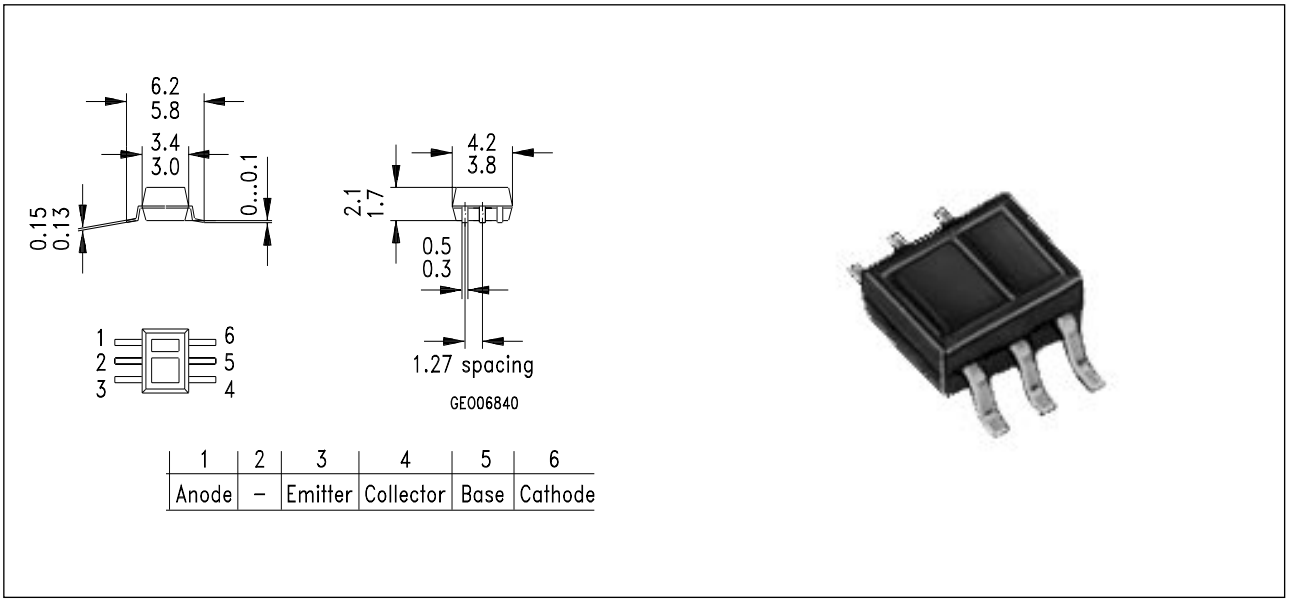
SIEMENS

Reflexlichtschranke im SMT-Gehäuse SFH 9101
Light Reflection Switch in SMT Package

Vorläufige Daten
Preliminary Data



Maβe in mm, wenn nicht anders angegeben/Dimensions in mm, unless otherwise specified.

Wesentliche Merkmale

- Reflexlichtschranke für 1 mm bis 5 mm Arbeitsabstand
- IR-GaAs-Lumineszenzdiode: Sender
- Si-NPN-Fototransistor: Empfänger
- Tageslichtsperrfilter
- Hoher Kollektor-Emitter-Strom 0.25 ... ≥ 1.0 mA
- Geringe Sättigungsspannung
- Kein Übersprechen
- Sender und Empfänger galvanisch getrennt
- Basisanschluβ herausgeführt

Features

- Light reflection switch for 1 mm to 5 mm operating distance
- IR-GaAs-emitter
- Silicon NPN phototransistor detector
- Daylight filter against undesired light effects
- High collector-emitter current 0.25 ... ≥ 1.0 mA
- Low saturation voltage
- No cross-talk
- Emitter and detector electrically isolated
- Base connection brought out

Anwendungen

- Positionsmelder
- Endabschalter
- Drehzahlüberwachung, -regelung
- Bewegungssensor

Applications

- Position reporting
- End position switch
- Speed monitoring and regulating
- Motion transmitter

Typ Type	Bestellnummer Ordering Code
SFH 9101	Q62702-P474

Grenzwerte
Maximum Ratings

Bezeichnung **Description**	**Symbol** **Symbol**	**Wert** **Value**	**Einheit** **Unit**
Sender (IR-GaAs-Diode) **Emitter** (IR-GaAs Diode)			
Sperrspannung Reverse voltage	V_R	6	V
Vorwärtsgleichstrom Forward current	I_F	50	mA
Vorwärtsstoβstrom, ($t_p \leq 10$ µs) Surge current	I_{FSM}	1.5	A
Verlustleistung Power dissipation	P_{tot}	80	mW
Empfänger (Si-Fototransistor) **Detector** (silicon phototransistor)			
Kollektor-Emitter-Sperrspannung Collector-emitter voltage	V_{CEO}	30	V
Emitter-Kollektor-Sperrspannung Emitter-collector voltage	V_{ECO}	7	
Kollektorstrom Collector current	I_C	10	mA
Verlustleistung Total power dissipation	P_{tot}	100	mW
Reflexlichtschranke **Light reflection switch**			
Lagertemperatur Storage temperature range	T_{stg}	– 40 ... + 85	°C
Umgebungstemperatur Ambient temperature range	T_A	– 40 ... + 85	
Sperrschichttemperatur Junction temperature range	T_j	100	

Löthinweise
Soldering conditions

Bauform Type	Tauch-, Schwall- und Schlepplötung Dip, wave and drag soldering			Reflowlötung Reflow soldering	
	Lötbad-temperatur Temperature of the soldering bath	Maximal zulässige Lötzeit Max. perm. soldering time	Abstand Lötstelle Gehäuse Distance between solder joint and case	Lötzonen-temperatur Temperature of soldering zone	Maximale Durchlaufzeit Max. transit time
SFH 9101	260 °C	8 s	–	260 °C : 215 °C Vorheizung Preheating: 150 °C	10 s : 40 s approx. 1 min.

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

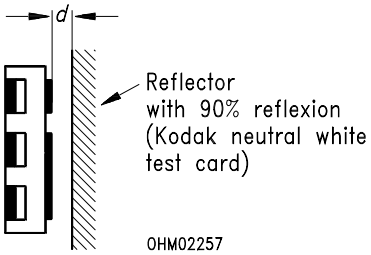
Kennwerte (T_A = 25 °C)
Characteristics

Bezeichnung Description	Symbol Symbol	Wert Value	Einheit Unit
Sender (IR-GaAs-Diode) **Emitter** (IR-GaAs diode)			
Durchlaßspannung Forward voltage I_F = 50 mA	V_F	1.25 (≤ 1.65)	V
Durchbruchspannung Breakdown voltage I_R = 10 µA	V_{BR}	≥ 6	V
Sperrstrom Reverse current V_R = 6V	I_R	0.01 (≤ 10)	µA
Kapazität Capacitance V_R = 0 V, f = 1 MHz	C_O	25	pF
Wärmewiderstand[1)] Thermal resistance[1)]	R_{thJA}	500	K/W

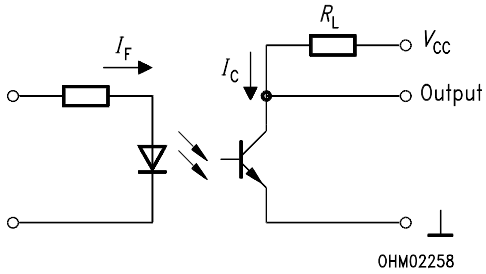
Kennwerte (T_A = 25 °C)
Characteristics

Bezeichnung **Description**	**Symbol** **Symbol**	**Wert** **Value**	**Einheit** **Unit**
Empfänger (Si-Fototransistor) **Detector** (silicon phototransistor)			
Kapazität Capacitance V_{CE} = 5 V, f = 1 MHz	C_{CE}	11	pF
Kollektor-Emitter-Reststrom Collector-emitter leakage current V_{CE} = 10 V	I_{CEO}	20 (≤ 200)	nA
Fotostrom (Fremdlichtempfindlichkeit) Photocurrent (outside light density) V_{CE} = 5 V, E_V = 1000 Lx	I_P	3.5	mA
Wärmewiderstand[1)] Thermal resistance[1)]	R_{thJA}	500	K/W
Reflexlichtschranke **Light reflection switch**			
Kollektor-Emitterstrom Collector-emitter current Kodak neutral white test card, 90 % Reflexion I_F = 10 mA; V_{CE} = 5 V; d = 1 mm	$I_{CE\ min.}$ $I_{CE\ typ.}$	0.25 0.70	mA mA
Kollektor-Emitter-Sättigungsspannung Collector-emitter-saturation voltage Kodak neutral white test card, 90 % Reflexion I_F = 10 mA; d = 1 mm; I_C = 85 µA	$V_{CE\ sat}$	0.2 (≤ 0.6)	V

1) Montage auf PC-Board mit >5 mm^2 Padgröβe
1) Mounting on pcb with >5 mm^2 pad size



Schaltzeiten (T_A = 25 °C, V_{CC} = 5 V, I_C = 1 mA[1)], R_L = 1 kΩ)
Switching times

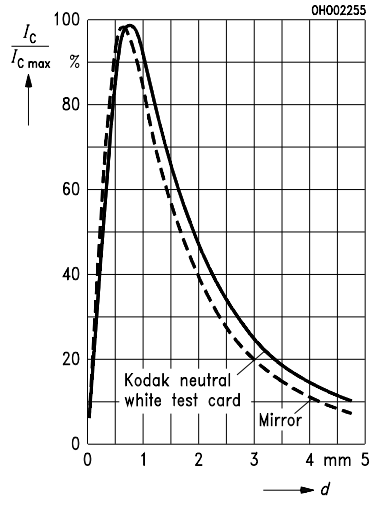


Bezeichnung Description	Symbol Symbol	Wert Value	Einheit Unit
Einschaltzeit Turn-on time	t_{ein} t_{on}	65	µs
Anstiegzeit Rise time	t_r	50	µs
Ausschaltzeit Turn-off time	t_{aus} t_{off}	55	µs
Abfallzeit Fall time	t_f	50	µs

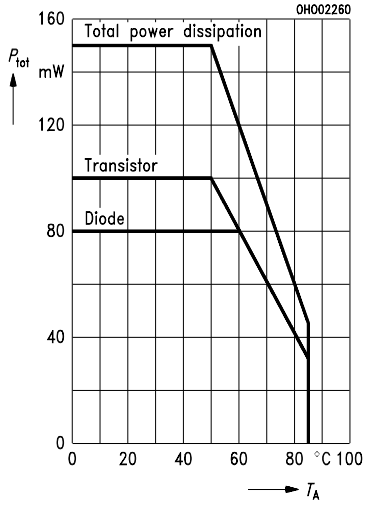
1) I_C eingestellt über den Durchlaβstrom der Sendediode, den Reflexionsgrad und den Abstand des Reflektors vom Bauteil (d)

1) I_C as a function of the forward current of the emitting diode, the degree of reflection and the distance between reflector and component (d)

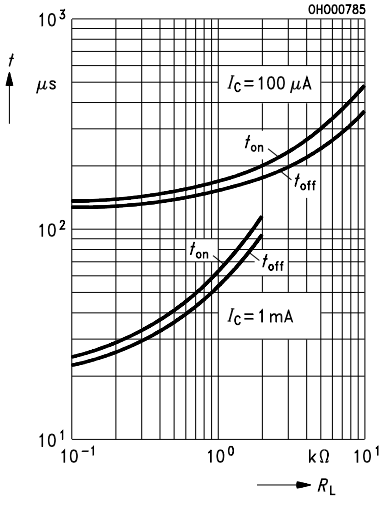
Collector current $\frac{I_C}{I_{Cmax}} = f(d)$



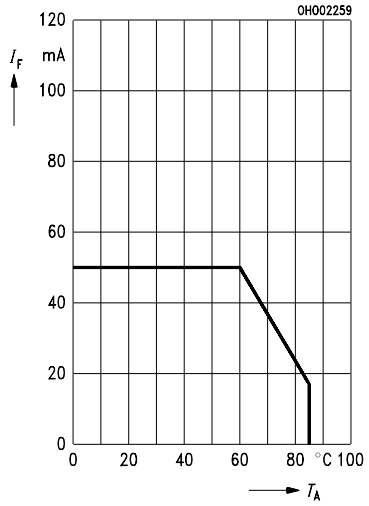
Permissible power dissipation for diode and transistor $P_{tot} = f(T_A)$



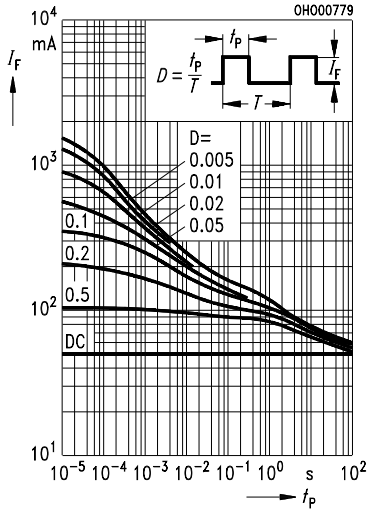
Switching characteristics $t = f(R_L)$
T_A = 25 °C, I_F = 10 mA



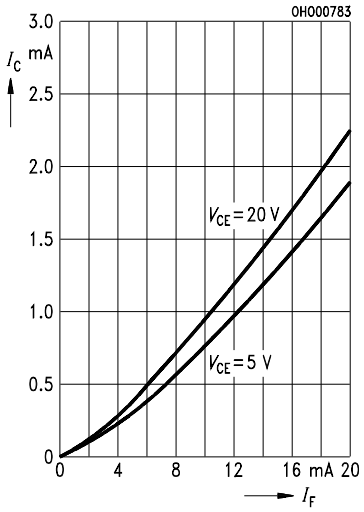
Max. permissible forward current
$I_F = f(T_A)$



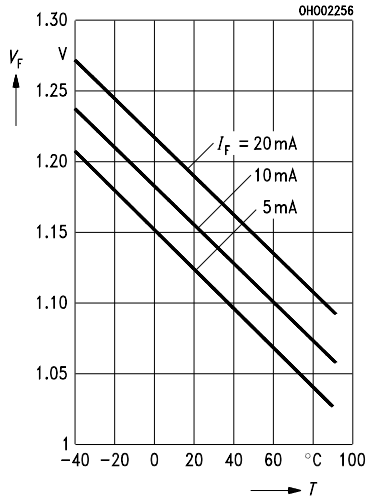
Permissible pulse handling capability
$I_F = f(t_p)$, D = Parameter, T_A = 25 °C



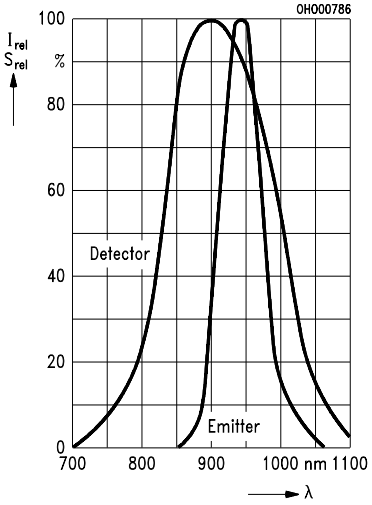
Collector current $I_C = f(I_F)$, spacing d to reflector = 1 mm, 90% reflection



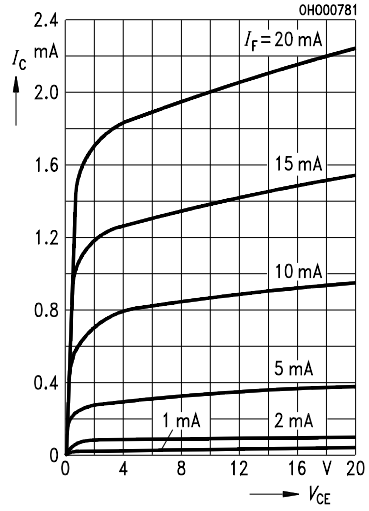
Forward voltage (typ.) of the diode
$V_F = f(T)$



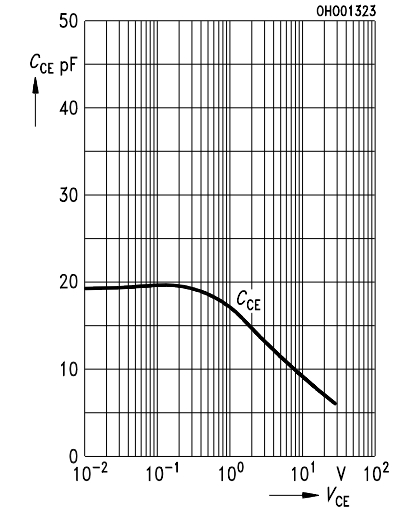
Relative spectral emission of emitter (GaAs) $I_{rel} = f(\lambda)$ **and detector (Si)** $S_{rel} = f(\lambda)$



Output characteristics
$I_C = f(V_{CE})$, spacing to reflector:
d = 1 mm, 90% reflection, T_A = 25 °C



Transistor capacitance (typ.)
$C_{CE} = f(V_{CE})$, T_A = 25 °C, f = 1 MHz



Output characteristics (typ.)
$I_C = f(V_{CE})$, spacing to reflector:
d = 1 mm, 90% reflection, T_A = 25 °C