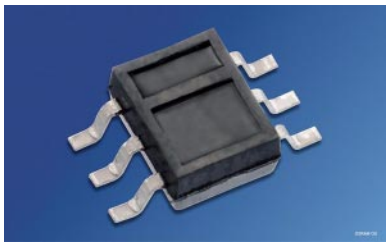
Reflexlichtschranke im SMT-Gehäuse
Reflective Interrupter in SMT Package

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

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

Anwendungen

- Positionsmelder
- Endabschalter
- Drehzahlüberwachung, -regelung
- Bewegungssensor

Applications

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

Typ **Type**	**Bestellnummer** **Ordering Code**	I_{CE} I_F = 10 mA, V_{CE} = 5 V, d = 1 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	
Elektrostatische 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 °C)
Characteristics

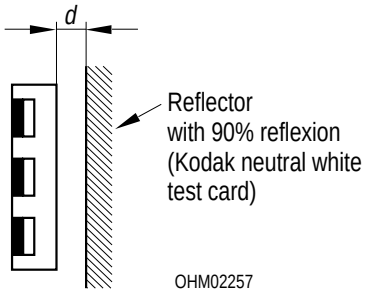
Bezeichnung **Parameter**	**Symbol** **Symbol**	**Wert** **Value**	**Einheit** **Unit**
Sender (IR-GaAs-Diode) **Emitter** (IR-GaAs diode)			
Durchlaβspannung Forward voltage I_F = 50 mA	V_F	1.25 (≤ 1.65)	V
Sperrstrom Reverse current V_R = 5 V	I_R	0.01 (≤ 1)	µA
Kapazität Capacitance V_R = 0 V, f = 1 MHz	C_O	25	pF
Wärmewiderstand[1)] Thermal resistance[1)]	R_{thJA}	400	K/W
Empfänger (Si-Fototransistor) **Detector** (silicon phototransistor)			
Kapazität Capacitance V_{CE} = 5 V, f = 1 MHz	C_{CE}	10	pF
Kollektor-Emitter-Reststrom Collector-emitter leakage current V_{CE} = 20 V	I_{CEO}	3 (≤ 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}	400	K/W

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

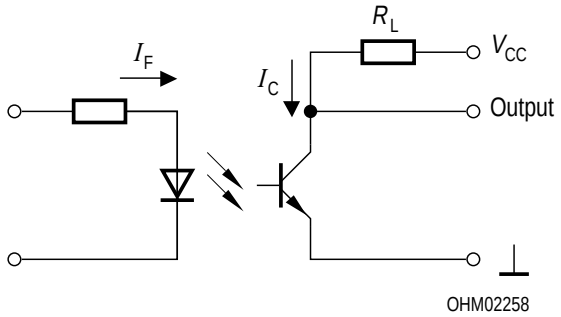
Bezeichnung **Parameter**	**Symbol** **Symbol**	**Wert** **Value**	**Einheit** **Unit**
Reflexlichtschranke **Light Reflection Switch**			
Kollektor-Emitterstrom Collector-emitter current Kodak neutral white test card, 90% Reflexion I_F = 10 mA; V_{CE} = 5 V; d = 1 mm	$I_{CE\ min.}$ $I_{CE\ typ.}$	0.25 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	$V_{CE\ sat}$	0.15 (≤ 0.6)	V

1) Montage auf PC-Board mit > 5 mm² Padgröβe

1) Mounting on pcb with > 5 mm² pad size



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

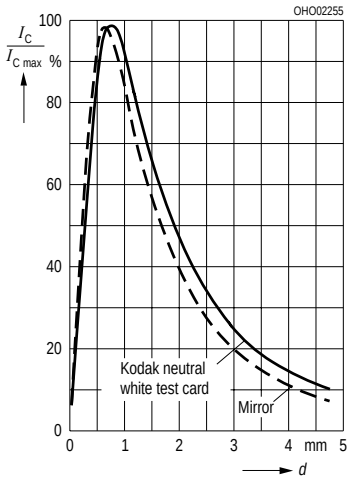


Bezeichnung **Parameter**	**Symbol** **Symbol**	**Wert** **Value**	**Einheit** **Unit**
Einschaltzeit Turn-on time	t_{ein} t_{on}	65	µs
Anstiegzeit Rise time	t_r	50	µs
Ausschaltzeit Turn-off time	t_{aus} t_{off}	55	µs
Abfallzeit Fall time	t_f	50	µs

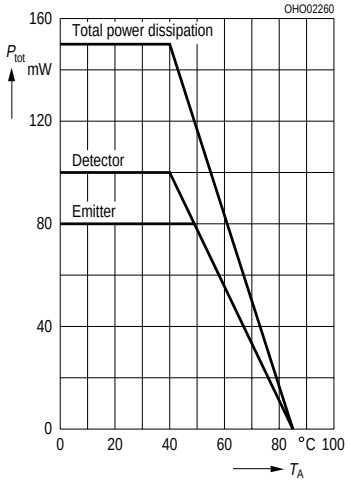
1) I_C eingestellt über den Durchlaßstrom der Sendediode, den Reflexionsgrad und den Abstand des Reflektors vom Bauteil (d)

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)

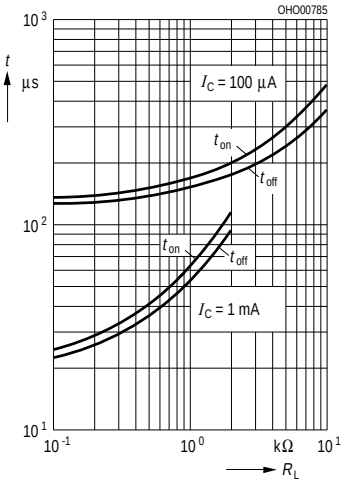
Collector Current $\frac{I_C}{I_{Cmax}} = f(d)$



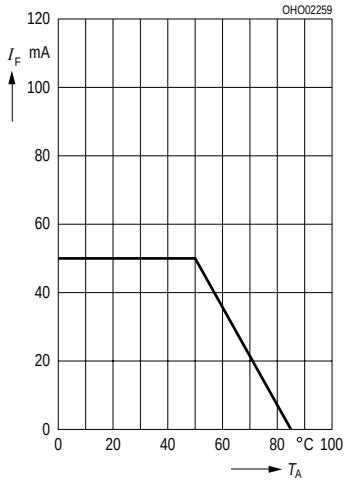
Permissible Power Dissipation for Diode and Transistor $P_{tot} = f(T_A)$



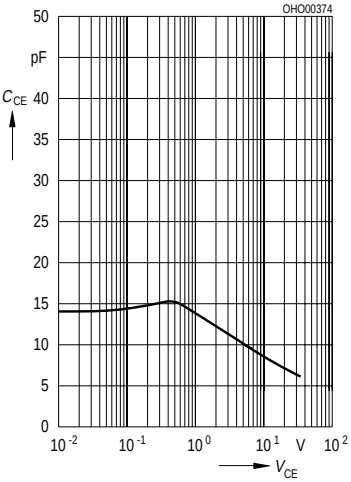
Switching Characteristics $t = f(R_L)$
T_A = 25 °C, I_F = 10 mA



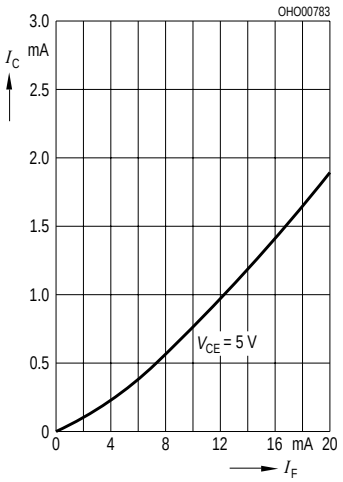
Max. Permissible Forward Current $I_F = f(T_A)$



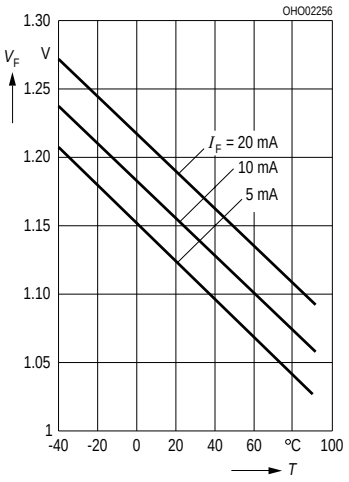
Transistor Capacitance (typ.)
$C_{CE} = f(V_{CE})$, T_A = 25 °C, f = 1 MHz



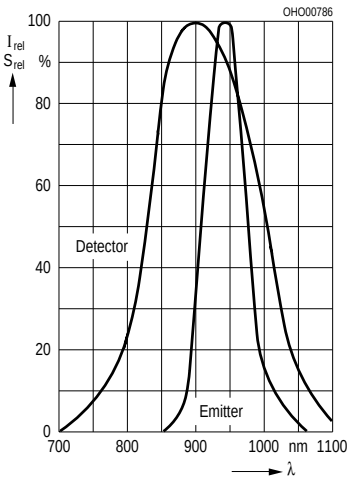
Collector Current $I_C = f(I_F)$, spacing d to reflector = 1 mm, 90% reflection



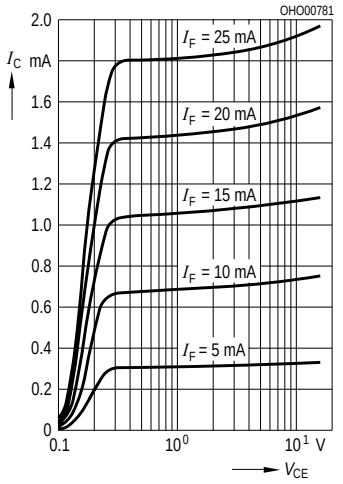
Forward Voltage (typ.) of the Diode $V_F = f(T)$



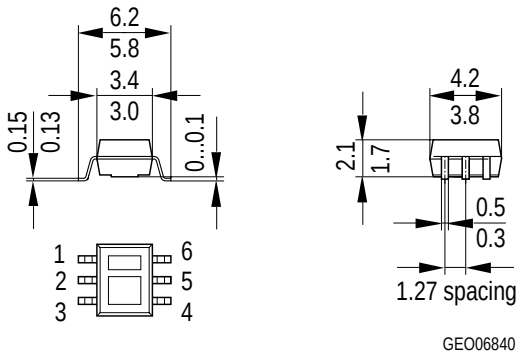
Relative Spectral Emission of Emitter (GaAs) $I_{rel} = f(\lambda)$ **and Detector (Si)** $S_{rel} = f(\lambda)$



Output Characteristics (typ.)
$I_C = f(V_{CE})$, spacing to reflector:
d = 1 mm, 90% reflection, T_A = 25 °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-, 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 9201	4	n. a.	–	245 °C	10 sec.	n.a.

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