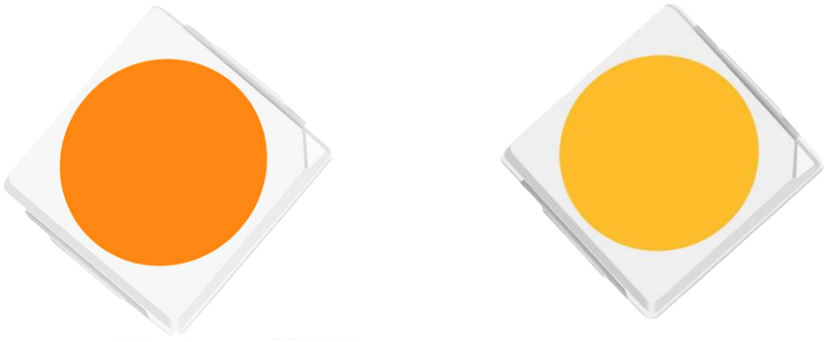
3030 Full Spectrum Datasheet



Features:

- Slim Size SMD Package: Design Flexibility
- High Lumen Output and High Efficacy
- Stable Performance & Great CCT Unity
- Full Spectrum 380-850nm
- Forward Voltage 3V, 6V Available
- Enviromental Friendly; ROHS Compliance
- Customized Service Available

Applications:

- LED Module, Illuminated Advertising
- Tube Light, Panel Light, Ceiling Lamp and other LED Indoor Lights
- Flood Light, High Bay Light, Tunel Light and other LED Outdoor Lights
- LED Aquarium Light, LED Plant Growing Light..

TABLE OF CONTENTS

PRODUCT NAMING RULES

LKL	XXXX	FSXX	X	X	XXX	XX
LKL	Type	Color	Chip QTY	Beam Angle	Brightness	Voltage
LEKOLED	3030	FS01: Full Spectrum 1	1: 1EA	0: 120°/140°	70: 70-80LM	3V
		FS03: Full Spectrum 3	2: 2EA		120: 120-130LM	6V
		FS11: Full Spectrum 11	3: 3EA		....	
		....				

CHARACTERISTICS

Parameter	Unit	Min	Typical	Max
Power Dissipation 1	mW		1050	
Forward Current 1	mA		350	
Forward Current 2	mA		150	
Forward Voltage 1	V	2,8		3,4
Forward Voltage 2	V	6.0		6,4
Color Rendering Index	Ra		90	
Beam Angle 2θ1/2	deg.		120	
Reverse Current	uA			10
Reverse Voltage	V			5
Operating Temperature Top	℃	-40		+60
Storage Temperature Tst	℃	-40		+85
Testing Point Tc	℃			55
Junction Temperature Tj	℃			120
Reverse Current（Vr=5V） Ir	uA			5
Related thermal resistance Rj-c	℃/W		8	
ESD（HBM）	V			2000
Reflow Soldering（Lead-Free） ST	℃			260

LUMINOUS FLUX CHARACTERISTIC

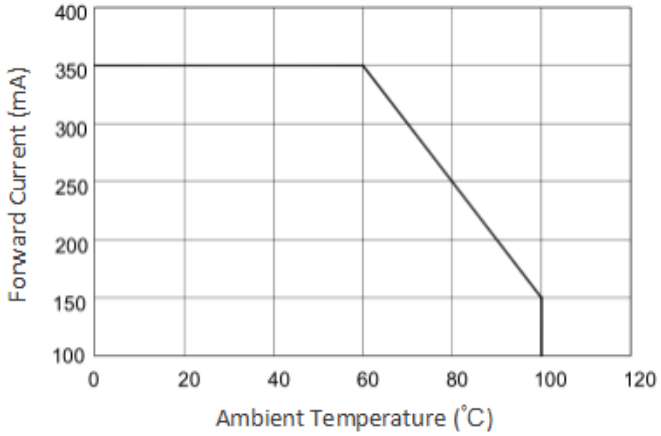
Specifications (IF=350mA, Tc=25℃)

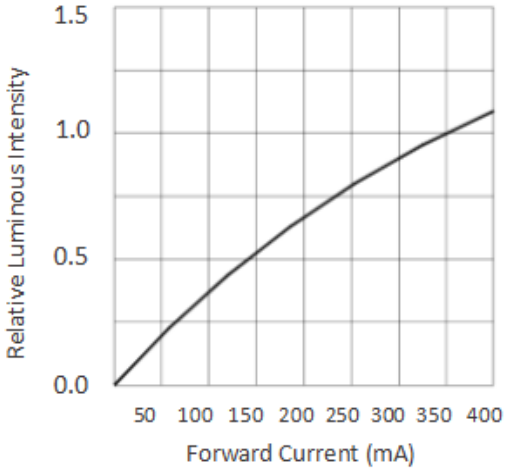
Light Color	Color Temperature (K)	CRI	1W, 3V @350mA	Model No.
			LM	
Full Spectrum 01	1200-1300K	/	120-130	LKL-3030FS0110120-3V
Full Spectrum 03	2900-3000K	90	70-80	LKL-3030FS031070-3V
Full Spectrum 04	6800-7000K	90	70-80	LKL-3030FS041070-3V
Full Spectrum 05	2900-3000K	90	70-80	LKL-3030FS051070-3V
Full Spectrum 07	1700-1800K	/	120-130	LKL-3030FS0710120-3V
Full Spectrum 09	1200-1300K	/	120-130	LKL-3030FS0910120-3V
Full Spectrum 11	4700-4900K	/	120-130	LKL-3030FS1110120-3V
Full Spectrum 13	4200-4400K	90	70-80	LKL-3030FS131070-3V
Full Spectrum 15	2000-2200K	/	120-130	LKL-3030FS1510120-3V
Full Spectrum 16	100000K	/	120-130	LKL-3030FS1610120-3V

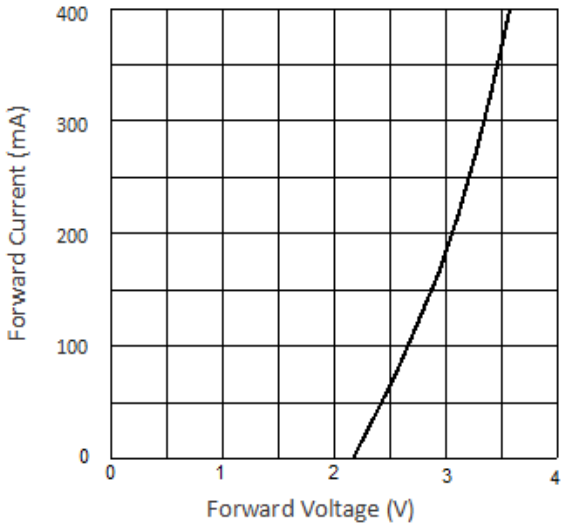
Specifications (IF=150mA, Tc=25℃)

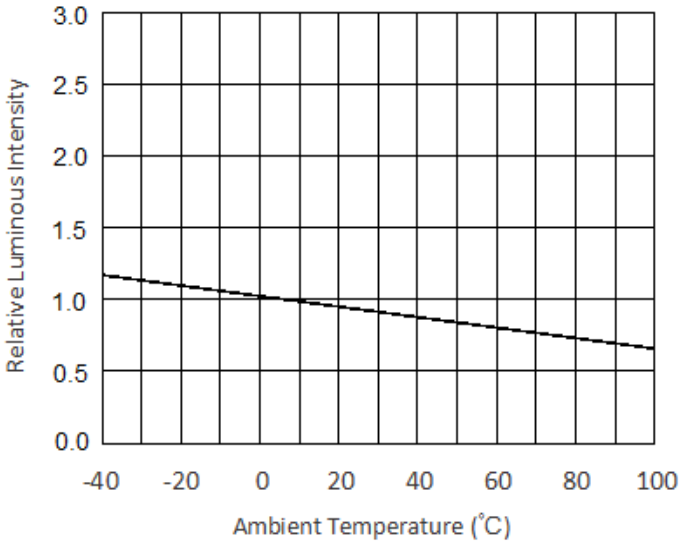
Light Color	Color Temperature (K)	CRI	1W, 6V @150mA	Model No.
			LM	
Full Spectrum 01	1200-1300K	/	120-130	LKL-3030FS0110120-6V
Full Spectrum 03	2900-3000K	90	70-80	LKL-3030FS031070-6V
Full Spectrum 04	6800-7000K	90	70-80	LKL-3030FS041070-6V
Full Spectrum 05	2900-3000K	90	70-80	LKL-3030FS051070-6V
Full Spectrum 07	1700-1800K	/	120-130	LKL-3030FS0710120-6V
Full Spectrum 09	1200-1300K	/	120-130	LKL-3030FS0910120-6V
Full Spectrum 11	4700-4900K	/	120-130	LKL-3030FS1110120-6V
Full Spectrum 13	4200-4400K	90	70-80	LKL-3030FS131070-6V
Full Spectrum 15	2000-2200K	/	120-130	LKL-3030FS1510120-6V
Full Spectrum 16	100000K	/	120-130	LKL-3030FS1610120-6V

TYPICAL CHARACTERISTIC CURVES IF=350mA

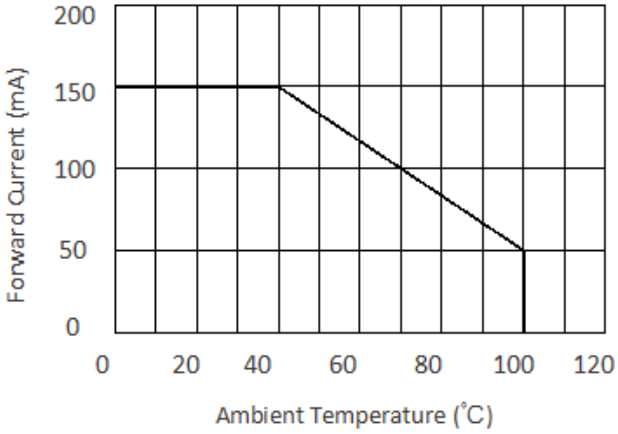


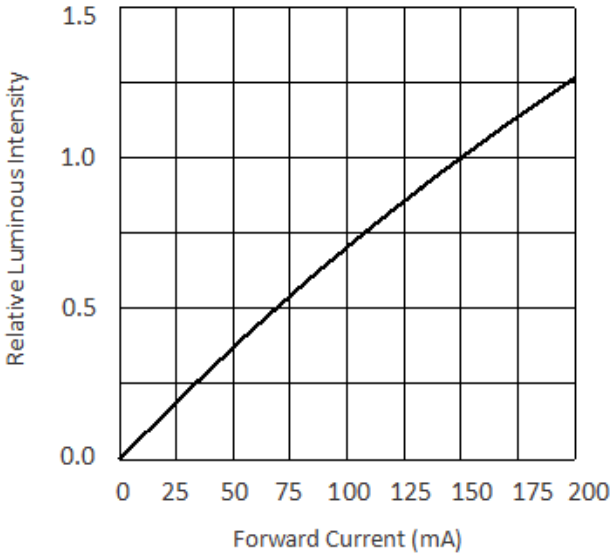


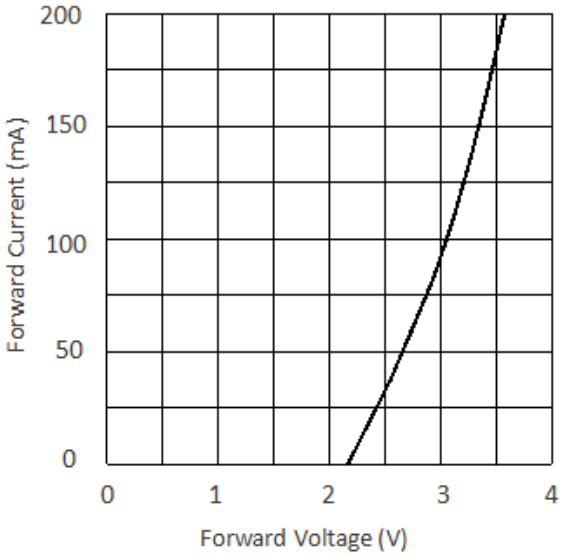


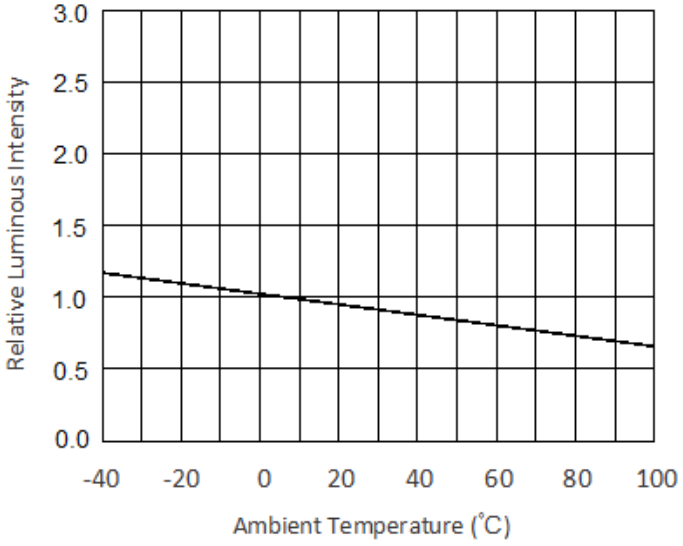


TYPICAL CHARACTERISTIC CURVES IF=150mA



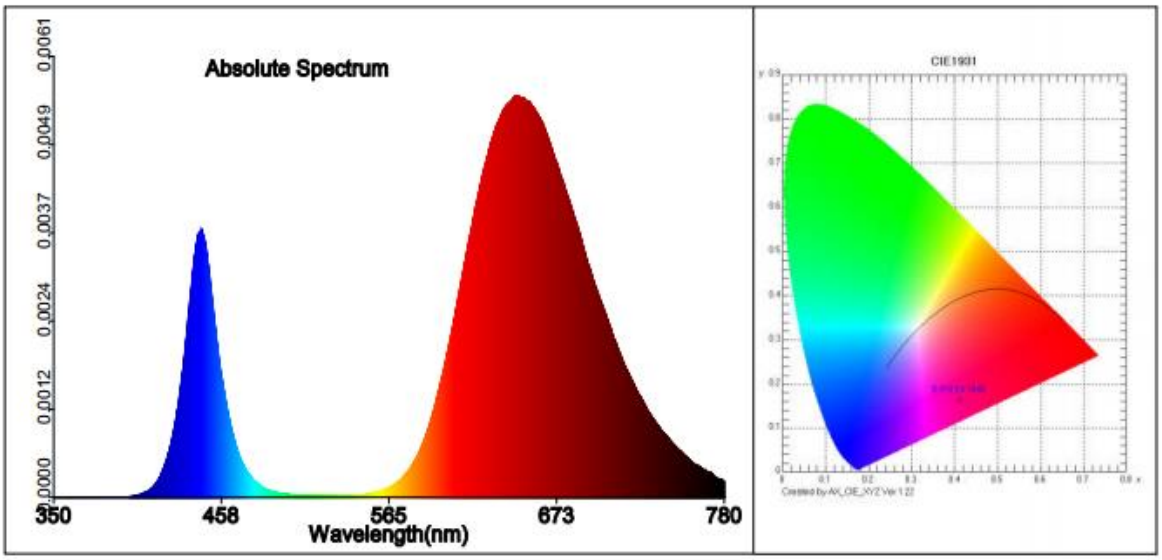






FULL SPECTRUM CURVES

NO. 1



Test parameter:

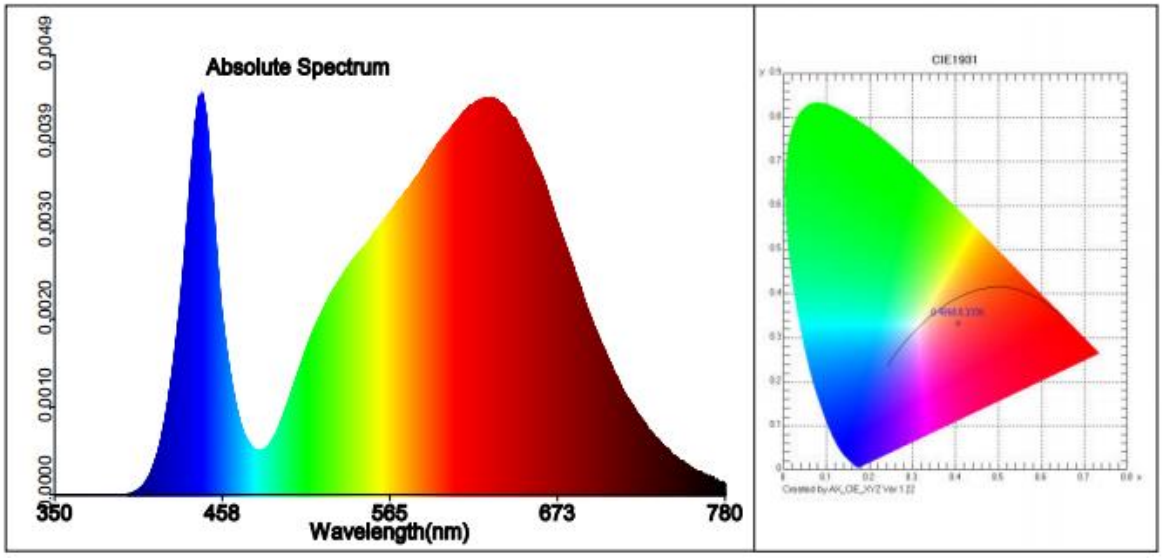
E= 49.0 lx	E(fc)=4.54948 fc		
CIE x= 0.4103	CIE y= 0.1640	CIE u'=0.3957	CIE v'=0.3559
Tc=1211 K	Lp=661.0 nm	HW=94.3 nm	Ld=610.2 nm
Pur=55.8 %	Ratio_R=78.6 %	Ratio_G=13.8 %	Ratio_B=7.6 %
Duv=0.12108			
Ra=-17.4	R1= 57	R2=-18	R3=-98
R4= 16	R5= 12	R6=-121	R7=-31
R8= 44	R9= 54	R10=-155	R11= 40
R12=-515	R13= 13	R14= -4	R15= 51

SDCM= 0.2()
White Class:OUT

E1=0.57817 W/m2	E2=0.73919 W/m2	PPFD=2.9661 μmol/(m·s)
Ech-A=0.15406 W/m2	Ech-B=0.1342 W/m2	Ef=0.16144 W/m2
Eb=0.11689 W/m2	Ey=0.013469 W/m2	Er=0.44791 W/m2
Ep=0.52529 Wphyto/m2	Erb_Ratio=3.8317	
PPFDf=9.4289E-001 μmol/(m2·s)		

FULL SPECTRUM CURVES

NO. 3

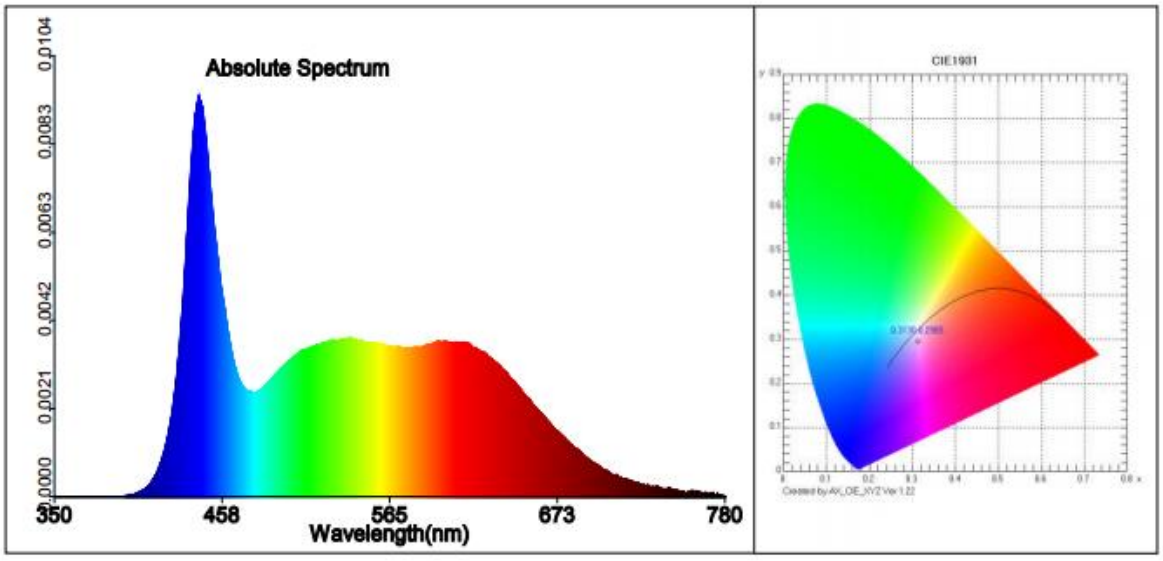


Test parameter:

E= 220.7 lx	E(fc)=20.5151 fc		
CIE x= 0.4068	CIE y= 0.3336	CIE u'=0.2629	CIE v'=0.4851
Tc=2910 K	Lp=449.0 nm	HW=26.2 nm	Ld=609.8 nm
Pur=22.1 %	Ratio_R=26.4 %	Ratio_G=71.0 %	Ratio_B=2.7 %
Duv=-0.02696			
Ra=92.1	R1= 97	R2= 95	R3= 92
R4= 87	R5= 95	R6= 92	R7= 88
R8= 91	R9= 92	R10= 90	R11= 85
R12= 89	R13= 96	R14= 94	R15= 94
SDCM= 0.3()			
White Class:OUT			
E1=0.86312 W/m2	E2=0.96281 W/m2	PPFD=4.2011 μmol/(m·s)	
Ech-A=0.12159 W/m2	Ech-B=0.13853 W/m2	Ef=0.099952 W/m2	
Eb=0.16281 W/m2	Ey=0.27285 W/m2	Er=0.42796 W/m2	
Ep=0.77237 Wphyto/m2	Erb_Ratio=2.6286		
PPFDf=5.8502E-001 μmol/(m2·s)			

FULL SPECTRUM CURVES

NO. 4



Test parameter:

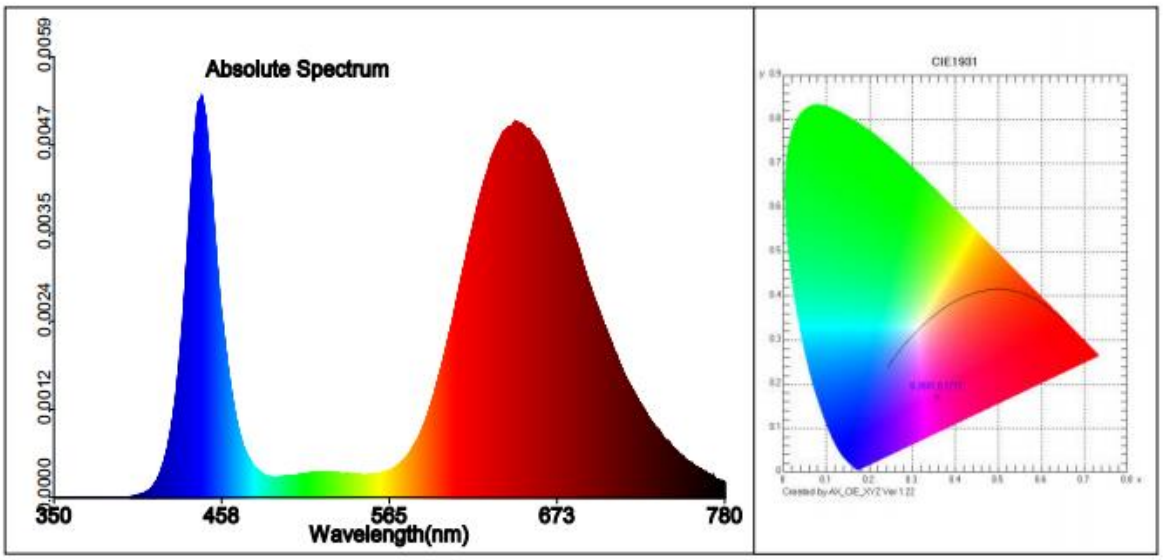
E= 284.1 lx	E(fc)=26.4054 fc		
CIE x= 0.3130	CIE y= 0.2965	CIE u'=0.2110	CIE v'=0.4499
Tc=6816 K	Lp=447.0 nm	HW=26.5 nm	Ld=448.4 nm
Pur=11.6 %	Ratio_R=17.4 %	Ratio_G=76.2 %	Ratio_B=6.4 %
Duv=-0.01470			
Ra=90.3	R1= 90	R2= 94	R3= 86
R4= 88	R5= 92	R6= 89	R7= 93
R8= 90	R9= 73	R10= 89	R11= 86
R12= 79	R13= 91	R14= 91	R15= 86

SDCM= 0.3()
White Class:OUT

E1=1.0696 W/m2	E2=1.1077 W/m2	PPFD=4.858 μmol/(m·s)
Ech-A=0.078194 W/m2	Ech-B=0.11615 W/m2	Ef=0.038201 W/m2
Eb=0.37545 W/m2	Ey=0.38903 W/m2	Er=0.30584 W/m2
Ep=0.90075 Wphyto/m2	Erb_Ratio=0.8146	
PPFDf=2.2503E-001 μmol/(m2·s)		

FULL SPECTRUM CURVES

NO. 5



Test parameter:

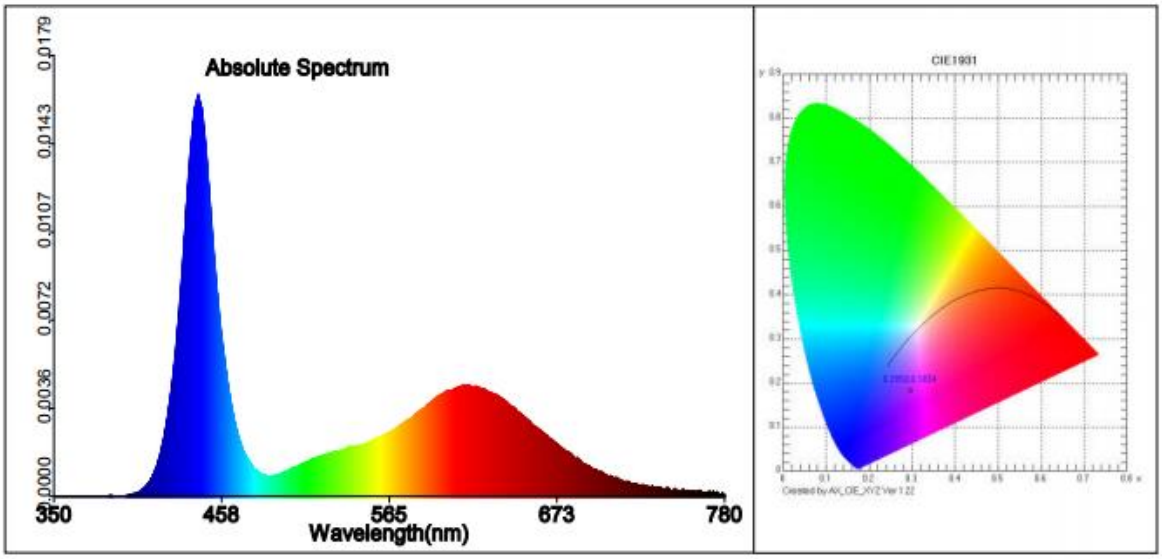
E= 66.7 lx	E(fc)=6.19713 fc		
CIE x= 0.3581	CIE y= 0.1712	CIE u'=0.3302	CIE v'=0.3551
Tc=1768 K	Lp=449.0 nm	HW=23.7 nm	Ld=610.2 nm
Pur=49.2 %	Ratio_R=57.2 %	Ratio_G=34.2 %	Ratio_B=8.6 %
Duv=-0.12360			
Ra=2.0	R1= 9	R2=-18	R3=-19
R4= 75	R5=-25	R6=-91	R7= 31
R8= 53	R9=-65	R10=-145	R11= 46
R12=-334	R13=-21	R14= 41	R15= -9

SDCM= 0.2()
White Class:OUT

E1=0.62799 W/m2	E2=0.77204 W/m2	PPFD=3.1203 μmol/(m·s)
Ech-A=0.13376 W/m2	Ech-B=0.11571 W/m2	Ef=0.14442 W/m2
Eb=0.16913 W/m2	Ey=0.042269 W/m2	Er=0.41674 W/m2
Ep=0.55871 Wphyto/m2	Erb_Ratio=2.4641	
PPFDf=8.4310E-001 μmol/(m2·s)		

FULL SPECTRUM CURVES

NO. 7



Test parameter:

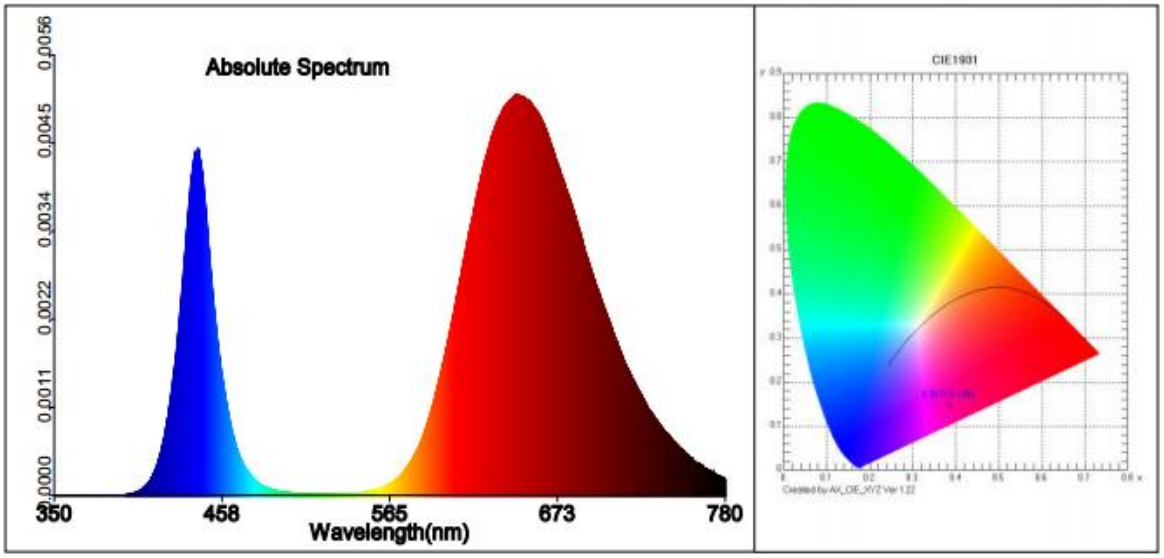
E= 202.8 lx	E(fc)=18.8464 fc		
CIE x= 0.2958	CIE y= 0.1834	CIE u'=0.2567	CIE v'=0.3581
Tc=100000 K	Lp=447.0 nm	HW=24.9 nm	Ld=380.0 nm
Pur=42.4 %	Ratio_R=28.6 %	Ratio_G=63.2 %	Ratio_B=8.2 %
Duv=-0.08083			
Ra=41.2	R1= 15	R2= 52	R3= 56
R4= 34	R5= 33	R6= 48	R7= 80
R8= 11	R9=-191	R10= 30	R11= 23
R12= 52	R13= 21	R14= 67	R15=-17

SDCM= 0.2()
White Class:OUT

E1=1.144 W/m2	E2=1.2004 W/m2	PPFD=5.1242 µmol/(m·s)
Ech-A=0.094375 W/m2	Ech-B=0.12661 W/m2	Ef=0.056532 W/m2
Eb=0.53494 W/m2	Ey=0.22667 W/m2	Er=0.38287 W/m2
Ep=0.9637 Wphyto/m2	Erb_Ratio=0.71572	
PPFDf=3.2785E-001 µmol/(m2·s)		

FULL SPECTRUM CURVES

NO. 9



Test parameter:

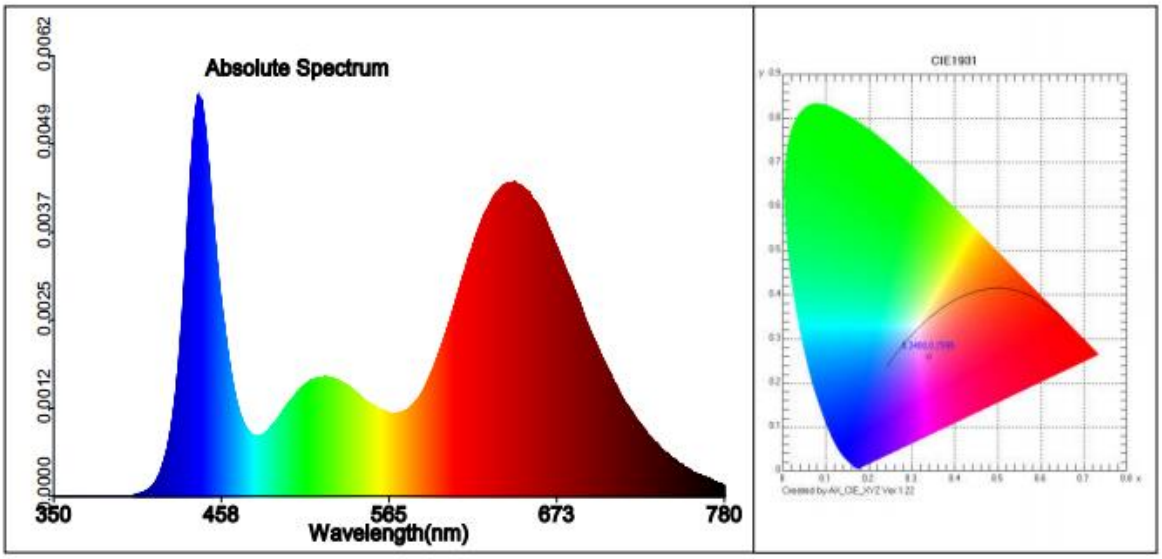
E= 47.9 lx	E(fc)=4.45347 fc		
CIE x= 0.3837	CIE y= 0.1486	CIE u'=0.3821	CIE v'=0.3331
Tc=1289 K	Lp=660.0 nm	HW=95.7 nm	Ld=610.2 nm
Pur=57.5 %	Ratio_R=77.0 %	Ratio_G=15.1 %	Ratio_B=8.0 %
Duv=0.13714			
Ra=-24.6	R1= 54	R2=-27	R3=-110
R4= 4	R5= 10	R6=-132	R7=-40
R8= 44	R9= 45	R10=-172	R11= 27
R12=-516	R13= 6	R14=-11	R15= 40

SDCM= 0.1()
White Class:OUT

E1=0.56991 W/m2	E2=0.71745 W/m2	PPFD=2.8754 μmol/(m·s)
Ech-A=0.13219 W/m2	Ech-B=0.11071 W/m2	Ef=0.14791 W/m2
Eb=0.1394 W/m2	Ey=0.014353 W/m2	Er=0.41626 W/m2
Ep=0.51337 Wphyto/m2	Erb_Ratio=2.986	
PPFDf=8.6331E-001 μmol/(m2·s)		

FULL SPECTRUM CURVES

NO. 11



Test parameter:

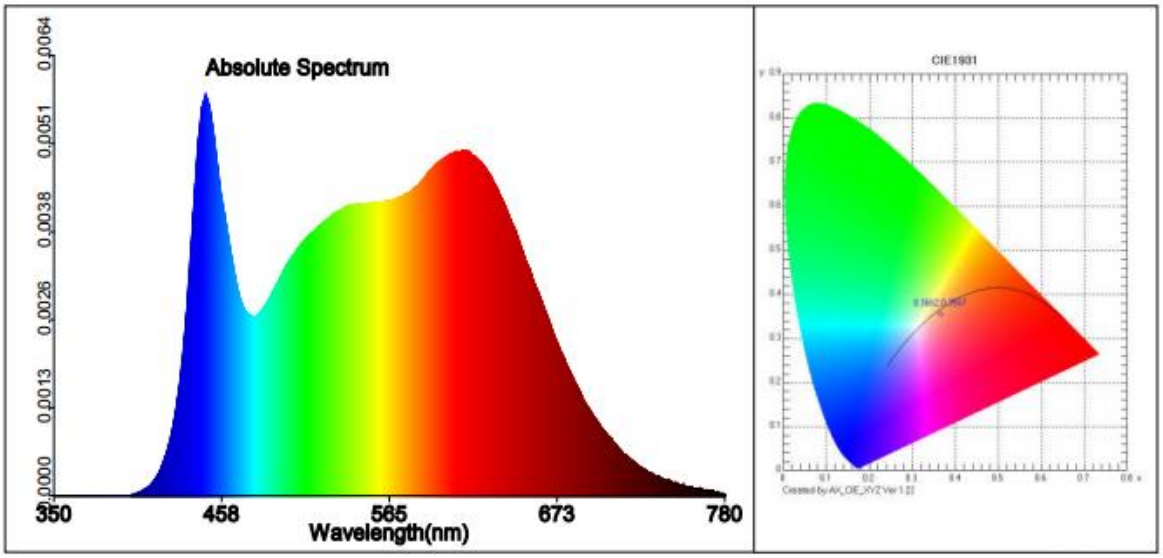
E= 132.1 lx	E(fc)=12.2804 fc		
CIE x= 0.3400	CIE y= 0.2595	CIE u'=0.2503	CIE v'=0.4298
Tc=4710 K	Lp=447.0 nm	HW=24.7 nm	Ld=610.2 nm
Pur=22.3 %	Ratio_R=29.6 %	Ratio_G=64.2 %	Ratio_B=6.2 %
Duv=-0.05329			
Ra=45.8	R1= 30	R2= 62	R3= 79
R4= 35	R5= 35	R6= 60	R7= 69
R8= -4	R9=-145	R10= 31	R11= 25
R12= 43	R13= 35	R14= 83	R15= 2

SDCM= 0.3()
White Class:OUT

E1=0.72767 W/m2	E2=0.84431 W/m2	PPFD=3.5175 μmol/(m·s)
Ech-A=0.11241 W/m2	Ech-B=0.10372 W/m2	Ef=0.11696 W/m2
Eb=0.19437 W/m2	Ey=0.15306 W/m2	Er=0.38052 W/m2
Ep=0.63509 Wphyto/m2	Erb_Ratio=1.9577	
PPFDf=6.8427E-001 μmol/(m2·s)		

FULL SPECTRUM CURVES

NO. 13



Test parameter:

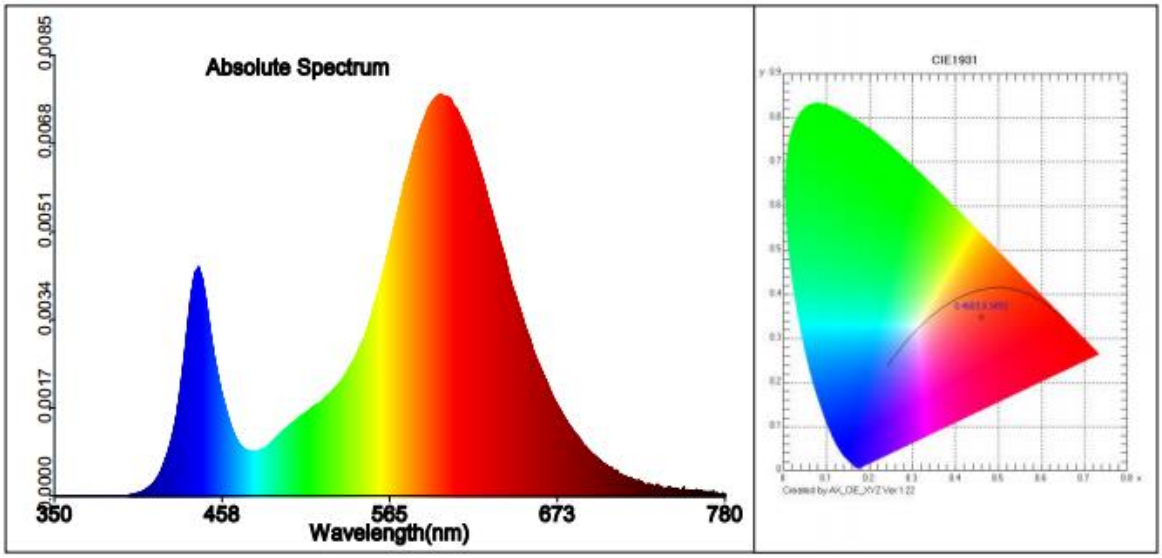
E= 333.1 lx	E(fc)=30.9572 fc		
CIE x= 0.3662	CIE y= 0.3567	CIE u'=0.2237	CIE v'=0.4903
Tc=4277 K	Lp=452.0 nm	HW=34.5 nm	Ld=582.3 nm
Pur=16.9 %	Ratio_R=20.1 %	Ratio_G=74.9 %	Ratio_B=5.0 %
Duv=-0.00526			
Ra=97.3	R1= 98	R2= 98	R3= 97
R4= 99	R5= 98	R6= 95	R7= 97
R8= 97	R9= 95	R10= 98	R11= 97
R12= 79	R13= 98	R14= 98	R15= 97

SDCM= 0.4()
White Class:OUT

E1=1.1474 W/m2	E2=1.2016 W/m2	PPFD=5.4105 μmol/(m·s)
Ech-A=0.094271 W/m2	Ech-B=0.12282 W/m2	Ef=0.054369 W/m2
Eb=0.27442 W/m2	Ey=0.44644 W/m2	Er=0.42738 W/m2
Ep=0.99299 Wphyto/m2	Erb_Ratio=1.5574	
PPFDf=3.2254E-001 μmol/(m2·s)		

FULL SPECTRUM CURVES

NO. 15



Test parameter:

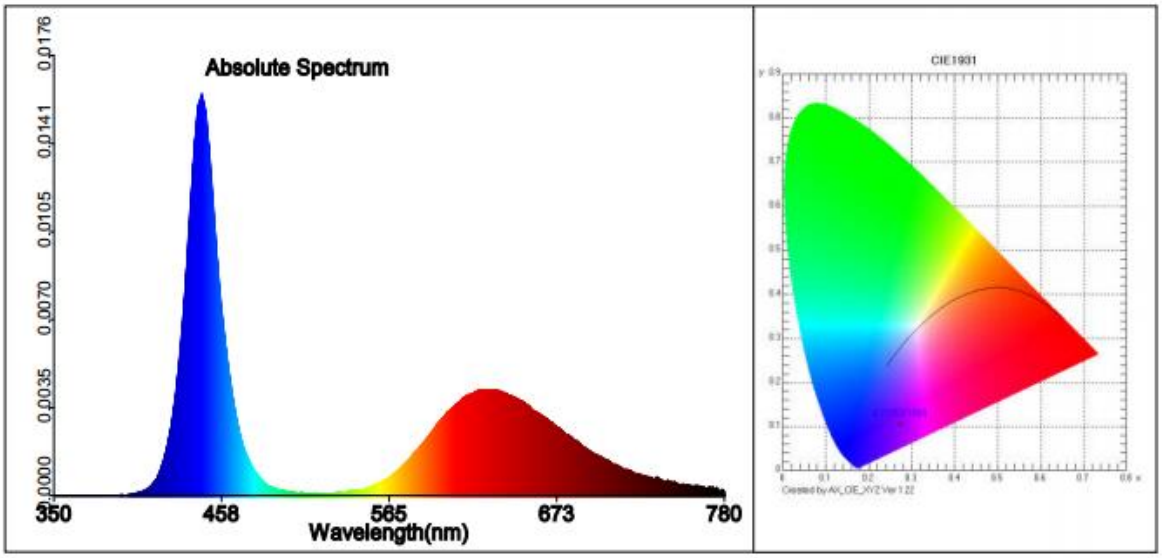
E= 307.9 lx	E(fc)=28.6185 fc		
CIE x= 0.4603	CIE y= 0.3493	CIE u'=0.2936	CIE v'=0.5013
Tc=2197 K	Lp=609.0 nm	HW=92.7 nm	Ld=600.4 nm
Pur=42.9 %	Ratio_R=31.5 %	Ratio_G=66.2 %	Ratio_B=2.3 %
Duv=-0.02341			
Ra=75.2	R1= 80	R2= 96	R3= 79
R4= 68	R5= 82	R6= 90	R7= 65
R8= 43	R9= 0	R10= 95	R11= 67
R12= 82	R13= 85	R14= 89	R15= 74

SDCM= 0.3()
White Class:OUT

E1=1.048 W/m2	E2=1.0841 W/m2	PPFD=5.1078 μmol/(m·s)
Ech-A=0.091626 W/m2	Ech-B=0.14551 W/m2	Ef=0.0363 W/m2
Eb=0.1642 W/m2	Ey=0.36369 W/m2	Er=0.52102 W/m2
Ep=0.95354 Wphyto/m2	Erb_Ratio=3.1731	
PPFDf=2.1342E-001 μmol/(m2·s)		

FULL SPECTRUM CURVES

NO. 16



Test parameter:

E= 92.5 lx	E(fc)=8.59386 fc		
CIE x= 0.2735	CIE y= 0.1059	CIE u'=0.2937	CIE v'=0.2560
Tc=100000 K	Lp=449.0 nm	HW=23.9 nm	Ld=380.0 nm
Pur=64.4 %	Ratio_R=51.8 %	Ratio_G=30.8 %	Ratio_B=17.4 %
Duv=-0.14787			
Ra=-67.8	R1=-85	R2=-111	R3=-114
R4=-11	R5=-66	R6=-110	R7= 5
R8=-50	R9=-455	R10=-357	R11=-38
R12=-188	R13=-113	R14= 3	R15=-166

SDCM= 0.1()
White Class:OUT

E1=0.92845 W/m2	E2=1.0241 W/m2	PPFD=4.1796 μmol/(m·s)
Ech-A=0.09374 W/m2	Ech-B=0.10334 W/m2	Ef=0.095869 W/m2
Eb=0.4968 W/m2	Ey=0.054004 W/m2	Er=0.37792 W/m2
Ep=0.77968 Wphyto/m2	Erb_Ratio=0.76071	
PPFDf=5.5020E-001 μmol/(m2·s)		

RELIABILITY TESTS

Test Items	Test Conditions	Sample QTY	Ac/Re
Aging Test	IF=150-350mA, Ta=25℃ x6000hrs	22	0/1
	IF=150-350mA, Ta=85℃ x6000hrs	22	0/1
High Temperature Storage	100℃ x1000hrs	22	0/1
Low Temperature Storage	-40℃ x1000hrs	22	0/1
High Temp & Humidity	IF=150-350mA, 85℃, 85% RH for 6000hrs	22	0/1
Temperature Shock	-40℃x30 min & +100℃x30 min, 100cycle	22	0/1
ESD(HBM)	2000V HBM/ 1 Time	10	0/1

Criteria for Judging LED Failure (Tc= 25℃)

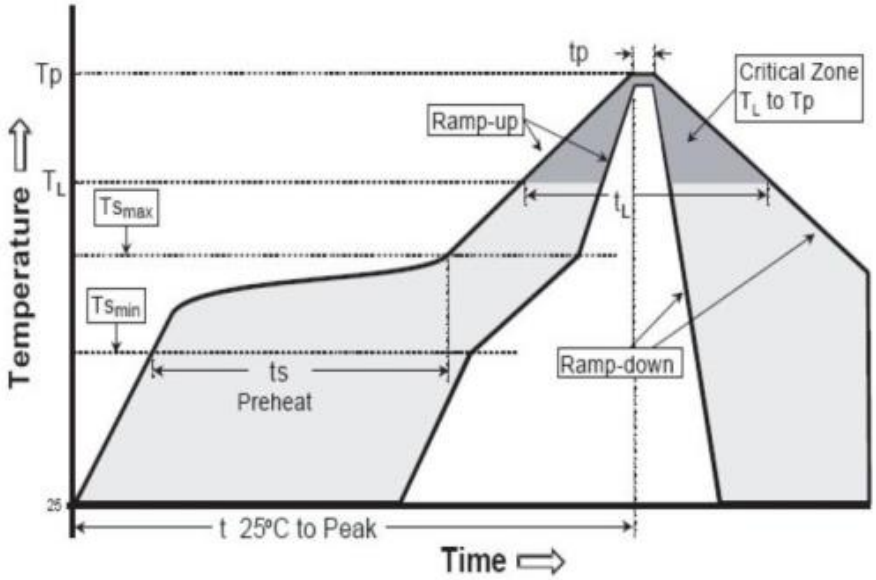
Items	Symbol	Test Conditions	Criteria for Judging LED Failure
Forward Voltage	VF	IF=150-350mA	>U x 1.1
Reverse Current	IR	VR=5V	IR>/= 10μA
Lumen	ΦV	IF=150-350mA	<S x 0.7

U refers to max value; S refers to initial value.

Notes: Judging criteria based on Tc=25℃.

TYPICAL CHARACTERISTIC CURVES

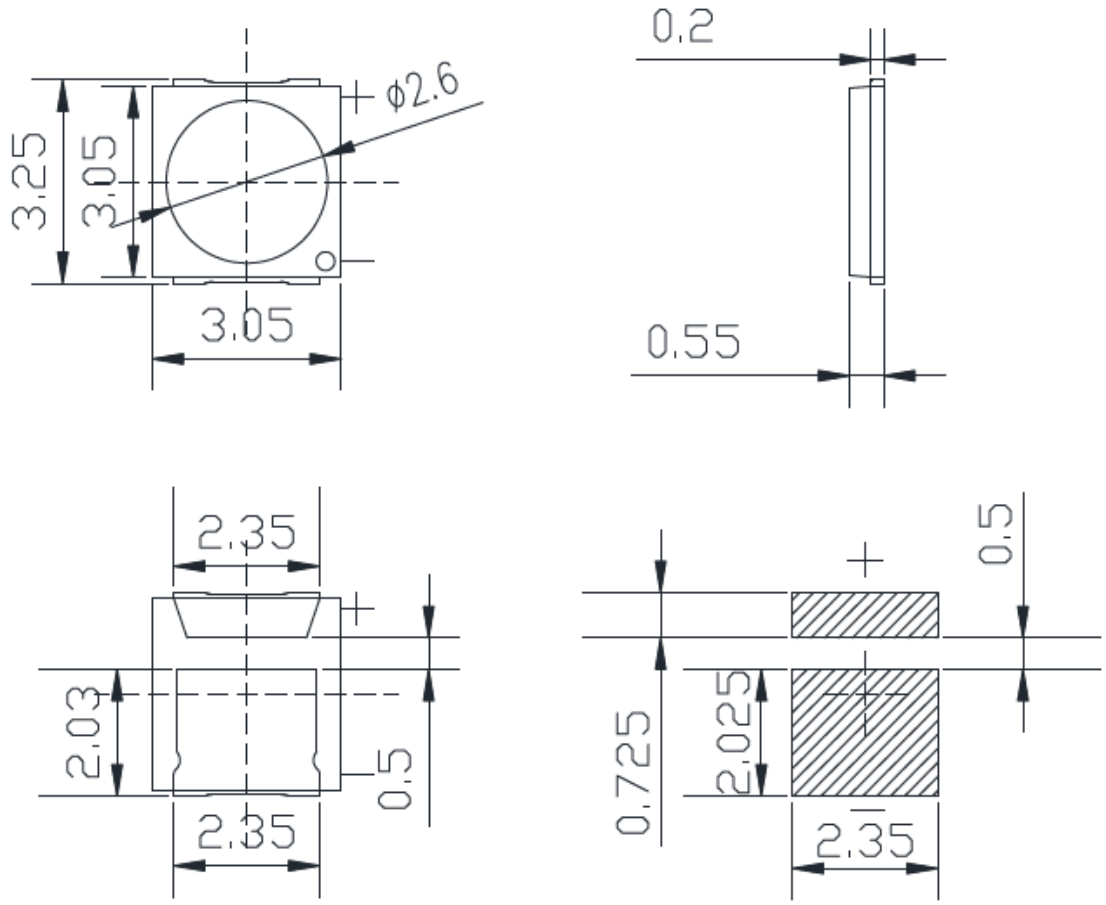
REFLOW SOLDERING PROFILE



Profile Features	Lead-free solder	Lead solder	Soldering by Manual
Ramp-up Speed(Ts max to Tp)	3 °C/ second max.	3 °C/ second max.	Max. temperature: 350°C 3 seconds/1 time
Preheat: Min. Temperature(Tsmin)	150 °C	100 °C	
Preheat: Max.Temperature(Tsmax)	200 °C	150 °C	
Preheat: Time (tsmin to tsmax)	60~180 seconds	60~120 seconds	
Temperature to Keep: (TL)	217 °C	183 °C	
Time to Keep: (tL)	60~150 seconds	60~150 seconds	
Peak Temperature (Tp)	260 °C	215 °C	
Time within the peak temperature (tp)	20~40 seconds	10~30 seconds	
Ramp-down Speed	6°C/ second max.	6°C/ second max.	
Time to the peak Temperature	8 minutes max.	6 minutes max.	

DIMENSIONS

Unit: mm



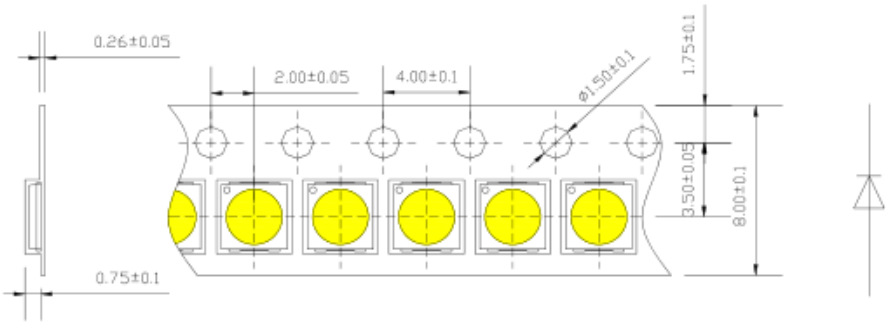
Notes：

*All dimensions are in millimeters.(tolerance:±0.2mm)

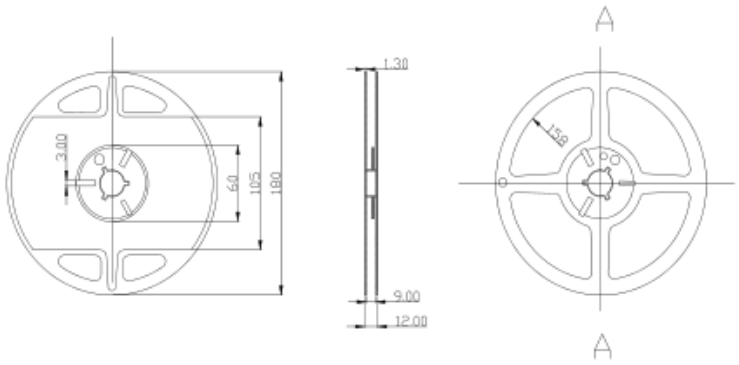
*The appearance and specifications of the product may be changed for improvement without notice.

PACKAGING

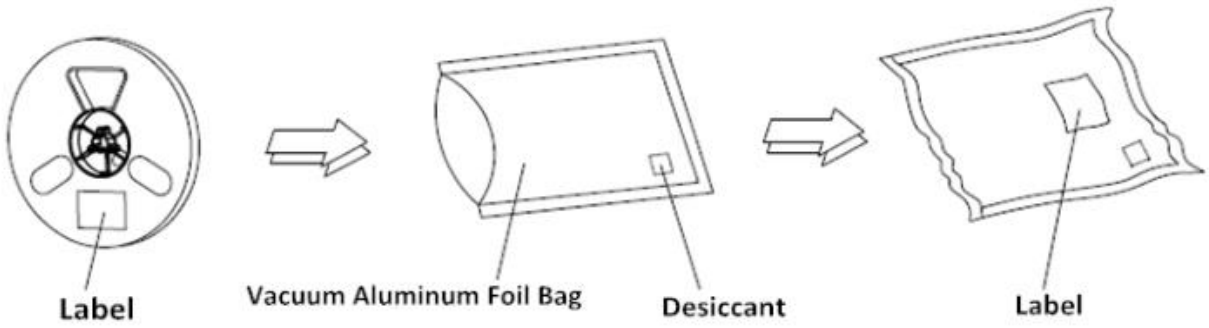
Tape Specifications (Units : mm)



Reel Dimensions



Moisture Resistant Packaging



PRECAUTIONS

Storage

1. Moisture proof and anti-electrostatic package with moisture absorbent material is used, to keep moisture to aminimum.
2. Before opening the package, the product should be kept at 30℃ or less and humidity less than 60% RH, and beused within a year.
3. After opening the package, the product should be stored at 30℃ or less and humidity less than 10%RH, and besoldered within 24 hrs (1day). It is recommended that the product be operated at the workshop condition of 30℃ or less and humidity less than 60%RH.
4. If the moisture absorbent material has fade away or the LEDs have exceeded the storage time, baking treatment should be performed based on the following condition: (80±5)℃ for 24 hours.

Static Electricity

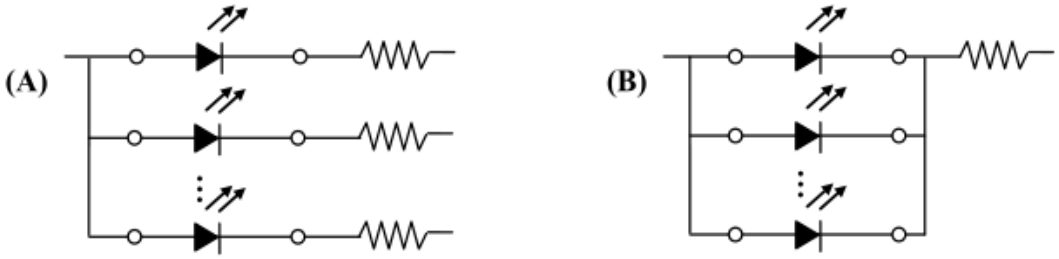
1. Static electricity or surge voltage damages the LEDs. Damaged LEDs will show some unusual characteristic such as the forward voltage becomes lower, or the LEDs do not light at the low current. even not light.
2. All devices, equipment and machinery must be properly grounded. At the same time, it is recommended that wrist bands or anti-electrostatic gloves, anti-electrostatic containers be used when dealing with the LEDs.

Vulcanization

LED curing is due to sulfur being in bracket and the +1 price of silver in the chemical reaction generated Ag2S in the process. It will lead to the capacity of reflecting of silver layer reducing, light color temperature drift and serious decline ,seriously affecting the performance of the product. So we should take corresponding measures to avioding vulcanization, such as to avoid using sulphur volatile substances and keeping away from high sulphur content of the material.

Design Consideration

1. In designing a circuit, the current through each LED must not exceed the absolute maximum rating specified for each LED. In the meanwhile, resistors for protection should be applied, otherwise slight voltage shift will cause big current change, burn out may happen.
2. It is recommended to use Circuit A which regulates the current flowing through each LED rather than Circuit B. When driving LEDs with a constant voltage in Circuit B, the current through the LEDs may vary due to the variation in Forward Voltage (VF) of the LEDs. In the worst case, some LED may be subjected to stresses in excess of the Absolute Maximum Rating.



3. Thermal Design is paramount importance because heat generation may result in the Characteristics decline, such as brightness decreased, Color changed and so on. Please consider the heat generation of the LEDs when making the system design.

PRECAUTIONS

Safety Advice For Human Eyes

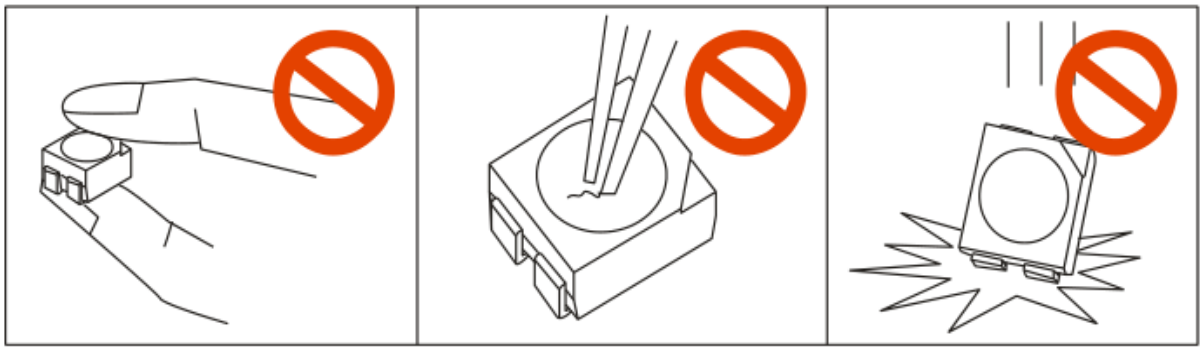
Viewing direct to the light emitting center of the LEDs, especially those of great Luminous Intensity will cause great hazard to human eyes. Please be careful.

The safe temperature for LEDs working

The high temperature will make the LEDs' Luminous Intensity decreased radically, if LEDs worked in hoteyes. Please be careful. environment for a long time, they will be disabled easily. When LEDs are working in a closed array, we suggest that the LEDs' surface temperature should be lower than 55℃ and the legs' temperature should be lower than 75℃.

Others

1. When handling the product, touching the encapsulant with bare hands will not only contaminate its surface, but also affect on its optical characteristics. Excessive force to the encapsulant might result in catastrophic failure of the LEDs due to Die breakage or wire deformation. For this reason, please do not put excessive stress on LEDs, especially when the LEDs are heated such as during Reflow Soldering.



2. The epoxy resin of encapsulant is fragile, so please avoid scratch or friction over the epoxy resin surface. While handling the product with tweezers, do not hold by the epoxy resin, be careful.