GaAlAs-IR-Lumineszenzdiode (880 nm) und Si-Fototransistor
GaAlAs-Infrared-Emitter (880 nm) and Si-Phototransistor

SFH 7221

Wesentliche Merkmale

- SMT-Gehäuse mit IR-Sender (880 nm) und Si-Fototransistor
- Geeignet für SMT-Bestückung
- Gegurtet lieferbar
- Sender und Empfänger getrennt ansteuerbar
- Geeignet für IR-Reflow Löten

Features

- SMT package with IR emitter (880 nm) and Si-phototransistor
- Suitable for SMT assembly
- Available on tape and reel
- Emitter und detector can be controlled separately
- Suitable for IR reflow soldering

Anwendungen

- Datenübertragung
- Wegfahrsperre
- Infrarotschnittstelle

Applications

- Data transmission
- Lock bar
- Infrared interface

Typ **Type**	**Bestellnummer** **Ordering Code**	**Gehäuse** **Package**
SFH 7221	Q62702-P1819	SMT Multi TOPLED®

Grenzwerte
Maximum Ratings

Bezeichnung Parameter	Symbol Symbol	Wert Value		Einheit Unit
		IRED	Transistor	
Betriebstemperatur Operating temperature range	T_{op}	– 40 ... + 100	– 40 ... + 100	°C
Lagertemperatur Storage temperature range	T_{stg}	– 40 ... + 100	– 40 ... + 100	°C
Sperrschichttemperatur Junction temperature	T_j	+ 100	+ 100	°C
Durchlaßstrom (LED) Forward current (LED)	I_F	100	–	mA
Kollektorstrom (Transistor) Collector current (Transistor)	I_C	–	15	mA
Stoßstrom Surge current $t \leq 10$ µs, $D = 0.005$	I_{FM}	2500	75	mA
Sperrspannung (LED) Reverse voltage (LED)	V_R	5	–	V
Kollektor-Emitter Spannung (Transistor) Collector-emitter voltage (Transistor)	V_{CE}	–	35	V
Verlustleistung Total power dissipation	P_{tot}	180	165	mW
Wärmewiderstand Sperrschicht / Umgebung Thermal resistance junction / ambient Montage auf PC-Board[1)] (Padgröße ≥ 16 mm²) mounting on pcb[1)] (pad size ≥ 16 mm²)	$R_{th\ JA}$	500	450	K/W
Sperrschicht / Lötstelle junction / soldering joint	$R_{th\ JS}$	400	–	K/W

[1)] PC-board: G30/FR4

Hinweis / Notes

Die angegebenen Grenzdaten gelten für einen Chip.

The stated maximum ratings refer to one chip.

Kennwerte IRED (T_A = 25 °C)
Characteristics IRED

Bezeichnung **Parameter**	**Symbol** **Symbol**	**Wert** **Value**	**Einheit** **Unit**
Wellenlänge der Strahlung Wavelength of radiation I_F = 100 mA, t_p = 20 ms	λ_{peak}	880	nm
Spektrale Bandbreite bei 50% von I_{max}, I_F = 100 mA Spectral bandwidth at 50% of I_{max}, I_F = 100 mA	$\Delta\lambda$	80	nm
Abstrahlwinkel Viewing angle	φ	± 60	Grad deg.
Aktive Chipfläche Active chip area	A	0.16	mm^2
Abmessungen der aktiven Chipfläche Dimensions of active chip area	$L \times B$ $L \times W$	0.4 × 0.4	mm
Schaltzeiten, I_e von 10% auf 90% und von 90% auf 10% Switching times, I_e from 10% to 90 % and from 90% to 10% I_F = 100 mA, R_L = 50 Ω	t_r, t_f	0.5	µs
Kapazität Capacitance V_R = 0 V, f = 1 MHz	C_o	25	pF
Durchlaßspannung Forward voltage I_F = 100 mA, t_p = 20 ms I_F = 1 A, t_p = 100 µs	 V_F V_F	 1.5 (≤ 1.8) 3.0 (≤ 3.8)	 V V
Sperrstrom Reverse current V_R = 5 V	I_R	0.01 (≤ 1)	µA
Gesamtstrahlungsfluß Total radiant flux I_F = 100 mA, t_p = 20 ms	Φ_e	23	mW
Temperaturkoeffizient von I_e bzw. Φ_e Temperature coefficient of I_e bzw. Φ_e I_F = 100 mA, I_F = 100 mA	TC_I	– 0.5	%/K

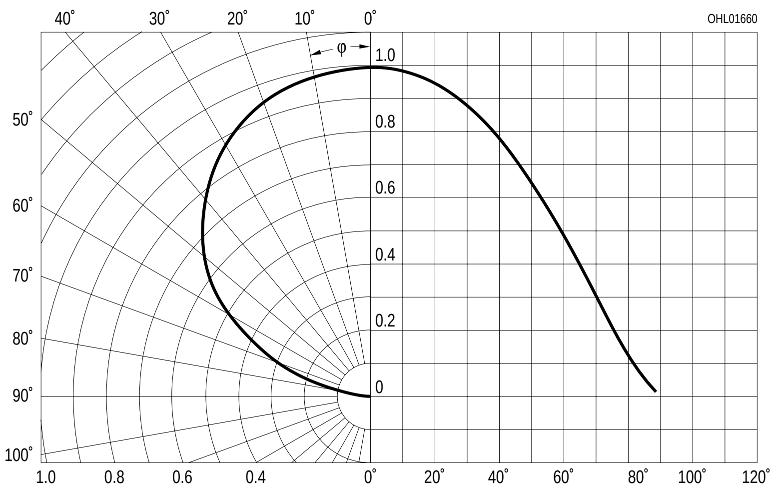
Kennwerte IRED (T_A = 25 °C)
Characteristics IRED (cont'd)

Bezeichnung **Parameter**	**Symbol** **Symbol**	**Wert** **Value**	**Einheit** **Unit**
Temperaturkoeffizient von V_F Temperature coefficient of V_F I_F = 100 mA	TC_V	– 2	mV/K
Temperaturkoeffizient von λ Temperature coefficient of λ I_F = 100 mA	TC_λ	+ 0.25	nm/K

Strahlstärke I_e in Achsrichtung
gemessen bei einem Raumwinkel Ω = 0.01 sr
Radiant Intensity I_e in Axial Direction
at a solid angle of Ω = 0.01 sr

Bezeichnung **Parameter**	**Symbol** **Symbol**	**Werte** **Values**	**Einheit** **Unit**
Strahlstärke Radiant intensity I_F = 100 mA, t_p = 20 ms	I_e	> 4	mW/sr
Strahlstärke Radiant intensity I_F = 1 A, t_p = 100 µs	$I_{e\ typ.}$	48	mW/sr

IRED Radiation Characteristics $I_{rel} = f(\varphi)$
Phototransistor Directional Characteristics $S_{rel} = f(\varphi)$

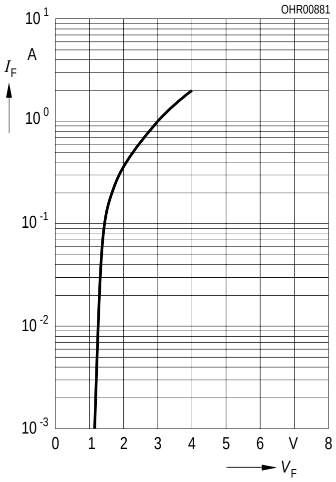


Kennwerte Fototransistor (T_A = 25 °C, λ = 880 nm)
Characteristics Phototransistor

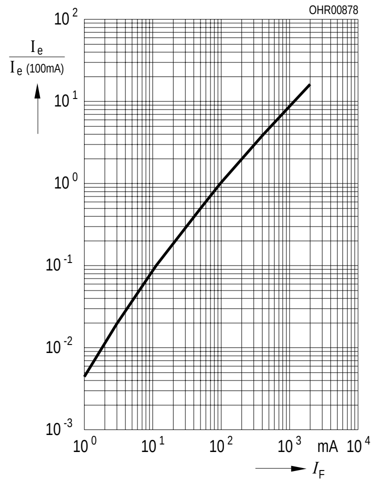
Bezeichnung **Parameter**	**Symbol** **Symbol**	**Wert** **Value**	**Einheit** **Unit**
Wellenlänge der max. Fotoempfindlichkeit Wavelength of max. sensitivity	$\lambda_{S\ max}$	860	nm
Spektraler Bereich der Fotoempfindlichkeit S = 10% von S_{max} Spectral range of sensitivity S = 10% of S_{max}	λ	380 … 1150	nm
Bestrahlungsempfindliche Fläche (∅ 240 µm) Radiant sensitive area (∅ 240 µm)	A	0.045	mm^2
Abmessung der Chipfläche Dimensions of chip area	$L \times B$	0.45 × 0.45	mm × mm
Abstand Chipoberfläche zu Gehäuseoberfläche Distance chip front to case surface	H	0.5 … 0.7	mm
Halbwinkel Half angle	φ	± 60	Grad deg.
Kapazität Capacitance V_{CE} = 0 V, f = 1 MHz, E = 0	C_{CE}	5.0	pF
Dunkelstrom Dark current V_{CE} = 25 V, E = 0	I_{CEO}	1 (≤ 200)	nA
Fotostrom Photocurrent E_e = 0.1 mW/cm^2, V_{CE} = 5 V	I_{PCE}	≥ 16	µA
Anstiegszeit/Abfallzeit Rise time/Fall time I_C = 1 mA, V_{CC} = 5 V, R_L = 1 kΩ	t_r, t_f	7	µs
Kollektor-Emitter-Sättigungsspannung Collector-emitter saturation voltage I_C = 5 µA, E_e = 0.1 mW/cm^2	V_{CEsat}	150	mV

IRED

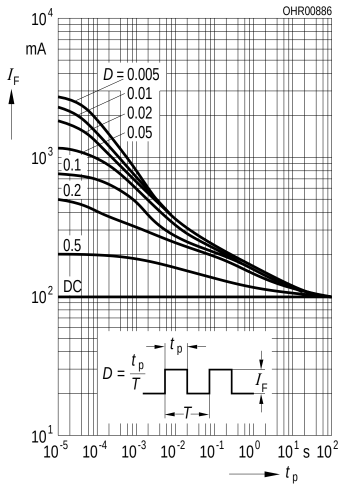
Forward Current $I_F = f(V_F)$
T_A = 25 °C



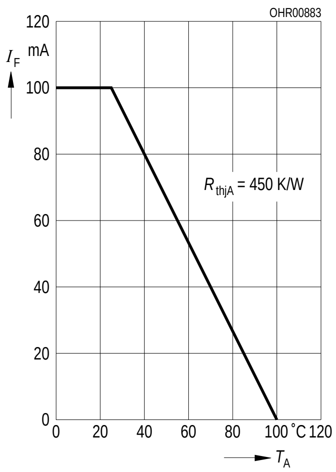
Rel Luminous Intensity
I_V / I_V (10 mA) = $f(I_F)$, T_A = 25 °C



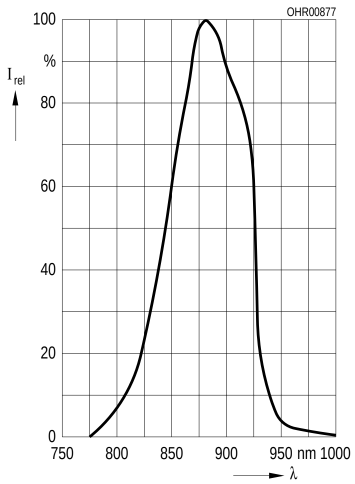
Perm. Pulse Handling Capability
$I_F = f(t_p)$, Duty cycle D = parameter,
T_A = 25 °C



Max. Permissible Forward Current
$I_F = f(T_A)$

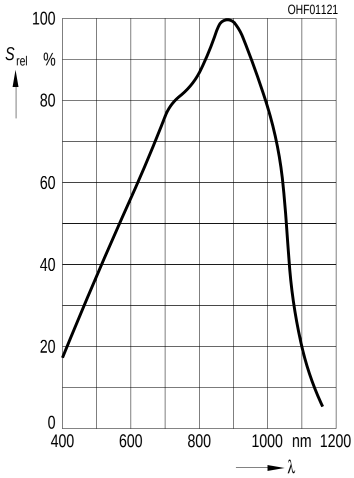


Relative Spectral Emission
$I_{rel} = f(\lambda)$

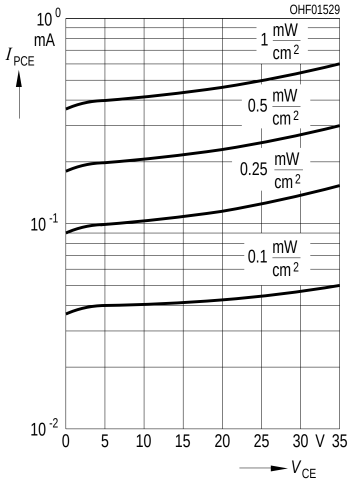


Phototransistor

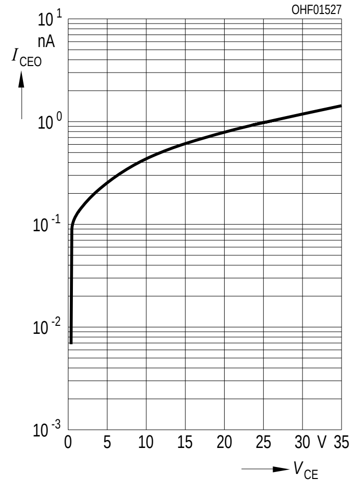
Rel. Spectral Sensitivity
$S_{rel} = f(\lambda)$



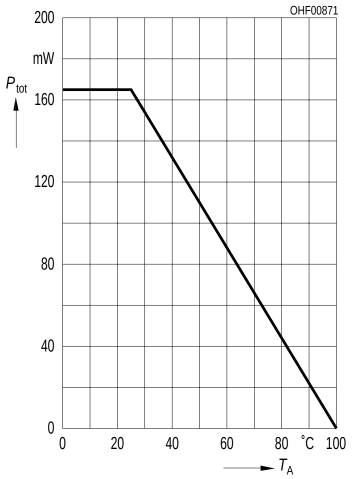
Photocurrent $I_{PCE} = f(V_{CE})$, E_e = Parameter



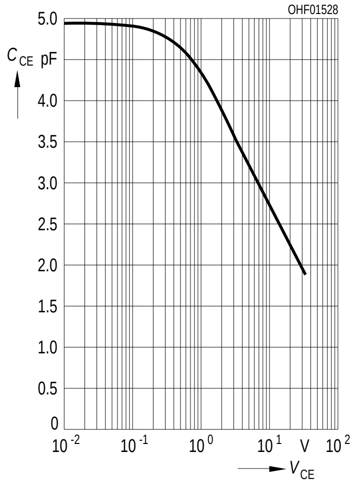
Dark Current
$I_{CEO} = f(V_{CE})$, $E = 0$



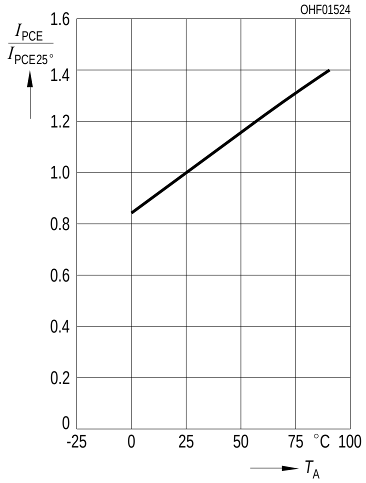
Total Power Dissipation
$P_{tot} = f(T_A)$



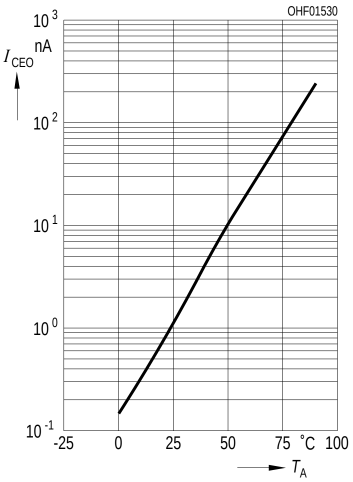
Capacitance
$C_{CE} = f(V_{CE})$, f = 1 MHz, $E = 0$



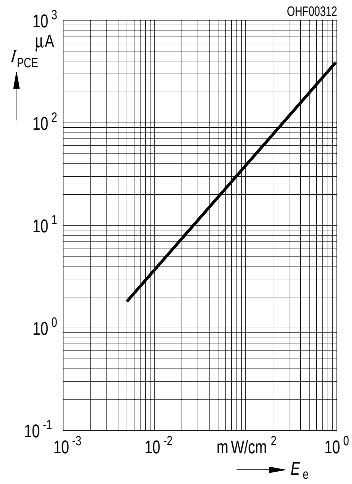
Photocurrent $I_{PCE}/I_{PCE25°} = f(T_A)$,
V_{CE} = 5 V



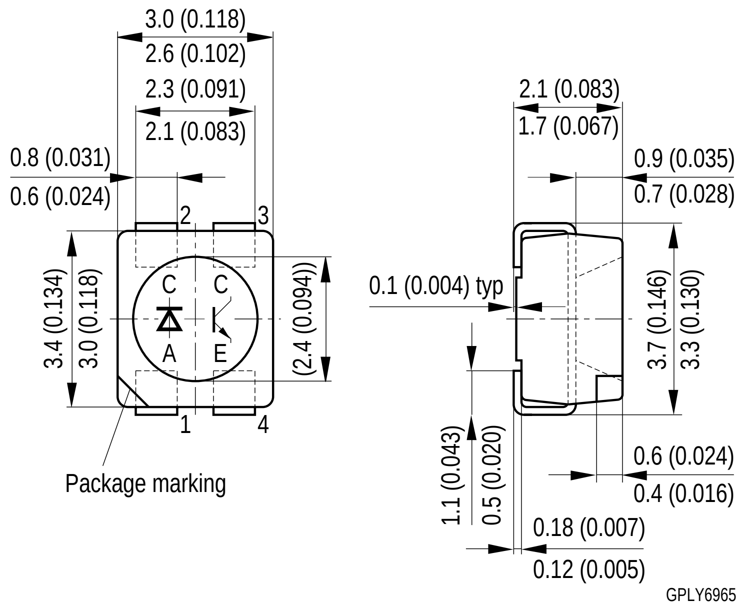
Dark Current
$I_{CEO} = f(T_A)$, V_{CE} = 5 V, $E = 0$



Photocurrent
$I_{PCE} = f(E_e)$, V_{CE} = 5 V



Maßzeichnung
Package Outlines



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

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