Infrared-Emitter (850 nm) and Si-Phototransistor
Version 1.3

SFH 7250



Features:

- Available on tape and reel
- SMT package with IR emitter (850 nm) and Si-phototransistor
- Suitable for SMT assembly
- Emitter and detector can be controlled separately

Applications

- Data transmission
- Lock bar
- Infrared interface

Ordering Information

Type:	Package:	Ordering Code
SFH 7250	SMT Multi TOPLED®	Q65111A3188

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Maximum Ratings

Parameter	Symbol	Values	Unit
Operating and storage temperature range	T_{op}; T_{stg}	-40 ... 100	°C
Junction temperature	T_j	100	°C
Electrostatic discharge (acc. to ANSI/ ESDA/ JEDEC JS-001 - HBM)	V_{ESD}	2000	V

Emitter 1

Forward current	I_F	70	mA
Surge current ($t_p \leq 10$ µs, D = 0)	I_{FSM}	0.7	A
Reverse voltage	V_R	5	V
Power consumption	P_{tot}	140	mW
Thermal resistance junction - ambient [1] *page 15*	R_{thJA}	500	K / W
Thermal resistance junction - solder point	R_{thJS}	400	K / W

Phototransistor

Collector current	I_C	15	mA
Surge current ($t_p \leq 10$ µs, D = 0)	I_{FSM}	0.075	A
Collector-emitter voltage	V_{CE}	35	V
Total Power dissipation	P_{tot}	165	mW
Thermal resistance [1] *page 15*	R_{thJA}	450	K / W

The stated maximum ratings refer to one chip.

Characteristics

Parameter		Symbol	Values	Unit
Emitter 1 (T_A = 25 °C)				
Peak wavelength (I_F = 70 mA, t_p = 20 ms)	(typ)	λ_{peak}	860	nm
Centroid wavelength (I_F = 70 mA, t_p = 20 ms)	(typ)	$\lambda_{centroid}$	850	nm
Spectral bandwidth at 50% of I_{max} (I_F = 70 mA, t_p = 20 ms)	(typ)	$\Delta\lambda$	30	nm
Half angle	(typ)	φ	± 60	°

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Parameter		Symbol	Values	Unit
Dimensions of active chip area	(typ)	L x W	0.2 x 0.2	mm x mm
Rise and fall time of I_e (10% and 90% of $I_{e\,max}$) (I_F = 70 mA, R_L = 50 Ω)	(typ)	t_r, t_f	12	ns
Forward voltage (I_F = 70 mA, t_p = 20 ms)	(typ (max))	V_F	1.6 (≤ 2)	V
Forward voltage (I_F = 500 mA, t_p = 100 µs)	(typ (max))	V_F	2.4 (≤ 3)	V
Reverse current (V_R = 5 V)	(typ (max))	I_R	not designed for reverse operation	µA
Total radiant flux (I_F = 70 mA, t_p = 20 ms)	(typ)	Φ_e	40	mW
Min Radiant Intensity (I_F = 70 mA, t_p = 20 ms)		$I_{e,\,min}$	6.3	mW / sr
Radiant intensity (I_F = 70 mA, t_p = 20 ms)		$I_{e,\,typ}$	10	mW/sr
Typ Radiant Intensity (I_F = 500 mA, t_p = 100 µs)		$I_{e,\,typ}$	60	mW / sr
Temperature coefficient of I_e or Φ_e (I_F = 70 mA, t_p = 20 ms)	(typ)	TC_I	-0.5	% / K
Temperature coefficient of V_F (I_F = 70 mA, t_p = 20 ms)	(typ)	TC_V	-0.7	mV / K
Temperature coefficient of wavelength (I_F = 70 mA, t_p = 20 ms)	(typ)	TC_λ	0.3	nm / K

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

Wavelength of max. sensitivity	(typ)	$\lambda_{S\,max}$	990	nm
Spectral range of sensitivity (S = 10% of S_{max})	(typ)	λ	440 ... 1150	nm
Radiant sensitive area (Ø = 240 µm)	(typ)	A	0.038	mm^2
Dimensions of chip area	(typ)	L x W	(typ) 0.45 x 0.45	mm x mm
Distance chip front to case surface	(typ)	H	(typ) 0.5 ... 0.7	mm
Half angle	(typ)	φ	± 60	°
Capacitance (V_{CE} = 0 V, f = 1 MHz, E = 0)	(typ)	C_{CE}	5	pF

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Parameter		Symbol	Values	Unit
Dark current (V_{CE} = 25 V, E = 0)	(typ (max))	I_{CE0}	1 (≤ 200)	nA
Photocurrent (λ = 880 nm, E_e = 0.1 mW/cm², V_{CE} = 5 V)		I_{PCE}	≥ 16	µA
Rise and fall time (I_C = 1 mA, V_{CC} = 5 V, R_L = 1 kΩ)	(typ)	t_r, t_f	7	µs
Collector-emitter saturation voltage (I_C = 5 µA, E_e = 0.1 mW/cm²)	(typ)	V_{CEsat}	150	mV

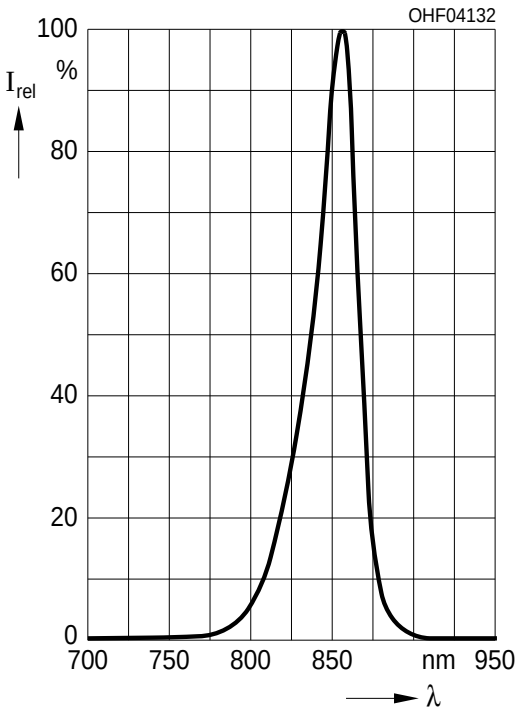
Grouping (T_A = 25 °C)

Group	Min Radiant Intensity I_F = 70 mA, t_p = 20 ms $I_{e, min}$	Max Radiant Intensity I_F = 70 mA, t_p = 20 ms $I_{e, max}$	Typ Radiant Intensity I_F = 500 mA, t_p = 100 µs $I_{e, typ}$
SFH 7250-Q	6.3	12.5	55
SFH 7250-R	10	20	90

Note: Measured at a solid angle of Ω = 0.01 sr.

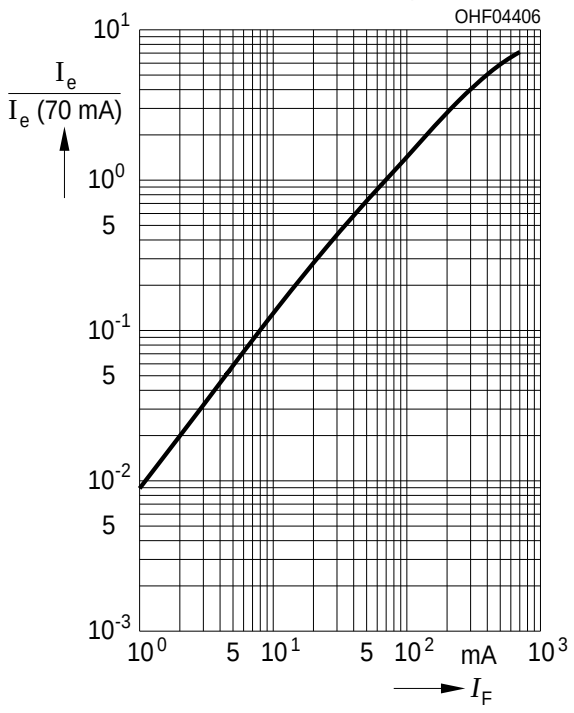
Relative Spectral Emission 2) *page 15*

(typ) I_{rel} = f(λ), T_A = 25°C



Radiant Intensity 2) *page 15*

I_e / I_e(70 mA) = f(I_F), single pulse, t_p = 25 µs



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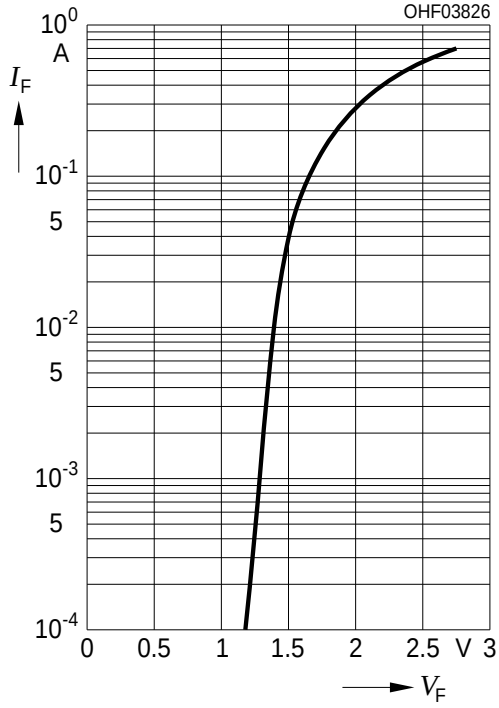
Max. Permissible Forward Current

$I_{F, max} = f(T_A)$



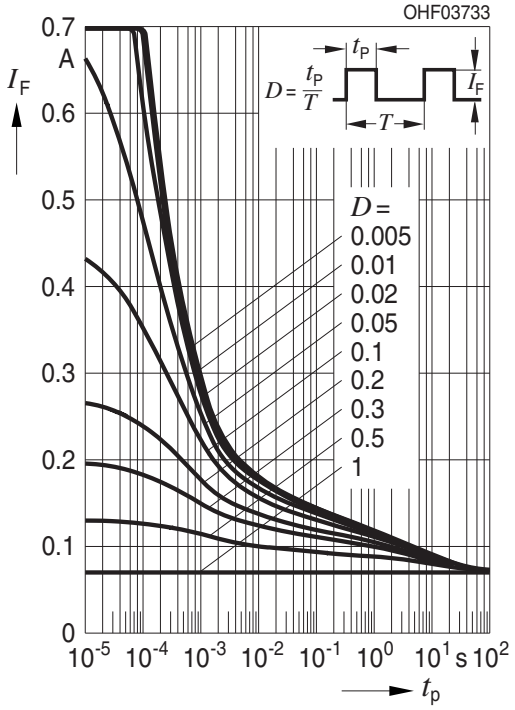
Forward Current [2) page 15]

$I_F = f(V_F)$, T_A = 25 °C



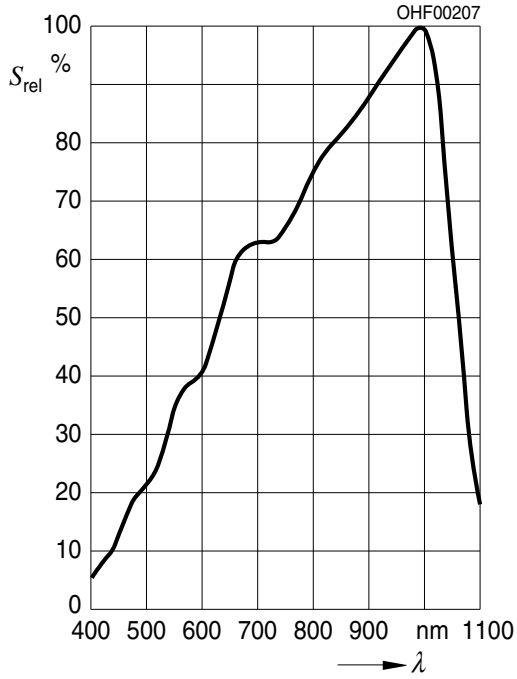
Permissible Pulse Handling Capability

$I_F = f(t_p)$, T_A = 25 °C, duty cycle D = parameter



Relative Spectral Sensitivity [2) page 15]

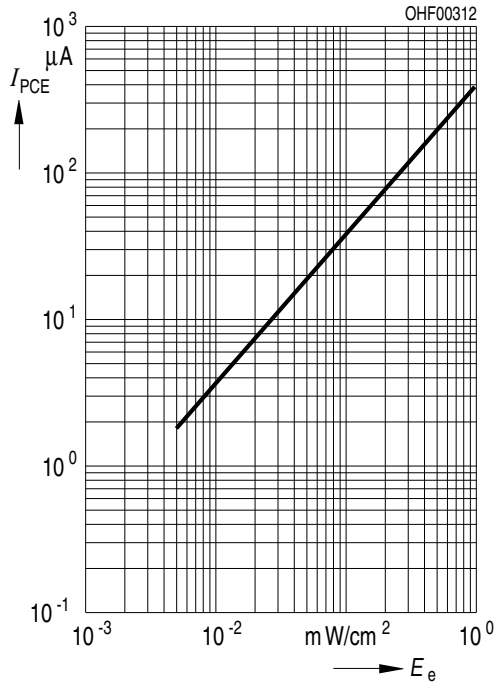
$S_{rel} = f(\lambda)$, T_A = 25°C



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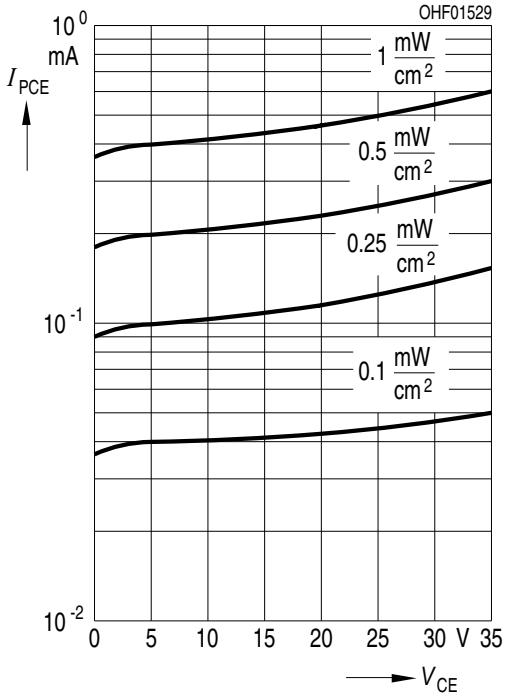
Photocurrent 2) *page 15*

$I_{PCE} = f(E_e)$, V_{CE} = 5 V, T_A = 25°C



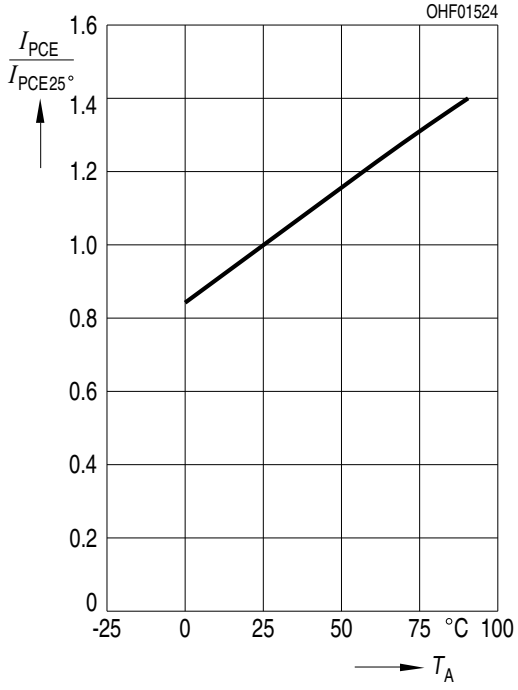
Photocurrent 2) *page 15*

$I_{PCE} = f(V_{CE})$, E_e = Parameter, T_A = 25°C



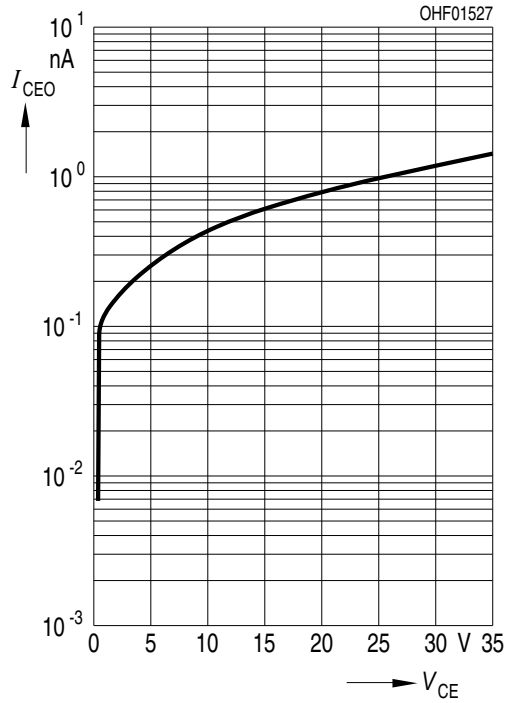
Photocurrent 2) *page 15*

$I_{PCE} / I_{PCE}(25°C) = f(T_A)$, V_{CE} = 5 V



Dark Current 2) *page 15*

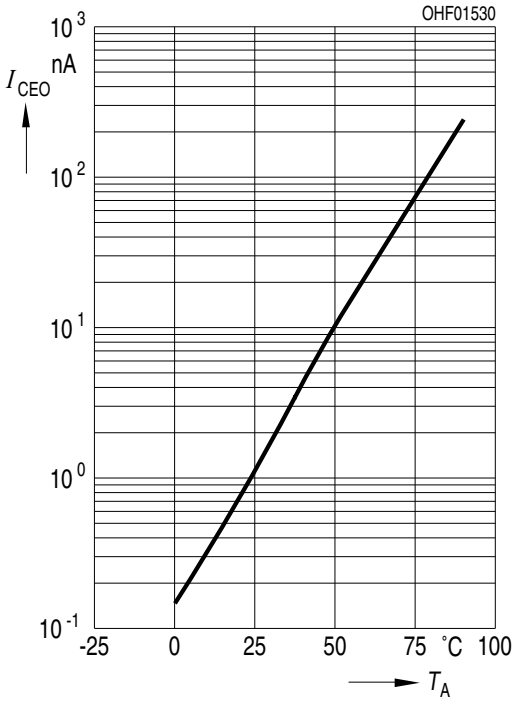
$I_{CEO} = f(V_{CE})$, E = 0, T_A = 25°C



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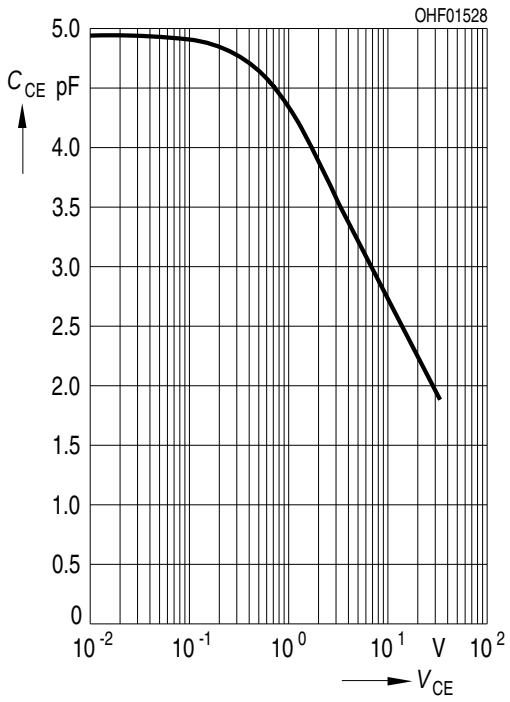
Dark Current 2) *page 15*

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



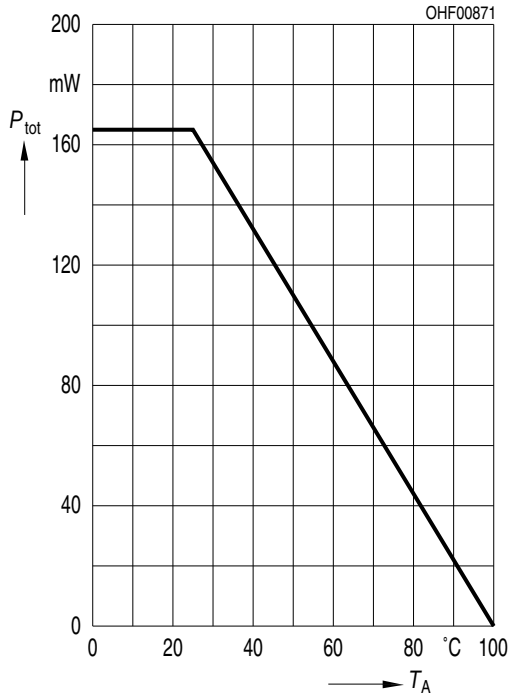
Collector-Emitter Capacitance 2) *page 15*

$C_{CE} = f(V_{CE})$, f = 1 MHz, E = 0, T_A = 25°C



Power Consumption

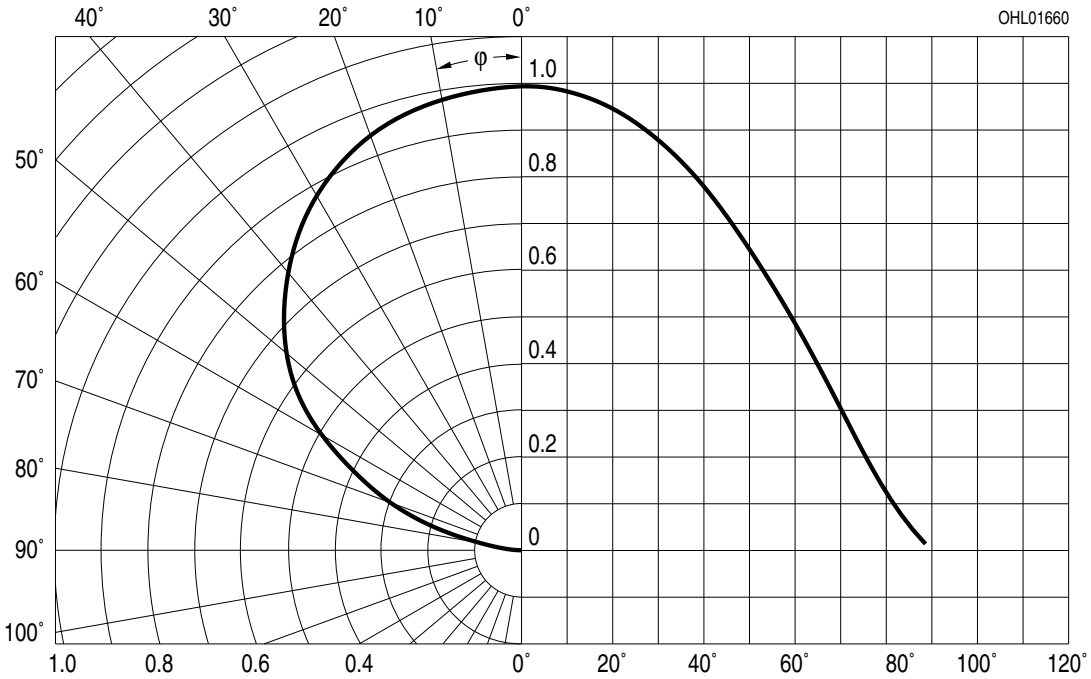
$P_{tot} = f(T_A)$



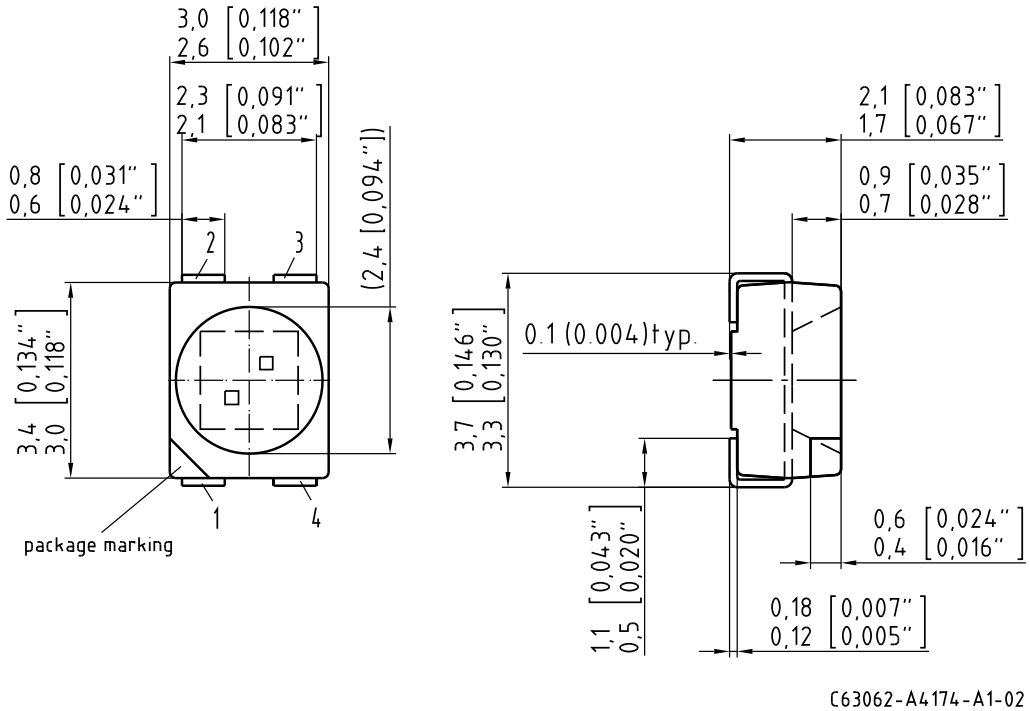
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Emitter Radiation Characteristics / Phototransistor Directional Characteristics [2] *page 15*

$I_{rel} = f(\phi) / S_{rel} = f(\phi)$



Package Outline



Dimensions in mm (inch).

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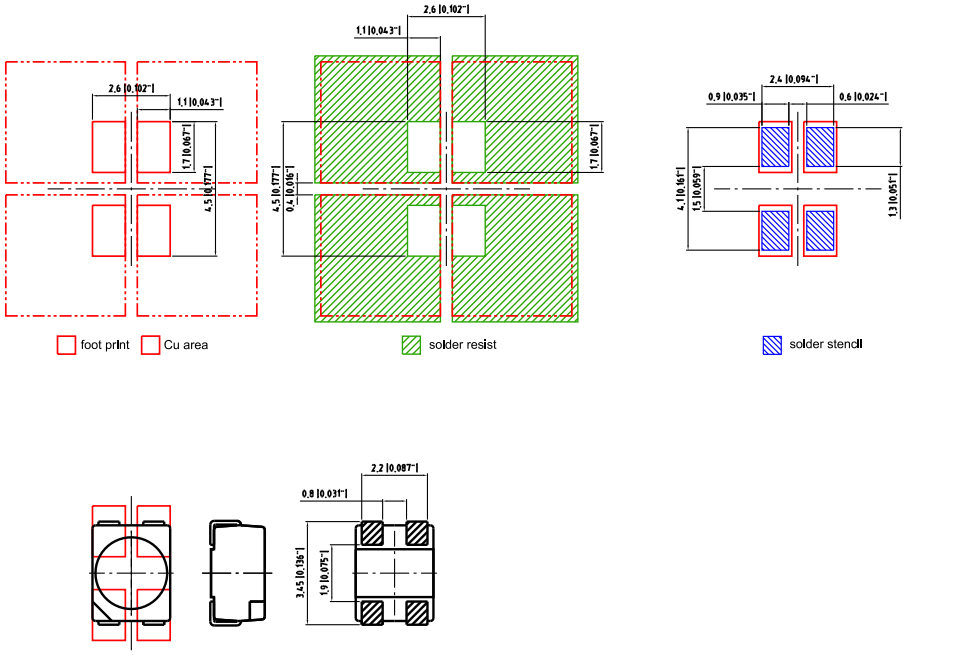
Pinning

Pin	Description
1	Anode Emitter 1
2	Cathode Emitter 1
3	Collector Phototransistor
4	Emitter Phototransistor

Package
Multi TOPLED

Approximate Weight:
34.0 mg

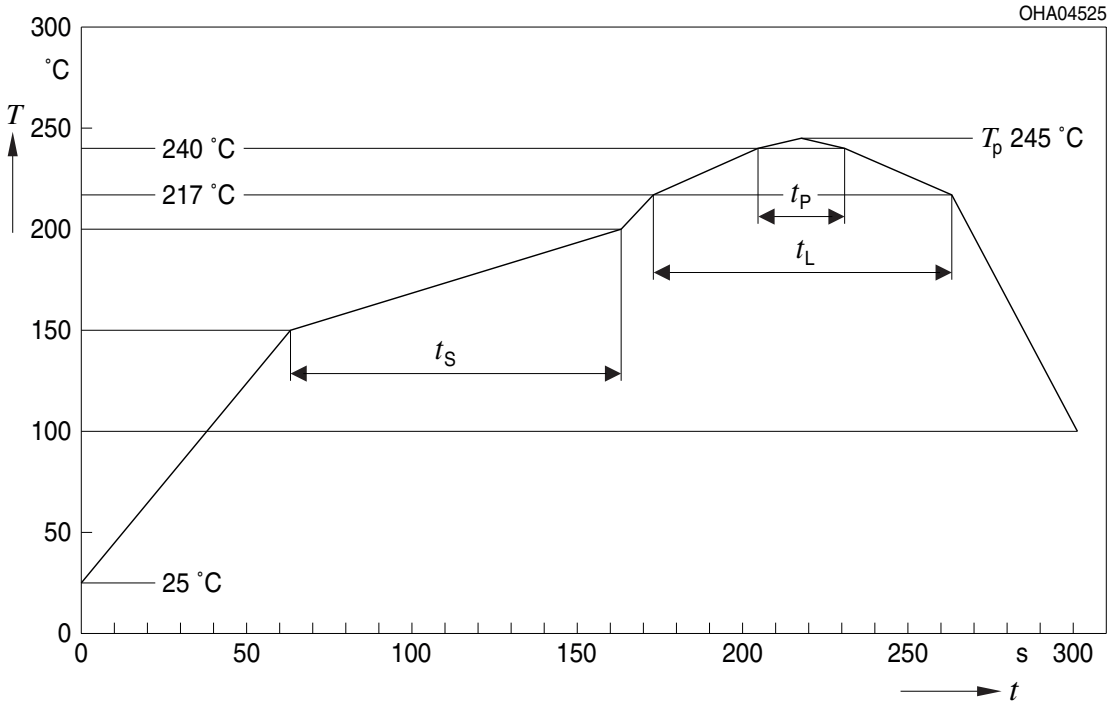
Recommended Solder Pad



Dimensions in mm (inch).

Reflow Soldering Profile

Product complies to MSL Level 2 acc. to JEDEC J-STD-020D.01



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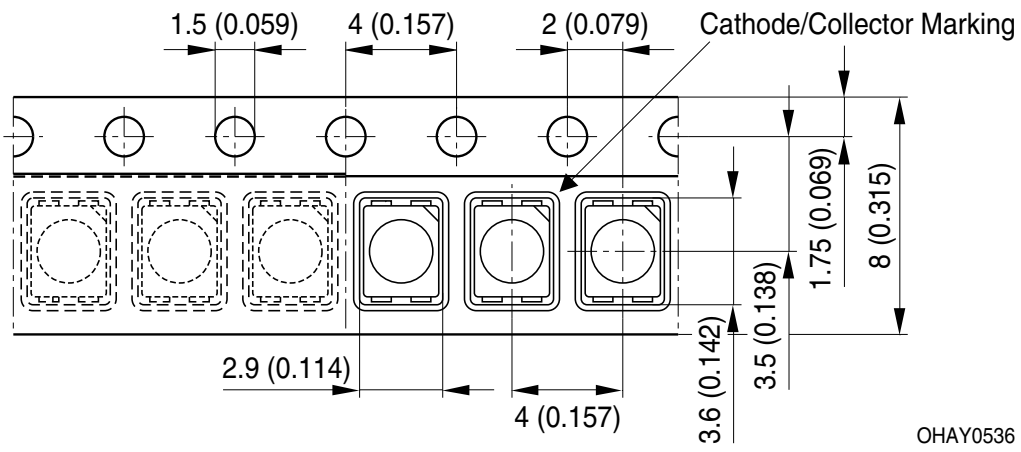
Profile Feature Profil-Charakteristik	Symbol Symbol	Pb-Free (SnAgCu) Assembly			Unit Einheit
		Minimum	Recommendation	Maximum	
Ramp-up rate to preheat*) 25 °C to 150 °C			2	3	K/s
Time t_S T_{Smin} to T_{Smax}	t_S	60	100	120	s
Ramp-up rate to peak*) T_{Smax} to T_P			2	3	K/s
Liquidus temperature	T_L		217		°C
Time above liquidus temperature	t_L		80	100	s
Peak temperature	T_P		245	260	°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	6	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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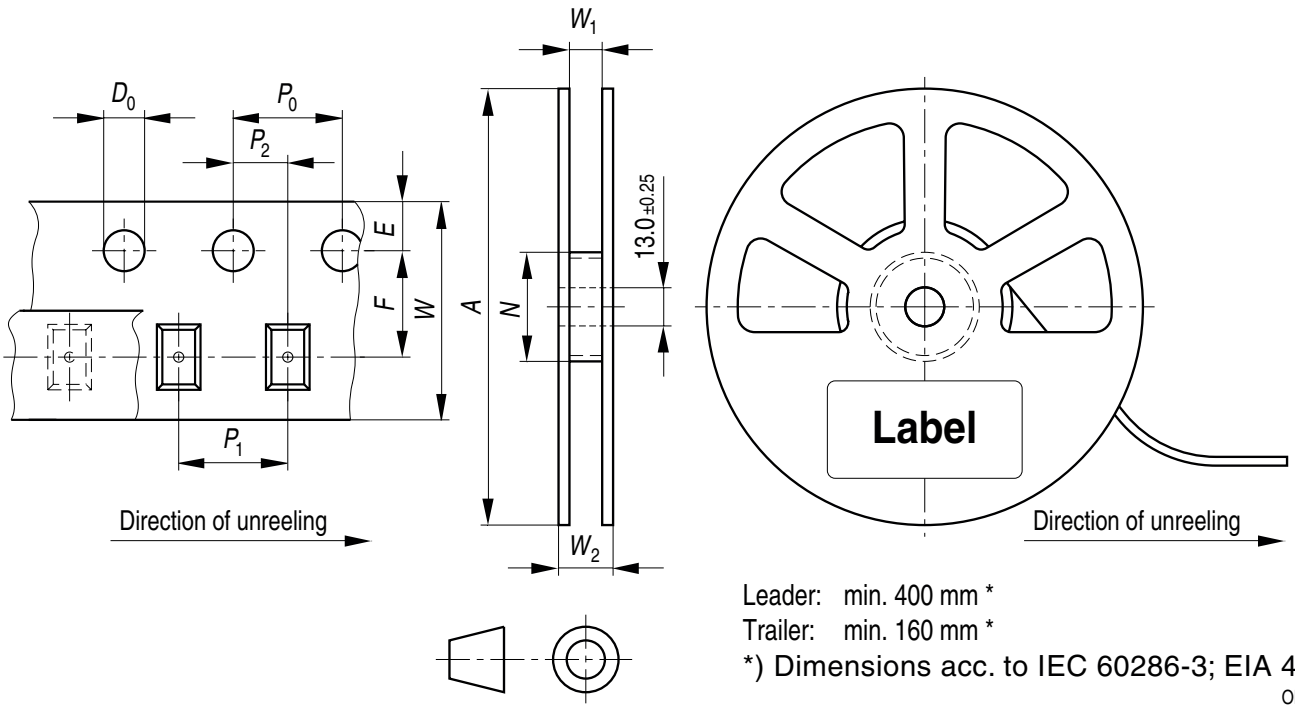
Taping



Dimensions in mm (inch).

Tape and Reel

8 mm tape with 2000 pcs. on ∅ 180 mm reel, 8000 pcs. on ∅ 330 mm reel



Leader: min. 400 mm *
Trailer: min. 160 mm *
*) Dimensions acc. to IEC 60286-3; EIA 481-D

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Tape dimensions [mm]

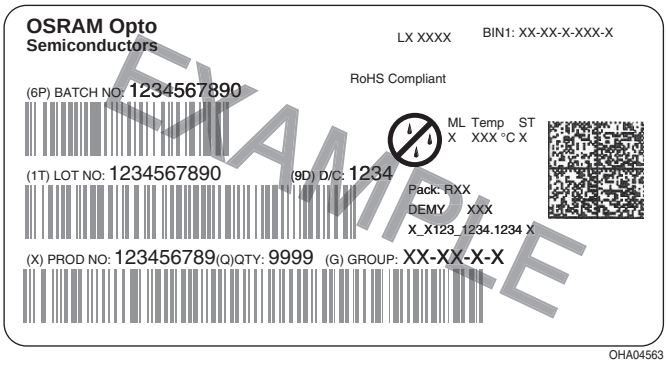
W	P_0	P_1	P_2	D_0	E	F
8 + 0.3 / -0.1	4 ± 0.1	2 ± 0.05 or 4 ± 0.1	2 ± 0.05	1.5 ± 0.1	1.75 ± 0.1	3.5 ± 0.05

Reel dimensions [mm]

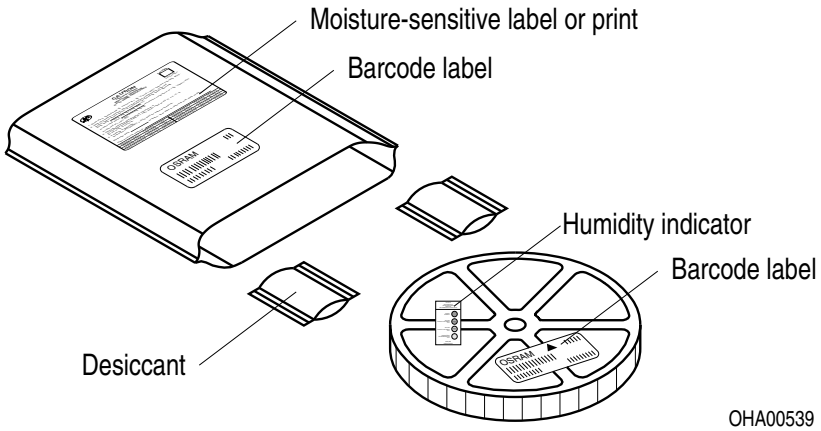
A	W	N_{min}	W_1	W_{2max}
180	8	60	8.4 + 2	14.4

A	W	N_{min}	W_1	W_{2max}
330	8	60	8.4 + 2	14.4

Barcode-Product-Label (BPL)



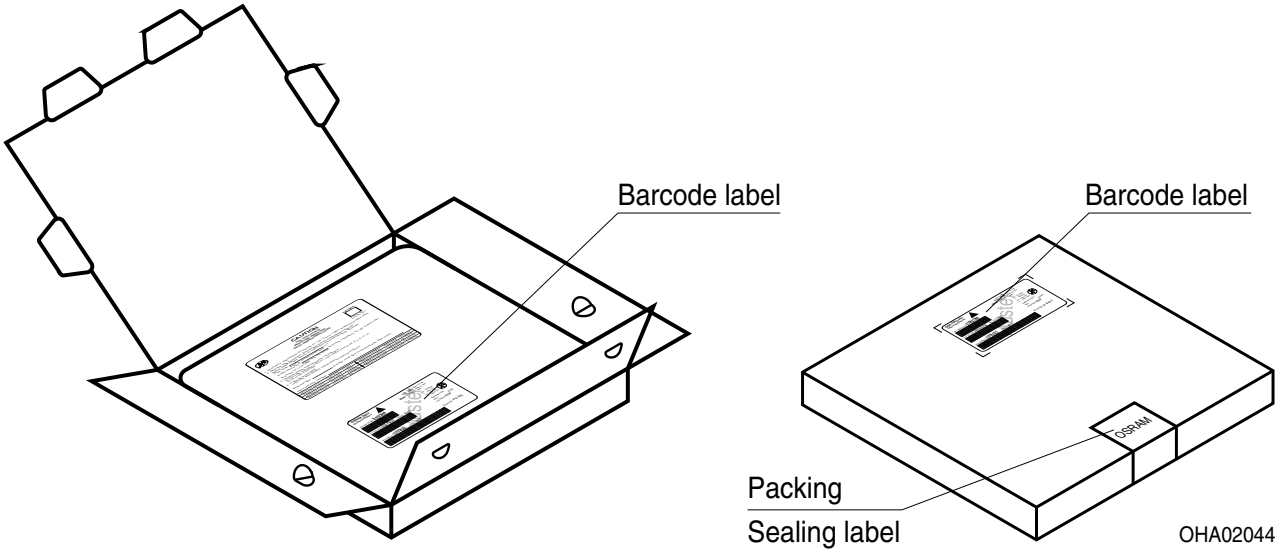
Dry Packing Process and Materials



Note:
Moisture-sensitive product is packed in a dry bag containing desiccant and a humidity card.
Regarding dry pack you will find further information in the internet. Here you will also find the normative

references like JEDEC.

Transportation Packing and Materials



Dimensions of transportation box in mm

Width	Length	Height
200 ± 5 352 ± 5	195 ± 5 352 ± 5	30 ± 5 33 ± 5

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Disclaimer

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

Attention please!
The information describes the type of component and shall not be considered as assured characteristics.
Terms of delivery and rights to change design reserved. Due to technical requirements components may contain dangerous substances.
For information on the types in question please contact our Sales Organization.
If printed or downloaded, please find the latest version in the Internet.
Packing
Please use the recycling operators known to you. We can also help you – get in touch with your nearest sales office. By agreement we will take packing material back, if it is sorted. You must bear the costs of transport. For packing material that is returned to us unsorted or which we are not obliged to accept, we shall have to invoice you for any costs incurred.
Components used in life-support devices or systems must be expressly authorized for such purpose!
Critical components* may only be used in life-support devices** or systems with the express written approval of OSRAM OS.

*) A critical component is a component used in 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 the effectiveness of that device or system.
**) 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 and the life of the user may be endangered.

Glossary

[1] **Thermal resistance:** junction -ambient, mounted on PC-board (FR4), padsize 16 mm^2 each

[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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