

# Schnelle IR-Lumineszenzdiode (950 nm) im 5 mm Radial-Gehäuse High-Speed Infrared Emitter (950 nm) in 5 mm Radial Package

## SFH 4501, SFH 4502, SFH 4503



SFH 4501



SFH 4502



SFH 4503

### Wesentliche Merkmale

- GaAs-LED mit sehr hohem Wirkungsgrad
- Hohe Zuverlässigkeit
- Gute spektrale Anpassung an Si-Fotoempfänger

### Anwendungen

- IR-Fernsteuerung von Fernseh- und Rundfunkgeräten, Videorecordern, Lichtdimmern
- Gerätefernsteuerungen für Gleich- und Wechsellichtbetrieb
- Sensorik
- Diskrete Lichtschranken

### Features

- Very highly efficient GaAs-LED
- High reliability
- Spectral match with silicon photodetectors

### Applications

- IR remote control of hi-fi and TV-sets, video tape recorders, dimmers
- Remote control for steady and varying intensity
- Sensor technology
- Discrete interrupters

Typ Type	Bestellnummer Ordering Code	Gehäuse Package
SFH 4501	Q62702-P5061	5-mm-LED-Gehäuse (T 1 <sup>3</sup> / <sub>4</sub> ), schwarz eingefärbt, Anschluß im 2.54-mm-Raster (1 <sup>1</sup> / <sub>10</sub> "'), Anodenkennzeichnung: kürzerer Anschluß
SFH 4502	Q62702-P5062	
SFH 4503	Q62702-P5305	5 mm LED package (T 1 <sup>3</sup> / <sub>4</sub> ), black-colored epoxy resin lens, solder tabs lead spacing 2.54 mm (1 <sup>1</sup> / <sub>10</sub> "'), anode marking: short lead

**Grenzwerte** ( $T_A = 25\text{ °C}$ )**Maximum Ratings**

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Betriebs- und Lagertemperatur Operating and storage temperature range	$T_{op}; T_{stg}$	- 40 ... + 100	°C
Sperrspannung Reverse voltage	$V_R$	3	V
Durchlaßstrom Forward current	$I_F$ (DC)	100	mA
Stoßstrom, $t_p = 10\text{ }\mu\text{s}$ , $D = 0$ Surge current	$I_{FSM}$	2.2	A
Verlustleistung Power dissipation	$P_{tot}$	180	mW
Wärmewiderstand Sperrschicht - Umgebung, freie Beinchenlänge max. 10 mm Thermal resistance junction - ambient, lead length between package bottom and PCB max. 10 mm	$R_{thJA}$	375	K/W

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

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Wellenlänge der Strahlung Wavelength at peak emission $I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$	$\lambda_{peak}$	950	nm
Spektrale Bandbreite bei 50% von $I_{max}$ Spectral bandwidth at 50% of $I_{max}$ $I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$	$\Delta\lambda$	40	nm
Abstrahlwinkel Half angle SFH 4501 SFH 4502 SFH 4503	$\varphi$	$\pm 7$ $\pm 18$ $\pm 4$	Grad deg.
Aktive Chipfläche Active chip area	$A$	0.09	mm <sup>2</sup>
Abmessungen der aktiven Chipfläche Dimension of the active chip area	$L \times B$ $L \times W$	$0.3 \times 0.3$	mm

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

<b>Bezeichnung Parameter</b>	<b>Symbol Symbol</b>	<b>Wert Value</b>	<b>Einheit Unit</b>
Schaltzeiten, $I_e$ von 10% auf 90% und von 90% auf 10%, bei $I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$ , $R_L = 50\text{ }\Omega$ Switching times, $I_e$ from 10% to 90% and from 90% to 10%, $I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$ , $R_L = 50\text{ }\Omega$	$t_r$ , $t_f$	10	ns
Kapazität Capacitance $V_R = 0\text{ V}$ , $f = 1\text{ MHz}$	$C_o$	35	pF
Durchlaßspannung, Forward voltage $I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$ $I_F = 1\text{ A}$ , $t_p = 100\text{ }\mu\text{s}$	$V_F$ $V_F$	1.5 ( $\leq 1.8$ ) 3.2 ( $\leq 4.0$ )	V V
Sperrstrom, Reverse current $V_R = 3\text{ V}$	$I_R$	0.01 ( $\leq 10$ )	$\mu\text{A}$
Gesamtstrahlungsfluß, Total radiant flux $I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$	$\Phi_e$	32	mW
Temperaturkoeffizient von $I_e$ bzw. $\Phi_e$ , $I_F = 100\text{ mA}$ Temperature coefficient of $I_e$ or $\Phi_e$ , $I_F = 100\text{ mA}$	$TC_I$	- 0.44	%/K
Temperaturkoeffizient von $V_F$ , $I_F = 100\text{ mA}$ Temperature coefficient of $V_F$ , $I_F = 100\text{ mA}$	$TC_V$	- 1.5	mV/K
Temperaturkoeffizient von $\lambda$ , $I_F = 100\text{ mA}$ Temperature coefficient of $\lambda$ , $I_F = 100\text{ mA}$	$TC_\lambda$	+ 0.2	nm/K

**Strahlstärke  $I_e$  in Achsrichtung**

gemessen bei einem Raumwinkel  $\Omega = 0.01$  sr

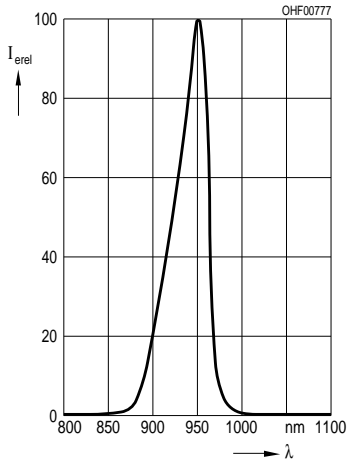
**Radiant Intensity  $I_e$  in Axial Direction**

at a solid angle of  $\Omega = 0.01$  sr

Bezeichnung Description	Symbol	Werte Values			Einheit Unit
		SFH 4501	SFH 4502	SFH 4503	
Strahlstärke Radiant intensity $I_F = 100$ mA, $t_p = 20$ ms	$I_{e \text{ min}}$	63	25	63	mW/sr
	$I_{e \text{ typ}}$	90	50	200	
Strahlstärke Radiant intensity $I_F = 1$ A, $t_p = 100$ $\mu$ s	$I_{e \text{ typ}}$	550	310	1200	mW/sr

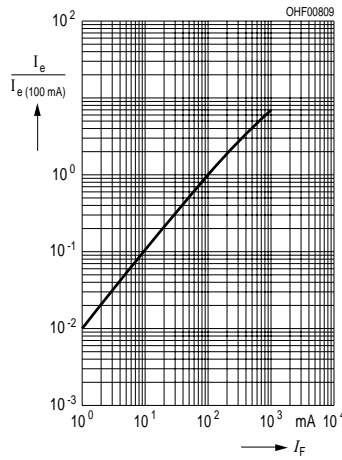
**Relative Spectral Emission**

$I_{rel} = f(\lambda)$



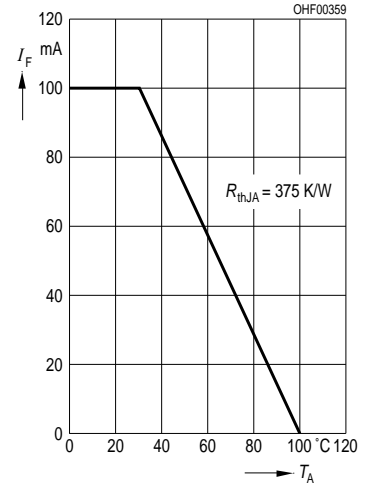
**Radiant Intensity**  $\frac{I_e}{I_e(100 \text{ mA})} = f(I_F)$

Single pulse,  $t_p = 20 \mu\text{s}$



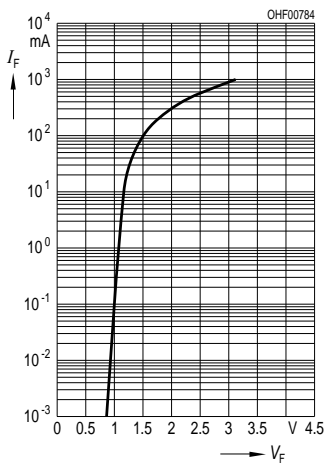
**Max. Permissible Forward Current**

$I_F = f(T_A)$



**Forward Current  $I_F = f(V_F)$**

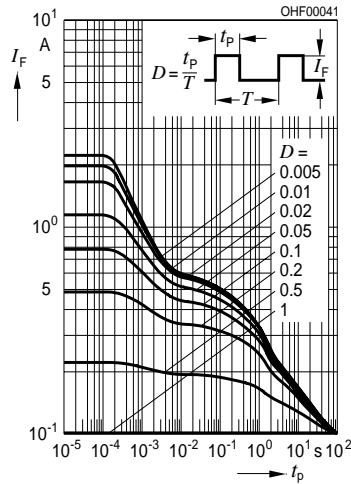
single pulse,  $t_p = 20 \mu\text{s}$



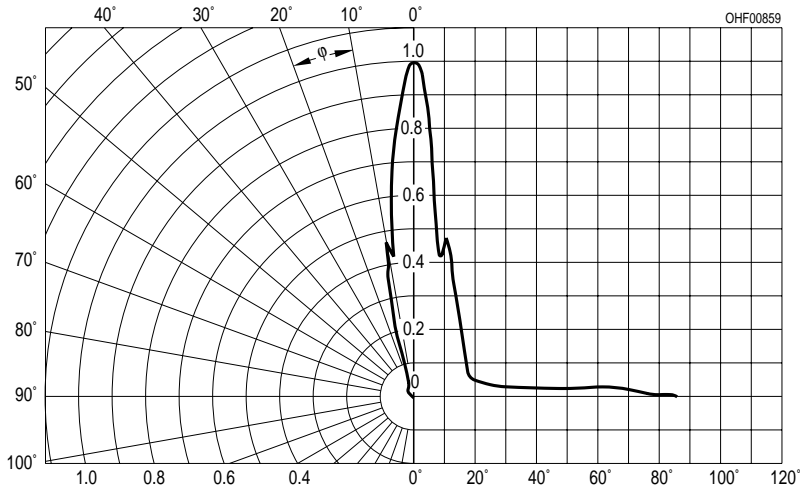
**Permissible Pulse Handling**

**Capability  $I_F = f(\tau)$ ,  $T_A = 25^\circ\text{C}$ ,**

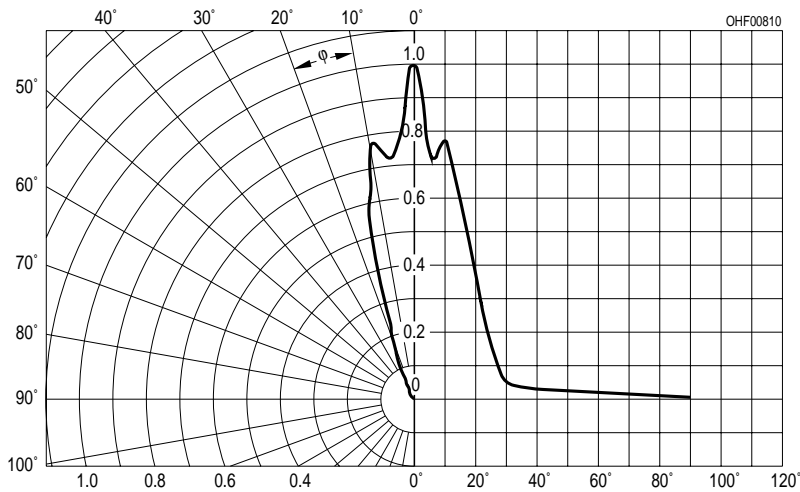
**duty cycle  $D =$  parameter**



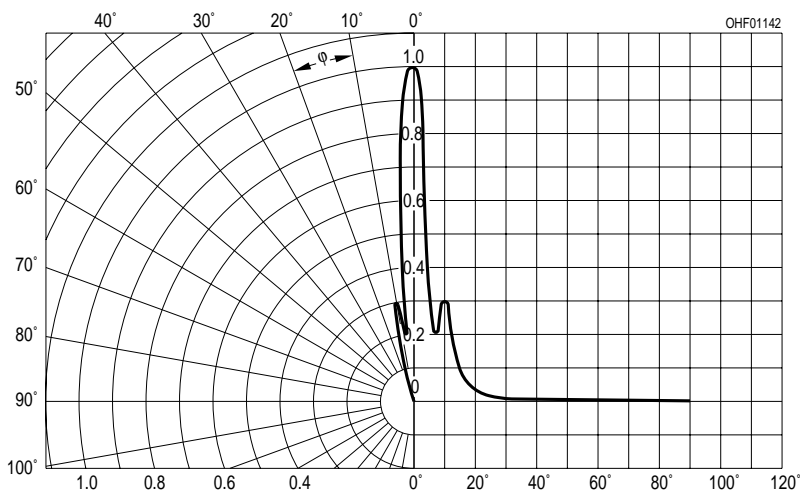
Radiation Characteristics  $I_{rel} = f(\varphi)$   
SFH 4501



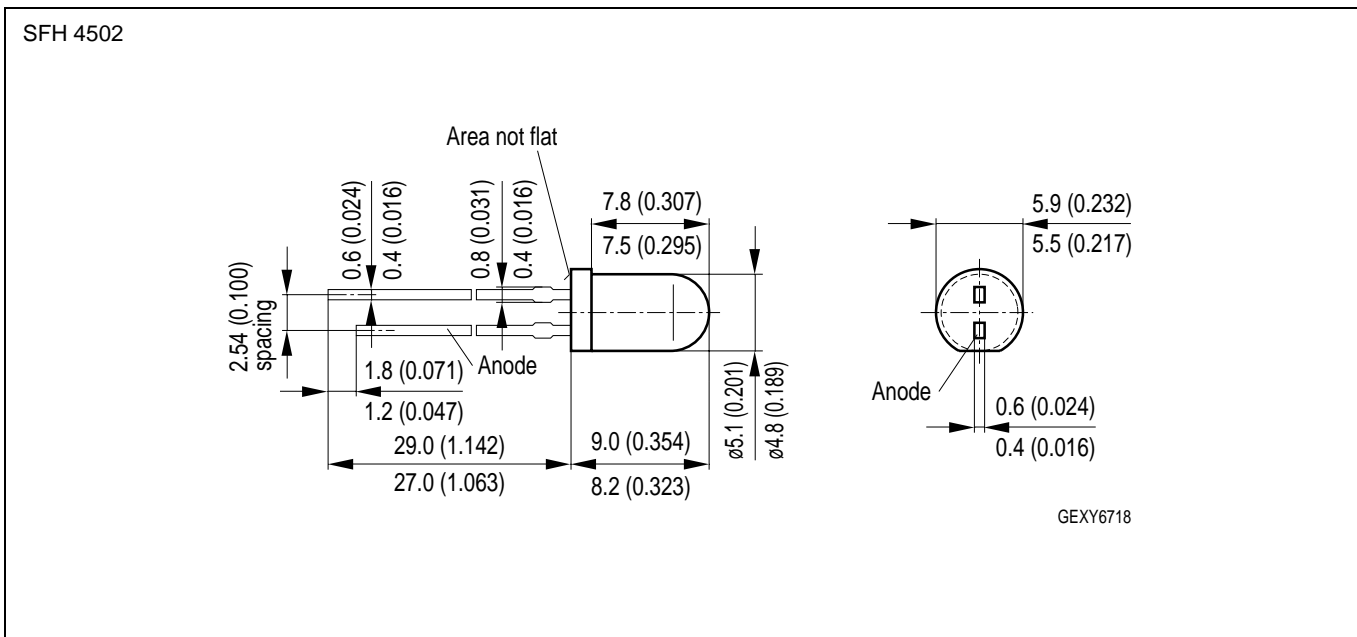
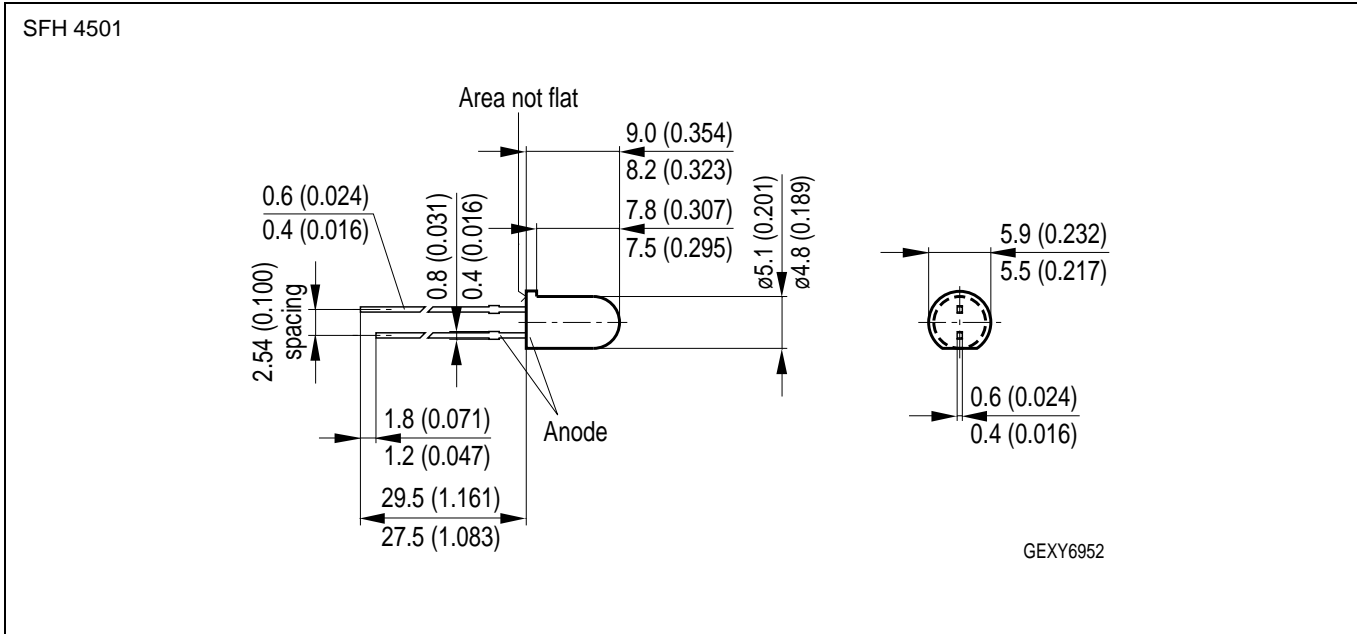
Radiation Characteristics  $I_{rel} = f(\varphi)$   
SFH 4502



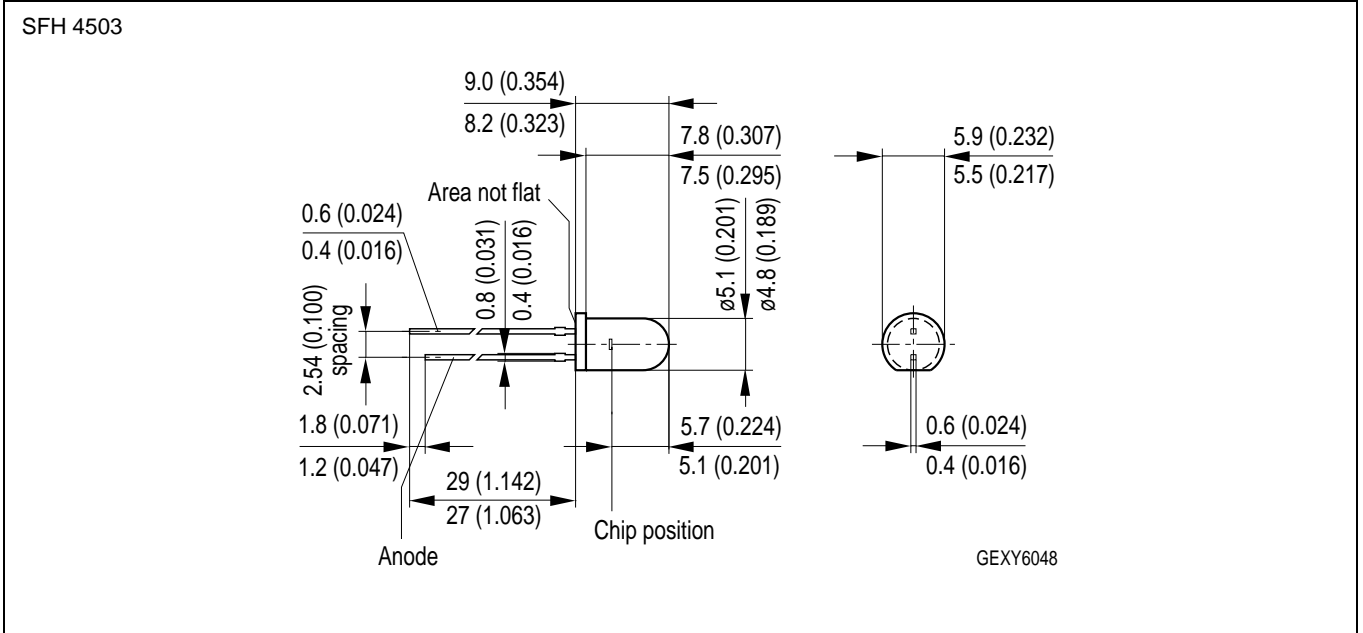
Radiation Characteristics  $I_{rel} = f(\varphi)$   
SFH 4503



Maßzeichnung  
Package Outlines



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



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**Lötbedingungen**  
**Soldering Conditions**

Tauch-, Schwall- und Schlepplötlung Dip, Wave and Drag Soldering			Kolbenlötlung (mit 1,5-mm-Kolbenspitze) Iron Soldering (with 1.5-mm-bit)		
Lötbad- temperatur	Maximal zulässige Lötzeit	Abstand Lötstelle – Gehäuse	Temperatur des Kolbens	Maximale zulässige Lötzeit	Abstand Lötstelle – Gehäuse
Temperature of the Soldering Bath	Max. Perm. Soldering Time	Distance between Solder Joint and Case	Temperature of the Soldering Iron	Max. Permissible Soldering Time	Distance between Solder Joint and Case
260 °C	10 s	≥ 1.5 mm	300 °C	3 s	≥ 1.5 mm

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