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LED Middle POWER

3030 Product Data Sheet

AQLxx Series

Created Date: 7 / 7 / 2014

Revision: 2.1

LED Middle POWER 3030AQLxx Series

1. Description

The LiteON 3030 Product series is a wide beam angle standard-dimension package, combining the lifetime and reliability advantages of Light Emitting Diodes with the brightness of conventional lighting. It gives you total design freedom and unmatched brightness, creating a new opportunities for solid state lighting to displace conventional lighting technologies.

1.1 Features

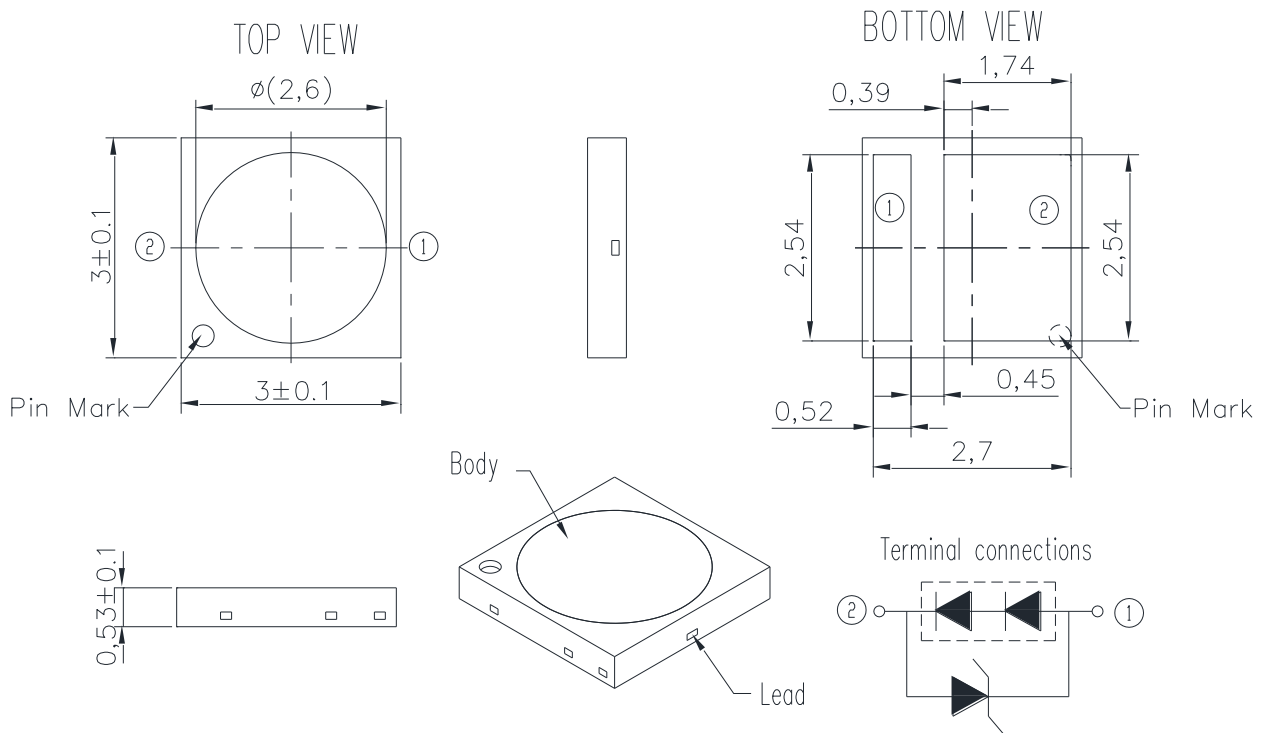
- Package in 8mm tape on 7" diameter reels.
- Compatible with automatic placement equipment.
- Compatible with infrared and vapor phase reflow solder process.
- EIA STD package.
- I.C. compatible.
- Meet green product and Pb-free(According to RoHS)

1.2 Available Part Numbers

CCT	Part Number
2700K	LTW-3030AQL27
3000K	LTW-3030AQL30
3500K	LTW-3030AQL35
4000K	LTW-3030AQL40
5000K	LTW-3030AQL50
5700K	LTW-3030AQL57
6500K	LTW-3030AQL65

LED Middle POWER 3030AQLxx Series

2. Package Dimensions



Part No.	Lens Color	Source Color
LTW-3030AQL65	Orange	InGaN Blue
LTW-3030AQL57		
LTW-3030AQL50		
LTW-3030AQL40		
LTW-3030AQL35		
LTW-3030AQL30		
LTW-3030AQL27		

Notes:

1. All dimensions are in millimeters.
2. Tolerance is $\pm 0,2$ mm (.008") unless otherwise noted.

LED Middle POWER 3030AQLxx Series

3. Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Rating	Unit
Power Dissipation	P _o	1320	mW
Continuous Forward Current	I _F	200	mA
Pulse Forward Current	I _{FP}	200	mA
Operating Temperature Range	T _{opr}	-40 ~ +100	°C
Storage Temperature Range	T _{stg}	-40 ~ +100	°C
Junction Temperature	T _j	≤ 125	°C

Notes :

1. 1/10 duty cycle, Pulse width ≤ 10 μs.
2. Forbid to operating at reverse voltage condition for long.
3. It is recommended to follow de-rating curve to use maximum rating to ensure LED can operated normally.

LED Middle POWER 3030AQLxx Series

4. Electro-Optical Characteristics

4.1 Typical Performance

Parameter	Symbol	Values								Unit	Test Condition
		Typ.	2700	3000	3500	4000	5000	5700	6500		
Correlated Color Temperature	CCT	Typ.	2700	3000	3500	4000	5000	5700	6500	'K	
Chromaticity Coordinates	x	Typ.	0.458	0.434	0.408	0.382	0.382	0.345	0.329	-	$I_F = 150\text{mA}$
	y	Typ.	0.410	0.403	0.392	0.380	0.380	0.355	0.342		
Luminous Flux ¹	Φ_v	Min	76.0	80.0	84.0	84.0	84.0	84.0	84.0	lm	
		Typ.	87.5	93.0	94.7	94.7	96.1	95.7	94.7		
		Max.	104.0	108.0	112.0	112.0	112.0	112.0	112.0		
Optical Efficiency	η_{opt}	Typ.	90.4	96.1	97.9	97.9	99.3	98.9	97.9	lm/W	
Color Rendering Index	CRI	Min.	90						-		
Viewing Angle	$2\theta_{1/2}$	Typ.	120						deg		
Forward Voltage	V_F	Min	5.8						V		
		Typ.	6.3								
		Max.	6.6								
Thermal Resistance	R_{js}	Typ.	10						°C/W		
ESD-Withstand Voltage	ESD	Min	5K						HBM	V	

Notes

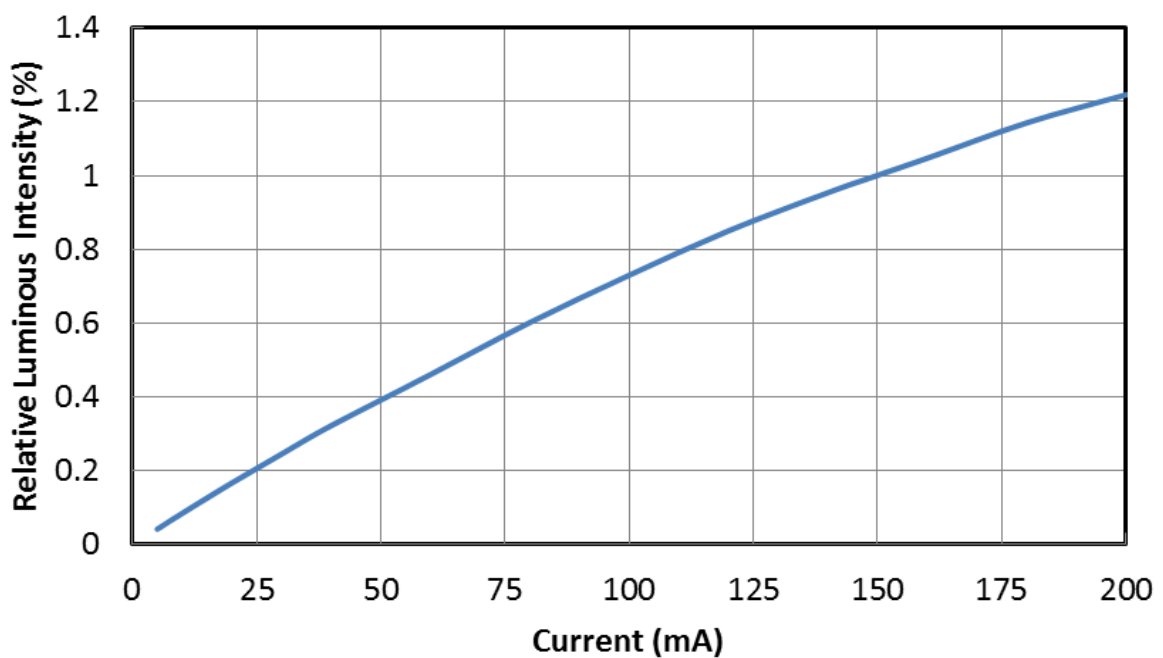
- Luminous flux is the total luminous flux output as measured with an integrating sphere.
- I_v (flux Φ_v) classification code is marked on each packing bag.
- The chromaticity coordinates (x, y) is derived from the 1931 CIE chromaticity diagram.
- Caution in ESD:

Static Electricity and surge damages the LED. It is recommended using a wrist band or anti-electrostatic glove when handling the LED. All devices, equipment and machinery must be properly grounded.
- CAS140B is the test standard for the chromaticity coordinates (x, y) & Φ_v .
- The chromaticity coordinates (x, y) guarantee should be added +/- 0.01 tolerance
- CRI measurement allowance is ± 5 , $R9 > 50$

LED Middle POWER 3030AQLxx Series

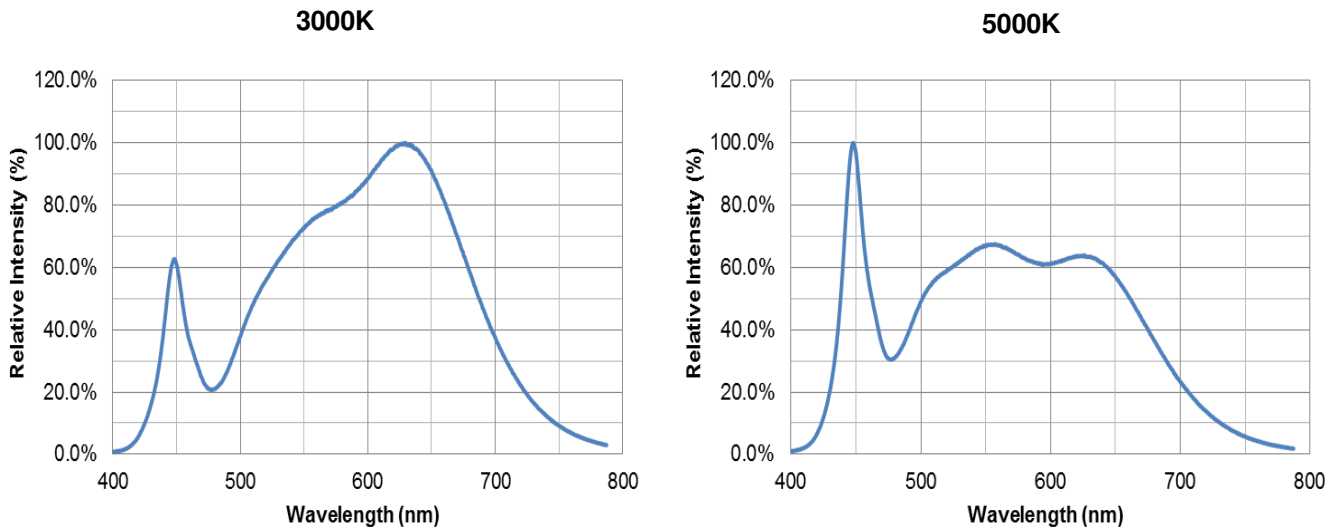
4.2 Forward Current vs. Lumen and Voltage

Current (mA)	V _F (V)	Lumen (lm)						
		2700K	3000K	3500K	4000K	5000K	5700K	6500K
20	5.49	14.6	15.5	15.8	15.8	16.0	16.0	15.8
40	5.65	28.2	29.9	30.5	30.5	30.9	30.8	30.5
60	5.77	40.3	42.9	43.6	43.6	44.3	44.1	43.6
80	5.90	52.7	56.0	57.0	57.0	57.8	57.6	57.0
100	6.01	63.9	67.8	69.1	69.1	70.2	69.9	69.1
120	6.11	74.4	79.0	80.4	80.4	81.6	81.3	80.4
140	6.22	83.4	88.6	90.3	90.3	91.6	91.2	90.3
150	6.28	87.5	93.0	94.7	94.7	96.1	95.7	94.7
160	6.34	91.6	97.4	99.1	99.1	100.6	100.2	99.1
180	6.42	100.1	106.3	108.3	108.3	109.9	109.4	108.3
200	6.52	106.7	113.4	115.4	115.4	117.2	116.7	115.4

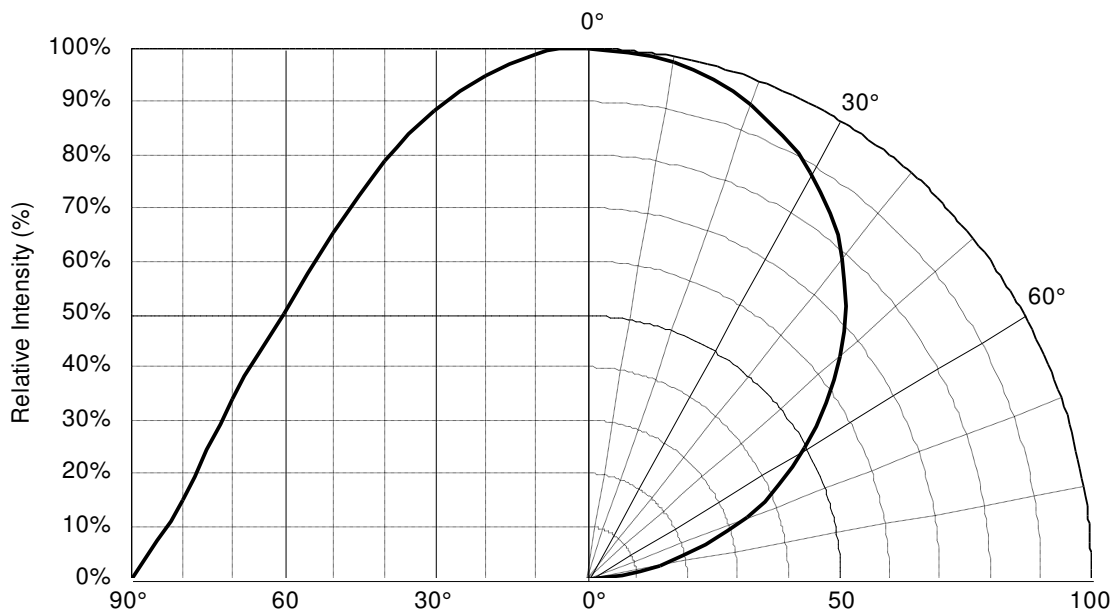


LED Middle POWER 3030AQLxx Series

4.3 Relative Spectral Power Distribution at Typical Current

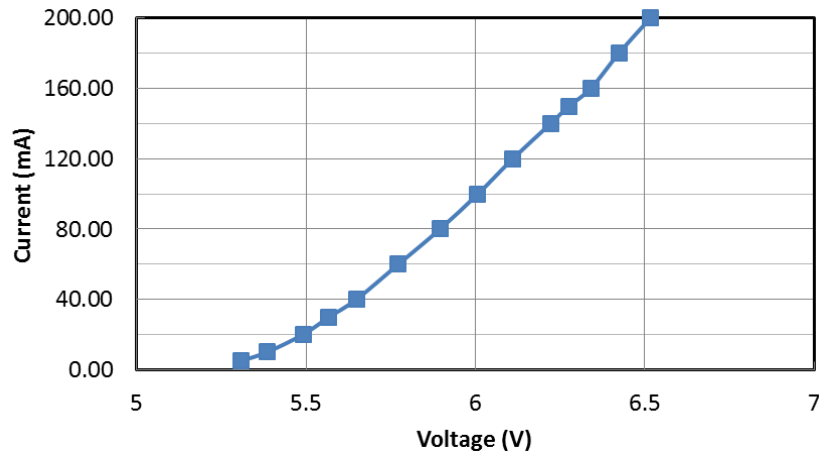


4.4 Radiation Characteristics



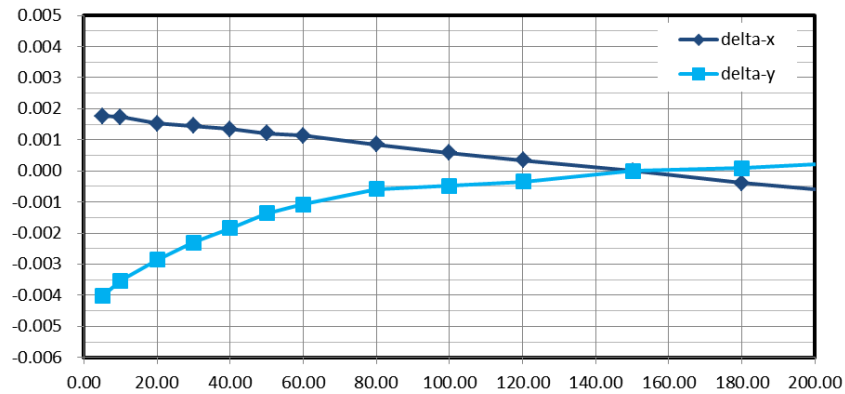
LED Middle POWER 3030AQLxx Series

4.5 Forward Voltage vs. Forward Current

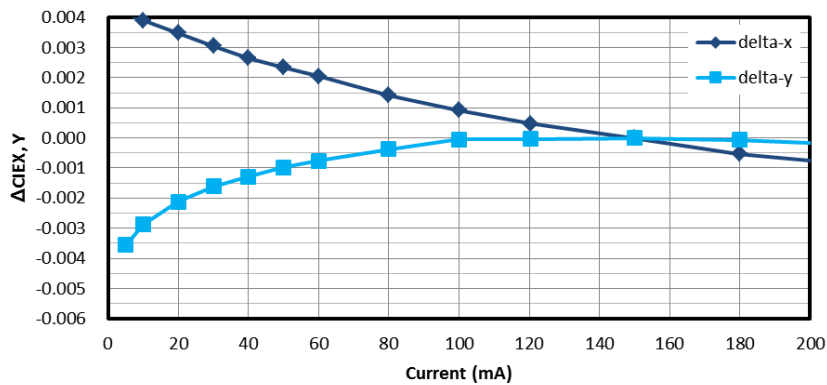


4.6 Color Shift vs. Forward Current

■ Cool White

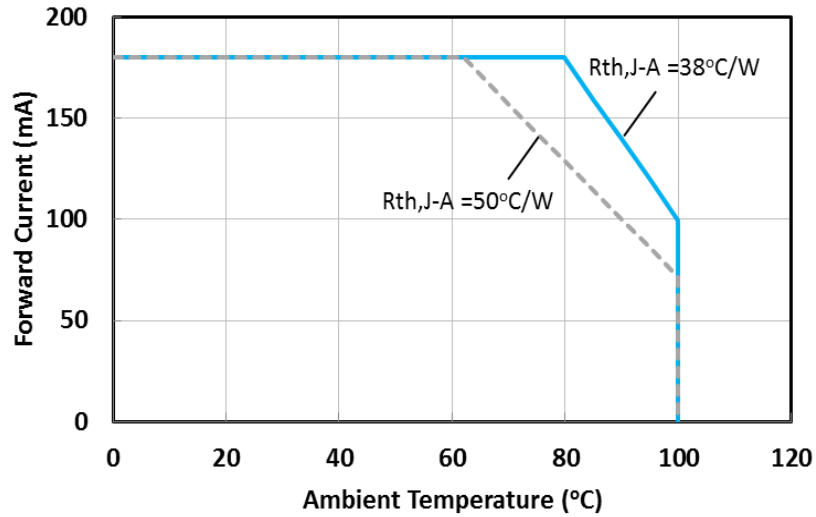


■ Warm White

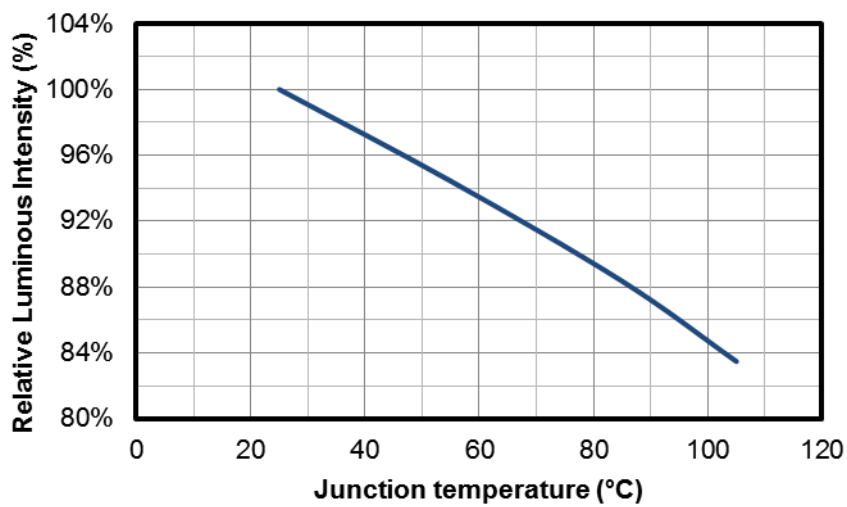


LED Middle POWER 3030AQLxx Series

4.7 Forward Current Derating Curve vs. Ambient Temperature

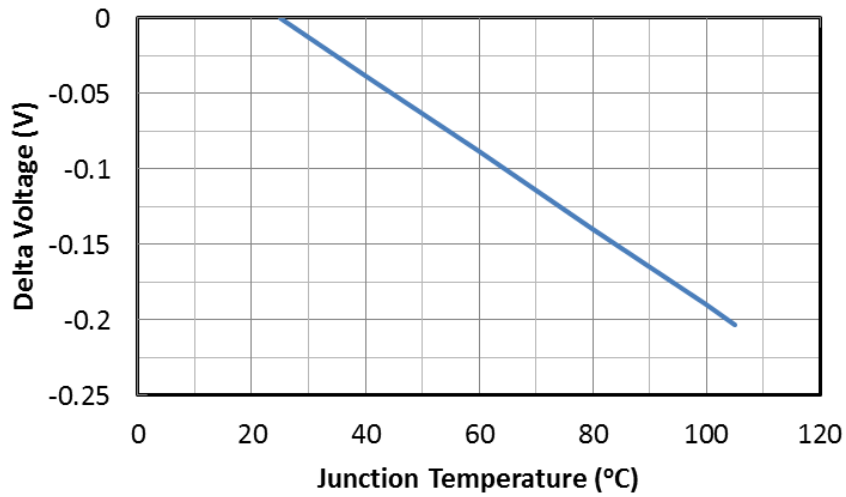


4.8 Relative Intensity vs. Junction Temperature



**LED Middle POWER
3030AQLxx Series**

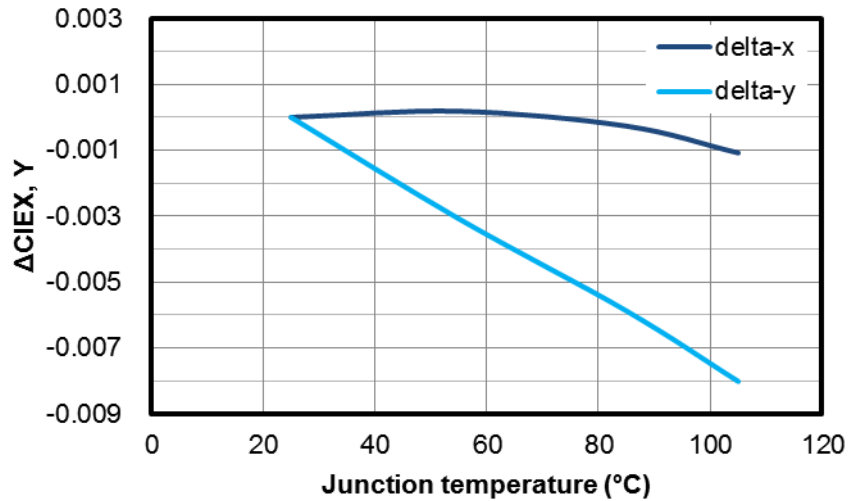
4.9 Voltage vs. Junction Temperature



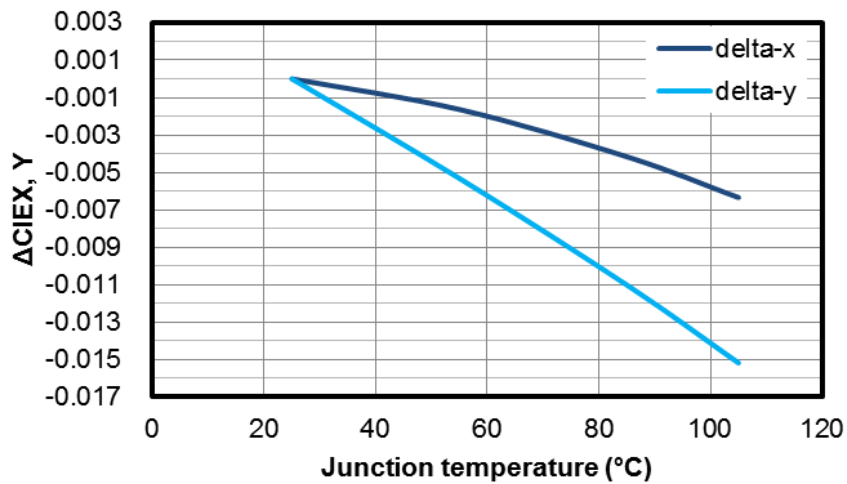
LED Middle POWER 3030AQLxx Series

4.10 Color Shift vs. Junction Temperature

■ Cool White



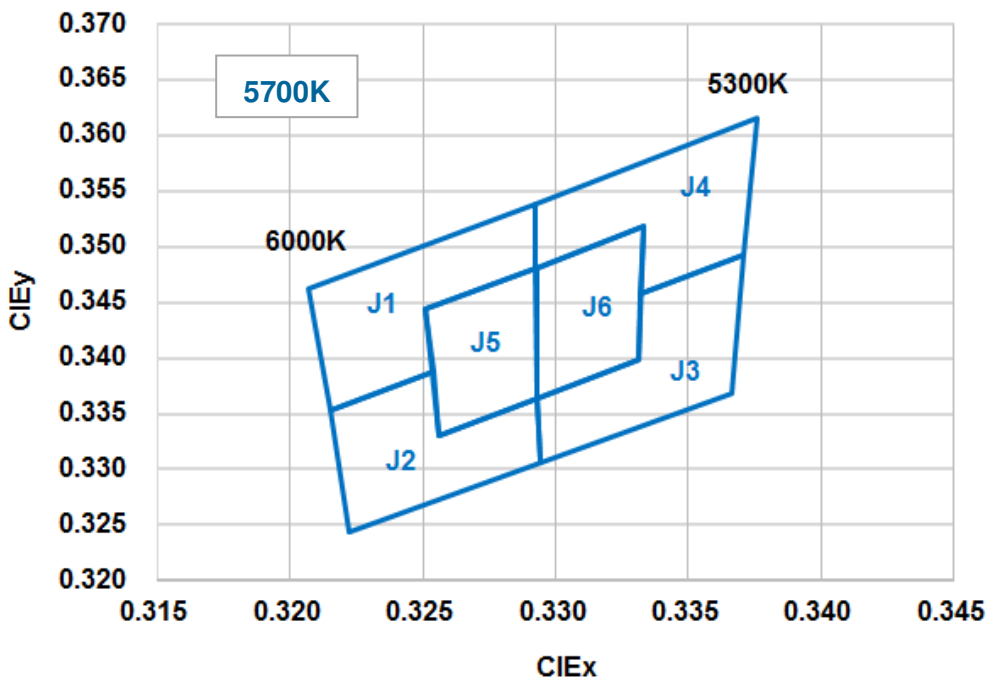
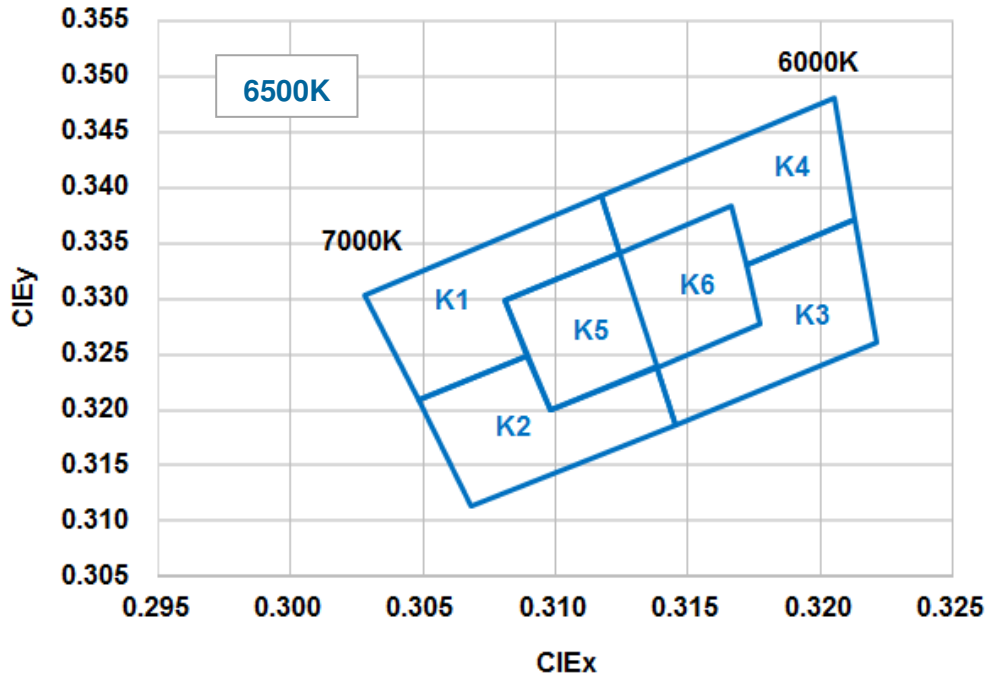
■ Warm White



LED Middle POWER 3030AQLxx Series

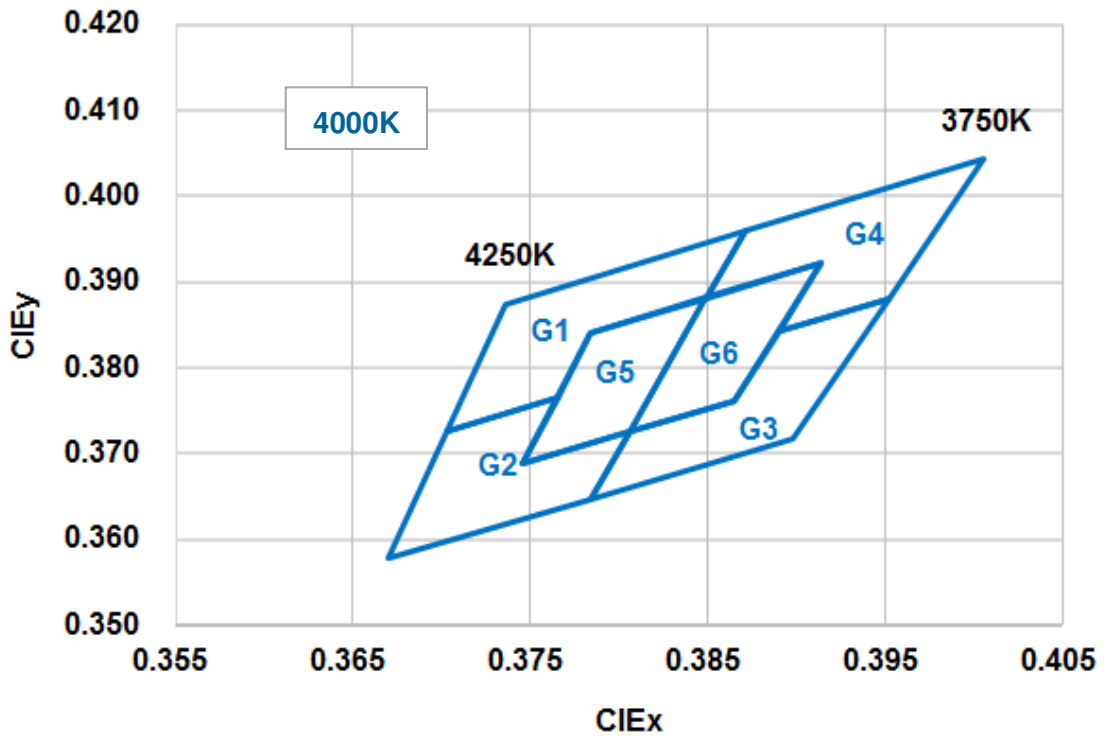
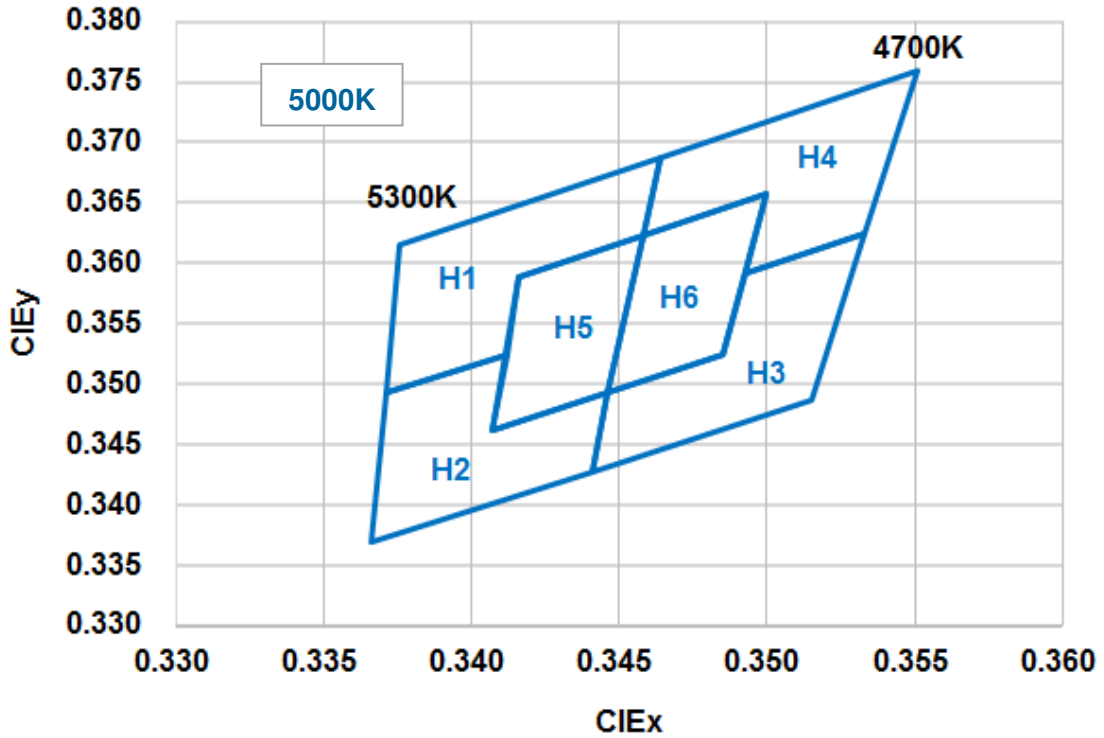
5. Binning Definition

5.1 Color Bin

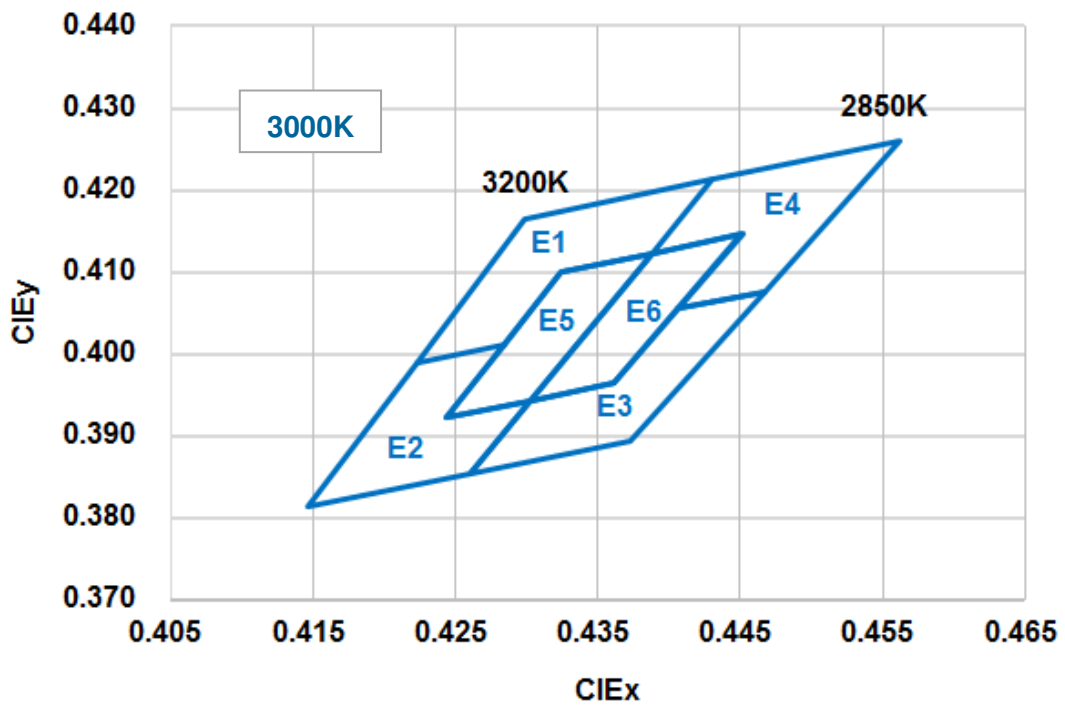
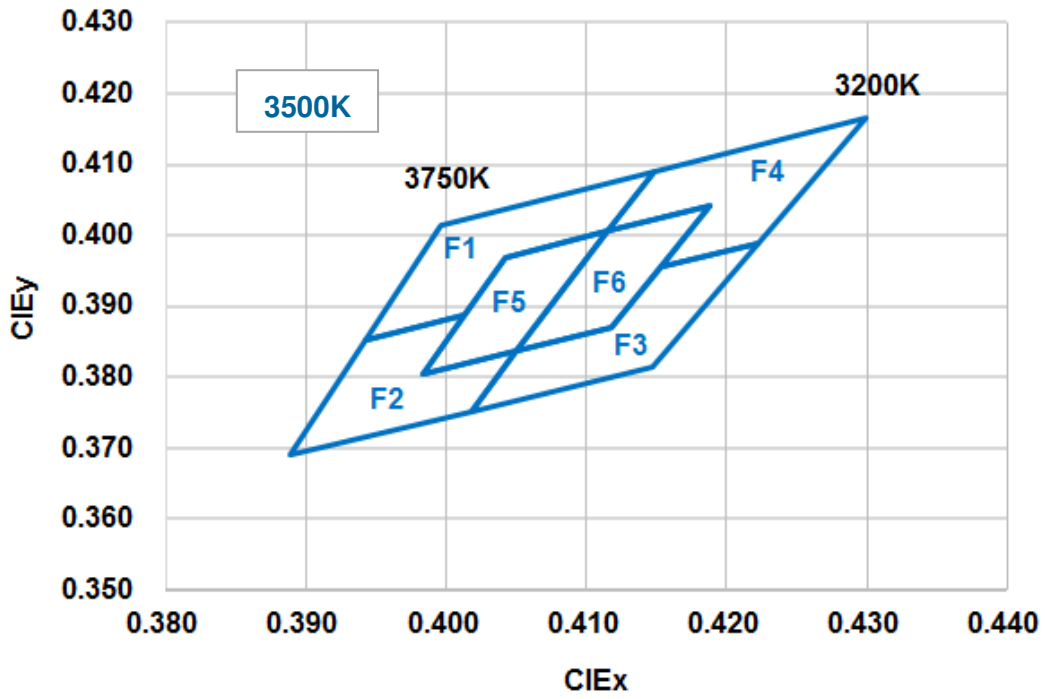




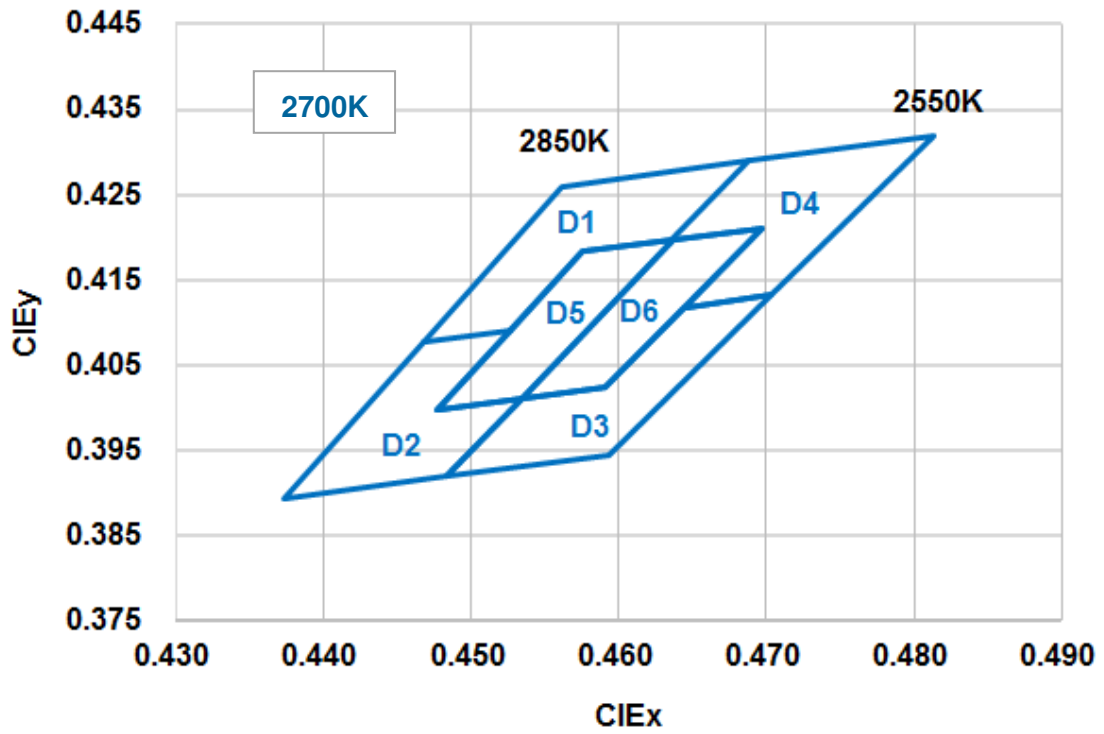
LED Middle POWER 3030AQLxx Series



LED Middle POWER
3030AQLxx Series



**LED Middle POWER
3030AQLxx Series**



LED Middle POWER 3030AQLxx Series

■ Color Rank

6500K ($I_F = 150 \text{ mA}$)											
Rank	-	x	y	Rank	-	x	y	Rank	-	x	y
K1	1	0.3048	0.3209	K3	1	0.3145	0.3187	K5	1	0.3098	0.320
	2	0.3028	0.3304		2	0.3138	0.3238		2	0.3081	0.3299
	3	0.3117	0.3393		3	0.3177	0.3277		3	0.3124	0.3342
	4	0.3124	0.3341		4	0.3172	0.3330		4	0.3138	0.3239
	5	0.3081	0.3299		5	0.3213	0.3371				
	6	0.3089	0.3249		6	0.3221	0.3261				
K2	1	0.3068	0.3113	K4	1	0.3117	0.3393	K6	1	0.3138	0.3239
	2	0.3048	0.3209		2	0.3205	0.3481		2	0.3124	0.3342
	3	0.3089	0.3249		3	0.3213	0.3371		3	0.3167	0.3384
	4	0.3098	0.32		4	0.3172	0.333		4	0.3178	0.3277
	5	0.3138	0.3238		5	0.3166	0.3384				
	6	0.3145	0.3187		6	0.3124	0.3341				

Tolerance on each Hue bin (x,y) is +/- 0.01.

5700K ($I_F = 150 \text{ mA}$)											
Rank	-	x	y	Rank	-	x	y	Rank	-	x	y
J1	1	0.3215	0.3353	J3	1	0.3294	0.3306	J5	1	0.3256	0.3331
	2	0.3207	0.3462		2	0.3293	0.3364		2	0.3251	0.3444
	3	0.3292	0.3539		3	0.3331	0.3398		3	0.3292	0.3481
	4	0.3292	0.3481		4	0.3332	0.3458		4	0.3293	0.3364
	5	0.3251	0.3444		5	0.3371	0.3493				
	6	0.3254	0.3388		6	0.3366	0.3369				
J2	1	0.3222	0.3243	J4	1	0.3292	0.3539	J6	1	0.3293	0.3364
	2	0.3215	0.3353		2	0.3376	0.3616		2	0.3293	0.3481
	3	0.3254	0.3388		3	0.3371	0.3493		3	0.3333	0.3518
	4	0.3256	0.3331		4	0.3332	0.3458		4	0.3331	0.3398
	5	0.3293	0.3364		5	0.3333	0.3518				
	6	0.3294	0.3306		6	0.3292	0.3481				

Tolerance on each Hue bin (x,y) is +/- 0.01.

LED Middle POWER 3030AQLxx Series

5000K ($I_F = 150 \text{ mA}$)											
Rank	-	x	y	Rank	-	x	y	Rank	-	x	y
H1	1	0.3371	0.3493	H3	1	0.3441	0.3428	H5	1	0.3407	0.3462
	2	0.3376	0.3616		2	0.3446	0.3493		2	0.3416	0.3589
	3	0.3464	0.3688		3	0.3485	0.3524		3	0.3458	0.3623
	4	0.3458	0.3623		4	0.3493	0.3591		4	0.3446	0.3493
	5	0.3416	0.3589		5	0.3533	0.3624				
	6	0.3412	0.3525		6	0.3515	0.3487				
H2	1	0.3366	0.3369	H4	1	0.3464	0.3688	H6	1	0.3446	0.3493
	2	0.3371	0.3493		2	0.3551	0.3760		2	0.3458	0.3623
	3	0.3412	0.3525		3	0.3533	0.3624		3	0.3500	0.3657
	4	0.3407	0.3462		4	0.3493	0.3591		4	0.3485	0.3524
	5	0.3446	0.3493		5	0.3500	0.3657				
	6	0.3441	0.3428		6	0.3458	0.3623				

Tolerance on each Hue bin (x,y) is +/- 0.01.

4000K ($I_F = 150 \text{ mA}$)											
Rank	-	x	y	Rank	-	x	y	Rank	-	x	y
G1	1	0.3703	0.3726	G3	1	0.3784	0.3647	G5	1	0.3746	0.3689
	2	0.3736	0.3874		2	0.3806	0.3725		2	0.3784	0.3841
	3	0.3871	0.3959		3	0.3865	0.3762		3	0.3849	0.3882
	4	0.3849	0.3881		4	0.3890	0.3842		4	0.3806	0.3726
	5	0.3784	0.3841		5	0.3952	0.3880				
	6	0.3766	0.3765		6	0.3898	0.3716				
G2	1	0.3670	0.3578	G4	1	0.3871	0.3959	G6	1	0.3806	0.3726
	2	0.3703	0.3726		2	0.4006	0.4044		2	0.3849	0.3882
	3	0.3766	0.3765		3	0.3952	0.3880		3	0.3914	0.3922
	4	0.3746	0.3689		4	0.3890	0.3842		4	0.3865	0.3762
	5	0.3806	0.3725		5	0.3914	0.3922				
	6	0.3784	0.3647		6	0.3849	0.3881				

Tolerance on each Hue bin (x,y) is +/- 0.01.

LED Middle POWER 3030AQLxx Series

3500K ($I_F = 150$ mA)											
Rank	-	x	y	Rank	-	x	y	Rank	-	x	y
F1	1	0.3943	0.3853	F3	1	0.4018	0.3752	F5	1	0.3983	0.3804
	2	0.3996	0.4015		2	0.4050	0.3837		2	0.4042	0.3970
	3	0.4148	0.4090		3	0.4118	0.3869		3	0.4115	0.4006
	4	0.4115	0.4006		4	0.4153	0.3955		4	0.4050	0.3837
	5	0.4042	0.3970		5	0.4223	0.3990				
	6	0.4013	0.3887		6	0.4147	0.3814				
F2	1	0.3889	0.3690	F4	1	0.4148	0.4090	F6	1	0.4050	0.3837
	2	0.3943	0.3853		2	0.4299	0.4165		2	0.4115	0.4006
	3	0.4013	0.3887		3	0.4223	0.3990		3	0.4188	0.4041
	4	0.3983	0.3804		4	0.4153	0.3955		4	0.4118	0.3869
	5	0.4050	0.3837		5	0.4188	0.4041				
	6	0.4018	0.3752		6	0.4115	0.4006				

Tolerance on each Hue bin (x,y) is +/- 0.01.

3000K ($I_F = 150$ mA)											
Rank	-	x	y	Rank	-	x	y	Rank	-	x	y
E1	1	0.4223	0.3990	E3	1	0.4260	0.3854	E5	1	0.4244	0.3923
	2	0.4299	0.4165		2	0.4303	0.3943		2	0.4324	0.4100
	3	0.4431	0.4213		3	0.4361	0.3964		3	0.4388	0.4123
	4	0.4388	0.4123		4	0.4406	0.4055		4	0.4303	0.3944
	5	0.4324	0.4100		5	0.4468	0.4077				
	6	0.4284	0.4011		6	0.4373	0.3893				
E2	1	0.4147	0.3814	E4	1	0.4431	0.4213	E6	1	0.4303	0.3944
	2	0.4223	0.3990		2	0.4562	0.4260		2	0.4388	0.4123
	3	0.4284	0.4011		3	0.4468	0.4077		3	0.4452	0.4146
	4	0.4244	0.3923		4	0.4406	0.4055		4	0.4361	0.3964
	5	0.4303	0.3943		5	0.4451	0.4146				
	6	0.4260	0.3854		6	0.4388	0.4123				

9

Tolerance on each Hue bin (x,y) is +/- 0.01.

LED Middle POWER 3030AQLxx Series

2700K ($I_F = 150 \text{ mA}$)											
Rank	-	x	y	Rank	-	x	y	Rank	-	x	y
D1	1	0.4468	0.4077	D3	1	0.4483	0.3919	D5	1	0.4477	0.3998
	2	0.4562	0.4260		2	0.4534	0.4011		2	0.4576	0.4183
	3	0.4688	0.4290		3	0.4591	0.4025		3	0.4637	0.4197
	4	0.4636	0.4197		4	0.4644	0.4118		4	0.4534	0.4012
	5	0.4576	0.4183		5	0.4703	0.4132				
	6	0.4527	0.4090		6	0.4593	0.3944				
D2	1	0.4373	0.3893	D4	1	0.4688	0.4290	D6	1	0.4534	0.4012
	2	0.4468	0.4077		2	0.4813	0.4319		2	0.4637	0.4197
	3	0.4527	0.4090		3	0.4703	0.4132		3	0.4697	0.4211
	4	0.4477	0.3998		4	0.4644	0.4118		4	0.4591	0.4025
	5	0.4534	0.4011		5	0.4697	0.4211				
	6	0.4483	0.3919		6	0.4636	0.4197				

Tolerance on each Hue bin (x,y) is +/- 0.01.

LED Middle POWER 3030AQLxx Series

5.2 Flux Bin

2700K	Φ_v Luminous Flux Spec. Table	
Φ_v Bin	Lumen (lm) at $I_F = 150$ mA	
	Min	Max
EG	76	84
GI	84	92
IL	92	104

4000K	Φ_v Luminous Flux Spec. Table	
Φ_v Bin	Lumen (lm) at $I_F = 150$ mA	
	Min	Max
GI	84	92
IK	92	100
KN	100	112

3000K	Φ_v Luminous Flux Spec. Table	
Φ_v Bin	Lumen (lm) at $I_F = 150$ mA	
	Min	Max
FH	80	88
HJ	88	96
JM	96	108

5000K	Φ_v Luminous Flux Spec. Table	
Φ_v Bin	Lumen (lm) at $I_F = 150$ mA	
	Min	Max
GI	84	92
IK	92	100
KN	100	112

3500K	Φ_v Luminous Flux Spec. Table	
Φ_v Bin	Lumen (lm) at $I_F = 150$ mA	
	Min	Max
GI	84	92
IK	92	100
KN	100	112

5700K	Φ_v Luminous Flux Spec. Table	
Φ_v Bin	Lumen (lm) at $I_F = 150$ mA	
	Min	Max
GI	84	92
IK	92	100
KN	100	112

6500K	Φ_v Luminous Flux Spec. Table	
Φ_v Bin	Lumen (lm) at $I_F = 150$ mA	
	Min	Max
GI	84	92
IK	92	100
KN	100	112

Tolerance on each Luminous Flux bin is +/- 10%.

LED Middle POWER 3030AQLxx Series

5.3 Voltage Bin

V _F Spec. Table		
V _F Bin	Forward Voltage (volts) at I _F = 150mA	
	Min	Max
V1	5.8	6.0
V2	6.0	6.2
V3	6.2	6.4
V4	6.4	6.6

Tolerance on each Forward Voltage bin is +/- 0.1V

6. Bin Code List

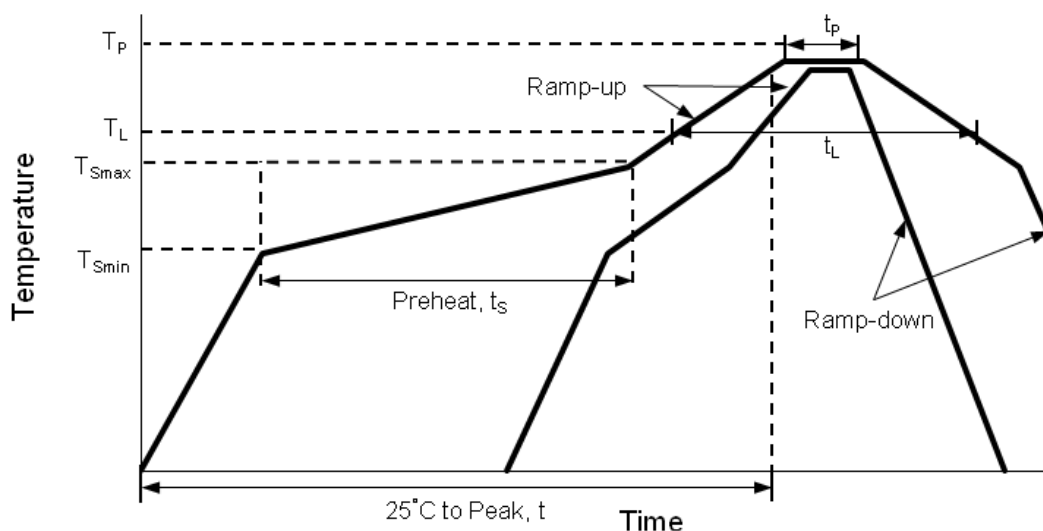
※ Notes: Full Rank on Label

Example: V1 / GI / D5

Forward Voltage Rank	Luminous Flux Rank	Color Rank
V1	GI	D5

LED Middle POWER 3030AQLxx Series

7. Reflow Soldering Characteristics



Profile Feature	Lead Free Assembly
Average Ramp-Up Rate (T_{Smax} to T_P)	3°C / second max
Preheat Temperature Min (T_{Smin})	150°C
Preheat Temperature Max (T_{Smax})	200°C
Preheat Time (t_{Smin} to t_{Smax})	60 – 180 seconds
Time Maintained Above Temperature (T_L)	217°C
Time Maintained Above Time (t_L)	60 – 150 seconds
Peak / Classification Temperature (T_P)	260°C
Time Within 5°C of Actual Peak Temperature (t_p)	5 seconds
Ramp – Down Rate	6°C / second max
Time 25°C to Peak Temperature	8 minutes max

Notes:

- The LEDs can be soldered using the reflow soldering or hand soldering method. The recommended hand soldering condition is 350 °C max. and 2 secs max. for one time only, and the recommended reflow soldering condition is 260 °C max. and 5 secs max. for three times max.
- All temperatures refer to topside of the package, measured on the package body surface.

LED Middle POWER 3030AQLxx Series

3. The soldering condition referring to J-STD-020B. The storage ambient for the LEDs should not exceed 30 °C temperature or 70% relative humidity. It is recommended that LEDs out of their original packaging are soldered within one week. For extended storage out of their original packaging, it is recommended that the LEDs were stored in a sealed container with appropriate desiccant, or desiccators with nitrogen ambient. If the LEDs were unpacked more than 168hrs, baking the LEDs at 60 °C for 24hrs before soldering process.
4. The soldering profile could be further referred to different soldering grease material characteristic. The grease vendor will provide this information.
5. A rapid-rate process is not recommended for the LEDs cooling down from the peak temperature.
6. Although the recommended reflow conditions are specified above, the reflow or hand soldering condition at the lowest possible temperature is desirable for the LEDs.
7. LiteOn cannot make a guarantee on the LEDs which have been already assembled using the dip soldering method.

LED Middle POWER 3030AQLxx Series

8. Reliability Test

No	Test item	Test Condition	Duration	Number of Damaged
1	Steady State Operating Life of High Temperature (HTOL)	Ta=85°C, I _F =150mA	1000 hrs	0/20
2	Steady State Operating Life of Low Temperature (LTOL)	Ta=-40°C, I _F =150mA	1000 hrs	0/20
3	Pulse Wet Operating Life of High Temperature (PWHTOL)	60°C/90%RH, I _F =150mA 30mins ON/30min OFF	500 hrs	0/20
4	High Temperature Storage (HTS)	100°C	1000 hrs	0/20
5	Low Temperature Storage (LTS)	-40°C	1000 hrs	0/20
6	Thermal Cycle (TC)	-40°C~100°C 30min dwell 5min transfer	200 cycles	0/20
7	Thermal Shock (TS)	-40°C~100°C 20min dwell 20sec transfer	200 cycles	0/20
8	Solder Resistance (SR)	265°C, 3X MSL	5sec	0/20
9	Solder Ability (SA)	245°C 5sec, 95% coverage	5sec	0/11
10	Mechanical Shock (MS)	1500G 0.5msec pulse shock	each 6 axis	0/6
11	Random Vibration (RV)	6G RMS, 10-2000Hz, 10min	per axis	0/6
12	Variable Vibration Frequency (VVF)	10-2000-10Hz, log or linear sweep rate, 20G for 1 min, 1.5mm each apply 3x per axis	over 6hrs	0/6
13	Salt Spread (SS)	35°C, 30g/m ² /day	48hrs	0/11

Criteria for Judging the Damage

Item	Symbol	Test Condition	Criteria for Judgment	
			Min.	Max.
Forward Voltage	V _F	I _F =Typical Current		U.S.L. x 1.1
Luminous Flux	Im	I _F =Typical Current	L.S.L. x 0.7	
CCX&CCY	x,y	I _F =Typical Current		Shift<0.02

LED Middle POWER 3030AQLxx Series

9. User Guide

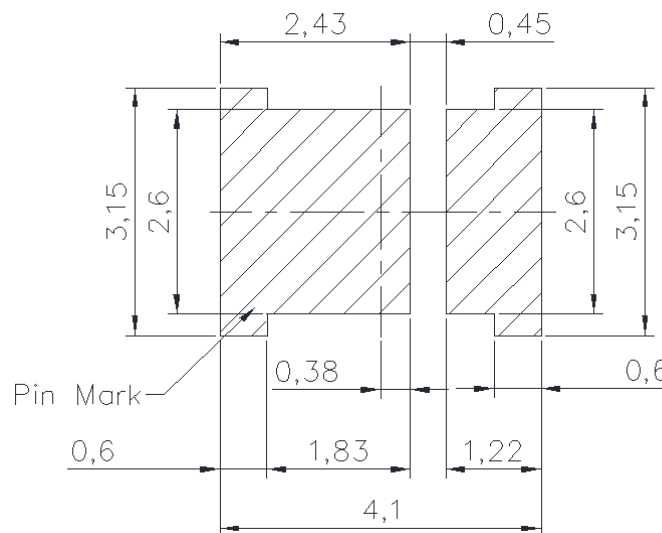
■ Cleaning

Do not use unspecified chemical liquid to clean LED they could harm the package. If cleaning is necessary, immerse the LED in ethyl alcohol or isopropyl alcohol at normal temperature for less than one minute.

■ Recommend Printed Circuit Board Attachment Pad

Infrared / vapor phase

Reflow Soldering



■ Package Dimensions of Tape

