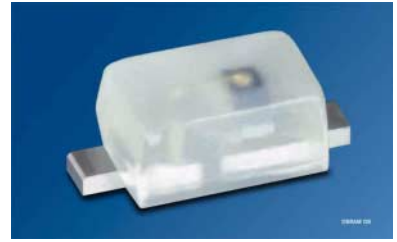


VCSEL-Laser

SFH 4020



Vorläufige Daten / Preliminary Data

Wesentliche Merkmale

- Sehr kleines Gehäuse:
(LxBxH) 1,7 mm x 0,8 mm x 0,65 mm
- Typische Peakwellenlänge 850nm
- Oberflächenstrahler mit kleinem Leuchtpunkt
(Durchmesser 15 µm)
- Enge Strahlverteilung
- IR Reflow Löten geeignet
- Gegurtet lieferbar

Features

- Very small package:
(LxWxH) 1.7 mm x 0.8 mm x 0.65 mm
- Typical Wavelength 850nm
- Top surface emitter with small emission area
(diameter 15 µm)
- Narrow beam characteristics
- Suitable for IR reflow soldering
- Available on tape and reel

Anwendungen

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

Applications

- Miniature photointerrupters
- Industrial electronics
- For drive and control circuits
- Sensor technology

Beim Betrieb dieses Bauteils sind die Sicherheitsvorschriften für die Laserklasse 1M nach IEC 60825-1 Am. 2 zu beachten.

Operating this device the safety instructions for laser class 1M according to IEC 60825-1 Am. 2 have to be observed.

Typ Type	Bestellnummer Ordering Code	Strahlstärkegruppierung ¹⁾ ($I_F = 8 \text{ mA}$, $t_p = 20 \text{ ms}$) Radiant intensity grouping ¹⁾ $I_e \text{ (mW/sr)}$
SFH 4020	on request	typ. 8

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

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 ... + 85	°C
Sperrspannung Reverse voltage	V_R	3	V
Durchlaßstrom Forward current	I_F	10	mA
Verlustleistung Power dissipation	P_{tot}	25	mW
Wärmewiderstand Sperrschicht - Umgebung bei Montage auf FR4 Platine, Padgröße je 16 mm ² Thermal resistance junction - ambient mounted on PC-board (FR4), padsize 16 mm ² each	R_{thJA}	1500	K/W

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

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Wellenlänge der Strahlung Wavelength at peak emission $I_F = 8\text{ mA}$, $t_p = 20\text{ ms}$	λ_{peak}	850	nm
Spektrale Bandbreite bei 50% von I_{max} Spectral bandwidth at 50% of I_{max} $I_F = 8\text{ mA}$	$\Delta\lambda$	1	nm
Abstrahlwinkel ¹⁾ Half angle ¹⁾ $I_F = I_{\text{th}} + 4\text{ mA}$	φ	± 15	Grad deg.
Aktive Chipfläche Active chip area	A	175	μm^2
Durchmesser der aktiven Chipfläche Diameter of the active chip area	D	15	μm
Kapazität, Capacitance $V_R = 0\text{ V}$, $f = 1\text{ MHz}$	C_0	15	pF
Durchlaßspannung, Forward voltage $I_F = 8\text{ mA}$, $t_p = 20\text{ ms}$	V_F	1.8 (≤ 2.5)	V
Sperrstrom, Reverse current $V_R = 3\text{ V}$	I_R	0.01 (≤ 1)	μA
Gesamtstrahlungsfluß, Total radiant flux $I_F = 8\text{ mA}$, $t_p = 20\text{ ms}$	Φ_e	1.5	mW
Schwellstrom ²⁾ Threshold current ²⁾	I_F	2.5 (< 5)	mA

¹⁾ Half angle increases with rising forward current.

²⁾ Device is not operating at forward currents below the threshold current.

Strahlstärke I_e in Achsrichtunggemessen 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
Typische Strahlstärke ¹⁾ Typical radiant intensity $I_F = 8$ mA, $t_p = 20$ ms	$I_{e \text{ typ}}$	8	mW/sr

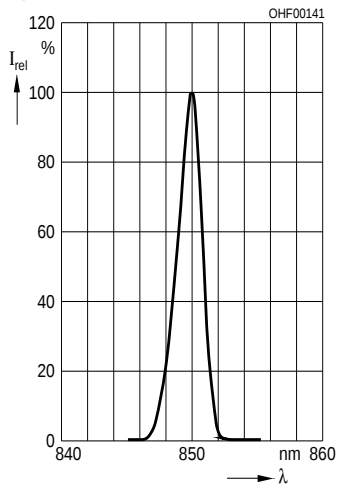
¹⁾ Radiant intensity varies nonlinear over current and temperature.

Note: It is recommended to use the device at the specified current of about 8mA, as other operating currents lead to a large radiant intensity variation.

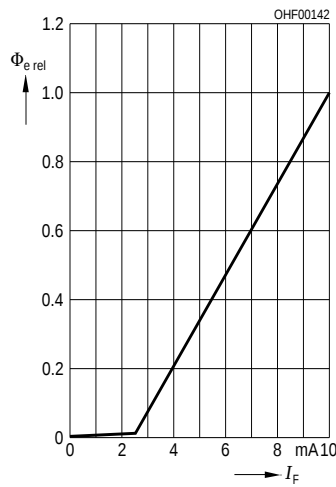
Changes in temperatures and operating current are having a bigger influence on the radiation characteristic as it is the case for standard emitters. It is recommended to use this emitter in applications that use all emitted light under an angle bigger or equal $\pm 10^\circ$. Having an application using light from a smaller angle may suffer from high variance in radiant intensity and radiation characteristics from one device to another as well as over temperature and forward current.

Relative Spectral Emission

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

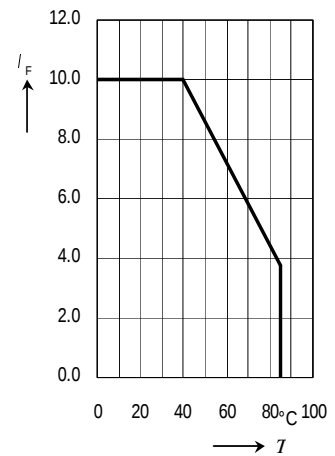


Optical Power $\frac{\Phi_e}{\Phi_e 10 \text{ mA}} = f(I_F)$



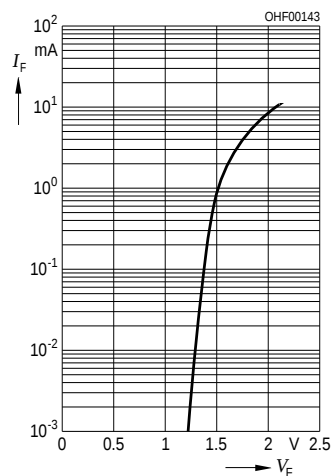
Max. Permissible Forward Current

$$I_F = f(T_A)$$

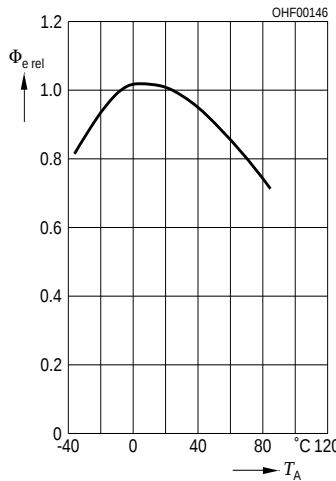


Forward Current

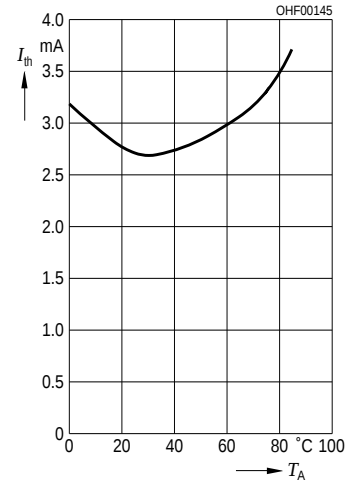
$$I_F = f(V_F)$$



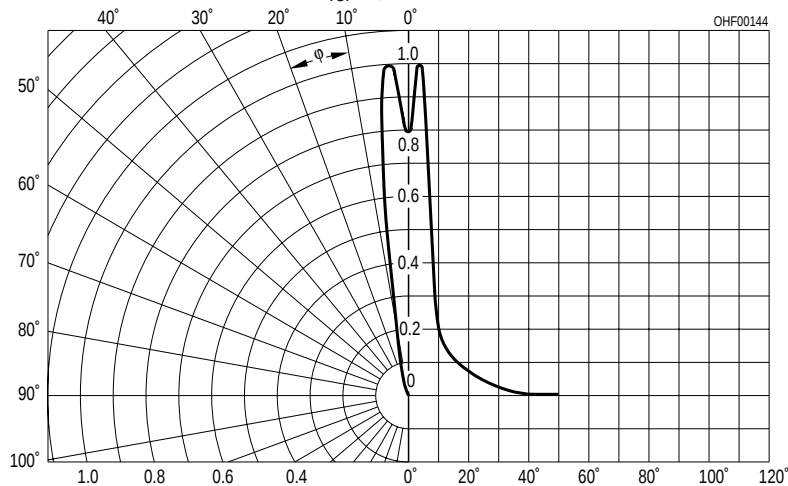
Optical power $\Phi_{\text{rel}} = f(T_A), I_F = 8 \text{ mA}$



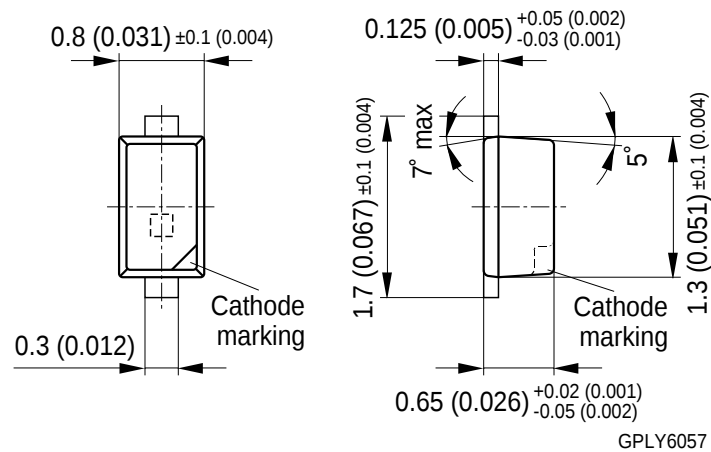
Threshold Current $I_{\text{th}} = f(T_A)$



Radiation characteristics $I_{\text{rel}} = f(\varphi)$



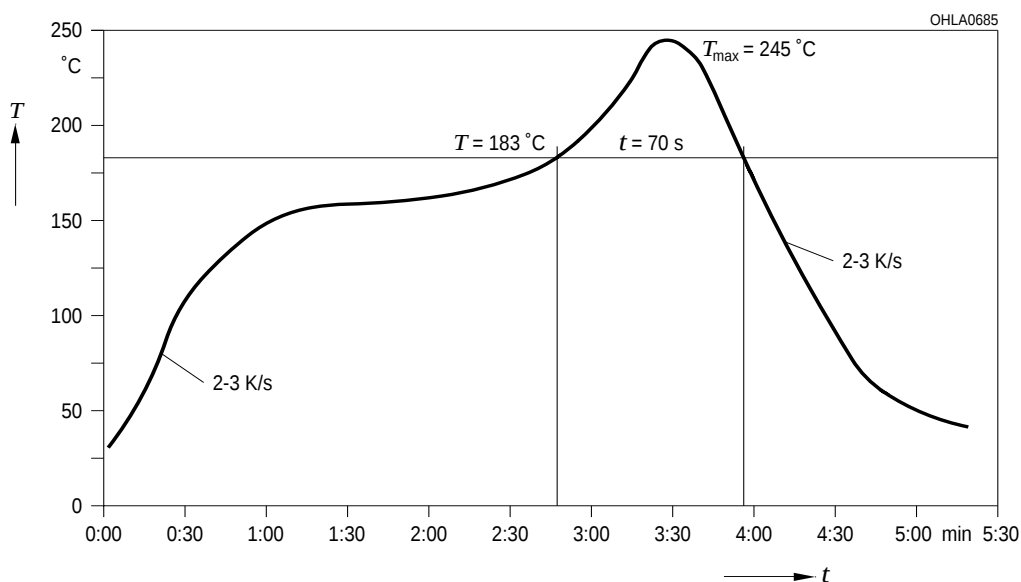
Maßzeichnung Package Outlines



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

IR-Reflow Lötprofil (nach IPC 9501)

IR Reflow Soldering profile (acc. to IPC 9501)



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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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