

LW TTSD specified at 5mA binning FK0PN0



TOPLED®

TOPLED, SMT LED with integrated reflector. With our great experience in SMT LED we are able to offer a high quality product for all kind of applications.



Applications

- Cluster, Button Backlighting
- Electronic Equipment
- Interior Illumination (e.g. Ambient Map)
- White Goods

Features:

- Package: white PLCC-2 package, colored diffused silicone resin
- Chip technology: ThinGaN
- Typ. Radiation: 120° (Lambertian emitter)
- Color: Cx = 0.33, Cy = 0.33 acc. to CIE 1931 (● white)
- Corrosion Robustness Class: 3B
- Qualifications: AEC-Q102 Qualified
- ESD: 2 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM)

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Ordering Information

Type	Luminous Intensity ¹⁾ $I_F = 5 \text{ mA}$ I_v	Ordering Code
LW TTSD-R2T1-FK0PN0-W266	140 ... 355 mcd	Q65113A1043

Maximum Ratings

Parameter	Symbol		Values
Operating Temperature	T_{op}	min.	-40 °C
		max.	110 °C
Storage Temperature	T_{stg}	min.	-40 °C
		max.	110 °C
Junction Temperature	T_j	max.	125 °C
Forward Current $T_s = 25\text{ °C}$	I_F	min.	1 mA
		max.	30 mA
Surge Current $t \leq 10\ \mu\text{s}$; $D = 0.005$; $T_s = 25\text{ °C}$	I_{FS}	max.	200 mA
Reverse voltage ²⁾ $T_s = 25\text{ °C}$	V_R	max.	5 V
ESD withstand voltage acc. to ANSI/ESDA/JEDEC JS-001 (HBM)	V_{ESD}		2 kV

Characteristics

$I_F = 5 \text{ mA}$; $T_S = 25 \text{ °C}$

Parameter	Symbol		Values
Chromaticity Coordinate ³⁾	C_x	typ.	0.33
	C_y	typ.	0.33
Viewing angle at 50% I_V	2ϕ	typ.	120 °
Forward Voltage ⁴⁾ $I_F = 5 \text{ mA}$	V_F	min.	2.60 V
		typ.	2.80 V
		max.	3.30 V
Reverse current ²⁾ $V_R = 5 \text{ V}$	I_R	typ.	0.01 μA
		max.	10 μA
Real thermal resistance junction/ambient ⁵⁾⁶⁾	$R_{thJA \text{ real}}$	max.	340 K / W
Real thermal resistance junction/solderpoint ⁵⁾	$R_{thJS \text{ real}}$	max.	180 K / W

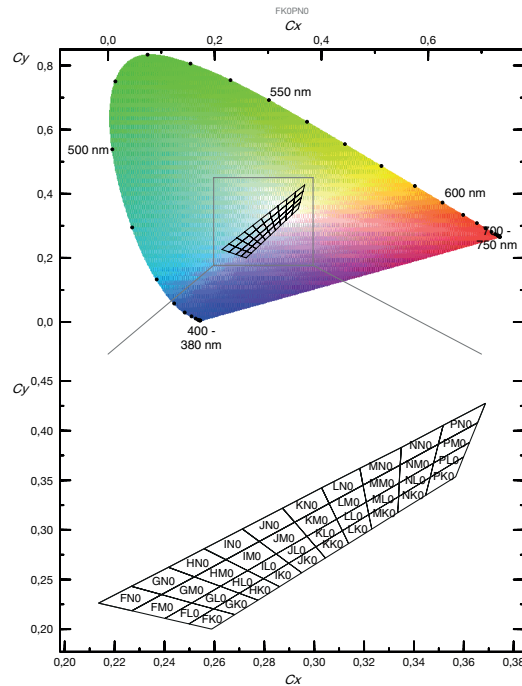
Brightness Groups

Group	Luminous Intensity ¹⁾ $I_F = 5 \text{ mA}$ min. I_v	Luminous Intensity ¹⁾ $I_F = 5 \text{ mA}$ max. I_v	Luminous Flux ⁷⁾ $I_F = 5 \text{ mA}$ typ. Φ_v
R2	140 mcd	180 mcd	480 mlm
S1	180 mcd	224 mcd	606 mlm
S2	224 mcd	280 mcd	756 mlm
T1	280 mcd	355 mcd	953 mlm

Forward Voltage Groups

Group	Forward Voltage ⁴⁾ $I_F = 5 \text{ mA}$ min. V_F	Forward Voltage ⁴⁾ $I_F = 5 \text{ mA}$ max. V_F
W2	2.60 V	2.70 V
Z6	2.70 V	3.00 V
66	3.00 V	3.30 V

Chromaticity Coordinate Groups



Chromaticity Coordinate Groups ³⁾

Group	Cx	Cy	Group	Cx	Cy	Group	Cx	Cy
FK0	0.2498	0.2053	GK0	0.2597	0.2204	HK0	0.2700	0.2361
	0.2597	0.2204		0.2700	0.2361		0.2797	0.2509
	0.2682	0.2146		0.2775	0.2292		0.2861	0.2427
	0.2589	0.2000		0.2682	0.2146		0.2775	0.2292
FLO	0.2402	0.2108	GLO	0.2509	0.2264	HLO	0.2624	0.2431
	0.2509	0.2264		0.2624	0.2431		0.2733	0.2590
	0.2597	0.2204		0.2700	0.2361		0.2797	0.2509
	0.2498	0.2053		0.2597	0.2204		0.2700	0.2361
FMO	0.2269	0.2185	GMO	0.2388	0.2348	HMO	0.2520	0.2527
	0.2388	0.2348		0.2520	0.2527		0.2646	0.2700
	0.2509	0.2264		0.2624	0.2431		0.2733	0.2590
	0.2402	0.2108		0.2509	0.2264		0.2624	0.2431
FNO	0.2136	0.2262	GNO	0.2267	0.2432	HNO	0.2416	0.2623
	0.2267	0.2432		0.2416	0.2623		0.2559	0.2810
	0.2388	0.2348		0.2520	0.2527		0.2646	0.2700
	0.2269	0.2185		0.2388	0.2348		0.2520	0.2527

LW TTSD specified at 5mA binning FK0PN0

Group	Cx	Cy	Group	Cx	Cy	Group	Cx	Cy
IK0	0.2797	0.2509	KK0	0.3007	0.2830	MK0	0.3219	0.3154
	0.2898	0.2664		0.3113	0.2992		0.3339	0.3336
	0.2950	0.2568		0.3138	0.2862		0.3335	0.3172
	0.2861	0.2427		0.3045	0.2717		0.3231	0.3008
ILO	0.2733	0.2590	KLO	0.2971	0.2935	MLO	0.3209	0.3281
	0.2848	0.2757		0.3090	0.3108		0.3341	0.3472
	0.2898	0.2664		0.3113	0.2992		0.3339	0.3336
	0.2797	0.2509		0.3007	0.2830		0.3219	0.3154
IMO	0.2646	0.2700	KMO	0.2922	0.3077	MM0	0.3196	0.3451
	0.2780	0.2883		0.3060	0.3266		0.3345	0.3654
	0.2848	0.2757		0.3090	0.3108		0.3341	0.3472
	0.2733	0.2590		0.2971	0.2935		0.3209	0.3281
INO	0.2559	0.2810	KNO	0.2873	0.3219	MNO	0.3183	0.3621
	0.2712	0.3009		0.3030	0.3424		0.3349	0.3830
	0.2780	0.2883		0.3060	0.3266		0.3345	0.3654
	0.2646	0.2700		0.2922	0.3077		0.3196	0.3451
JK0	0.2898	0.2664	LKO	0.3113	0.2992	NKO	0.3339	0.3336
	0.3007	0.2830		0.3219	0.3154		0.3465	0.3530
	0.3045	0.2717		0.3231	0.3008		0.3447	0.3347
	0.2950	0.2568		0.3138	0.2862		0.3335	0.3172
JLO	0.2848	0.2757	LLO	0.3090	0.3108	NLO	0.3341	0.3472
	0.2971	0.2935		0.3209	0.3281		0.3479	0.3673
	0.3007	0.2830		0.3219	0.3154		0.3465	0.3530
	0.2898	0.2664		0.3113	0.2992		0.3339	0.3336
JMO	0.2780	0.2883	LMO	0.3060	0.3266	NMO	0.3345	0.3654
	0.2922	0.3077		0.3196	0.3451		0.3498	0.3863
	0.2971	0.2935		0.3209	0.3281		0.3479	0.3673
	0.2848	0.2757		0.3090	0.3108		0.3341	0.3472
JNO	0.2712	0.3009	LNO	0.3030	0.3424	NNO	0.3349	0.3830
	0.2873	0.3219		0.3183	0.3621		0.3517	0.4053
	0.2922	0.3077		0.3196	0.3451		0.3498	0.3863
	0.2780	0.2883		0.3060	0.3266		0.3345	0.3654

LW TTSD specified at 5mA binning FK0PN0

Group	Cx	Cy	Group	Cx	Cy
PK0	0.3465	0.3530	PM0	0.3498	0.3863
	0.3599	0.3735		0.3655	0.4079
	0.3567	0.3535		0.3623	0.3882
	0.3447	0.3347		0.3479	0.3673
PL0	0.3479	0.3673	PN0	0.3517	0.4053
	0.3623	0.3882		0.3687	0.4276
	0.3599	0.3735		0.3655	0.4079
	0.3465	0.3530		0.3498	0.3863

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Group Name on Label

Example: R2-FK0-66

Brightness

Color Chromaticity

Forward Voltage

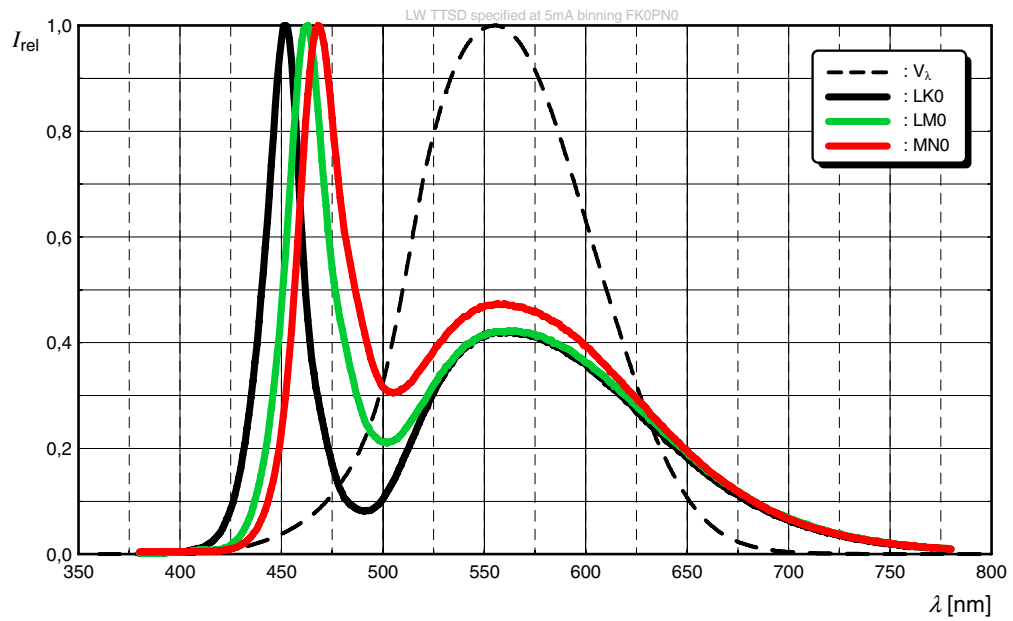
R2

FK0

66

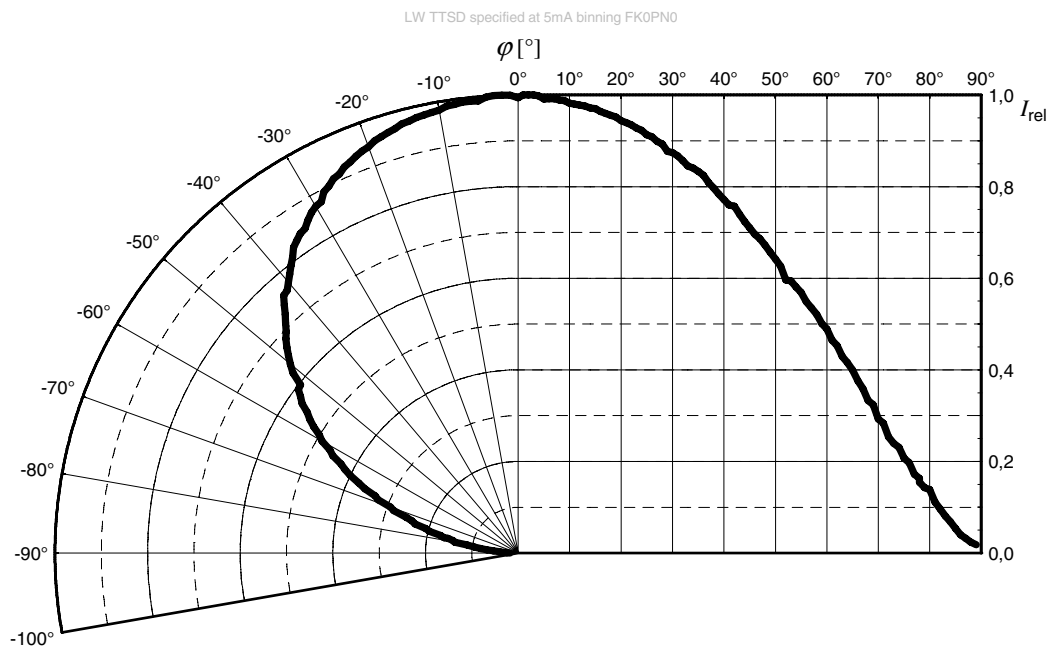
Relative Spectral Emission ⁷⁾

$$I_{rel} = f(\lambda); I_F = 5 \text{ mA}; T_S = 25 \text{ }^\circ\text{C}$$



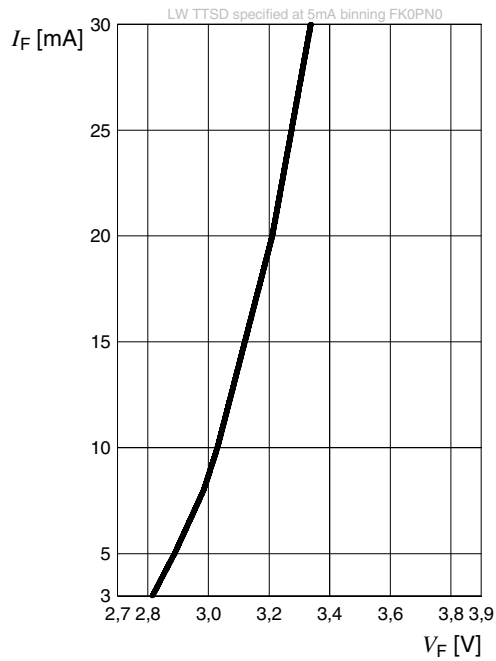
Radiation Characteristics ⁷⁾

$$I_{rel} = f(\phi); T_S = 25 \text{ }^\circ\text{C}$$



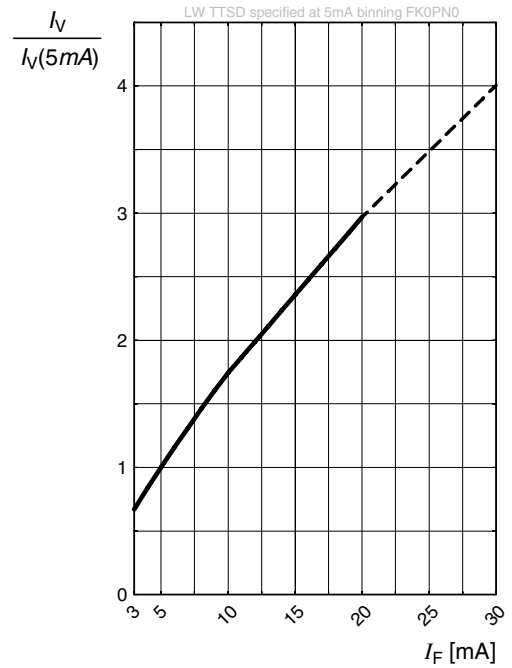
Forward current ⁷⁾

$$I_F = f(V_F); T_S = 25 \text{ }^\circ\text{C}$$



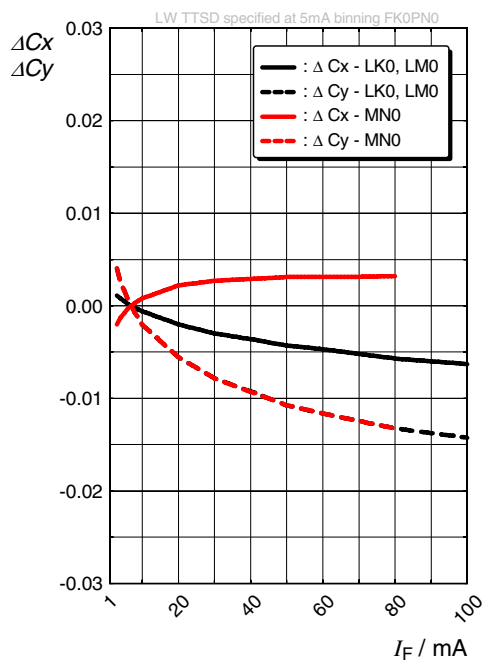
Relative Luminous Intensity ^{7), 8)}

$$I_V/I_V(5 \text{ mA}) = f(I_F); T_S = 25 \text{ }^\circ\text{C}$$



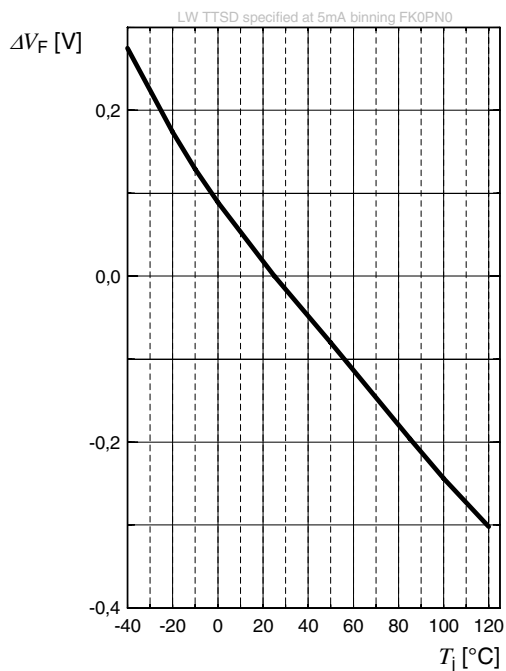
Chromaticity Coordinate Shift ⁷⁾

$$\Delta Cx, \Delta Cy = f(I_F); T_S = 25 \text{ }^\circ\text{C}$$



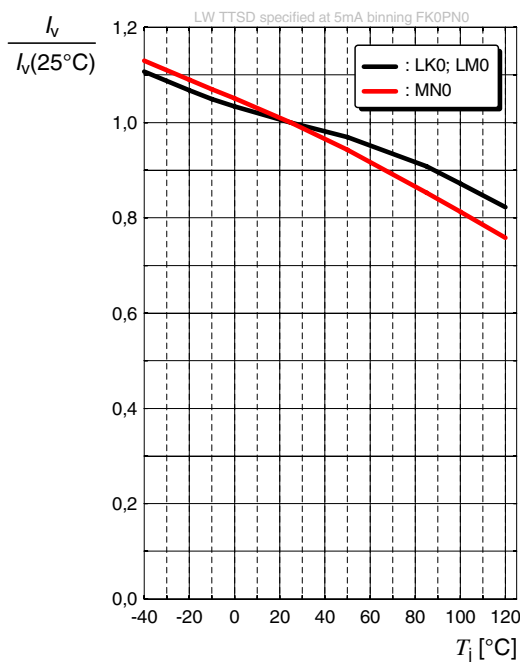
Forward Voltage ⁷⁾

$$\Delta V_F = V_F - V_F(25^\circ\text{C}) = f(T_j); I_F = 5\text{ mA}$$



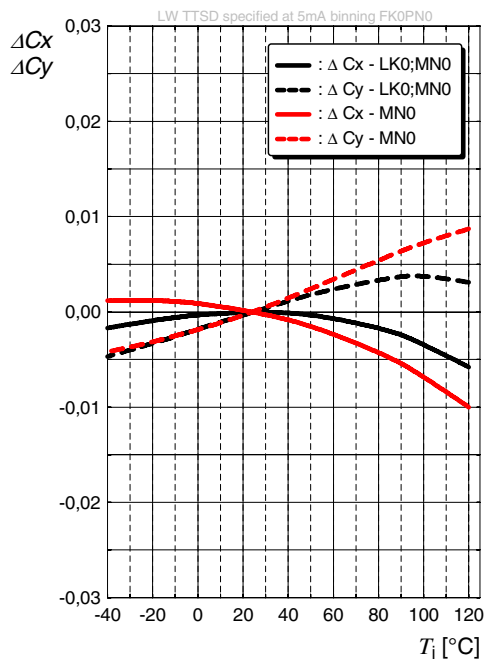
Relative Luminous Intensity ⁷⁾

$$I_v/I_v(25^\circ\text{C}) = f(T_j); I_F = 5\text{ mA}$$



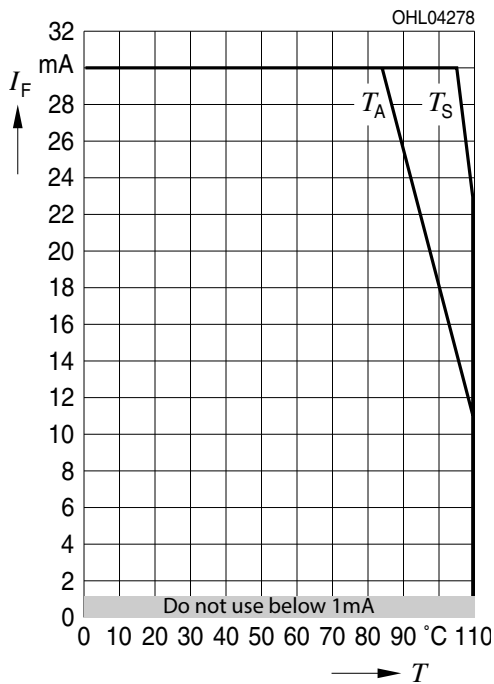
Chromaticity Coordinate Shift ⁷⁾

$$\Delta C_x, \Delta C_y = f(T_j); I_F = 5\text{ mA}$$



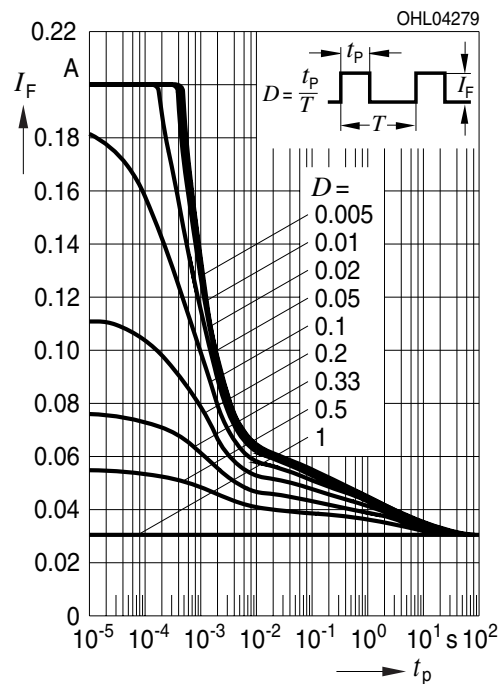
Max. Permissible Forward Current

$$I_F = f(T)$$



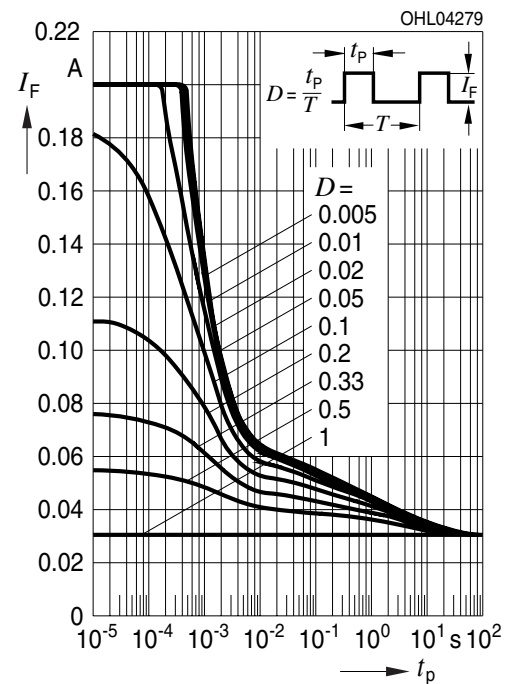
Permissible Pulse Handling Capability

$$I_F = f(t_p); D: \text{Duty cycle}; T_S = 25^\circ\text{C}$$

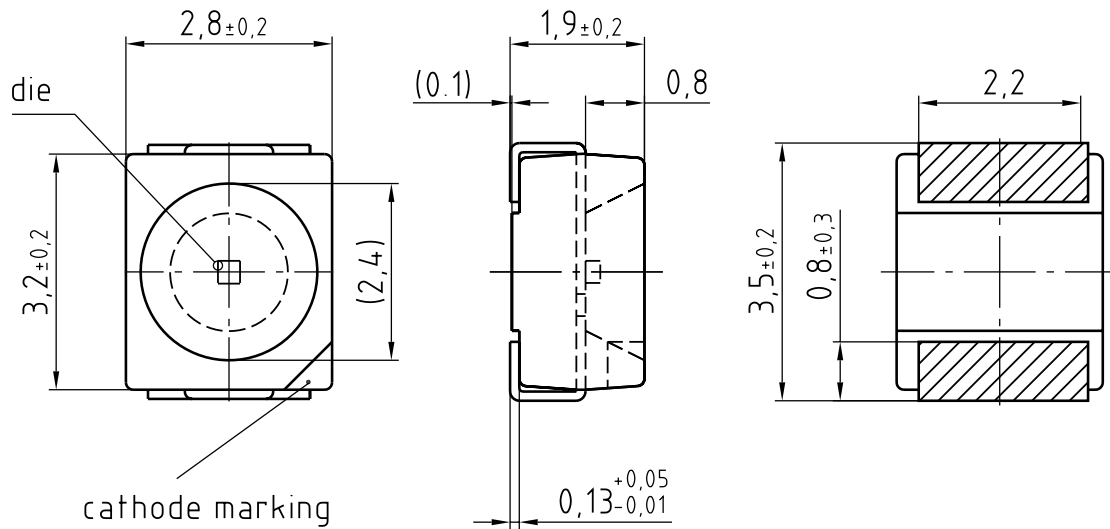


Permissible Pulse Handling Capability

$$I_F = f(t_p); D: \text{Duty cycle}; T_S = 85^\circ\text{C}$$



Dimensional Drawing ⁹⁾



general tolerance $\pm 0,1$

lead finish Sn 

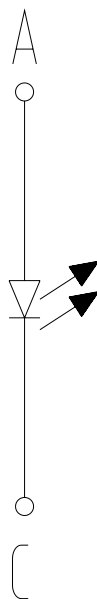
C63062-A3863-A4...-03

Further Information:

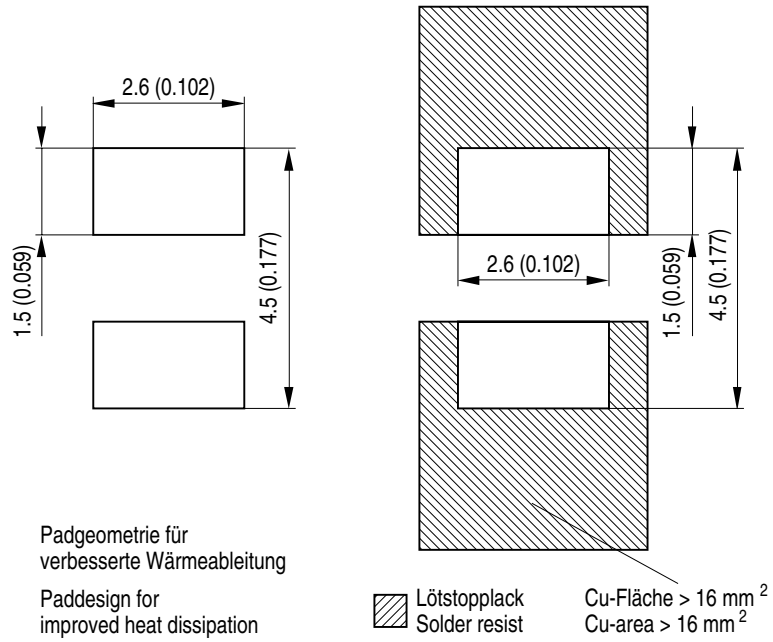
Approximate Weight: 32.0 mg

Corrosion test: Class: 3B
Test condition: 40°C / 90 % RH / 15 ppm H₂S / 14 days (stricter than IEC 60068-2-43)

Electrical Internal Circuit

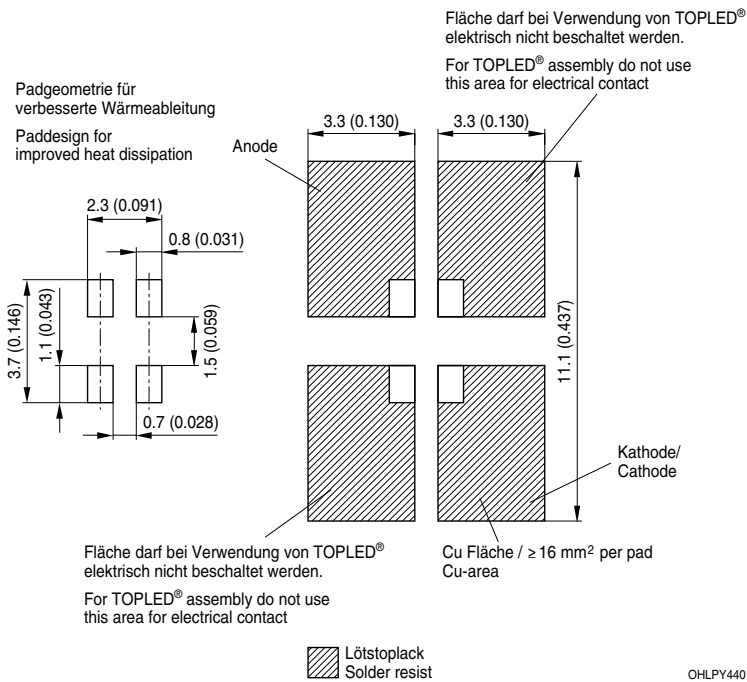


Recommended Solder Pad ⁹⁾



OHLPY970

Recommended Solder Pad ⁹⁾



OHLPY440

For superior solder joint connectivity results we recommend soldering under standard nitrogen atmosphere. Package not suitable for ultra sonic cleaning.

Reflow Soldering Profile

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

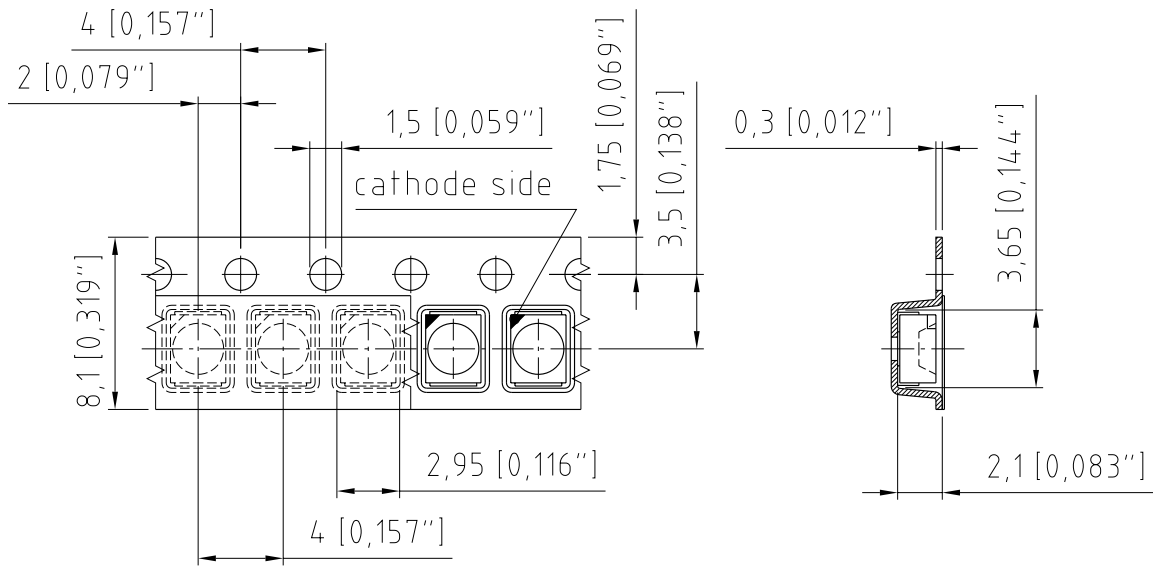


Profile Feature	Symbol	Pb-Free (SnAgCu) Assembly			Unit
		Minimum	Recommendation	Maximum	
Ramp-up rate to preheat ^{*)} 25 °C to 150 °C			2	3	K/s
Time t_s T_{Smin} to T_{Smax}	t_s	60	100	120	s
Ramp-up rate to peak ^{*)} T_{Smax} to T_p			2	3	K/s
Liquidus temperature	T_L		217		°C
Time above liquidus temperature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

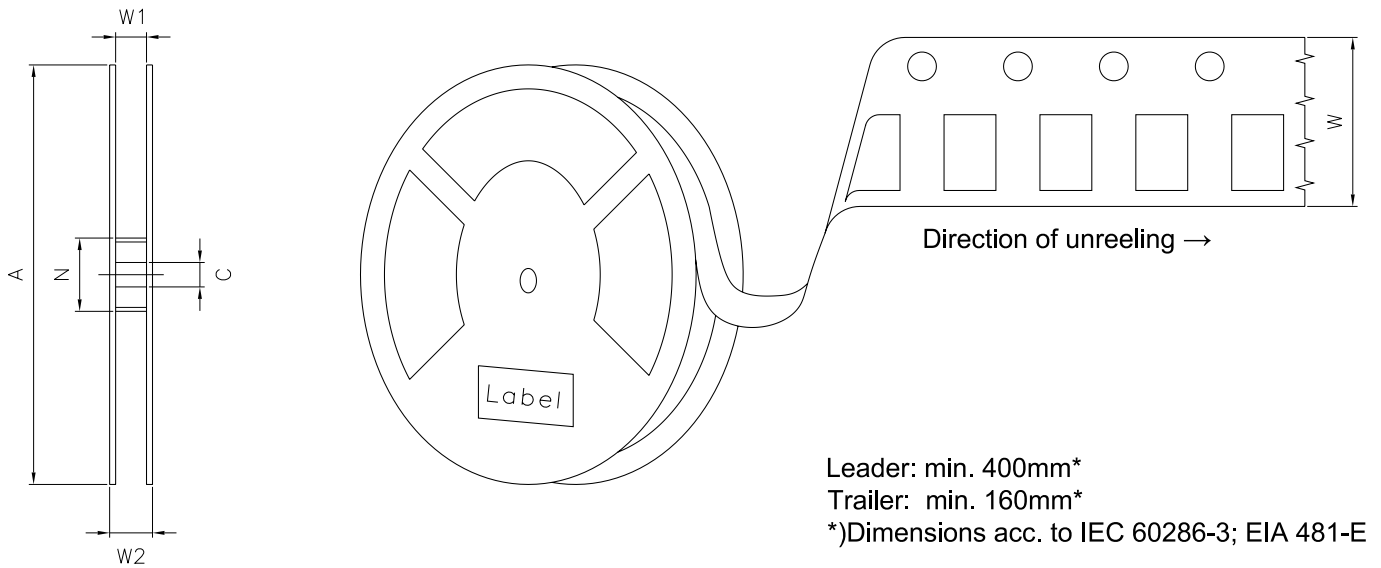
* slope calculation DT/Dt : Dt max. 5 s; fulfillment for the whole T-range

Taping ⁹⁾



C63062-A3863-B3 -02

Tape and Reel ¹⁰⁾



Reel Dimensions

A	W	N_{\min}	W_1	$W_{2\max}$	Pieces per PU
180 mm	$8 + 0.3 / - 0.1$ mm	60 mm	$8.4 + 2$ mm	14.4 mm	2000
330 mm	$8 + 0.3 / - 0.1$ mm	60 mm	$8.4 + 2$ mm	14.4 mm	8000

Barcode-Product-Label (BPL)

OSRAM Opto Semiconductors LX XXXX BIN1: XX-XX-X-XXX-X

RoHS Compliant

(6P) BATCH NO: 1234567890 ML Temp ST
X XXX °C X

(1T) LOT NO: 1234567890 (9D) D/C: 1234 Pack: RXX
DEMY XXX
X_X123_1234.1234 X

(X) PROD NO: 123456789(Q)QTY: 9999 (G) GROUP: XX-XX-X-X

The label features three barcode types: a standard 1D barcode for batch number, a 1D barcode for lot number, and a 1D barcode for product number. A QR code is located on the right side. A 'no moisture' symbol is present above the ML Temp ST information.

OHA04563

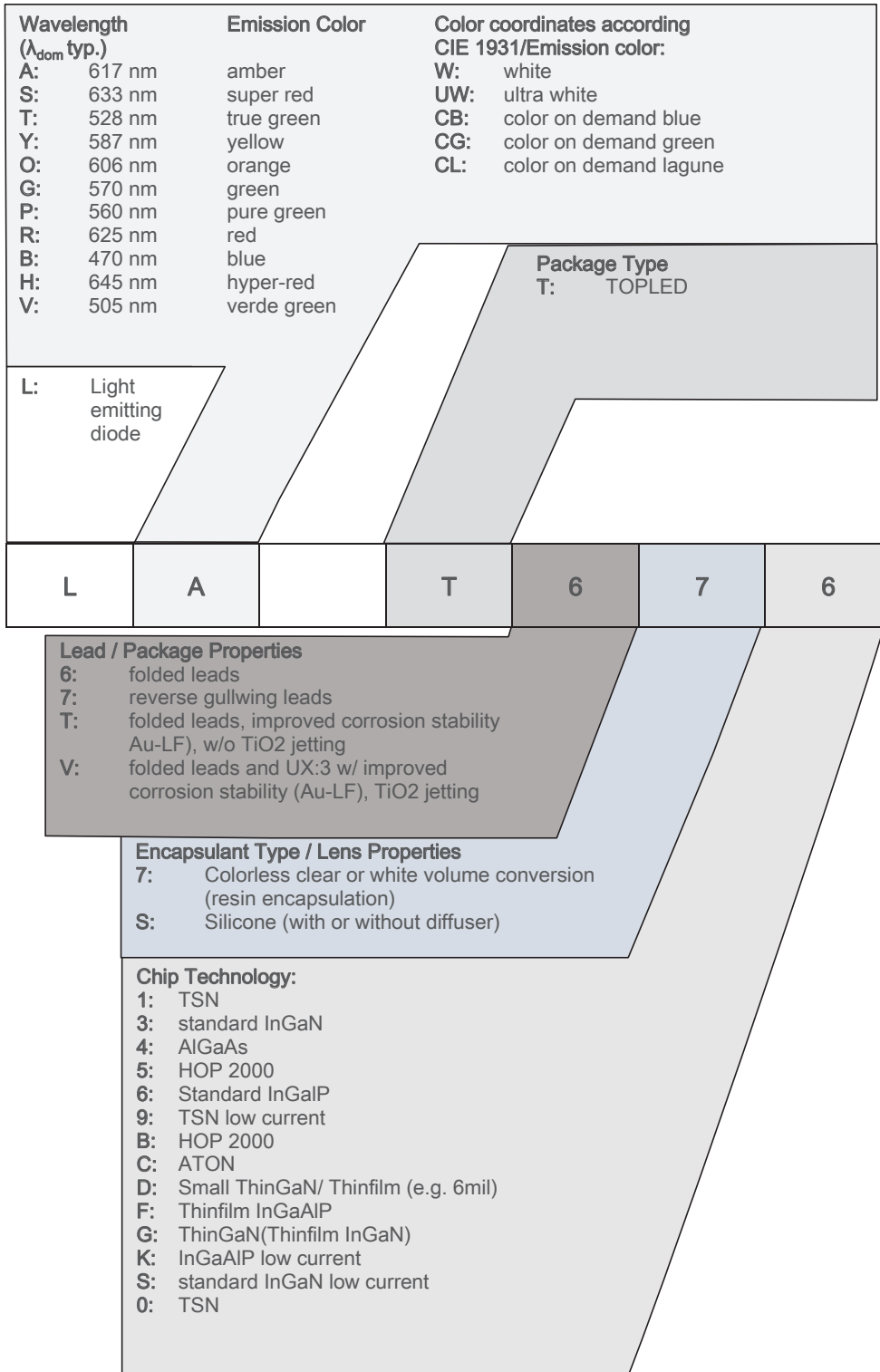
Dry Packing Process and Materials ⁹⁾



OHA00539

Moisture-sensitive product is packed in a dry bag containing desiccant and a humidity card according JEDEC-STD-033.

Type Designation System



Notes

The evaluation of eye safety occurs according to the standard IEC 62471:2006 (photo biological safety of lamps and lamp systems). Within the risk grouping system of this IEC standard, the device specified in this data sheet falls into the class **exempt group (exposure time 10000 s)**. Under real circumstances (for exposure time, conditions of the eye pupils, observation distance), it is assumed that no endangerment to the eye exists from these devices. As a matter of principle, however, it should be mentioned that intense light sources have a high secondary exposure potential due to their blinding effect. When looking at bright light sources (e.g. headlights), temporary reduction in visual acuity and afterimages can occur, leading to irritation, annoyance, visual impairment, and even accidents, depending on the situation.

Subcomponents of this device contain, in addition to other substances, metal filled materials including silver. Metal filled materials can be affected by environments that contain traces of aggressive substances. Therefore, we recommend that customers minimize device exposure to aggressive substances during storage, production, and use. Devices that showed visible discoloration when tested using the described tests above did show no performance deviations within failure limits during the stated test duration. Respective failure limits are described in the IEC60810.

For further application related information please visit www.osram-os.com/appnotes

Disclaimer

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 on the OSRAM OS website.

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.

Product and functional safety devices/applications or medical devices/applications

OSRAM OS components are not developed, constructed or tested for the application as safety relevant component or for the application in medical devices.

OSRAM OS products are not qualified at module and system level for such application.

In case buyer – or customer supplied by buyer – considers using OSRAM OS components in product safety devices/applications or medical devices/applications, buyer and/or customer has to inform the local sales partner of OSRAM OS immediately and OSRAM OS and buyer and /or customer will analyze and coordinate the customer-specific request between OSRAM OS and buyer and/or customer.

Glossary

- 1) **Brightness:** Brightness values are measured during a current pulse of typically 25 ms, with an internal reproducibility of $\pm 8\%$ and an expanded uncertainty of $\pm 11\%$ (acc. to GUM with a coverage factor of $k = 3$).
- 2) **Reverse Operation:** This product is intended to be operated applying a forward current within the specified range. Applying any continuous reverse bias or forward bias below the voltage range of light emission shall be avoided because it may cause migration which can change the electro-optical characteristics or damage the LED.
- 3) **Chromaticity coordinate groups:** Chromaticity coordinates are measured during a current pulse of typically 25 ms, with an internal reproducibility of ± 0.005 and an expanded uncertainty of ± 0.01 (acc. to GUM with a coverage factor of $k = 3$).
- 4) **Forward Voltage:** The forward voltage is measured during a current pulse of typically 8 ms, with an internal reproducibility of ± 0.05 V and an expanded uncertainty of ± 0.1 V (acc. to GUM with a coverage factor of $k = 3$).
- 5) **Thermal Resistance:** $R_{th\ max}$ is based on statistic values (6σ).
- 6) **Thermal Resistance:** R_{thJA} results from mounting on PC board FR 4 (pad size 16 mm² per pad)
- 7) **Typical Values:** Due to the special conditions of the manufacturing processes of semiconductor devices, 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.
- 8) **Characteristic curve:** In the range where the line of the graph is broken, you must expect higher differences between single devices within one packing unit.
- 9) **Tolerance of Measure:** Unless otherwise noted in drawing, tolerances are specified with ± 0.1 and dimensions are specified in mm.
- 10) **Tape and Reel:** All dimensions and tolerances are specified acc. IEC 60286-3 and specified in mm.

Revision History

Version	Date	Change
1.1	2019-09-09	Dimensional Drawing
1.2	2020-05-26	Ordering Information Characteristics Electro - Optical Characteristics (Diagrams)
1.2	2020-06-03	Ordering Information Characteristics Electro - Optical Characteristics (Diagrams)

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按照中国的相关法规和标准，不含有毒有害物质或元素。

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

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «JONHON», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «FORSTAR».



JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели,
кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



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