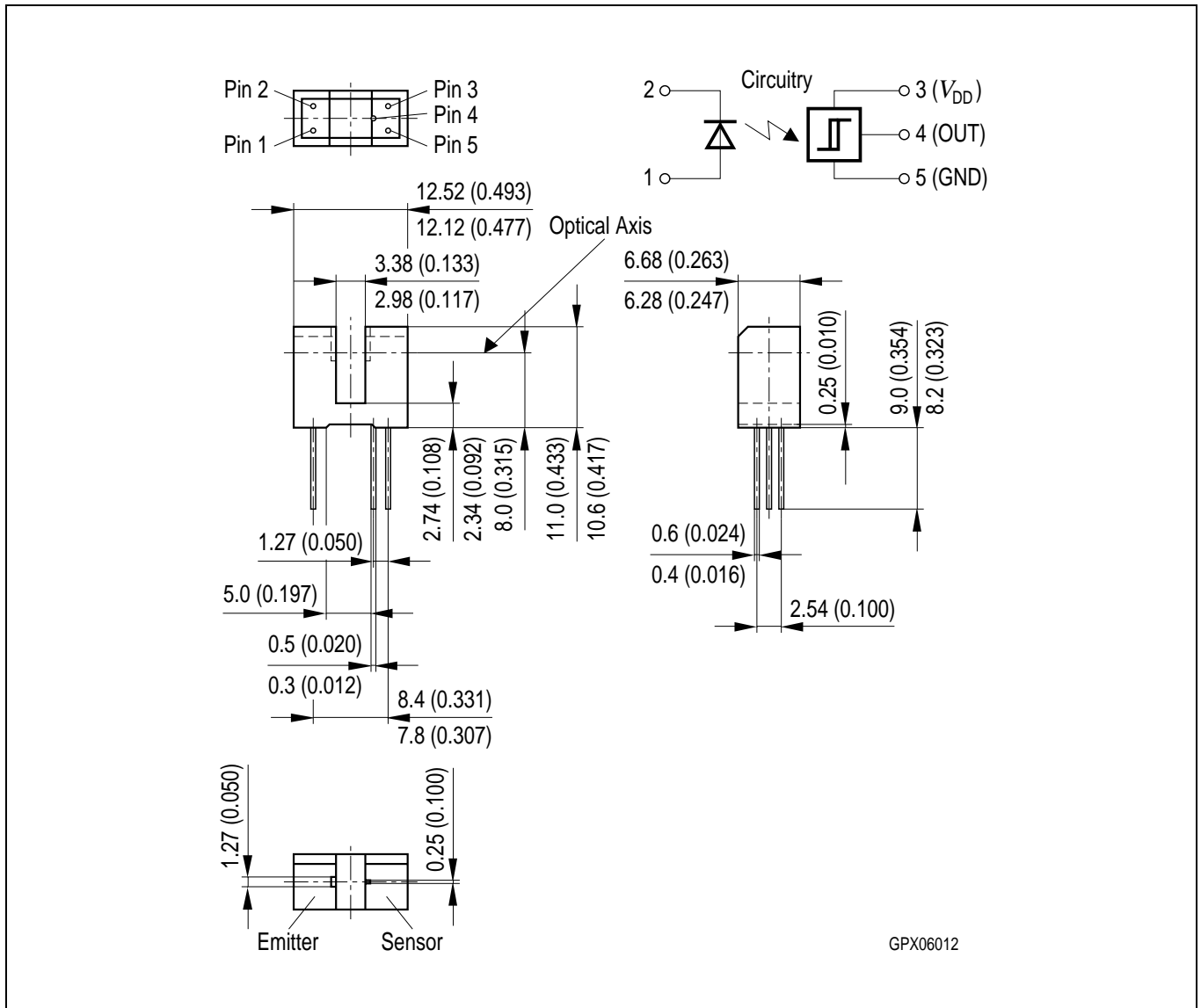


Forward Current $I_F = f(V_F)$

Single pulse, $t_p = 20 \mu s$



**Maßzeichnung
Package Outlines**



Maße werden wie folgt angegeben: mm (inch) / Dimensions are specified as follows: mm (inch).

Löthinweise
Soldering Conditions

Bauform Type	Tauch-, Schwalllötung Dip, Wave Soldering		Reflowlötung Reflow Soldering		Kolbenlötung Iron Soldering	
	Peak Temp. (solderbath)	Max. Time in Peak Zone	Peak Temp. (package temp.)	Max. Time in Peak Zone	(Iron temp.)	Max. Time
SFH 9340 SFH 9341	260 °C	10 s	n.a.	–	300 °C	5 s

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