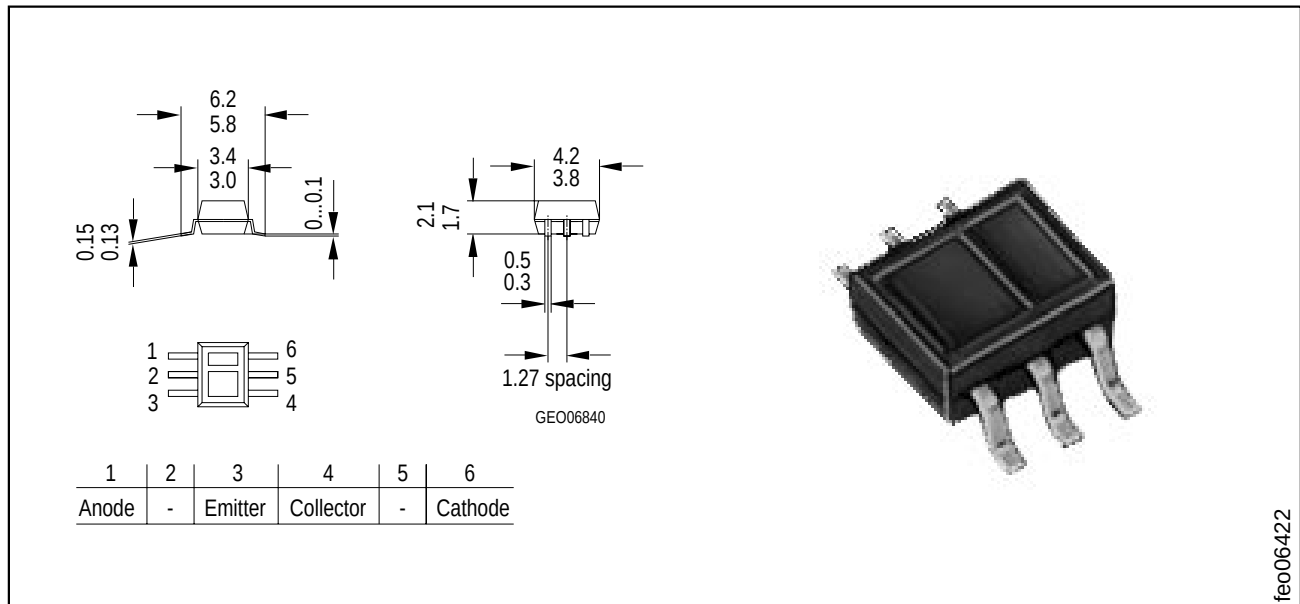


Reflexlichtschranke im SMT-Gehäuse Reflective Interrupter in SMT Package

SFH 9201



feo06422

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

Type Type	Bestellnummer Ordering Code	I_{CE} $I_F = 10 \text{ mA}, V_{CE} = 5 \text{ V}, d = 1 \text{ mm}$ mA
SFH 9201	Q62702-P5038	0.25 ... 2.00
SFH 9201-1/2	Q62702-P5055	0.25 ... 0.80
SFH 9201-2/3	Q62702-P5056	0.40 ... 1.25
SFH 9201-3/4	Q62702-P5057	0.63 ... 2.00

Grenzwerte Maximum Ratings

Bezeichnung Description	Symbol Symbol	Wert Value	Einheit Unit
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Sender (GaAs-Diode) Emitter (GaAs diode)

Sperrspannung Reverse voltage	V_R	5	V
Vorwärtsgleichstrom Forward current	I_F	50	mA
Verlustleistung Power dissipation	P_{tot}	80	mW

Empfänger (Si-Fototransistor) Detector (silicon phototransistor)

Dauer-Kollektor-Emitter-Sperrspannung Continuous collector-emitter voltage	V_{CE}	16	V
Kollektor-Emitter-Sperrspannung, ($t \leq 2$ min) Collector-emitter voltage, ($t \leq 2$ min)	V_{CE}	30	
Emitter-Kollektor-Sperrspannung Emitter-collector voltage	V_{EC}	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	
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	Drypack Level acc. to IPS- stand. 020	Tauch-, Schwalllötung Dip, wave soldering		Reflowlötung Reflow soldering		Kolbenlötung Iron soldering (Iron temp.)
		Peak temp. (solderbath)	Max. time in peak zone	Peak temp. (package temp.)	Max. time in peak zone	
SFH 9201	4	n. a.	—	245 °C	10 sec.	300 °C < 5 sec.

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

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

Bezeichnung Description	Symbol Symbol	Wert Value	Einheit Unit
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Sender (IR-GaAs-Diode) Emitter (IR-GaAs diode)

Durchlaßspannung Forward voltage $I_F = 50\text{ mA}$	V_F	1.25 (≤ 1.65)	V
Sperrstrom Reverse current $V_R = 5\text{ V}$	I_R	0.01 (≤ 1)	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

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 $V_{CE} = 20\text{ V}$	I_{CEO}	3 (≤ 200)	nA
Fotostrom (Fremdlichtempfindlichkeit) Photocurrent (outside light density) $V_{CE} = 5\text{ V}, E_V = 1000\text{ Lx}$	I_P	3.5	mA

Kennwerte ($T_A = 25\text{ °C}$)

Characteristics

Bezeichnung Description	Symbol Symbol	Wert Value	Einheit Unit
Wärmewiderstand ¹⁾ Thermal resistance ¹⁾	R_{thJA}	400	K/W

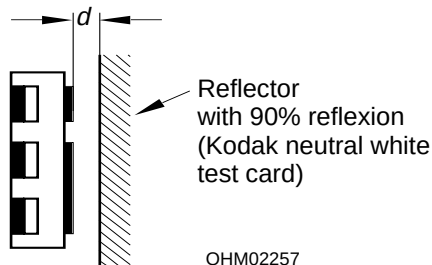
Reflexlichtschranke

Light reflection switch

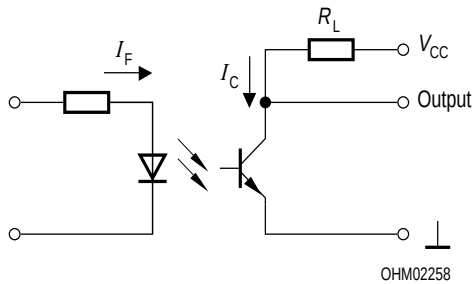
Kollektor-Emitterstrom Collector-emitter current Kodak neutral white test card, 90 % Reflexion $I_F = 10\text{ mA}$; $V_{CE} = 5\text{ V}$; $d = 1\text{ mm}$	$I_{CE\text{ min.}}$ $I_{CE\text{ typ.}}$	0.25 0.70	mA mA
Kollektor-Emitter-Sättigungsspannung Collector-emitter-saturation voltage Kodak neutral white test card, 90 % Reflexion $I_F = 10\text{ mA}$; $d = 1\text{ mm}$; $I_C = 85\text{ }\mu\text{A}$	$V_{CE\text{ sat}}$	0.15 (≤ 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 ($T_A = 25^\circ\text{C}$, $V_{CC} = 5\text{ V}$, $I_C = 1\text{ mA}^1$, $R_L = 1\text{ k}\Omega$)
Switching times



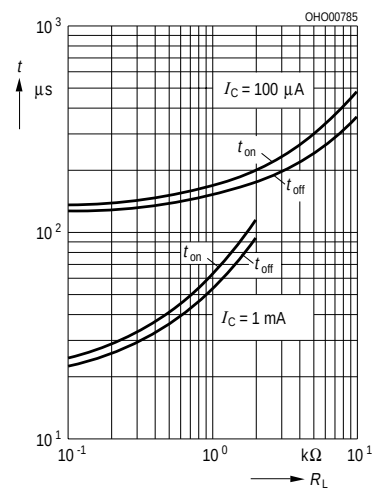
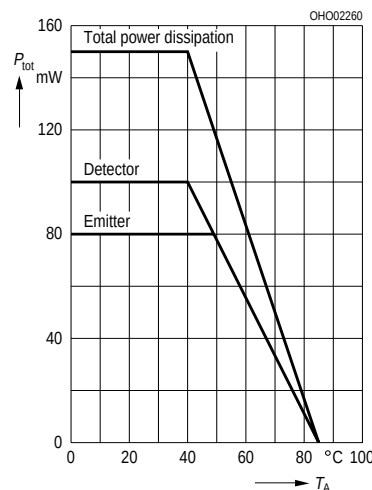
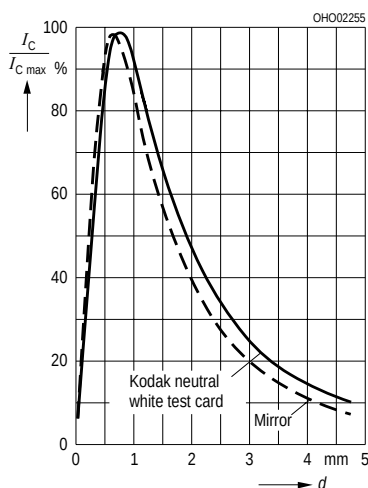
Bezeichnung Description	Symbol Symbol	Wert Value	Einheit Unit
Einschaltzeit Turn-on time	t_{ein} t_{on}	65	μs
Anstiegszeit Rise time	t_r	50	μs
Ausschaltzeit Turn-off time	t_{aus} t_{off}	55	μs
Abfallzeit Fall time	t_f	50	μs

- 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 $\frac{I_C}{I_{C\text{max}}} = f(d)$

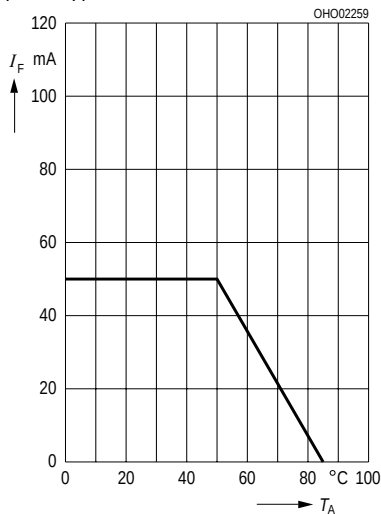
Permissible power dissipation for diode and transistor $P_{\text{tot}} = f(T_A)$

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



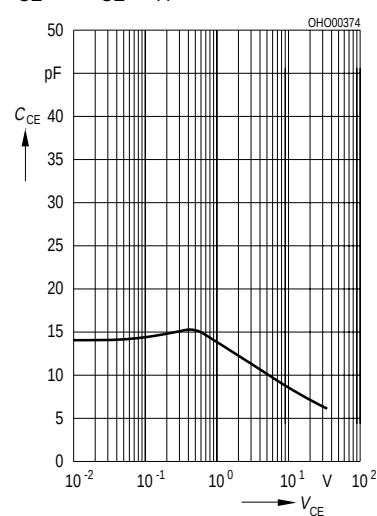
Max. permissible forward current

$$I_F = f(T_A)$$

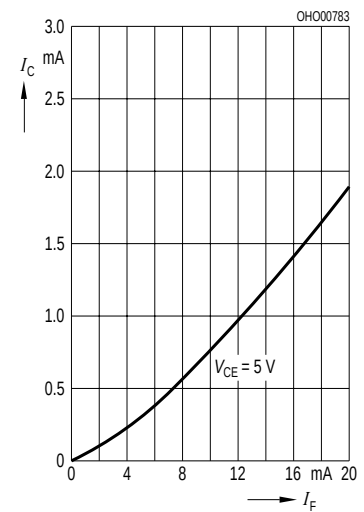


Transistor capacitance (typ.)

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

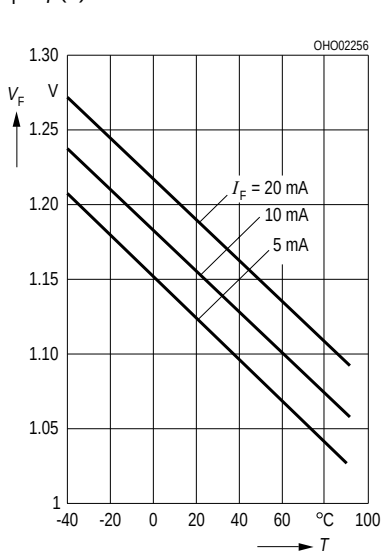


Collector current $I_C = f(I_F)$, spacing d to reflector = 1 mm, 90% reflection

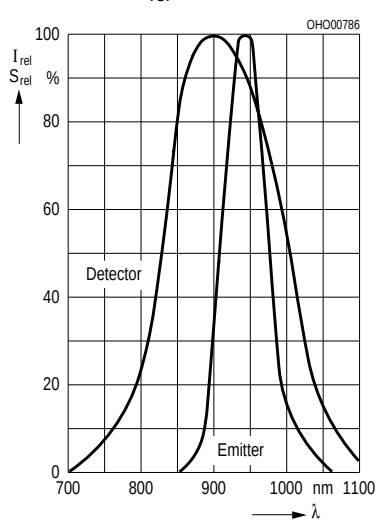


Forward voltage (typ.) of the diode

$$V_F = f(T)$$



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



Output characteristics (typ.)

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

