

**Photodetektor mit Spannungsausgang**  
**Light to Voltage Converter**  
**Lead (Pb) Free Product - RoHS Compliant**

**SFH 5130**



**Wesentliche Merkmale**

- Integrierter Fotodetektor mit linearem Spannungsausgang
- Transparentes Plastikgehäuse mit 3 Pins
- Hohe Empfindlichkeit von 350 nm bis 1100 nm
- Runde Fotodiode

**Anwendungen**

- Lichtschranken

**Features**

- Integrated photodiode with linear voltage output
- Transparent sidelooker package with 3 pins
- High sensitivity from 350 nm to 1100 nm
- Circular photodiode

**Applications**

- Photointerrupter

<b>Typ</b> <b>Type</b>	<b>Bestellnummer</b> <b>Ordering Code</b>	<b>Gehäuse</b> <b>Package</b>
SFH 5130	on request	Sidelooker Gehäuse Sidelooker Package

**Grenzwerte**  
**Maximum Ratings**

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Lagertemperatur Storage temperature range	$T_{stg}$	- 40 ... + 85	°C
Versorgungsspannung Supply Voltage	$V_{DD}$	6	V
Ausgangsspannung Output voltage	$V_{OUT}$	< $V_{DD}$	V
Elektrostatische Entladung Electrostatic Discharge Human Body Model according to EOS/ESD-5.1-1993	<i>ESD</i>	2	kV

**Empfohlener Arbeitsbereich**  
**Recommended Operating Conditions**

Bezeichnung Parameter	Symbol Symbol	Wert Value			Einheit Unit
		min.	typ.	max.	
Funktionstemperatur Operating Temperature	$T_{op}$	- 40	+ 25	+ 75	°C
Betriebsspannung Supply Voltage	$V_{DD}$	4.5	5	5.5	V
Kapazitive Ausgangslast Output load capacitance	$C_L$			30	nF

**Kennwerte** ( $T_A = 25\text{ °C}$ ,  $V_{DD} = 5\text{ V}$ ,  $R_L = 10\text{ k}\Omega$ )

**Characteristics**

Bezeichnung Parameter	Symbol Symbol	Wert Value			Einheit Unit
		min.	typ.	max.	
Stromaufnahme, $E_e = 0$ Current consumption	$I_{DD}$	-	1.5	4.5	mA
Dunkelspannung Dark Voltage	$V_D$	-	1.2	15	mV
Spektraler Bereich der Fotoempfindlichkeit Spectral range of sensitivity	$\lambda$	350	-	1100	nm

**Kennwerte** ( $T_A = 25\text{ °C}$ ,  $V_{DD} = 5\text{ V}$ ,  $R_L = 10\text{ k}\Omega$ )

**Characteristics**

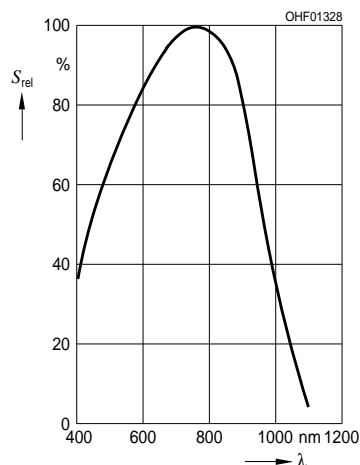
Bezeichnung Parameter	Symbol Symbol	Wert Value			Einheit Unit
		min.	typ.	max.	
Wellenlänge der max. Fotoempfindlichkeit Wavelength of max. photosensitivity	$\lambda_{s\text{ max}}$	–	770	–	nm
Durchmesser der aktiven Fläche Diameter of active area	$D$	–	0.75	–	mm
Empfindlichkeit <sup>1)</sup> , $\lambda = 428\text{ nm}$ Irradiance responsivity	$N_e$	–	1180	–	mV/ $\mu\text{W}/\text{cm}^2$
Ausgangsspannung <sup>1)</sup> Output Voltage, $E_e = 1.69\text{ }\mu\text{W}/\text{cm}^2$ , $\lambda = 428\text{ nm}$	$V_O$	1.0	–	3.2	V
Sättigungsspannung, $V_{DD} = 4.5\text{ V}$ , $E_e \geq 7\text{ }\mu\text{W}/\text{cm}^2$ Maximum output voltage swing	$V_{\text{sat}}$	4	4.47	–	V
Anstiegszeit <sup>2)</sup> , $E_e = 0$ to $E_e = 1.69\text{ }\mu\text{W}/\text{cm}^2$ Rise time	$t_r$	–	50	250	$\mu\text{s}$
Abfallzeit, $E_e = 1.69$ to $0\text{ }\mu\text{W}/\text{cm}^2$ Fall time	$t_f$	–	70	250	$\mu\text{s}$
Einschwingzeit, to 99% of nominal Settling time	$t_s$	–	90	–	$\mu\text{s}$
Temperaturkoeffizient der Dunkelspannung, $T = 5$ to $45\text{ °C}$ Temperature coefficient of dark voltage	$\alpha_{\text{vd}}$	– 100	$\pm 8$	+ 100	$\mu\text{V}/\text{K}$
Temperaturkoeffizient der Ausgangsspannung Temperature coefficient of output voltage $E_e = 1.69\text{ }\mu\text{W}/\text{cm}^2$ , $\lambda = 428\text{ nm}$ , $T = 5$ to $45\text{ °C}$	$\alpha_{\text{vo}}$	– 3	$\pm 1$	+ 3	mV/K
Power supply rejection ratio <sup>3)</sup> $f_{\text{ac}} = 100\text{ Hz}$ $f_{\text{ac}} = 1\text{ kHz}$	PSRR PSRR	–	45	–	dB dB
Output noise voltage $f = 0$ to $1\text{ kHz}$ $f = 10\text{ Hz}$ $f = 100\text{ Hz}$ $f = 1\text{ kHz}$		–	< 1	–	$\mu\text{V RMS}$ $\mu\text{V}/\text{Hz}^{(1/2)}$ $\mu\text{V}/\text{Hz}^{(1/2)}$ $\mu\text{V}/\text{Hz}^{(1/2)}$

<sup>1)</sup> The sensitivity is characterized using 428 nm LEDs as light source. A constant irradiance over the whole lens area is created.

- 2) The light source used is a 428 nm LED with following characteristics:  $t_r > 1 \mu\text{s}$ ,  $t_f < 1 \mu\text{s}$ . The output waveform is monitored on an oscilloscope with  $t_r > 100 \text{ ns}$ ,  $Z_i = 1 \text{ M}\Omega$ ,  $C_i < 20 \text{ pF}$ . The rise time is defined as the time from the 10% to the 90% value, the fall time is defined as the time from the 90% to the 10% value.
- 3) PSRR is defined as  $20 \log (V_{\text{DD}}(f) / V_{\text{O}}(f))$  with  $V_{\text{DD}}(0 \text{ Hz}) = 4.5 \text{ V}$  and  $V_{\text{O}}(0 \text{ Hz}) = 2 \text{ V}$

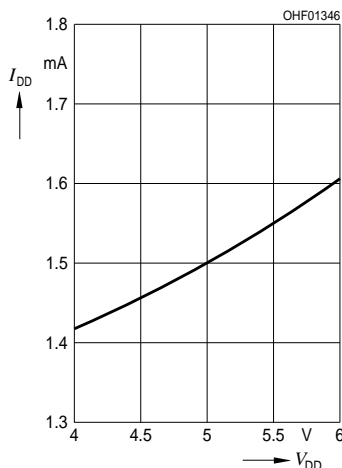
**Spectral Sensitivity**

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



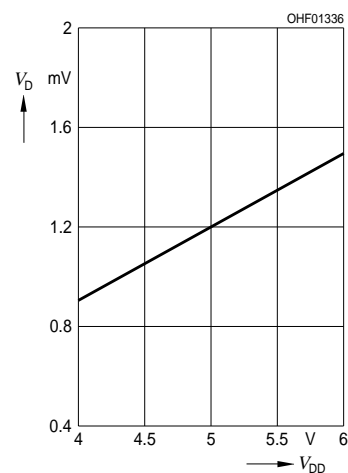
**Current Consumption**

$I_{DD} = f(V_{DD})$

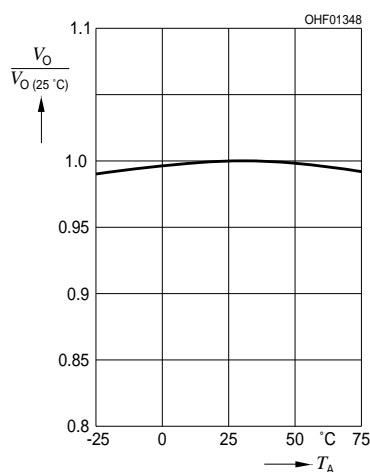


**Dark Voltage**

$V_D = f(V_{DD})$

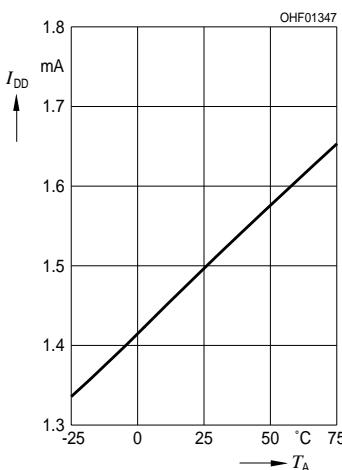


**Output Voltage,  $V_O = f(T_A)$ ,  
 $E_e = 1.69 \mu\text{W}/\text{cm}^2, \lambda = 428\text{nm}$**



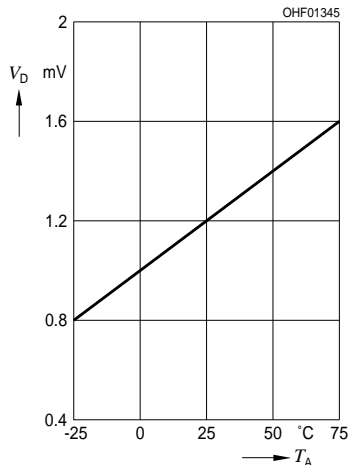
**Current Consumption**

$I_{DD} = f(T_A)$



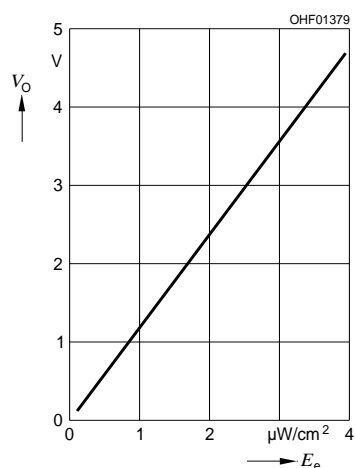
**Dark Voltage**

$V_D = f(T_A)$



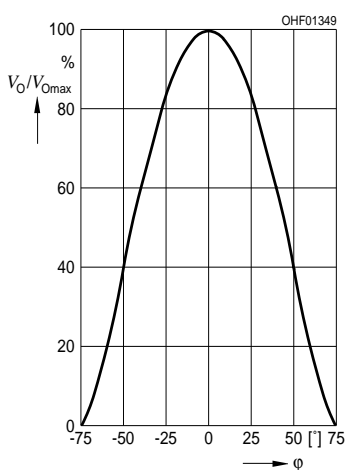
**Linearity**

$V_O = f(E_e)$

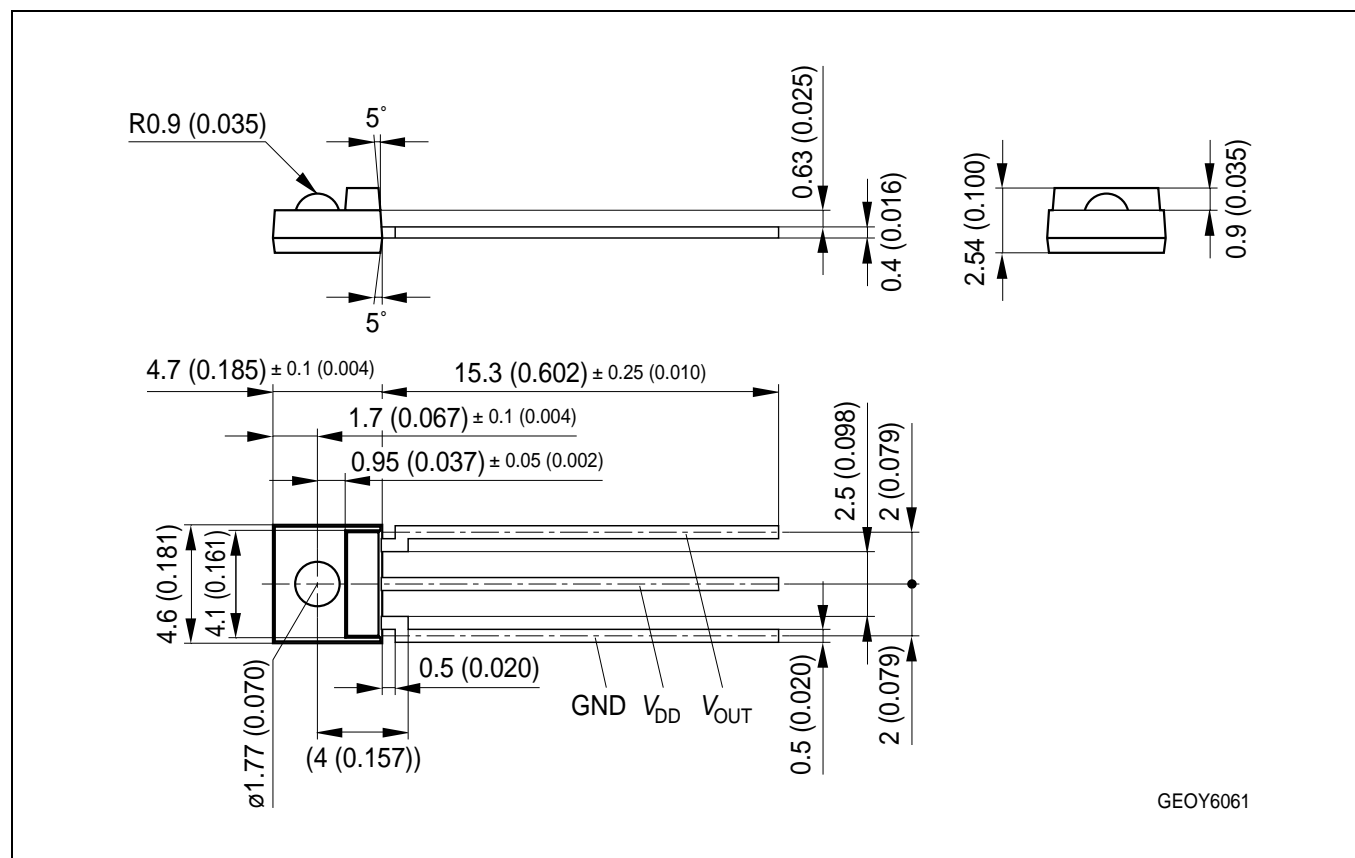


**Directional Characteristics**

$V_O = f(\phi)$



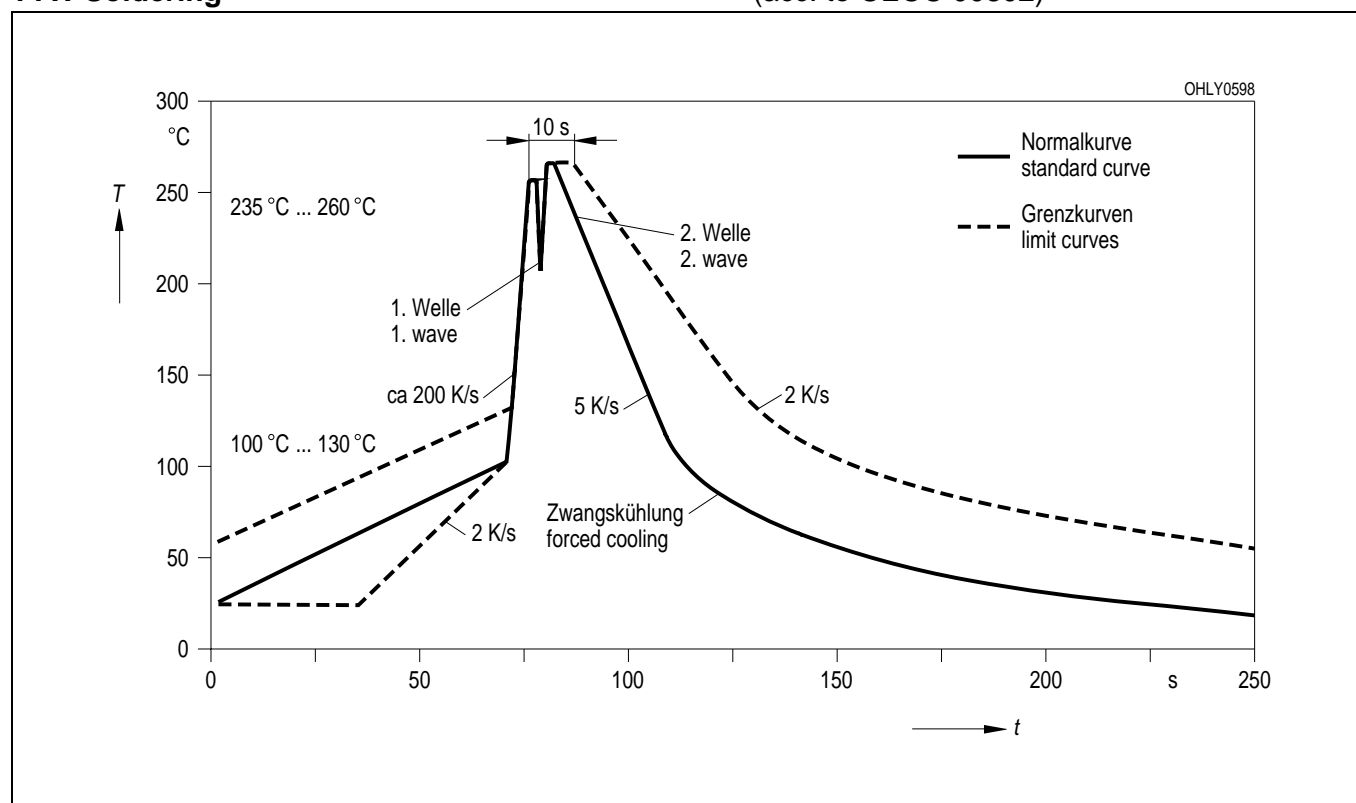
## Maßzeichnung Package Outlines



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

**Lötbedingungen**  
**Soldering Conditions**  
**Wellenlöten (TTW)**  
**TTW Soldering**

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



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