

**Specific Lighting
Product Data Sheet**
LTW-E608DC65-PA

Spec No. :DS23-2020-0019
Effective Date: 03/07/2020
Revision: -

LITE-ON DCC

RELEASE

BNS-OD-FC001/A4

Specific Lighting LTW-E608DCxx-PA Series

1. Description

The LTW (LiteOn White LED) is a revolutionary, energy efficient and ultra compact new light source, 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

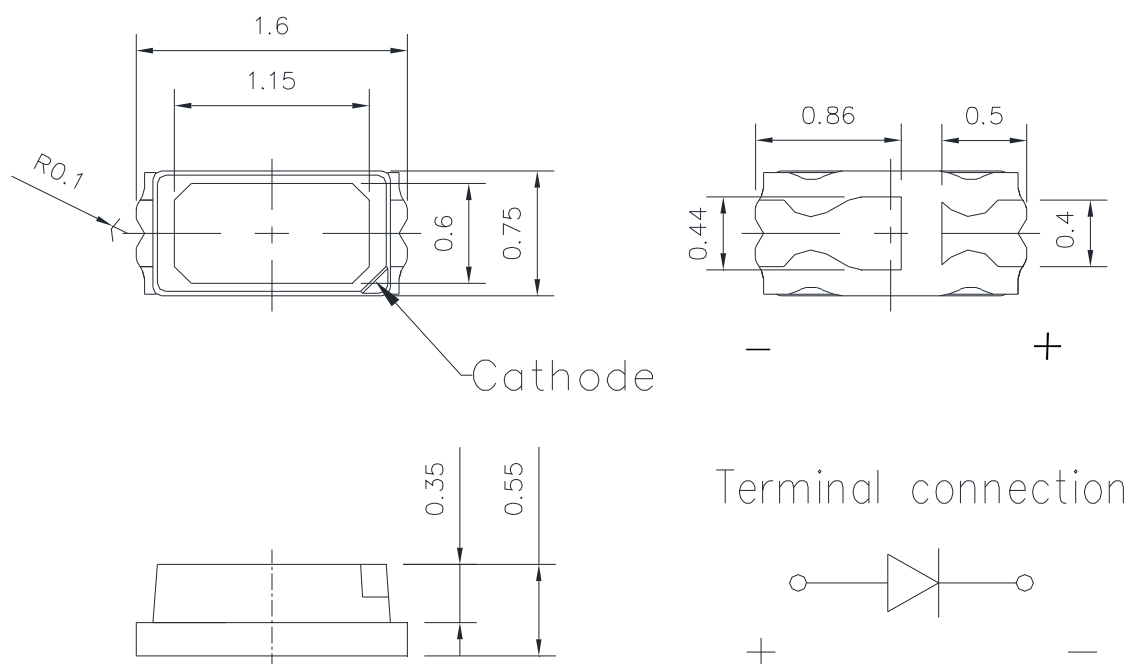
- Package in 8mm tape on 7" diameter reels
- Compatible with automatic placement equipment.
- Compatible with infrared and vapor phase reflow solder process.
- EIA STD package.
- I.C. compatible.
- Meet green product and Pb-free(According to RoHS)

1.2 Available Part Numbers

CCT	Part Number
2700K	LTW-E608DC27-PA
3000K	LTW-E608DC30-PA
4000K	LTW-E608DC40-PA
5000K	LTW-E608DC50-PA
5700K	LTW-E608DC57-PA
6500K	LTW-E608DC65-PA

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2. Outline Dimensions



Part No.	Lens Color	Source Color	Emission Color
LTW-E608DC27-PA	Orange	InGaN Blue	White
LTW-E608DC30-PA			
LTW-E608DC40-PA			
LTW-E608DC50-PA			
LTW-E608DC57-PA			
LTW-E608DC65-PA			

Notes

1. All dimensions are in millimeters.
2. Tolerance is ± 0.1 mm (.004") unless otherwise noted.

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3. Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Rating	Unit
Power Dissipation	P_o	100	mW
DC Forward Current	I_F	30	mA
Pulse Forward Current ¹	I_{FP}	100	mA
Reverse Voltage ²	V_R	5	V
Operating Temperature Range	T_{opr}	-40 ~ +105	°C
Storage Temperature Range	T_{stg}	-40 ~ +105	°C
Junction Temperature	T_j	120	°C

Note

1. I_{FP} conditions: pulse width $\leq 10\text{msec.}$ and duty cycle $\leq 1/10$.
2. Forbid to operating at reverse voltage condition.
3. It is recommended to follow de-rating curve to use maximum rating to ensure LED can be operated.

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4. Electro-Optical Characteristics at Ta=25°C

4.1 Typical Performance

Parameter	Symbol	Values							Unit	Test Condition
Color Selection	CCT	Typ.	2700	3000	4000	5000	5700	6500	°K	
Chromaticity	X	Typ.	0.458	0.434	0.382	0.345	0.329	0.312	-	I _F = 10mA
Coordinates	Y	Typ.	0.410	0.403	0.380	0.355	0.342	0.328		
Luminous Intensity ¹	I _v	Min	800	1000	1100	1200	1200	1100	mcd	
		Typ.	1000	1200	1300	1400	1400	1300		
		Max.	1300	1500	1600	1700	1700	1600		
Luminous Flux ¹	Φ _v	Min	2.4	3.0	3.3	3.6	3.6	3.3	lm	
		Typ.	3.0	3.6	3.9	4.2	4.2	3.9		
		Max.	3.9	4.5	4.8	5.1	5.1	4.8		
Color Rendering Index	CRI	Min	70						-	
Viewing Angle	2θ _{1/2}	Typ.	120						deg	
Forward Voltage	V _F	Min	2.6						V	
		Typ.	2.9							
		Max.	3.1							

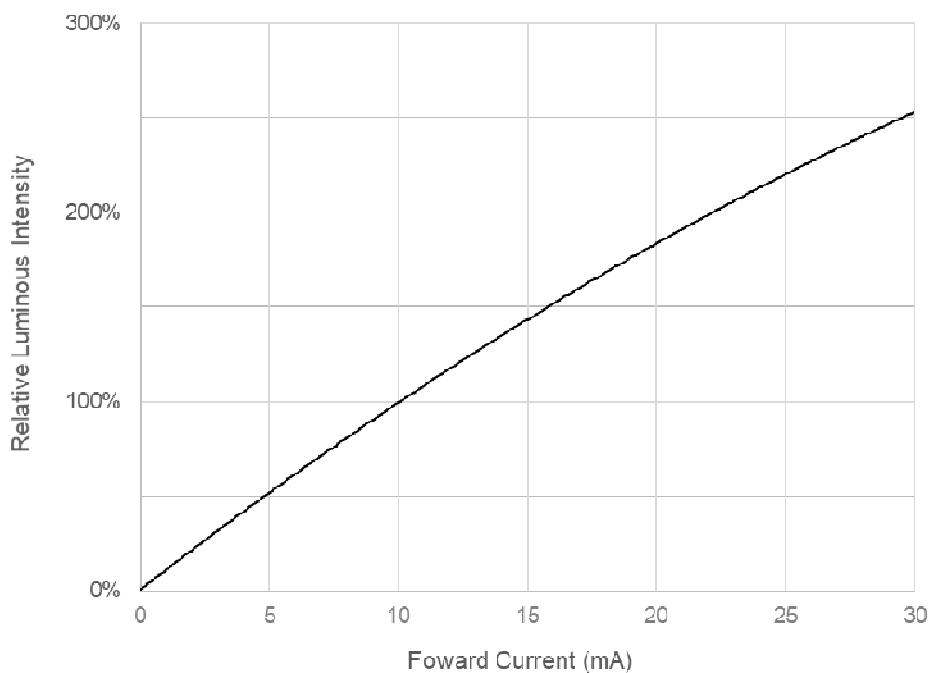
Notes

1. Luminous intensity and luminous flux are measured with a light sensor and filter combination that approximates the CIE eye-response curve.
2. $\theta_{1/2}$ is the off-axis angle at which the luminous intensity is half the axial luminous intensity.
3. The chromaticity coordinates (x, y) is derived from the 1931 CIE chromaticity diagram.
4. CAS140B is the test standard for the chromaticity coordinates (x, y) & mcd.
5. The chromaticity coordinates (x, y) guarantee should be added +/- 0.01 tolerance.
6. Caution in ESD:

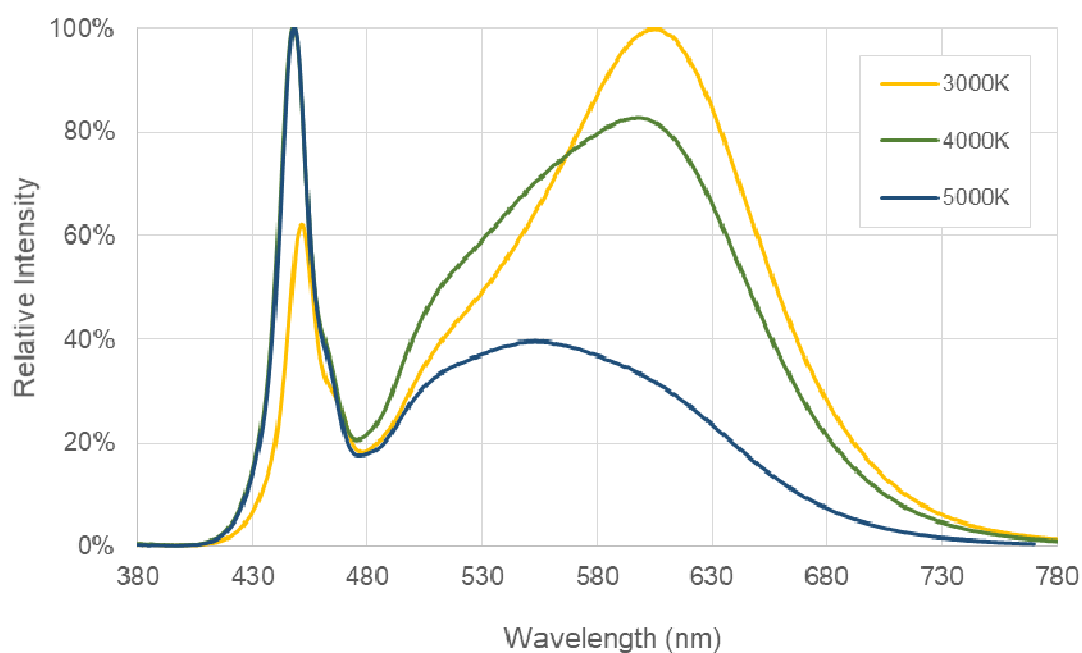
Static Electricity and surge damages the LED. It is recommend to use a wrist band or anti-Electrostatic glove when handling the LED. All devices, equipment and machinery must be properly grounded.

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4.2 Forward Current vs. Lumen

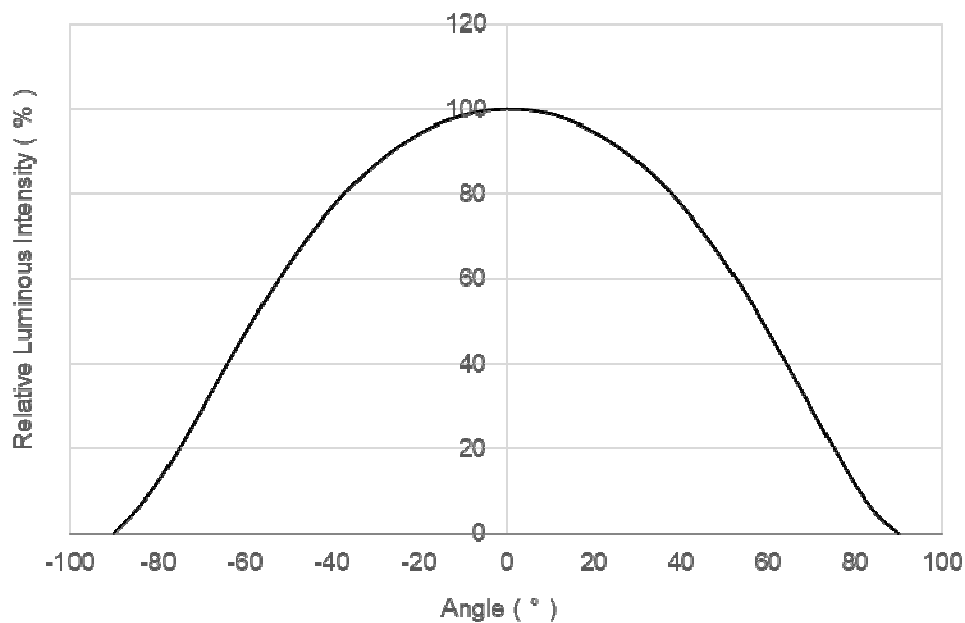


4.3 Relative Spectral Power Distribution at Typical Current

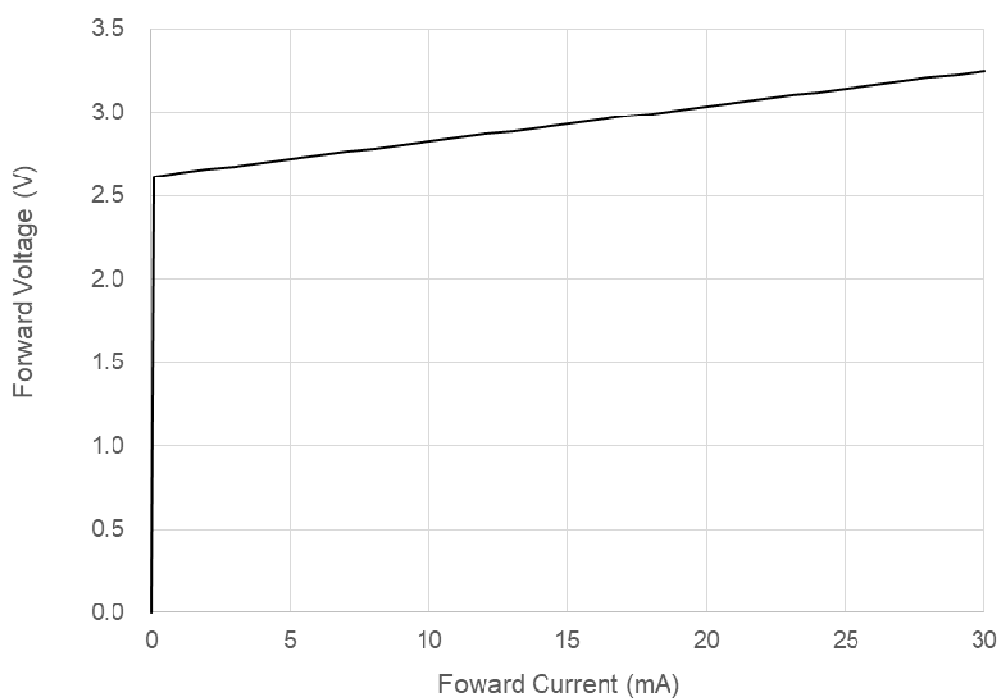


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4.4 Radiation Characteristics

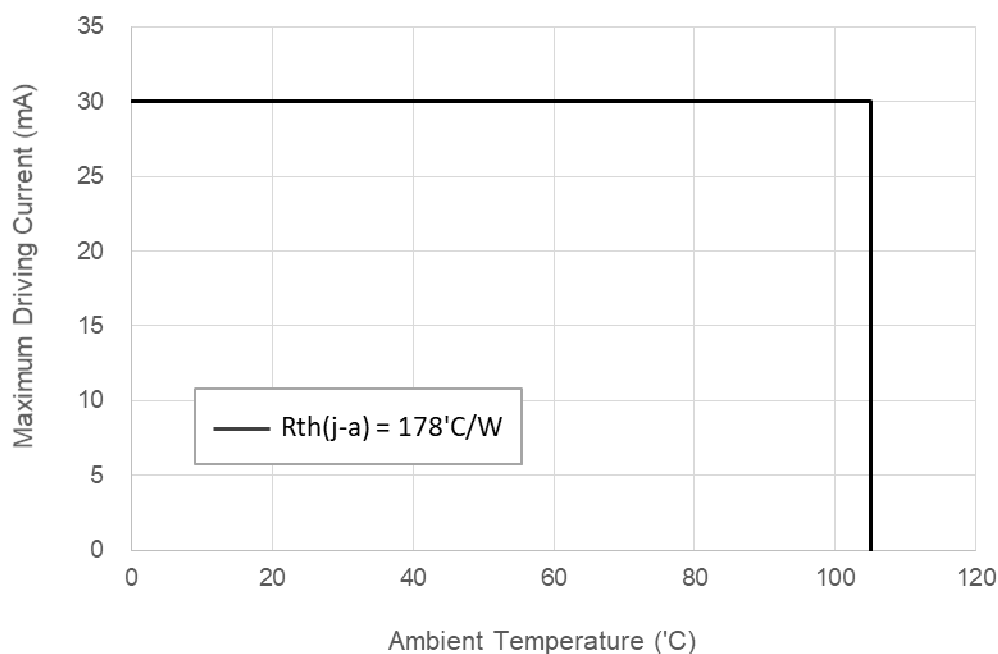


4.5 Forward Current vs. Forward Voltage

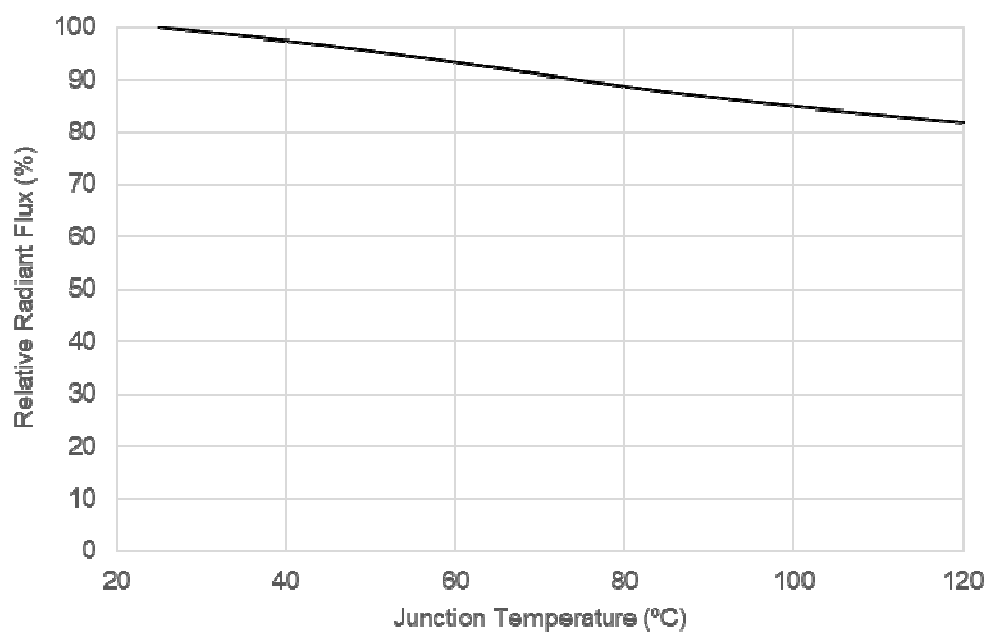


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4.6 Forward Current Derating Curve



4.7 Relative Intensity vs. Junction Temperature

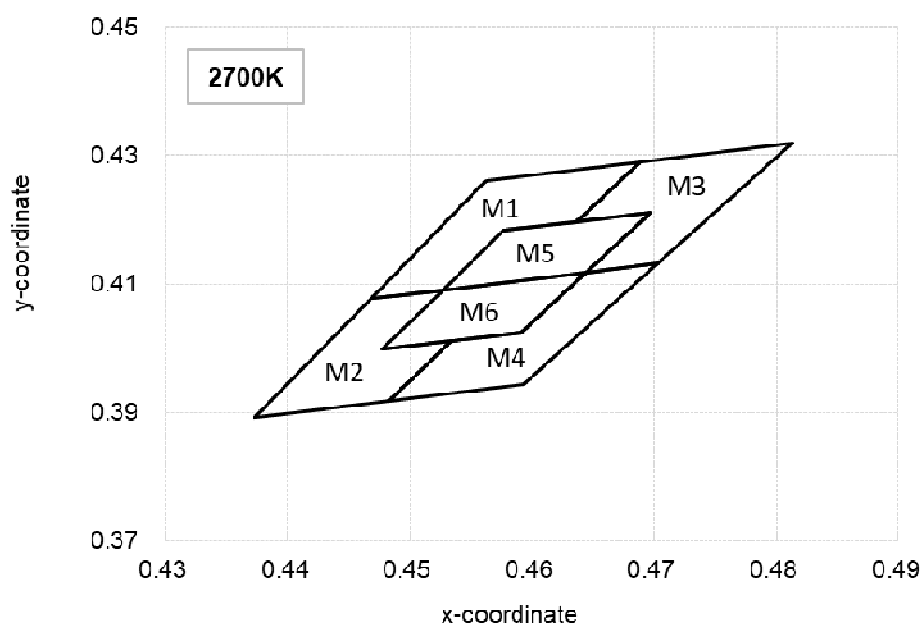


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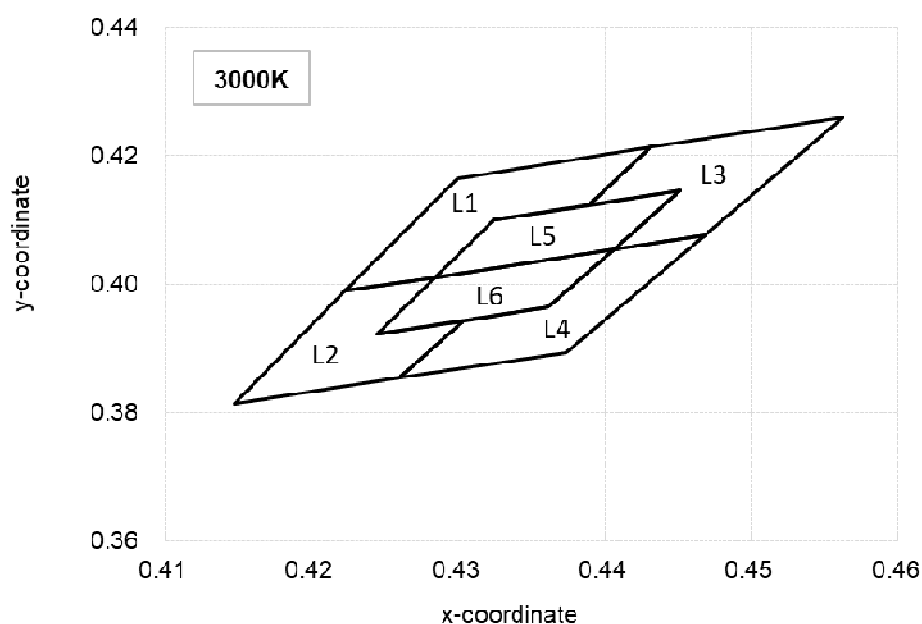
5. Binning Definition

5.1 Color Bin

C.I.E. 1931 Chromaticity Diagram

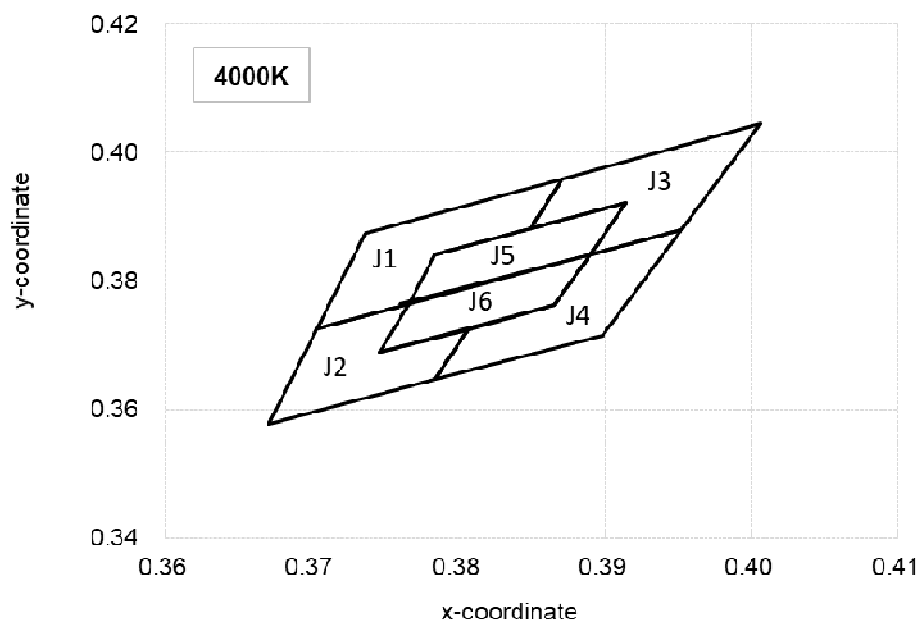


C.I.E. 1931 Chromaticity Diagram

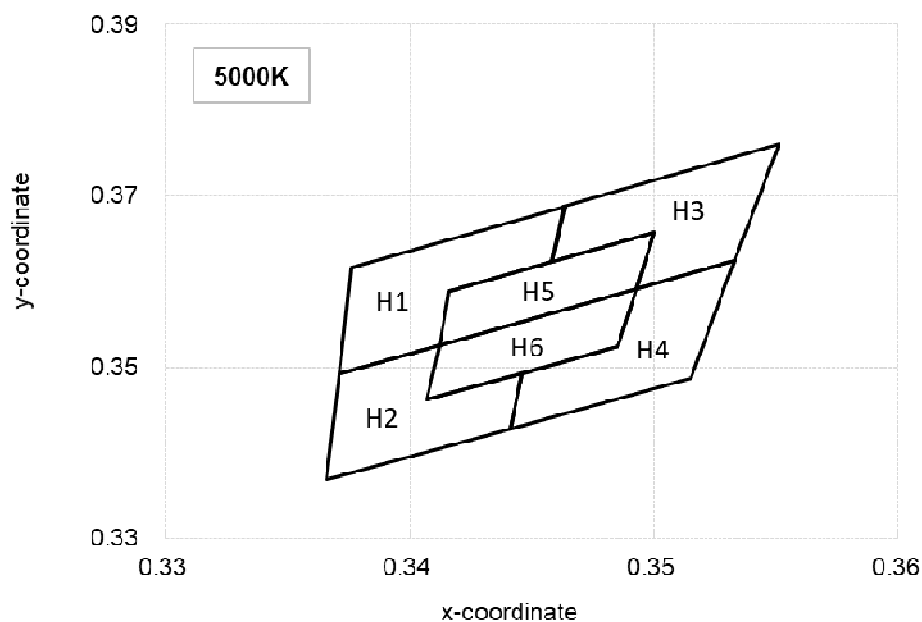


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C.I.E. 1931 Chromaticity Diagram

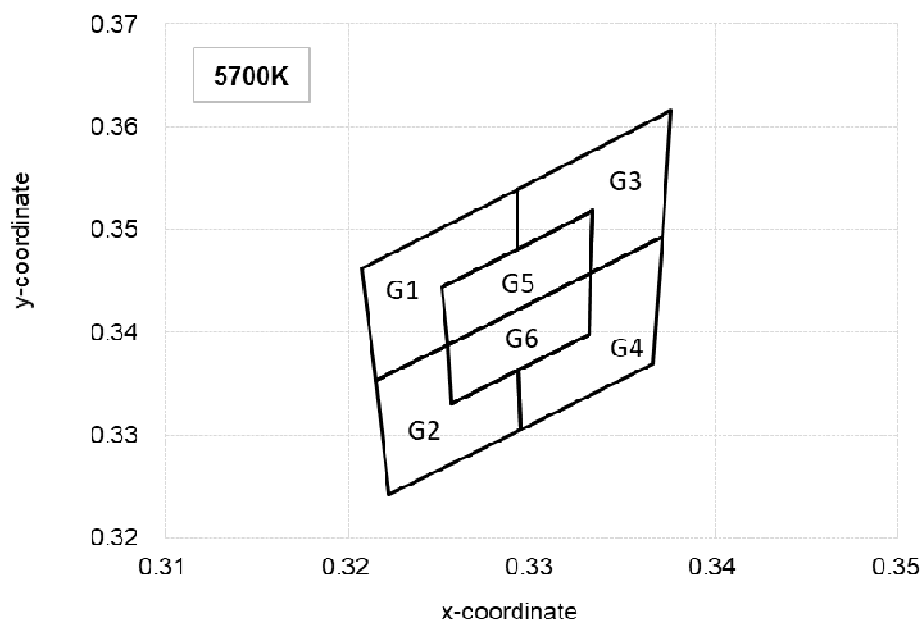


C.I.E. 1931 Chromaticity Diagram

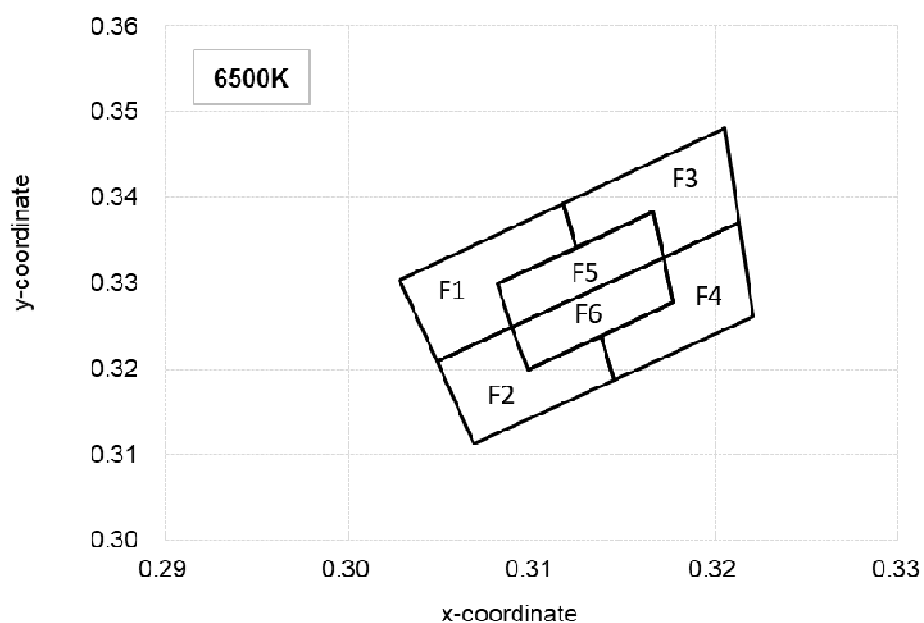


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C.I.E. 1931 Chromaticity Diagram



C.I.E. 1931 Chromaticity Diagram



Specific Lighting LTW-E608DCxx-PA Series

5.2 Color Binning Definition

2700K CIE 1931 Chromaticity coordinates							
Color Rank		Bin limits at $I_F = 10$ mA					
M1	x	0.4468	0.4562	0.4688	0.4636	0.4576	0.4527
	y	0.4077	0.4260	0.4290	0.4197	0.4183	0.4090
M2	x	0.4373	0.4468	0.4527	0.4477	0.4534	0.4483
	y	0.3893	0.4077	0.4090	0.3998	0.4011	0.3919
M3	x	0.4688	0.4813	0.4703	0.4644	0.4697	0.4636
	y	0.4290	0.4319	0.4132	0.4118	0.4211	0.4197
M4	x	0.4483	0.4534	0.4591	0.4644	0.4703	0.4593
	y	0.3919	0.4011	0.4025	0.4118	0.4132	0.3944
M5	x	0.4576	0.4697	0.4644	0.4527		
	y	0.4183	0.4211	0.4118	0.4090		
M6	x	0.4527	0.4644	0.4591	0.4477		
	y	0.4090	0.4118	0.4025	0.3998		

3000K CIE 1931 Chromaticity coordinates							
Color Rank		Bin limits at $I_F = 10$ mA					
L1	x	0.4223	0.4299	0.4431	0.4388	0.4324	0.4284
	y	0.3990	0.4165	0.4213	0.4123	0.4100	0.4011
L2	x	0.4147	0.4223	0.4284	0.4244	0.4303	0.4260
	y	0.3814	0.3990	0.4011	0.3923	0.3943	0.3854
L3	x	0.4431	0.4562	0.4468	0.4406	0.4451	0.4388
	y	0.4213	0.4260	0.4077	0.4055	0.4146	0.4123
L4	x	0.4260	0.4303	0.4361	0.4406	0.4468	0.4373
	y	0.3854	0.3943	0.3964	0.4055	0.4077	0.3893
L5	x	0.4324	0.4451	0.4406	0.4284		
	y	0.4100	0.4146	0.4055	0.4011		
L6	x	0.4284	0.4406	0.4361	0.4244		
	y	0.4011	0.4055	0.3964	0.3923		

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

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4000K CIE 1931 Chromaticity coordinates							
Color Rank		Bin limits at $I_F = 10$ mA					
J1	x	0.3703	0.3736	0.3871	0.3849	0.3784	0.3766
	y	0.3726	0.3874	0.3959	0.3881	0.3841	0.3765
J2	x	0.3670	0.3703	0.3766	0.3746	0.3806	0.3784
	y	0.3578	0.3726	0.3765	0.3689	0.3725	0.3647
J3	x	0.3871	0.4006	0.3952	0.3890	0.3914	0.3849
	y	0.3959	0.4044	0.3880	0.3842	0.3922	0.3881
J4	x	0.3784	0.3806	0.3865	0.3890	0.3952	0.3898
	y	0.3647	0.3725	0.3762	0.3842	0.3880	0.3716
J5	x	0.3784	0.3914	0.3890	0.3760		
	y	0.3841	0.3922	0.3842	0.3765		
J6	x	0.3766	0.3890	0.3865	0.3746		
	y	0.3765	0.3842	0.3762	0.3689		

5000K CIE 1931 Chromaticity coordinates							
Color Rank		Bin limits at $I_F = 10$ mA					
H1	x	0.3371	0.3376	0.3464	0.3458	0.3416	0.3412
	y	0.3493	0.3616	0.3688	0.3623	0.3589	0.3525
H2	x	0.3366	0.3371	0.3412	0.3407	0.3446	0.3441
	y	0.3369	0.3493	0.3525	0.3462	0.3493	0.3428
H3	x	0.3463	0.3551	0.3533	0.3493	0.3500	0.3458
	y	0.3688	0.3760	0.3624	0.3591	0.3657	0.3623
H4	x	0.3441	0.3446	0.3485	0.3493	0.3533	0.3515
	y	0.3428	0.3493	0.3524	0.3591	0.3624	0.3487
H5	x	0.3416	0.3500	0.3493	0.3412		
	y	0.3589	0.3657	0.3591	0.3525		
H6	x	0.3412	0.3493	0.3485	0.3407		
	y	0.3525	0.3591	0.3524	0.3462		

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

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5700K CIE 1931 Chromaticity coordinates							
Color Rank		Bin limits at $I_F = 10$ mA					
G1	x	0.3215	0.3207	0.3292	0.3292	0.3251	0.3254
	y	0.3353	0.3462	0.3539	0.3481	0.3444	0.3388
G2	x	0.3222	0.3215	0.3254	0.3256	0.3293	0.3294
	y	0.3243	0.3353	0.3388	0.3331	0.3364	0.3306
G3	x	0.3292	0.3376	0.3371	0.3332	0.3333	0.3292
	y	0.3539	0.3616	0.3493	0.3458	0.3518	0.3481
G4	x	0.3294	0.3293	0.3331	0.3332	0.3371	0.3366
	y	0.3306	0.3364	0.3398	0.3458	0.3493	0.3369
G5	x	0.3251	0.3333	0.3332	0.3254		
	y	0.3444	0.3518	0.3458	0.3388		
G6	x	0.3254	0.3332	0.3331	0.3256		
	y	0.3388	0.3458	0.3398	0.3331		

6500K CIE 1931 Chromaticity coordinates							
Color Rank		Bin limits at $I_F = 10$ mA					
F1	x	0.3048	0.3028	0.3117	0.3124	0.3081	0.3089
	y	0.3209	0.3304	0.3393	0.3341	0.3299	0.3249
F2	x	0.3068	0.3048	0.3089	0.3098	0.3138	0.3145
	y	0.3113	0.3209	0.3249	0.3200	0.3238	0.3187
F3	x	0.3117	0.3205	0.3213	0.3172	0.3166	0.3124
	y	0.3393	0.3481	0.3371	0.3330	0.3384	0.3341
F4	x	0.3145	0.3138	0.3177	0.3172	0.3213	0.3221
	y	0.3187	0.3238	0.3277	0.3330	0.3371	0.3261
F5	x	0.3081	0.3166	0.3172	0.3089		
	y	0.3299	0.3384	0.3330	0.3249		
F6	x	0.3089	0.3172	0.3177	0.3098		
	y	0.3249	0.3330	0.3277	0.3200		

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

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5.3 Luminous Intensity Bin

2700 Luminous Intensity Spec. Table				
I _v Bin	I _v (mcd) at I _F = 10 mA		Φ _v (lm) at I _F = 10 mA	
	Min	Max	Min	Max
S8	800	900	2.4	2.7
S9	900	1000	2.7	3.0
L0	1000	1100	3.0	3.3
L1	1100	1200	3.3	3.6
L2	1200	1300	3.6	3.9

3000 Luminous Intensity Spec. Table				
I _v Bin	I _v (mcd) at I _F = 10 mA		Φ _v (lm) at I _F = 10 mA	
	Min	Max	Min	Max
L0	1000	1100	3.0	3.3
L1	1100	1200	3.3	3.6
L2	1200	1300	3.6	3.9
L3	1300	1400	3.9	4.2
L4	1400	1500	4.2	4.5

4000 Luminous Intensity Spec. Table				
I _v Bin	I _v (mcd) at I _F = 10 mA		Φ _v (lm) at I _F = 10 mA	
	Min	Max	Min	Max
L1	1100	1200	3.3	3.6
L2	1200	1300	3.6	3.9
L3	1300	1400	3.9	4.2
L4	1400	1500	4.2	4.5
L5	1500	1600	4.5	4.8

Tolerance on each Luminous Intensity and Flux bin are +/- 10%

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5000 Luminous Intensity Spec. Table				
I _v Bin	I _v (mcd) at I _F = 10 mA		Φ _v (lm) at I _F = 10 mA	
	Min	Max	Min	Max
L2	1200	1300	3.6	3.9
L3	1300	1400	3.9	4.2
L4	1400	1500	4.2	4.5
L5	1500	1600	4.5	4.8
L6	1600	1700	4.8	5.1

5700 Luminous Intensity Spec. Table				
I _v Bin	I _v (mcd) at I _F = 10 mA		Φ _v (lm) at I _F = 10 mA	
	Min	Max	Min	Max
L2	1200	1300	3.6	3.9
L3	1300	1400	3.9	4.2
L4	1400	1500	4.2	4.5
L5	1500	1600	4.5	4.8
L6	1600	1700	4.8	5.1

6500 Luminous Intensity Spec. Table				
I _v Bin	I _v (mcd) at I _F = 10 mA		Φ _v (lm) at I _F = 10 mA	
	Min	Max	Min	Max
L1	1100	1200	3.3	3.6
L2	1200	1300	3.6	3.9
L3	1300	1400	3.9	4.2
L4	1400	1500	4.2	4.5
L5	1500	1600	4.5	4.8

Tolerance on each Luminous Intensity and Flux bin are +/- 10%

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5.4 Forward Voltage Bin

Forward Voltage Spec. Table		
V _F Bin	V _F (volts) at I _F = 10mA	
	Min.	Max.
V0	2.6	2.7
V1	2.7	2.8
V2	2.8	2.9
V3	2.9	3.0
V4	3.0	3.1

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

6. Bin Code List

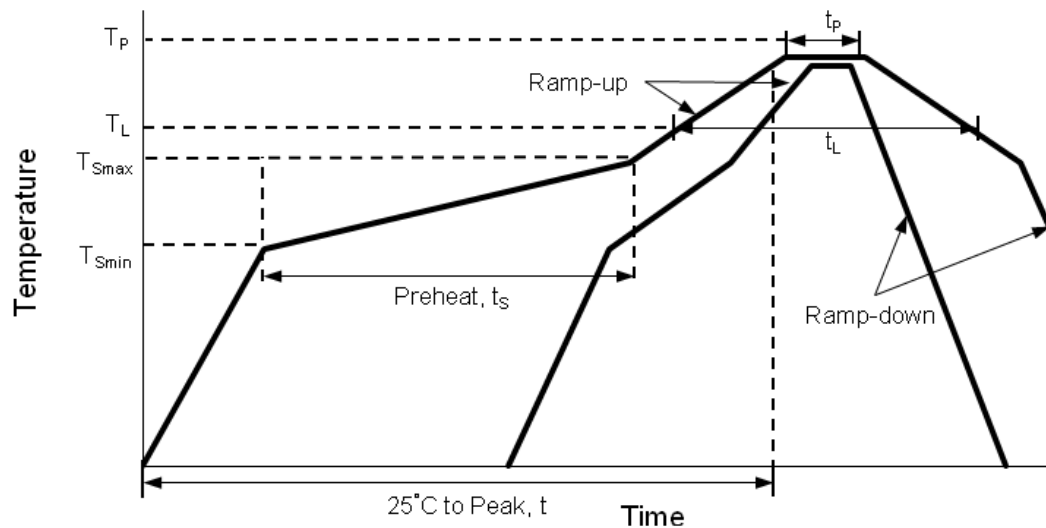
※ Notes: Full Rank on Label

Example: V0 / L1 / M1

Forward Voltage Rank	Luminous Intensity Rank	Color Rank
V0	L1	M1

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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

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Notes:

1. 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 two times max.
2. All temperatures refer to topside of the package, measured on the package body surface.
3. The soldering condition referring to J-STD-020D. 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.

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8. Reliability Test

8.1 Reliability Test Conditions

Test Item	Test Condition	Note	Number of Damaged
Solderability (Reflow Soldering)	Tsld=245±5°C, 3sec. (Lead Free Solder)	1 time Over 95%	0/20
Steady State Operating Life	Ta=25°C, IF=10mA	1000 hrs.	0/20
Steady State Operating Life of High Temperature	Ta=85°C, IF=10mA	1000 hrs.	0/20
Steady State Operating Life of low Temperature	Ta=-40°C, IF=10mA	1000 hrs.	0/20
Steady State Operating Life of High Humidity Heat	60°C, RH=90% , IF=10mA	500 hrs.	0/20
Thermal Cycle	100°C~25°C~ -40°C 30m~5m~30mins	100 cycles	0/20
Thermal Shock	-40°C ~ 85°C 30min. 30min.	100 cycles	0/20

8.2 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

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9. User Guide

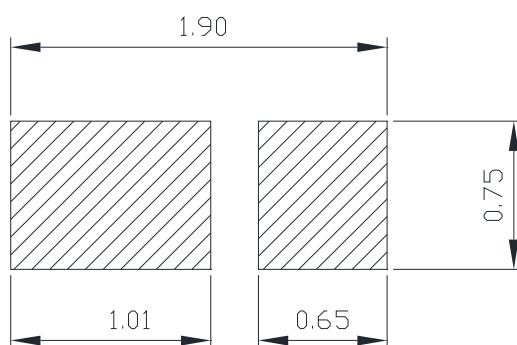
9.1 Cleaning

Do not use unspecified chemical liquid to clean LED they could harm the package.

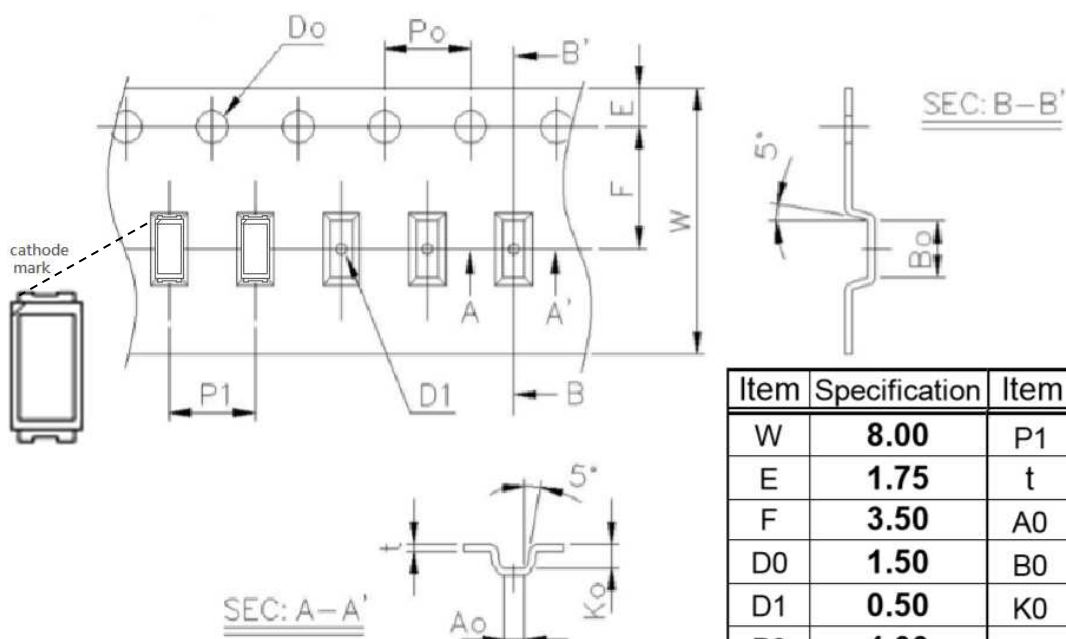
If cleaning is necessary, immerse the LED in ethyl alcohol or isopropyl alcohol at normal temperature for less than one minute.

9.2 Recommend Printed Circuit Board Attachment Pad

Infrared / vapor phase Reflow Soldering



9.3 Package Dimensions of Tape

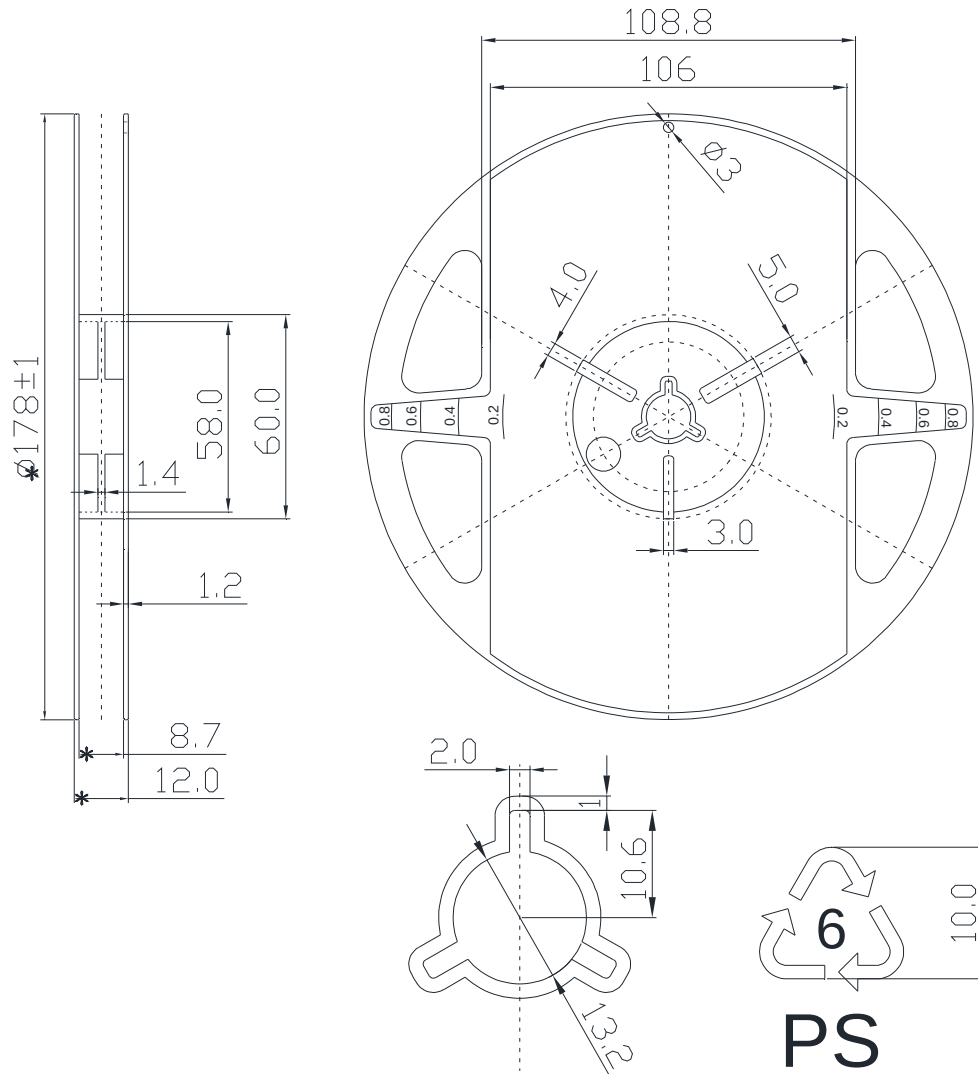


Item	Specification	Item	Specification
W	8.00	P1	4.00
E	1.75	t	0.23
F	3.50	A0	0.90
D0	1.50	B0	1.83
D1	0.50	K0	0.68
P0	4.00		

Note All dimensions are in mm.

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9.4 Package Dimensions of Reel



Notes

1. Empty component pockets sealed with top cover tape.
2. 7 inch reel- maximum 4000 pieces per reel.
3. Minimum packing quantity is 500 pieces for remainders.
4. The maximum number of consecutive missing lamps is two.
5. In accordance with EIA-481-1-B specifications.

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10. CAUTIONS

10.1 Application

The LEDs described here are intended to be used for ordinary electronic equipment (such as office equipment, communication equipment and household applications). Consult Liteon's Sales in advance for information on applications in which exceptional reliability is required, particularly when the failure or malfunction of the LEDs may directly jeopardize life or health (such as in aviation, transportation, traffic control equipment, medical and life support systems and safety devices).

10.2 Storage

This product is qualified as Moisture sensitive Level 3 per JEDEC J-STD-020 Precaution when handling this moisture sensitive product is important to ensure the reliability of the product.

The package is sealed

The LEDs should be stored at 30°C or less and 90%RH or less. And the LEDs are limited to use within one year, while the LEDs is packed in moisture-proof package with the desiccants inside.

The package is opened

The LEDs should be stored at 30°C or less and 60%RH or less. Moreover, the LEDs are limited to solder process within 168hrs. If the Humidity Indicator shows the pink color in 10% even higher or exceed the storage limiting time since opened, that we recommended to baking LEDs at 60°C at least 48hrs. To seal the remainder LEDs return to package, it's recommended to be with workable desiccants in original package.

10.3 Cleaning

Use alcohol-based cleaning solvents such as isopropyl alcohol to clean the LED if necessary.

10.4 Soldering

Recommended soldering conditions:

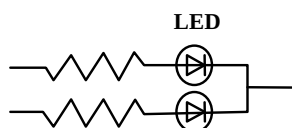
Reflow soldering		Soldering iron	
Pre-heat	150~200°C	Temperature	300°C Max.
Pre-heat time	180 sec. Max.	Soldering time	3 sec. Max.
Soldering Temp.	260°C Max.		(one time only)
Soldering time	5 sec. Max.		

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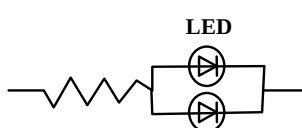
10.5 Drive Method

An LED is a current-operated device. In order to ensure intensity uniformity on multiple LEDs connected in parallel in an application, it is recommended that a current limiting resistor be incorporated in the drive circuit, in series with each LED as shown in Circuit A below.

Circuit model A



Circuit model B



(A) Recommended circuit.

(B) The brightness of each LED might appear different due to the differences in the I-V characteristics of those LEDs.

10.6 ESD (Electrostatic Discharge)

Static Electricity or power surge will damage the LED.

Suggestions to prevent ESD damage:

- Use of a conductive wrist band or anti-Static glove when handling these LEDs.
- All devices, equipment, and machinery must be properly grounded.
- Work tables, storage racks, etc. should be properly grounded.
- Use ion blower to neutralize the static charge which might have built up on surface of the LED's plastic lens as a result of friction between LEDs during storage and handling.

ESD-damaged LEDs will exhibit abnormal characteristics such as high reverse leakage current, low forward voltage, or "no lightup" at low currents.

To verify for ESD damage, check for "lightup" and V_f of the suspect LEDs at low currents.

10.7 Others

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

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10.8 Suggested Checking List

Training and Certification

1. Everyone working in a static-safe area is ESD-certified?
2. Training records kept and re-certification dates monitored?

Static-Safe Workstation & Work Areas

1. Static-safe workstation or work-Sreas have ESD signs?
2. All surfaces and objects at all static-safe workstation and within 1 ft measure less than 100V?
3. All ionizer activated, positioned towards the units?
4. Each work surface mats grounding is good?

Personnel Grounding

1. Every person (including visitors) handling ESD sensitive (ESDS) items wear wrist strap, heel strap or conductive shoes with conductive flooring?
2. If conductive footwear used, conductive flooring also present where operator stand or walk?
3. Garments, hairs or anything closer than 1 ft to ESD items measure less than 100V*?
4. Every wrist strap or heel strap/conductive shoes checked daily and result recorded for all DLs?
5. All wrist strap or heel strap checkers calibration up to date?

Note: *50V for Blue LED.

Device Handling

1. Every ESDS items identified by EIA-471 labels on item or packaging?
2. All ESDS items completely inside properly closed static-shielding containers when not at static-safe workstation?
3. No static charge generators (e.g. plastics) inside shielding containers with ESDS items?
4. All flexible conductive and dissipative package materials inspected before reuse or recycle?

Others

1. Audit result reported to entity ESD control coordinator?
2. Corrective action from previous audits completed?
3. Are audit records complete and on file?