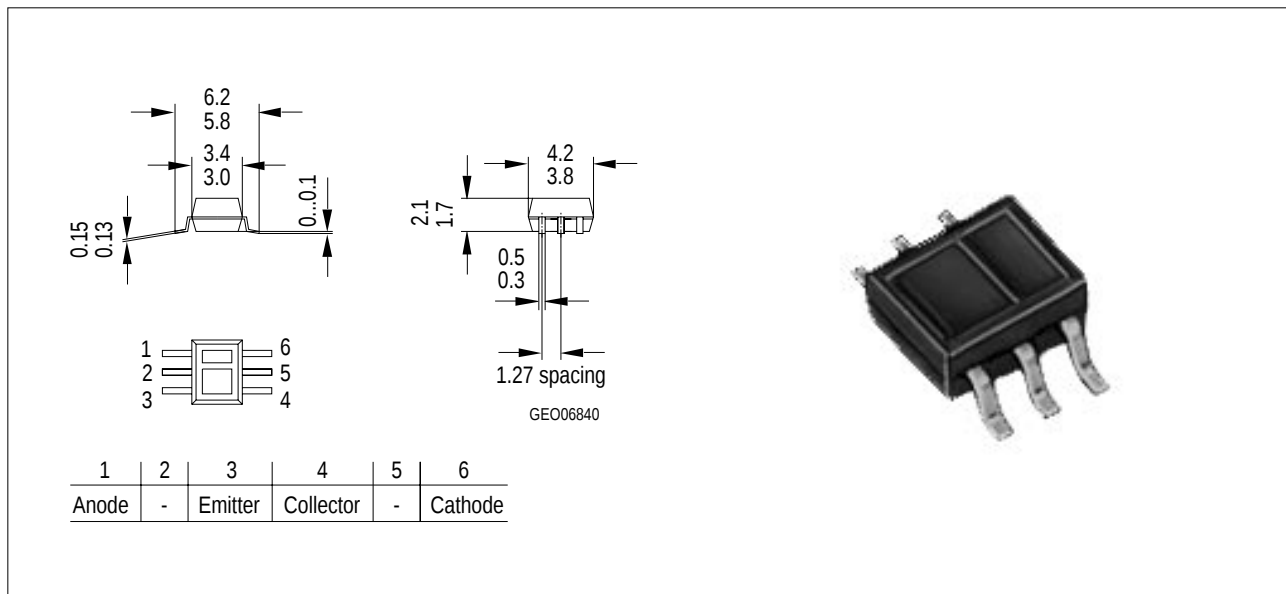


Reflexlichtschranke im SMT-Gehäuse Light Reflection Switch in SMT Package

SFH 9201

Vorläufige Daten / Preliminary Data



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

Wesentliche Merkmale

- Optimaler Arbeitsabstand 1 mm bis 5 mm
- IR-GaAs-Lumineszenzdiode: Sender
- Si-NPN-Fototransistor: Empfänger
- Tageslichtsperrfilter
- Hoher Kollektor-Emitter-Strom typ. 0.7 mA
- Geringe Sättigungsspannung
- Sender und Empfänger galvanisch getrennt

Anwendungen

- Positionsmelder
- Endabschalter
- Drehzahlüberwachung, -regelung
- Bewegungssensor

Features

- Optimal operating distance 1 mm to 5 mm
- IR-GaAs-emitter
- Silicon NPN phototransistor detector
- Daylight filter against undesired light effects
- High collector-emitter current typ. 0.7 mA
- Low saturation voltage
- Emitter and detector electrically isolated

Applications

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

Typ Type	Bestellnummer Ordering Code
SFH 9201	Q62702-P474

Grenzwerte
Maximum Ratings

Bezeichnung Description	Symbol Symbol	Wert Value	Einheit Unit
Sender (GaAs-Diode) Emitter (GaAs diode)			
Sperrspannung Reverse voltage	V_R	6	V
Vorwärtsgleichstrom Forward current	I_F	50	mA
Vorwärtsstoßstrom ($t_p \leq 10 \mu s$) Surge current	I_{FSM}	1.5	A
Verlustleistung Power dissipation	P_{tot}	80	mW

Empfänger (Si-Fototransistor)
Detector (silicon phototransistor)

Dauer-Kollektor-Emitter-Sperrspannung Continuous collector-emitter voltage	V_{CEO}	16	V
Kollektor-Emitter-Sperrspannung, ($t \leq 2 \text{ min}$) Collector-emitter voltage, ($t \leq 2 \text{ min}$)	V_{CEO}	30	
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	
Elektrostatistische Entladung Electrostatic discharge	ESD	2	KV
Umweltbedingungen / Environment conditions	3 K3 acc. to EN 60721-3-3 (IEC 721-3-3)		

Löthinweise Soldering conditions

Bauform Type	Tauch-, Schwall- und Schleppplötung 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 9201	–	–	–	260 °C : 215 °C Vorheizung Preheating: 150 °C	10 s : 40 s approx. 1 min.

Bitte Verarbeitungshinweise für SMT-Bauelemente beachten!
Please observe the handling guidelines for SMT devices!
Handhabung / Handling: JEDEC Standard A112-A, level 4.

Kennwerte ($T_A = 25\text{ °C}$) Characteristics

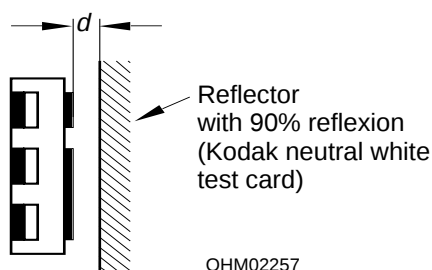
Bezeichnung Description	Symbol Symbol	Wert Value	Einheit Unit
Durchlaßspannung Forward voltage $I_F = 50\text{ mA}$	V_F	1.25 (≤ 1.65)	V
Durchbruchspannung Breakdown voltage $I_R = 10\text{ }\mu\text{A}$	V_{BR}	≥ 6	V
Sperrstrom Reverse current $V_R = 6\text{ V}$	I_R	0.01 (≤ 10)	μA
Kapazität Capacitance $V_R = 0\text{ V}, f = 1\text{ MHz}$	C_O	25	pF
Wärmewiderstand ¹⁾ Thermal resistance ¹⁾	R_{thJA}	400	K/W

Kennwerte ($T_A = 25\text{ °C}$) Characteristics

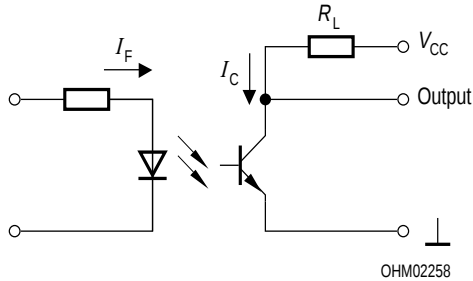
Bezeichnung Description	Symbol Symbol	Wert Value	Einheit Unit
Empfänger (Si-Fototransistor) Detector (silicon phototransistor)			
Kapazität Capacitance $V_{CE} = 5\text{ V}, f = 1\text{ MHz}$	C_{CE}	10	pF
Kollektor-Emitter-Reststrom Collector-emitter leakage current $V_{CE} = 10\text{ V}$	I_{CEO}	20 (≤ 200)	nA
Fotostrom (Fremdlichtempfindlichkeit) Photocurrent (outside light density) $V_{CE} = 5\text{ V}, E_V = 1000\text{ Lx}$	I_p	3.5	mA
Wärmewiderstand ¹⁾ Thermal resistance ¹⁾	R_{thJA}	400	K/W
Reflexlichtschranke Light reflection switch			
Kollektor-Emitterstrom Collector-emitter current Kodak neutral white test card, 90 % Reflexion $I_F = 10\text{ mA}; V_{CE} = 5\text{ V}; d = 1\text{ mm}$	$I_{CE\text{ min.}}$ $I_{CE\text{ typ.}}$	0.25 0.70	mA mA
Kollektor-Emitter-Sättigungsspannung Collector-emitter-saturation voltage Kodak neutral white test card, 90 % Reflexion $I_F = 10\text{ mA}; d = 1\text{ mm}; I_C = 85\text{ }\mu\text{A}$	$V_{CE\text{ sat}}$	0.2 (≤ 0.6)	V

1) Montage auf PC-Board mit $>5\text{ mm}^2$ Padgröße

1) Mounting on pcb with $>5\text{ mm}^2$ pad size



Schaltzeiten ($T_A = 25\text{ °C}$, $V_{CC} = 5\text{ V}$, $I_C = 1\text{ mA}^{1)}$, $R_L = 1\text{ k}\Omega$)
Switching times



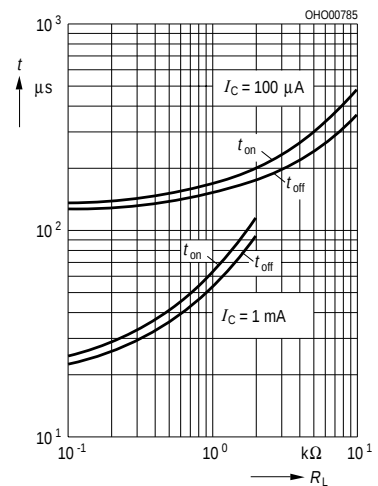
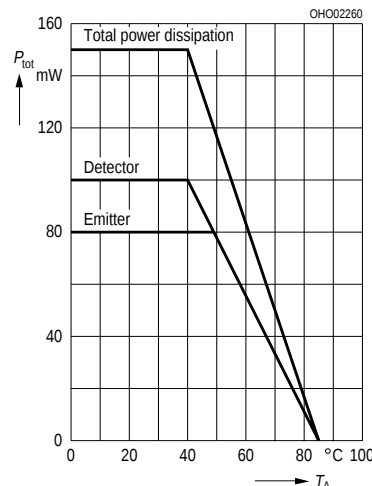
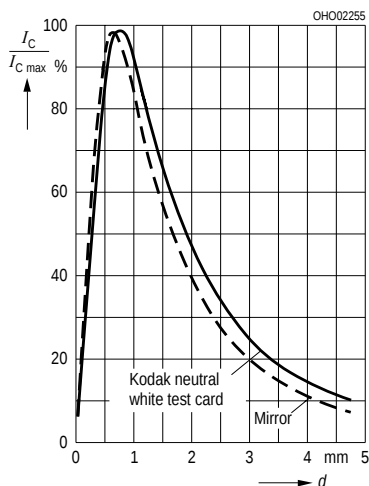
Bezeichnung Description	Symbol Symbol	Wert Value	Einheit Unit
Einschaltzeit Turn-on time	t_{ein} t_{on}	65	μs
Anstiegszeit Rise time	t_r	50	μs
Ausschaltzeit Turn-off time	t_{aus} t_{off}	55	μs
Abfallzeit Fall time	t_f	50	μs

- 1) I_C eingestellt über den Durchlaßstrom 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 $\frac{I_C}{I_{C\text{max}}} = f(d)$

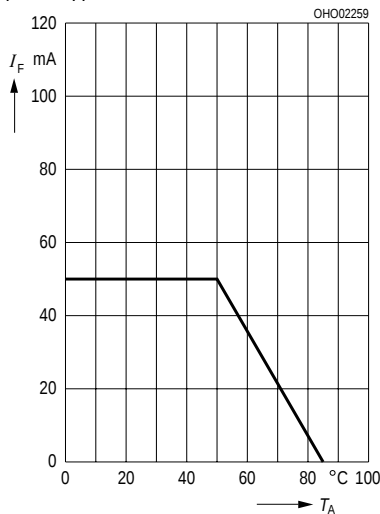
Permissible power dissipation for diode and transistor $P_{\text{tot}} = f(T_A)$

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



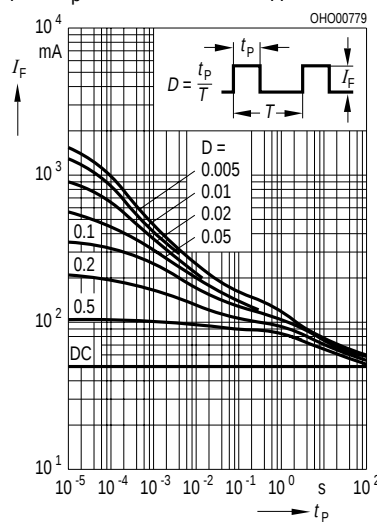
Max. permissible forward current

$$I_F = f(T_A)$$



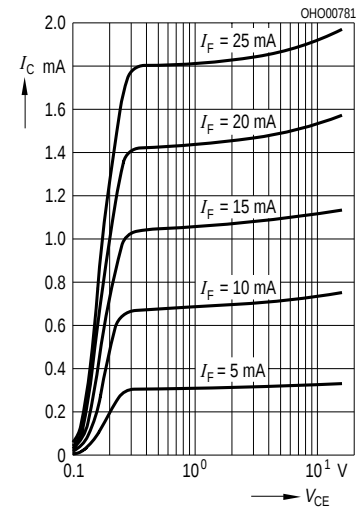
Permissible pulse handling capability

$$I_F = f(t_p), D = \text{Parameter}, T_A = 25^\circ\text{C}$$



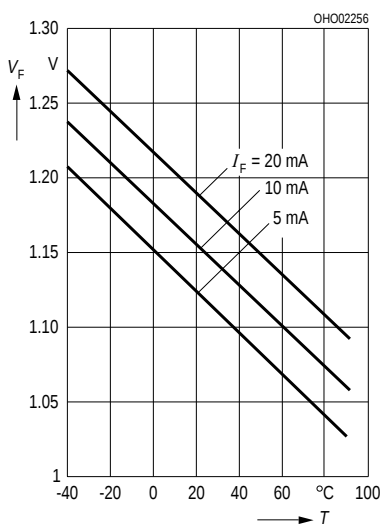
Output characteristics (typ.)

$$I_C = f(V_{CE}), \text{ spacing to reflector: } d = 1 \text{ mm, } 90\% \text{ reflection, } T_A = 25^\circ\text{C}$$

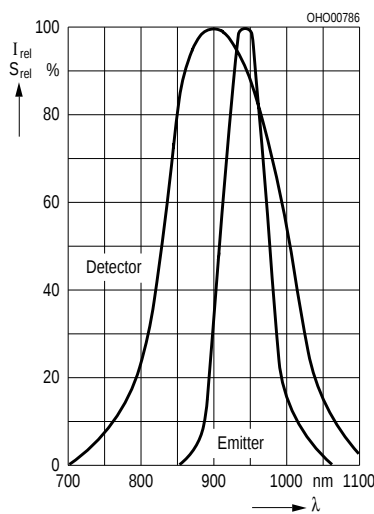


Forward voltage (typ.) of the diode

$$V_F = f(T)$$

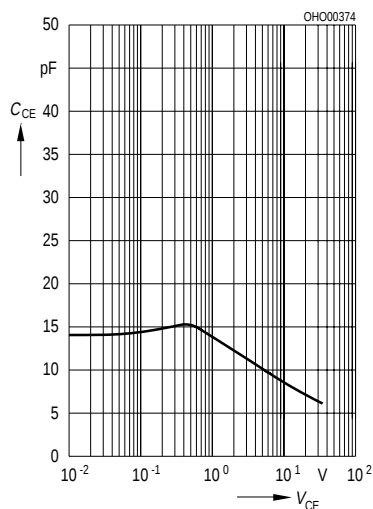


Relative spectral emission of emitter (GaAs) $I_{rel} = f(\lambda)$ and detector (Si) $S_{rel} = f(\lambda)$



Transistor capacitance (typ.)

$$C_{CE} = f(V_{CE}), T_A = 25^\circ\text{C}, f = 1 \text{ MHz}$$



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

