



SEOUL SEMICONDUCTOR

Новые продукты от южнокорейского производителя светодиодов

Seoul Semiconductor

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Kiev

12 09 2018

1. Мировые тенденции рынка светодиодной промышленности.
2. Рекорды эффективности:
 - Светодиод 3030BP-E2 с эффективностью 223Lm/W
 - Новое поколение светодиодов в корпусе 5630: STW8Q14D-E4
3. Светодиоды 3528 на любой вкус: дешево / эффективно.
4. Светодиод 3528 с CRI>95 и индексом R9>90.
5. Wicor: бескорпусные светодиоды. Экспансия продолжается.
6. Диод 3535 перезагрузка: новый SZ5-M3.
7. Диод 5050 в PLCC с максимальной мощностью до 4Вт.
8. COB — стабильно, качественно, надежно.
9. Sunlike — оружие для завоевания мира качественного света

Мировые тенденции рынка светодиодов.

Перспектива до 2022 года

Средний рост 4% на горизонте до 2022 года

➤ Лидеры роста:

Филаменты 11%

Декоративное освещение 8-9%

Светодиодные трубки 7%

➤ Замедление роста:

Уличное освещение 1%

Линейные светильники 1%

Портативное освещение 2%

Figure: 2-3.1 WW LED Revenue Forecast, General Lighting, by application ('2018 Q1)




	2016	2017	2018	2019	2020	2021	2022	CAGR 2017-2022
A-Lamps/GSL/Standard bulbs	1,054	1,405	1,521	1,606	1,628	1,575	1,520	2%
Par and Rs	312	358	422	456	451	447	442	4%
MR16	167	190	222	239	237	235	232	4%
Candelabras & Decorative Lamps	68	80	94	102	101	100	99	4%
LED Tubes	1,077	1,486	1,947	2,501	2,339	2,187	2,044	7%
Downlighting	769	798	941	1,016	1,006	996	986	4%
High Bay	563	675	796	860	851	843	834	4%
Streetlights	513	560	552	596	590	584	578	1%
Parking Luminaires	407	435	424	484	505	528	552	5%
Troffers	107	138	163	176	174	172	171	4%
Panel Lighting	97	125	147	159	158	156	155	4%
Ceiling Lighting	99	127	150	162	161	159	158	4%
Filament Light	106	191	302	326	323	320	317	11%
RGB LED Light	31	33	40	45	46	47	48	8%
Flood Lighting	239	242	285	325	339	355	371	9%
LED Linear Lighting	180	190	195	210	208	206	204	1%
Consumer Portable	152	172	176	192	193	193	193	2%
Others	128	164	204	223	230	241	251	9%
Total LED Revenue	6,068	7,369	8,583	9,680	9,541	9,344	9,156	4%

Всегда что-то новое

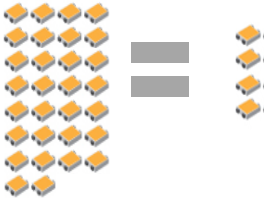
Has introduced the world's first LED technologies

Acrich MJT
Multi Junction Technology
Driven at high voltage



110V/220V
at home

3V 30pcs 32V 4pcs



2009

nPola
Same area, but 10X brighter




Conventional LED Bulb




nPola LED Bulb

2012


Wicop
Beyond CSP




Conventional CSP



Vertical chip




CSP 2010




Wicop 2015

2015

Driver
World Smallest Driver



Nano Driver




Micro Driver


- Extremely Small size
- Low Flicker
- Phase Cut

2017

SunLike SEUL
Powered by Seoul Semiconductor
Back to natural light



Health, Circadian
Human oriented



Class: 4000K Midday: 5000K Dusk: 2700K

2017

Наши технологии

Developed proper Solutions in Lighting

Product



Technology Trend

Color Quality
(CRI, CrispWhite, Vivid, GAI)

Human Centric Light
(Circadian, CCT Tuning)

Wall Plug Efficacy

Cost

SSC's Solution

WICOP

Acrich MJT

Filament

SunLike

Driver

?

Y22

5630
3030
3528

COB
3030

Nano
Micro

Рекорды эффективности в корпусах средней МОЩНОСТИ

3030 - главный претендент на роль промышленного лидера



< 3V 3030 >

3030B

STWxC2PB-E1

STWxC2PB-E2 ^{New}

3V

203 lm/W
@65mA, 5000K

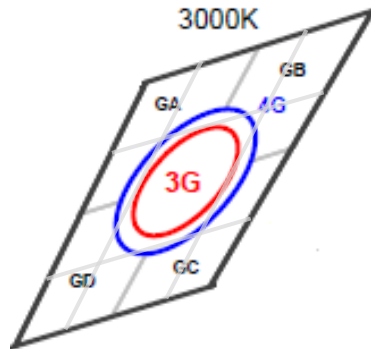
223 lm/W
@65mA, 5000K

LM80

- 9khrs @ 300mA

Schedule

ES Now: (220~223lm/W)
MP : Sep 2018
Sulfur test : started Sept
LM80: Now



**3step + kitting
with center 4bin**

<6V 3030 >

3030B-NZ

STWxC2SB-NZ

6V

151 lm/W
@150mA, 5000K
(165 lm/W @ CRI70)

LM80

- 9khrs @ 150mA

MJT3030B

SAWxC22B

155 lm/W
@150mA, 5000K
(168 lm/W @ CRI70)

LM80

- 9khrs @ 150mA

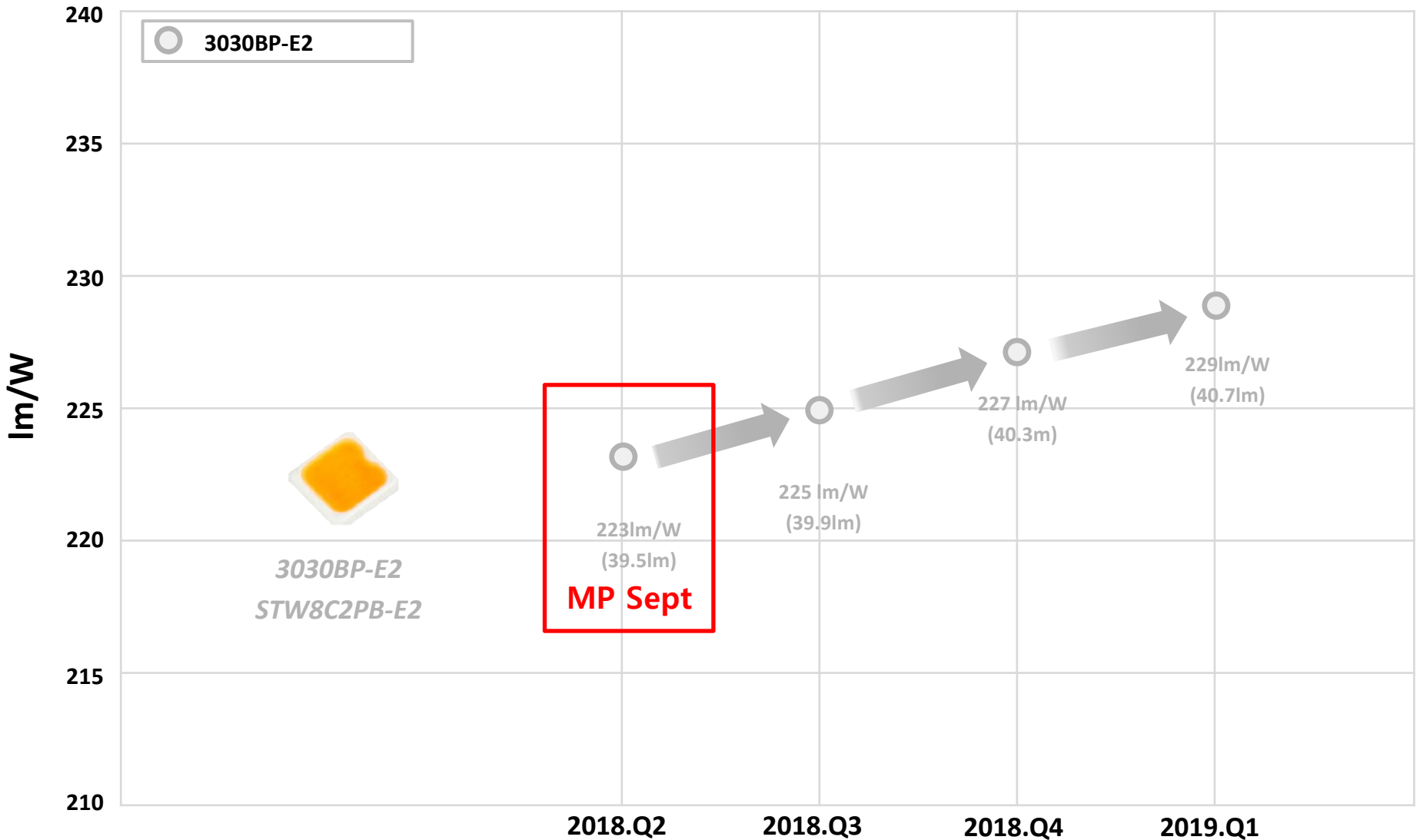


Optimized for High-bay & Industrial lighting

3030BP-E2 Roadmap

@ $T_j=25^\circ\text{C}$ / 65mA / 5000K / Ra80

* This roadmap criteria is the end of quarter.



5630 все еще в строю



5630D

193 lm/W
@65mA, 5000K

LM80

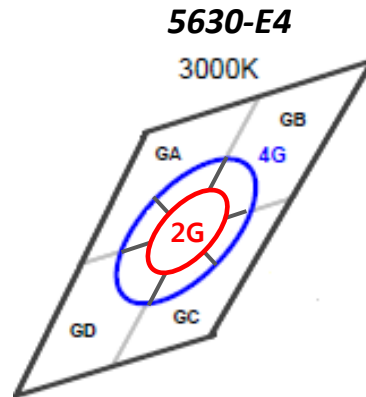
- 12khr @65mA

5630D-E3

213 lm/W
@65mA, 5000K

LM80

- 11khrs @200mA



**2step + kitting
with 4step MCE bin**

5630D-E4 ^{New}

223 lm/W
@65mA, 5000K

LM80

- Covered by E3 Report

Schedule

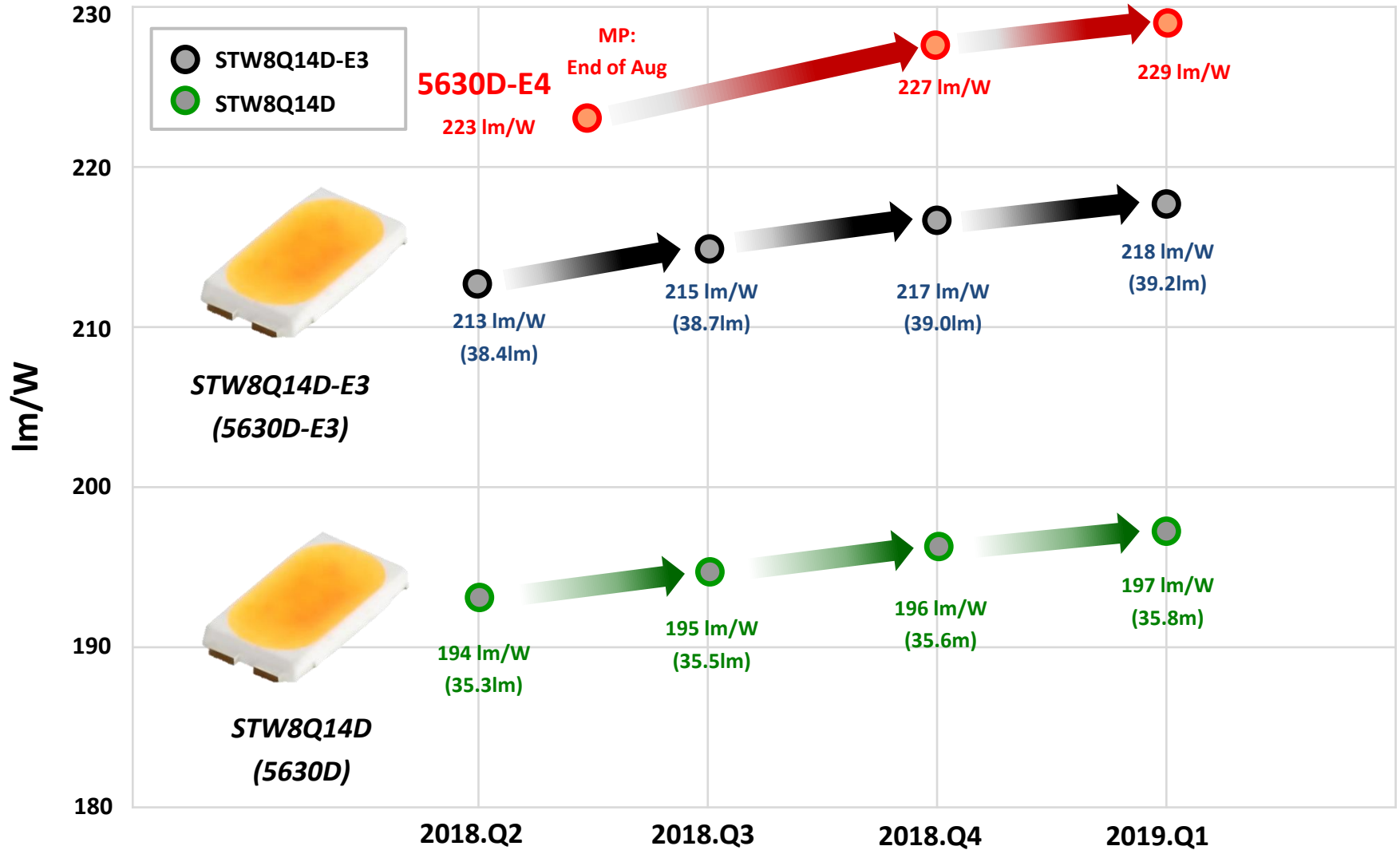
- ES Now: (220~223lm/W)
- MP : Oct 2018
- Sulfur test : started Sept
- LM80: Now

- ★ High Efficacy
- ★ 2step Kitting
- ★ 0.05V VF sorting

5630 series Roadmap

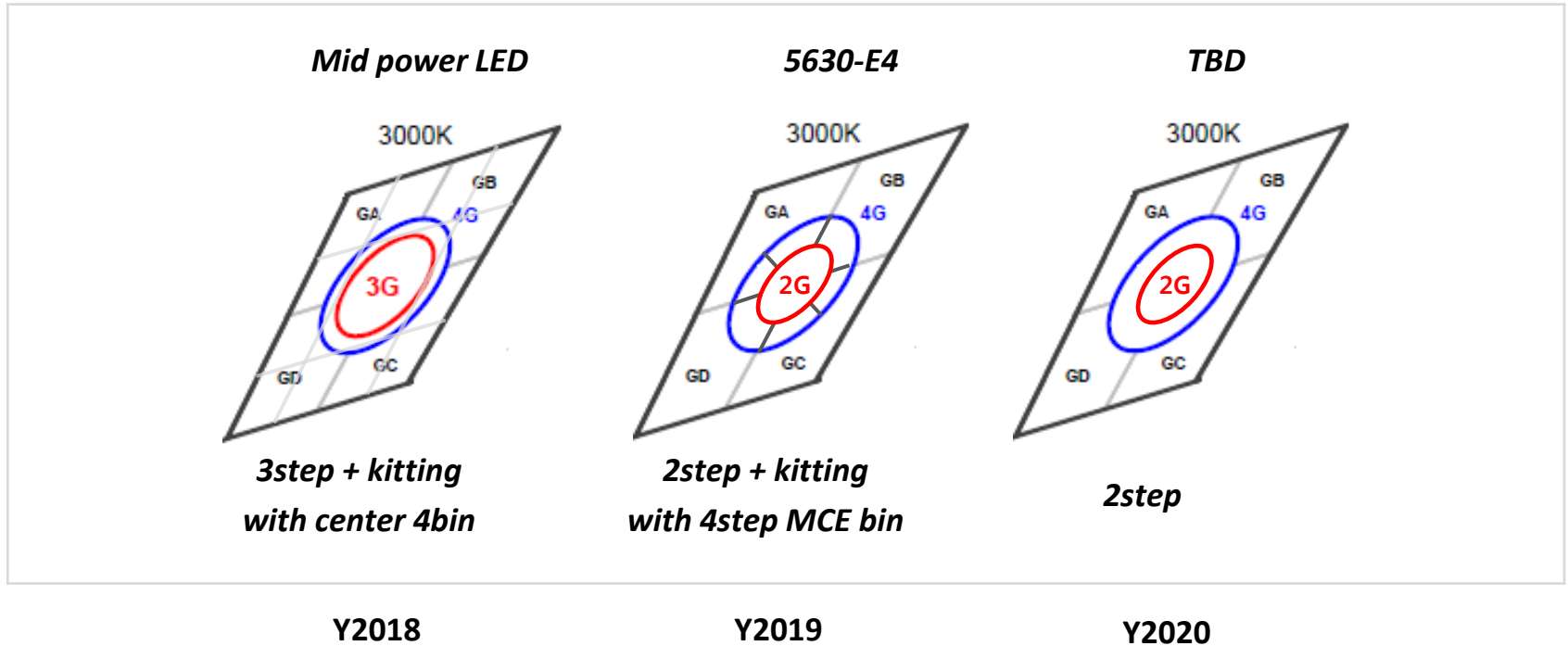
@ $T_j=25^\circ\text{C}$ / 65mA / 5000K / Ra80

* This roadmap criteria is the end of quarter.



CIE структура бинов цветовой температуры

@ $T_j=25^\circ\text{C}$ / 65mA



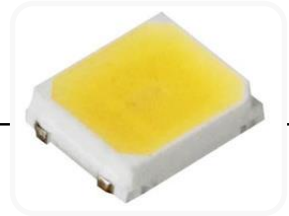
- Y 2018 : 3step ellipse bin + kitting with cent 4 bin
- Y 2019 : 2step ellipse bin + kitting with 4 step ellipse bin
- Y 2020 : 2step bin
- New bin system is adapted for new product first (5630-E4 2step kitting)

3

3528

светодиоды на любой вкус

3528 на любой вкус и кошелек



< 3528 Line-up > @ 65mA / 5000K

3528 3V

3V

- 165 lm/W : STW8A12D
- 179 lm/W : STW8A12D-E1
- 183 lm/W : STW8A12D-E2
- 190 lm/W : STW8A2PD
- 197 lm/W : STW8A12D-E3

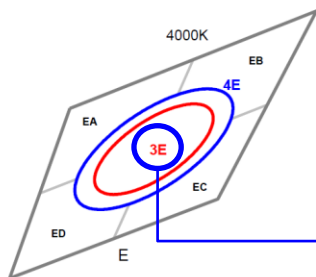
New 3528 3V (lm sorting)

- 160 lm/W : STW8A12D-S1
- 180 lm/W : STW8A2PD-S1
- 200 lm/W : STW8A2PD-E1
- 210 lm/W : T.B.D

MP : 7/20

SPL : 11/1
MP : 12/1

Color Bin Structure : **Ellipse Bin**



Example Bin Name

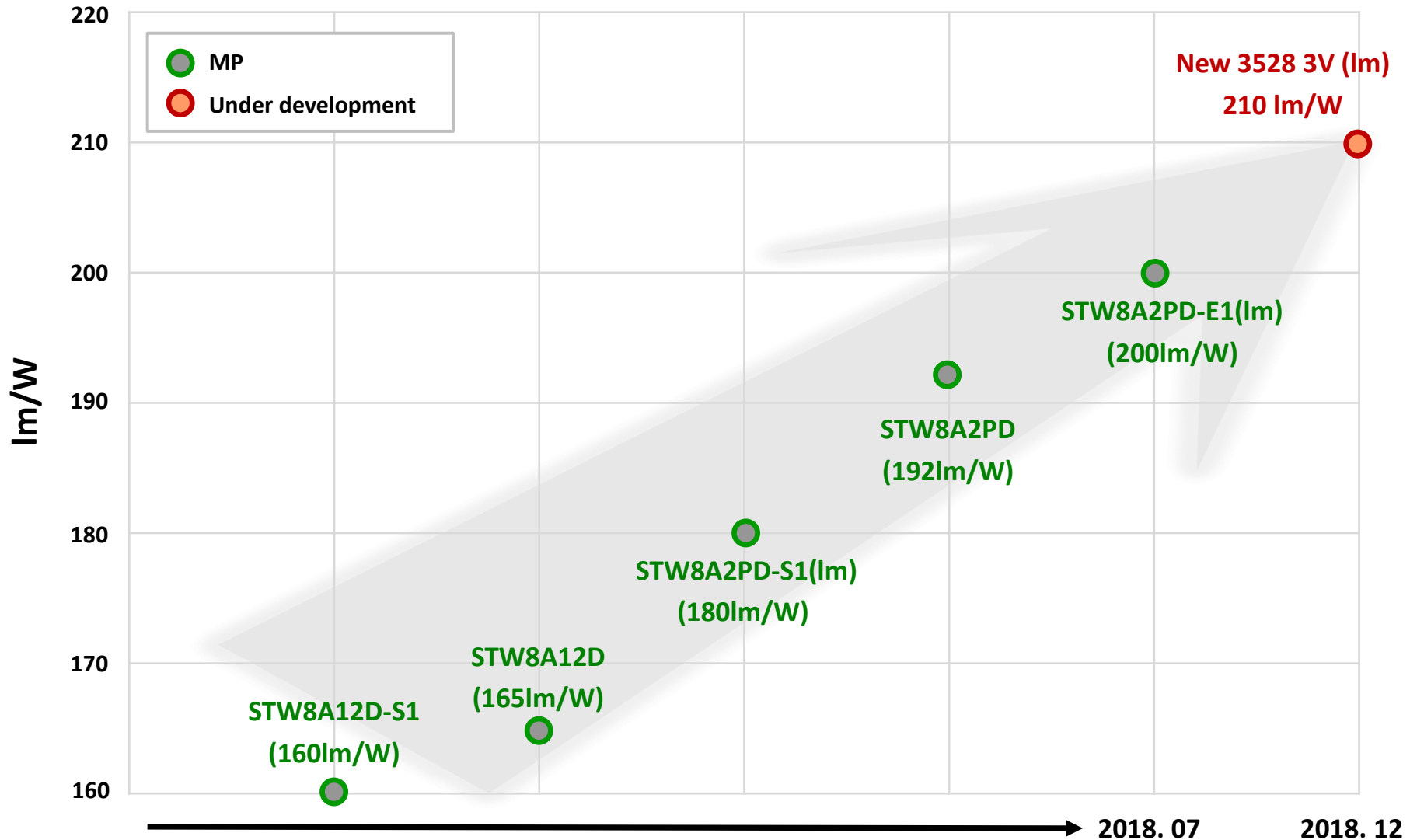
→ **T33EY1**

1. Sorting method : **lm Sorting**
2. Color Bin Structure : **Ellipse Bin**
3. Q'ty of a reel : **16,000pcs**

3528 3V Roadmap

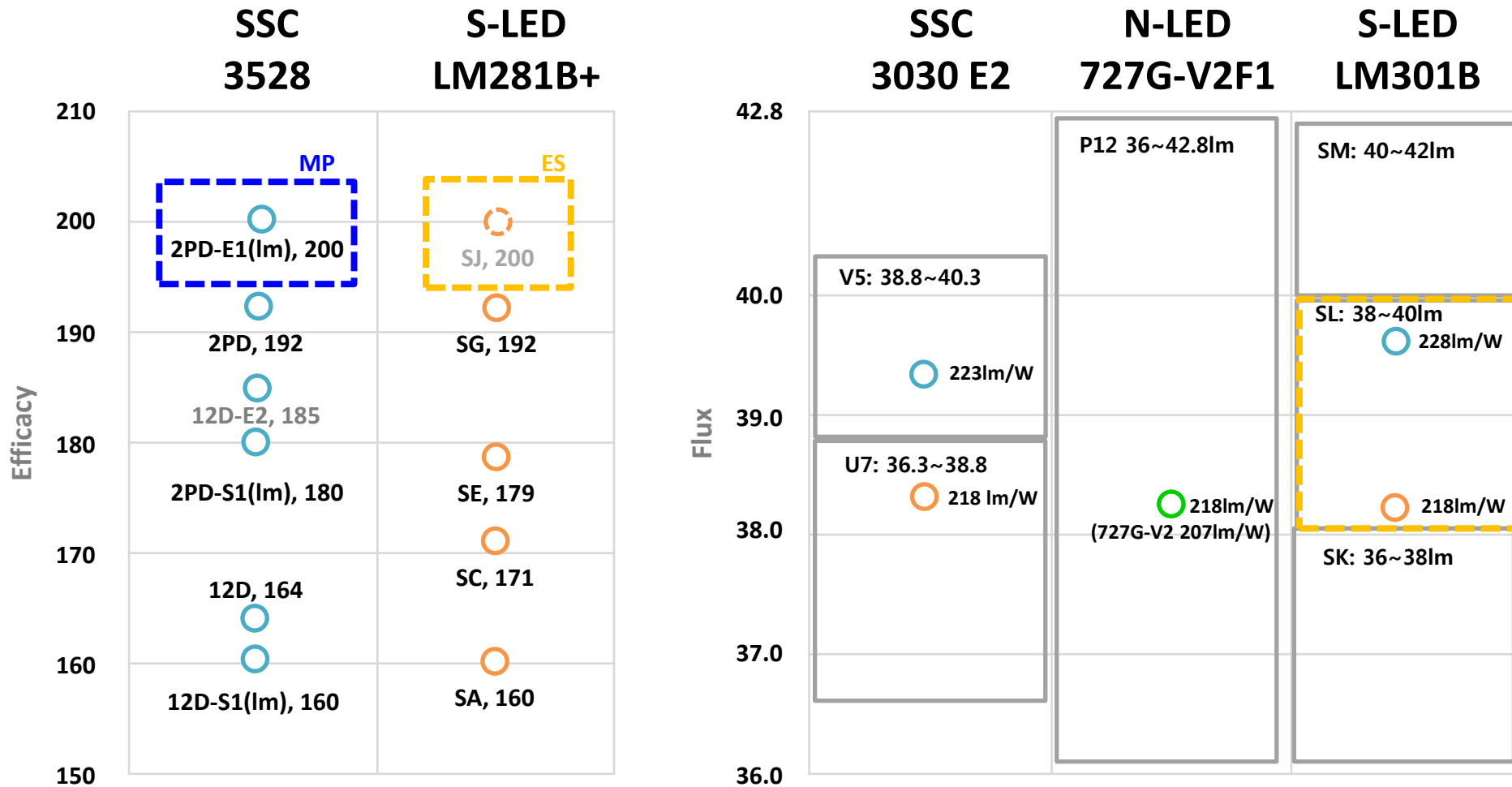
@ $T_j=25^\circ\text{C}$ / 65mA / 5000K / Ra80

* This roadmap criteria is the end of quarter.



Конкуренция в области средней мощности

3528 3V : Performance Leading, cost competitive
 3030 3V : Back in performance competition



3528 для гурманов: CRI>95, R9>90

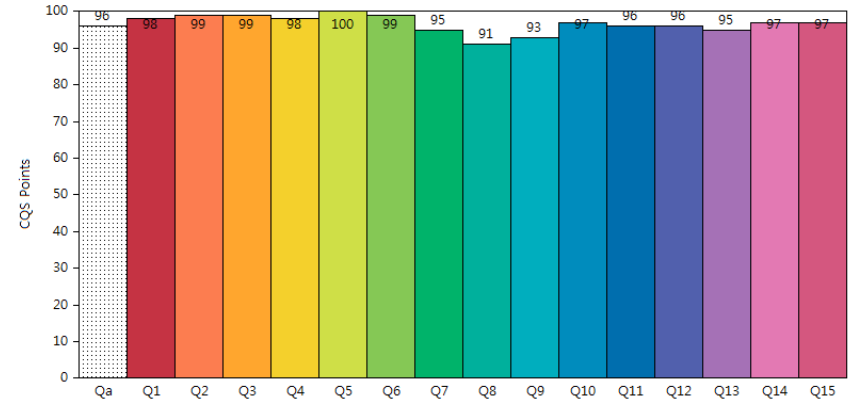
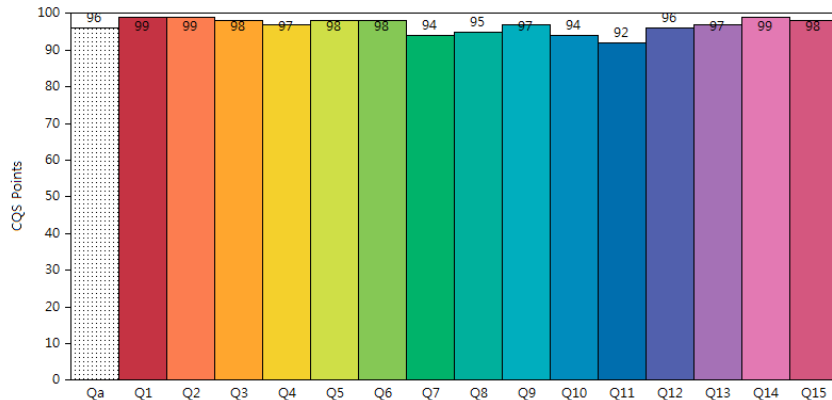
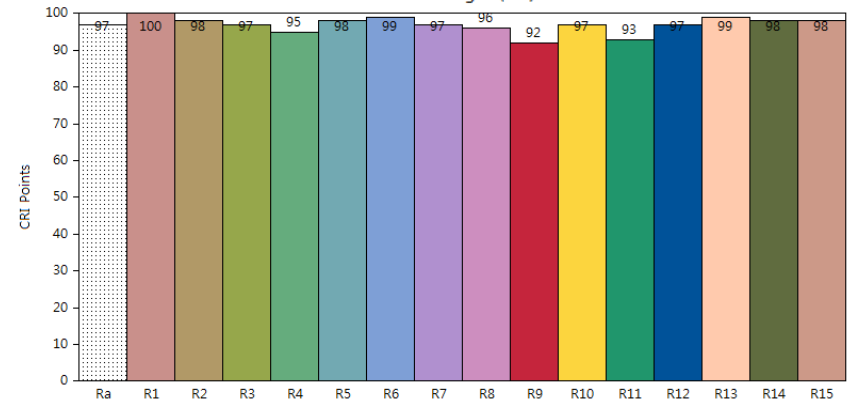
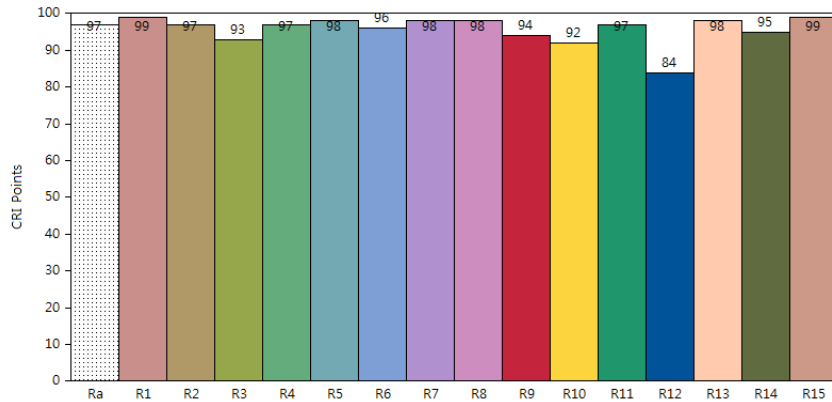
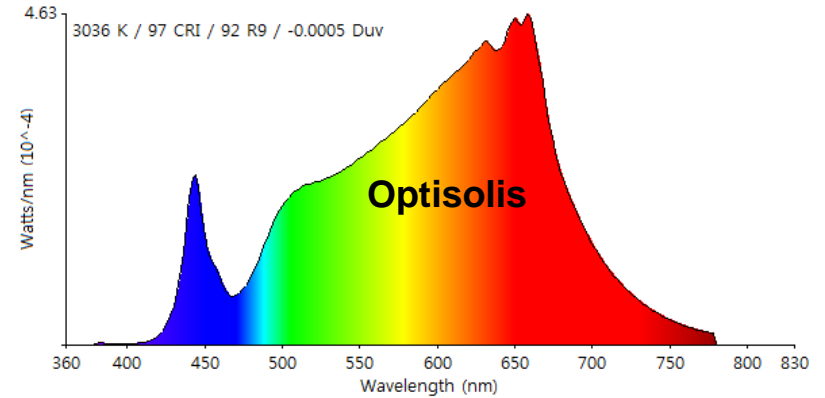
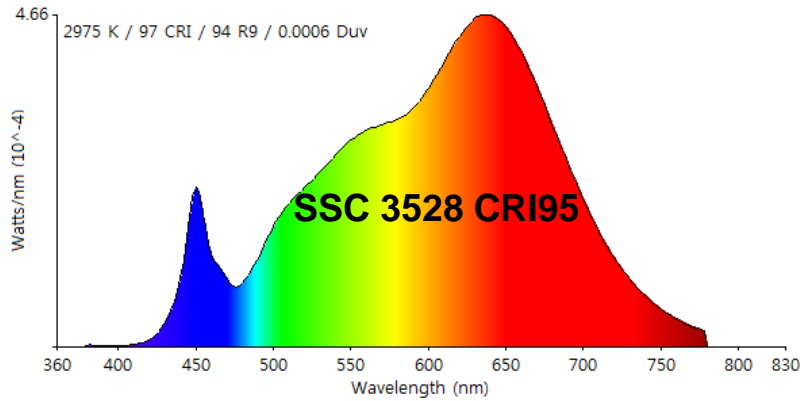
- Cost competitive solution in high CRI series
- Suitable for where the highest CRI is preferred / a qualified color reproduction
- 3 Step available

*Performance @3000K, CRI95, 25°C

Product	SSC 3528 CRI95	Optisolis	Remark
PKG size [mm]	3.5 x 2.8 x 0.7	3.0 x 3.0 x 0.65	Different form factor
Flux typ [lm]	22.5	22.6	@Actual measurement
Efficacy typ [lm/W]	119.5	125.5	@65mA by different Vf level
CRI	Min 95	Min 95	
CCT available	5000K to 2700K	4000K to 2700K	Optisolis w/ blue chip @ 4000K to 2700K
Reflector	PCT	EMC	
LM80	Available	N/A	SSC LM80 available @65mA, 150mA
Max Tj	125°C	120°C	
Max current	200mA	150mA	
Price	33%	100%	

3528 CRI95 vs Optisolis – Color Quality @3000K

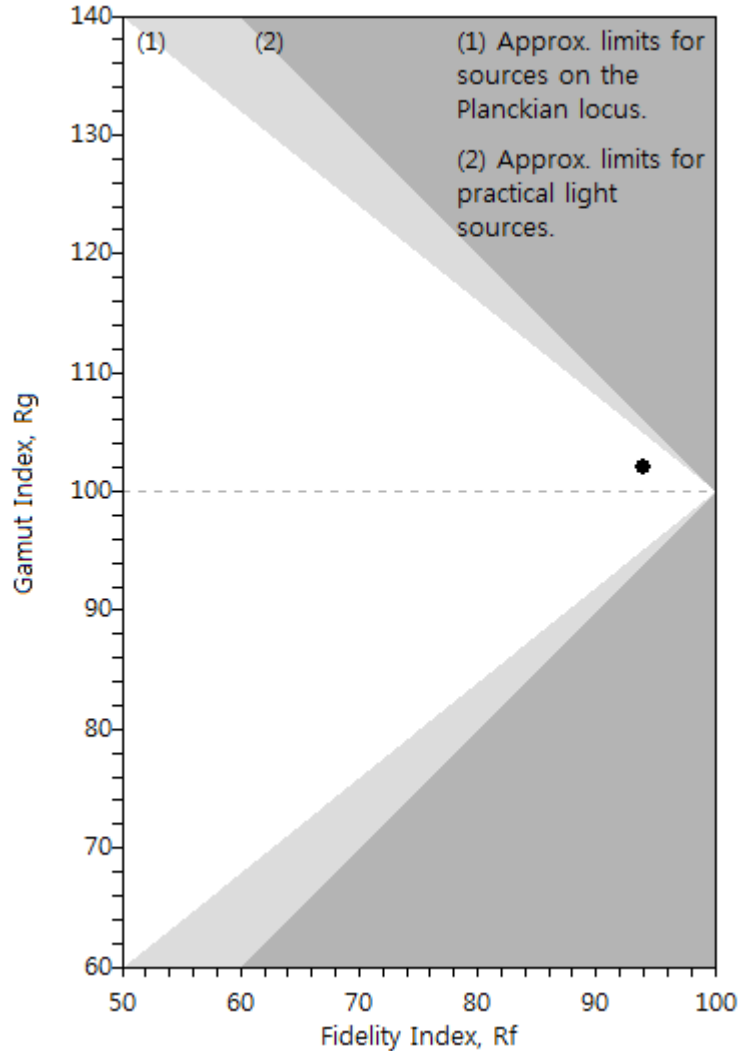
Source: Measurement



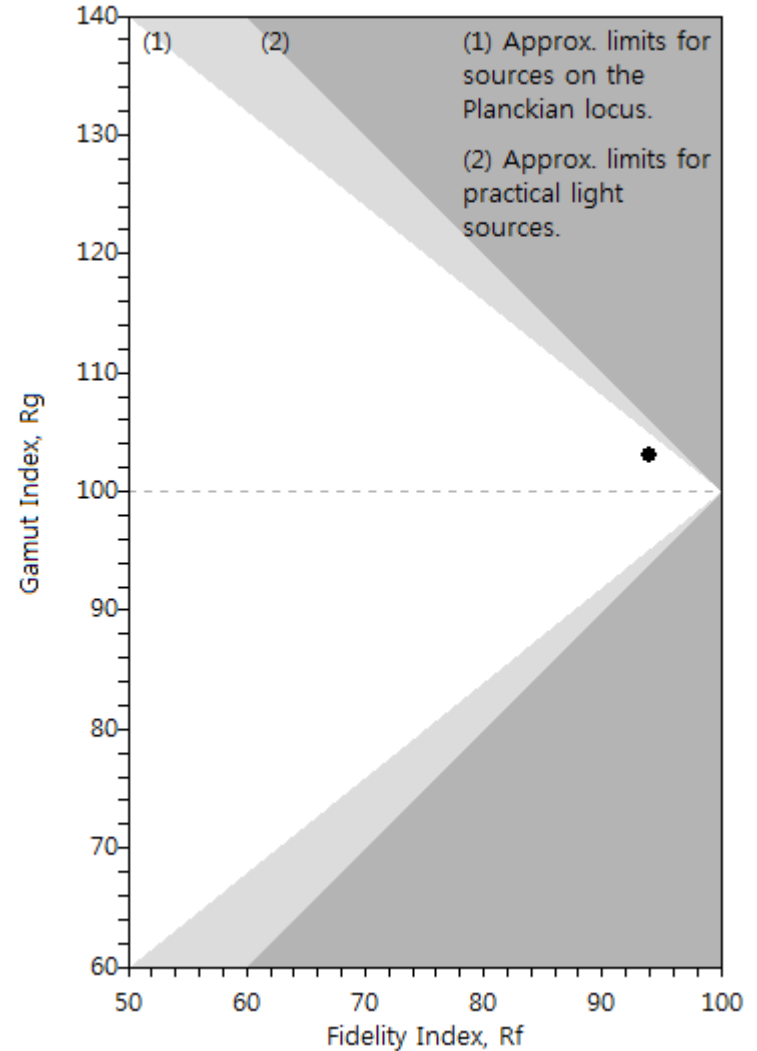
3528 CRI95 vs Optisolis – Color Quality @3000K

Source: Measurement

SSC 3528 CRI95 : Rf 94 Rg 102

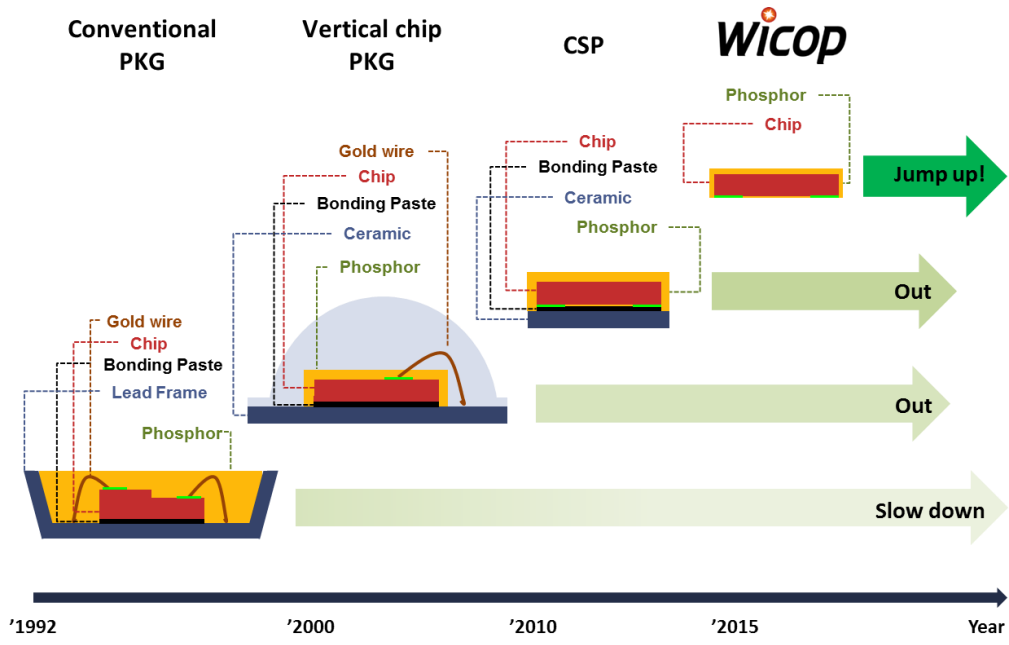


Optisolis : Rf 94 Rg 103



WICOP – и ничего лишнего!

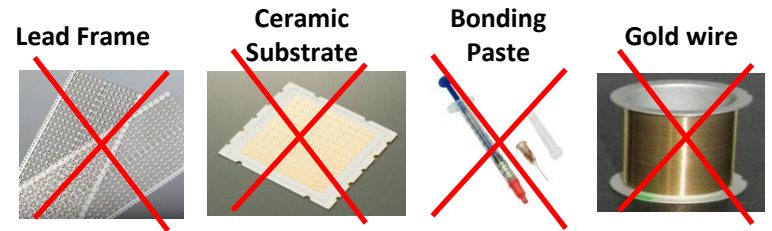
Innovation of Packageless LED



Production Facilities



Raw Materials



Development of Wicop

Wicop in TV & Auto



Wicop in Lighting



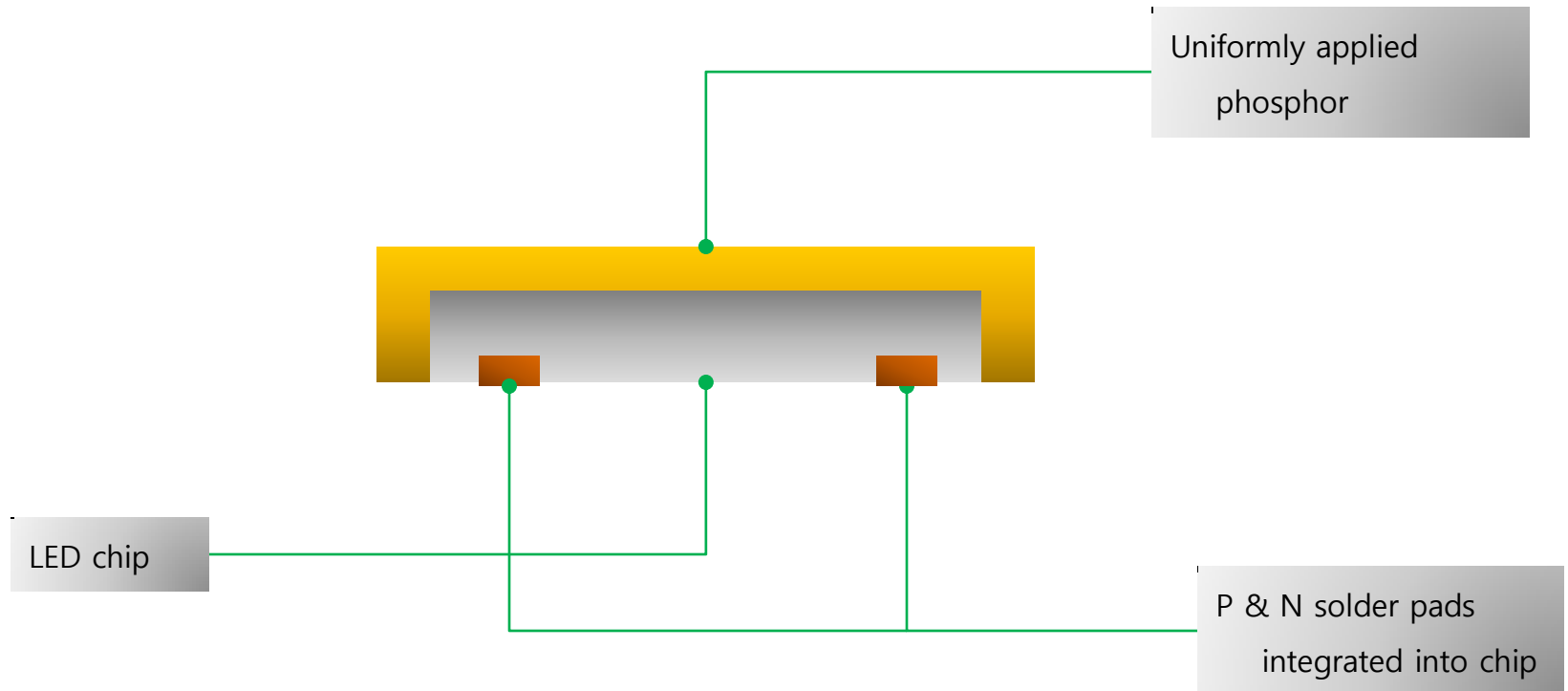
Next?

Higher Im/W

WICOP – максимальная простота

WICOP: Wafer Level Integrated Chip on PCB

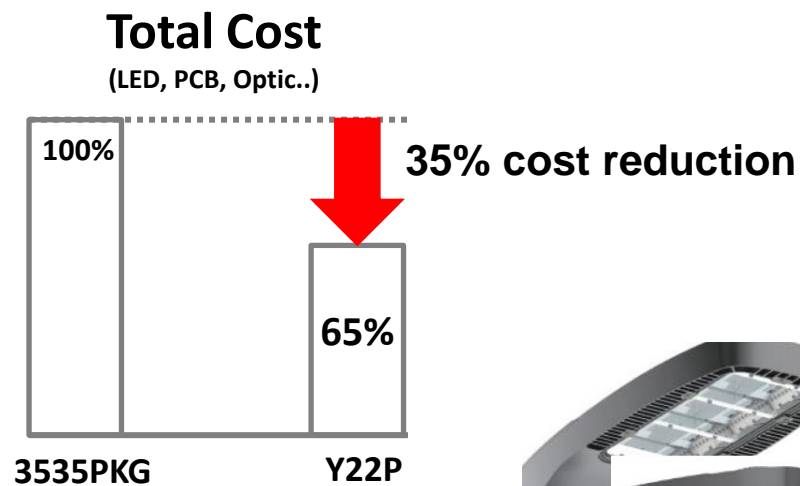
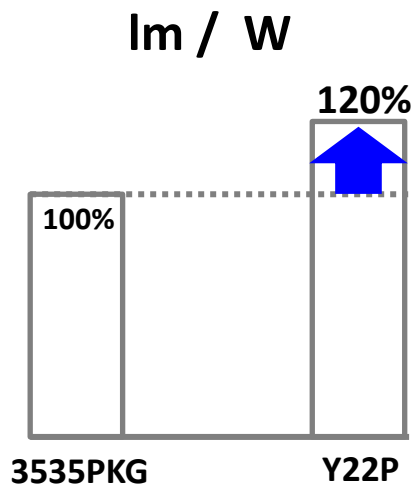
The simplest LED: LED chip with phosphor and solderable pads that can be directly mounted on a PCB



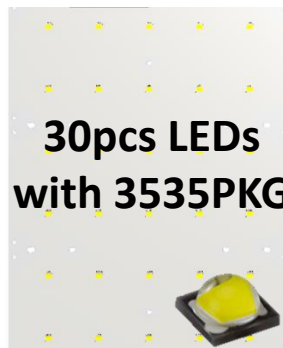
WICOP – вот тебе и первая выгода!

Высокая эффективность за разумные деньги

20% higher efficacy, 30% Cost Down



	3535	Y22P	Remark
Current	1.2 A		
System power	400 W		
Flux	40000 lm	48000 lm	20% ↑
Efficacy	100 lm/W	120 lm/W	20% ↑
Remark	100pcs, Street lighting		



of LEDs ↓
PCB Size ↓

Under same performance with same heat sink size



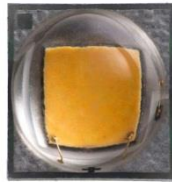
WICOP – вот тебе и вторая выгода!

Идеально ровный цвет

Best Color over Angle (COA) Solution with Wicop

High Power

- Complex manufacturing
- Color variation



WICOP

- Simple Optics
- Small Color variation($u'-v'$)

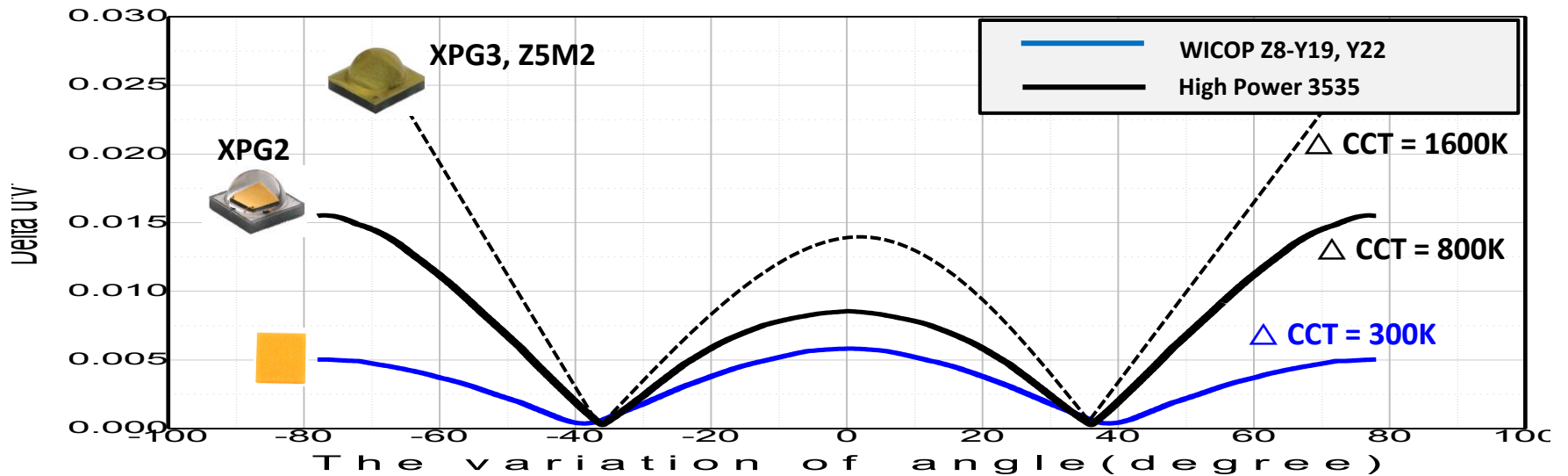


Fig) Delta u'v' graph through the variation of angle

COA – В ЖИЗНИ ЭТО ВЫГЛЯДИТ ТАК:

Color Over Angle



If delta CCT is 1600K,



3400K

5000K

3400K

5000K

3400K

5000K

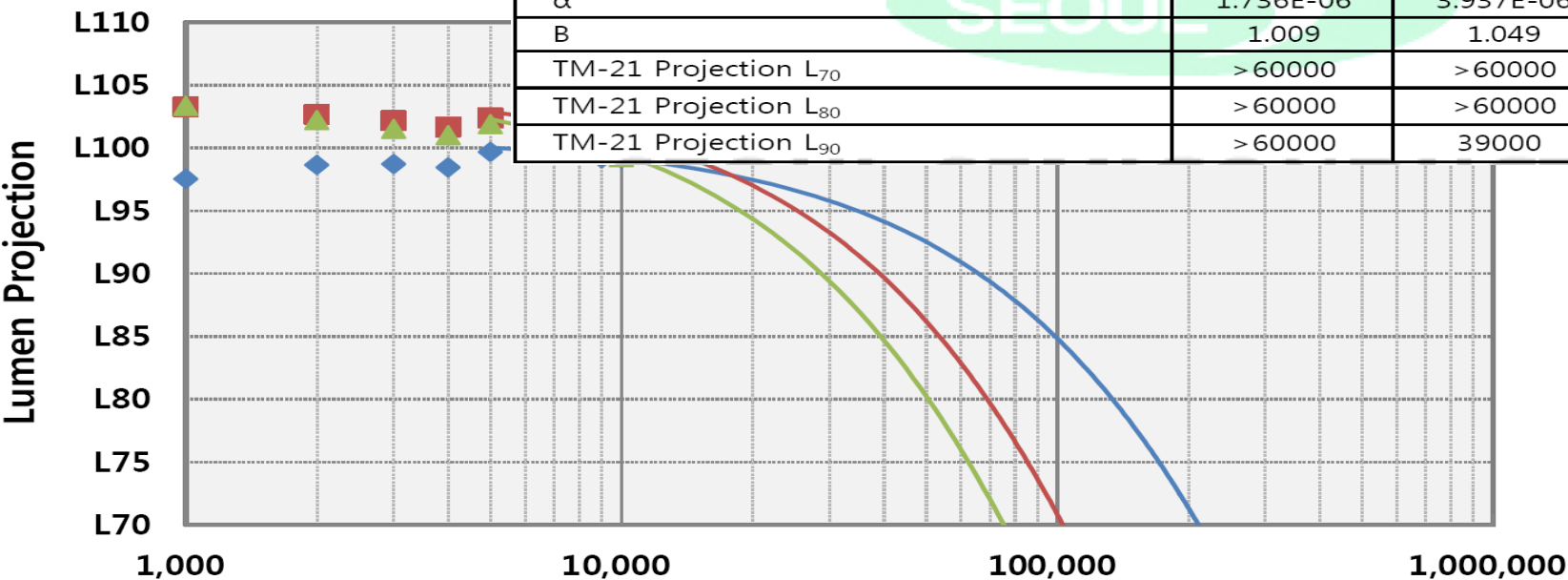


Based on Z5M2, XPG3, LuxeonTX @5000K, 70CRI

WICOP – светить всегда!!!

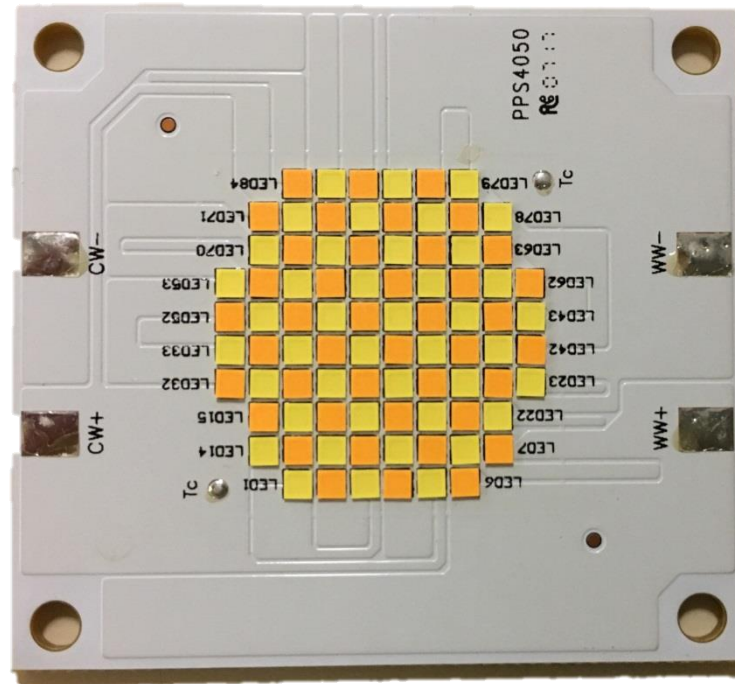
Summary of LM80 Test results for Y22

Items	Nominal Case Temperature		
	55 °C	85 °C	105 °C
Number of LED tested	20	20	20
Drive Current	1 050 mA	1 050 mA	1 050 mA
Measurment Current	1 050 mA	1 050 mA	1 050 mA
Test Duration	10 000 h	10 000 h	10 000 h
Actual Case Temperature	≥ 53.3 °C	≥ 83.6 °C	≥ 103.4 °C
Actual Ambient Temperature	≥ 51.6 °C	≥ 81.5 °C	≥ 101.4 °C
Air Flow Velocity	≤ 0.84 m/s	≤ 0.54 m/s	≤ 0.17 m/s
Averaged Initial Luminous Flux	362.3 lm	351.2 lm	346.5 lm
Averaged Initial CCT	2972 K	2998 K	2983 K
Averaged Forward Voltage	3.04 V	3.05 V	3.05 V
Averaged Lumen Maintenance	99.1 %	100.7 %	99.3 %
Averaged Chromacity Shift	0.002 1	0.003 5	0.004 5
α	1.736E-06	3.937E-06	5.402E-06
B	1.009	1.049	1.051
TM-21 Projection L ₇₀	> 60000	> 60000	> 60000
TM-21 Projection L ₈₀	> 60000	> 60000	51000
TM-21 Projection L ₉₀	> 60000	39000	29000



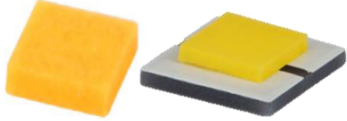




WICOP –невероятная гибкость решений

Ultra high power in smaller form factors

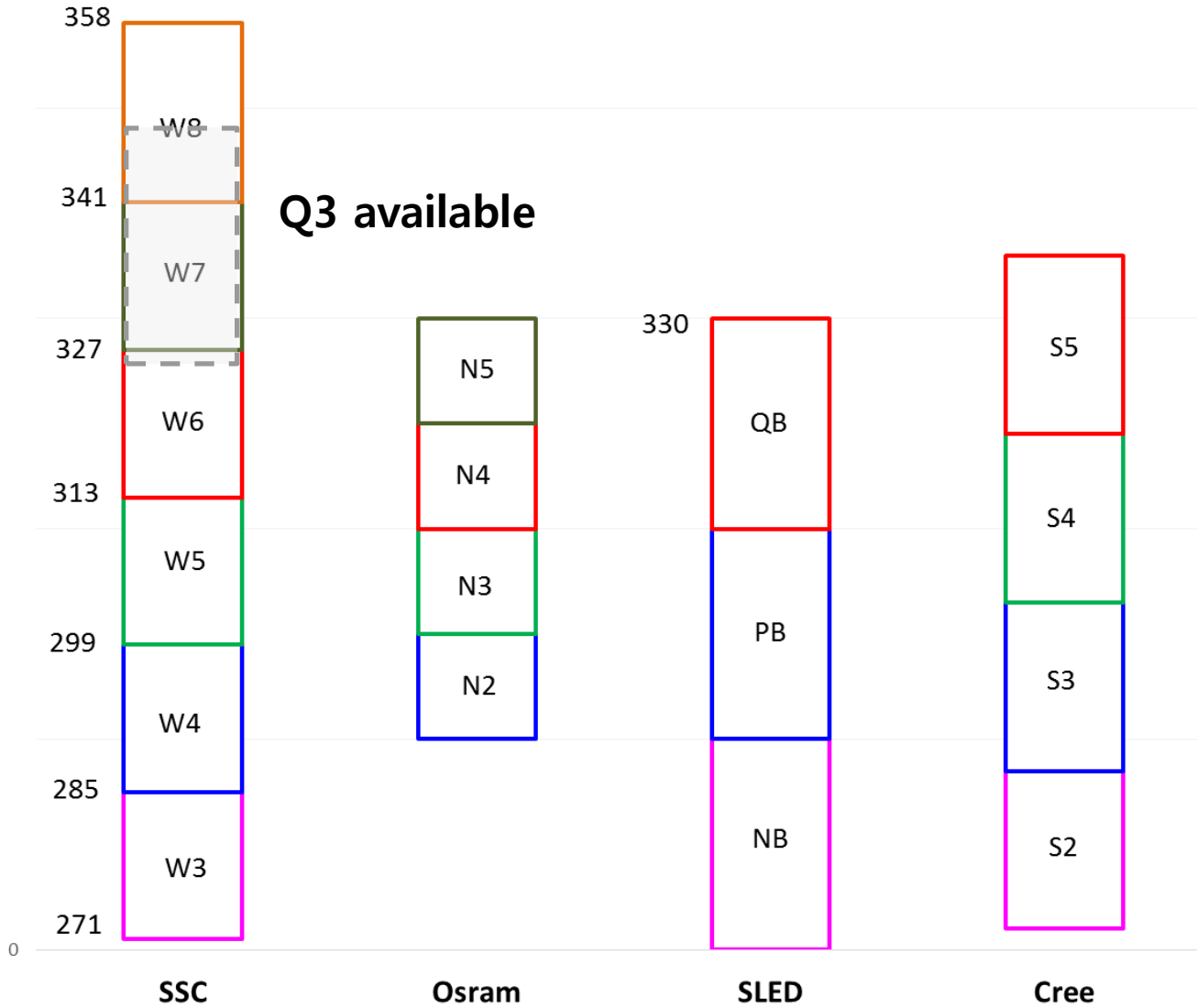


Example of an 260W LED module with 84 LEDs & PCB footprint of 45 x 50mm

Wicop Overview

Category	WICOP				
PKG design					
Part name	SZ8-Y22-WN-C0-x	SZ8-Y19-WN-C0	SZ8-Y15-WN-C7	SZ8-Y11-WN-C8-x	SZ8-Y50-WN-C7-x
	Y22x	Y19	Y15	Y11	Y50P
Vf [V]	2.78	2.86	2.84	3.0	10.9
If [mA]	700	700	350	350	700
CCT [K]	4000	4000	4000	4000	4000
Flux [lm]	337	305	134	143	1240
Efficacy [lm/W]	173	152	136	136	163
LM80 availability	9Khrs	10Khrs	6Khrs	9Khrs	9khrs

Wicor: конкурентов нет!



3535 перезагрузка: новый SZ5-M3



Size: 3.5x3.5x2.0 [t]

Новинка осени!

SZ5-M2-XX-XX

Features & Benefits

- Long Lifetime - More than 100,000 hrs
- Deliver efficacy up to 185 lm/W (@350mA, 25°C)
- Hot binning (Tj=85°C, 700mA condition)

LM80

- 9,000hrs @1.2A : Done

● Electrical Optical Characteristics

@ Tj = 85 °C

CCT	5000K	4000K
Power [W]	2.0	2.0
Current [mA]	700	700
FLUX [lm]	296	291
VF [V]	2.86	2.86
Efficacy [lm/W]	148	146
CRI	Min 70	Min 70

SZ5-M3-XX-XX

Features & Benefits

- Deliver efficacy up to 195 lm/W (@350mA, 25°C)
- Hot binning (Tj=85°C, 700mA condition)
- **Cost competitiveness with performance**

Schedule

ES Now

MP : Oct 2018

Sulfur test : started Sept

LM80: Now

● Electrical Optical Characteristics

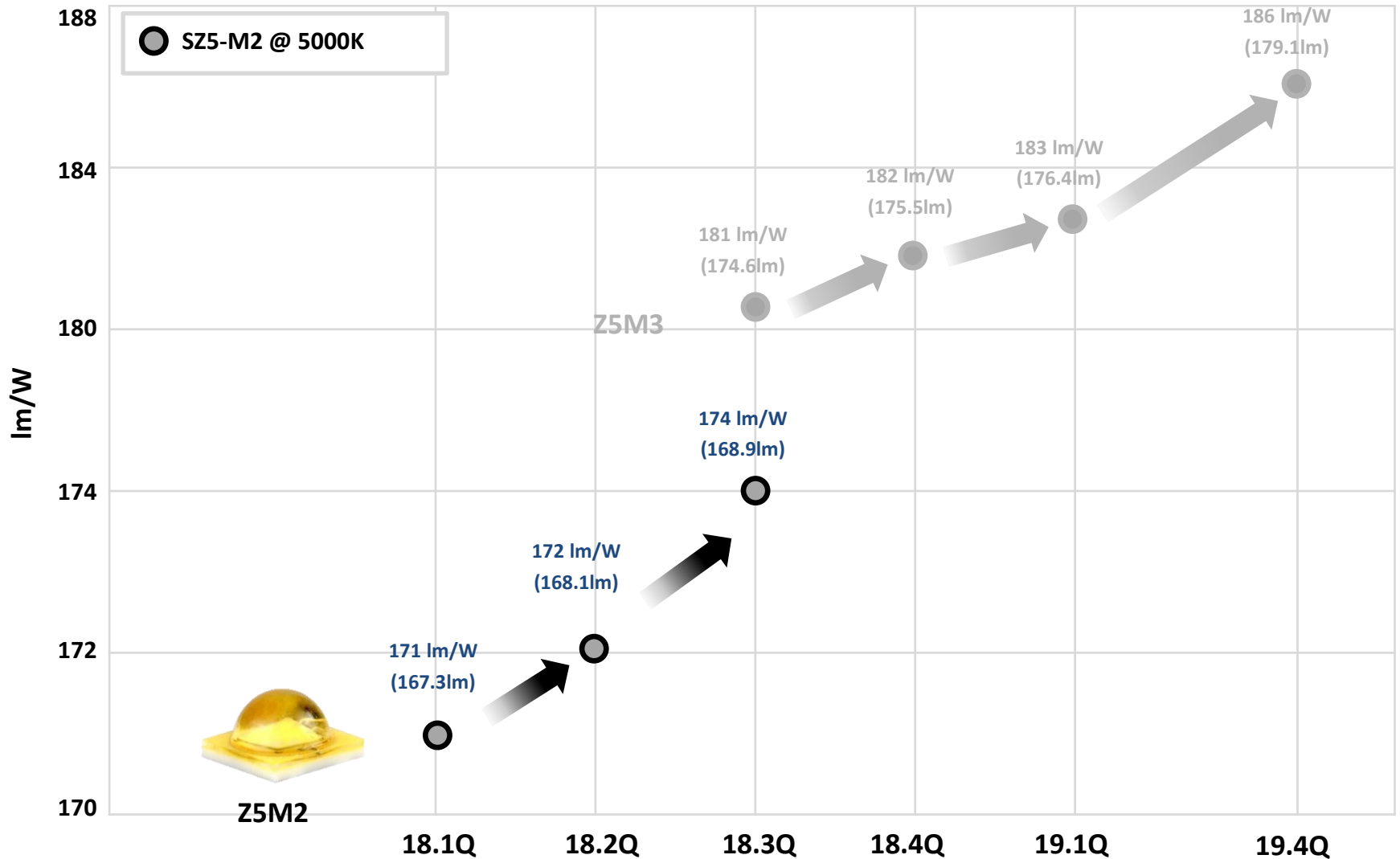
@ Tj = 85 °C

CCT	5000K	4000K
Power [W]	1.95	1.95
Current [mA]	700	700
FLUX [lm]	306	303
VF [V]	2.79	2.79
Efficacy [lm/W]	157	155
CRI	Min 70	Min 70

Z5M2 / Z5M3 Roadmap

@ $T_j=85^\circ\text{C}$ / 350mA / Ra70

* This roadmap criteria is the end of quarter.



SSC – Horticulture Lighting

High Power portfolio

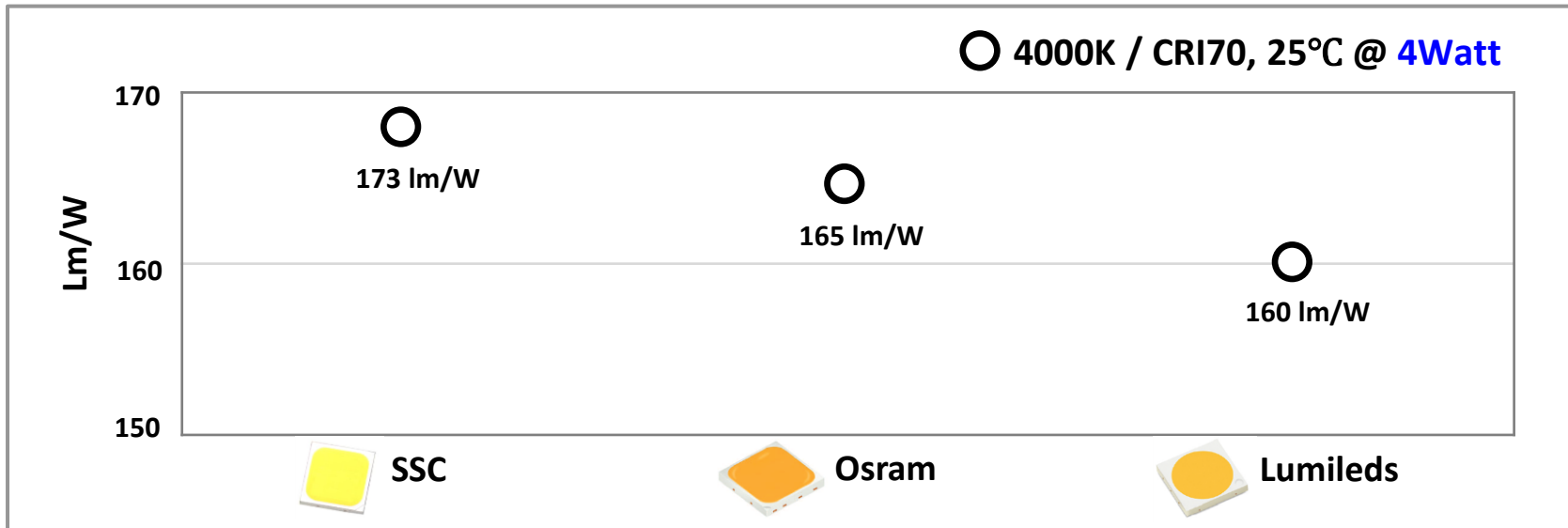
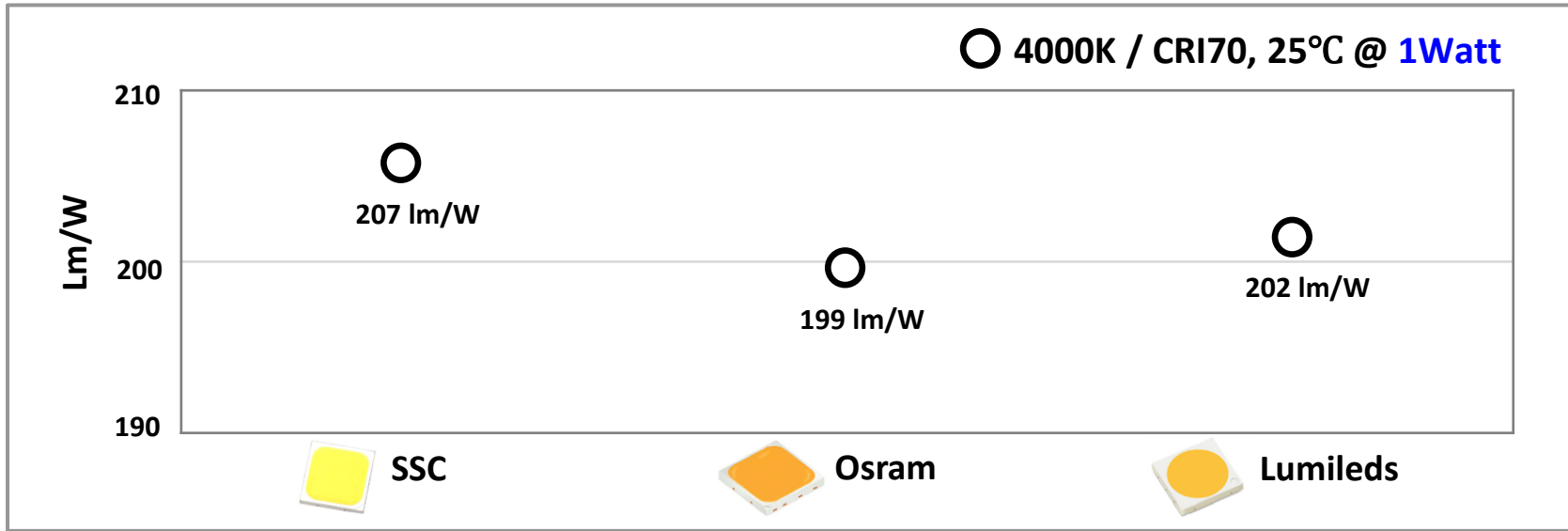
Z5M series

Size: 3.5x3.5x2.0 [t]

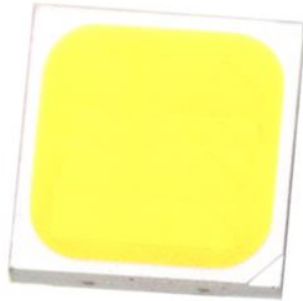


Colors	UV/Purple	Blue	Deep Red	Far Red
Performance [lm], [mW]	668 mW	660 mW	410 mW	317mW
PPF [$\mu\text{mol/s}$]	1.7	2.44	2.22	0.19
PPF/W [$\mu\text{mol/J}$]	1.41	2.36	3.02	0.29
Dominant/Peak Wavelength	Typ 405nm; Range 398 - 412	Typ 455nm; Range 448 - 463	Typ 657nm; Range 646 - 667	Typ 730nm; Range 710 - 750
Viewing Angle	120°	120°	120°	120°
Typ. Rth	3.5 K/W	3.0 K/W	3.2 K/W	4.0 K/W
Max Current	0.5 A	1.2 A	0.7 A	0.7 A
Typ. Vf.	3.45V @350mA	2.95 @350mA	2.10V @350mA	1.9V @350mA

5050: рекордная эффективность в PLCC до 4Вт



5050-E1 18V



Size: 5.0 x 5.0
Thickness: 0.65 mm

SAWxL60A

Features & Benefits

- Super high flux output and high luminance
- Typical 16.2V forward voltage @60mA, 25°C
- Optimized for outdoor application

Schedule

- LM80 : 6000hrs @ 1.5W
: 6000hrs @ 4.0W

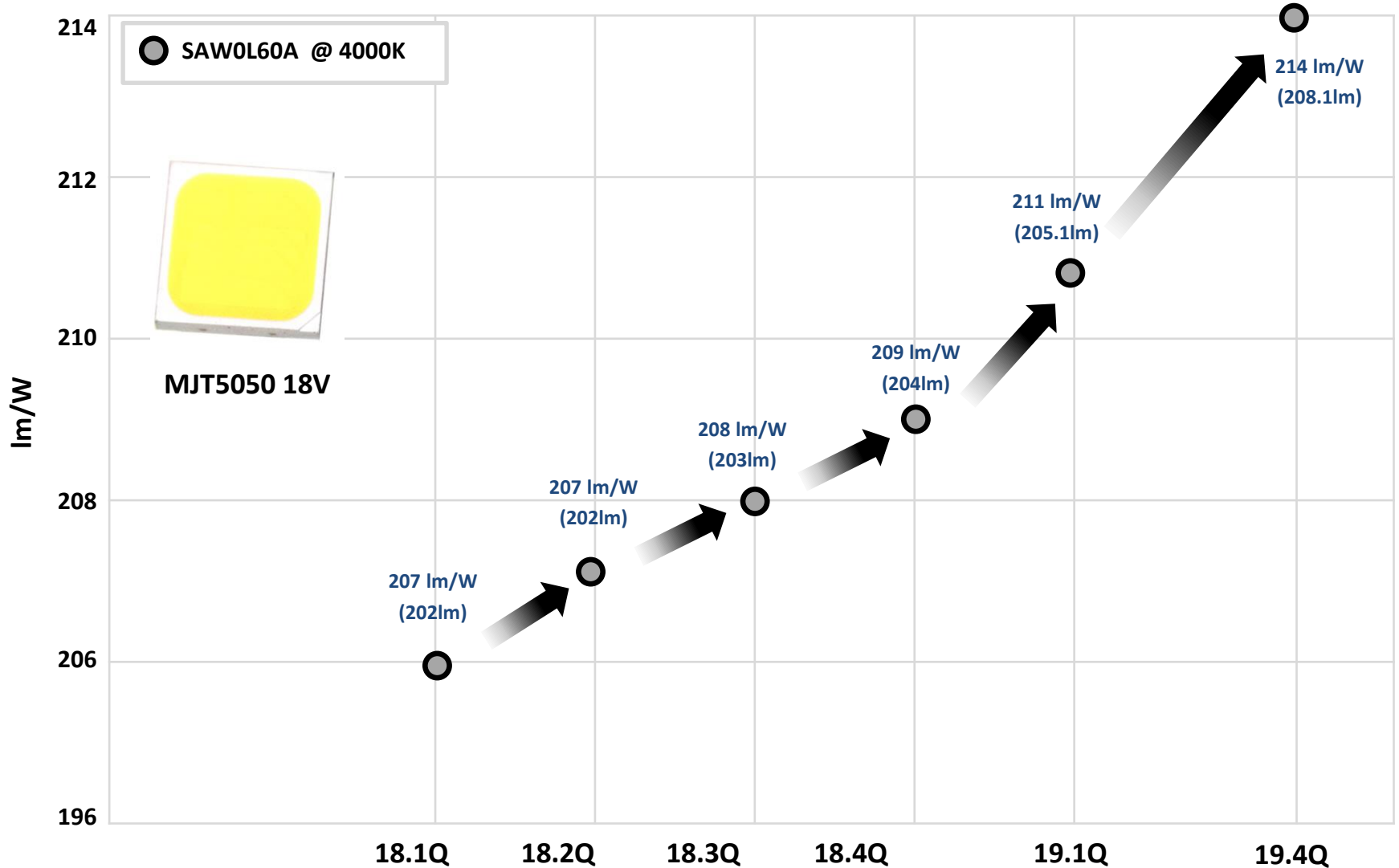
● Electrical Optical Characteristics

CCT	4000K		3000K	
Current [mA]	60	220	60	220
VF [V]	16.2	18	16.2	18
Power [W]	0.97	4	1	4
Flux [lm]	202	692	194	663
Efficacy [lm/W]	207	173	200	167
CRI	70			

5050-E1 Roadmap


@ $T_j=25^\circ\text{C}$ / 60mA / Ra70

* This roadmap criteria is the end of quarter.






На память!

Performance

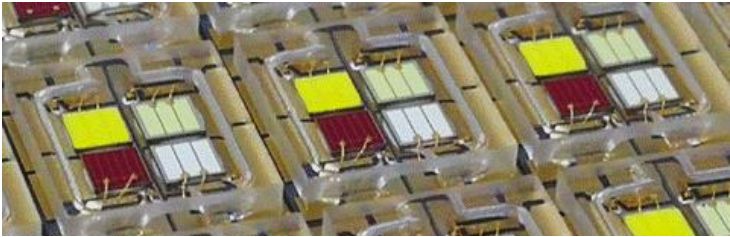
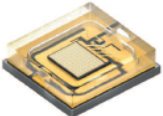
	Parts	Y22	Y22P	MJT5050-E1
	Design			
Characteristics	PKG Size	2.2x2.2x0.4mm	3.5x3.5x0.9mm	5.0x5.0x0.65mm
	VF	2.78V	2.78V	Typ. 16.2V (@60mA, 25deg.)
	Im (5000K,70CRI)	Typ. 340lm	Typ. 340lm	Typ. 202lm
	LPW	175lm/W	175lm/W	207lm/W

Cost-Effective

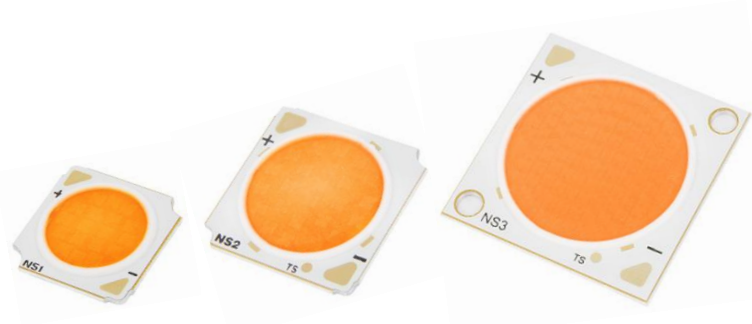
	Parts	Z5M2	Y15	Y19
	Design			
Characteristics	PKG Size	3.5x3.5x2.0mm	1.5x1.5x0.4mm	1.9x1.9x0.4mm
	VF	Typ. 2.96V	Typ. 2.95V	2.86V
	Im (5000K, 70CRI)	Typ. 300lm	Typ. 278lm	Typ. 308lm
	LPW	150lm/W	135lm/W	154lm/W

Full Color Lighting

High Power Full Color Portfolio

Power	15W	40W	60W	8W
Design	 <p>Engineering Sample</p>			 <p>Reference</p>
Chip	4chip in 1PKG			1chip in 1PKG
PKG Size	4.68 x 5.75 x 1.21mm	4.68 x 5.75 x 1.21mm	5.75 x 6.38 x 1.21mm	3.65 x 3.9 x 1.21mm
Pin Count	8	8	8	2
Dominant Wavelength	Red : 625nm Green : 530nm Blue : 453nm White : 6500K			
Viewing Angle	120°			
Current [mA] (Ts = 25 °C)	0.7A	1.0A	1.4A	1.4A
Max Current	1.0 A	2.5 A	4.5 A	4.5 A

Acrich MJT COB: стабільно, якасцёва, надзейна



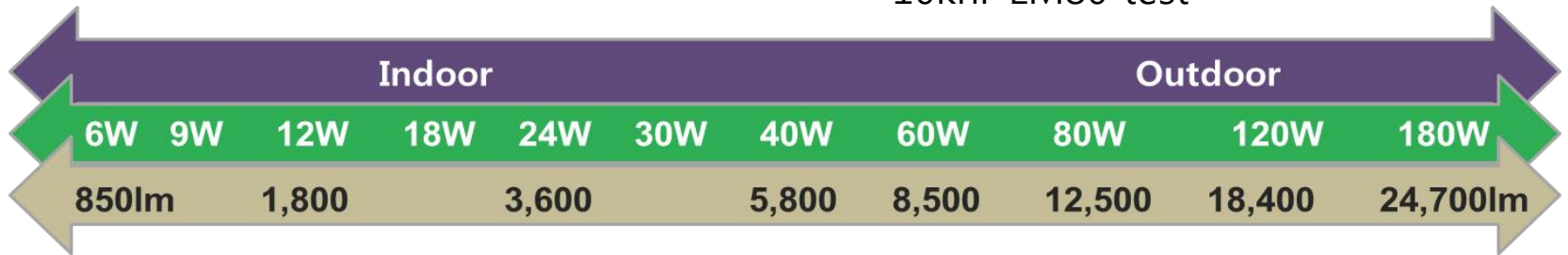
Features & Benefits



- MJT(Multi Junction Technology) Solution
- **Smallest LES@6W (φ6)**
- **MacAdam 2-step, 3-step binning**
- **Below BBL product available**
- **Highest efficacy up to 160 lm/W (3000K and CRI80 @ Tj=85°C)**

Reliability

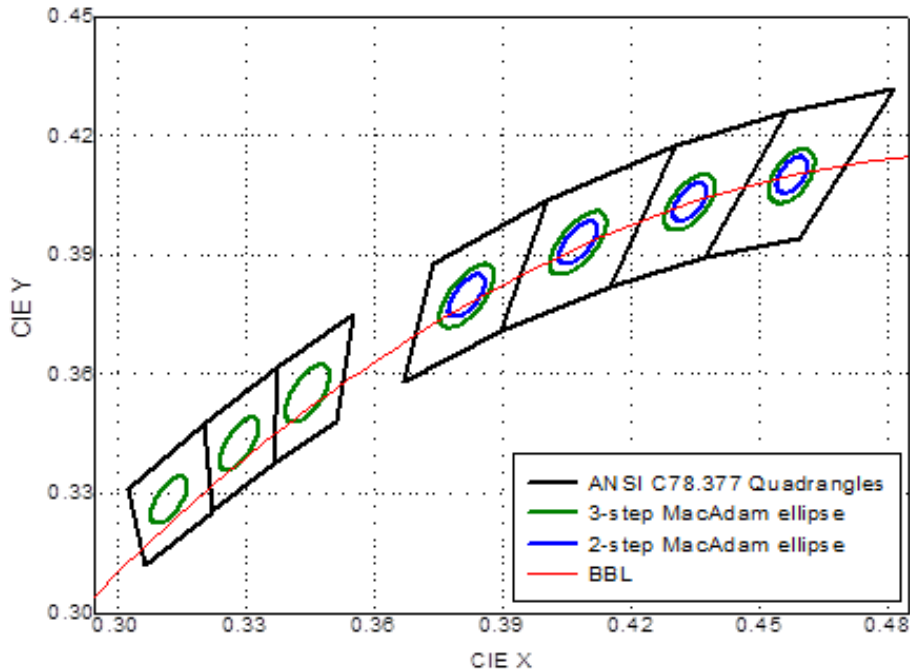
- 10khr LM80 test



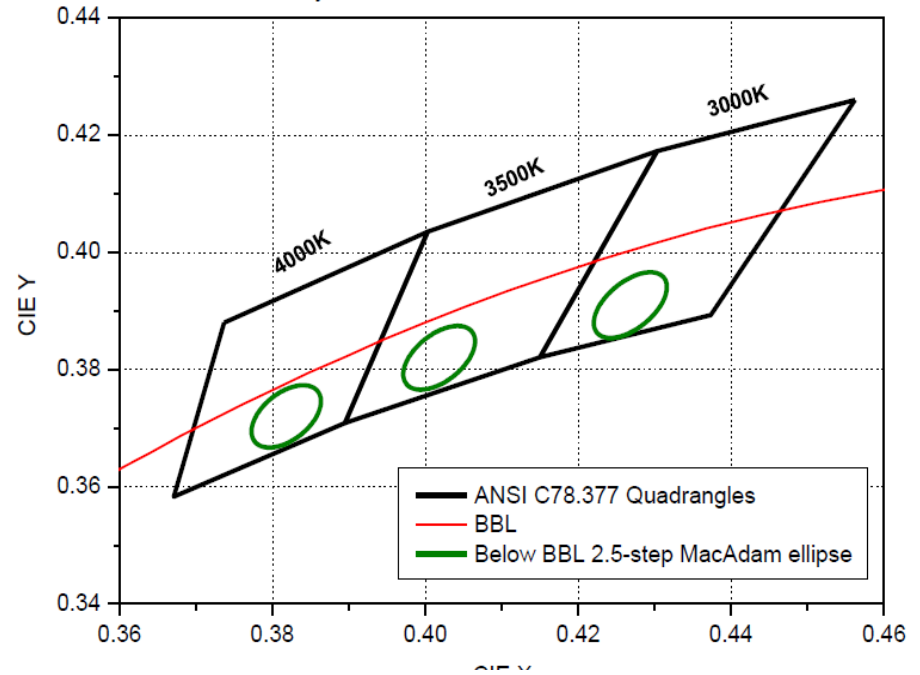
MR Bulb Par Down light Ceiling light High bay Flood light Street light

Acrich MJT COB

On the BBL 2-step / 3-step



Below BBL 2.5-step

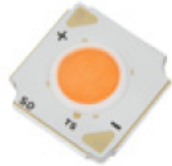


SunLike COB

Advantages & Benefits

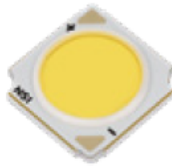
- SunLike spectrum
- Lower blue peak
- Eye safety Risk 1
- CRI typ 97 & R1~R14 >95
- Rf=97, Rg=102 under TM30-15 (2700K ~ 5000K)
- 2700K ~ 6500K line up

SunLike 6W MJT COB



Part No.	SAWS0661A	Typ. Vf [V] @Tj=85		36.1
Size [mm]	13.5x13.5	Typ. Flux [lm] @Tj=85	3000K	515
LES [mm]	6		4000K	560
IF [A]	0.17		5000K	585

SunLike 10W MJT COB



Part No.	SAWS1063A	Typ. Vf [V] @Tj=85		34.8
Size [mm]	13.5x13.5	Typ. Flux [lm] @Tj=85	3000K	920
LES [mm]	9.8		4000K	1,000
IF [A]	0.29		5000K	1,045

SunLike 15W MJT COB



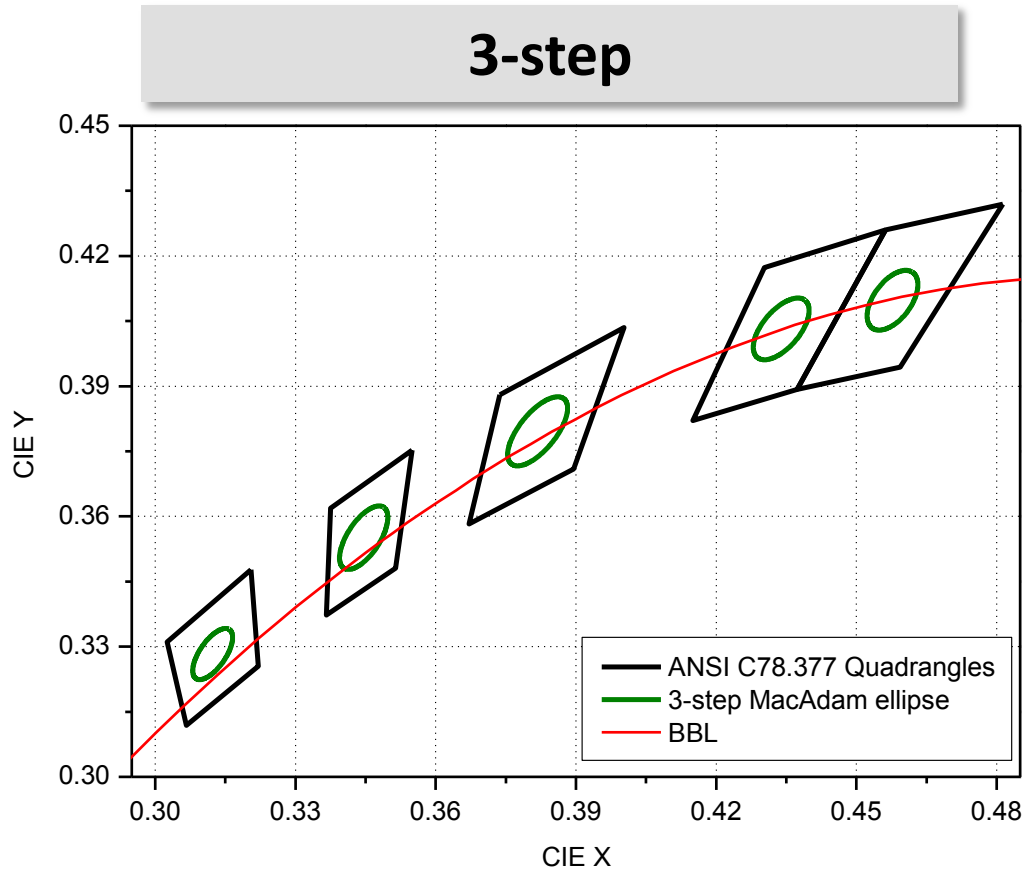
Part No.	SAWS1564A	Typ. Vf [V] @Tj=85		35.0
Size [mm]	19x19	Typ. Flux [lm] @Tj=85	3000K	1,425
LES [mm]	14.5		4000K	1,550
IF [A]	0.43		5000K	1,620

SunLike 25W MJT COB



Part No.	SAWS1566A	Typ. Vf [V] @Tj=85		35.2
Size [mm]	19x19	Typ. Flux [lm] @Tj=85	3000K	2,335
LES [mm]	14.5		4000K	2,540
IF [A]	0.72		5000K	2,655

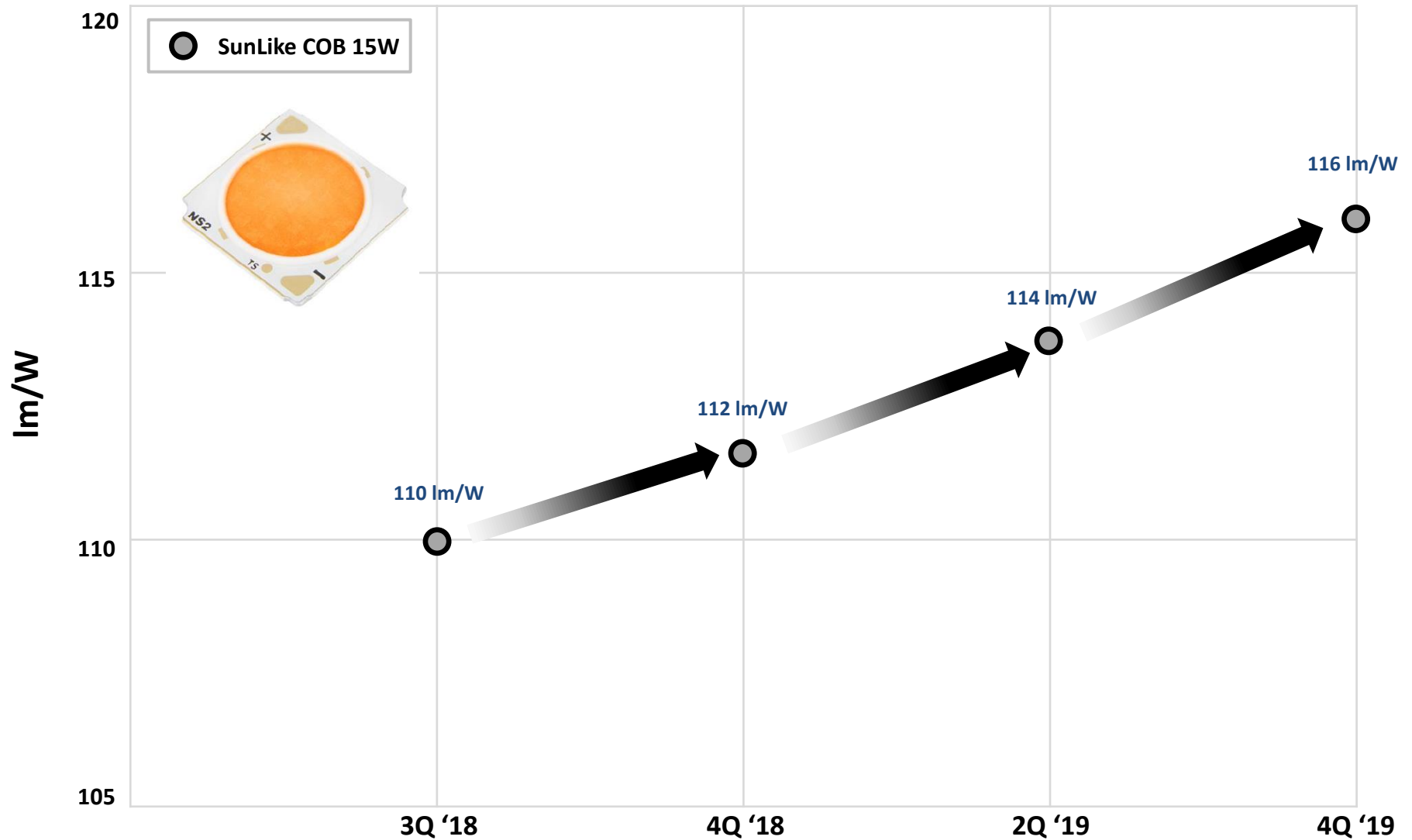
SunLike COB

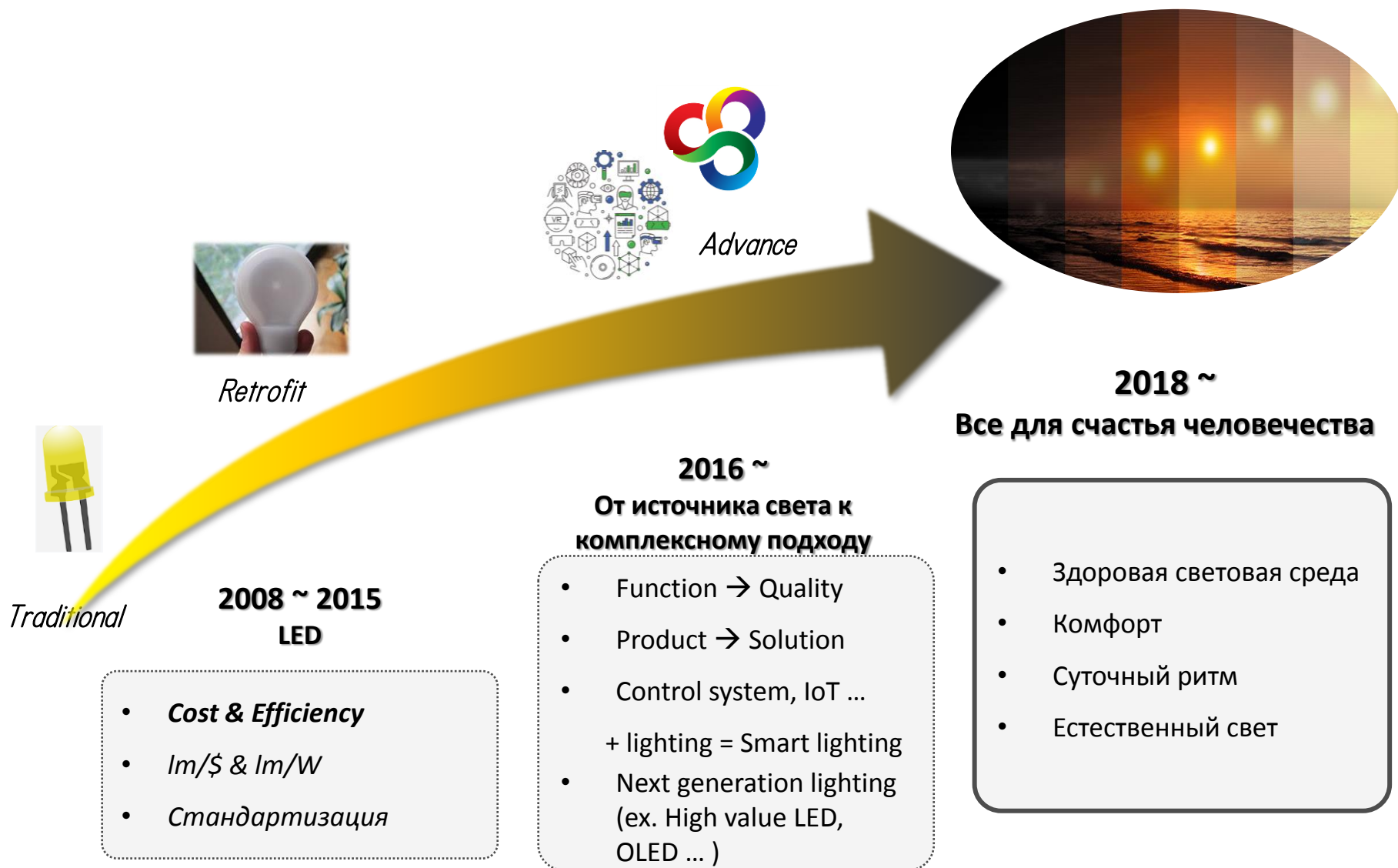


SunLike COB Roadmap

@ $T_j=85^{\circ}\text{C}$ / 0.43A / 5000K

* This roadmap criteria is the end of half year.





Человечество эволюционировало под солнечным светом



Sunshine

Fire

Incandescent lamp

Florescent lamp

White LED

SunLike SEOUL
Powered by 



4 million years ago

0.5 million years ago

3 B.C.

1879

1936

1996

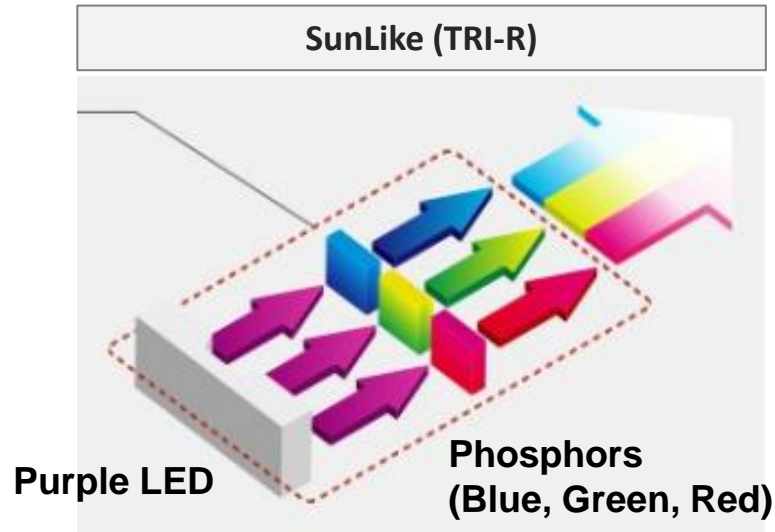
Blackbody radiation (Natural light)

Artificial light

Sunlike = НОВАЯ ЭРА В ИСТОРИИ ЧЕЛОВЕЧЕСТВА!

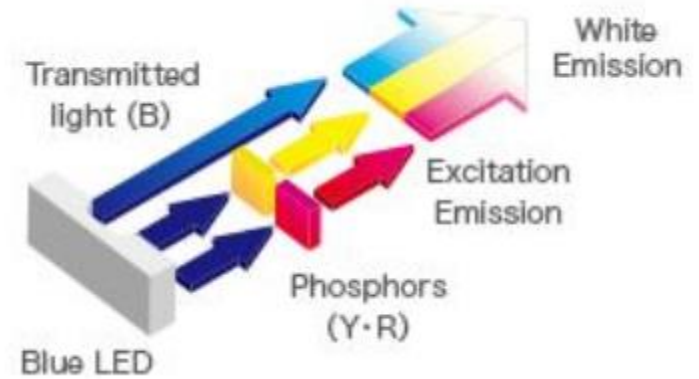
1. Здоровый, комфортный свет
2. Правильное цветовосприятие
3. Четкость и отсутствие бликов



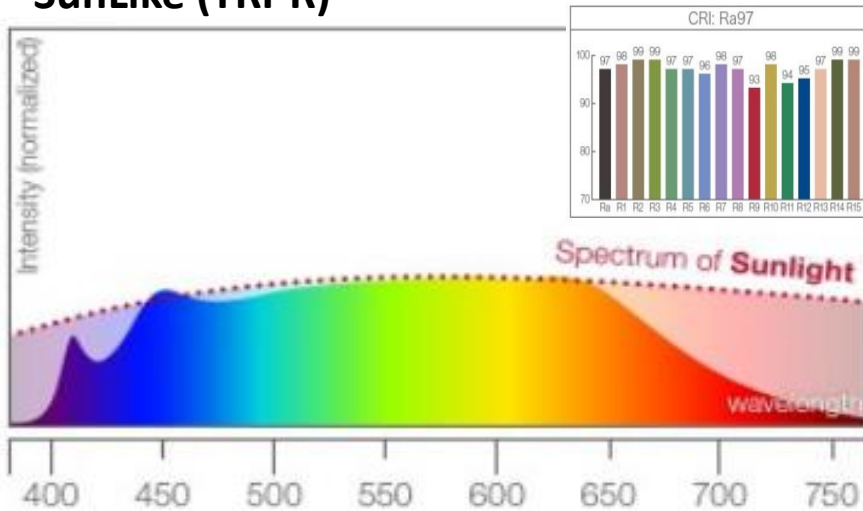


Традиционная технология LED (B+YR)

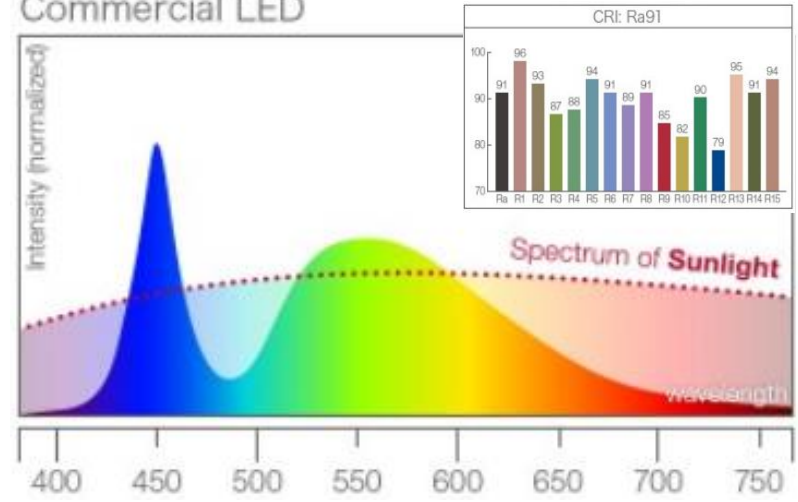
VS.



SunLike (TRI-R)



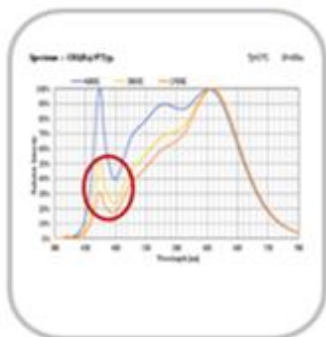
Commercial LED



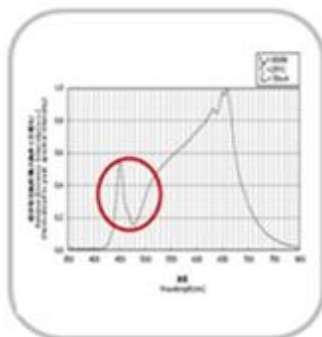
TRI-R, совместная разработка с Toshiba Materials

Blue based CRI>95 & Near UV технологии по сравнению с SunLike

Blue Pump

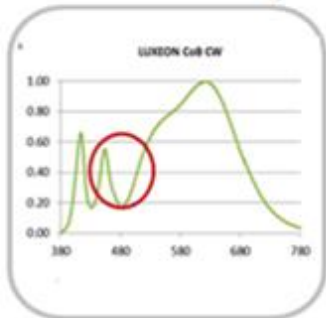


Blue Pump

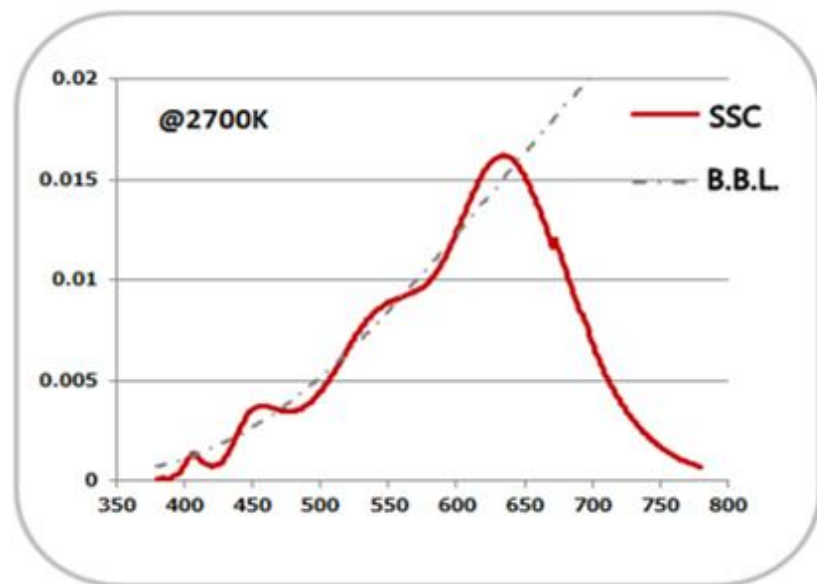
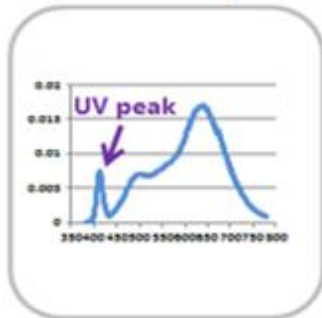


- ✓ Less Blue effect & UV leakage
- ✓ 15% higher lm/W

Violet Pump

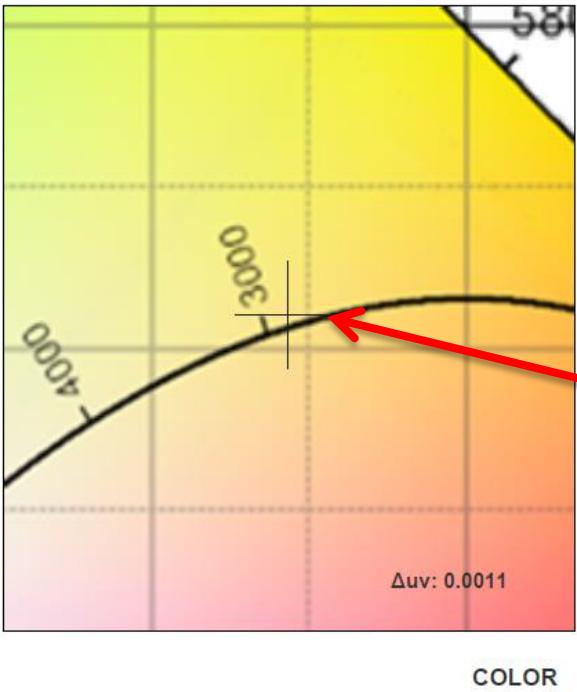
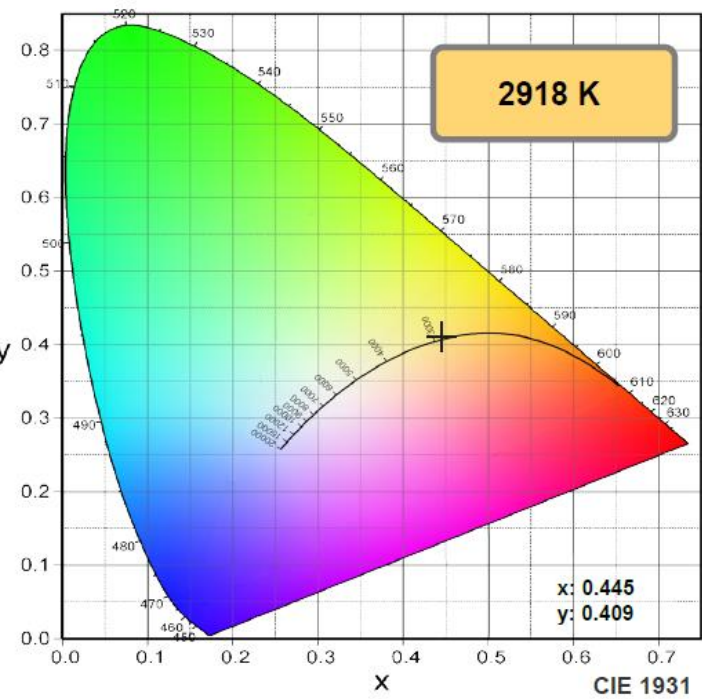


UV Pump



Spectrums shown above are taken from datasheets of products available in the market

Измерения: Sunlike 3000K



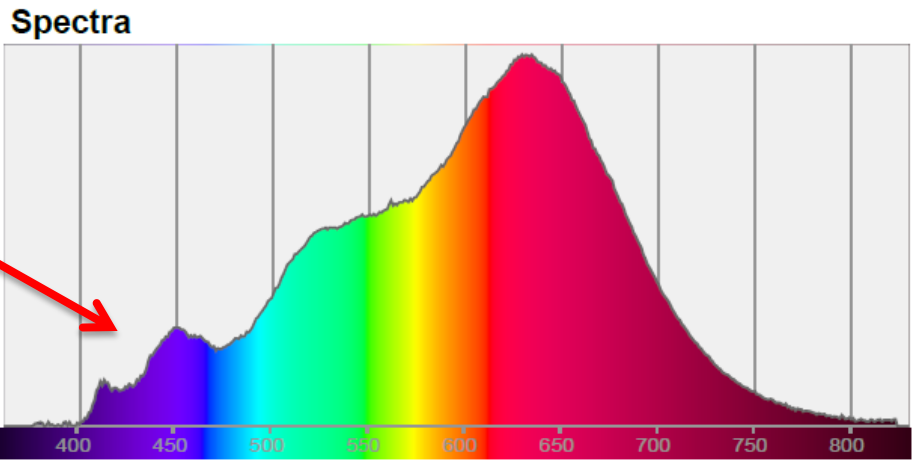
Точно соответствие
BBL: реальный цвет
как при естественном
освещении

Delta UV < 0.001
(отсутствие
искажений цвета)

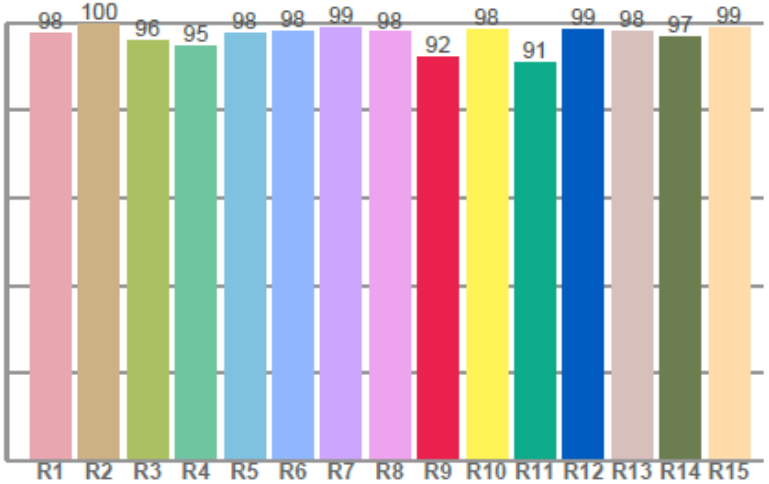
Отсутствие UV/Blue peak

Отсутствие искажений цвета

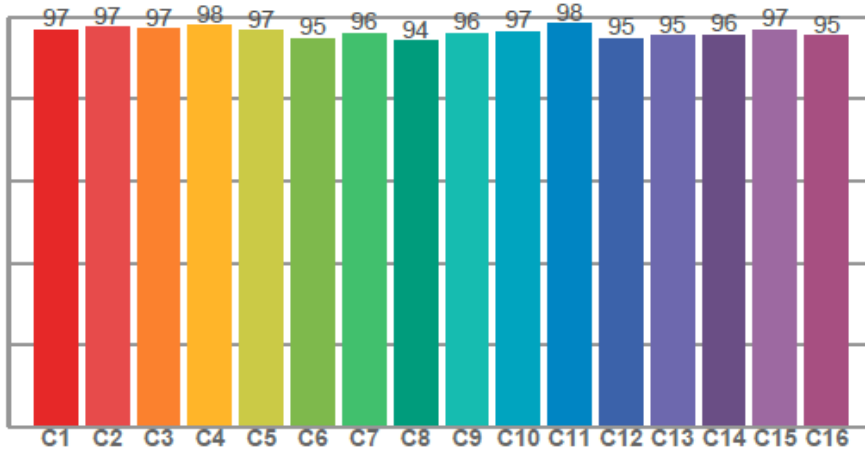
Отсутствие негативного
влияния на здоровье



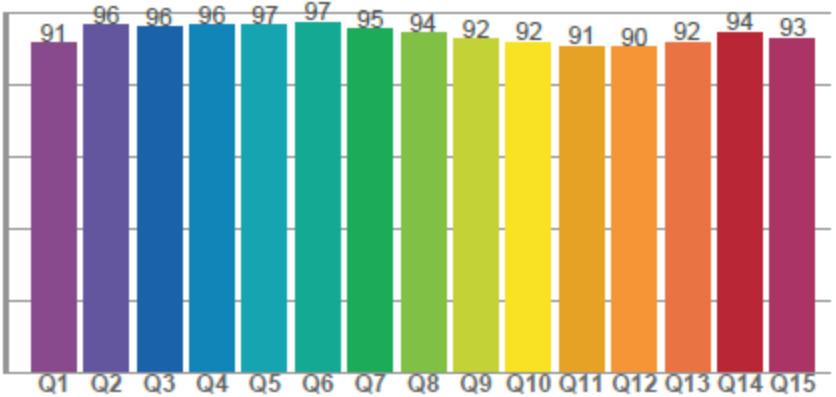
CRI: 97.6 (R1-R8)



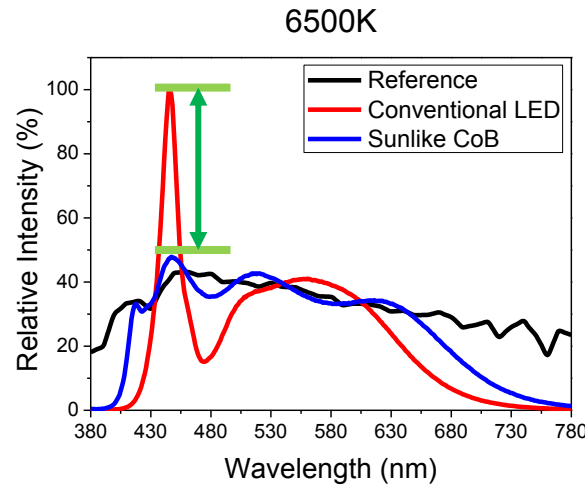
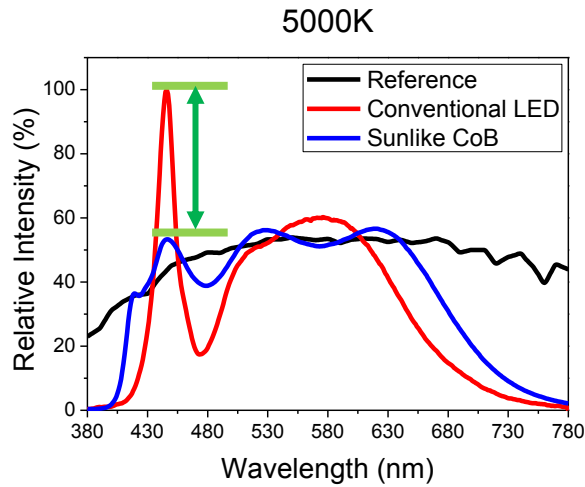
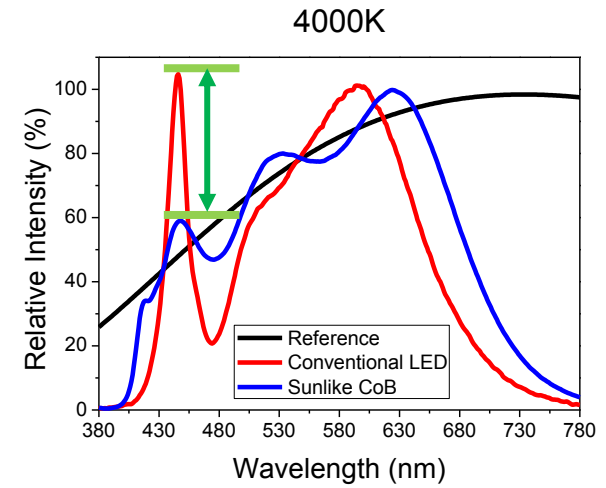
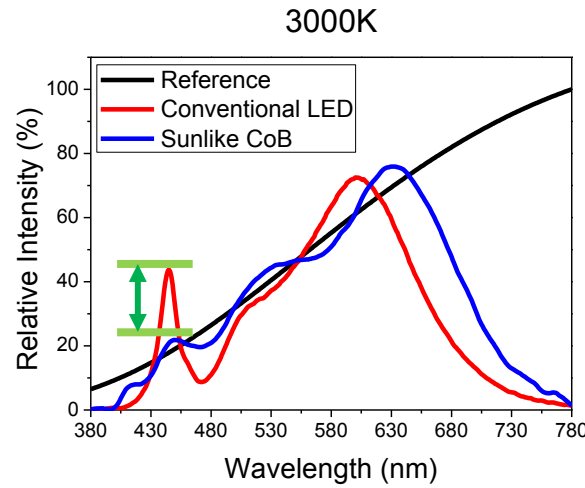
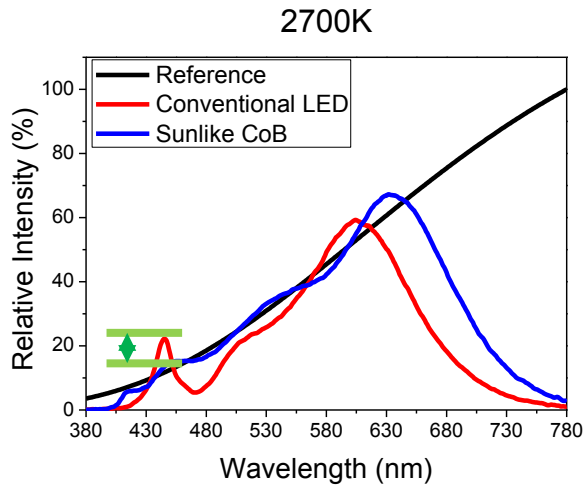
TM30: 96.5



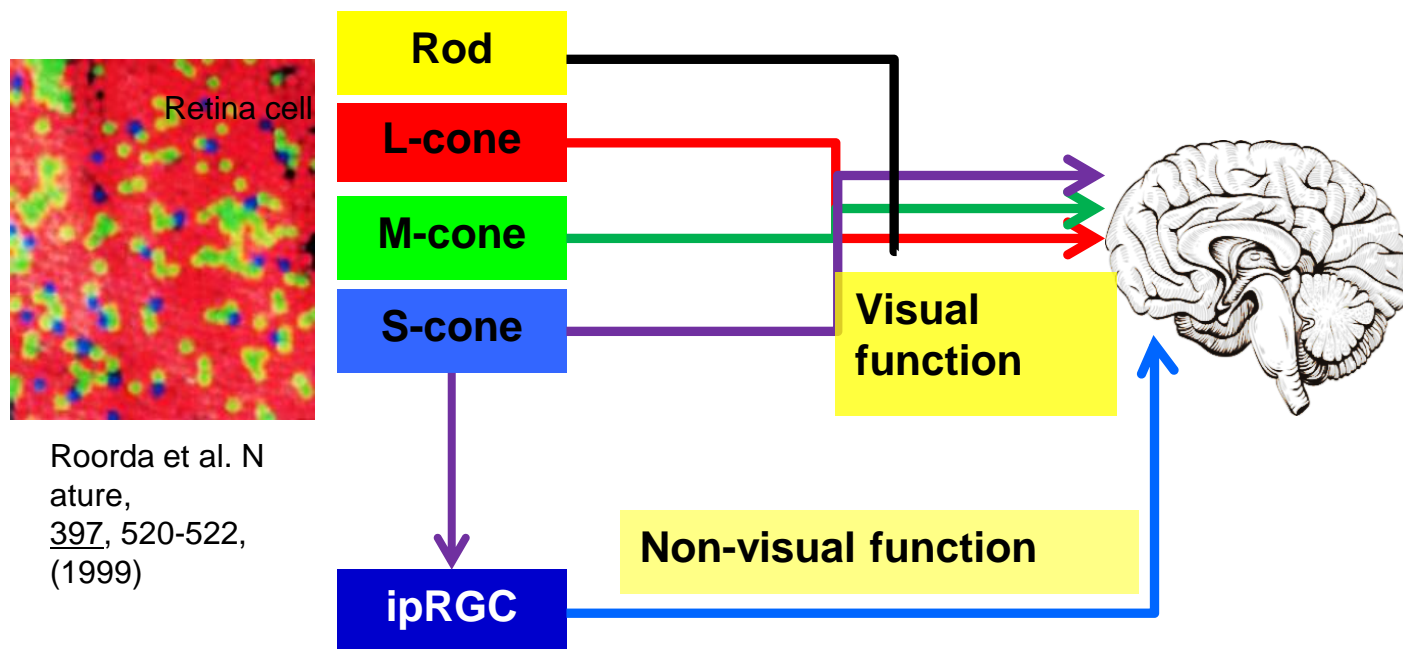
CQS: 93.3



Sunlike обеспечивает наилучшие результаты по всем существующим методикам измерений: TM30, CRI, CQS



Синий свет негативно влияет на восприятие света и здоровье



*L-cone : Long wavelength, Red / M-cone : Medium wavelength, Green / S-cone : Short wavelength, Blue

- Менее 6% клеток сетчатки (S-cone) воспринимают синий свет
- ipRGC (светочувствительные нервные клетки сетчатки глаза) реагируют только на синий свет и контролируют циркадный ритм (подавление выработки мелатонина)



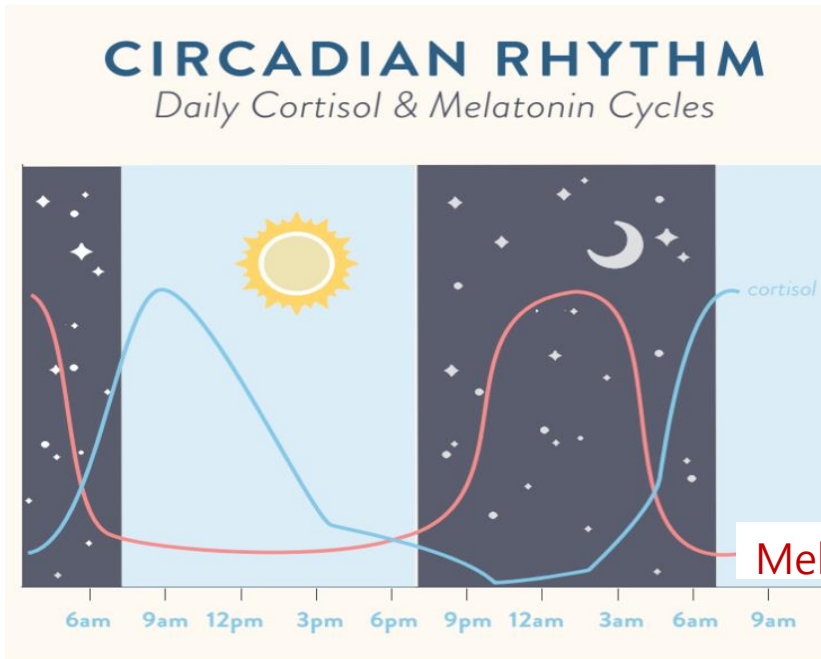
Nobelforsamlingen

The Nobel Assembly at Karolinska Institutet

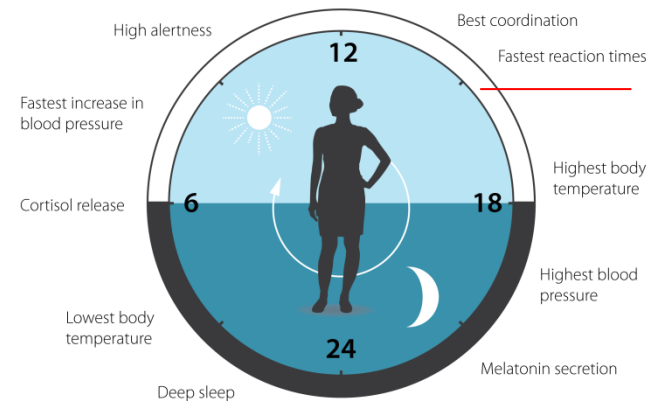


Нобелевская премия по физиологии и медицине 2017 вручена за открытие и исследование молекулярных механизмов, управляющих циркадными ритмами — внутренними часами, которые работают в живых организмах, подстраивая жизнедеятельность к смене дня и ночи.

Лауреатами стали Джеффри Холл, Майкл Росбаш и Майкл Янг.

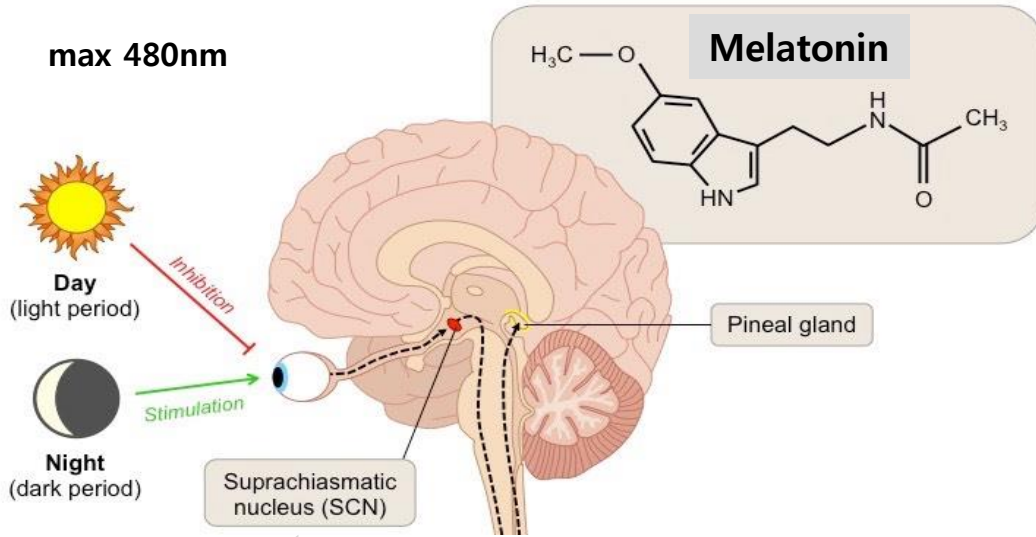


Melatonin

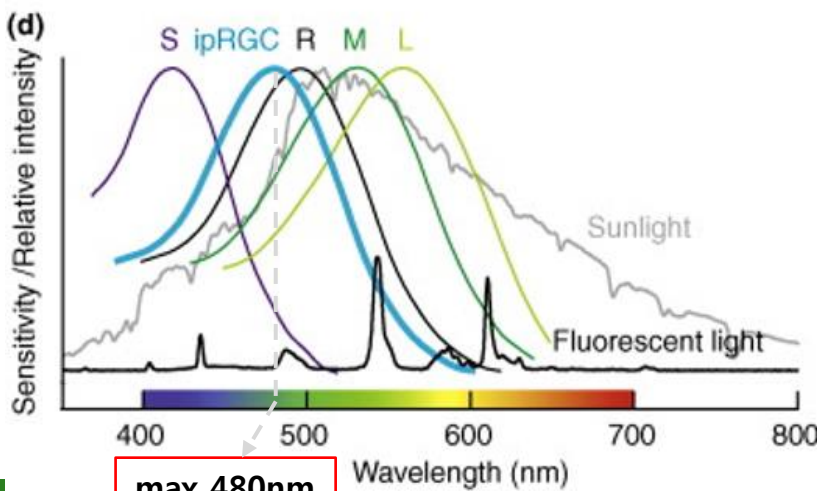
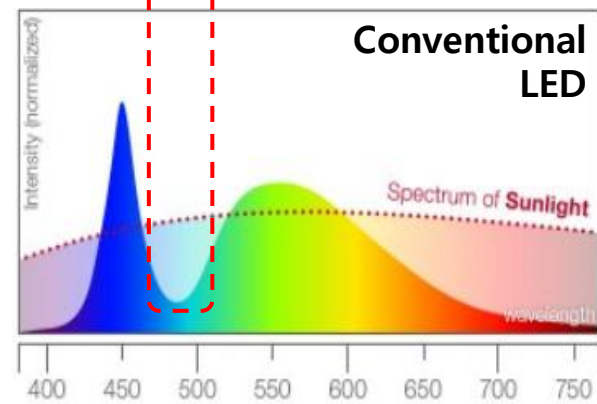
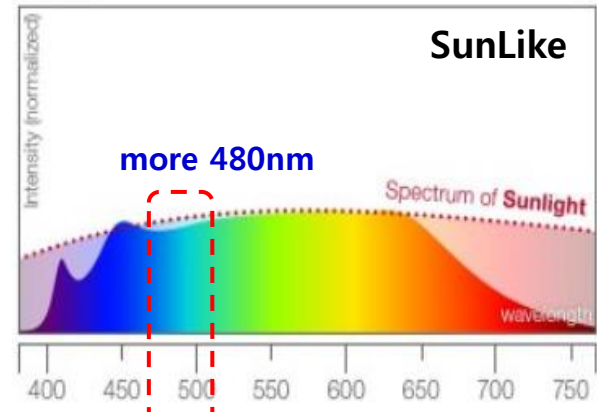


Влияние света на циркадный ритм и здоровье

480nm on circadian rhythm



modified from J Clin Sleep Med. 2009 Apr 15; 5(2): 155–163.



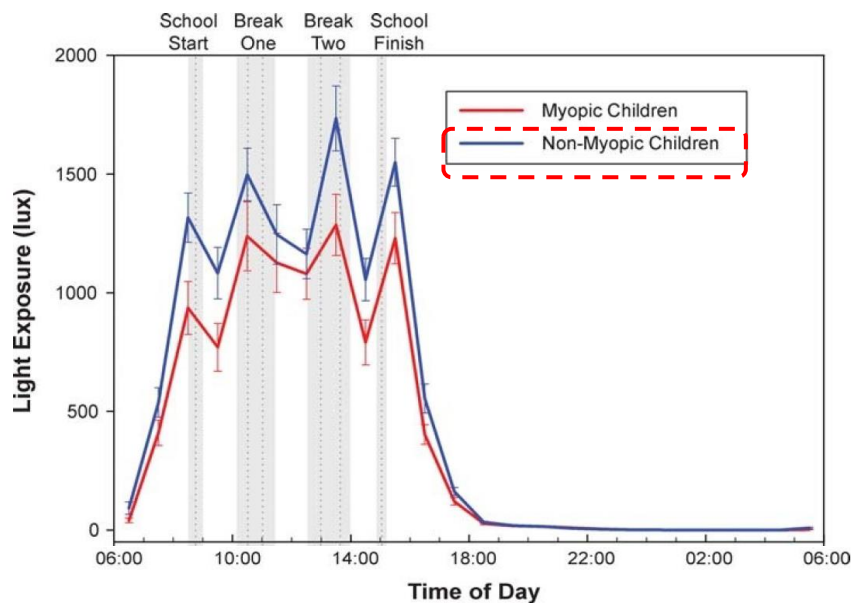
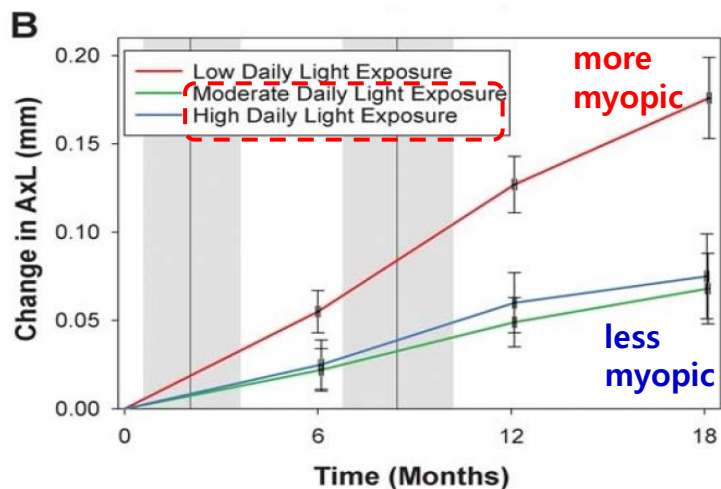
Circadian rhythm disruption

- Sleep disorder
- Alertness / Cognitive problem
- Cancer
- Obesity/diabetes

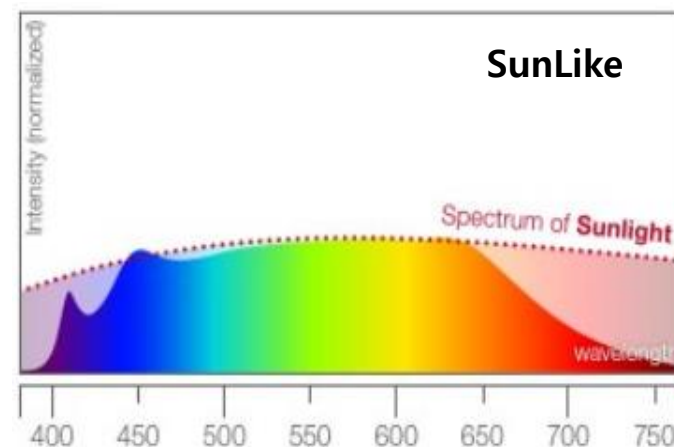
- Nat Rev Neurosci. 2014 Jul;15(7):443-54.
 - Environ Health Perspect. 2018 Apr 23;126(4):047011.

Влияние света на близорукость

More outdoor lighting, less myopia progress



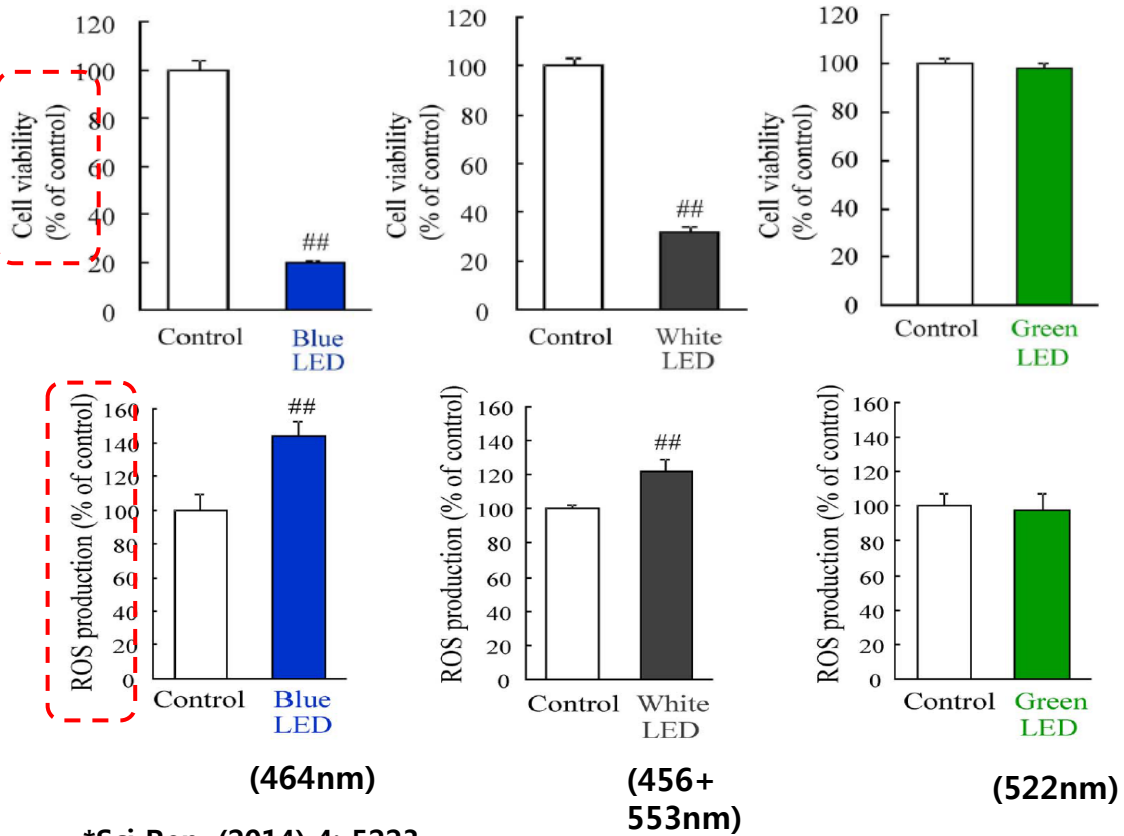
More SunLike indoor-lighting, less myopia progress



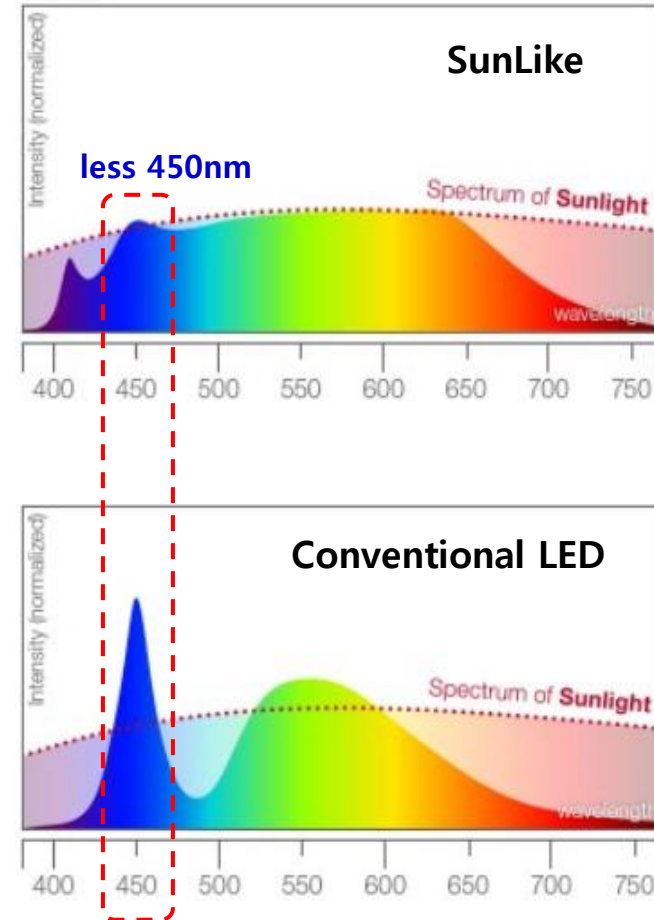
- Optom Vis Sci. 2016; 93: 1031-1041.
- PLoS One. 2017; 12(7): e0181772.

Влияние света на сетчатку

Blue light (450~460nm) damage on retinal cells



*Sci Rep. (2014) 4: 5223

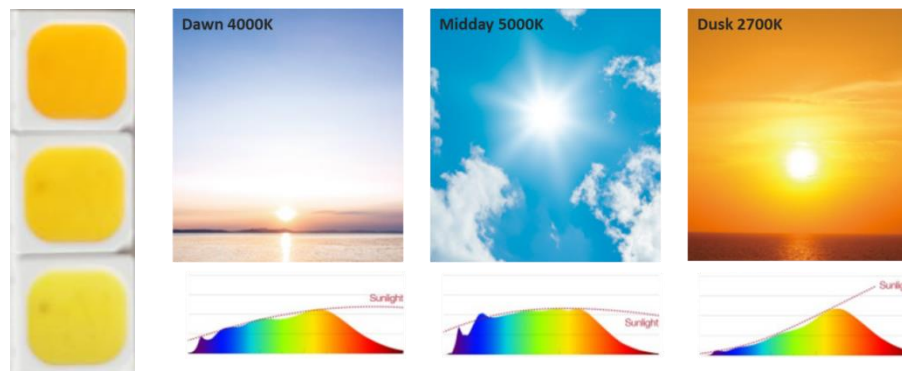


→ Кумулятивное воздействие синего света (450~460nm) может приводить к возрастной дегенерации макулы и как .

Технология SunLike обеспечивает возможность создания светильников с изменяющейся цветовой температурой

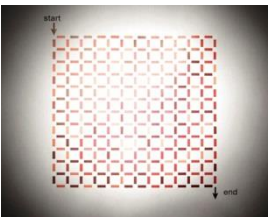
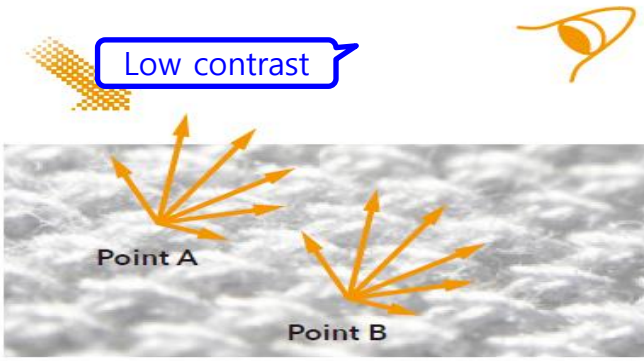


Регулировка CCT в пределах 2700K - 6500K

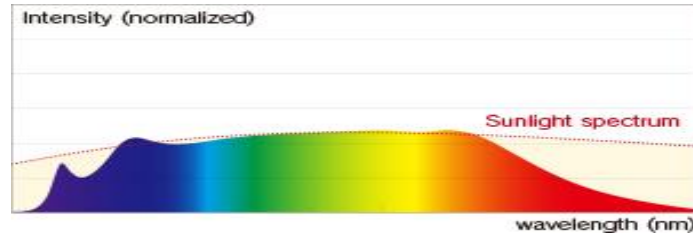
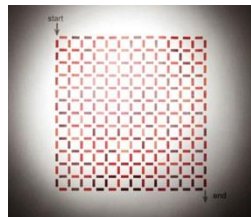
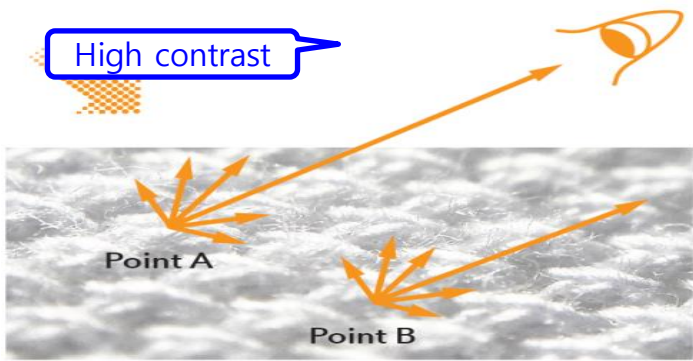


Защита глаза от ослепления и повышение контрастности и четкости

Ordinary LED



SunLike



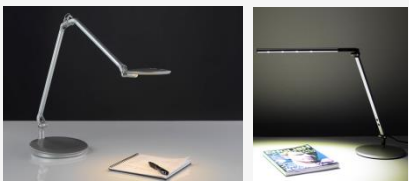
Насыщенные и натуральные цвета

Residential	Hospitality & Architectural	Retail
-------------	-----------------------------	--------

• Dressing room



• Study rooms & task lighting



Par / Bulb / Tube / Linear

• Lobbies & lounges



• Museum / Gallery



Linear Bar

• Fashion store



• Beauty salon



• Grocery, Food



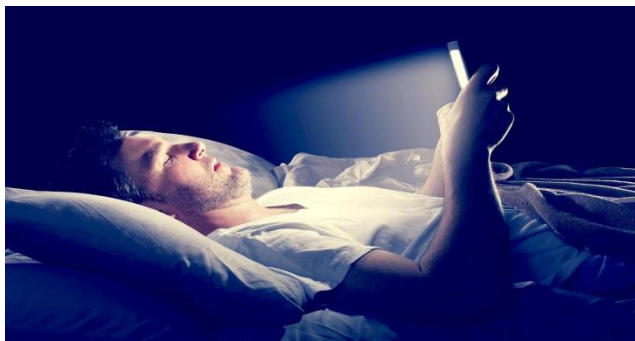
MR / Par / Linear

Крепкий и здоровый сон



Lighting with circadian rhythm

- Sound sleep
- Pleasant & active during the day
- Health/Well-being



Conventional LED with Blue peaks at Night

Disorder of circadian rhythm/ Suppression of Melatonin production

- Sleep disorder
- Cancer, Heart disease
- Diabetes, Obesity

Здоровая световая среда



Рабочее освещение



Дети – это наше все!



Круглосуточное пребывание



Свет для истинных ценителей красоты



Гардеробная



Гримерная

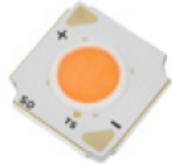


MJT COB

Преимущества:

- Спектр солнечного света
- Отсутствие синего пика
- Eye safety Risk 1
- CRI ≥ 97 & R1~R14 >95
- Rf=97, Rg=102 по TM30-15 (2700K ~ 5000K)
- 2700K~6500K в массовом производстве

SunLike 6W MJT COB



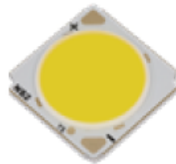
Part No.	SAWS0661A	Typ. Vf [V] @Tj=85		36.1
Size [mm]	13.5x13.5	Typ. Flux [lm] @Tj=85	3000K	515
LES [mm]	6		4000K	560
IF [A]	0.17		5000K	585

SunLike 10W MJT COB



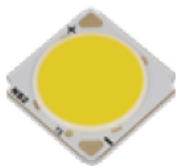
Part No.	SAWS1063A	Typ. Vf [V] @Tj=85		34.8
Size [mm]	13.5x13.5	Typ. Flux [lm] @Tj=85	3000K	920
LES [mm]	9.8		4000K	1,000
IF [A]	0.29		5000K	1,045

SunLike 15W MJT COB

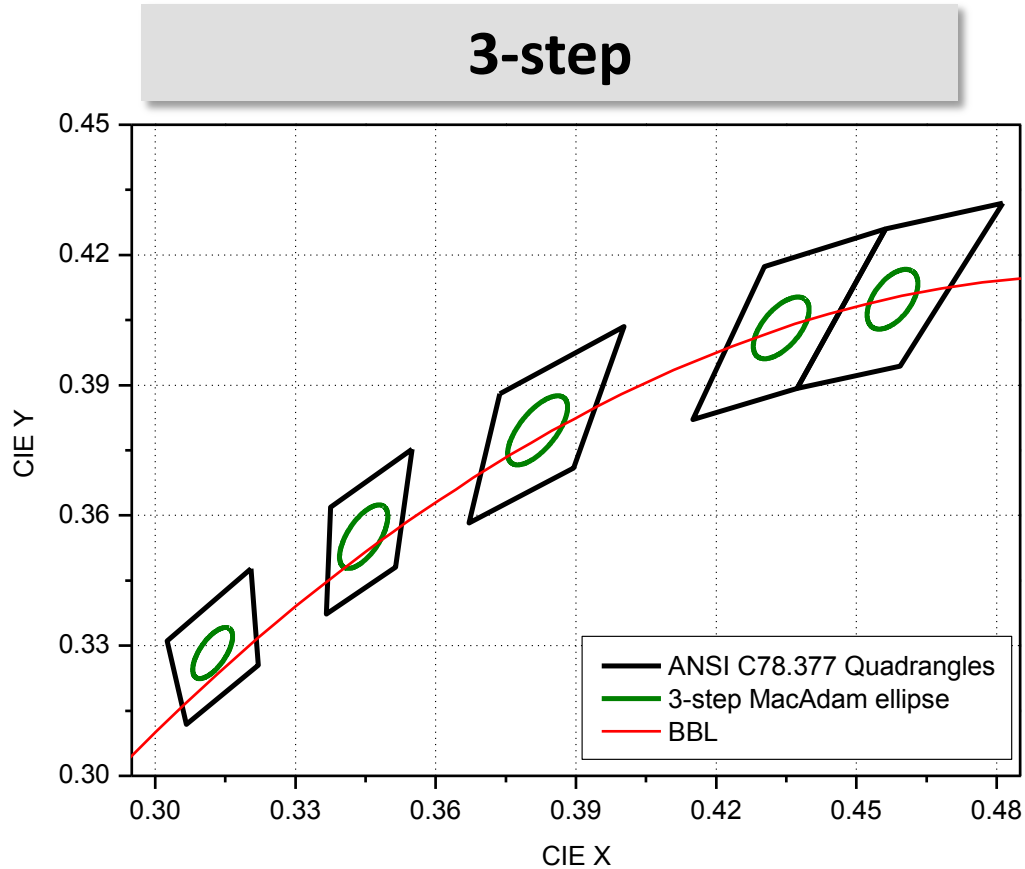


Part No.	SAWS1564A	Typ. Vf [V] @Tj=85		35.0
Size [mm]	19x19	Typ. Flux [lm] @Tj=85	3000K	1,425
LES [mm]	14.5		4000K	1,550
IF [A]	0.43		5000K	1,620

SunLike 25W MJT COB



Part No.	SAWS1566A	Typ. Vf [V] @Tj=85		35.2
Size [mm]	19x19	Typ. Flux [lm] @Tj=85	3000K	2,335
LES [mm]	14.5		4000K	2,540
IF [A]	0.72		5000K	2,655



3030

▪ SunLike 3030



Size (mm)	30 x 30			
CRI (Min.)	96			
CCT	2700	3000	4000	5000
Power (W)	0.2			
Vf (V)	2.96			
If (A)	0.065			
Flux (lm)	20.8	21.4	22.6	22.6
lm/W	105	108	114	114

Преимущества:

- Спектр солнечного света
- Отсутствие синего пика
- Eye safety Risk 0
- CRI ≥ 95
- Линейные светильники для торговых сетей, архитектурное освещение
- 2700K~5000K в массовом производстве
- 6500K готовится к запуску

KTR Test Report issued under the responsibility of Korea Testing & Research Institute

TEST REPORT
IEC 62471
Photobiological safety of lamps and lamp systems

Report Reference No. : CEC2017-0139
Date of issue : 2017. 08. 13
Total number of pages : 18 pages
Tested by (name + signature) : Myung-ha Choi 김민하
Approved by (name + signature) : Kyung-ho Noh 노경호
Testing Laboratory : KTR (KOREA TESTING & RESEARCH INSTITUTE)
Address : 58, Goyukwon-ro, Gwacheon-si, Gyeonggi-do, Korea
Applicant's name : Seoul Semiconductor Co., Ltd.
Address : 97-11, Sandan-ro 163beon-gil, Danwon-gu, Ansan-si, Gyeonggi-do, Korea, 15429
Manufacturer's name : Seoul Semiconductor Co., Ltd.
Address : 97-11, Sandan-ro 163beon-gil, Danwon-gu, Ansan-si, Gyeonggi-do, Korea, 15429

Test specification:
Standard : IEC 62471:2006 (First Edition)
European Group Difference and National differences
Test procedure : N/A
Non-standard test method : N/A
Test Report Form No. : KTR-QI-Y10053-F19(02)
TRF Originator : Korea Testing & Research Institute
Master TRF : Date of 2012-05

General remarks:
1. The test results of this test report are only limited to the samples and sample names provided by the client and do not guarantee the quality of all products of the client. You can check website(www.ktr.or.kr) or QR code to verify the authenticity of the certificate.
2. This test report shall be used only within the purpose of its defined usage and shall not be used for public relation, advertisement and etc.
3. This test report is only valid when printed on KTR original report paper with hologram and when re-issued by KTR. The copy and the electronic file of the test report are only for reference.

Test item description : LED PKG
Trade Mark :
Manufacturer : Seoul Semiconductor Co., Ltd.
Model/Type reference : SxW9CxxB-x
Rating : 65 mA (Constant Current)

QR code for forgery

KTR-QI-Y10053-F19(02) A4(210 × 297)

Test item particulars

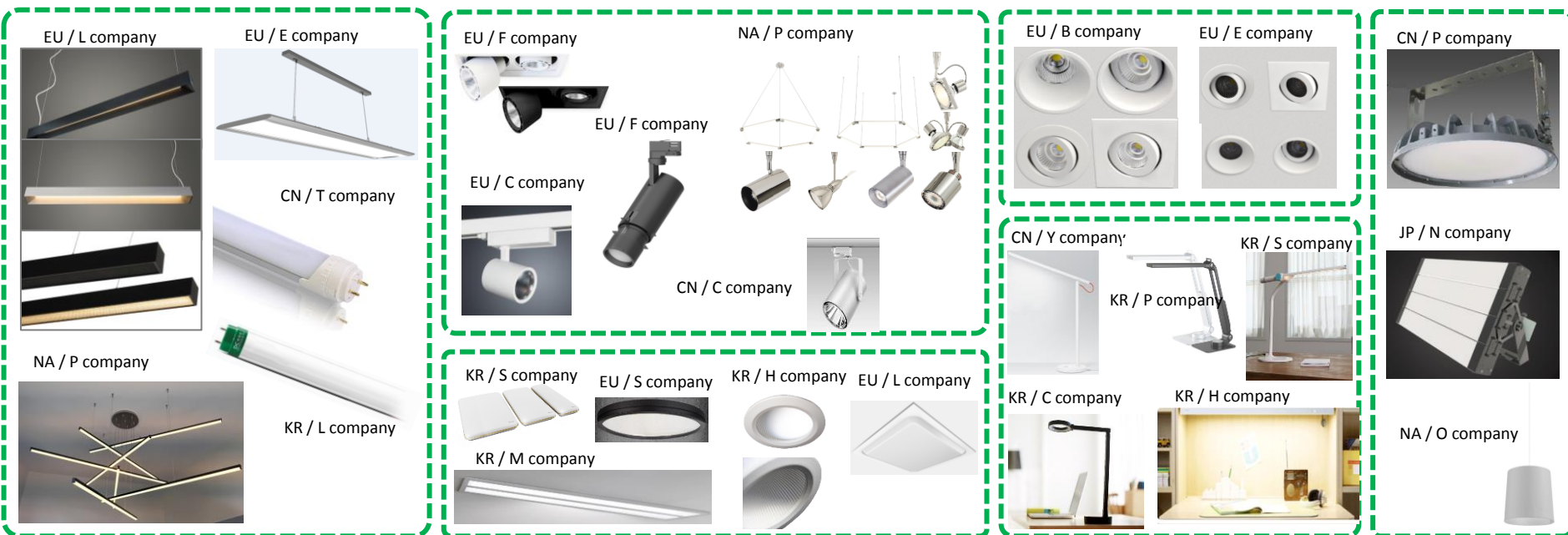
Tested lamp : continuous wave lamps pulsed lamps
Tested lamp system :
Lamp classification group : exempt risk 1 risk 2 risk 3
Lamp cap :
Bulb :
Rated of the lamp : See page 1
Furthermore marking on the lamp :
Seasoning of lamps according IEC standard :
Used measurement instrument : IDR-300
Temperature by measurement : 25°C
Information for safety use :
Possible test case verdicts:
- test case does not apply to the test object : N/A
- test object does meet the requirement : P (Pass)
- test object does not meet the requirement : F (Fail)

Testing:
Date of receipt of test item : 2017. 08. 14
Date (s) of performance of tests : 2017. 08. 14 ~ 2017. 09. 13

General product information:
Manufacture : Seoul Semiconductor Co., Ltd.
Manufacture Address : 97-11, Sandan-ro 163beon-gil, Danwon-gu, Ansan-si, Gyeonggi-do, Korea, 15429
Factory : Seoul Semiconductor Co., Ltd.
Factory Address : Same as manufacture address
Models : SxW9CxxB-x
Rating : 65 mA (Constant Current)

KTR-QI-Y10053-F19(02) A4(210 × 297)

SunLike: история успеха



EU / L company / Pompeii



EU / L company



SunLike: история успеха: FLOS

FLOS Architectural



SunLike: история успеха: LEDLuks

Plain Spectra: now available also with Spectra technology. **SunLike** Powered by 



Nordic design Designed by Kai Piippo for Annell.
Superior performance Manufactured and produced by LED Luks.

Plain LED

LED  **TW** **125 lm/W**

Dimensional stability, efficiency, and LED innovation

With a Nordic approach to design, balanced with functionality and aesthetics, the well renowned Swedish lighting designer Kai Piippo created Plain LED. Defined with elegant straight lines, it adds a tasteful expression to your office. The suspended direct/indirect LED luminaire produces a medium beam downlight and a wide beam uplight, which adds perfect light and ambience to your office environment. Lower UGR ensures excellent glare control.

Kyra Spectra: now available also with Spectra technology. **SunLike** Powered by 



LED  **TW** **125 lm/W**

KYRA LED

Infinite beam of light.

Kyra LED impresses with its up to 3 meters long elegant housing, bringing you homogenous and efficient light distribution with low UGR and cost-savings. Thus, it is most suitable for open-space offices, corridors, foyers, conference areas, classrooms and other spacious ambiances.

direct/indirect LED luminaire
high-quality aluminium housing with black, white or grey powder coated finish
available sizes: 1200, 1500, 2400 and 3000 mm
UGR < 16
flicker-free dimming (20-100%) / 2-channels / CASAMBI (on request)
2700 / 3000 / 4000 / 5000 K or
TW 2700-5000 K
option of stand-alone sensor Active+

Designed by Kai Piippo

Awards & Nominations (selected)

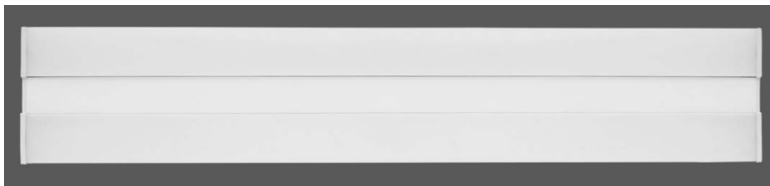
- 2014. Nominated to the Swedish Lighting Award for the Sölvesborgsbron bridge, Sölvesborg, Sweden
- 2013. Received the Bertil and Britt Svensson Foundation Major Achievement Award
- 2013. Received the Swedish Lighting Award for "In the tracks of the giants" Åre, Sweden
- 2010. IALD (International Association of Lighting Designers) Award of Excellence for the Eriksberg crane, Gothenburg, Sweden
- 2010. Nordic Lighting Award for K:fem shopping centre, Stockholm, Sweden
- 2009. IALD Special mention for K:fem
- 2008. Swedish Lighting Award for K:fem
- 2006. Solna Stadsmiljöpris (Solna Urban Environmental Prize) for Solna Business Park
- 2002. Trophée Européen de la Lumière, first prize for Nordic Light Hotel, Stockholm
- Honourable mention in Swedish Lighting Awards; 1994, 2002, 2004, 2005, 2007, 2009



Living room



Bed room



Kitchen



Desk Lamp

SunLike: история успеха: Quantula



Power (W)	Flux (lm)	Efficacy (LPW)	CRI (Ra)	CCT (K)
15	1320	88	97	4000/3000

SunLike: история успеха: ES System

OPPOSITE 2 OUT CIRCADIAN ES-SYSTEM Light is Life 4899832



Luminaire type 600x600
Mounting type recessed

OPPOSITE 2 OUT CIRCADIAN
a premium luminaire for recessed installation in coffered ceilings with low glare – UGR 19 – and an unusual, registered design. The CIRCADIAN function is a specialized system that supports the human circadian rhythm of daily activity. The most advanced purple LED module with excellent 95% color rendering, including the red component. A square, thermoformed, convex, multi-layer PMMA diffuser with rounded corners has glare-reducing microprisms, whereas the opalized layer evenly disperses light over the entire surface of the room. The spring-lamella system simplifies assembly. Wireless communication.

OPPOSITE 2 IN CIRCADIAN ES-SYSTEM Light is Life 4899833



Luminaire type 600x600

OPPOSITE 2 IN CIRCADIAN
a premium luminaire for recessed installation in coffered ceilings with low glare – UGR 19 – and an unusual, registered design. The CIRCADIAN function is a specialized system that supports the human circadian rhythm of daily activity. The most advanced purple LED module with excellent 95% color rendering, including the red component. A square, thermoformed, concave, multi-layer PMMA diffuser with rounded corners has glare-reducing microprisms, whereas the opalized layer evenly disperses light over the entire surface of the room. The spring-lamella system simplifies assembly. Wireless communication.

OPPOSITE 1 OUT CIRCADIAN ES-SYSTEM Light is Life 4899834



Luminaire type 600x600

OPPOSITE 1 OUT CIRCADIAN
a premium luminaire for recessed installation in coffered ceilings with low glare – UGR 19 – and an unusual, registered design. The CIRCADIAN function is a specialized system that supports the human circadian rhythm of daily activity. The most advanced purple LED module with excellent 95% color rendering, including the red component. A round, thermoformed, concave, multi-layer PMMA diffuser has glare-reducing microprisms, whereas the opalized layer evenly disperses light over the entire surface of the room. The spring-lamella system simplifies assembly. Wireless communication.

OPPOSITE 1 IN CIRCADIAN ES-SYSTEM Light is Life 4899835



Luminaire type 600x600

OPPOSITE 1 IN CIRCADIAN
a premium luminaire for recessed installation in coffered ceilings with low glare – UGR 19 – and an unusual, registered design. The CIRCADIAN function is a specialized system that supports the human circadian rhythm of daily activity. The most advanced purple LED module with excellent 95% color rendering, including the red component. A round, thermoformed, concave, multi-layer PMMA diffuser has glare-reducing microprisms, whereas the opalized layer evenly disperses light over the entire surface of the room. The spring-lamella system simplifies assembly. Wireless communication.



THANK YOU!

www.seoulsemicon.com