

IR-Lumineszenzdiode (850 nm) mit hoher Ausgangsleistung
High Power Infrared Emitter (850 nm)
Lead (Pb) Free Product - RoHS Compliant
SFH 4050

Nicht für Neuentwicklungen /
not for new designs



Vorläufige Daten / Preliminary Data

Wesentliche Merkmale

- Sehr kleines Gehäuse:
(LxBxH) 1.7 mm x 0.8 mm x 0.65 mm
- Emissionswellenlänge typ. 850 nm
- Für IR Reflow Löten geeignet
- Gegurtet lieferbar
- Sehr hohe Gesamtleistung

Anwendungen

- Miniaturlichtschranken
- Industrieelektronik
- „Messen/Steuern/Regeln“
- Sensorik
- Alarm- und Sicherungssysteme
- IR-Freiraumübertragung

Sicherheitshinweise

Je nach Betriebsart emittieren diese Bauteile hochkonzentrierte, nicht sichtbare Infrarot-Strahlung, die gefährlich für das menschliche Auge sein kann. Produkte, die diese Bauteile enthalten, müssen gemäß den Sicherheitsrichtlinien der IEC-Normen 60825-1 und 62471 behandelt werden.

Features

- Very small package:
(LxWxH) 1.7 mm x 0.8 mm x 0.65 mm
- Peak wavelength typ. 850 nm
- Suitable for IR reflow soldering
- Available on tape and reel
- High optical total power

Applications

- Miniature photointerrupters
- Industrial electronics
- For drive and control circuits
- Sensor technology
- Alarm and safety equipment
- IR free air transmission

Safety Advices

Depending on the mode of operation, these devices emit highly concentrated non visible infrared light which can be hazardous to the human eye. Products which incorporate these devices have to follow the safety precautions given in IEC 60825-1 and IEC 62471.

Typ Type	Bestellnummer Ordering Code	Strahlstärkegruppierung ¹⁾ ($I_F = 100 \text{ mA}$, $t_p = 20 \text{ ms}$) Radiant Intensity Grouping ¹⁾ I_e (mW/sr)
SFH 4050	Q65110A2109	≥ 4 (typ. 7)

¹⁾ gemessen bei einem Raumwinkel $\Omega = 0.01 \text{ sr}$ / measured at a solid angle of $\Omega = 0.01 \text{ sr}$



ATTENTION - Observe Precautions For Handling - Electrostatic Sensitive Device

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	5	V
Vorwärtsgleichstrom Forward current	I_F	100	mA
Stoßstrom, $t_p = 10\ \mu\text{s}$, $D = 0$ Surge current	I_{FSM}	1	A
Verlustleistung Power dissipation	P_{tot}	180	mW
Wärmewiderstand Sperrschicht - Umgebung bei Montage auf FR4 Platine, Padgröße je $5\ \text{mm}^2$ Thermal resistance junction - ambient mounted on PC-board (FR4), pads size $5\ \text{mm}^2$ each	R_{thJA}	450	K/W
Wärmewiderstand Sperrschicht - Lötstelle bei Montage auf Metall-Block Thermal resistance junction - soldering point, mounted on metal block	R_{thJS}	250	K/W

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

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Wellenlänge der Strahlung Wavelength at peak emission $I_F = 100\ \text{mA}$	λ_{peak}	850	nm
Spektrale Bandbreite bei 50% von I_{max} Spectral bandwidth at 50% of I_{max} $I_F = 100\ \text{mA}$	$\Delta\lambda$	35	nm
Abstrahlwinkel Half angle	φ	± 80	Grad deg.
Aktive Chipfläche Active chip area	A	0.09	mm^2
Abmessungen der aktiven Chipfläche Dimension of the active chip area	$L \times B$ $L \times W$	0.3×0.3	mm^2

Kennwerte ($T_A = 25\text{ °C}$)

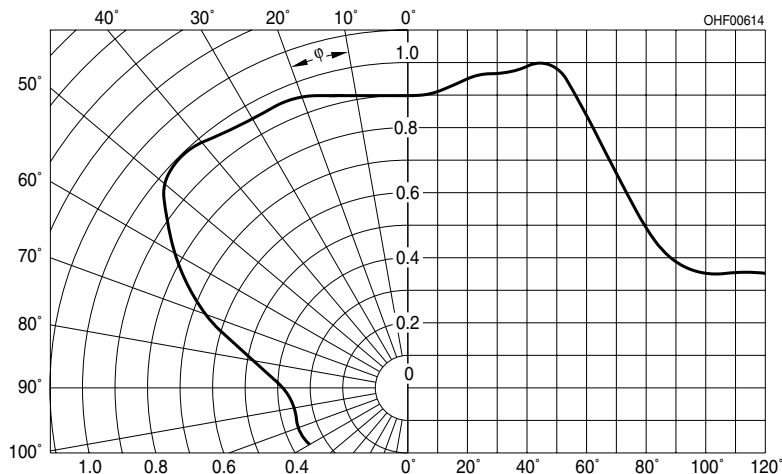
Characteristics (cont'd)

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Schaltzeiten, I_e von 10% auf 90% und von 90% auf 10%, bei $I_F = 100\text{ mA}$, $R_L = 50\ \Omega$ Switching times, I_e from 10% to 90% and from 90% to 10%, $I_F = 100\text{ mA}$, $R_L = 50\ \Omega$	t_r, t_f	12	ns
Kapazität, Capacitance $V_R = 0\text{ V}$, $f = 1\text{ MHz}$	C_o	15	pF
Durchlassspannung Forward voltage $I_F = 100\text{ mA}$, $t_p = 20\text{ ms}$ $I_F = 1\text{ A}$, $t_p = 100\ \mu\text{s}$	V_F V_F	1.5 (< 1.8) 2.4 (< 3.0)	V V
Sperrstrom Reverse current $V_R = 5\text{ V}$	I_R	not designed for reverse operation	μA
Gesamtstrahlungsfluss Total radiant flux $I_F = 100\text{ mA}$, $t_p = 20\text{ ms}$	$\Phi_{e\text{ typ}}$	50	mW
Temperaturkoeffizient von I_e bzw. Φ_e , $I_F = 100\text{ mA}$ Temperature coefficient of I_e or Φ_e , $I_F = 100\text{ mA}$	TC_I	- 0.5	%/K
Temperaturkoeffizient von V_F , $I_F = 100\text{ mA}$ Temperature coefficient of V_F , $I_F = 100\text{ mA}$	TC_V	- 0.7	mV/K
Temperaturkoeffizient von λ , $I_F = 100\text{ mA}$ Temperature coefficient of λ , $I_F = 100\text{ mA}$	TC_λ	+ 0.2	nm/K

Strahlstärke I_e in Achsrichtung¹⁾gemessen bei einem Raumwinkel $\Omega = 0.01$ sr**Radiant Intensity I_e in Axial Direction**at a solid angle of $\Omega = 0.01$ sr

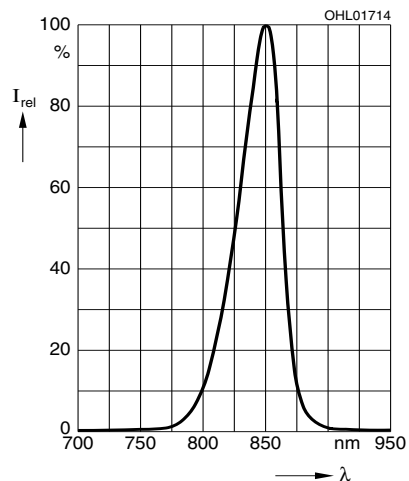
Bezeichnung Parameter	Symbol	Werte Values		Einheit Unit
		SFH 4050-P	SFH 4050-Q	
Strahlstärke Radiant intensity $I_F = 100$ mA, $t_p = 20$ ms	$I_{e \text{ min}}$ $I_{e \text{ max}}$	4 8	6.3 12.5	mW/sr mW/sr
Strahlstärke Radiant intensity $I_F = 1$ A, $t_p = 100$ μ s	$I_{e \text{ typ}}$	50	70	mW/sr

¹⁾ Nur eine Gruppe in einer Verpackungseinheit (Streuung kleiner 2:1) /
Only one group in one packing unit (variation lower 2:1)

Abstrahlcharakteristik**Radiation Characteristics $I_{\text{rel}} = f(\varphi)$** 

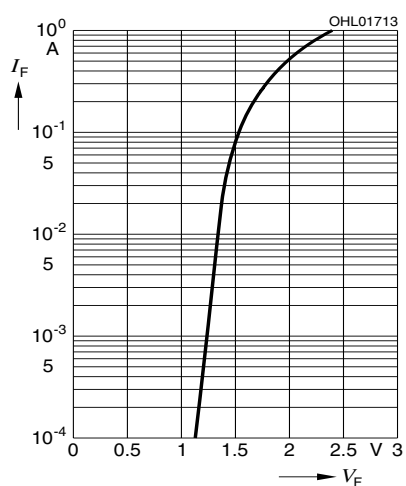
Relative Spectral Emission

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



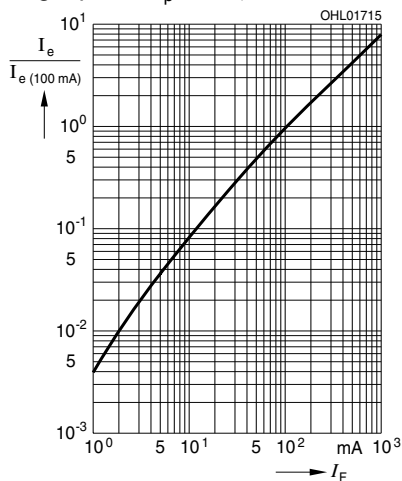
Forward Current $I_F = f(V_F)$

Single pulse, $t_p = 20 \mu s$



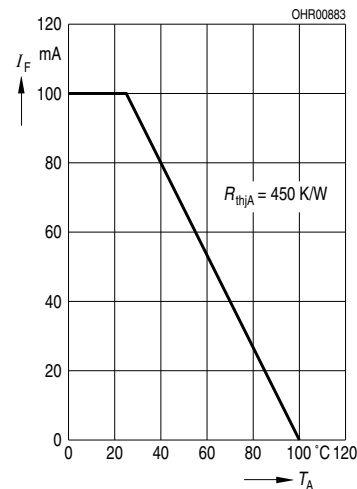
Radiant Intensity $\frac{I_e}{I_e 100 \text{ mA}} = f(I_F)$

Single pulse, $t_p = 20 \mu s$



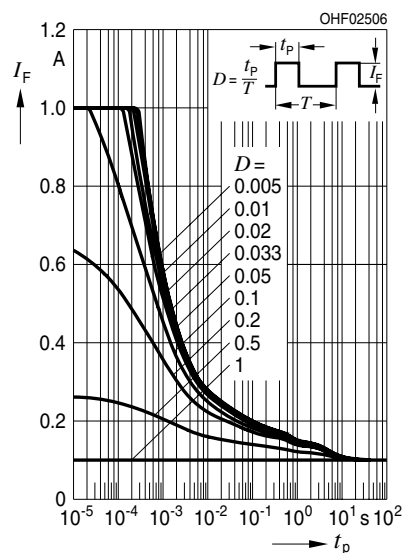
Max. Permissible Forward Current

$I_F = f(T_A), R_{thJA} = 450 \text{ K/W}$

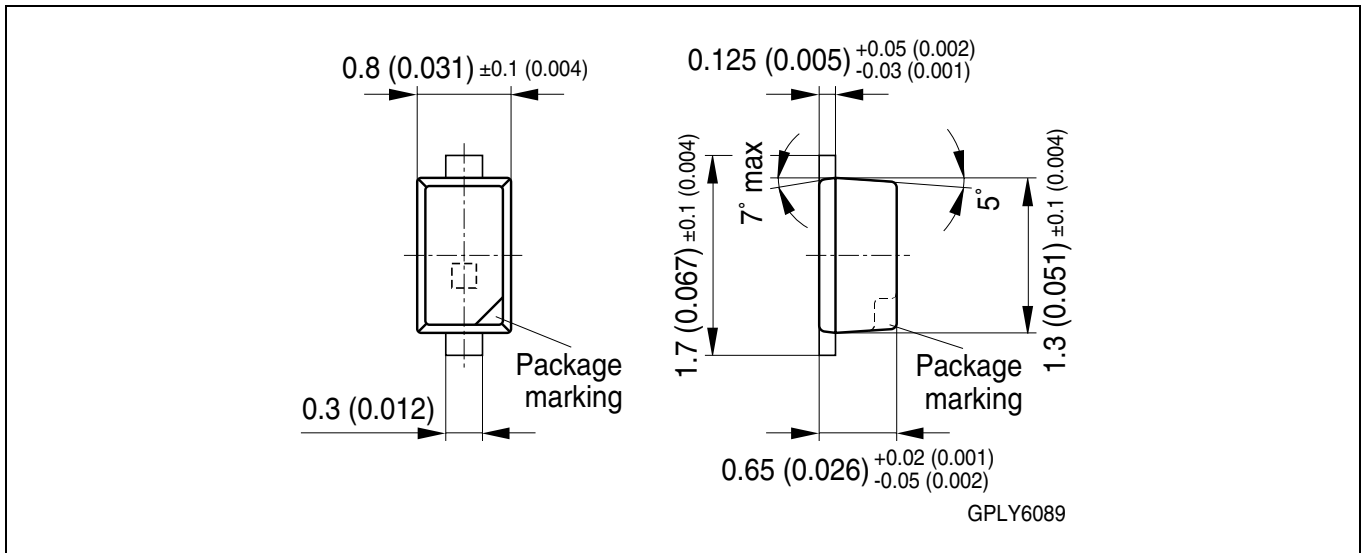


Permissible Pulse Handling Capability $I_F = f(\tau), T_A = 25^\circ C$

duty cycle $D =$ parameter



**Maßzeichnung
Package Outlines**

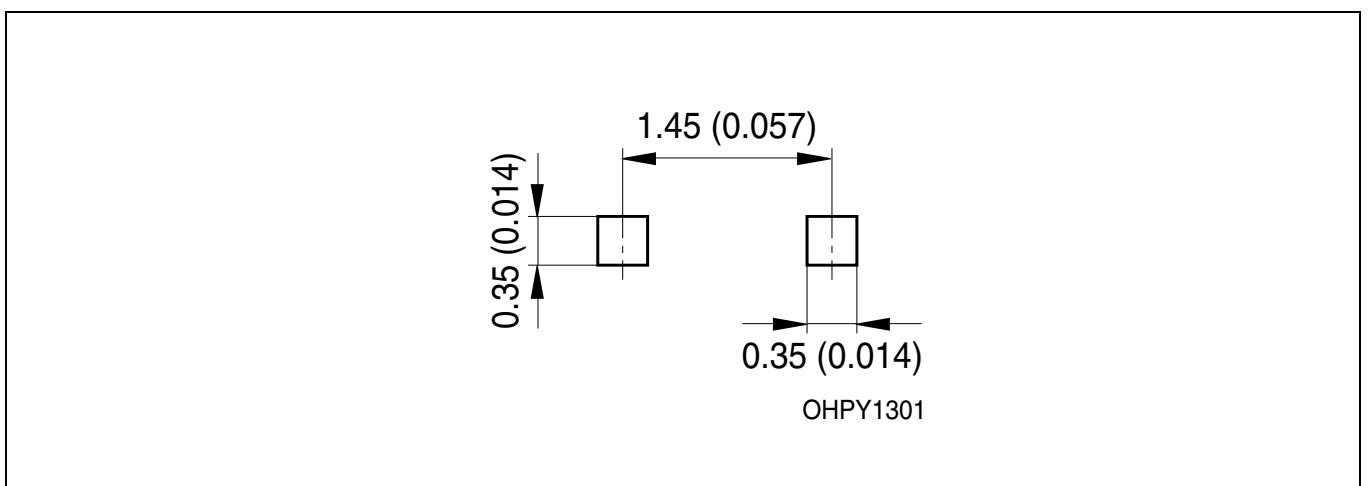


Maße in mm (inch) / Dimensions in mm (inch).

Gehäuse / Package	Epoxyharz, diffus / Epoxy, diffuse
Farbe / Colour	Farblos / colourless
Gehäusemarkierung/ Package marking	Anode

**Empfohlenes Lötpad Design
Recommended Solder Pad Design**

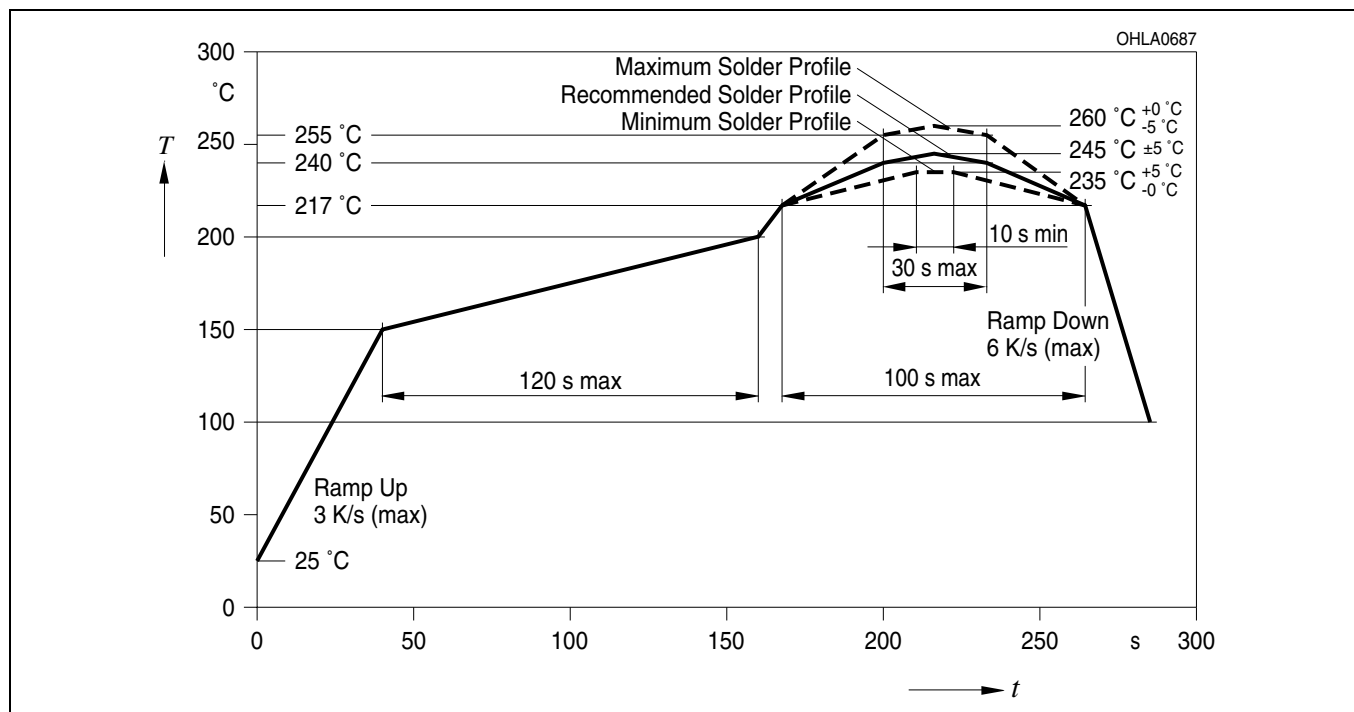
Reflow Löten
Reflow Soldering



Maße in mm (inch) / Dimensions in mm (inch).

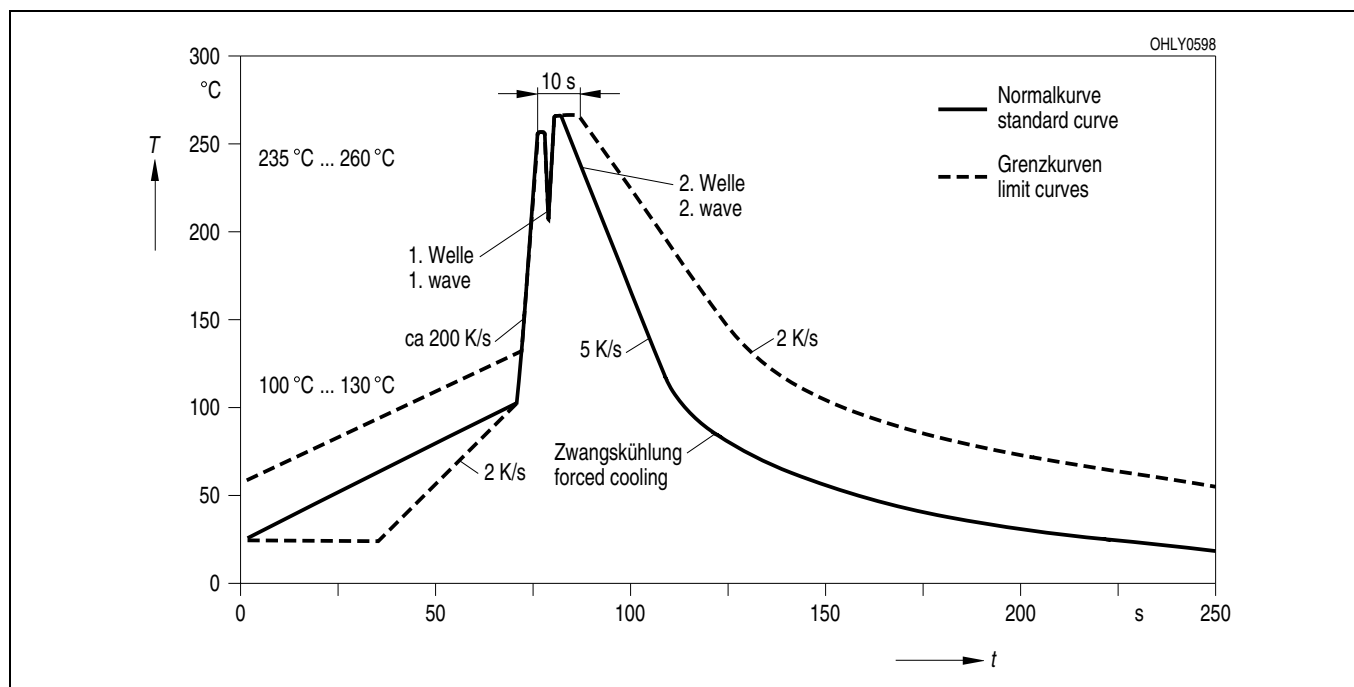
Lötbedingungen
Soldering Conditions
Reflow Lötprofil für bleifreies Löt
Reflow Soldering Profile for lead free soldering

Vorbehandlung nach JEDEC Level 2
 Preconditioning acc. to JEDEC Level 2
 (nach J-STD-020C)
 (acc. to J-STD-020C)



Wellenlöt (TTW)
TTW Soldering

(nach CECC 00802)
 (acc. to CECC 00802)



Published by
OSRAM Opto Semiconductors GmbH
Wernerwerkstrasse 2, D-93049 Regensburg
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