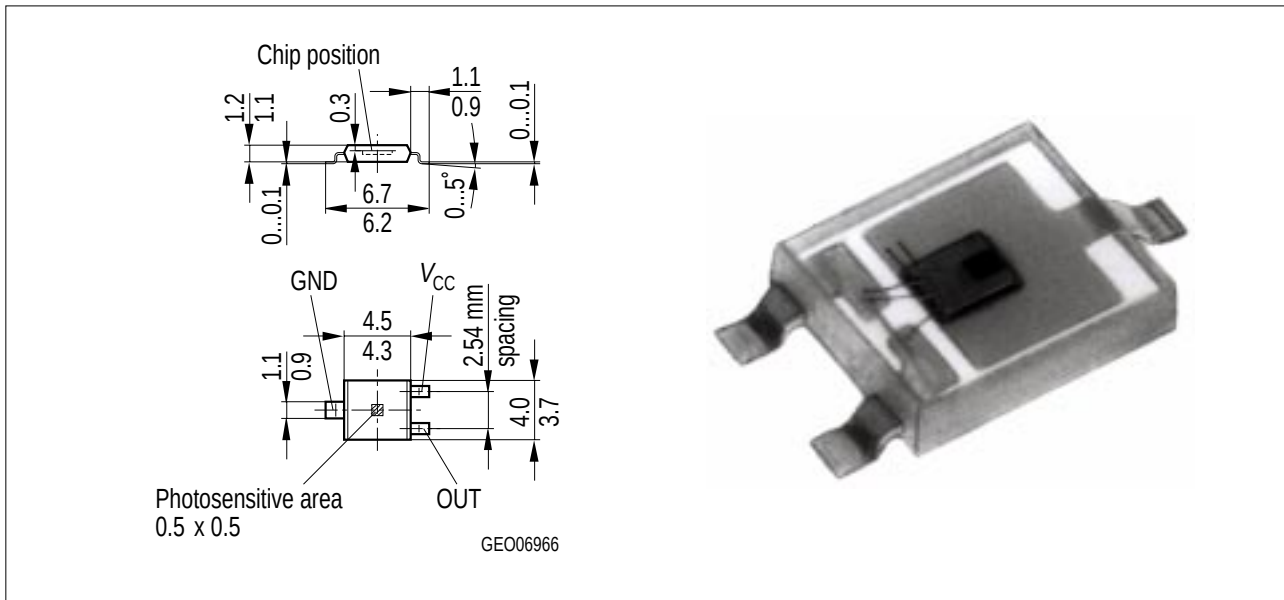




Maße in mm, wenn nicht anders angegeben/Dimensions in mm, unless otherwise specified.

### Wesentliche Merkmale

- Geeignet für Anwendungen im Bereich von 500 nm bis 900 nm
- Fotodiode mit integriertem Schmitt-Trigger
- SMT-Bauform
- TTL- und CMOS-kompatibel
- Ausgang: push-pull

### Anwendungen

- Optischer Schalter
- Lichtschranken
- Pulsformer
- Zähler

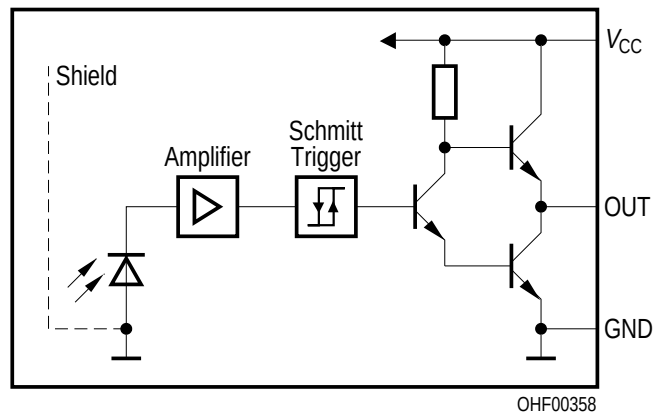
### Features

- Suitable for applications from 500 nm to 900 nm
- Photodiode with built-in Schmitt trigger
- SMT package
- TTL and CMOS compatible
- Output: push-pull

### Applications

- Optoelectronic switch
- Interrupter
- Pulse former
- Photoelectric counter

| Typ<br>Type | Bestellnummer<br>Ordering Code |
|-------------|--------------------------------|
| SFH 5400    | Q62703-Q2275                   |



## Block Diagram

## Grenzwerte Maximum Ratings

| Bezeichnung<br>Description                                               | Symbol<br>Symbol  | Wert<br>Value | Einheit<br>Unit |
|--------------------------------------------------------------------------|-------------------|---------------|-----------------|
| Betriebs- und Lagertemperatur<br>Operating and storage temperature range | $T_{op}; T_{stg}$ | – 40 ... + 85 | °C              |
| Versorgungsspannung<br>Supply voltage                                    | $V_{CC}$          | – 0.5 ... 15  | V               |
| Ausgangsspannung<br>Output voltage                                       | $V_O$             | – 0.5 ... 15  | V               |
| Ausgangsstrom<br>Output current                                          | $I_q$             | – 25 ... 40   | mA              |
| Ausgangsleistung $T_A = 25\text{ °C}$<br>Total output power              | $P_q$             | 100           | mW              |

## Funktionsbereich Functional Characteristics

| Bezeichnung<br>Description                                               | Symbol<br>Symbol  | Wert<br>Value | Einheit<br>Unit |
|--------------------------------------------------------------------------|-------------------|---------------|-----------------|
| Betriebs- und Lagertemperatur<br>Operating and storage temperature range | $T_{op}; T_{stg}$ | – 40 ... + 85 | °C              |
| Versorgungsspannung<br>Supply voltage                                    | $V_{CC}$          | 4.5 ... 15    | V               |

## Kennwerte Characteristics

$T_A = -40 \dots 85 \text{ °C}$ ,  $V_{CC} = 4.5 \dots 15 \text{ V}$ ,  $E_e = 3.2 \dots 10 \text{ mW/cm}^2$

$T_A = 25 \text{ °C}$ ,  $V_{CC} = 5 \text{ V}$ ,  $E_e = 6.5 \text{ mW/cm}^2$  for typical values

| Bezeichnung<br>Description                                                                                                    | Symbol<br>Symbol | Wert<br>Value  |        | Einheit<br>Unit    |
|-------------------------------------------------------------------------------------------------------------------------------|------------------|----------------|--------|--------------------|
|                                                                                                                               |                  | typ.           | Limit  |                    |
| Schwelle Bestrahlungsstärke<br>Threshold radiant intensity<br>(Ausgang L → H)<br>(Output L → H)<br>$\lambda = 660 \text{ nm}$ | $E_{eSchw}$      | 1.3            | –      | mW/cm <sup>2</sup> |
| Min. Bestrahlungsstärke, Ausgang H<br>Min. radiant intensity, Output H<br>$\lambda = 660 \text{ nm}$                          | $E_{eHmin}$      | –              | < 3.2  | mW/cm <sup>2</sup> |
| Max. Bestrahlungsstärke, Ausgang L<br>Max. radiant intensity, Output L<br>$\lambda = 660 \text{ nm}$                          | $E_{eLmax}$      | –              | > 0.16 | mW/cm <sup>2</sup> |
| Hysterese<br>Hysteresis                                                                                                       | $\Delta E_e$     | > 0.2          | –      | mW/cm <sup>2</sup> |
| Ausgangsspannung L<br>Output voltage L<br>$I_{OL} = 6.4 \text{ mA}$                                                           | $V_{OL}$         | 0.15           | < 0.5  | V                  |
| Ausgangsspannung H<br>Output voltage H<br>$I_{OH} = -2.6 \text{ mA}$                                                          | $V_{OH}$         | $V_{CC} - 1.8$ | > 2.4  | V                  |

## Kennwerte

### Characteristics (cont'd)

$T_A = -40 \dots 85 \text{ }^\circ\text{C}$ ,  $V_{CC} = 4.5 \dots 15 \text{ V}$ ,  $E_e = 3.2 \dots 10 \text{ mW/cm}^2$

$T_A = 25 \text{ }^\circ\text{C}$ ,  $V_{CC} = 5 \text{ V}$ ,  $E_e = 6.5 \text{ mW/cm}^2$  for typical values

| Bezeichnung<br>Description                                                                                                                                         | Symbol<br>Symbol | Wert<br>Value |                  | Einheit<br>Unit |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------|------------------|-----------------|
|                                                                                                                                                                    |                  | typ.          | Limit            |                 |
| Ausgangsleckstrom ( $V_O > V_{CC} = 4.5 \text{ V}$ )<br>Output leakage current ( $V_O > V_{CC} = 4.5 \text{ V}$ )<br>$V_O = 5.5 \text{ V}$<br>$V_O = 15 \text{ V}$ | $I_{OHH}$        | 0.2<br>0.25   | < 100<br>< 500   | $\mu\text{A}$   |
| Kurzschlußstrom L<br>Short-circuit current L<br>$t_p < 10 \text{ ms}$ , $E_e = 0$ ;<br>$V_{CC} = V_O = 5.5 \text{ V}$<br>$V_{CC} = V_O = 15 \text{ V}$             | $I_{OSL}$        | 40<br>80      | > 25<br>> 40     | mA              |
| Kurzschlußstrom H<br>Short-circuit current H<br>$t_p < 10 \text{ ms}$ , $V_O = \text{GND}$ ;<br>$V_{CC} = 5.5 \text{ V}$<br>$V_{CC} = 15 \text{ V}$                | $I_{OSH}$        | – 22<br>– 45  | < – 10<br>< – 25 | mA              |
| Versorgungsstrom L<br>Supply current L<br>$E_e = 0$ ;<br>$V_{CC} = 5.5 \text{ V}$<br>$V_{CC} = 15 \text{ V}$                                                       | $I_{CCL}$        | 3.5<br>4      | < 6<br>< 7.5     | mA              |
| Versorgungsstrom<br>Supply current L<br>$V_{CC} = 5.5 \text{ V}$<br>$V_{CC} = 15 \text{ V}$                                                                        | $I_{CCH}$        | 3.4<br>3.8    | < 5<br>< 6       | mA              |
| Ausgangsverzögerungszeit <sup>1)</sup><br>Ausgang H → L<br>Output delay time <sup>1)</sup><br>Output H → L                                                         | $t_{PHL}$        | 200           | –                | ns              |
| Ausgangsverzögerungszeit <sup>1)</sup><br>Ausgang L → H<br>Output delay time <sup>1)</sup><br>Output L → H                                                         | $t_{PLH}$        | 200           | –                | ns              |

## Kennwerte

### Characteristics (cont'd)

$T_A = -40 \dots 85 \text{ }^\circ\text{C}$ ,  $V_{CC} = 4.5 \dots 15 \text{ V}$ ,  $E_e = 3.2 \dots 10 \text{ mW/cm}^2$

$T_A = 25 \text{ }^\circ\text{C}$ ,  $V_{CC} = 5 \text{ V}$ ,  $E_e = 6.5 \text{ mW/cm}^2$  for typical values

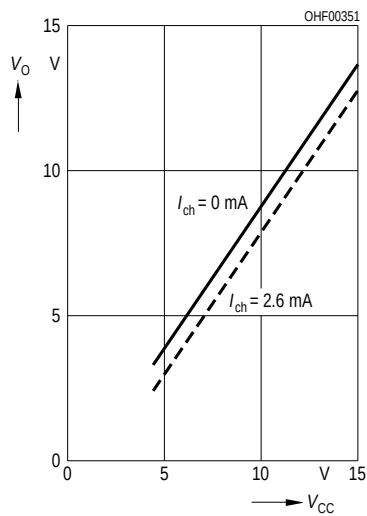
| Bezeichnung<br>Description                                       | Symbol<br>Symbol | Wert<br>Value |       | Einheit<br>Unit |
|------------------------------------------------------------------|------------------|---------------|-------|-----------------|
|                                                                  |                  | typ.          | Limit |                 |
| Anstiegszeit Ausgang (10% → 90%)<br>Rise time output (10% → 90%) | $t_r$            | 30            | —     | ns              |
| Abfallzeit Ausgang (90% → 10%)<br>Fall time output (90% → 10%)   | $t_f$            | 10            | —     | ns              |

- 1) Gemessen von 50% Punkt der ansteigenden Flanke Eingangspuls bis zu 1,3 V Punkt der ansteigenden Flanke Ausgangspuls ( $t_{PLH}$ ), bzw. von 50% Punkt der abfallenden Flanke Eingangspuls bis zu 1,3 V Punkt der abfallenden Flanke Ausgangspuls ( $t_{PHL}$ ).

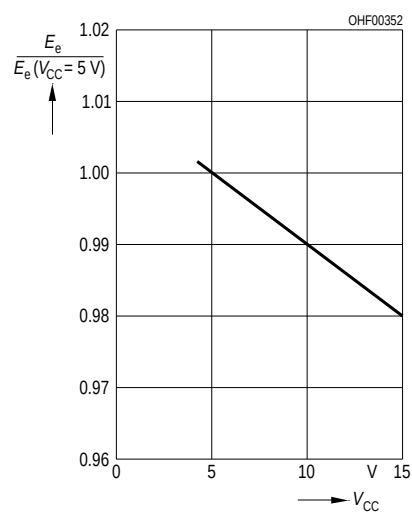
Measured from 50% of the rising edge of the input pulse to 1.3 V of the rising edge of the output pulse ( $t_{PLH}$ ) or from 50% of the descending edge input pulse to 1.3 V of the descending output pulse edge ( $t_{PHL}$ ), respectively.

## Output voltage

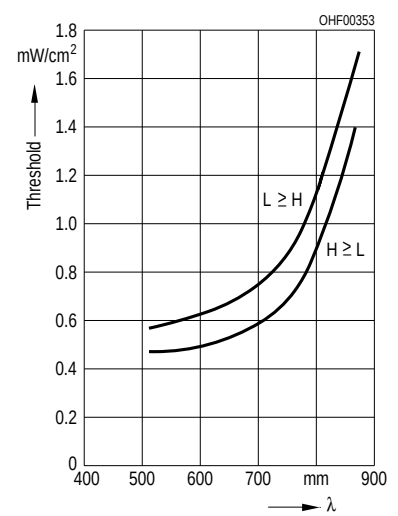
$$V_O = f(V_{CC}, I_C)$$



## Rel. threshold $E_e/E_e(V_{CC} = 5 \text{ V})$



## Switching threshold



## Output characteristics $V_{oh} = f(I_{oh})$

$$V_{CC} = 5 \text{ V}$$

