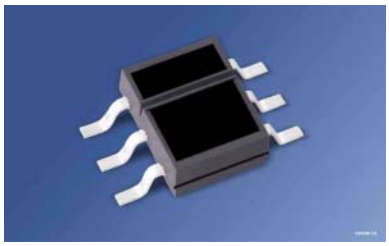
Reflexlichtschranke mit Schmitt-Trigger
Reflective Interrupter with Schmitt-Trigger
Lead (Pb) Free Product - RoHS Compliant

SFH 9240
SFH 9241



Wesentliche Merkmale

- IR-GaAs-Lumineszenzdiode in Kombination mit einem Schmitt-Trigger IC
- SFH 9240: Output active low
- SFH 9241: Output active high
- Tageslichtsperrfilter
- Einschaltstrom: typ. 3 mA
- Sender und Empfänger galvanisch getrennt
- Lötmethode: IR-Reflow Löten
- Vorbehandlung nach JEDEC Level 4

Features

- IR-GaAs-emitter in combination with a Schmitt-Trigger IC
- SFH 9240: Output active low
- SFH 9241: Output active high
- Daylight cut-off filter
- Threshold current: typ. 3 mA
- Emitter and detector electrically isolated
- Soldering Methode: IR Reflow Soldering
- Preconditioning acc. to JEDEC Level 4

Anwendungen

- Optischer Schalter
- Pulsformer
- Zähler

Applications

- Optical threshold switch
- Pulseformer
- Counter

Typ Type	Bestellnummer Ordering Code	$I_{F,ON}$ [mA] (V_{CC} = 5 V, d = 1 mm Kodak neutral white test card with 90% reflection)
SFH 9240	Q65110A2714	3 (< 10)
SFH 9241	Q65110A2715	3 (< 10)

Grenzwerte (T_A = 25 °C)
Maximum Ratings

Bezeichnung **Parameter**	**Symbol** **Symbol**	**Wert** **Value**	**Einheit** **Unit**
Sender (GaAs-Diode) **Emitter** (GaAs diode)			
Sperrspannung Reverse voltage	V_R	5	V
Vorwärtsgleichstrom Forward current	I_F	50	mA
Stoßstrom ($t_P \leq 10$ µs) Surge current ($t_P \leq 10$ µs)	I_{FSM}	1.5	A
Verlustleistung Power dissipation	P_{tot}	80	mW
Empfänger (Schmitt-Trigger IC) **Detector** (Schmitt-Trigger IC)			
Versorgungsspannung Supply voltage	V_{CC}	– 0.5 … + 20	V
Ausgangsspannung Output voltage	V_O	– 0.5 … + 20	V
Ausgangsstrom Output current (T_A = 25 °C)	I_O	50	mA
Verlustleistung Power dissipation	P_{tot}	175	mW
Reflexlichtschranke **Light Reflection Switch**			
Betriebs- und Lagertemperatur Operating and storage temperature range	T_{op}, T_{stg}	– 40 … + 100	°C
Verlustleistung Power dissipation	P_{tot}	150	mW

Kennwerte (T_A = 25 °C)
Characteristics

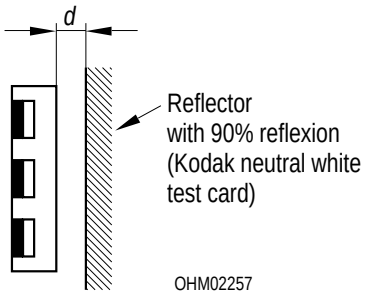
Bezeichnung **Parameter**	**Symbol** **Symbol**	**Wert** **Value**	**Einheit** **Unit**
Sender (GaAs-Diode) **Emitter** (GaAs diode)			
Durchlassspannung Forward voltage I_F = 50 mA	V_F	1.25 (≤ 1.65)	V
Sperrstrom Reverse current V_R = 5 V	I_R	0.01 (≤ 1)	µA
Kapazität Capacitance V_R = 0 V, f = 1 MHz	C_O	25	pF
Wärmewiderstand (Montage auf PC-Board mit > 5 mm² Padgröße) Thermal resistance (mounting on pcb with > 5 mm² pad size)	R_{thJA}	270	K/W
Empfänger (Schmitt-Trigger IC) (wenn nicht anders angegeben, V_{CC} = 5 V) **Detector** (Schmitt-Trigger IC) (unless otherwise specified, V_{CC} = 5 V)			
Ausgangsspannung „high“ Output voltage “high” I_O = 0	V_{OH}	V_{CC} (> 4.0)	V
Ausgangsspannung „low“ Output voltage “low” I_O = 16 mA	V_{OL}	0.15 (< 0.4)	V
Stromaufnahme Supply current V_{CC} = 5 V V_{CC} = 18 V	I_{CC}	 3.3 (< 5) 5.0	mA
Anstiegszeit 10% bis 90% Rise time 10% to 90% R_L = 280 Ω, I_F = 20 mA	t_r	SFH9240: 20 SFH9241: 30	ns
Abfallzeit 90% bis 10% Fall time 90% to 10% R_L = 280 Ω, I_F = 20 mA	t_f	SFH9240: 10 SFH9241: 20	ns

Kennwerte (T_A = 25 °C)
Characteristics (cont'd)

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Ausgangsverzögerungszeit Propagation delay time "ON" R_L = 280 Ω, I_F = 20 mA	t_{ON}	1	µs
Ausgangsverzögerungszeit Propagation delay time "OFF" R_L = 280 Ω, I_F = 20 mA	t_{OFF}	2	µs

Reflexlichtschranke
Light Reflection Switch

Schaltschwelle Threshold current, Kodak neutral white test card with 90% reflection V_{CC} = 5 V, d = 1 mm	$I_{F, ON}$	3 (< 10)	mA
Hysterese Hysteresis	$I_{F, OFF}$ / $I_{F, ON}$	0.6 (0.5 … 0.9)	–



Zulässiger Arbeitsbereich
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.

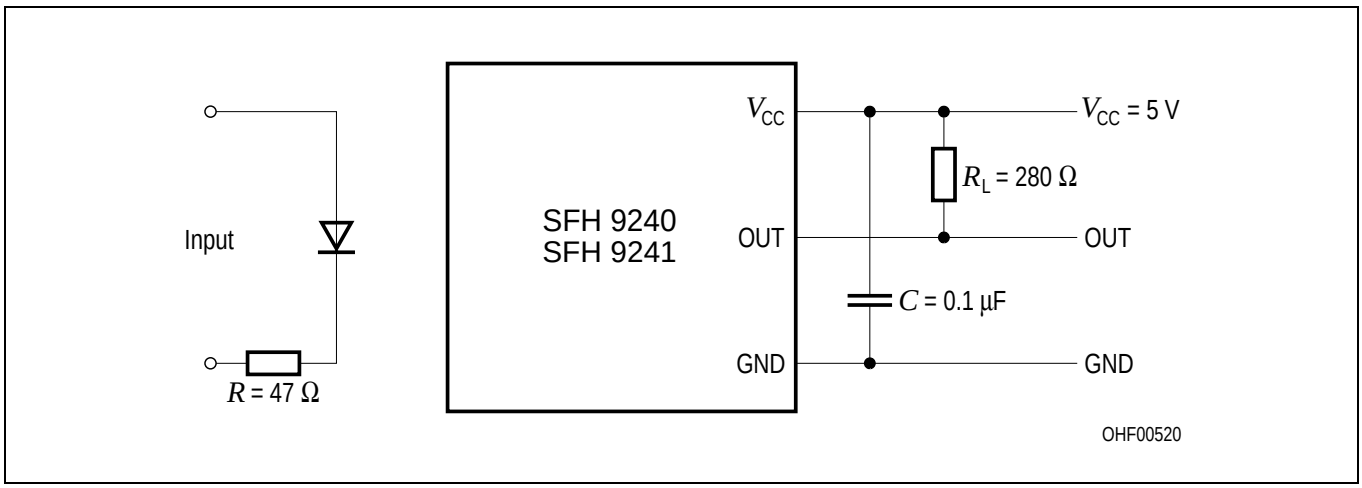


Figure 1 **Test Circuit for Switching and Response Time**

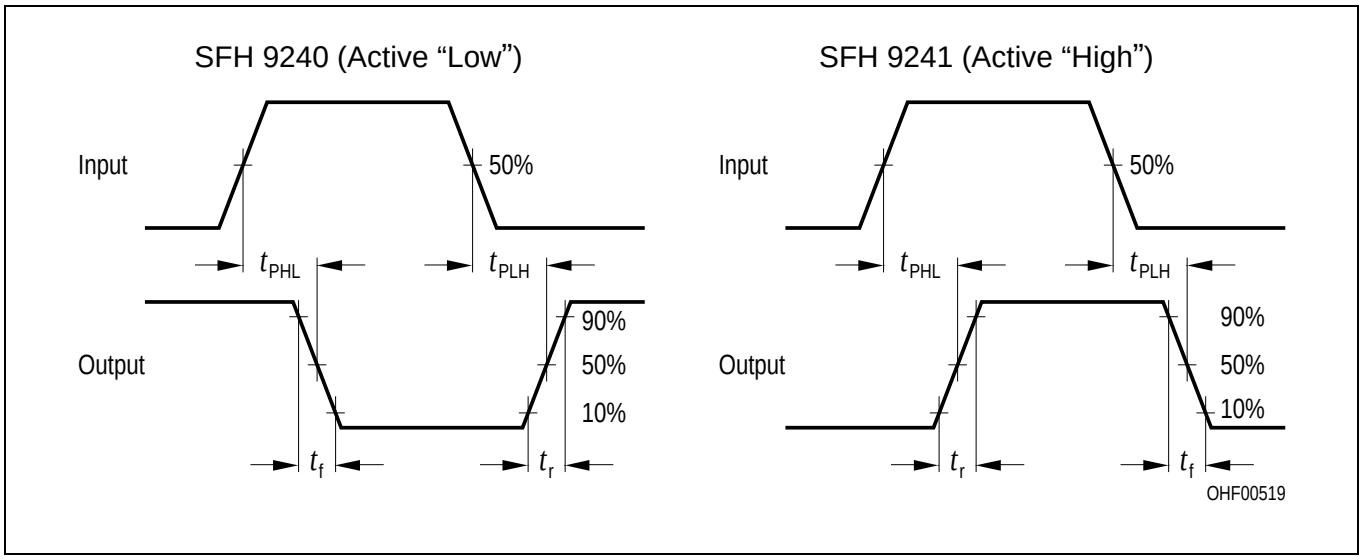
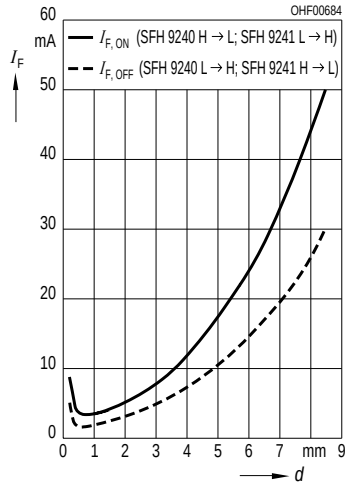
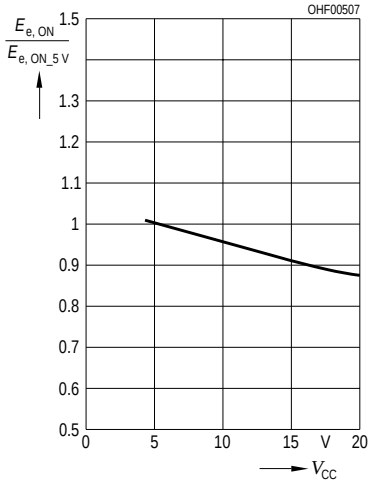


Figure 2 **Switching Time Definitions**

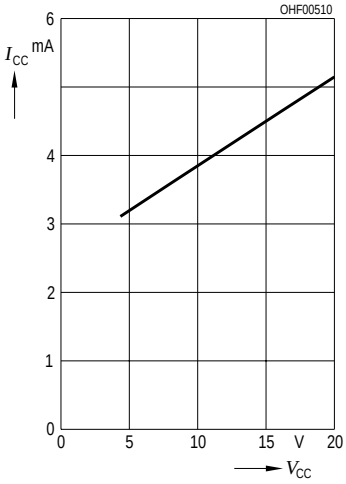
Threshold Current vs. Distance
$I_F = f(d)$



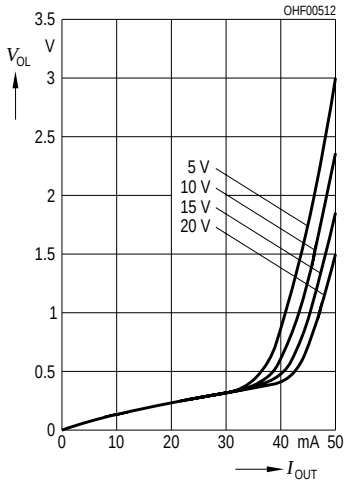
Relative Threshold
$E_{e,ON}/E_{e,ON\ VCC} = 5\ V = f(V_{CC})$



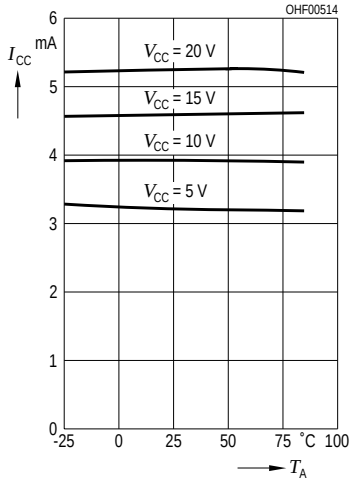
Supply Current
$I_{CC} = f(V_{CC})$



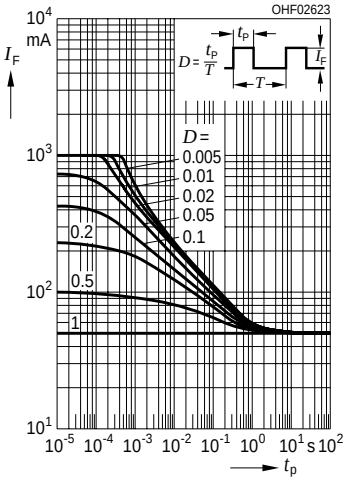
Output Voltage
$V_{OL} = f(I_{OUT}, V_{CC})$



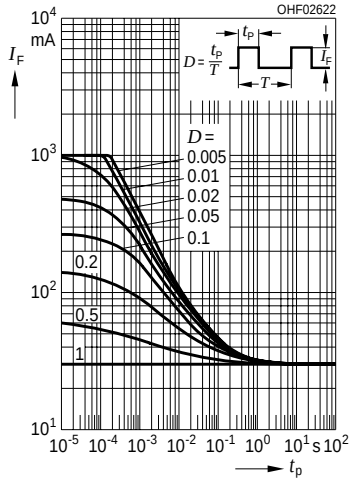
Supply Current vs. Ambient Temperature $I_{CC} = f(T_A, V_{CC})$



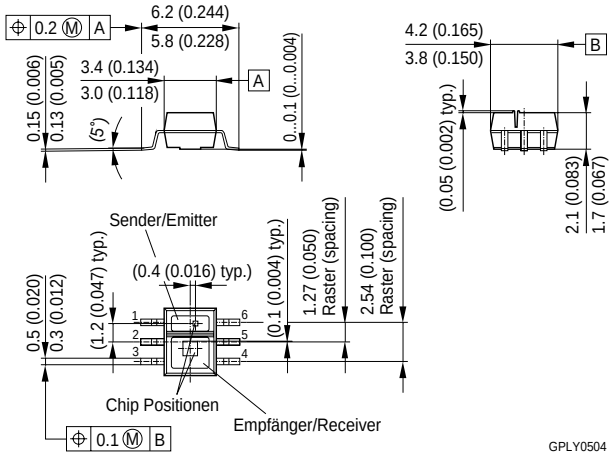
Perm. Pulse Handling Capability
$I_F = f(t_p)$, Duty cycle D = parameter, T_A = 25 °C



Perm. Pulse Handling Capability
$I_F = f(t_p)$, Duty cycle D = parameter, T_A = 85 °C



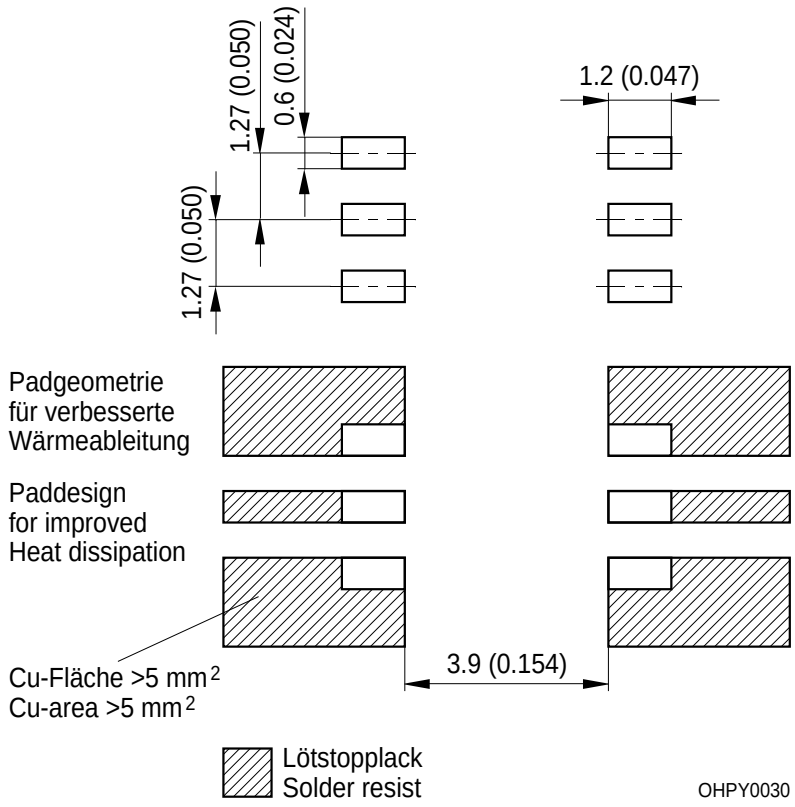
Maßzeichnung
Package Outlines



Type	1	2	3	4	5	6
SFH 9240 SFH 9241	Anode	OUT	Vcc	-	GND	Cathode

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

Empfohlenes Lötpaddesign IR-Reflow Löten
Recommended Solder Pad IR Reflow Soldering



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

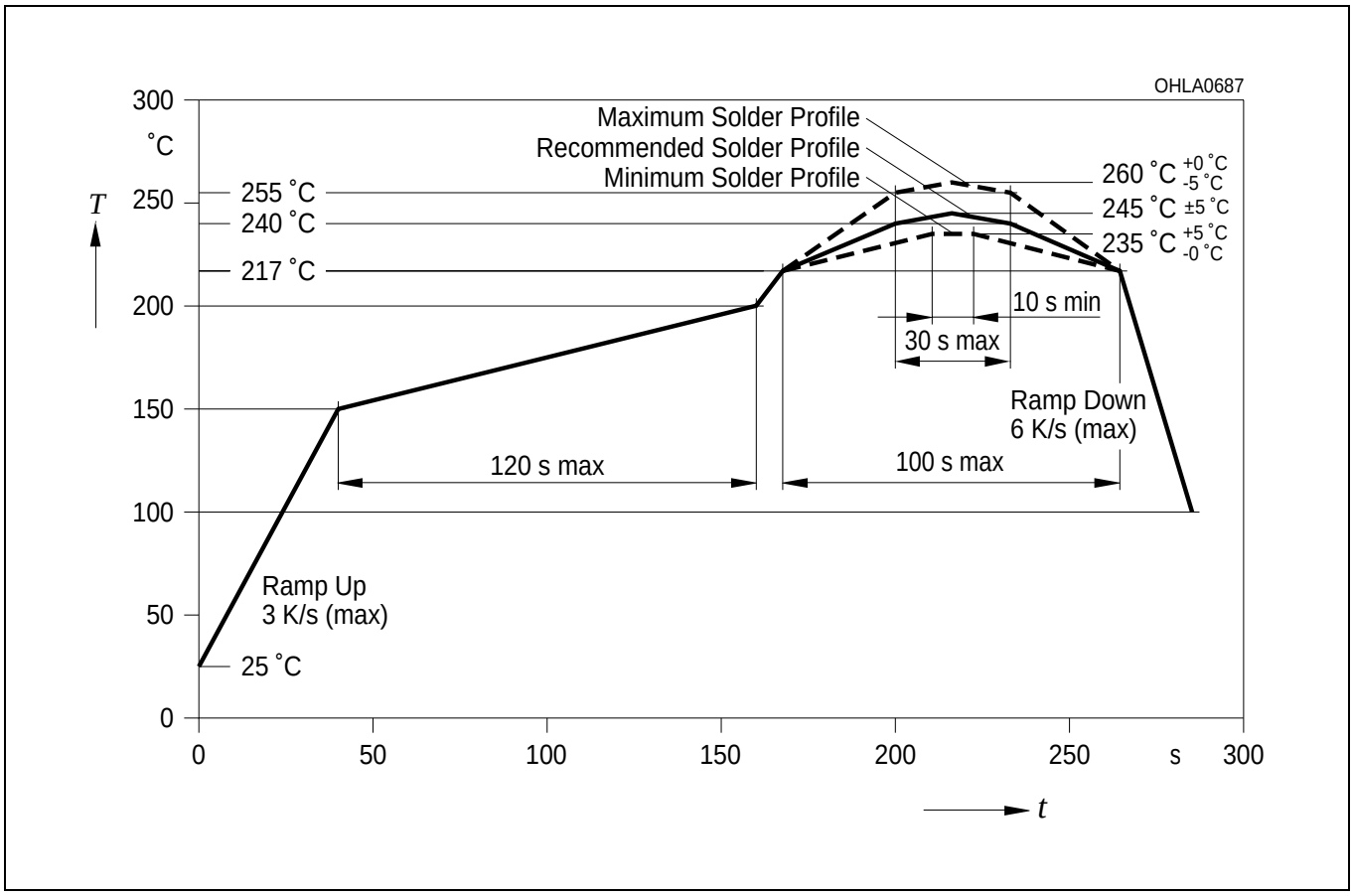
Lötbedingungen
Soldering Conditions

Bauform Type	Drypack Level acc. to JEDEC A112-A	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.)
SFH 9240 SFH 9241	4	n. a.	–	260 °C	20 sec.	n.a.

Bitte Verarbeitungshinweise für SMT-Bauelemente beachten!
Please observe the handling guidelines for SMT devices!

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

Vorbehandlung nach JEDEC Level 4
Preconditioning acc. to JEDEC Level 4
(nach J-STD-020B)
(acc. to J-STD-020B)



Gurtung / Polarität und Lage	siehe Dokument: Short Form Katalog: Gurtung und Verpackung - SMT-Bauelemente - Gehäuse:SMT RLS
Methode of Taping / Polarity and Orientation	see document: Short Form Catalog: Tape and Reel - SMT-Components - Package: SMT-RLS

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