Slotted Interrupter
Version 1.3

SFH 9540



Features:

- Suitable for surface mounting (SMT)
- Compact housing out of black LCP
- GaAs infrared emitter (950 nm)
- Silicon phototransistor with daylight-cutoff filter
- With positioning pin
- Suitable for pick and place
- High sensing accuracy (slit width: 0.5 mm)
- Wide gap between emitter and detector (5 mm)
- High stability on pcb due to large width of device (6.8 mm)

Applications

- Speed control
- Motor control
- Monitoring of paper feed in printers, copiers, facsimiles
- Control of print head in printers
- Coin detection
- Optoelectronic switches

Ordering Information

Type:	**Collector-emitter current** I_{PCE} [µA] **I_F = 20 mA, V_{CE} = 5 V**	**Ordering Code**
SFH 9540	≥ 1000	Q65111A6122

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Maximum Ratings (T_A = 25 °C)

Parameter	Symbol	Values	Unit
Emitter			
Reverse voltage	V_R	5	V
Forward current	I_F	60	mA
Power consumption	P_{tot}	100	mW
Thermal resistance junction - ambient [1] *page 10*	R_{thJA}	350	K / W
Detector			
Collector-emitter voltage	V_{CE}	30	V
Collector-emitter voltage (t ≤ 2 min)	V_{CE}	70	V
Emitter-collector voltage	V_{EC}	7	V
Collector current	I_C	50	mA
Total Power dissipation	P_{tot}	150	mW
Thermal resistance junction - ambient [1] *page 10*	R_{thJA}	350	K / W
Slotted Interrupter			
Operation temperature range	T_{op}	-40 ... 85	°C
Storage temperature range	T_{stg}	-40 ... 85	°C
Electrostatic discharge	V_{ESD}	2	kV
Thermal resistance junction - ambient	R_{thJA}	350	K / W

Characteristics (T_A = 25 °C)

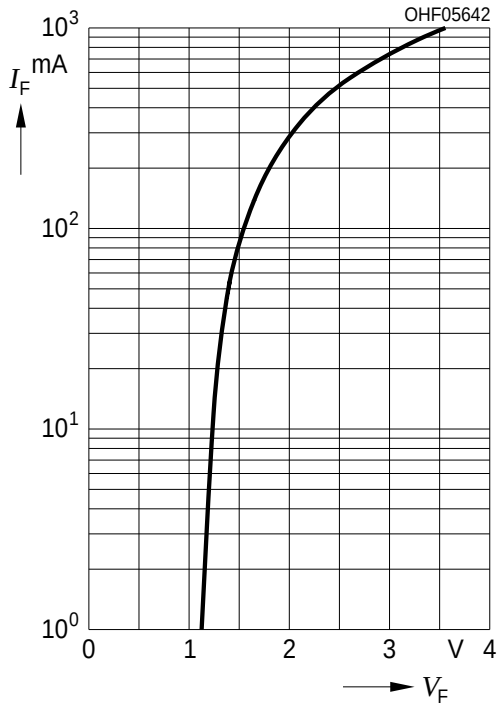
Parameter		Symbol	Values	Unit
Emitter				
Peak wavelength (I_F = 20 mA, t_p = 20 ms)	(typ)	λ_{peak}	950	nm
Forward voltage (I_F = 20 mA, t_P = 20 ms)	(typ (max))	V_F	1.3 (≤ 1.6)	V
Reverse current (V_R = 5 V)		I_R	not designed for reverse operation	µA
Detector				
Wavelength of max. sensitivity	(typ)	$\lambda_{S\ max}$	920	nm

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Parameter		Symbol	Values	Unit
Spectral range of sensitivity	(typ)	$\lambda_{10\%}$	(typ) 840 ... 1080	nm
Capacitance (V_{CE} = 0 V, f = 1 MHz, E = 0)	(typ)	C_{CE}	6.5	pF
Dark current (V_{CE} = 20 V)	(typ (max))	I_{CE0}	2 (≤ 50)	nA
Interrupter				
Collector-emitter current (I_F = 20 mA, V_{CE} = 5 V)	(min)	I_{PCE}	1000	µA
Collector-emitter saturation voltage (I_F = 20 mA, I_C = 0.3 mA)		V_{CEsat}	≤ 400	mV
Switching Times				
Rise time (V_{CC} = 5 V, I_C = 1 mA, R_L = 1 kΩ)	(typ)	t_r	13	µs
Fall time (V_{CC} = 5 V, I_C = 1 mA, R_L = 1 kΩ)	(typ)	t_f	17	µs

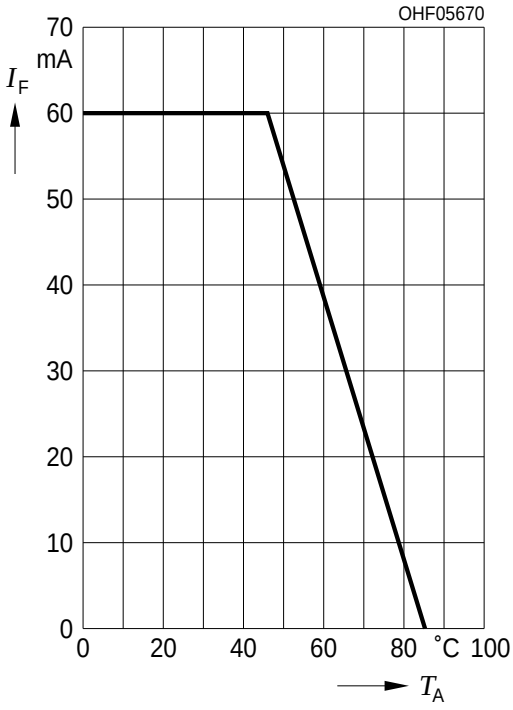
Forward Current 2) *page 10*

$I_F = f(V_F)$, single pulse, t_p = 100 µs, T_A = 25°C



Max. Permissible Forward Current

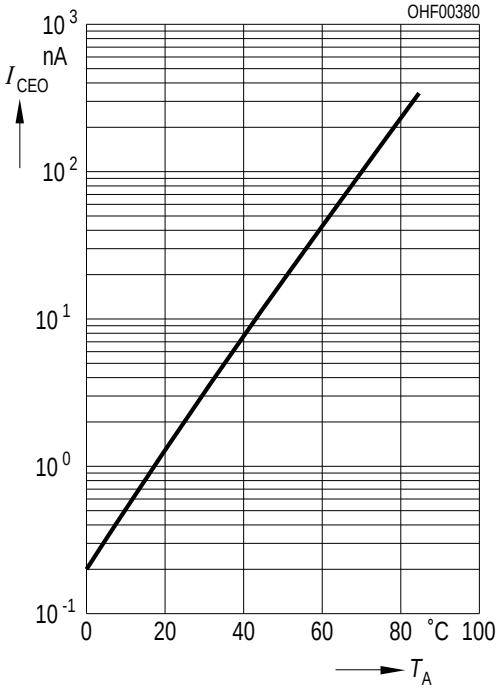
$I_{F, max} = f(T_A)$, R_{thJA} = 350 K / W



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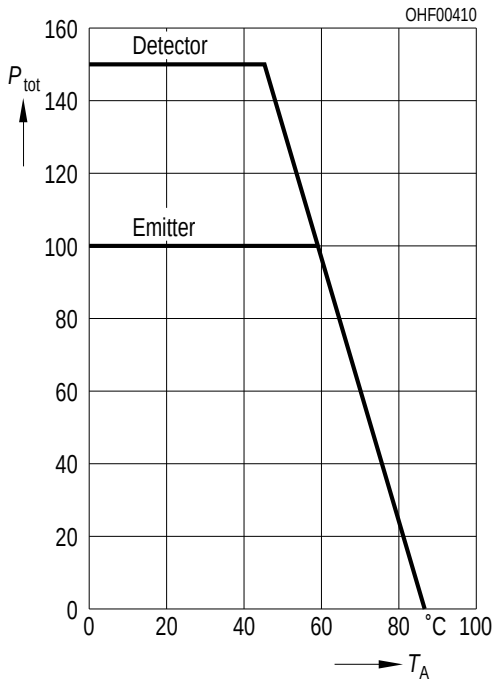
Dark Current 2) *page 10*

$I_{CEO} = f(T_A)$, V_{CE} = 20 V, E = 0



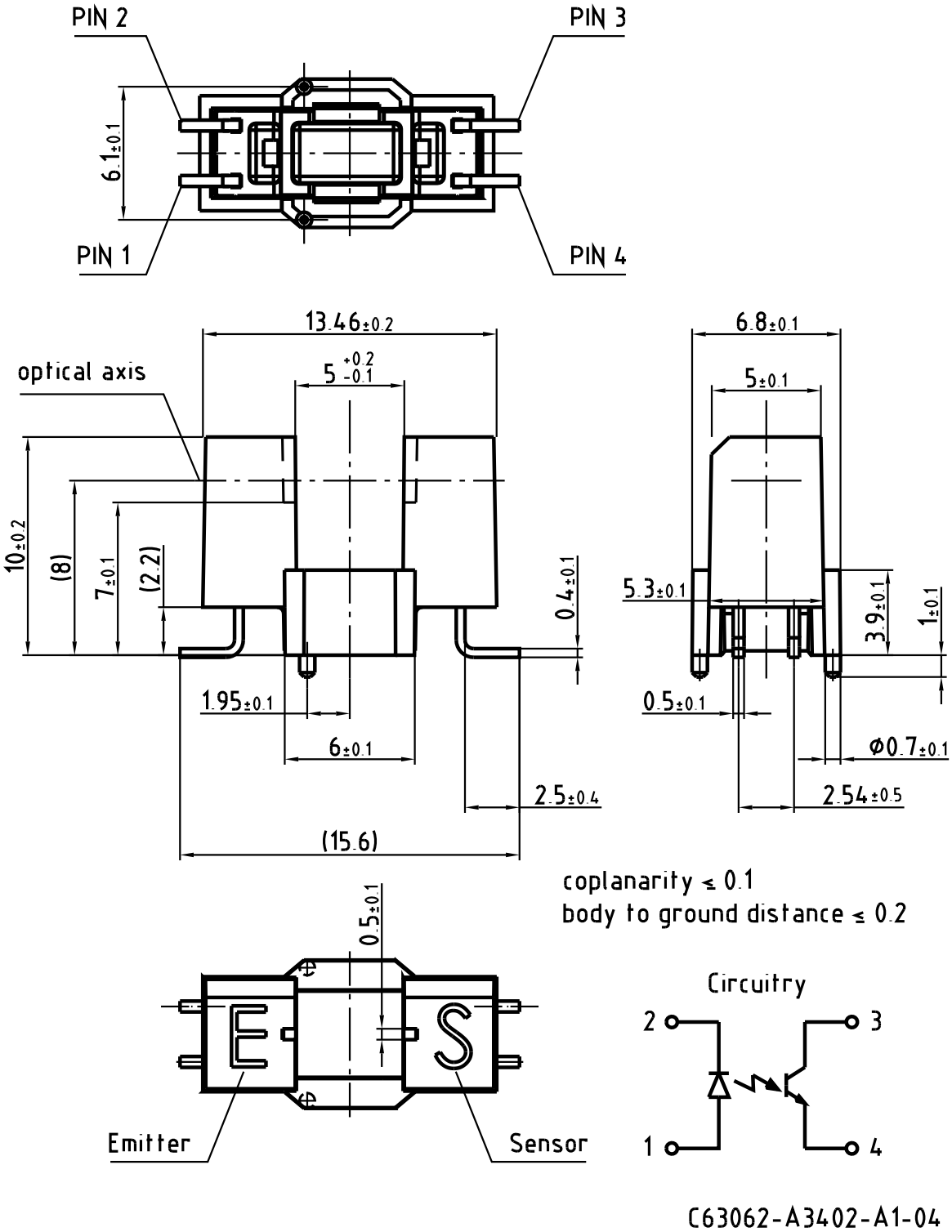
Power Consumption

$P_{tot} = f(T_A)$



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Package Outline



Dimensions in mm.

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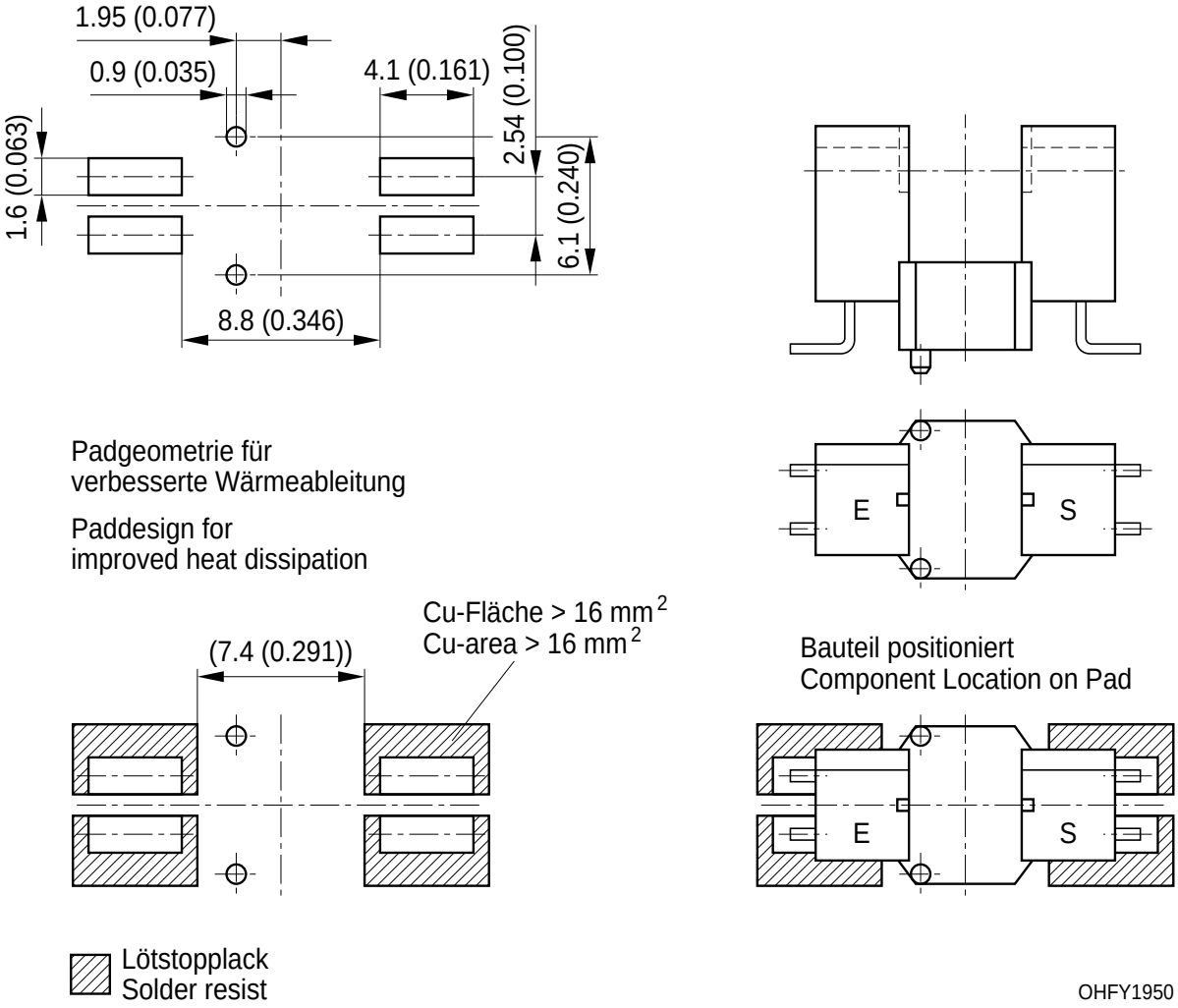
Pinning

Pin	Description
1	Emitter - Anode
2	Emitter - Cathode
3	Sensor - Collector
4	Sensor - Emitter

Package
Slotted Interrupter

Approximate Weight:
0.6 g

Recommended Solder Pad

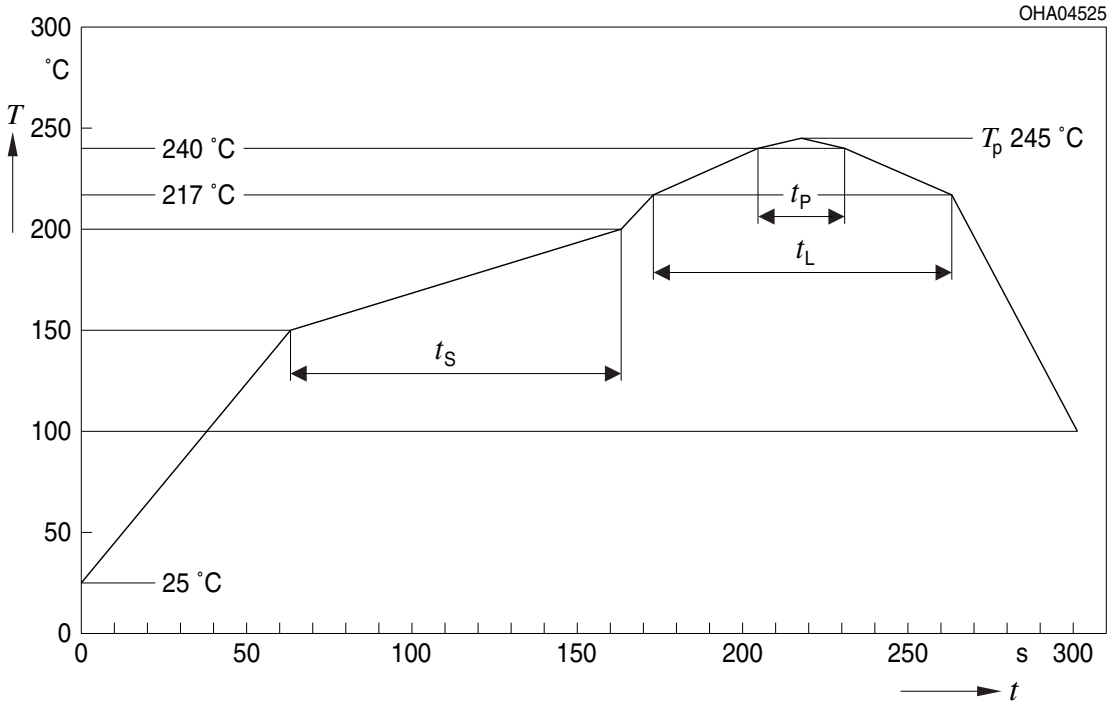


Dimensions in mm (inch).

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Reflow Soldering Profile

Product complies to MSL Level 1 acc. to JEDEC J-STD-020D.01



Profil-Charakteristik Profile Feature	Symbol Symbol	Pb-Free (SnAgCu) Assembly			Einheit Unit
		Minimum	Recommendation	Maximum	
Ramp-up Rate to Preheat*) 25 °C to 150 °C			2	3	K/s
Time t_S T_{Smin} to T_{Smax}	t_S	60	100	120	s
Ramp-up Rate to Peak*) T_{Smax} to T_P			2	3	K/s
Liquidus Temperature	T_L		217		°C
Time above Liquidus temperature	t_L		80	100	s
Peak Temperature	T_P		245	250	°C
Time within 5 °C of the specified peak temperature T_P - 5 K	t_P	10	20	30	s
Ramp-down Rate* T_P to 100 °C			3	4	K/s
Time 25 °C to T_P				480	s

All temperatures refer to the center of the package, measured on the top of the component

* slope calculation DT/Dt: Dt max. 5 s; fulfillment for the whole T-range

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Disclaimer

Language english will prevail in case of any discrepancies or deviations between the two language wordings.

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Glossary

[1] **Thermal resistance:** Mounting on PC-board with > 5 mm^2 pad size

[2] **Typical Values:** Due to the special conditions of the manufacturing processes of LED, the typical data or calculated correlations of technical parameters can only reflect statistical figures. These do not necessarily correspond to the actual parameters of each single product, which could differ from the typical data and calculated correlations or the typical characteristic line. If requested, e.g. because of technical improvements, these typ. data will be changed without any further notice.

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