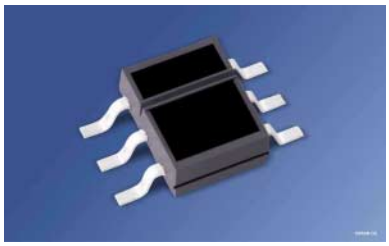
Reflexlichtschranke
Reflective Interrupter
Lead (Pb) Free Product - RoHS Compliant

SFH 9202



Wesentliche Merkmale

- Optimaler Arbeitsabstand 1 mm bis 5 mm
- IR-GaAs-Lumineszenzdiode in Kombination mit einem Si-NPN-Fototransistor
- Tageslichtsperrfilter
- Geringe Sättigungsspannung
- Sender und Empfänger galvanisch getrennt
- Lötmethode: IR-Reflow Löten
- Vorbehandlung nach JEDEC Level 4

Features

- Optimal operating distance 1 mm to 5 mm
- IR-GaAs-emitter in combination with a Silicon NPN phototransistor
- Daylight cut-off filter
- Low saturation voltage
- Emitter and detector electrically isolated
- Soldering Methode: IR Reflow Soldering
- Preconditioning acc. to JEDEC Level 4

Anwendungen

- Positionsmelder
- Endabschalter
- Drehzahlüberwachung
- Bewegungssensor

Applications

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

Typ Type	Bestellnummer Ordering Code	I_{CE} [mA] (I_F = 10 mA, V_{CE} = 5 V, d = 1 mm)
SFH 9202	Q65110A2712	0.063 … 0.8
SFH 9202-2/3	Q65110A2705	0.063 … 0.2
SFH 9202-3/4	Q65110A2710	0.10 … 0.32
SFH 9202-4/5	Q65110A2709	0.16 … 0.50
SFH 9202-5/6	Q65110A2711	0.25 … 0.80

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, ($t \leq 1$ min) Collector-emitter voltage, ($t \leq 1$ 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 … + 100	°C
Umgebungstemperatur Ambient temperature range	T_A	– 40 … + 100	
Verlustleistung Power dissipation	P_{tot}	150	mW
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

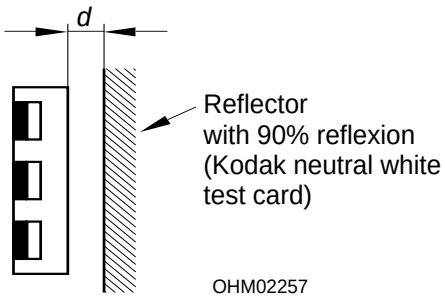
Bezeichnung **Parameter**	**Symbol** **Symbol**	**Wert** **Value**	**Einheit** **Unit**
Sender (GaAs-Diode) **Emitter** (GaAs diode)			
Durchlaβspannung Forward voltage I_F = 50 mA	V_F	1.25 (≤ 1.65)	V
Sperrstrom Reverse current V_R = 5 V	I_R	0.01 (≤ 1)	µA
Kapazität Capacitance V_R = 0 V, f = 1 MHz	C_O	25	pF
Wärmewiderstand[1)] Thermal resistance[1)]	R_{thJA}	270	K/W
Empfänger (Si-Fototransistor) **Detector** (silicon phototransistor)			
Kapazität Capacitance V_{CE} = 5 V, f = 1 MHz	C_{CE}	5	pF
Kollektor-Emitter-Reststrom Collector-emitter leakage current V_{CE} = 20 V	I_{CEO}	1 (≤ 50)	nA
Fotostrom (Fremdlichtempfindlichkeit) Photocurrent (outside light density) V_{CE} = 5 V, E_v = 1000 Lx	I_P	1	mA
Wärmewiderstand[1)] Thermal resistance[1)]	R_{thJA}	270	K/W

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

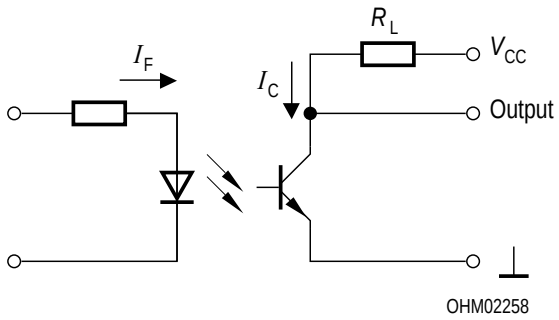
Bezeichnung **Parameter**	**Symbol** **Symbol**	**Wert** **Value**	**Einheit** **Unit**
Reflexlichtschranke **Light Reflection Switch**			
Kollektor-Emitterstrom Collector-emitter current Kodak neutral white test card, 90% Reflexion I_F = 10 mA; V_{CE} = 5 V; d = 1 mm	$I_{CE\ min.}$ $I_{CE\ max}$	63 800	µA µA
Kollektor-Emitter-Sättigungsspannung Collector-emitter saturation voltage Kodak neutral white test card, 90% Reflexion I_F = 10 mA; d = 1 mm; I_C = 20 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 = 100 µA[1)], R_L = 1 kΩ)
Switching Times

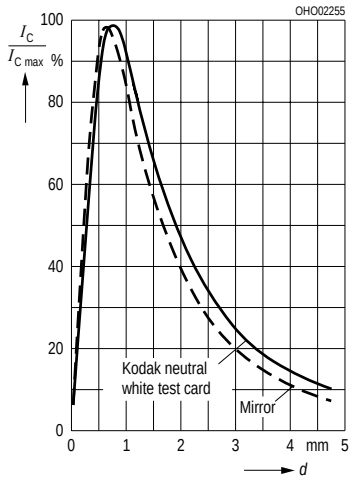


Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Einschaltzeit Turn-on time	t_{ein} t_{on}	40	µs
Anstiegzeit Rise time	t_r	30	µs
Ausschaltzeit Turn-off time	t_{aus} t_{off}	45	µs
Abfallzeit Fall time	t_f	40	µs

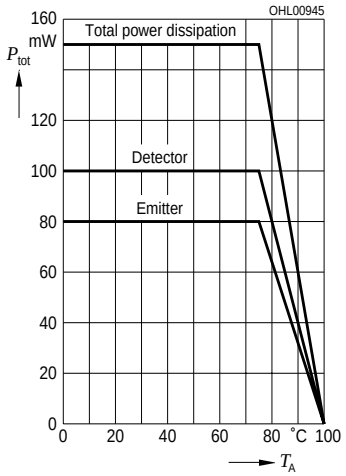
1) I_C eingestellt über den Durchlaβstrom der Sendediode, den Reflexionsgrad und den Abstand des Reflektors vom Bauteil (d)

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)

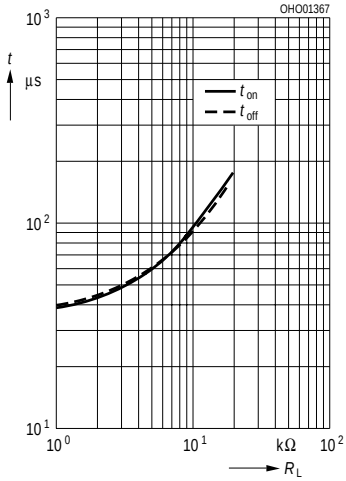
Collector Current $\frac{I_C}{I_{Cmax}} = f(d)$



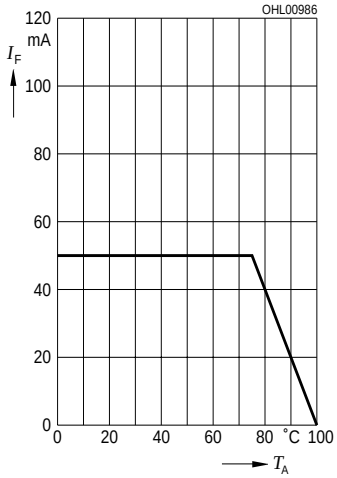
Permissible Power Dissipation for Diode and Transistor $P_{tot} = f(T_A)$



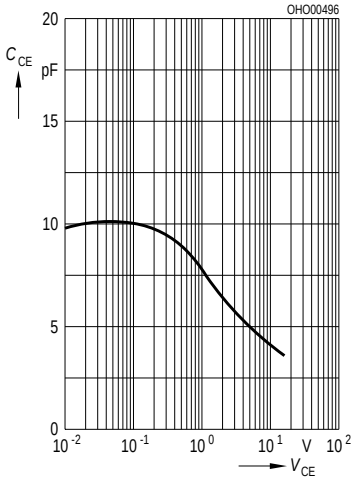
Switching Characteristics $t = f(R_L)$
T_A = 25 °C, I_F = 10 mA



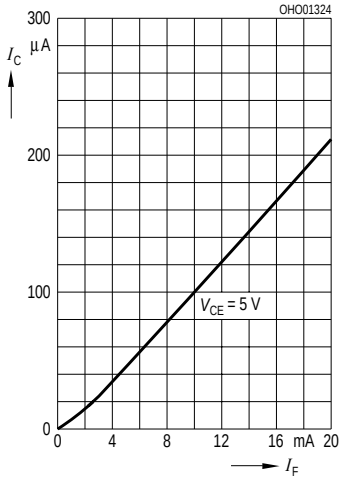
Max. Permissible Forward Current $I_F = f(T_A)$



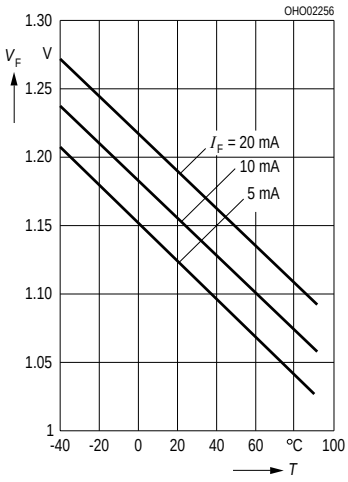
Transistor Capacitance (typ.)
$C_{CE} = f(V_{CE})$, T_A = 25 °C, f = 1 MHz



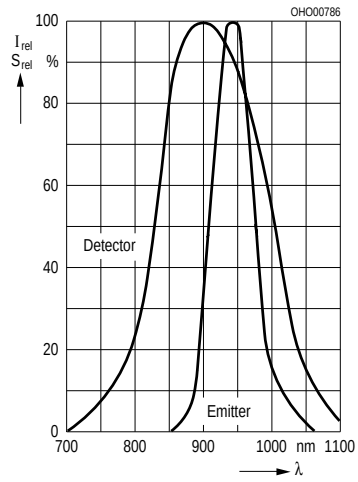
Collector Current $I_C = f(I_F)$, spacing d to reflector = 1 mm, 90% reflection



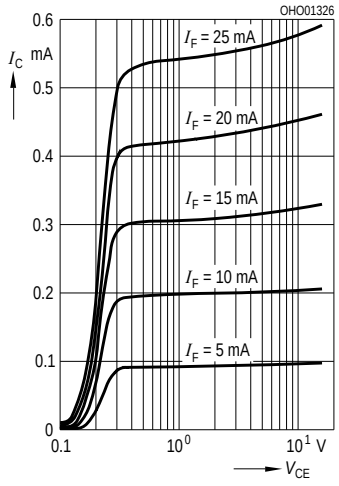
Forward Voltage (typ.) of the Diode $V_F = f(T)$



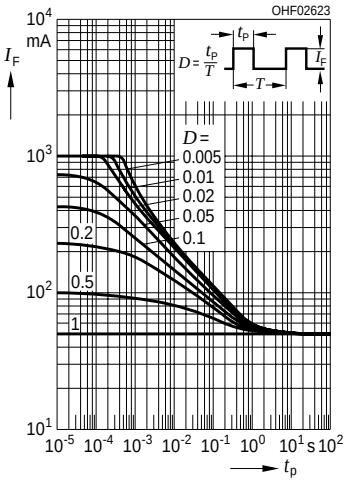
Relative Spectral Emission of Emitter (GaAs) $I_{rel} = f(\lambda)$ **and Detector (Si)** $S_{rel} = f(\lambda)$



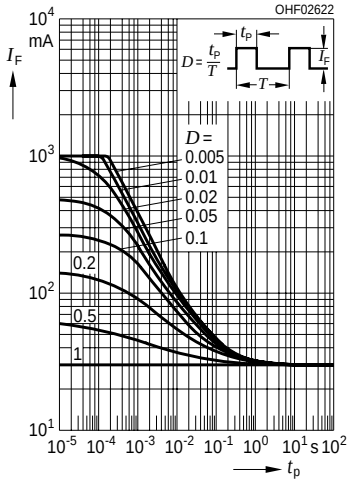
Output Characteristics (typ.)
$I_C = f(V_{CE})$, spacing to reflector:
d = 1 mm, 90% reflection, T_A = 25 °C



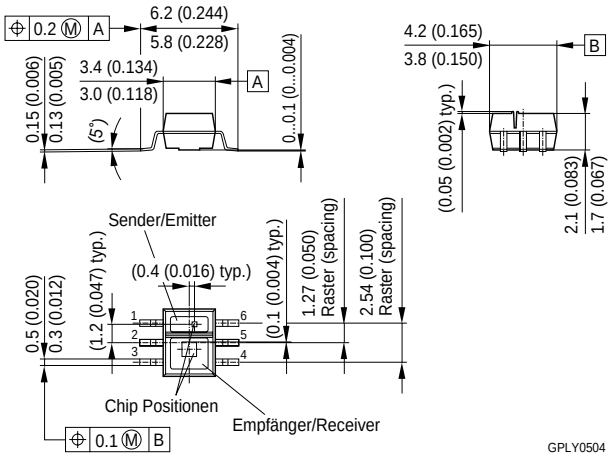
Perm. Pulse Handling Capability
$I_F = f(t_p)$, Duty cycle D = parameter,
T_A = 25 °C



Perm. Pulse Handling Capability
$I_F = f(t_p)$, Duty cycle D = parameter,
T_A = 85 °C



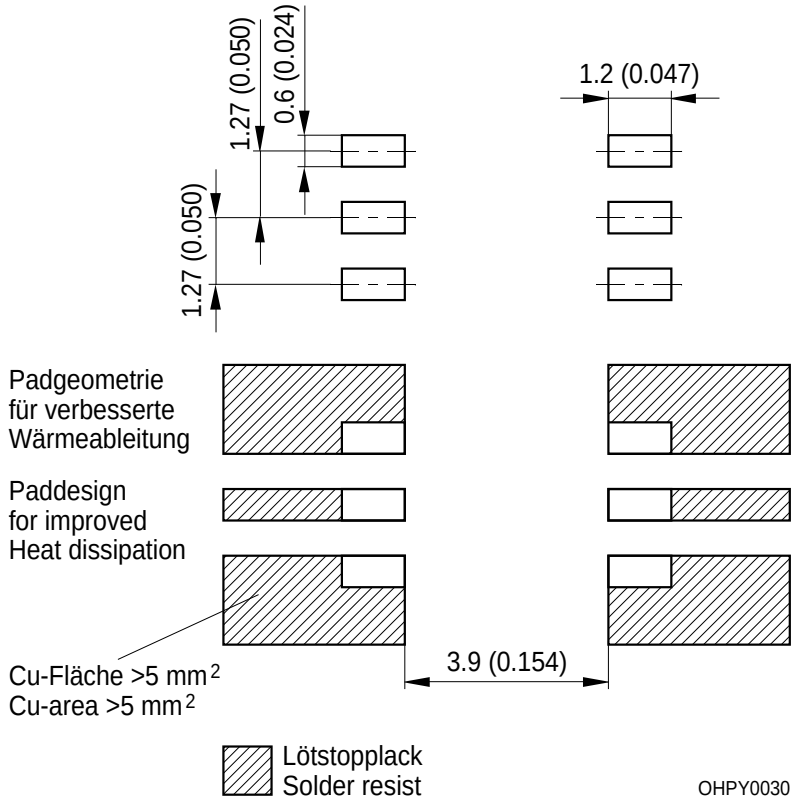
Maßzeichnung
Package Outlines



Type	1	2	3	4	5	6
SFH 9202	Anode	–	Emitter	Collector	–	Cathode

Maße werden wie folgt angegeben: mm (inch) / Dimensions are specified as follows: mm (inch).

Empfohlenes Lötpaddesign IR-Reflow Löten
Recommended Solder Pad IR REflow Soldering



Maße werden wie folgt angegeben: mm (inch) / Dimensions are specified as follows: mm (inch).

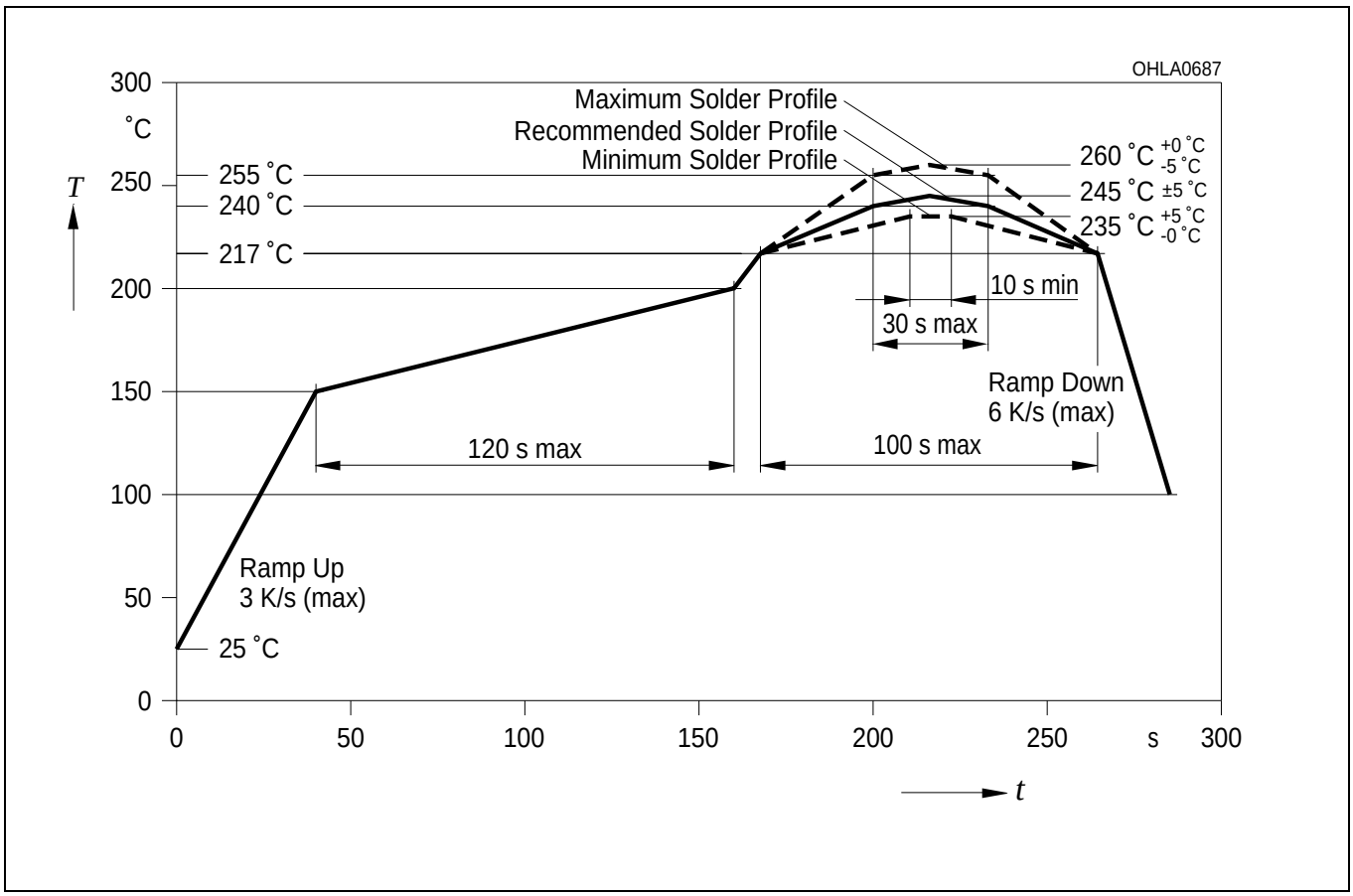
Löthinweise
Soldering Conditions

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 9202	4	n. a.	–	260 °C	20 sec.	n.a.

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

Lötbedingungen
Soldering Conditions
IR-Reflow Lötprofil für bleifreies Löten
IR Reflow Soldering Profile for lead free soldering

Vorbehandlung nach JEDEC Level 4
Preconditioning acc. to JEDEC Level 4
(nach J-STD-020B)
(acc. to J-STD-020B)



Gurtung / Polarität und Lage	siehe Dokument: Short Form Katalog: Gurtung und Verpackung - SMT-Bauelemente - Gehäuse:SMT RLS
Methode of Taping / Polarity and Orientation	see document: Short Form Catalog: Tape and Reel - SMT-Components - Package: SMT-RLS

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Packing

Please use the recycling operators known to you. We can also help you – get in touch with your nearest sales office. By agreement we will take packing material back, if it is sorted. You must bear the costs of transport. For packing material that is returned to us unsorted or which we are not obliged to accept, we shall have to invoice you for any costs incurred.

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