Technical Data Sheet

Acriche
semiconductor eco lighting

SEOUL SEMICONDUCTOR

RoHS

Specification
SSC-SZ5M

(Rev.02_120103)

SSC		Customer
Drawn	Approval	Approval

SSC-SZ5M
January 2012
www.seoulsemicon.com

서식번호 : SSC- QP- 7- 07- 12 (Rev.02)

[Contents]

Acriche
semiconductor eco lighting

SEOUL SEMICONDUCTOR

SZ5M

SZ5M

Description

The Z-Power series is designed for high current operation and high flux output applications.
It incorporates state of the art SMD design and low thermal resistant material.
The Z Power LED is ideal light sources for general illumination applications, custom designed solutions, automotive, large backlights and high performance torches.

Features

- Super high Flux output and high Luminance
- Designed for high current operation
- SMT solderable
- Lead Free product
- RoHS compliant

Applications

- Automotive interior / exterior lighting
- Automotive forward lighting
- General Torch
- Architectural lighting
- Projector light source
- Task lighting
- Decorative / Pathway lighting
- Remote / Solar powered lighting

Full code of SZ5-M series

Full code form : $X_1 X_2 X_3 - X_4 X_5 - X_6 X_7 - X_8 X_9$

1. Part Number

- **X_1 : Company**
- **X_2 : Z-Power LED series number**
- **X_3 : PKG series**

2. Internal Number

- **X_4: Series Code**
  - P: P series
  - M: M series

X_5: Revision number

$X_6 X_7$: Color specification

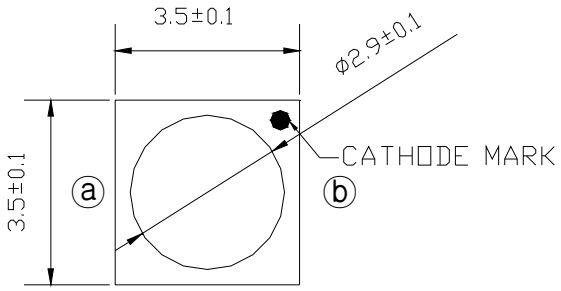
- W0: Pure white
- WN: Neutral white
- WW: Warm white

$X_8 X_9$: CRI Group

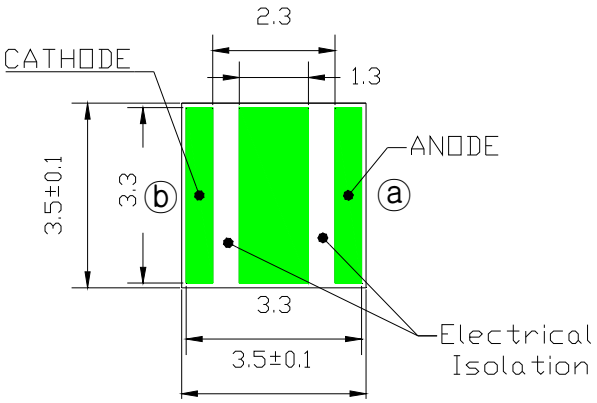
- C8: CRI min.80
- C9: CRI min.90
- 85: CRI min.85
- 00: The others

Outline dimensions

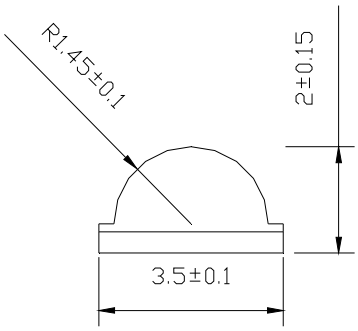
Top View



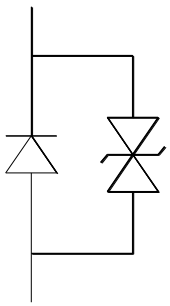
Bottom View



Side View



Circuit



Notes :

[1] All dimensions are in millimeters.
[2] Scale : none
[3] Undefined tolerance is ± 0.1mm

Characteristics of SZ5-M0-W0-00

Pure White

1-1 Electro-Optical characteristics at 350mA

(Ta=25℃, RH30%)

Parameter	Symbol	Value			Unit
		Min	Typ	Max	
Luminous Flux [1]	Φ_V [2]	-	125	-	lm
	Φ_V(Tj=100℃)	-	115	-	
Correlated Color Temperature [3]	CCT	-	6000	-	K
CRI	R_a	-	70	-	-
Forward Voltage [4]	V_F	-	3.2	-	V
Thermal resistance (J to S)	$R\theta_{J-S}$		5.8		K/W
View Angle	2Θ ½	120			deg.

1-2 Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Forward Current	I_F	1200	mA
		1200(1/10duty@1kHz)	
Reverse Voltage	V_R	5	V
Power Dissipation	P_d	4	W
Junction Temperature	T_j	145(@ $I_F \leq$ 1200mA)	ºC
Operating Temperature	T_{opr}	-40 ~ +85	ºC
Storage Temperature	T_{stg}	-40 ~ +100	ºC
ESD Sensitivity [5]	-	± 8,000V HBM	-

*Notes :

[1] SSC maintains a tolerance of ±10% on flux and power measurements.

[2] Φ_V is the total luminous flux output as measured with an integrating sphere.

[3] Correlated Color Temperature is derived from the CIE 1931 Chromaticity diagram. Color coordinate : 0.005, CCT ±5% tolerance.

[4] Tolerance is ±0.06V on forward voltage measurements

[5] A zener diode is included to protect the product from ESD.

Characteristics of SZ5-M0-W0-C8

Pure White

1-1 Electro-Optical characteristics at 350mA

(Ta=25℃, RH30%)

Parameter	Symbol	Value			Unit
		Min	Typ	Max	
Luminous Flux [1]	Φ_V [2]	-	115	-	lm
	Φ_V(Tj=100℃)	-	105	-	
Correlated Color Temperature [3]	CCT	-	6000	-	K
CRI	R_a	80	-	-	-
Forward Voltage [4]	V_F	-	3.2	-	V
Thermal resistance (J to S)	$R\theta_{J-S}$		5.8		K/W
View Angle	2Θ ½	120			deg.

1-2 Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Forward Current	I_F	1200	mA
		1200(1/10duty@1kHz)	
Reverse Voltage	V_R	5	V
Power Dissipation	P_d	4	W
Junction Temperature	T_j	145(@ $I_F \leq$ 1200mA)	ºC
Operating Temperature	T_{opr}	-40 ~ +85	ºC
Storage Temperature	T_{stg}	-40 ~ +100	ºC
ESD Sensitivity [5]	-	± 8,000V HBM	-

*Notes :

[1] SSC maintains a tolerance of ±10% on flux and power measurements.

[2] Φ_V is the total luminous flux output as measured with an integrating sphere.

[3] Correlated Color Temperature is derived from the CIE 1931 Chromaticity diagram. Color coordinate : 0.005, CCT ±5% tolerance.

[4] Tolerance is ±0.06V on forward voltage measurements

[5] A zener diode is included to protect the product from ESD.

Characteristics of SZ5-M0-WN-C8

Neutral White

1-1 Electro-Optical characteristics at 350mA

(Ta=25℃, RH30%)

Parameter	Symbol	Value			Unit
		Min	Typ	Max	
Luminous Flux [1]	Φ_V [2]	-	108	-	lm
	Φ_V(Tj=100℃)	-	98	-	
Correlated Color Temperature [3]	CCT	-	4000	-	K
CRI	R_a	80		-	-
Forward Voltage [4]	V_F	-	3.2	-	V
Thermal resistance (J to S)	$R\theta_{J-S}$		5.8		K/W
View Angle	2Θ ½	120			deg.

1-2 Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Forward Current	I_F	1200	mA
		1200(1/10duty@1kHz)	
Reverse Voltage	V_R	5	V
Power Dissipation	P_d	4	W
Junction Temperature	T_j	145(@ $I_F \leq$ 1200mA)	ºC
Operating Temperature	T_{opr}	-40 ~ +85	ºC
Storage Temperature	T_{stg}	-40 ~ +100	ºC
ESD Sensitivity [5]	-	± 8,000V HBM	-

*Notes :

[1] SSC maintains a tolerance of ±10% on flux and power measurements.

[2] Φ_V is the total luminous flux output as measured with an integrating sphere.

[3] Correlated Color Temperature is derived from the CIE 1931 Chromaticity diagram. Color coordinate : 0.005, CCT ±5% tolerance.

[4] Tolerance is ±0.06V on forward voltage measurements

[5] A zener diode is included to protect the product from ESD.

Characteristics of SZ5-M0-WN-00

Neutral White

1-1 Electro-Optical characteristics at 350mA

(Ta=25℃, RH30%)

Parameter	Symbol	Value			Unit
		Min	Typ	Max	
Luminous Flux [1]	Φ_V [2]	-	118	-	lm
	Φ_V(Tj=100℃)	-	107	-	
Correlated Color Temperature [3]	CCT	-	4000	-	K
CRI	R_a	-	67	-	-
Forward Voltage [4]	V_F	-	3.2	-	V
Thermal resistance (J to S)	$R\theta_{J-S}$		5.8		K/W
View Angle	2Θ ½	120			deg.

1-2 Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Forward Current	I_F	1200	mA
		1200(1/10duty@1kHz)	
Reverse Voltage	V_R	5	V
Power Dissipation	P_d	4	W
Junction Temperature	T_j	145(@ $I_F \leq$ 1200mA)	ºC
Operating Temperature	T_{opr}	-40 ~ +85	ºC
Storage Temperature	T_{stg}	-40 ~ +100	ºC
ESD Sensitivity [5]	-	± 8,000V HBM	-

*Notes :

[1] SSC maintains a tolerance of ±10% on flux and power measurements.

[2] Φ_V is the total luminous flux output as measured with an integrating sphere.

[3] Correlated Color Temperature is derived from the CIE 1931 Chromaticity diagram. Color coordinate : 0.005, CCT ±5% tolerance.

[4] Tolerance is ±0.06V on forward voltage measurements

[5] A zener diode is included to protect the product from ESD.

Characteristics of SZ5-M0-WW-C8

Warm white

1-1 Electro-Optical characteristics at 350mA

Parameter	Symbol	Value			Unit
		Min	Typ	Max	
Luminous Flux [1]	Φ_V [2]	-	100	-	lm
	Φ_V(Tj=100℃)	-	91	-	
Correlated Color Temperature [3]	CCT	-	3000	-	K
CRI	R_a	80	-	-	-
Forward Voltage [4]	V_F	-	3.2	-	V
Thermal resistance (J to S)	$R\theta_{J-S}$		5.8		K/W
View Angle	2Θ ½	120			deg.

1-2 Absolute Maximum Ratings

Parameter		Value	Unit
Forward Current	I_F	1200	mA
		1200(1/10duty@1kHz)	
Reverse Voltage	V_R	5	V
Power Dissipation	P_d	4	W
Junction Temperature	T_j	145(@ $I_F \leq$ 1200mA)	ºC
Operating Temperature	T_{opr}	-40 ~ +85	ºC
Storage Temperature	T_{stg}	-40 ~ +100	ºC
ESD Sensitivity [5]	-	± 8,000V HBM	-

*Notes :
[1] SSC maintains a tolerance of ±10% on flux and power measurements.
[2] Φ_V is the total luminous flux output as measured with an integrating sphere.
[3] Correlated Color Temperature is derived from the CIE 1931 Chromaticity diagram.
Color coordinate : 0.005, CCT ±5% tolerance.
[4] Tolerance is ±0.06V on forward voltage measurements
[5] A zener diode is included to protect the product from ESD.

Characteristics of SZ5-M0-WW-85

Warm white

1-1 Electro-Optical characteristics at 350mA

Parameter	Symbol	Value			Unit
		Min	Typ	Max	
Luminous Flux [1]	Φ_V [2]	-	96	-	lm
	Φ_V(Tj=100℃)	-	87	-	
Correlated Color Temperature [3]	CCT	-	3000	-	K
CRI	R_a	85	-	-	-
Forward Voltage [4]	V_F	-	3.2	-	V
Thermal resistance (J to S)	$R\theta_{J-S}$		5.8		K/W
View Angle	2Θ ½	120			deg.

1-2 Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Forward Current	I_F	1200	mA
		1200(1/10duty@1kHz)	
Reverse Voltage	V_R	5	V
Power Dissipation	P_d	4	W
Junction Temperature	T_j	145(@ $I_F \leq$ 1200mA)	ºC
Operating Temperature	T_{opr}	-40 ~ +85	ºC
Storage Temperature	T_{stg}	-40 ~ +100	ºC
ESD Sensitivity [5]	-	± 8,000V HBM	-

*Notes :

[1] SSC maintains a tolerance of ±10% on flux and power measurements.

[2] Φ_V is the total luminous flux output as measured with an integrating sphere.

[3] Correlated Color Temperature is derived from the CIE 1931 Chromaticity diagram. Color coordinate : 0.005, CCT ±5% tolerance.

[4] Tolerance is ±0.06V on forward voltage measurements

[5] A zener diode is included to protect the product from ESD.

Characteristics of SZ5-M0-WW-C9

Warm white

1-1 Electro-Optical characteristics at 350mA

Parameter	Symbol	Value			Unit
		Min	Typ	Max	
Luminous Flux [1]	Φ_V [2]	-	87	-	lm
	Φ_V(Tj=100℃)	-	79	-	
Correlated Color Temperature [3]	CCT	-	3000	-	K
CRI	R_a	90	-	-	-
Forward Voltage [4]	V_F	-	3.2	-	V
Thermal resistance (J to S)	$R\theta_{J-S}$		5.8		K/W
View Angle	2Θ ½	120			deg.

1-2 Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Forward Current	I_F	1200	mA
		1200(1/10duty@1kHz)	
Reverse Voltage	V_R	5	V
Power Dissipation	P_d	4	W
Junction Temperature	T_j	145(@ $I_F \leq$ 1200mA)	ºC
Operating Temperature	T_{opr}	-40 ~ +85	ºC
Storage Temperature	T_{stg}	-40 ~ +100	ºC
ESD Sensitivity [5]	-	± 8,000V HBM	-

*Notes :

[1] SSC maintains a tolerance of ±10% on flux and power measurements.

[2] Φ_V is the total luminous flux output as measured with an integrating sphere.

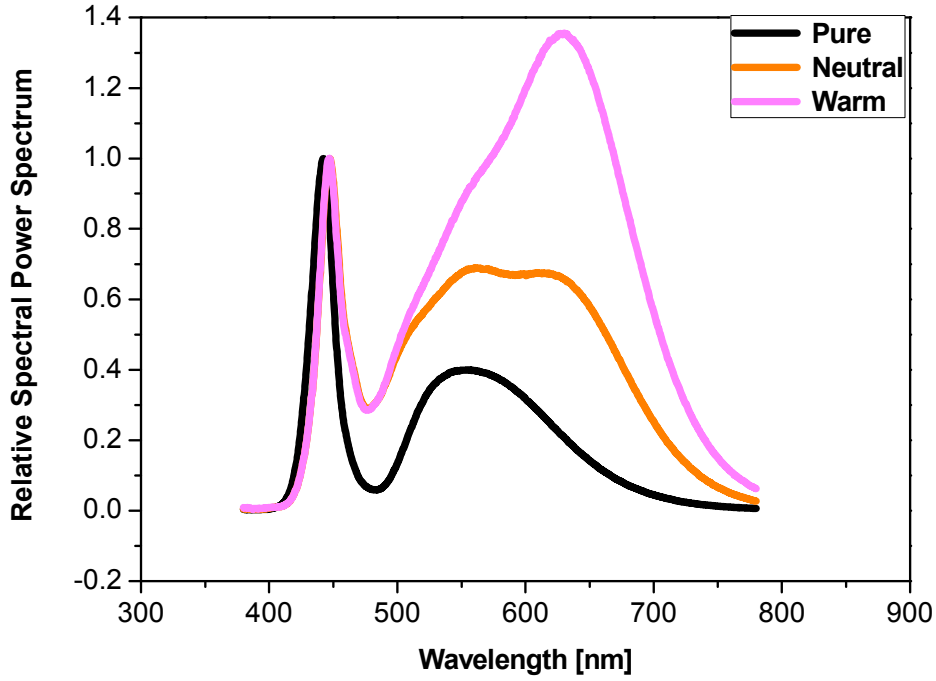
[3] Correlated Color Temperature is derived from the CIE 1931 Chromaticity diagram. Color coordinate : 0.005, CCT ±5% tolerance.

[4] Tolerance is ±0.06V on forward voltage measurements

[5] A zener diode is included to protect the product from ESD.

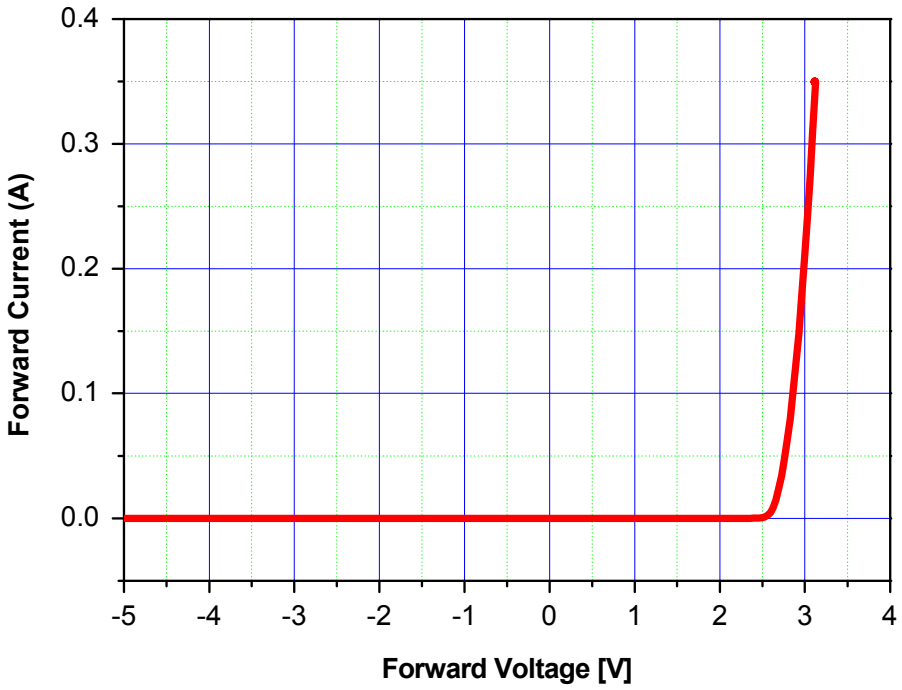
Color Spectrum

(IF=350mA, Ta=25℃, RH30%)

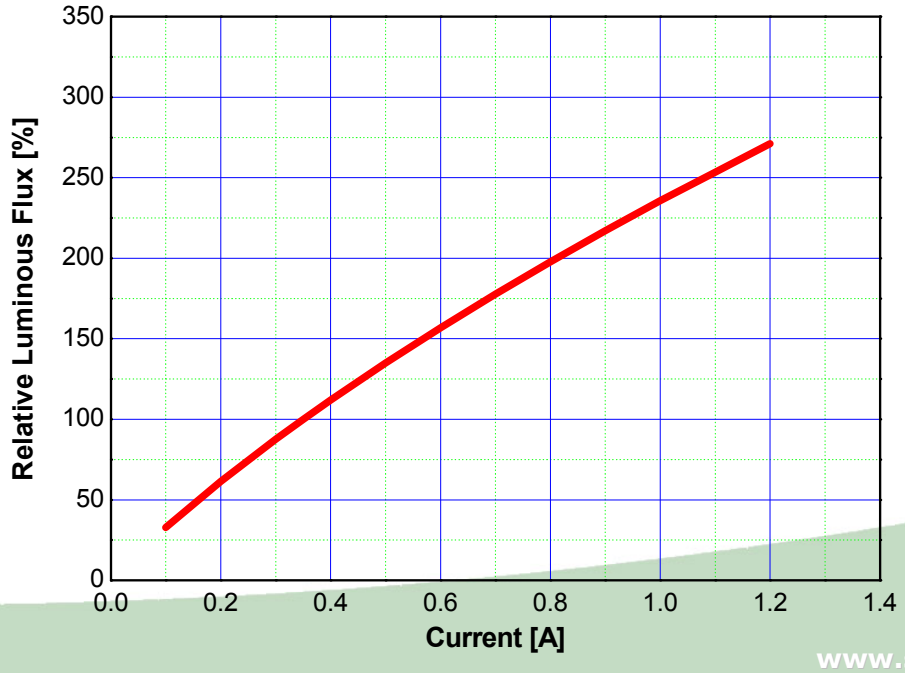


Forward Current Characteristics

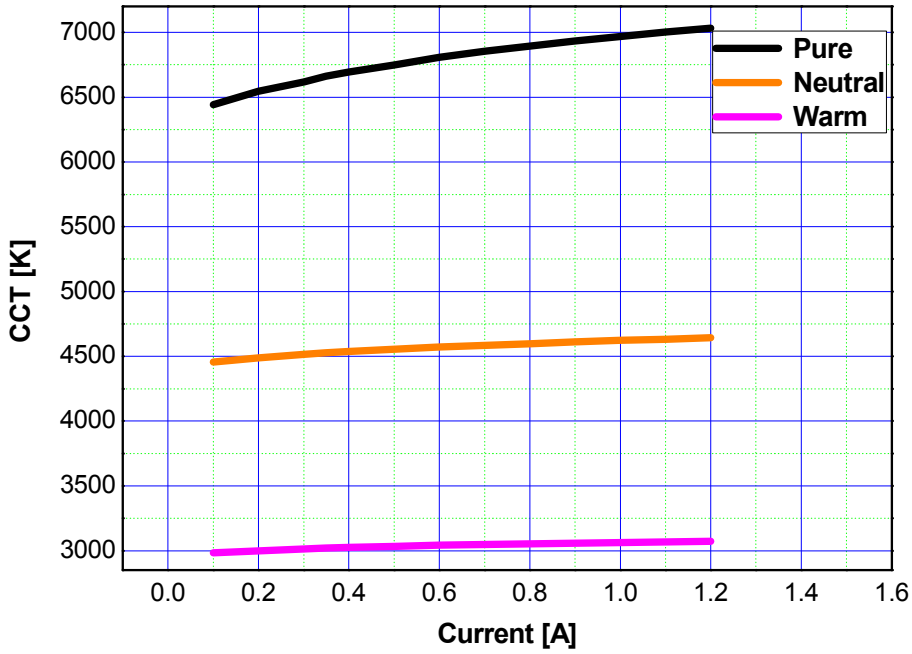
Forward Voltage vs. Forward Current, Ta=25℃



Forward Current vs. Normalized Relative Luminous Flux, Ta=25℃..

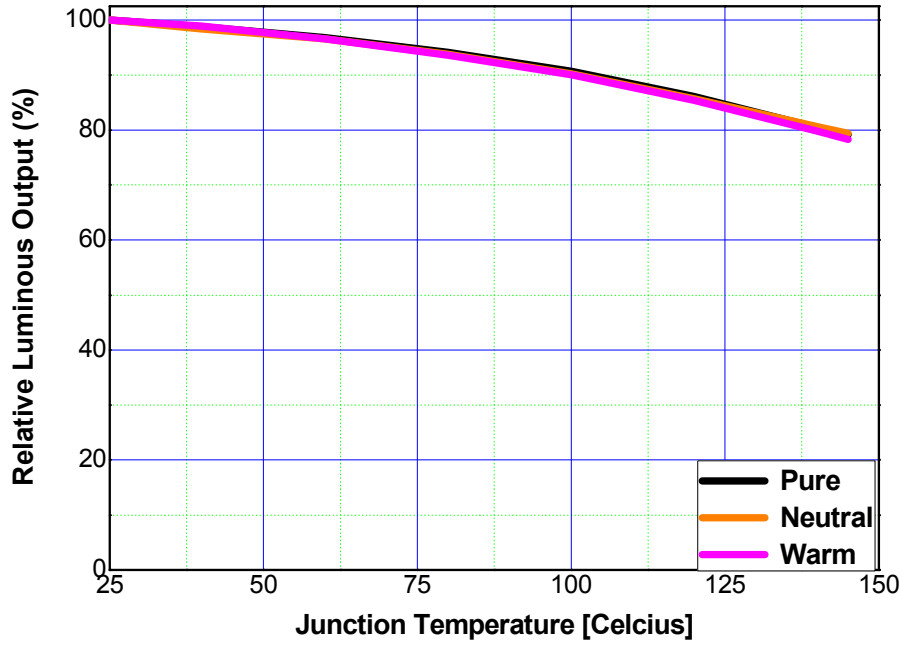


CCT vs. Forward Current, Ta=25℃

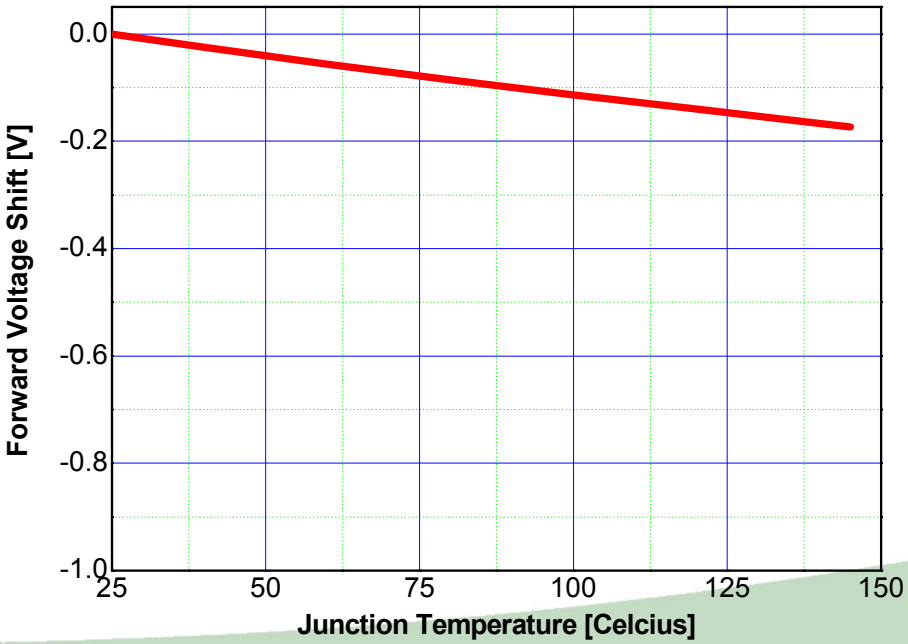


Junction Temperature Characteristics

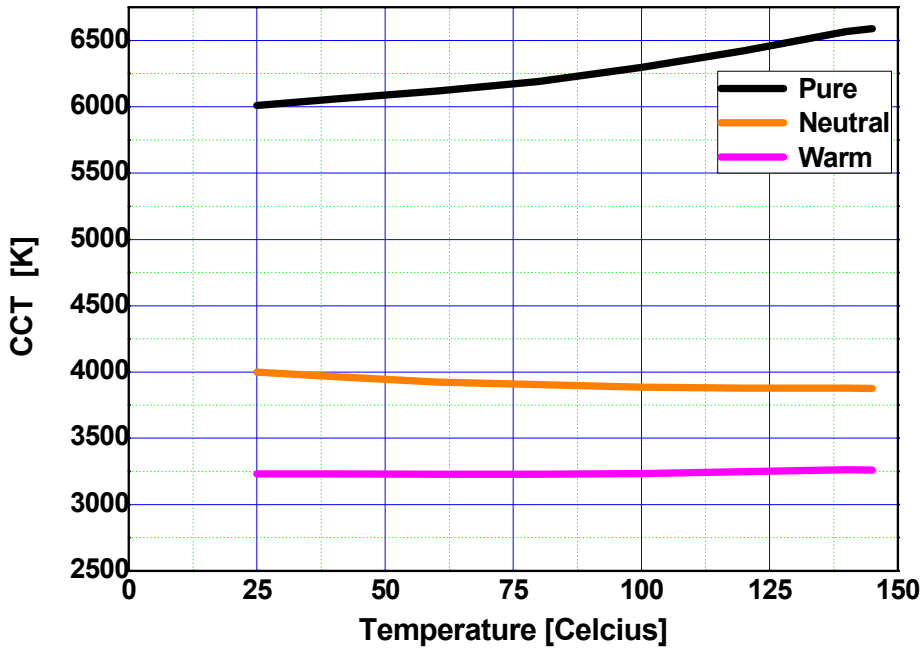
Relative Light Output vs. Junction Temperature at IF=350mA



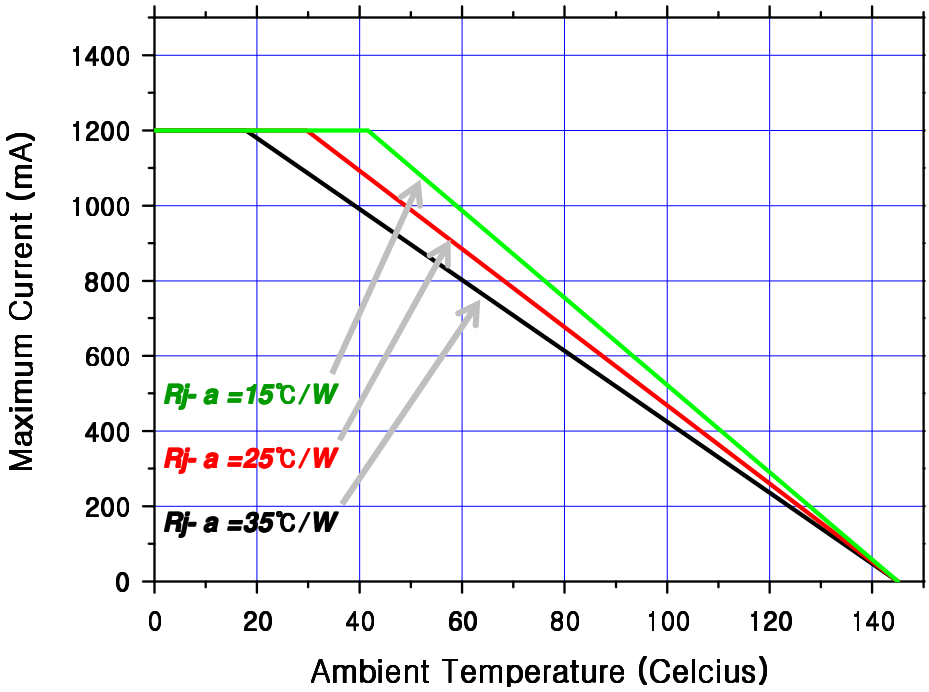
VF vs. Junction Temperature at IF=350mA



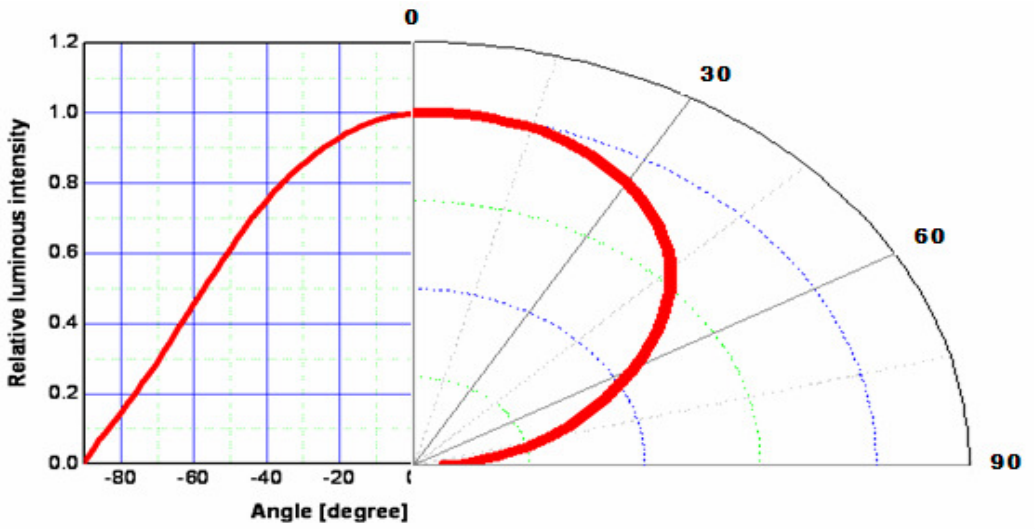
CCT vs. Junction Temperature at IF=350mA



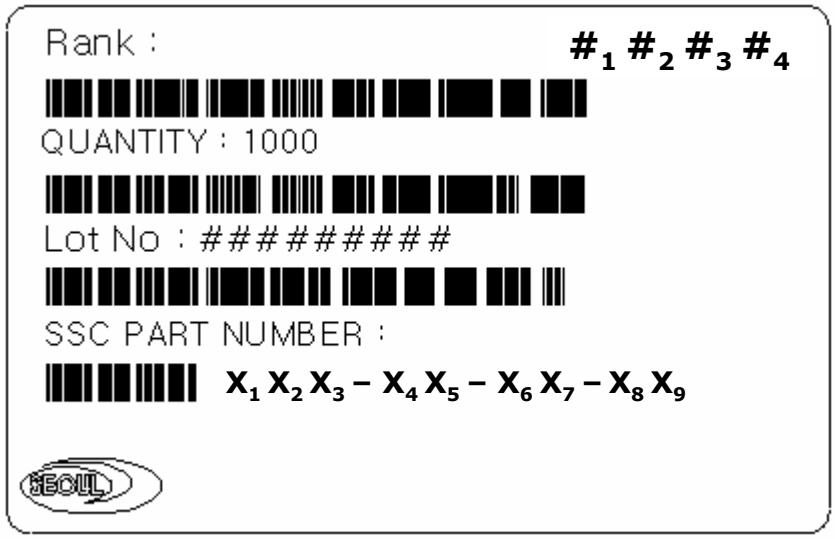
Ambient Temperature vs. Allowable Forward Current
Pure White, Neutral White, Warm White (Tjmax = 145℃, @1.2A)



Radiation pattern at 350mA



Label



Full code form :

$X_1\,X_2\,X_3 - X_4\,X_5 - X_6\,X_7 - X_8\,X_9$

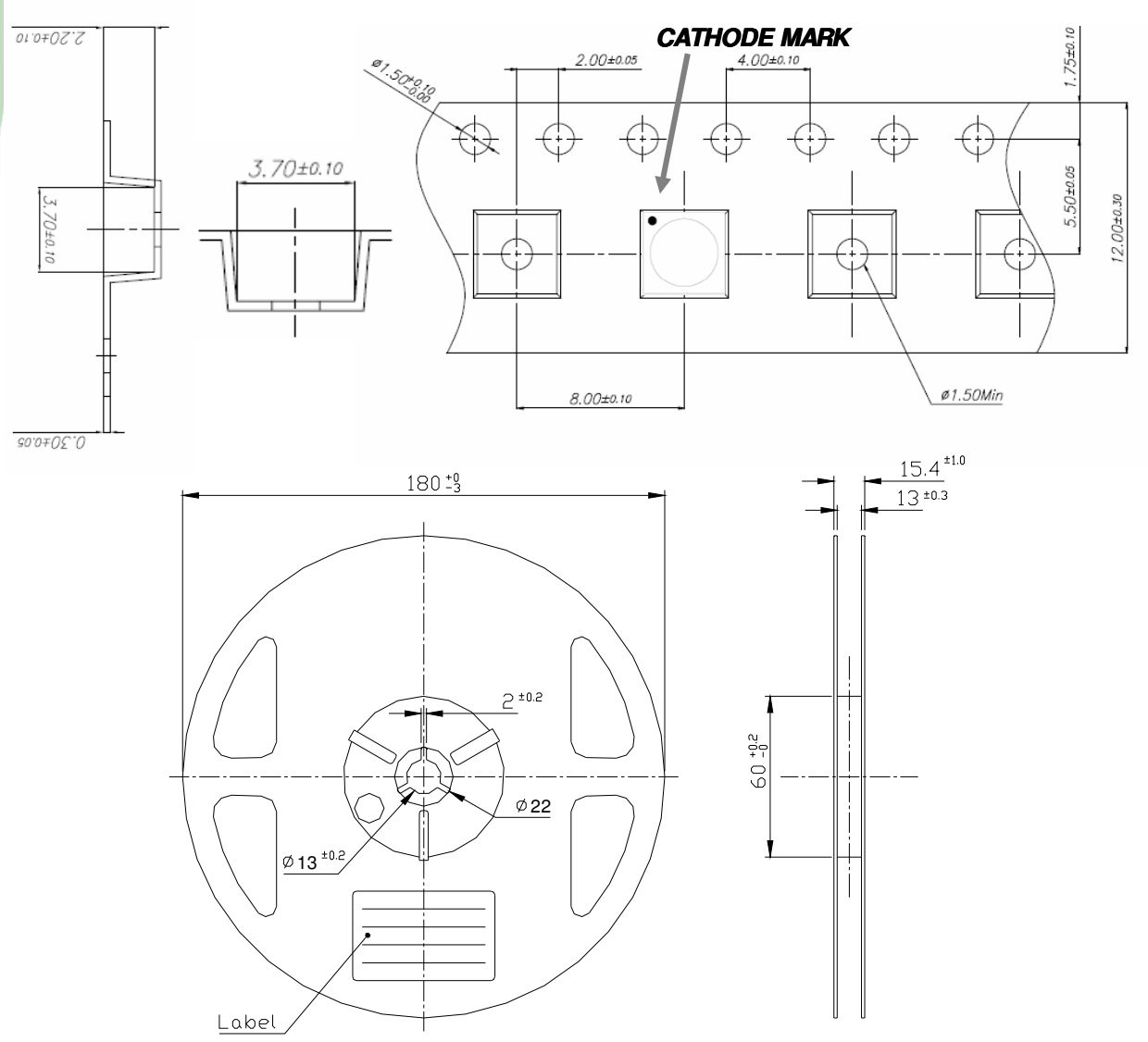
- **$X_1X_2X_3$: Part Number**
- **X_4: Series Code**
- **X_5: Revision number**
- **X_6X_7 : Color specification**
- **X_8X_9 : CRI group**

Rank

$\#_1\#_2\#_3\#_4$

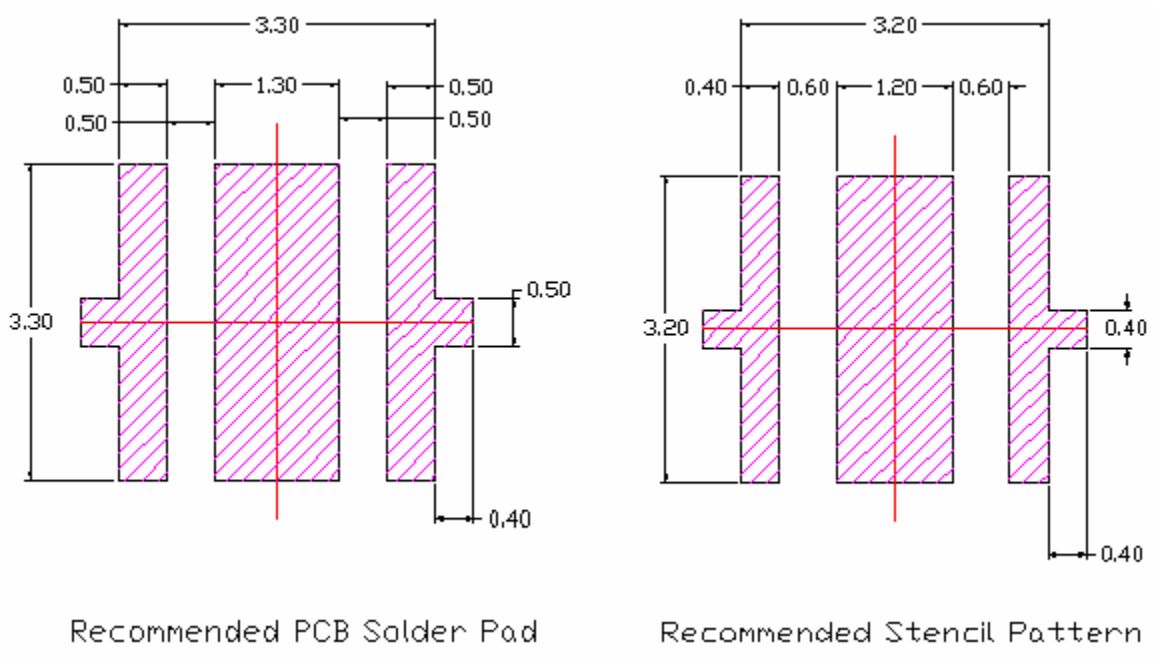
- **$\#_1$: Luminous Flux : LF [lm]**
- **$\#_2\#_3$: Color coordinates : x, y**
- **$\#_4$: Forward Voltage : V_F [V]**

Emitter Carrier & Reel Packaging



NOTES:
1. 10 sprocket hole pitch cumulative tolerance ±0.20
2. Camber not to exceed 1mm in 250mm
3. Material: Black conductive Polystyrene
4. Ao and Bo measured on a plane 0.3mm above the bottom of the pocket
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
6. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.
7. Pocket center and pocket hole center must be same position.

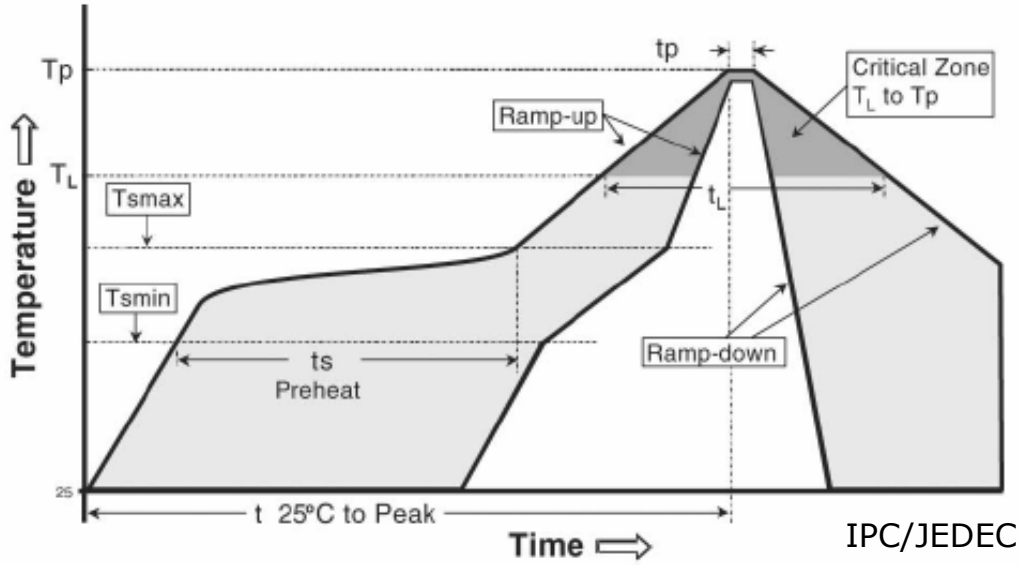
Recommended solder pad



Notes :

[1] All dimensions are in millimeters.
[2] Scale : none
[3] This drawing without tolerances are for reference only

Reflow Soldering Conditions / Profile



IPC/JEDEC J-STD-020C

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate (Tsmax to Tp)	3° C/second max.	3° C/second max.
Preheat - Temperature Min (Tsmin) - Temperature Max (Tsmax) - Time (Tsmin to Tsmax) (ts)	 100 ℃ 150 ℃ 60-120 seconds	 150 ℃ 200 ℃ 60-180 seconds
Time maintained above: - Temperature (TL) - Time (tL)	 183 ℃ 60-150 seconds	 217 ℃ 60-150 seconds
Peak Temperature (Tp)	215℃	260℃
Time within 5℃ of actual Peak Temperature (tp)2	10-30 seconds	20-40 seconds
Ramp-down Rate	6 ℃/second max.	6 ℃/second max.
Time 25℃ to Peak Temperature	6 minutes max.	8 minutes max.

*** Caution**

1. **Reflow soldering should not be done more than one time.**
2. **Repairs should not be done after the LEDs have been soldered. When repair is unavoidable, suitable tools must be used.**
3. **Die slug is to be soldered.**
4. **When soldering, do not put stress on the LEDs during heating.**
5. **After soldering, do not warp the circuit board.**
6. **Recommend to use a convection type reflow machine with 7 ~ 8 zones.**

Precaution for use

• Storage

To avoid the moisture penetration, we recommend storing Z Power LEDs in a dry box with a desiccant . The recommended storage temperature range is 5C to 30C and a maximum humidity of 50%.

• Use Precaution after Opening the Packaging

Use proper SMD techniques when the LED is to be soldered dipped as separation of the lens may affect the light output efficiency.

Pay attention to the following:

a. Soldering should be done immediately after opening the package (within 24Hrs).

b. Required conditions after opening the package

- Sealing
- Temperature : 5 ~ 40℃ Humidity : less than 30%

c. If the package has been opened more than 4 week or the color of the desiccant changes, components should be dried for 10-12hr at 60±5℃

• Do not apply mechanical force or excess vibration during the cooling process to normal temperature after soldering.

• Do not rapidly cool device after soldering.

• Components should not be mounted on warped (non coplanar) portion of PCB.

• Radioactive exposure is not considered for the products listed here in.

• Gallium arsenide is used in some of the products listed in this publication. These products are dangerous if they are burned or shredded in the process of disposal. It is also dangerous to drink the liquid or inhale the gas generated by such products when chemically disposed of.

• This device should not be used in any type of fluid such as water, oil, organic solvent and etc. When washing is required, IPA (Isopropyl Alcohol) should be used.

• When the LEDs are in operation the maximum current should be decided after measuring the package temperature.

• LEDs must be stored properly to maintain the device. If the LEDs are stored for 3 months or more after being shipped from SSC, a sealed container with a nitrogen atmosphere should be used for storage.

• The appearance and specifications of the product may be modified for improvement without notice.

• Long time exposure of sunlight or occasional UV exposure will cause lens discoloration.

• The slug is isolated from anode electrically.
Therefore, we recommend that you don't isolate the heat sink.

• Attaching LEDs, do not use adhesives that outgas organic vapor.

Handling of Silicone resin LEDs

The Z-Power LED is encapsulated with a silicone resin for the highest flux efficiency.
Notes for handling:

- Avoid touching silicone resin parts especially with sharp tools such as Pincetter (Tweezers)
- Avoid leaving fingerprints on silicone resin parts.
- Silicone resin will attract dust so use covered containers for storage.
- When populating boards in SMT production, there are basically no restrictions regarding the form of the pick and place nozzle, except that excessive mechanical pressure on the surface of the resin must be prevented.
- It is not recommend to cover the silicone resin of the LEDs with other resin (epoxy, urethane, etc)

OCEAN CHIPS
Океан Электроники
Поставка электронных компонентов

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**».

AVIC 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).

FORSTAR®

Телефон: 8 (812) 309-75-97 (многоканальный)
Факс: 8 (812) 320-03-32
Электронная почта: ocean@oceanchips.ru
Web: http://oceanchips.ru/
Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А