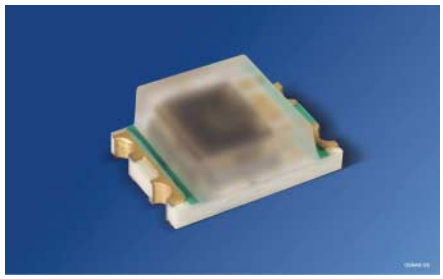
Hochgenauer Umgebungslichtsensor
High Accuracy Ambient Light Sensor
Lead (Pb) Free Product - RoHS Compliant

SFH 5711



Wesentliche Merkmale

- Optohybrid mit logarithmischem Stromausgang
- Perfekt an die Augenempfindlichkeit (Vλ) angepasst
- Niedriger Temperaturkoeffizient der Fotoempfindlichkeit
- Hohe Genauigkeit über weiten Beleuchtungsstärkebereich
- Automotive Freigabe

Features

- Opto hybrid with logarithmic current output
- Perfect match to Human Eye Sensitivity (Vλ)
- Low temperature coefficient of spectral sensitivity
- High accuracy over wide illumination range
- Automotive qualified

Anwendungen

- Anwendungen im Automobilbereich
- Sonnenlichtsensor / Fahrlichtkontrolle
- Steuerung von Displayhinterleuchtungen
- Mobile Geräte

Applications

- Automotive applications
- Sunlight sensor / head lamp control
- Control of display backlighting
- Mobile devices

Typ **Type**	**Bestellnummer** **Ordering Code**	**Ausgangsstrom**, E_v= 1000lx, (white LED LW 541C) **Output current**, I_{OUT} / µA
SFH 5711-2/3[1)]	Q65110A4513	27 - 32
SFH 5711-1/2[1)]	on request	25 - 30
SFH 5711-3/4[1)]	on request	29 - 34

[1)] Nur eine Gruppe innerhalb einer Verpackungseinheit, siehe Kenndaten.
Only one bin within one packing unit, see characteristics

Grenzwerte
Maximum Ratings

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Betriebs- und Lagertemperatur Operating ans storage temperature range	T_{stg}	– 40 … + 100[1)]	° 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	ESD	2	kV

1) JEDEC level 4

Empfohlener Arbeitsbereich
Recommended Operating Conditions

Bezeichnung Parameter	Symbol Symbol	Wert Value			Einheit Unit
		min.	typ.	max.	
Betriebsspannung Supply Voltage	V_{DD}	2.3		5.5	V
Beleuchtungsstärke Illuminance T_A = – 30 °C ... + 70 °C T_A = – 40 °C ... + 100 °C	E_V		 3 ... 80k 10...80k		lx
Kapazitive Ausgangslast Output load capacitance	C_L		1		nF

Kennwerte (T_A = 25 °C)
Characteristics

Bezeichnung Parameter	Symbol Symbol	Wert Value			Einheit Unit
		min.	typ.	max.	
Stromaufnahme, E_V = 0 Current consumption V_{DD} = 2.5 V V_{DD} = 5.0 V	I_{DD}		 410 420	 500	µA
Stromaufnahme, E_V = 1000lx Current consumption, E_V = 1000lx V_{DD} = 2.5 V V_{DD} = 5.0 V	I_{DD}		 460 470	 550	µA
Spektraler Bereich der Fotoempfindlichkeit Spectral range of sensitivity	$\lambda_{10\%}$		475 ... 650		nm
Wellenlänge der max. Fotoempfindlichkeit Wavelength of max. photosensitivity	$\lambda_{s\ max}$		550		nm
Abmessung der bestrahlungsempfindlichen Fläche Dimensions of radiant sensitive area	$L \times B$ $L \times W$		0.4 x 0.4		mm x mm
Ausgangskapazität Output capacitance	C_{OUT}		3		pF
Transferfunktion Transfer function	G		10		µA / dek µA / dec
Abweichung der Ausgangskennlinie von der Logarithmierfunktion Deviation of Outputcharacteristic from logarithmic function	L	- 3		+ 3	%
Maximale Ausgangsspannung Maximum output voltage	V_{OUT}			V_{DD} - 0.5	V
Einschaltzeit, E_V = 1000 lx Power on time, E_V = 1000 lx V_{DD} = 0V -> V_{DD}	t_{ON}		 0.1	 1.2	ms
Antwortzeit, R_L = 25 kOhm Response Time, s. Fig. 2 E_V = 100 -> 1000 lx E_V = 1000 -> 100 lx	t_r / t_f		 0.03 0.1		ms

Kennwerte (T_A = 25 °C)
Characteristics

Bezeichnung Parameter	Symbol Symbol	Wert Value			Einheit Unit
		min.	typ.	max.	
Ausgangsgenauigkeit über Temperaturbereich[1)] Output Accuracy Over Temperature Range[1)] E_V = 1000 lx T_A = – 30 °C ... + 70 °C T_A = 0 °C ... + 50 °C	ΔI_{OUT}		 ±0.6 ±0.2		µA
Ausgangsdunkelstrom, E_V = 0 Output dark current	I_{out}		0.1	100	nA

[1)] Diese Werte entsprechen einer Photodiode mit einem TC von ungefähr 0.3 %/K.
These values correspond to a photodiode with a TC of approximately 0.3 %/K.

Guppierung (T_A = 25 °C)
Binning

Bezeichnung Parameter	Symbol Symbol	Wert Value				Einheit Unit
		-1	-2	-3	-4	
Ausgangsstrom[1)] Output current E_V = 1000lx (white LED LW 541C)	I_{out}	25 ... 28	27 ... 30	29 ... 32	31 ... 34	µA

[1)] 3µA Gruppenbreite entspricht ein Verhältnis von 1:2 in der Bestrahlungsstärke.
3µA bin width is equivalent to a spread of 1:2 of the irradiance.

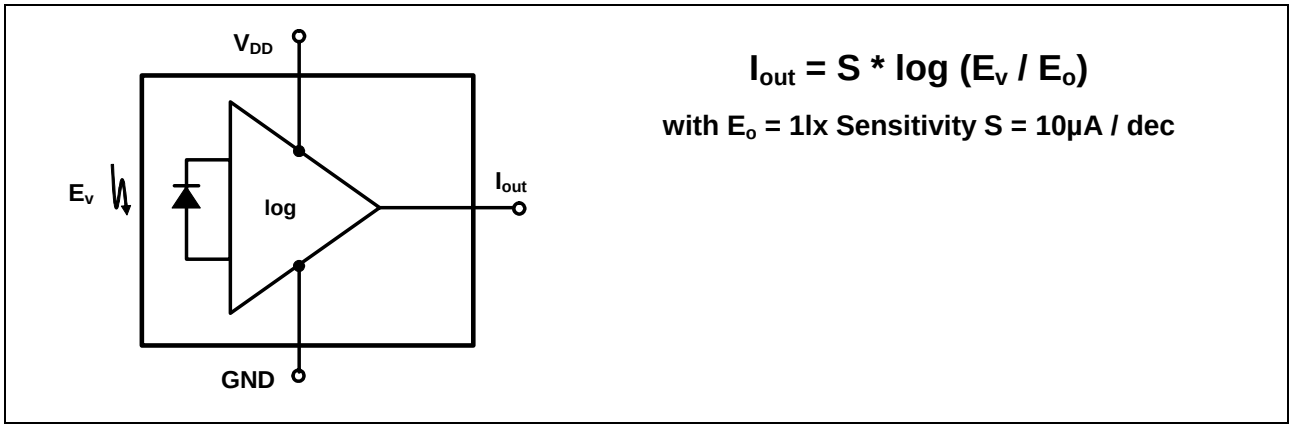


Figure 1 **Ersatzschaltbild**
Circuitry

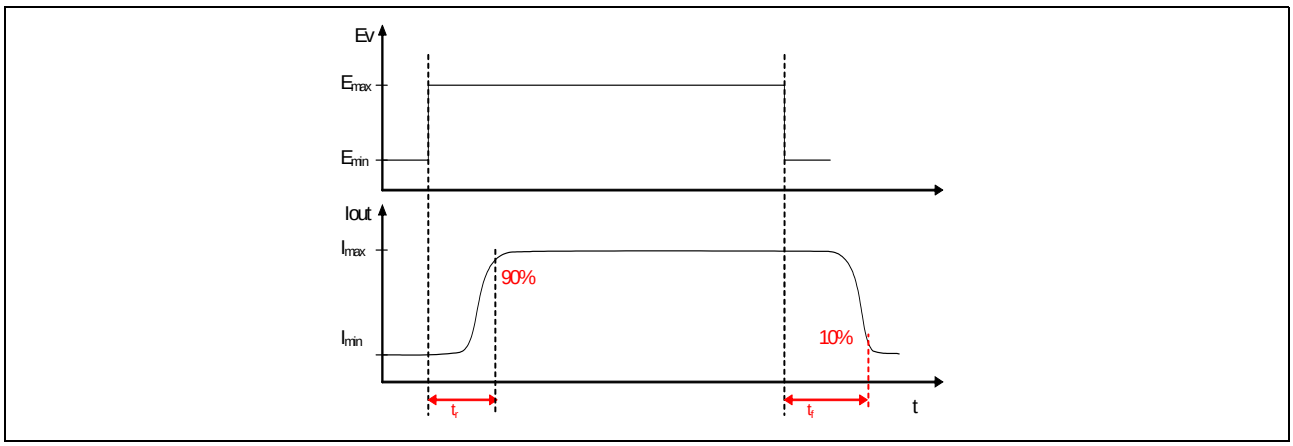
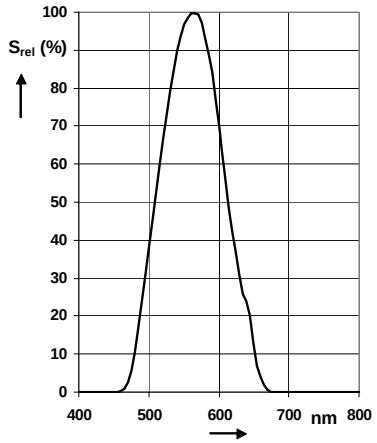
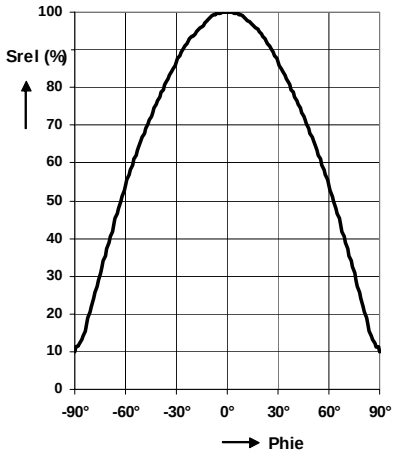


Figure 2 **Definition der Antwortzeit**
Definition of Response Time

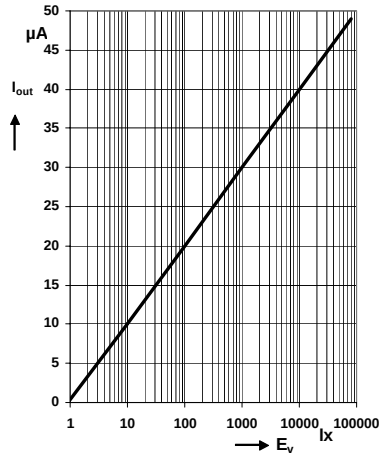
Relative Spectral Sensitivity
$S_{rel} = f(\lambda)$



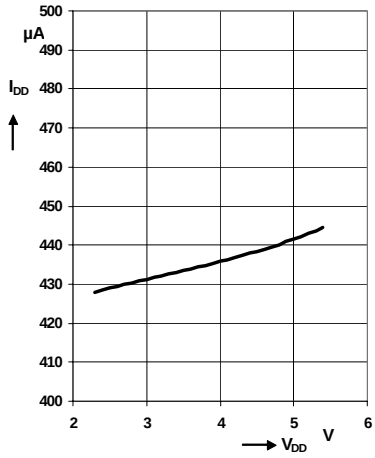
Directional Characteristics of photodiode
$S_{rel} = f(\phi)$



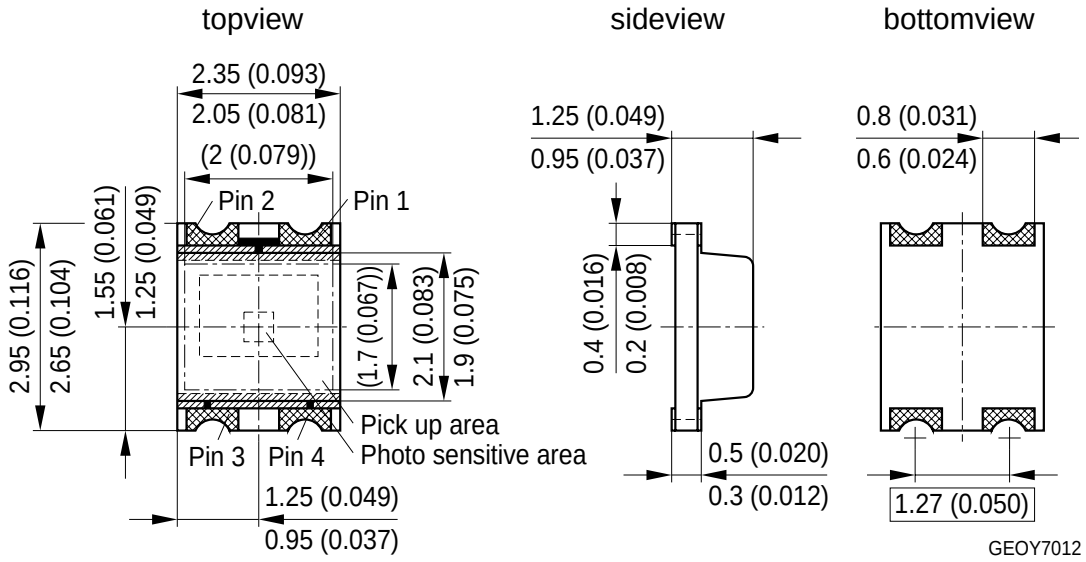
Output Current
$I_{OUT} = f(E_V)$



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



Maßzeichnung
Package Outlines



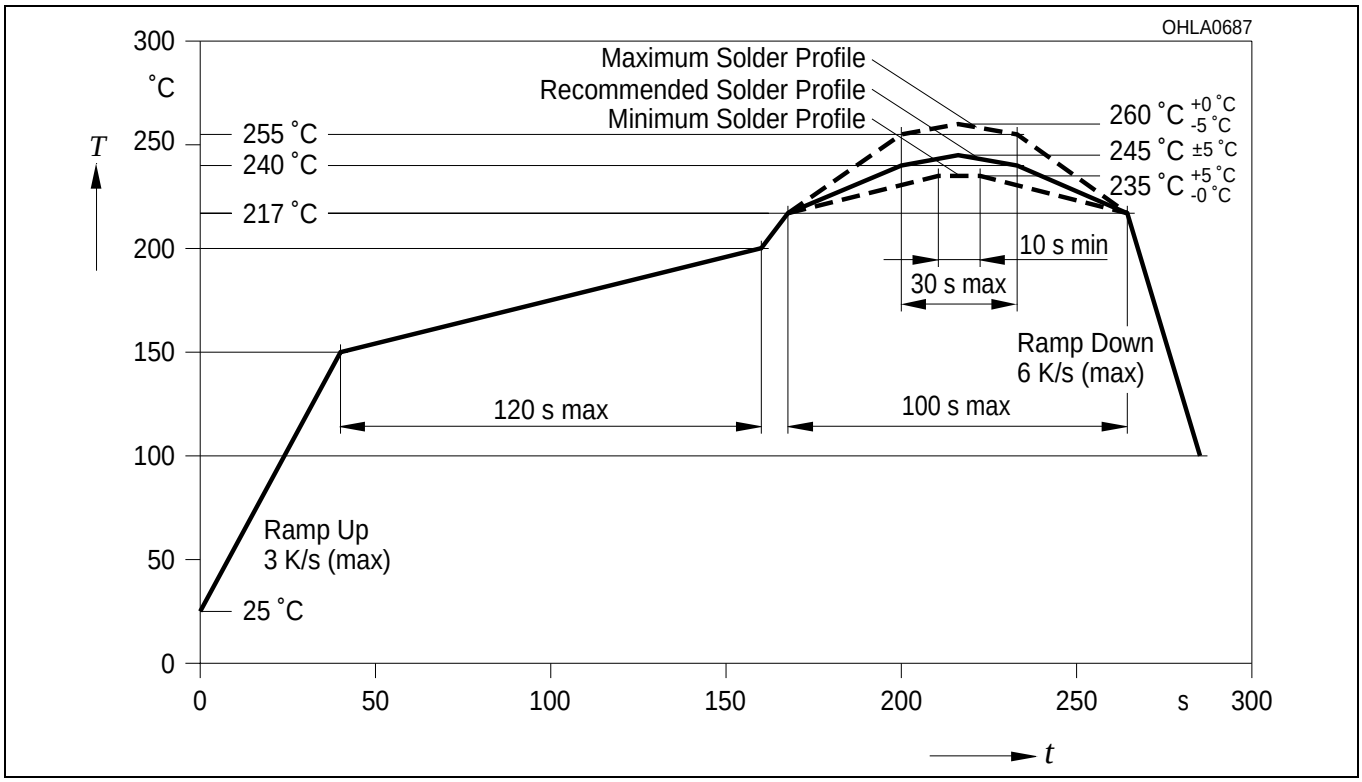
Maße werden wie folgt angegeben: mm (inch) / Dimensions are specified as follows: mm (inch).

Anschlußbelegung
Pin configuration

Pin #	Description
1	V_{SS}
2	V_{SS}
3	V_{DD}
4	I_{OUT}

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

Vorbehandlung nach JEDEC Level 3
Preconditioning acc. to JEDEC Level 3
(nach J-STD-020B)
(acc. to J-STD-020B)



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[1] A critical component is a component usedin a life-support device or system whose failure can reasonably be expected to cause the failure of that life-support device or system, or to affect its safety or effectiveness of that device or system.

[2] Life support devices or systems are intended (a) to be implanted in the human body, or (b) to support and/or maintain and sustain human life. If they fail, it is reasonable to assume that the health of the user may be endangered.