

**Schmitt-Trigger IC im Mini-Sidelooker Gehäuse mit Linse**  
**Schmitt-Trigger IC in Miniature Sidelooker Package with Lens**  
**Lead (Pb) Free Product - RoHS Compliant**

**SFH 5140 F**  
**SFH 5141 F**



**Wesentliche Merkmale**

- Integrierter Schmitt-Trigger
- SFH 5140 F: Output active low
- SFH 5141 F: Output active high
- Miniatur-Gehäuse

**Anwendungen**

- Optischer Schalter
- Pulsformer
- Zähler
- Empfänger in Lichtschranken

**Features**

- Built-in Schmitt Trigger circuit
- SFH 5140 F: Output active low
- SFH 5141 F: Output active high
- Compact package

**Applications**

- Optical threshold switch
- Pulseformer
- Counter
- Receiver in interrupters

<b>Typ</b> <b>Type</b>	<b>Bestellnummer</b> <b>Ordering Code</b>
SFH 5140 F	Q62702P5112
SFH 5141 F	Q62702P5113

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

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Betriebs- und Lagertemperatur Operating and storage temperature range	$T_{op}; T_{stg}$	- 40 ... + 85	°C
Versorgungsspannung Supply voltage	$V_{CC}$	- 0.5 ... + 20	V
Ausgangsspannung Output voltage	$V_O$	- 0.5 ... + 20	V
Ausgangsstrom Output current	$I_O$	50	mA
Verlustleistung Power dissipation	$P_{tot}$	175	mW

**Empfohlener Arbeitsbereich**  
**Recommended Operating Conditions**

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  $\mu\text{F}$  empfohlen.

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

**Kennwerte ( $T_A = 25\text{ °C}$ ,  $V_{CC} = 5\text{ V}$ )**  
**Characteristics**

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Ausgangsspannung „high“ Output voltage “high” $I_O = 0$	$V_{OH}$	$V_{CC} (> 4.0)$	V
Ausgangsspannung „low“ Output voltage “low” $I_O = 16\text{ mA}$	$V_{OL}$	0.15 (< 0.4)	V

**Kennwerte** ( $T_A = 25\text{ °C}$ ,  $V_{CC} = 5\text{ V}$ )  
**Characteristics** (cont'd)

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Stromaufnahme Supply current $V_{CC} = 5\text{ V}$ $V_{CC} = 18\text{ V}$	$I_{CC}$	3.3 (< 5) 5.0	mA
Hysteresis Hysteresis	$E_{e, OFF}/E_{e, ON}$	0.6 (0.5 ... 0.9)	–
Halbwinkel Half angle	$\varphi$	$\pm 12$	Grad degr.
Anstiegszeit 10% bis 90% Rise time 10% to 90% $R_L = 280\ \Omega$ , $E_e = 90\ \mu\text{W}/\text{cm}^2$ , $\lambda = 950\text{ nm}$	$t_r$	100	ns
Abfallzeit 90% bis 10% Fall time 90% to 10% $R_L = 280\ \Omega$ , $E_e = 90\ \mu\text{W}/\text{cm}^2$ , $\lambda = 950\text{ nm}$	$t_f$	100	ns
Ausgangsverzögerungszeit Propagation delay time "H" → "L" $R_L = 280\ \Omega$ , $E_e = 90\ \mu\text{W}/\text{cm}^2$ , $\lambda = 950\text{ nm}$	$t_{PHL}$	5 (< 15)	$\mu\text{s}$
Ausgangsverzögerungszeit Propagation delay time "L" → "H" $R_L = 280\ \Omega$ , $E_e = 90\ \mu\text{W}/\text{cm}^2$ , $\lambda = 950\text{ nm}$	$t_{PLH}$	5 (< 15)	$\mu\text{s}$

**Die Schmitt-Trigger ICs werden nach ihrer Schaltschwelle gruppiert und mit arabischen Ziffern gekennzeichnet.**

**The schmitt-triggers ICs are grouped according to their threshold and distinguished by arabian figures.**

Bezeichnung Parameter	Symbol Symbol	Wert Value					Einheit Unit
		1	2	3	4	5	
Schaltschwelle, $\lambda = 950\text{ nm}$ Threshold SFH 5140 F: "H" → "L" SFH 5141 F: "L" → "H"	$E_{e, ON}$	4 ... 8	6.3 ... 12.5	10 ... 20	16 ... 32	25 ... 50	$\mu\text{W}/\text{cm}^2$

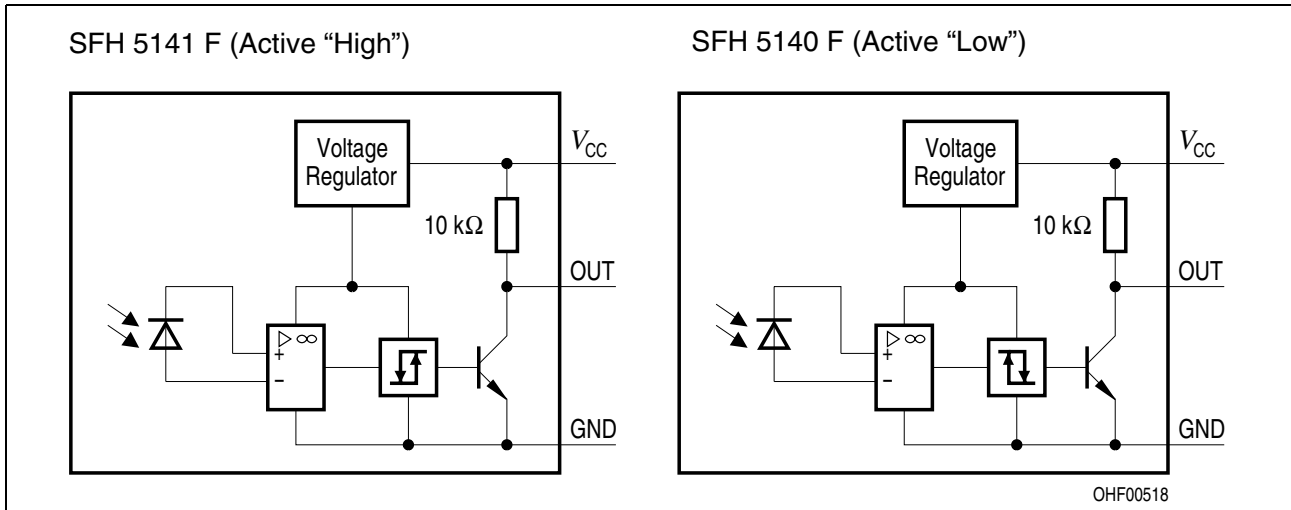


Figure 1 Block Diagram

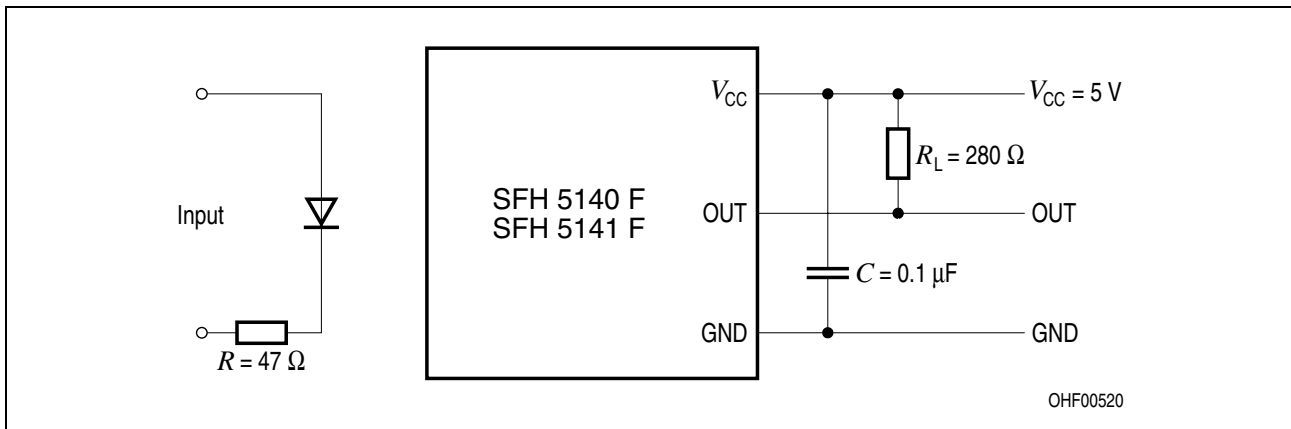


Figure 2 Test Circuit for Switching and Response Time

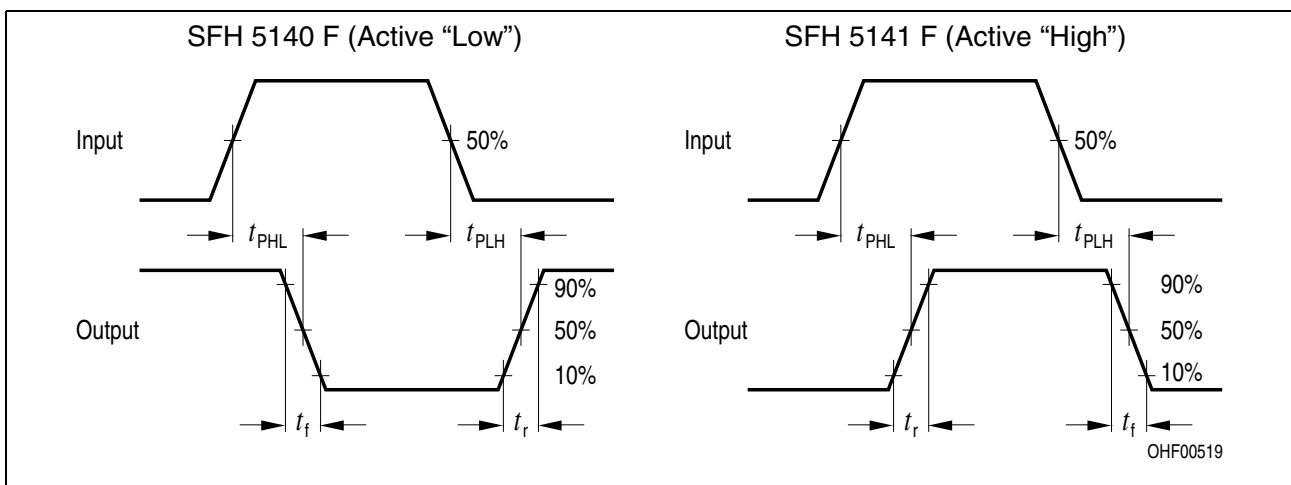
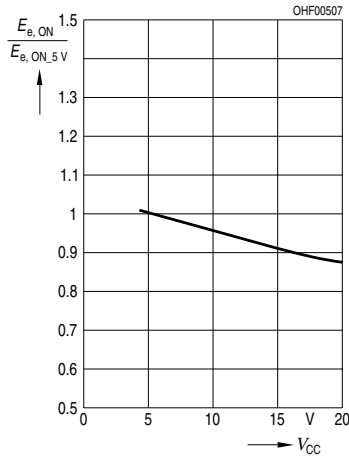


Figure 3 Switching Time Definitions

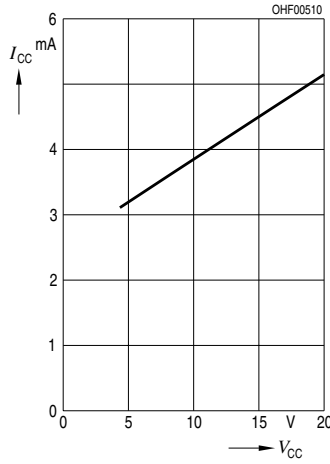
**Relative Threshold**

$$E_{e,ON}/E_{e,ON}(V_{CC} = 5\text{ V}) = f(V_{CC})$$



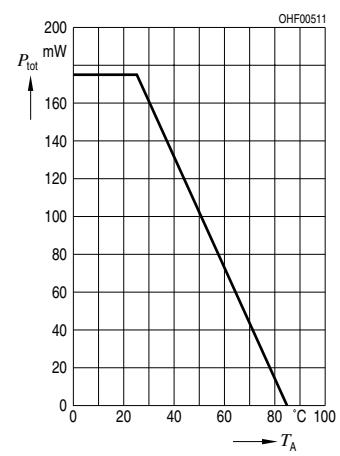
**Supply Current**

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



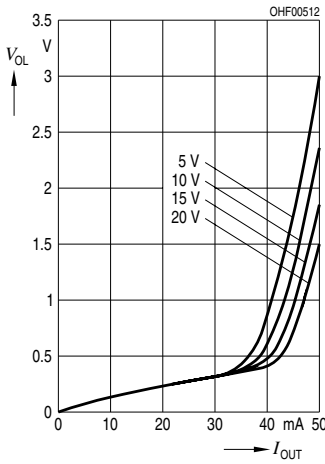
**Total Power Dissipation**

$$P_{tot} = f(T_A)$$



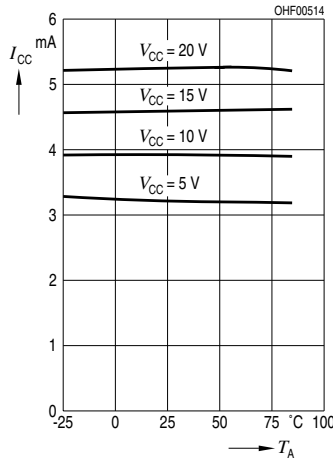
**Output Voltage**

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

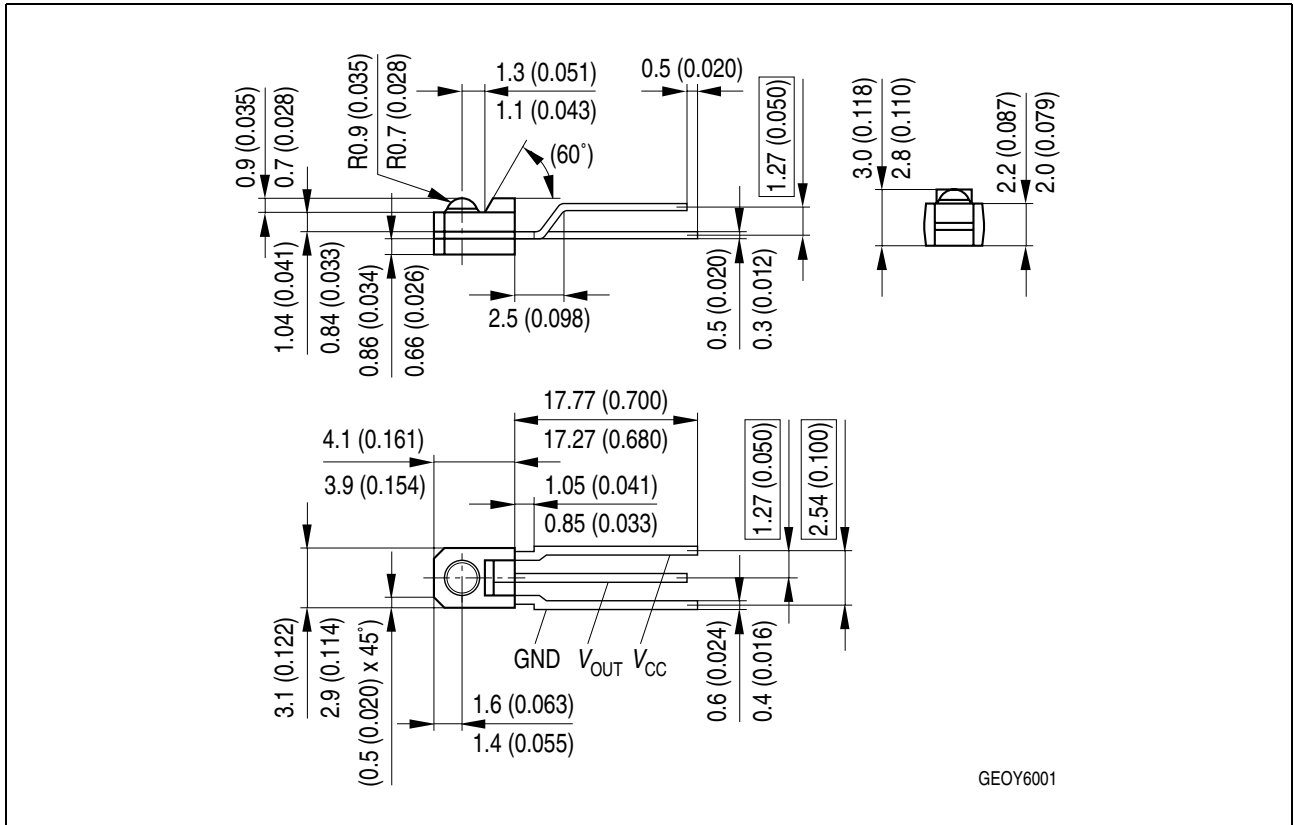


**Supply Current vs. Ambient Temperature**

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



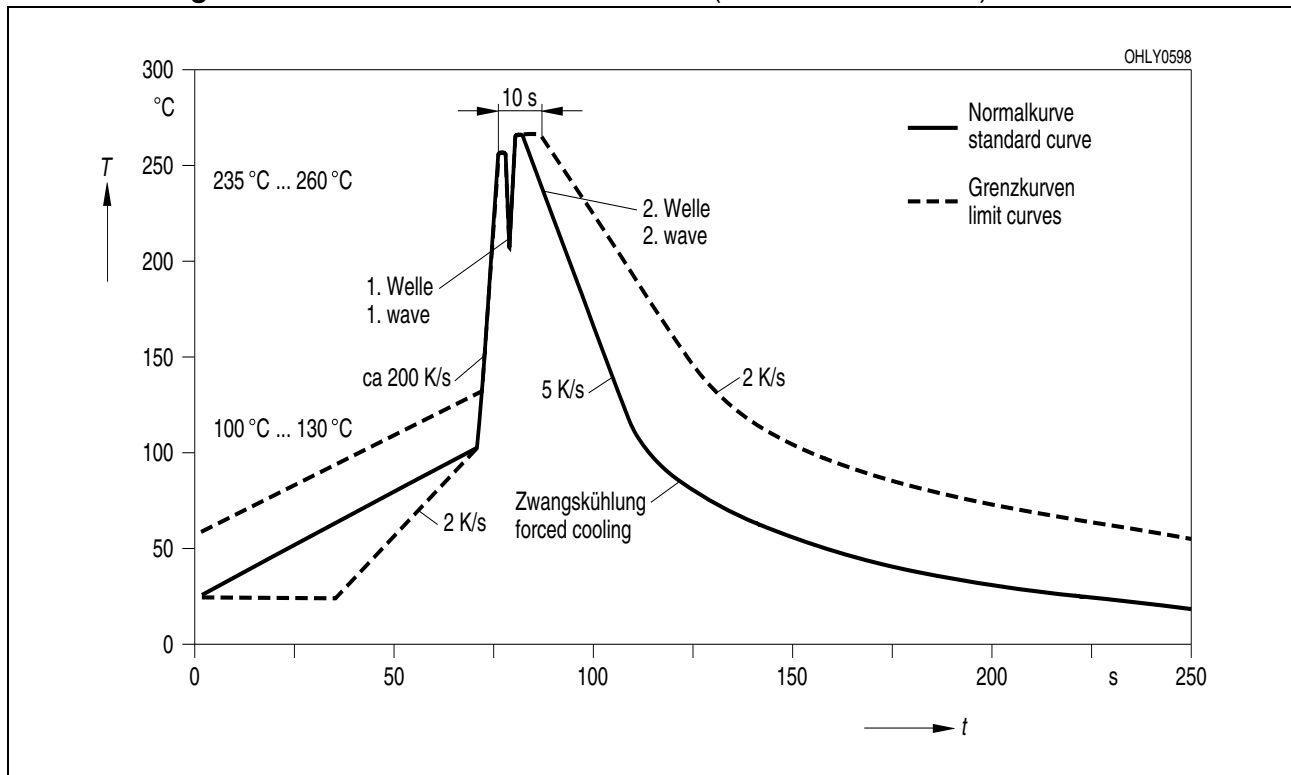
Maßzeichnung  
Package Outlines



Maße in mm (inch) / Dimensions in mm (inch).

**Lötbedingungen**  
**Soldering Conditions**  
**Wellenlöten (TTW)**  
**TTW Soldering**

(nach CECC 00802)  
(acc. to CECC 00802)



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