BIOFY® Sensor
Version 1.1

SFH 7070

Features:
- Multi chip package featuring two green emitters and one detector
- Package size: (WxDxH) 7.5 mm x 3.9 mm x 0.9 mm
- Light Barriers to block optical crosstalk
- optimized for strong PPG signal

Applications
- Heart rate monitoring

for:
- Wearable devices (e.g. smart watches, fitness trackers, ...)
- Mobile devices

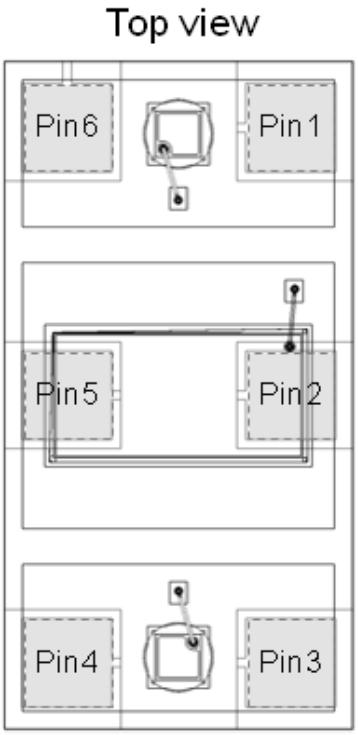
Ordering Information

Type	Ordering Code
SFH 7070	Q65111A9887

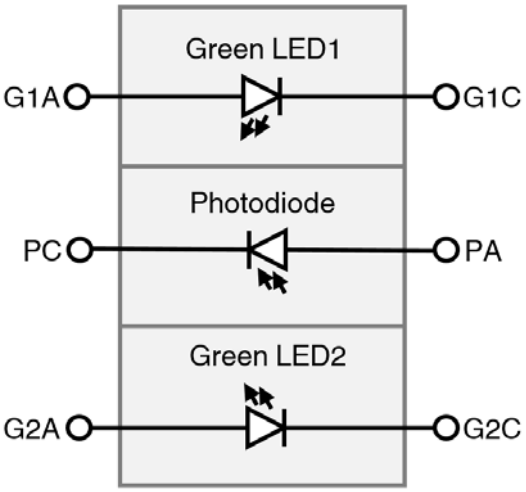
OSRAM Opto Semiconductors

Pin configuration

Pin	Name	Function
1	G1C	Green LED 1 Cathode
2	PA	Photodiode Anode
3	G2C	Green LED 2 Cathode
4	G2A	Green LED 2 Anode
5	PC	Photodiode Cathode
6	G1A	Green LED 1 Anode



Block diagram



OSRAM Opto Semiconductors

Maximum Ratings (T_A = 25 °C)

Parameter	Symbol	Values	Unit
General			
Operating temperature range	T_{op}	-40 … 85	°C
Storage temperature range	T_{stg}	-40 … 85	°C
ESD withstand voltage (acc. to ANSI/ ESDA/ JEDEC JS-001 - HBM)	V_{ESD}	2	kV
Green Emitters			
Reverse voltage	V_R	5	V
Forward current	$I_{F\ (DC)}$	25	mA
Surge current (t_p = 10 µs, D = 0)	I_{FSM}	300	mA
Detector			
Reverse voltage	V_R	16	V

Characteristics (T_A = 25 °C)

Parameter		Symbol	Value	Unit
Green Emitter (single emitter)				
Wavelength of peak emission (I_F = 20 mA)	(typ.)	λ_{peak}	526	nm
Centroid Wavelength (I_F = 20 mA)	(typ. (max.))	$\lambda_{centroid}$	530 (±10)	nm
Spectral bandwidth at 50% of I_{max} (I_F = 20 mA)	(typ.)	$\Delta\lambda$	32	nm
Half angle	(typ.)	φ	± 60	°
Rise and fall time of I_e (10% and 90% of $I_{e\ max}$) (I_F = 100 mA, t_p = 16 µs, R_L = 50 Ω)	(typ.)	t_r, t_f	56	ns
Forward voltage (I_F = 20 mA)	(typ. (max.))	V_F	3.0 (≤ 3.4)	V
Reverse current (V_R = 5 V)		I_R	not designed for reverse operation	µA
Radiant intensity (I_F = 20 mA, t_p = 20 ms)	(typ.)	I_e	3.8	mW / sr
Total radiant flux (I_F = 20 mA, t_p = 20 ms)	(typ.)	Φ_e	11.7	mW
Temperature coefficient of I_e or Φ_e (I_F = 20 mA, t_p = 20 ms)	(typ.)	TC_I	-0.35	% / K
Temperature coefficient of $\lambda_{centroid}$ (I_F = 20 mA, t_p = 20 ms)	(typ.)	$TC_{\lambda centroid}$	0.03	nm / K
Temperature coefficient of V_F (I_F = 20 mA, t_p = 20 ms)	(typ.)	TC_V	-3.6	mV / K

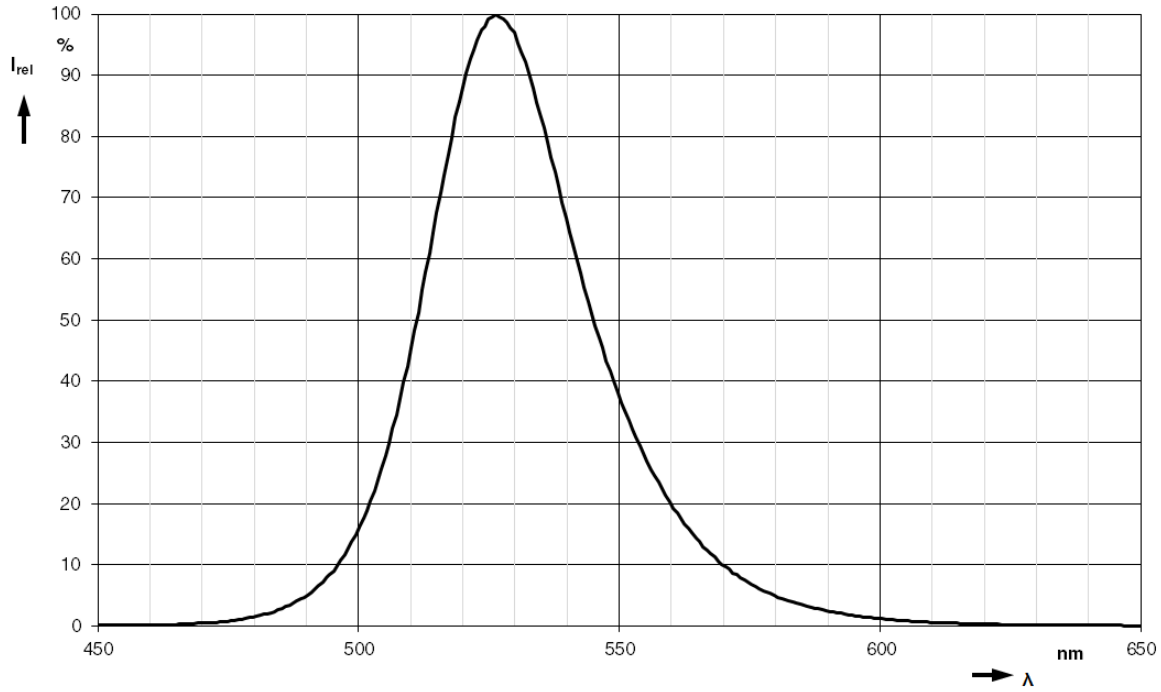
Characteristics (T_A = 25 °C)

Parameter		Symbol	Value	Unit
Detector				
Photocurrent (E_e = 0.1 mW/cm², λ = 530 nm, V_R = 5 V)	(typ.)	$I_{P,530}$	0.985	µA
Wavelength of max. sensitivity	(typ.)	$\lambda_{S\ max}$	635	nm
Spectral range of sensitivity	(typ.)	$\lambda_{10\%}$	402 … 694	nm
Radiation sensitive area	(typ.)	A	3.46	mm^2
Dimensions of radiant sensitive area	(typ.)	L x W	1.29 x 2.69	mm x mm
Half angle	(typ.)	φ	± 57	°
Dark current (V_R = 5 V, Ee = 0 mW/cm²)	(typ. (max.))	I_R	0.4 (≤ 5)	nA
Spectral sensitivity of the chip (λ = 530nm)	(typ.)	$S_{\lambda 530}$	0.31	A / W
Spectral sensitivity of the chip (λ > 690nm)	(typ.)	S_{IR}	0.02	A / W
Open-circuit voltage (E_e = 0.1 mW/cm², λ = 530 nm)	(typ.)	$V_{O,535}$	390	mV
Short-circuit current (E_e = 0.1 mW/cm², λ = 530 nm)	(typ.)	$I_{SC,535}$	0.984	µA
Rise and fall time (V_R = 5 V, R_L = 50 Ω, λ = 530nm)	(typ.)	t_r, t_f	40	ns
Forward voltage (I_F = 10 mA, E = 0 mW/cm²)	(typ.)	V_F	0.84	V
Capacitance (V_R = 5 V, f = 1 MHz, E = 0 mW/cm²)	(typ.)	C_0	55	pF

Diagrams for green emitters

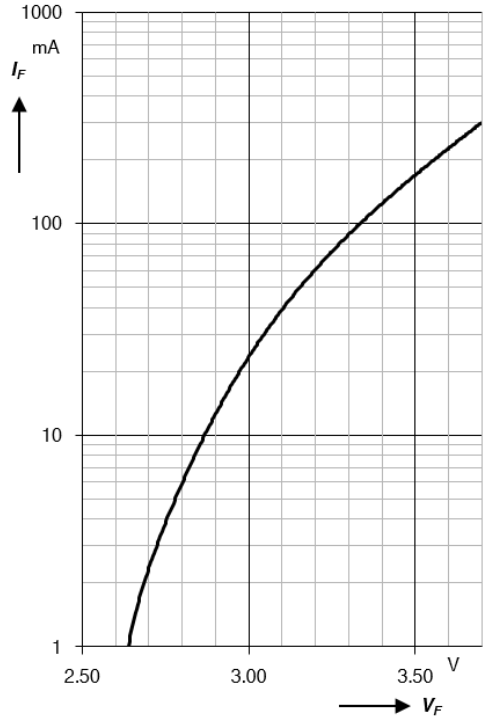
Relative spectral emission [1)]

$I_{rel} = f(\lambda)$, $T_A = 25$ °C, $I_F = 20$ mA



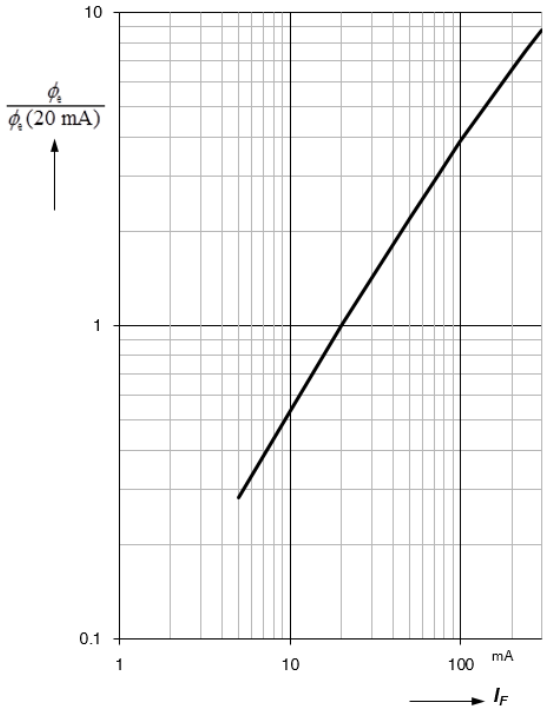
Forward current [1)]

$I_F = f(V_F)$, $T_A = 25$°C



Relative radiant flux [1)]

$\Phi_e/\Phi_e(20\text{ mA}) = f(I_F)$, single pulse, $t_p = 25\mu s$, $T_A = 25$°C

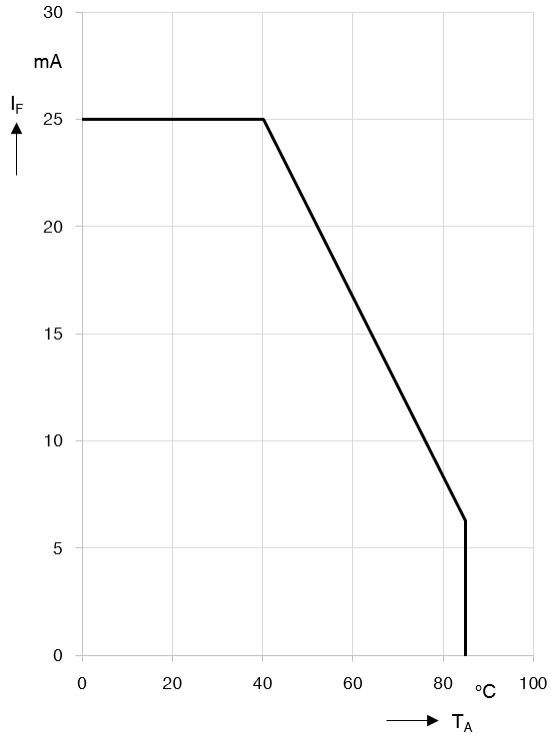


OSRAM Opto Semiconductors

Diagrams for green emitters

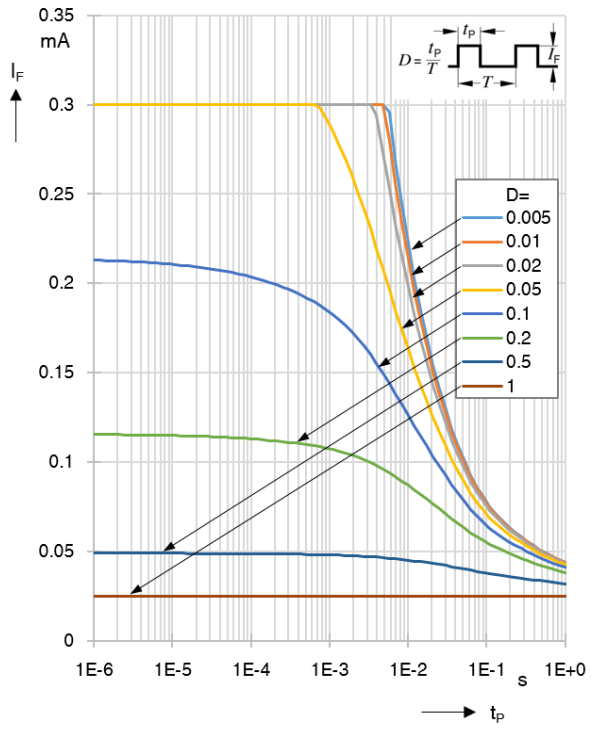
Max. permissible forward current [1)]

$I_{F,max} = f(T_A)$, R_{thJA} = 800 K/W



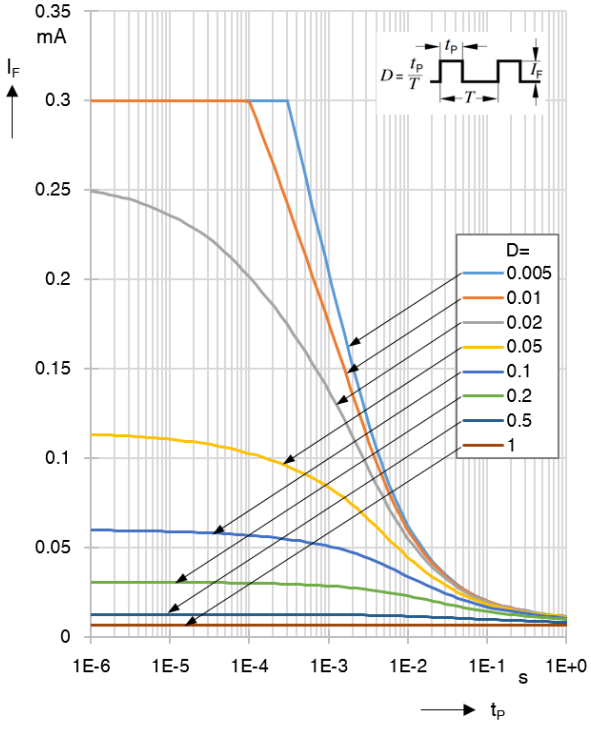
Permissible pulse handling capability [1)]

$I_F = f(t_p)$, T_A= 40°C, duty cycle D



Permissible pulse handling capability [1)]

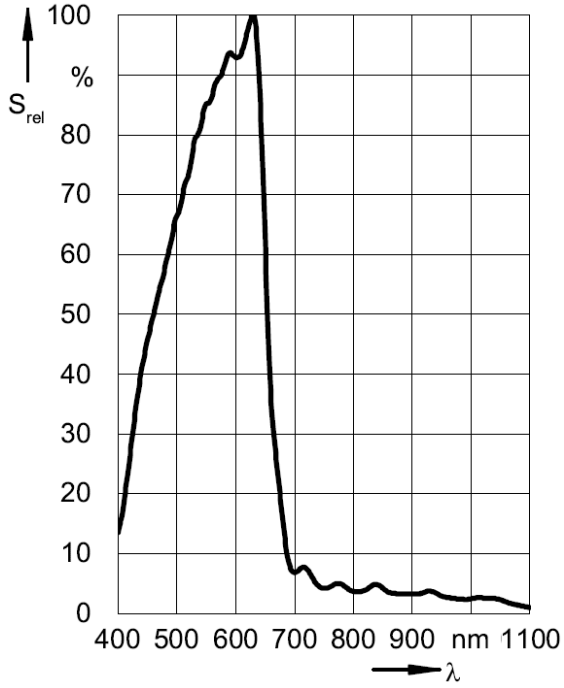
$I_F = f(t_p)$, T_A= 85°C, duty cycle D



Diagrams for detector

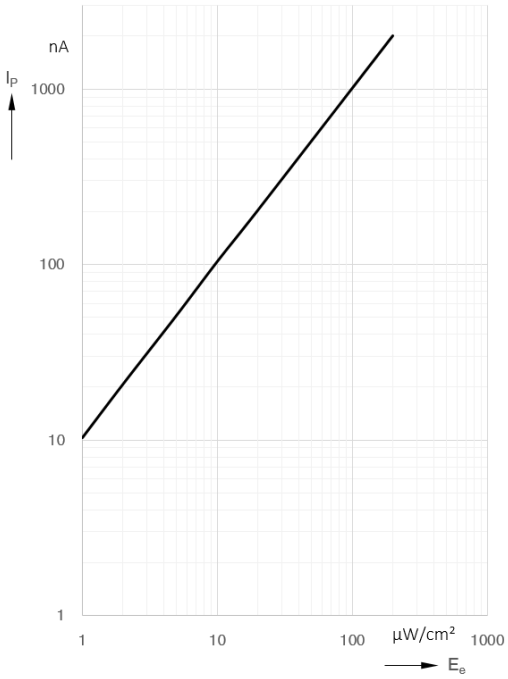
Relative spectral sensitivity [1)]

$S_{rel} = f(\lambda)$, $T_A = 25$ °C



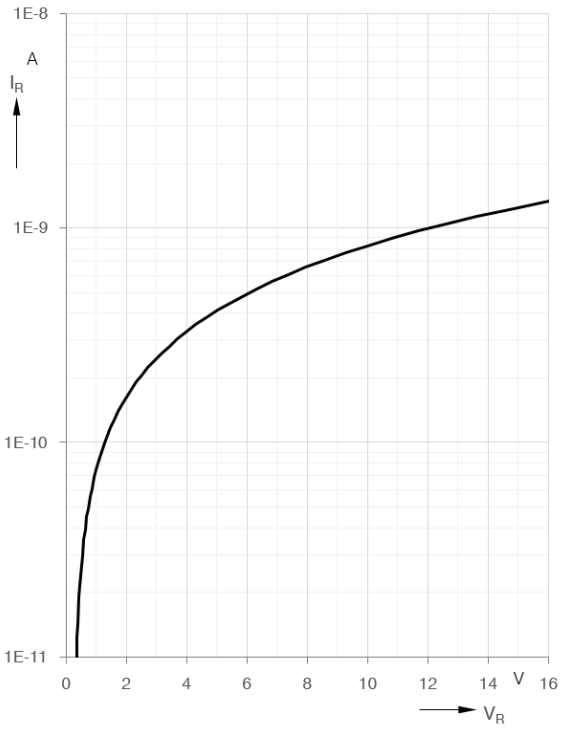
Photocurrent [1)]

$I_P(V_R = 5\ V)$, λ=530nm, $T_A = 25$ °C



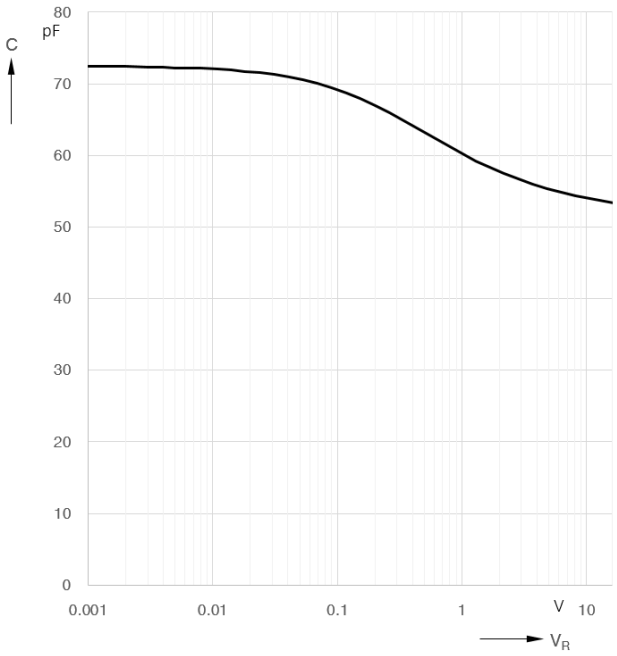
Dark current [1)]

$I_R = f(V_R)$, E = 0 mW/cm², $T_A = 25$ °C



Capacitance [1)]

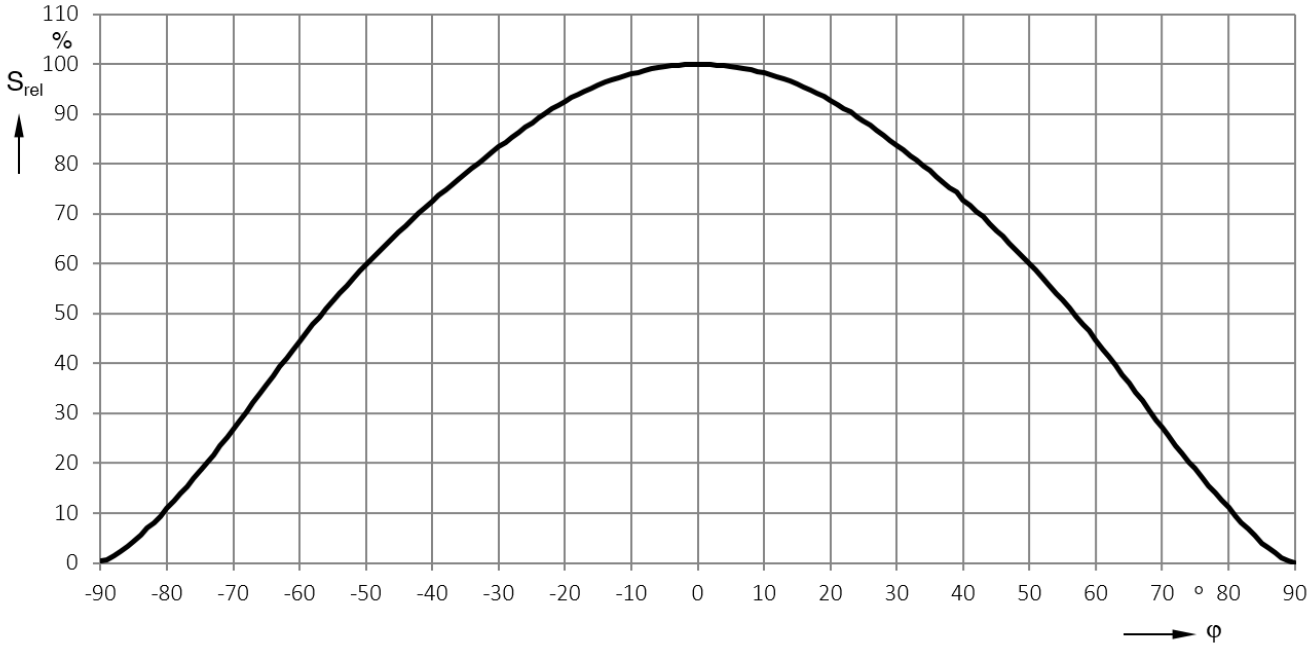
$C = f(V_R)$, f = 1 MHz, E = 0 mW/cm², $T_A = 25$ °C



OSRAM Opto Semiconductors

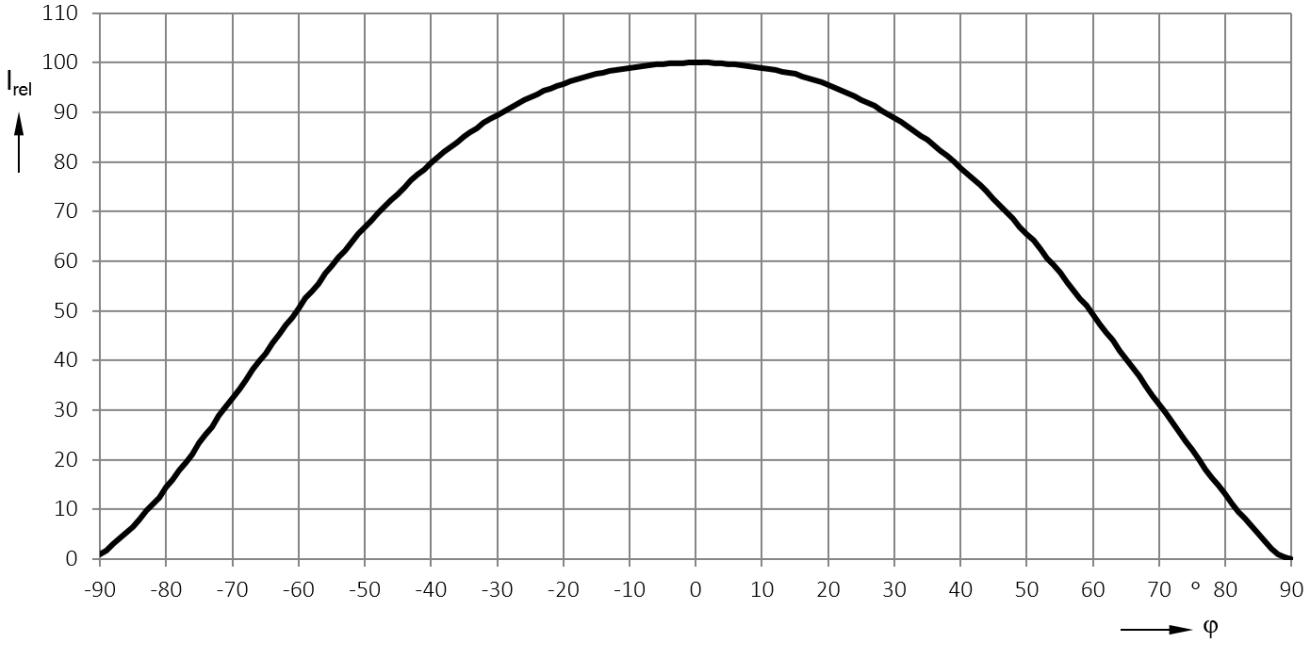
Directional characteristics of detector [1)]

$S_{rel} = f(\varphi)$, λ=530nm

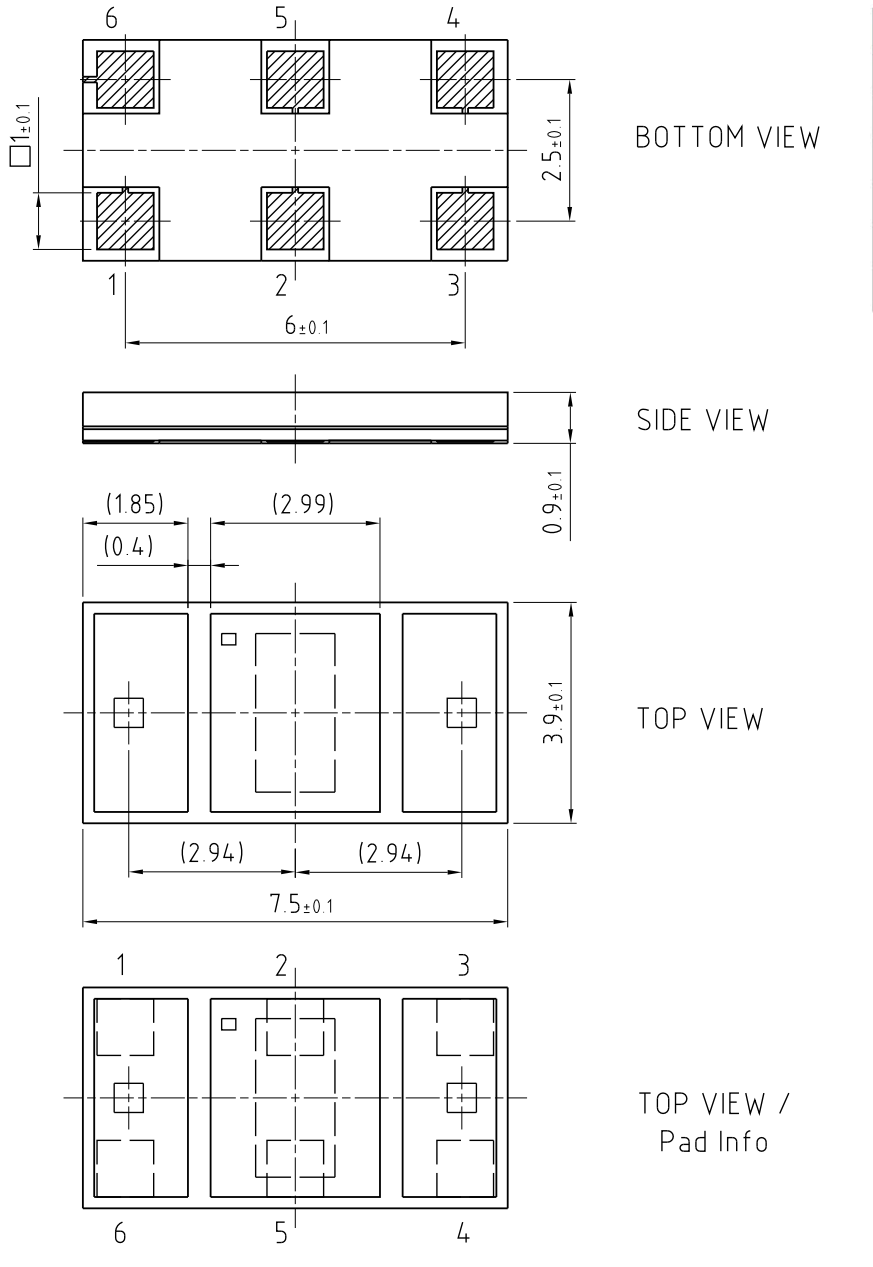


Radiation characteristics of emitter [1)]

$I_{rel} = f(\varphi)$



Package Outline



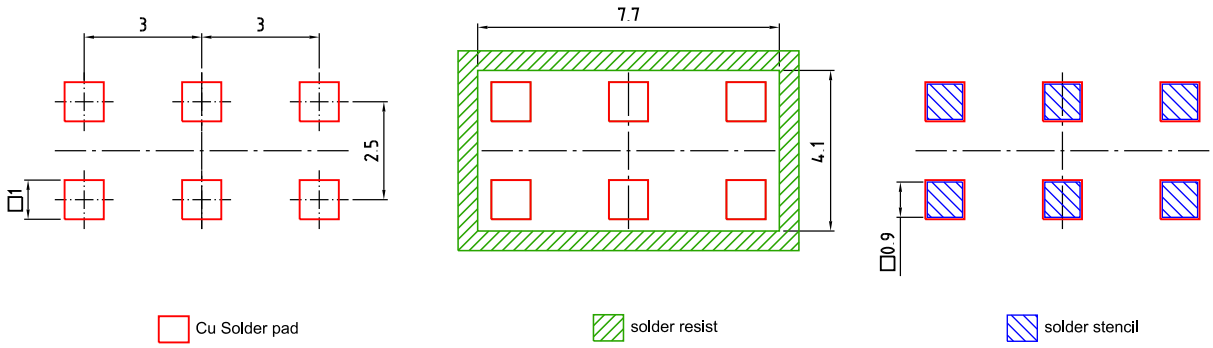
Pin	Name	Function
1	G1C	Green LED1 cathode
2	PA	Photodiode anode
3	G2C	Green LED2 cathode
4	G2A	Green LED2 anode
5	PC	Photodiode cathode
6	G1A	Green LED1 anode

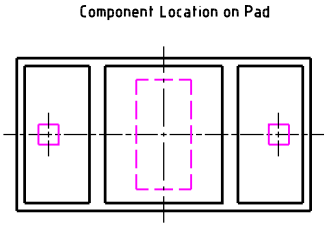
Dimensions in mm

Package:
chip on board

Approximate Weight:
43 mg

Recommended solder pad design



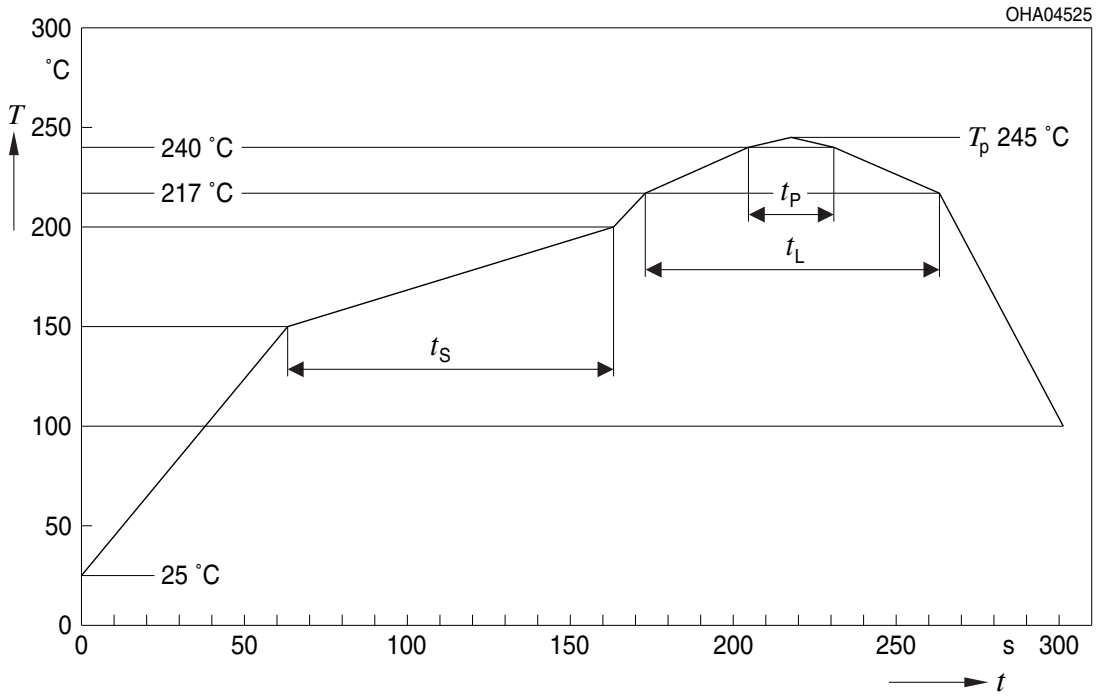


E062.3010.204-02

Dimensions in mm (inch).

Reflow Soldering Profile

Product complies to MSL Level 4 acc. to JEDEC J-STD-020D.01



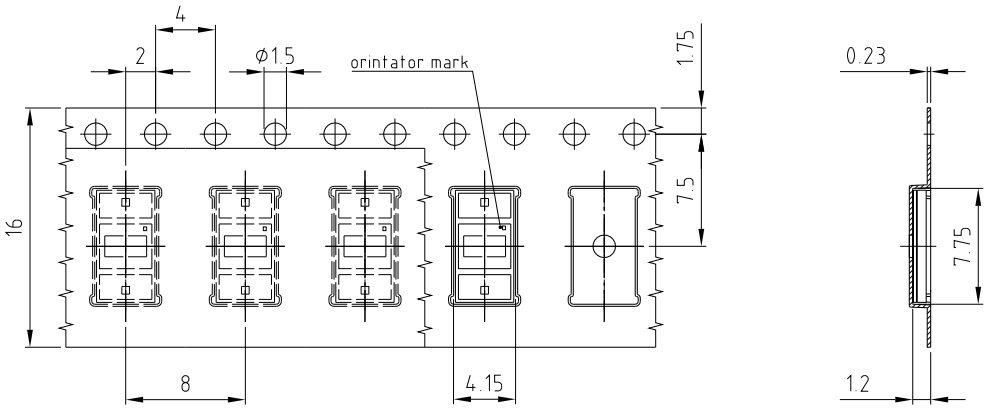
OSRAM Opto Semiconductors

OHA04612

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

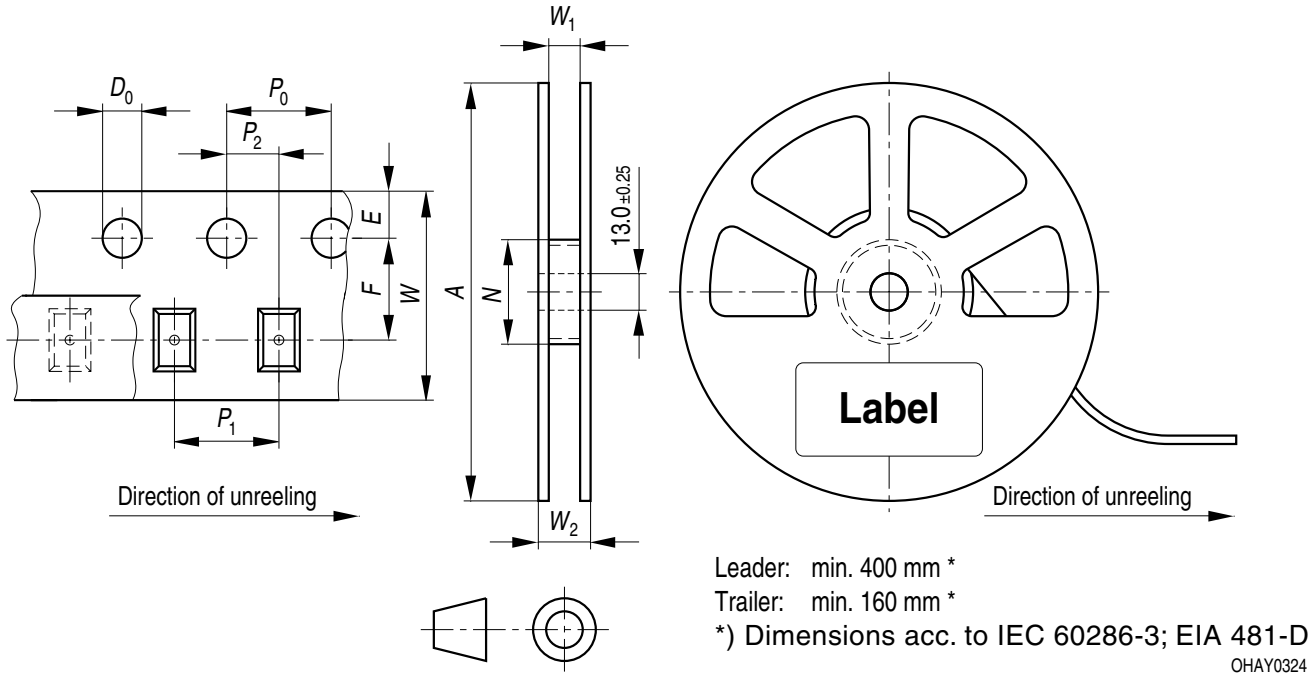
Method of Taping



Dimensions in mm [inch].

Tape and Reel

16 mm tape with 1500 pcs. on Ø 180 mm reel



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

OHAY0324

Dimensions in mm

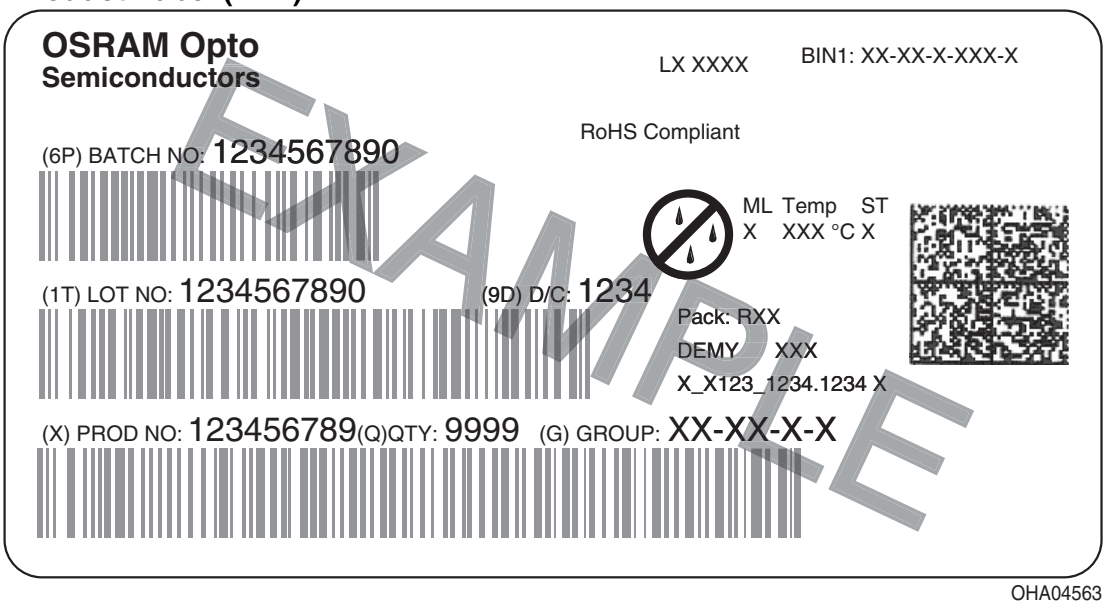
Tape Dimensions [mm]

W	P_0	P_1	P_2	D_0	E	F
16 +0.3 / -0.1	4 ±0.1	8 ±0.1	2 ±0.05	1.5 ±0.1	1.75 ±0.1	7.5 ±0.05

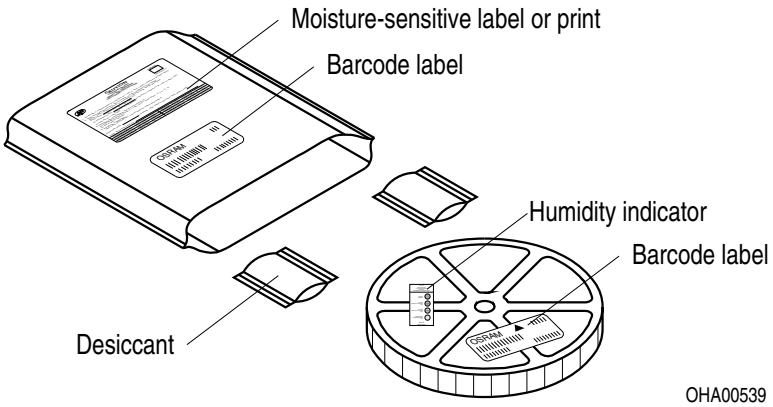
Reel Dimensions [mm]

A	W	N_{min}	W_1	W_{2max}
180	16	60	16.4 +2	22.4

Barcode-Product-Label (BPL)

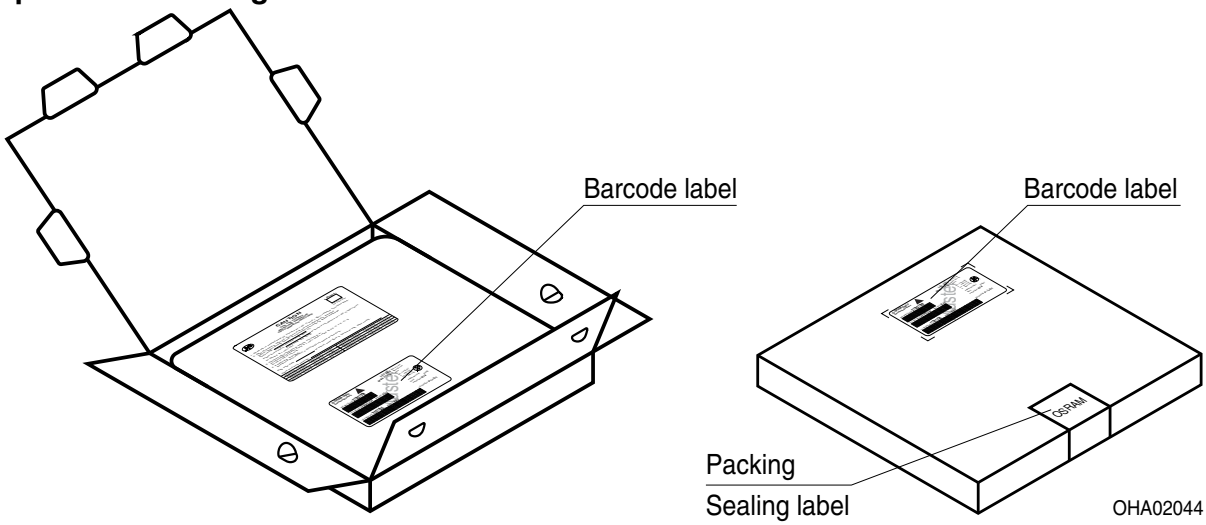


Dry Packing Process and Materials



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
195 ± 5	195 ± 5	42 ± 5

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)] **Typical Values:** Due to the special conditions of the manufacturing processes of LED and photodiodes, 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.

Published by OSRAM Opto Semiconductors GmbH
Leibnizstraße 4, D-93055 Regensburg

EU RoHS and China RoHS compliant product

此产品符合欧盟 RoHS 指令的要求；
按照中国的相关法规和标准，不含有毒有害物质或元素。

OSRAM Opto Semiconductors

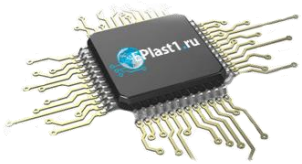
Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)
Факс: 8 (812) 320-02-42
Электронная почта: org@eplast1.ru
Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.