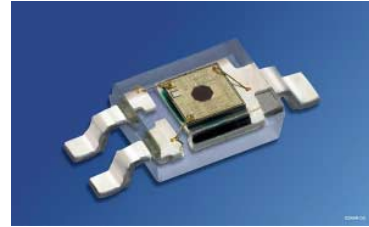


Schmitt-Trigger IC im Smart DIL Gehäuse
Schmitt-Trigger IC in Smart DIL Package
Lead (Pb) Free Product - RoHS Compliant

SFH 5440



Wesentliche Merkmale

- SFH 5440: Ausgang active low
- Gegurtet lieferbar
- Geeignet für Anwendungen im Bereich von 400 nm bis 1100 nm

Anwendungen

- Optischer Schalter
- Pulsformer
- Zähler

Features

- SFH 5440: Output active low
- Available on tape and reel
- Suitable for applications from 400 nm to 1100 nm

Applications

- Optical threshold switch
- Pulseformer
- Counter

Typ Type	Bestellnummer Ordering Code	Gehäuse Package
SFH 5440	Q65110A1212	Smart-DIL Gehäuse, GND-Kennzeichnung: breiter Anschluß Smart-DIL package, GND marking: broad lead

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

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Lagertemperatur Storage temperature range	T_{stg}	- 40 ... + 100	°C
Betriebstemperatur Operating temperature range	T_{op}	- 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 μF empfohlen.

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

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

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Ausgangsspannung „high“ Output voltage “high” $I_{\text{O}} = 0$	V_{OH}	$V_{\text{CC}} (> 4.0)$	V
Ausgangsspannung „low“ Output voltage “low” $I_{\text{O}} = 16\text{ mA}$	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, $E = 0$ Supply current $V_{CC} = 5\text{ V}$ $V_{CC} = 18\text{ V}$	I_{CC}	3.3 (< 5) 5.0	mA
Schaltswelle, $\lambda = 950\text{ nm}$ Threshold "ON" SFH 5440: "H" → "L"	$E_{e, ON}$	170 (< 320)	$\mu\text{W}/\text{cm}^2$
Hysteresis Hysteresis	$E_{e, OFF}/E_{e, ON}$	0.6 (0.5 ... 0.9)	–
Halbwinkel Half angle	φ	± 60	Grad degr.
Anstiegszeit 10% bis 90% Rise time 10% to 90% $R_L = 280\ \Omega$, $E_e = 600\ \mu\text{W}/\text{cm}^2$, $\lambda = 950\text{ nm}$	t_r	100	ns
Abfallzeit 90% bis 10% Fall time 90% to 10% $R_L = 280\ \Omega$, $E_e = 600\ \mu\text{W}/\text{cm}^2$, $\lambda = 950\text{ nm}$	t_f	100	ns
Ausgangsverzögerungszeit Propagation delay time "H" → "L" $R_L = 280\ \Omega$, $E_e = 600\ \mu\text{W}/\text{cm}^2$, $\lambda = 950\text{ nm}$	t_{PHL}	5 (< 15)	μs
Ausgangsverzögerungszeit Propagation delay time "L" → "H" $R_L = 280\ \Omega$, $E_e = 600\ \mu\text{W}/\text{cm}^2$, $\lambda = 950\text{ nm}$	t_{PLH}	5 (< 15)	μs

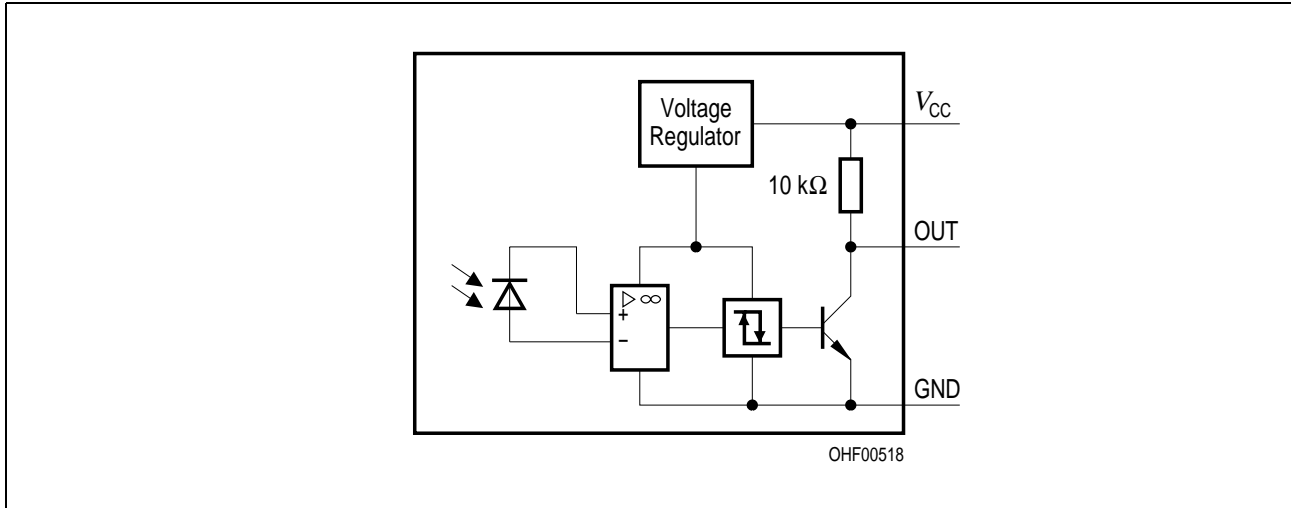


Figure 1 Block Diagram

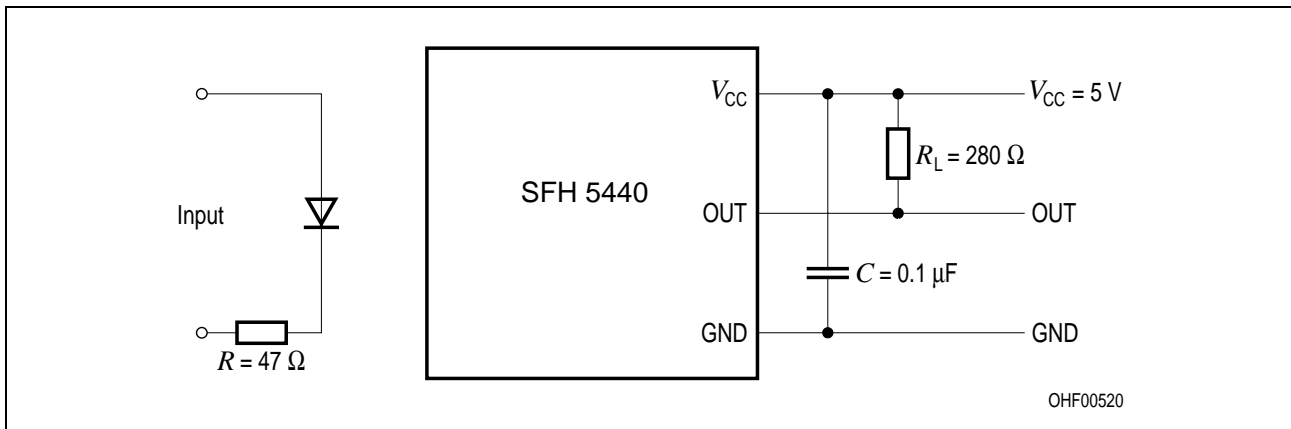


Figure 2 Test Circuit for Switching and Response Time

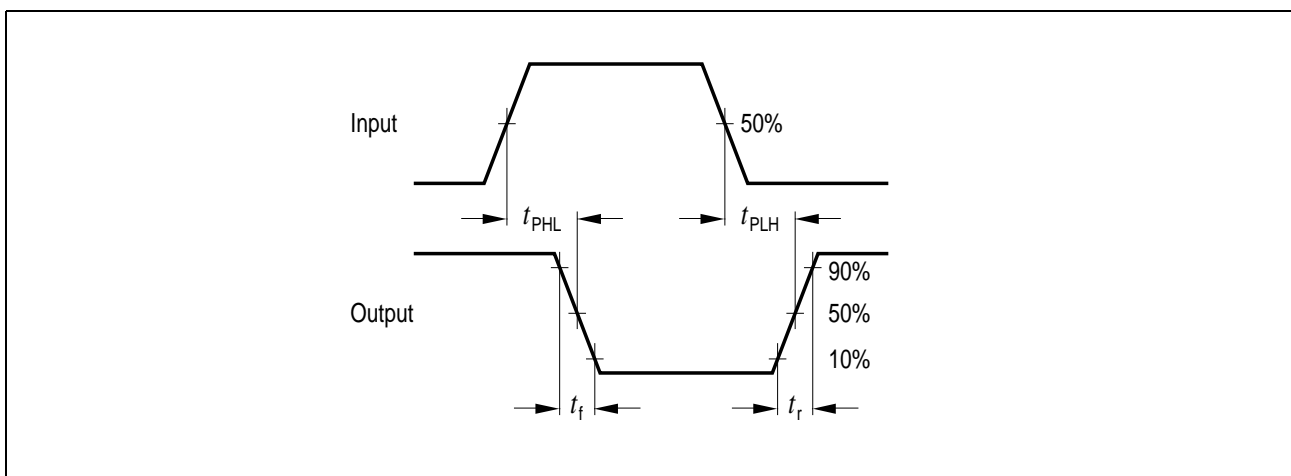
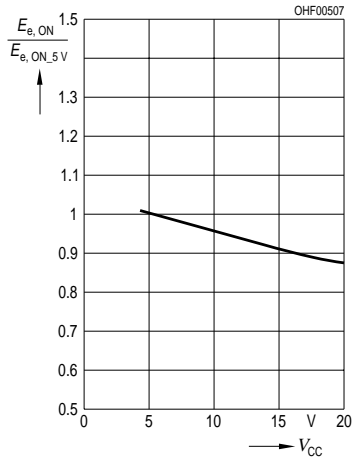


Figure 3 Switching Time Definitions

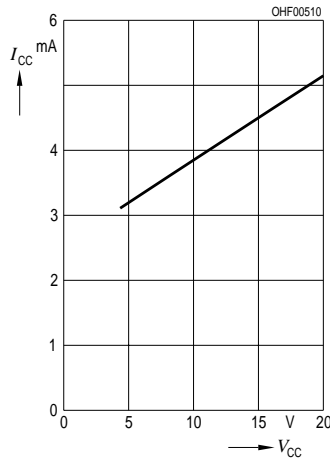
Relative Threshold

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



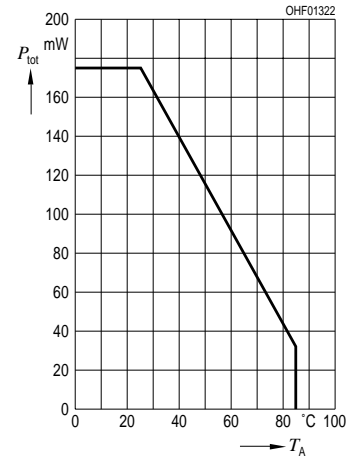
Supply Current

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



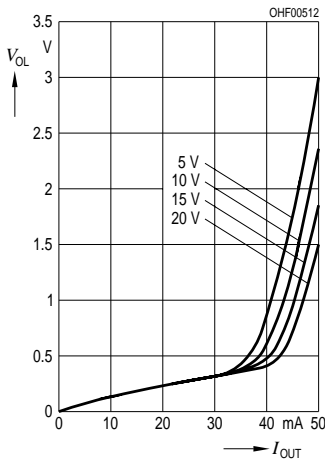
Total Power Dissipation

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



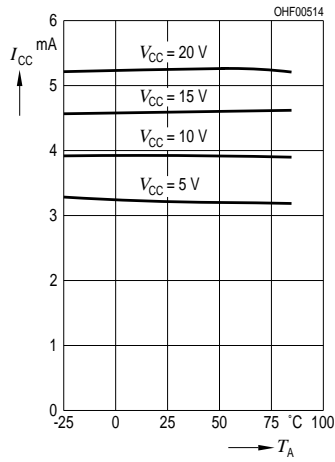
Output Voltage

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

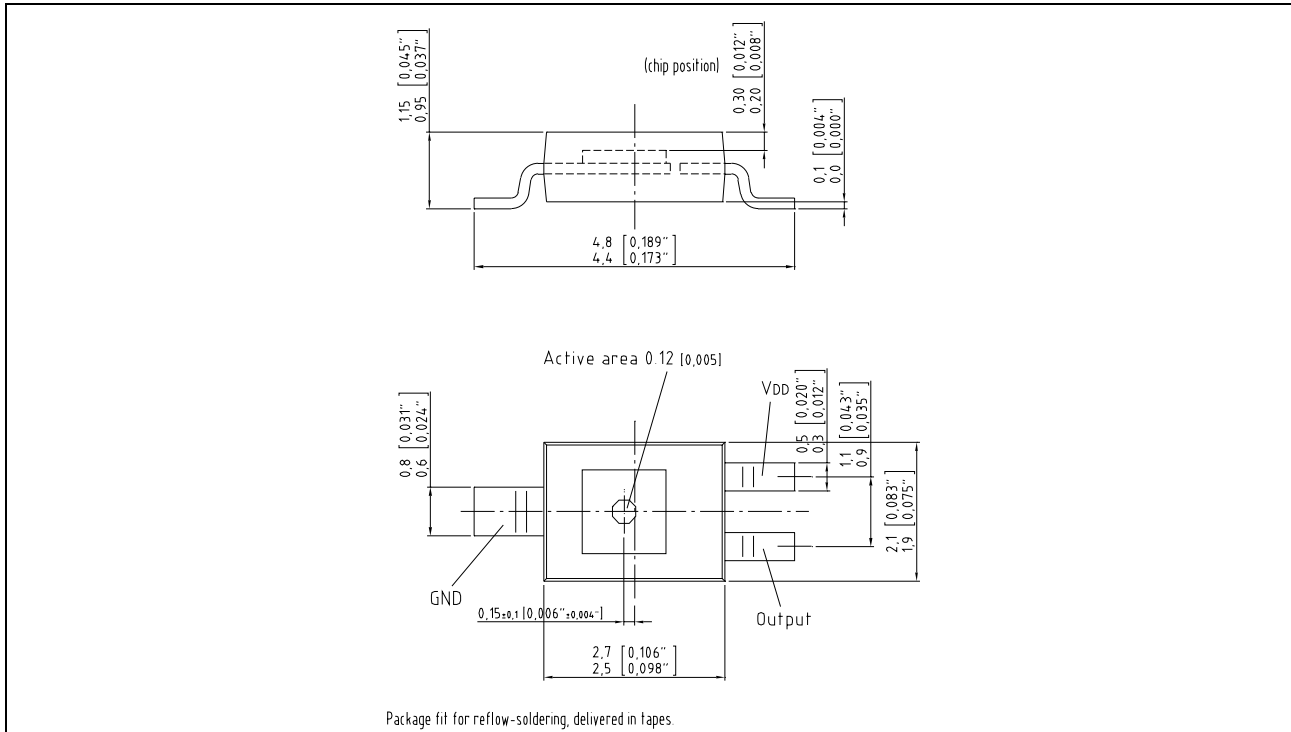


Supply Current vs. Ambient Temperature

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

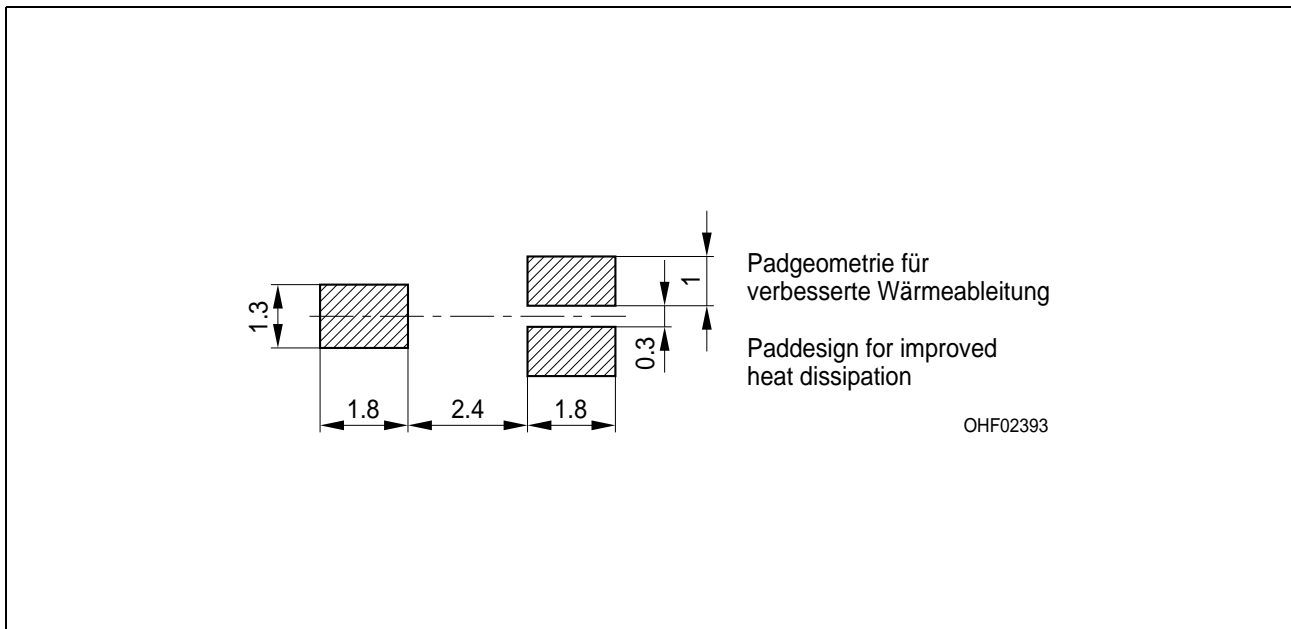


**Maßzeichnung
Package Outlines**



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

**Empfohlenes Lötpadesign
Recommended Solderpad Design**



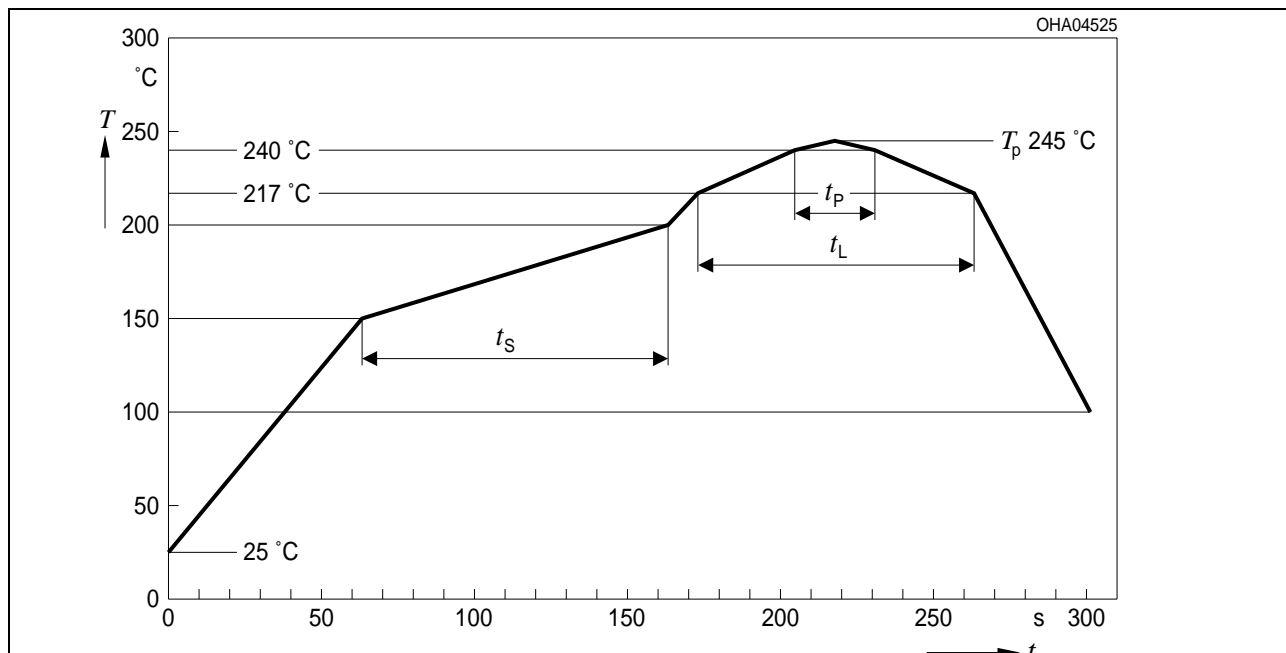
Lötbedingungen**Soldering Conditions****Reflow Lötprofil für bleifreies Löten****Reflow Soldering Profile for lead free soldering**

Vorbehandlung nach JEDEC Level 4

Preconditioning acc. to JEDEC Level 4

(nach J-STD-020-D.01)

(acc. to J-STD-020-D.01)



Pb-Free (SnAgCu) Assembly		
Profile Feature	Recommendation	Max. Ratings
Ramp-up Rate to Preheat*) 25°C to 150°C	2°C / sec	3°C / sec
Time t_s from T_{Smin} to T_{Smax} (150°C to 200°C)	100s	min. 60sec max. 120sec
Ramp-up Rate to Peak*) T_{Smax} to T_p	2°C / sec	3°C / sec
Liquidus Temperature T_L	217°C	
Time t_L above T_L	80sec	max. 100sec
Peak Temperature T_p	245°C	max. 260°C
Time t_p within 5°C of the specified peak temperature $T_p - 5K$	20sec	min. 10sec max. 30sec
Ramp-down Rate* T_p to 100°C	3°C / sec	6°C / sec maximum
Time 25°C to Peak temperature		max. 8 min.

All temperatures refer to the center of the package, measured on the top of the component

* slope calculation $\Delta T/\Delta t$: Δt max. 5 sec; fulfillment for the whole T-range

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¹ A critical component is a component used in a life-support device or system whose failure can reasonably be expected to cause the failure of that life-support device or system, or to affect its safety or effectiveness of that device or system.

² Life support devices or systems are intended (a) to be implanted in the human body, or (b) to support and/or maintain and sustain human life. If they fail, it is reasonable to assume that the health of the user may be endangered.

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