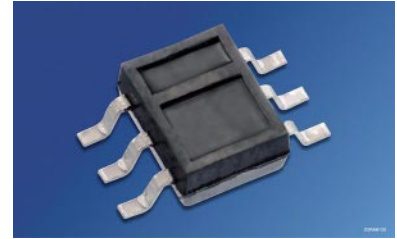


Reflexlichtschranke im SMT-Gehäuse Reflective Interrupter in SMT Package

SFH 9201



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 | 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 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 |
| 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) | | |

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

| Bezeichnung Parameter | Symbol Symbol | Wert Value | Einheit Unit |
|---|------------------|----------------------|-----------------|
| 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 |

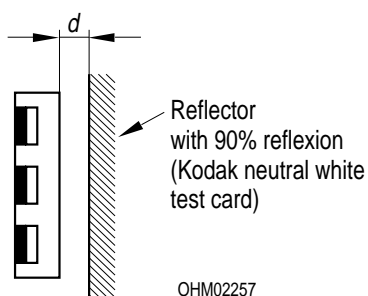
Empfänger (Si-Fototransistor)**Detector** (silicon phototransistor)

| | | | |
|--|------------|------------------|-----|
| 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 |
| Wärmewiderstand ¹⁾ Thermal resistance ¹⁾ | R_{thJA} | 400 | K/W |

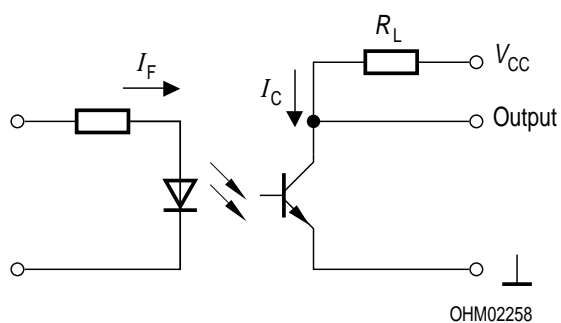
Kennwerte ($T_A = 25\text{ °C}$)

Characteristics (cont'd)

| Bezeichnung Parameter | Symbol Symbol | Wert Value | Einheit Unit |
|--|--|---------------------|-----------------|
| 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 $> 5\text{ mm}^2$ Padgröße1) Mounting on pcb with $> 5\text{ mm}^2$ pad size

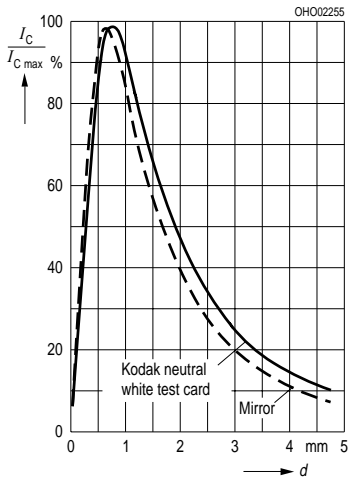
Schaltzeiten ($T_A = 25\text{ °C}$, $V_{CC} = 5\text{ V}$, $I_C = 1\text{ mA}^1$), $R_L = 1\text{ k}\Omega$)
Switching Times



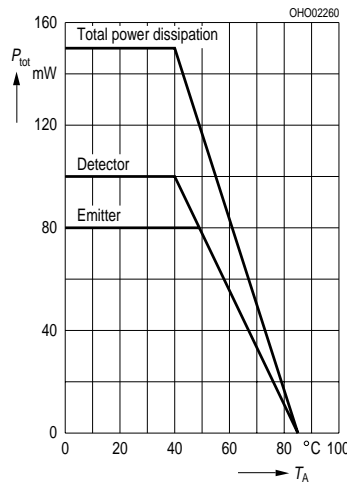
| Bezeichnung Parameter | Symbol Symbol | Wert Value | Einheit Unit |
|--------------------------------|--------------------------------------|---------------|-----------------|
| Einschaltzeit Turn-on time | t_{ein} t_{on} | 65 | μs |
| Anstiegszeit Rise time | t_r | 50 | μs |
| Ausschaltzeit Turn-off 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)

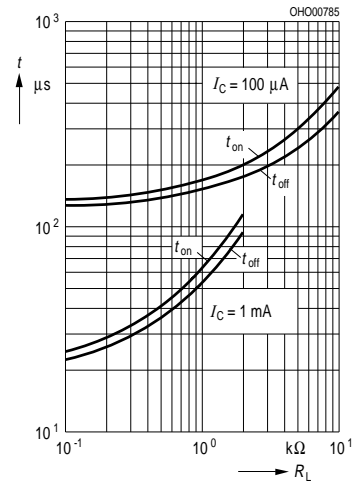
Collector Current $\frac{I_C}{I_{Cmax}} = f(d)$



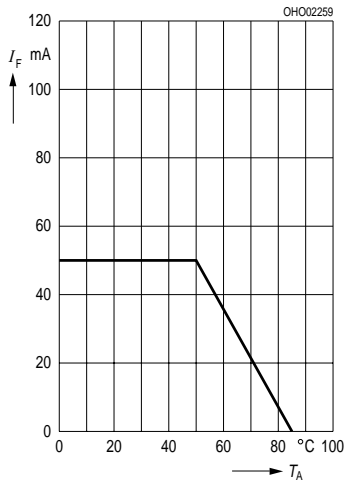
Permissible Power Dissipation for Diode and Transistor $P_{tot} = f(T_A)$



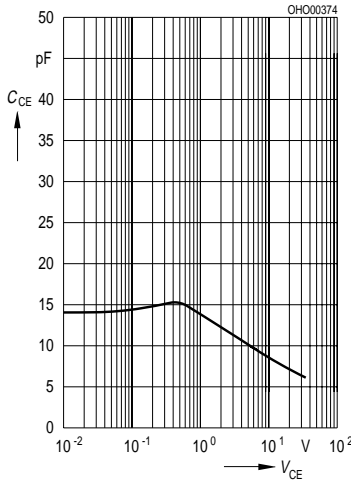
Switching Characteristics $t = f(R_L)$
 $T_A = 25\text{ °C}, I_F = 10\text{ mA}$



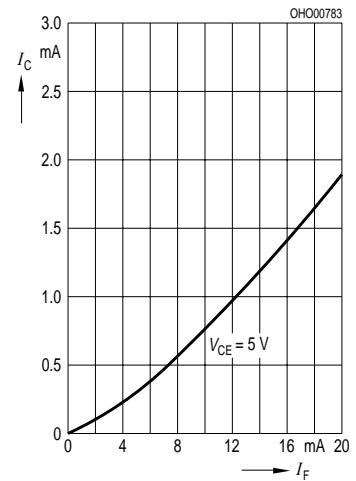
Max. Permissible Forward Current
 $I_F = f(T_A)$



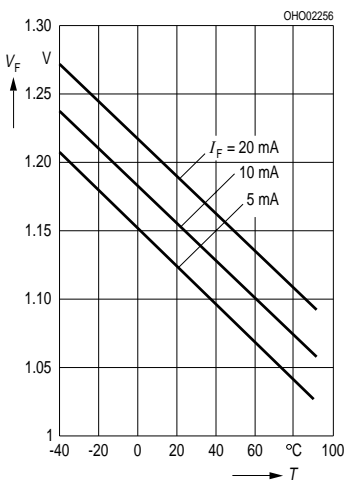
Transistor Capacitance (typ.)
 $C_{CE} = f(V_{CE}), T_A = 25\text{ °C}, f = 1\text{ MHz}$



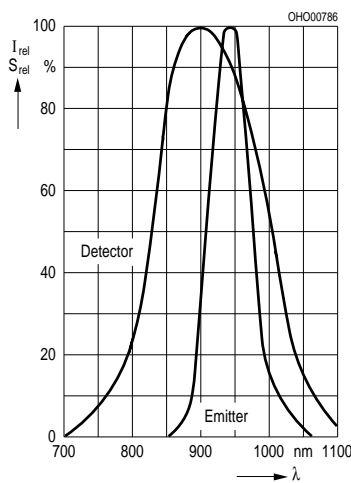
Collector Current $I_C = f(I_F)$, spacing d to reflector = 1 mm, 90% reflection



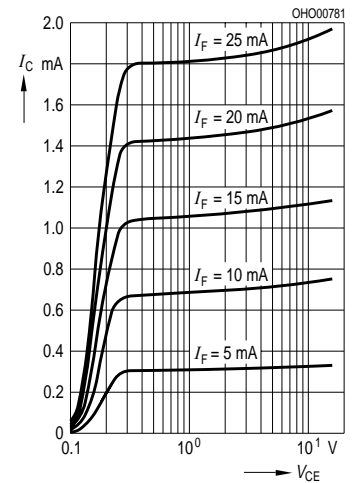
Forward Voltage (typ.) of the Diode $V_F = f(T)$



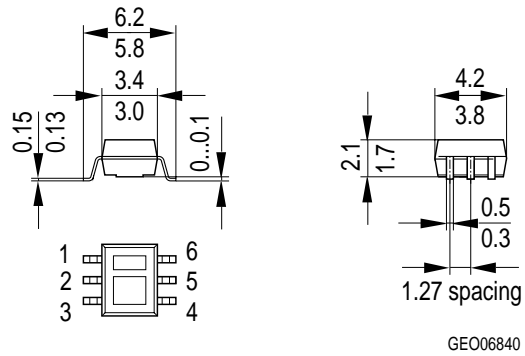
Relative Spectral Emission of Emitter (GaAs) $I_{rel} = f(\lambda)$ and Detector (Si) $S_{rel} = f(\lambda)$



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



Maßzeichnung Package Outlines



| Type | 1 | 2 | 3 | 4 | 5 | 6 |
|----------|-------|---|---------|-----------|---|---------|
| SFH 9201 | Anode | – | Emitter | Collector | – | Cathode |

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

Löthinweise
Soldering Conditions

| Bauform Type | Drypack Level acc. to IPS-stand. 020 | Tauch-, Schwallötung 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. | n.a. |

Bitte Verarbeitungshinweise für SMT-Bauelemente beachten!

Please observe the handling guidelines for SMT devices!