东莞市欧思科光电科技有限公司
DONGGUAN OPSCO OPTOELECTRONICS CO., LTD
Factory : 7 Weier Road, Qishi Town, Dongguan City. guangdong province, China
Dongguan Tel: (769)82632725 Dongguan Fax: (769)82632735

Specification

Document No.: OSK-SPC- S50RGBX-XX

Product No.: S50RGBX-XX

Description.: 5.5x5.0x1.6mm Top SMD Type 4-chips 0.4 Watt Power RGBW Flash Color LED

Rev. No.: A/0

Date: 2020-08-21

Customer approval			Opsco approval		
Approval	Review	Confirmation	Approval	Review	Confirmation
			朱更生	吴振雷	周 凯
☐Qualified ☐Disqualified Stamp			Stamp		

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***Official website: https://www.opscoled.com**

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Change History

Date	Rev. No.	Changes/Reason of changes	Signature
2014-10-07	01	Initial Document	KEVIN ZHU
2014-12-22	02	Correct product size	KEVIN ZHU
2015-11-04	03	Revise product parameters	KEVIN ZHU
2017-08-18	04	Revise product parameters	KEVIN ZHU
2019-02-21	05	Revision of Specification Format	KEVIN ZHU
2020-04-15	06	Correction of packaging information	KEVIN ZHU
2020-08-21	A/0	Revision of Specification Format	KANE ZHOU

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Factory : **7 Weier Road, Qishi Town, Dongguan City. guangdong province, China**
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1. Product overview

These SMD LEDs are packaged in the industry standard CLPP6 package. These high-reliability and high-brightness LEDs are designed to work in a wide range of environmental conditions and are ideally suited for use in illumination applications. Their wide viewing angle makes these LEDs ideally suited for channel letter, or general backlighting and illumination applications. The flat top emitting surface makes it easy for these LEDs to mate with light pipes. All components are produced by packing high-performance LED chips and silicon resin with proprietary phosphors.

2. Features and Benefits

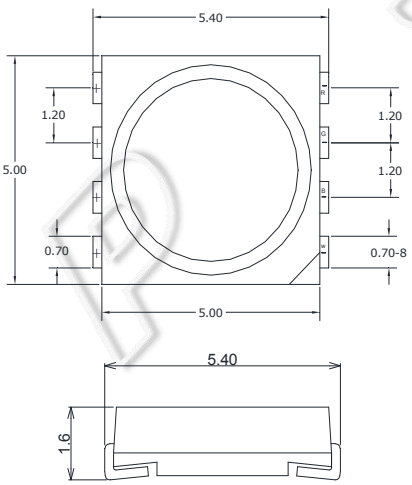
- **. Ideal for LED lighting application to avoid multi-shadows**
- **. Higher heat conductivity for better thermal management**
- **. Provide variable and innovative array LED layout designs and combinations**
- **. Reduce the initial development cost and time**
- **. High lumen-performance per dollar cost**
- **. Lead free reflow solder compatible with RoHS compliant**

3. Applications

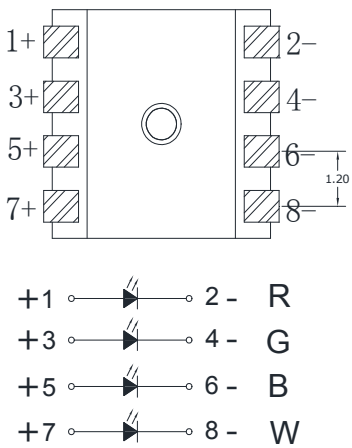
- **. Light Strip**
- **. Channel Letter**
- **. Backlight**

4. Dimensions and Materials

- **. Dimensions: 5.5 mm x 5.0 mm x 1.6 mm**
- **. Packages: Top SMD**
- **. Capsulated Resin: Silicone Resin with Aluminate Phosphor**
- **. Electrodes: Ag Plating**
- **. Chips: Total 4 chips packed in a cavity**



BOTTOM VIEW



Notes:
1. All dimensions are in millimeters.
2. Tolerance is ±0.1mm unless otherwise noted

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5. General description of product naming

S50 RGBX –XX-X

① ② ③ ④

①	②	③	④
Series	Light color code	Color temperature code	Internal Cooding
The default is to integrate the RGB chip in the 5.4x5.0x1.6mm package outline	RGBX: R 620-630NM G :515-530NM B :460-470NM X: :W White Color Y 585-595nm	XX: BW Blue White 5700-7500K NW Natural White 3800-4500K WS Warm Sunlight 2700-3200K GW GOLD White 2400-2700K	X:Represents internal coding

Note： **Typical CRI for White (2400 K – 7500 K CCT) is 80.**

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6. Absolute Maximum Ratings

(Thermal Pad Temperature @25℃)

ITEM		SYMBOL	ABSOLUTE MAXIMUM RATING	UNIT
Power Dissipation	White	Pd	0.072	W
	Red/Amber		0.048	
	Green		0.072	
	Blue		0.072	
D.C Forward Current		If	20	mA
Pulse Forward Current (*1)		Ifp	100	mA
Thermal Resistance , Junction-Case (*2)		$R_{\theta j\text{-}c}$	230	℃/W
Reverse Voltage		Vr	5	V
Operating Temperature		Topr	- 20~+65	℃
Storage Temperature		Tstg	- 40~+80	℃
Soldering Temperature (Reflow) (*3)		Tsld	max.240 < 5sec	℃

*1: Ifp conditions: 1/10 Duty Cycle & 0.1ms for pulse width.
*2: Rth test condition: Mounted on PC Board FR 4 (pad size≥40mm^2)
*3: Reflow method: 1.2mm MCPCB from body for 5 seconds not exceeding the recommended maximum temperature.

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7. Electrical/Optical Characteristics

. Forward Voltage

(Thermal Pad Temperature @25℃)

Color	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
White	Vf	If=20 mA	2.8	3.3	3.6	V
YELLOW		If=20 mA	1.8	2.0	2.4	V
Red		If=20 mA	1.8	2.0	2.4	V
Green		If=20 mA	2.8	3.3	3.6	V
Blue		If=20 mA	2.8	3.3	3.6	V

. Reverse Current

(Thermal Pad Temperature @25℃)

Color	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
White	IR	VR=5 V	--	--	5	μA
Yellow		VR=5 V	--	--	5	μA
Red		VR=5 V	--	--	5	μA
Green		VR=5 V	--	--	5	μA
Blue		VR=5 V	--	--	5	μA

. Luminous Flux

(Thermal Pad Temperature @25℃)

Color	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
White	Φv	If=20 mA	5.5	6.5	--	lm
Yellow		If=20 mA	1.0	2.0	--	lm
Red		If=20 mA	1.0	2.0	--	lm
Green		If=20 mA	3.5	5	--	lm
Blue		If=20 mA	1.0	2.0	--	lm

. Color Temperature or Dominate Wavelength

(Thermal Pad Temperature @25℃)

Color	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Yellow	λd	If=20 mA	--	590	--	nm
Red		If=20 mA	--	625	--	nm
Green		If=20 mA	--	520	--	nm
Blue		If=20 mA	--	465	--	nm

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. Bin Code List For Reference

(Thermal Pad Temperature @25℃)

Item	Bin Code		SYMBOL	TEST CONDITIONS	MIN.	MAX.	UNIT
Forward Voltage	RED	A2	Vf	If=20 mA	1.8	2.0	V
		A3			2.0	2.2	
		A4			2.2	2.4	
		A5			2.4	2.6	
	BLUE GREEN	B2	Vf	If=20 mA	2.8	3.0	
		B3			3.0	3.2	
		B4			3.2	3.4	
		B5			3.4	3.6	

Note: Measurement tolerance of the forward voltage: ±0.1V

Hue Bin Specification for Yellow、Red、 Green、Blue

Name	Code	λd MIN (nm)	λd MAX (nm)
YELLOW	YL1	585	590
	YL2	590	595
RED	HR1	620	625
	HR2	625	630
BLUE	BL5	460	465
	BL6	465	470
GREEN	PG2	515	520
	PG3	520	525
	PG4	525	530

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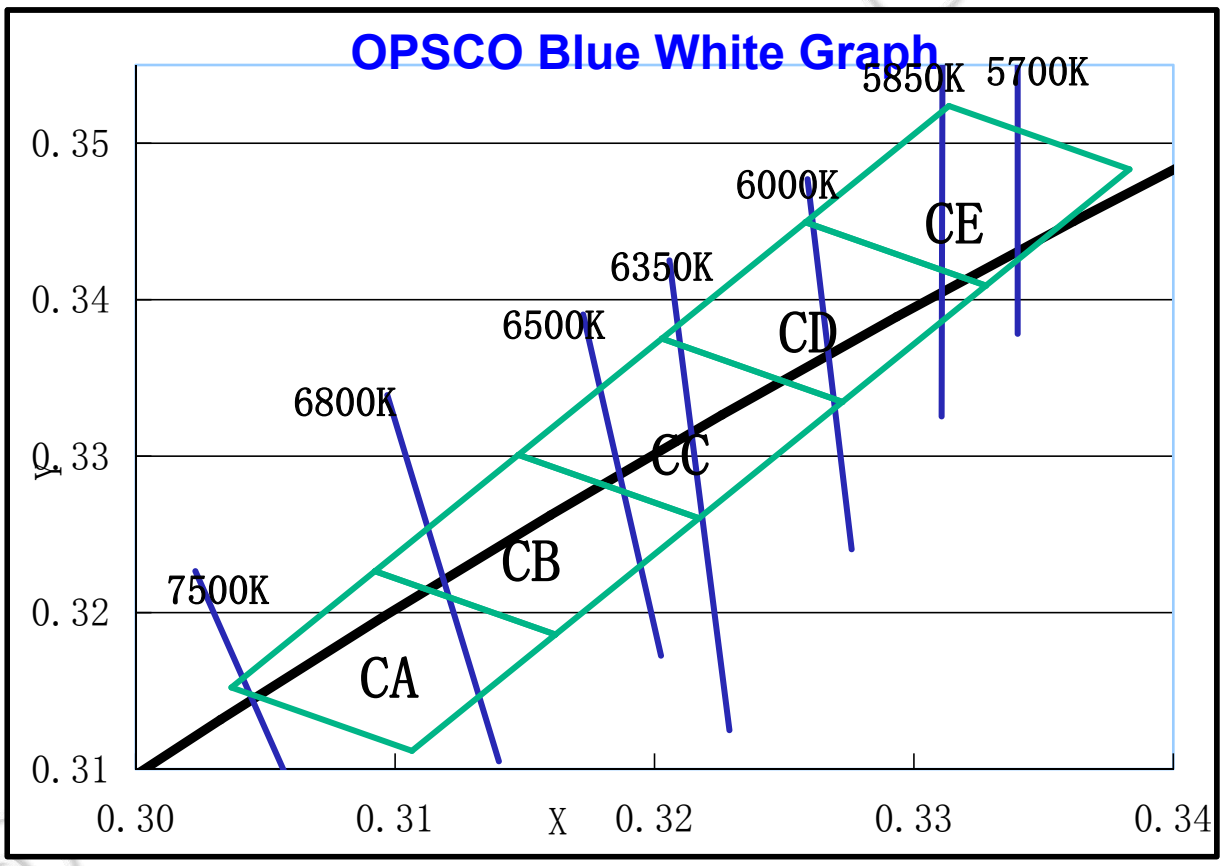
8. White Color Temperature Ranks & CIE Color Rank (Refer to CIE 1931 chromaticity diagram)

CIE chromaticity coordinates (ANSI Cool White)

CA	X1	Y1	X2	Y2	X3	Y3	X4	Y4
CA	0.305649	0.30617	0.29869	0.31022	0.30422	0.31765	0.31118	0.3136
CB	0.311181	0.3136	0.30422	0.31765	0.30975	0.32508	0.31671	0.32103
CC	0.316713	0.32103	0.30975	0.32508	0.31529	0.33252	0.32225	0.32847
CD	0.322245	0.32847	0.31529	0.33252	0.32082	0.33995	0.32778	0.3359
CE	0.327777	0.3359	0.32082	0.33995	0.32635	0.34738	0.33331	0.34333

ANSI Blue White Color bin structures



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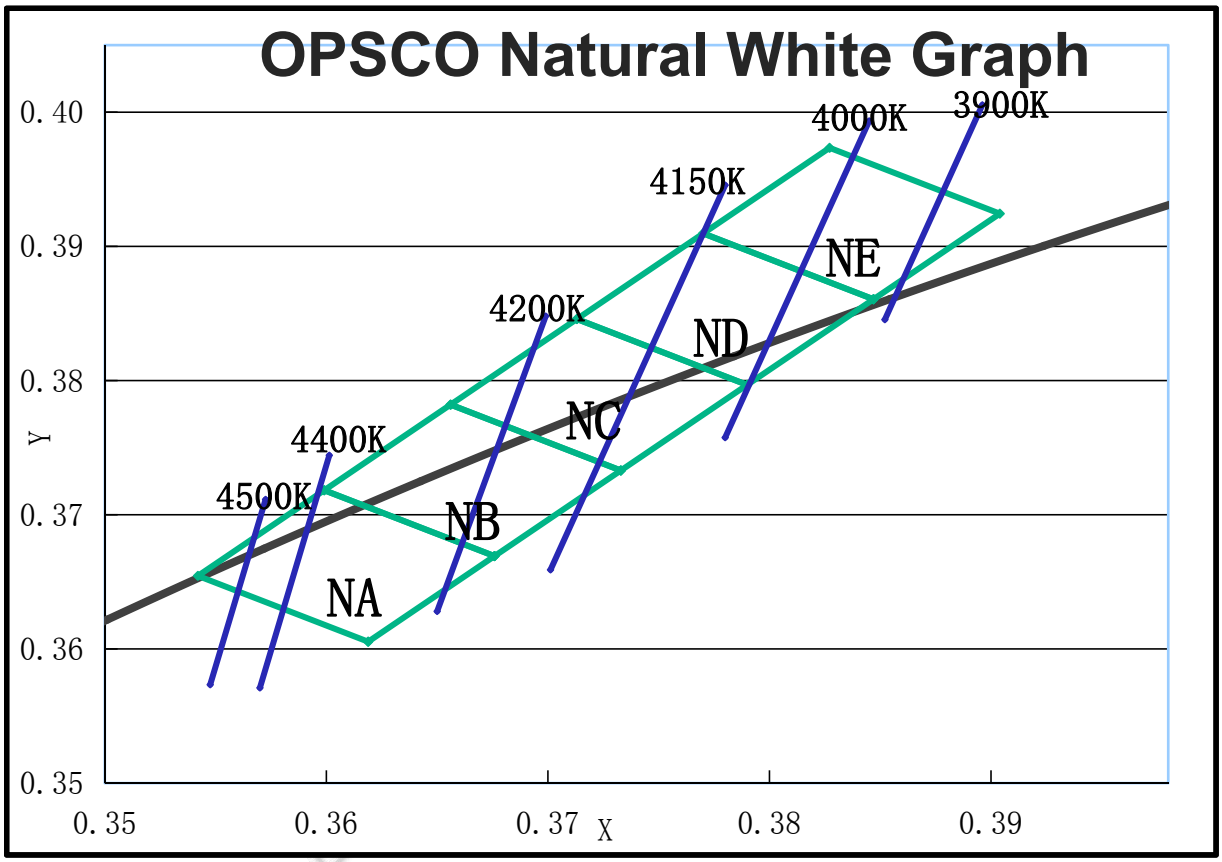
CIE chromaticity coordinates (ANSI Natural white)

CA	X1	Y1	X2	Y2	X3	Y3	X4	Y4
NA	0.3662	0.3541	0.3578	0.3594	0.3623	0.3666	0.3707	0.3612
NB	0.3707	0.3612	0.3623	0.3666	0.3669	0.3737	0.3753	0.3683
NC	0.3753	0.3683	0.3669	0.3737	0.3714	0.3808	0.3798	0.3754
ND	0.3798	0.3754	0.3714	0.3808	0.3759	0.3879	0.3844	0.3825
NE	0.3844	0.3825	0.3759	0.3879	0.3805	0.3950	0.3889	0.3897

ANSI Natural White Color bin structures



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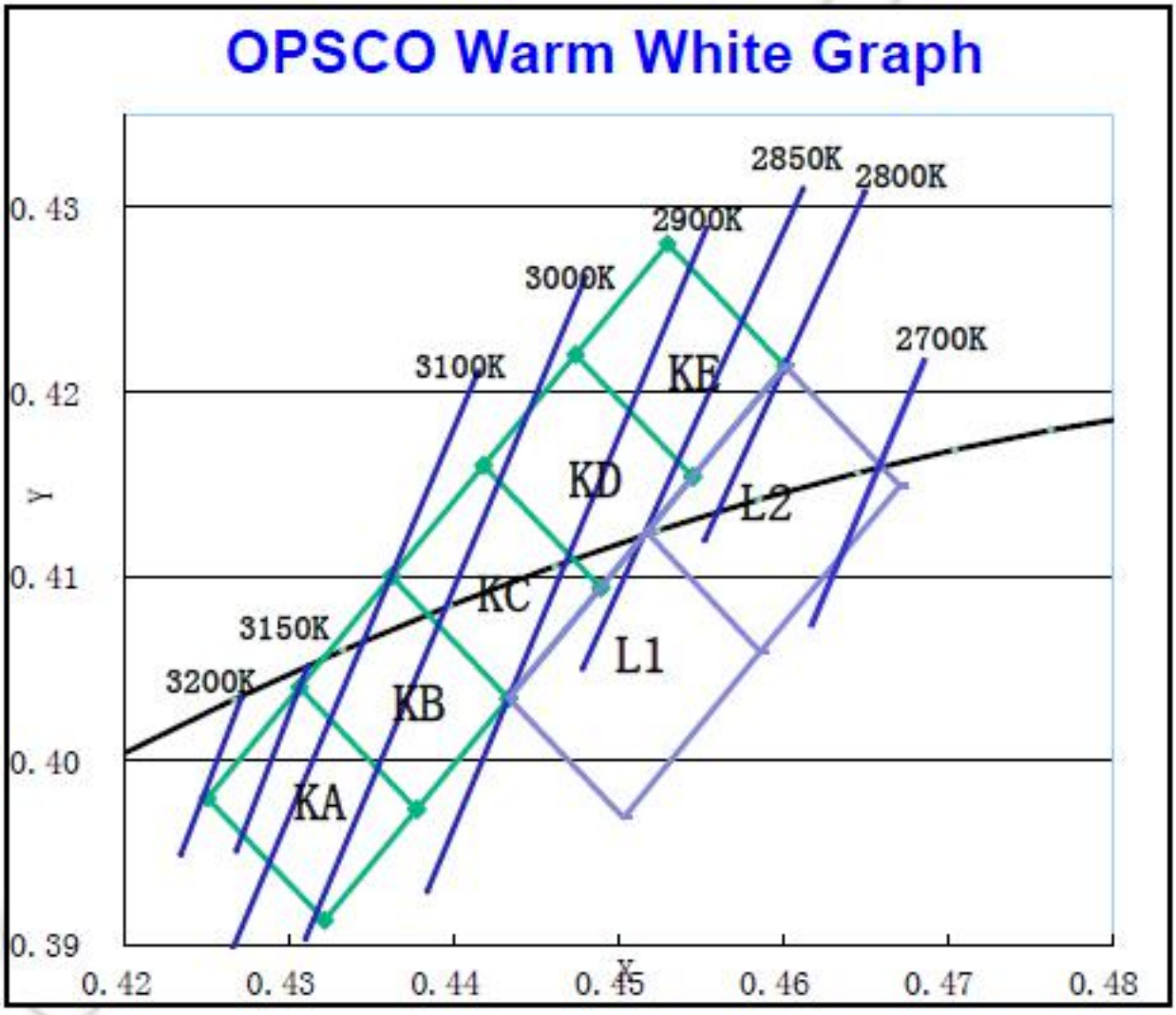
CIE chromaticity coordinates (ANSI Warm White)

CA	X1	Y1	X2	Y2	X3	Y3	X4	Y4
KA	0. 427	0. 386	0. 420	0. 393	0. 426	0. 399	0. 433	0. 392
KB	0. 433	0. 392	0. 426	0. 399	0. 431	0. 405	0. 438	0. 398
KC	0. 438	0. 398	0. 431	0. 405	0. 437	0. 411	0. 444	0. 404
KD	0. 444	0. 404	0. 437	0. 411	0. 442	0. 417	0. 449	0. 410
KE	0. 449	0. 410	0. 442	0. 417	0. 448	0. 423	0. 455	0. 416
L1	0. 4453	0. 3919	0. 4383	0. 3984	0. 4467	0. 4074	0. 4536	0. 4009
L2	0. 4536	0. 4009	0. 4467	0. 4074	0. 4551	0. 4164	0. 4621	0. 4099

ANSI Warm White Color bin structures



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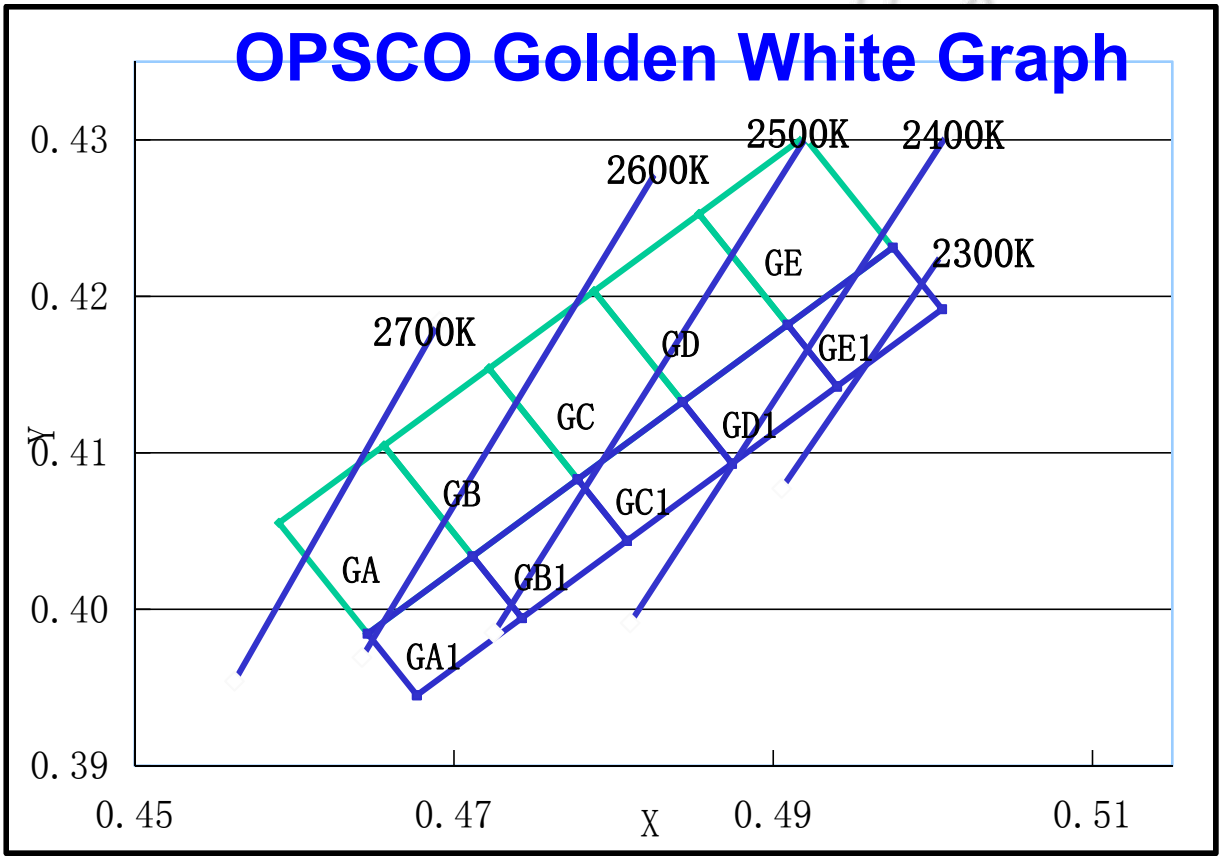
CIE chromaticity coordinates (ANSI Warm Lighting)

CA	X1	Y1	X2	Y2	X3	Y3	X4	Y4
GA	0. 459741	0. 3982	0. 4548	0. 4045	0. 4613	0. 4096	0. 4662	0. 4033
GB	0. 466212	0. 4033	0. 4613	0. 4096	0. 4677	0. 4147	0. 4727	0. 4084
GC	0. 472682	0. 4084	0. 4677	0. 4147	0. 4742	0. 4198	0. 4792	0. 4135
GD	0. 479152	0. 4135	0. 4742	0. 4198	0. 4807	0. 4248	0. 4856	0. 4185
GE	0. 485622	0. 4185	0. 4807	0. 4248	0. 4872	0. 4299	0. 4921	0. 4236
GA1	0. 462676	0. 3945	0. 4597	0. 3982	0. 4662	0. 4033	0. 4693	0. 3994
GB1	0. 469255	0. 3994	0. 4662	0. 4033	0. 4727	0. 4084	0. 4758	0. 4044
GC1	0. 475835	0. 4044	0. 4727	0. 4084	0. 4792	0. 4135	0. 4824	0. 4093
GD1	0. 482415	0. 4093	0. 4792	0. 4135	0. 4856	0. 4185	0. 489	0. 4142
GE1	0. 488995	0. 4142	0. 4856	0. 4185	0. 4921	0. 4236	0. 4956	0. 4192

ANSI Warm Lighting Color bin structures



- Color coordinates measurement allowance is ± 0.005
- To order specify color temperature ranks, please contact OPSCO Lighting Holdings LTD. for further information.
- Thermal Pad Temperature @25℃ @ 20mA

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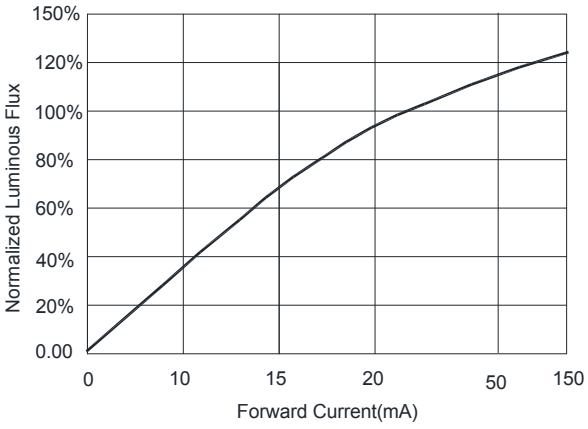
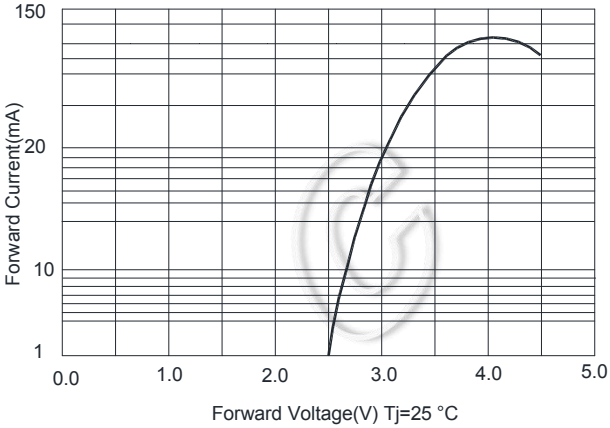
9. Optical-Electrical Characteristic Graphs (InGaN)

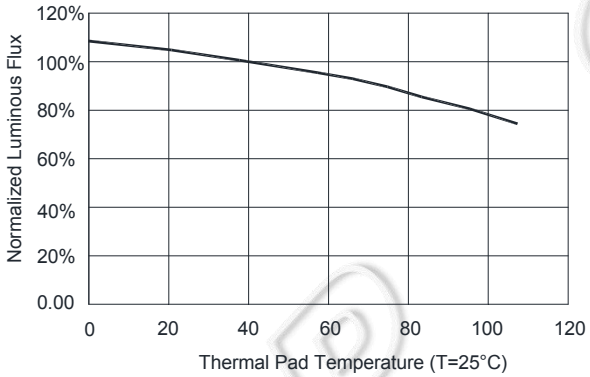
Typical Relative Luminous Flux vs. Forward Current



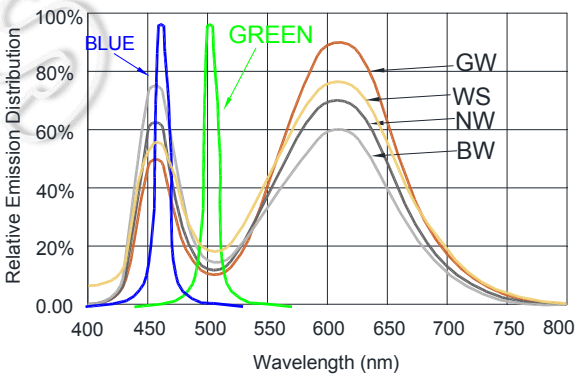
Forward Voltage vs. Forward Current



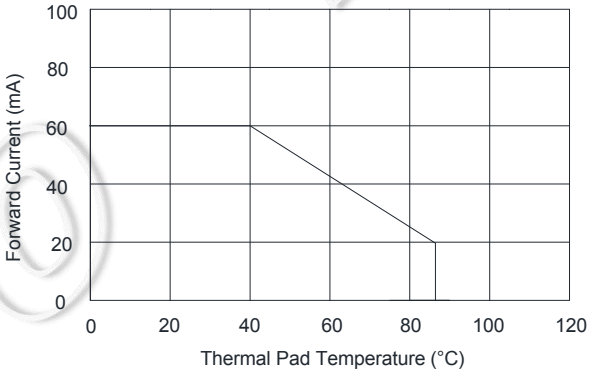
Thermal Pad Temperature vs. Relative Light Output



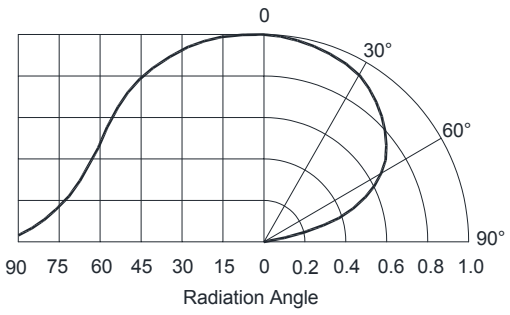
Wavelength Characteristics



Thermal Pad Temperature vs. Forward Current



Typical Radiation Pattern 120°



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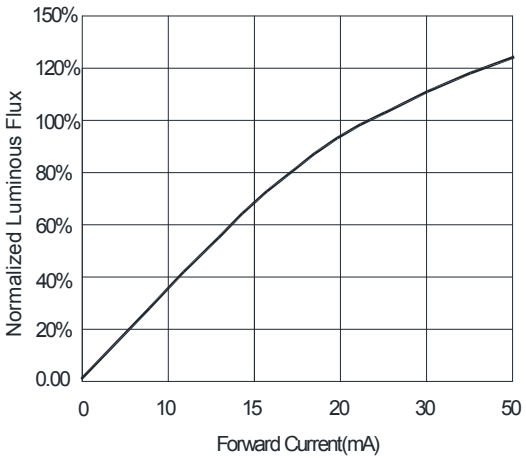
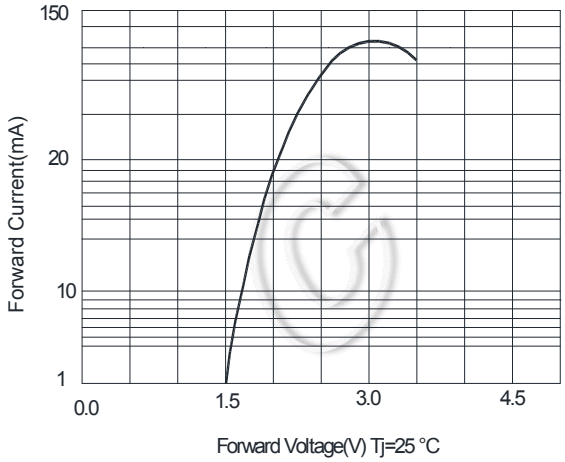
Optical-Electrical Characteristic Graphs (AlInGaP)

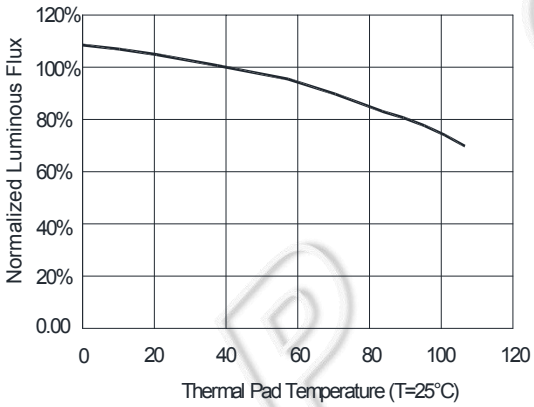
Typical Relative Luminous Flux vs. Forward Current



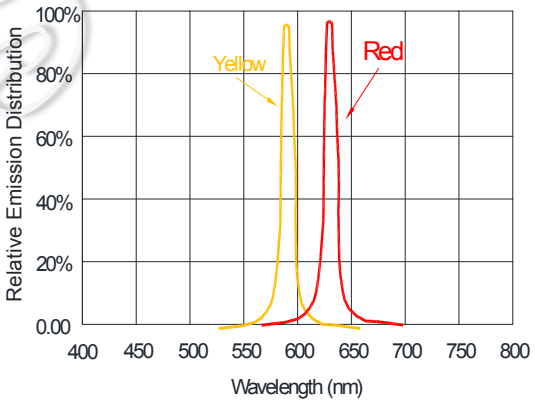
Forward Voltage vs. Forward Current



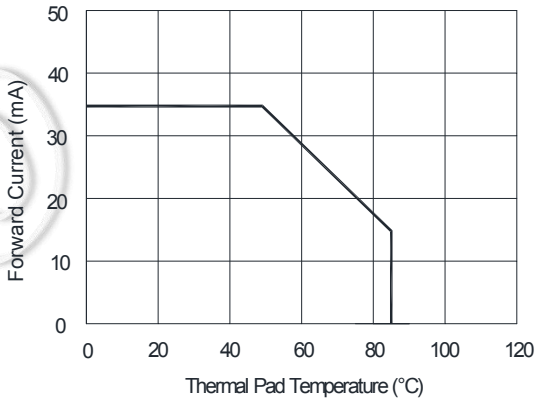
Thermal Pad Temperature vs. Relative Light Output



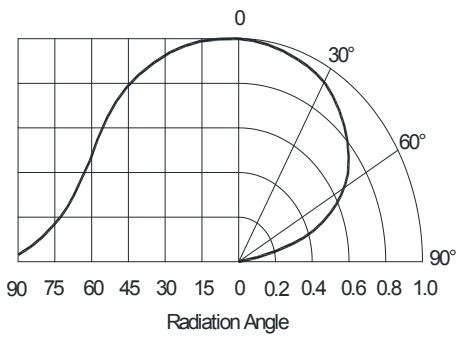
Wavelength Characteristics



Thermal Pad Temperature vs. Forward Current



Typical Radiation Pattern 120°



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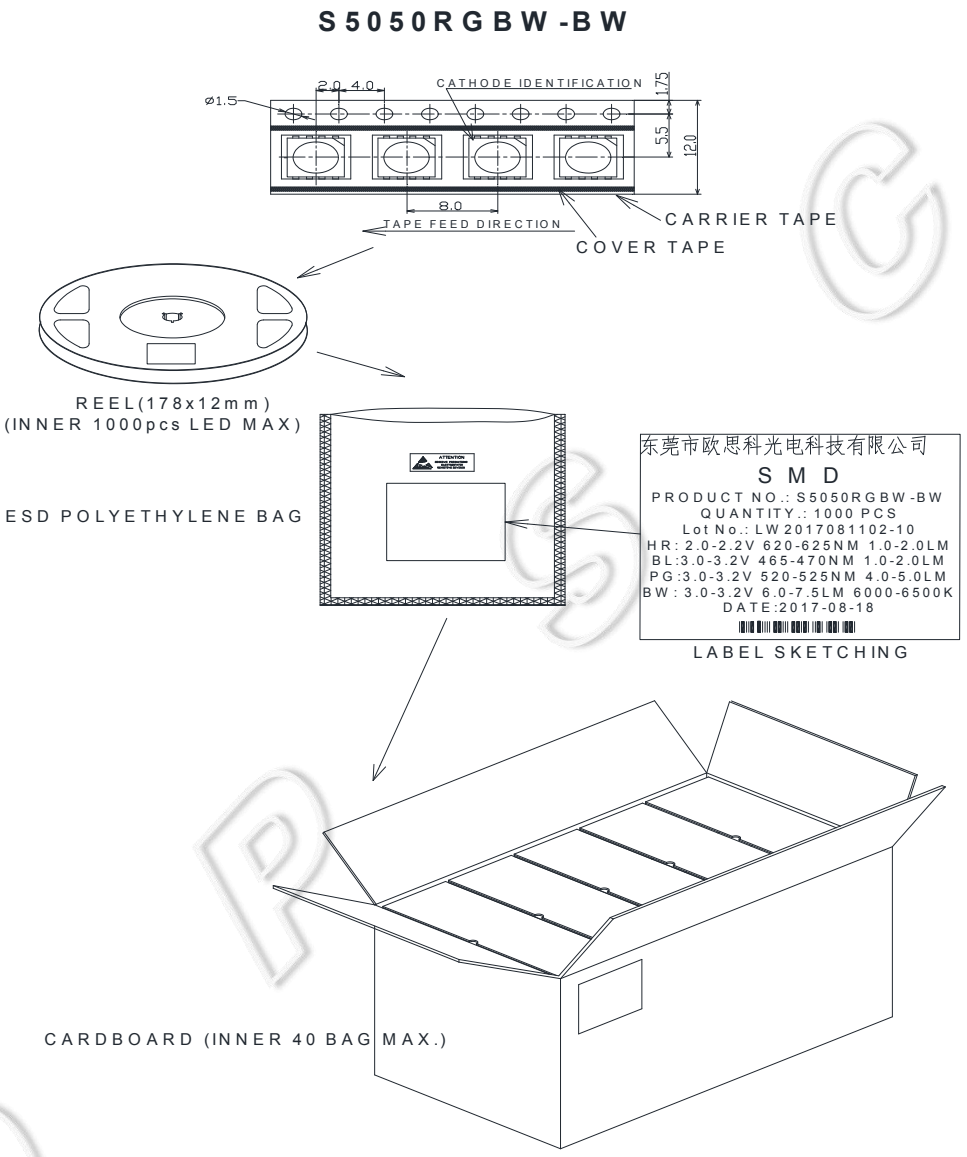
10. Packaging Standard:



The reel pack is applied in SMD LED. The LEDs are packed in cardboard boxes after packaging in normal or anti-electrostatic bags. cardboard boxes will be used to protect the LEDs from mechanical shocks during transportation. The boxes are not water resistant and therefore must be kept away from water and moisture.

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11. Reliability Test :

NO.	Test item	Test Conditions	Reference	Criterion
1	Thermal Shock	100 ± 5° C ~ -40° C ± 5° C 15min~15min 100 cycles	MIL-STD-202G	0/22
2	High Temperature Storage	Ta= +100°C 1000hrs	JEITA ED-4701 200 201	0/22
3	Low Temperature Storage	Ta= -40°C 1000hrs	JEITA ED-4701 200 202	0/22
4	High Temperature High Humidity Storage	Ta=60°C RH=90% 1000hrs	JEITA ED-4701 100 103	0/22
5	Temperature Cycle	-40°C~25°C~100°C~25°C 30min~5min~30min~5min 100 cycles	JEITA ED-4701 100 105	0/22
6	Resistance to Soldering Heat	Tsld = 260° C, 10sec. 2 times	JEITA ED-4701 300 301	0/22
7	Room temp Life Test	25° C, IF: Typical current , 1000hrs	JESD22-A 108D	0/22

Criteria for Judging the Damage:

Item	Symbol	Test Condition	Limit	
			Min	Max
Luminous Intensity	IV	DC=5V, Typical current	Init. Value*0.7	---
Resistance to Soldering Heat	---	DC=5V, Typical current	No dead lights or obvious damage	