Unilite Opto Technology

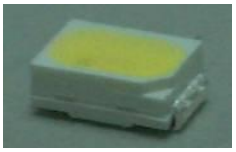
Specification

U-P3014W-XX

■ Description

The PLCC2 type U-P3014W SMD LED, with its light weight and smaller than lead frame type components, enables smaller board size, higher packing density, reduced storage space and miniature applications.

- Dice Material： InGaN
- Light Color： White
- Lens Color： Yellow



■ Features

- 1 chip package
- Compatible with automatic placement equipment
- Compatible with reflow soldering process
- Long operating life
- Low forward voltage operated
- Instant light
- Pb -free/ RoHS compliant
- Q'ty/reel: 2000-4000pcs/reel

■ Applications

- Information boards
- Automotive Interior Lighting
- Indoor and outdoor display
- Indicator
- Backlighting
- Gerneral applications
- T8/T5 Tube
- LED Light Bar

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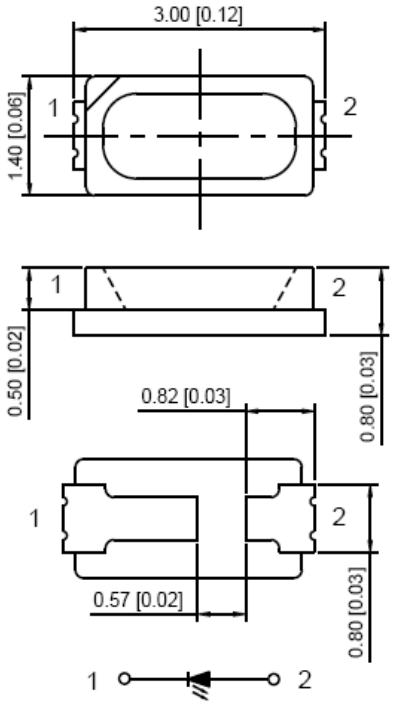
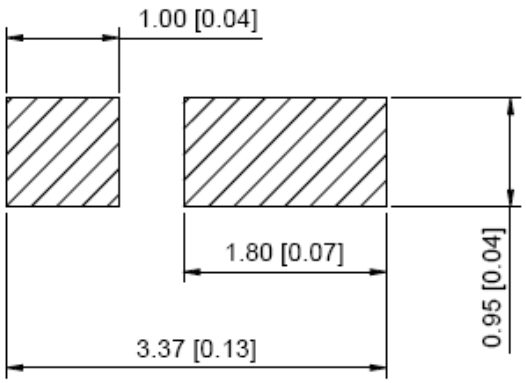
■ Outline Dimensions (mm)



Tolerance ：± 0.15 mm

■ Recommended Soldering Pad Design



Notes:

1. All dimension unites are millimeters.

2. All dimenstion tolerance is +/- 0.15mm unless otherwise noted.

■ Part Numbering System

U - P 3 0 1 4 W - XX

- Color Bin : WW: Warm White / CW: Cold White
- Lighting Color: White
- Package Type code
- Product Code

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■ **Absolute Maximum Ratings at Ta = 25 ℃**

PARAMETER	symbol	MAX.	UNIT
Power Dissipation	PD	100	mW
Continuous Forward Current	IF	30	mA
Peak Forward Current (1/10 Duty Cycle , 10ms Pulse Width)	IFP	100	mA
Reverse Voltage	VR	5	V
Color Rendering Index	Ra	>80	
Operating Temperature Range	Topr	−30 to + 85	°C
Storage Temperature Range	Tstg	−40 to + 100	°C
LED Junction Temperature	Tj	100	°C
Electrostatic Discharge (HBM)	ESD	1000	V
Reflow Soldering Condition 260 ℃ for 10 seconds	Tsld	2	times

■ **Electro-Optical Characteristics (Condition : IF = 30mA ,Ta = 25°C)**

PN No#: UP3014W-WW

PARAMETER	SYMBOL	TEST CONDITION	VALUES			UNIT
			MIN.	TYP.	MAX.	
* Forward Voltage	V_F	I_F=30mA		3.3	3.6	V
Reverse Current	I_R	V_R= 5V			10	μA
Color Coordinates	X	I_F=30mA		0.43		
	Y			0.40		
Color Temperature	Tc	I_F=30mA		3000		K
Lumious Intensity	mcd	I_F=30mA	2800	3000		mcd
Lumnous Flux	lm	I_F=30mA	9.5	10.5		lm
Viewing Angle at 50% Iv	2θ 1/2	I_F=30mA		120		Deg.

PN No#: UP3014W-CW

PARAMETER	SYMBOL	TEST CONDITION	VALUES			UNIT
			MIN.	TYP.	MAX.	
* Forward Voltage	V_F	I_F=30mA		3.3	3.6	V
Reverse Current	I_R	V_R= 5V			10	μA
Color Coordinates	X	I_F=30mA		0.32		
	Y			0.33		
Color Temperature	Tc	I_F=30mA		6000		K
Lumious Intensity	mcd	I_F=30mA	3000	3300		mcd
Lumnous Flux	lm	I_F=30mA	10.5	11		lm
Viewing Angle at 50% Iv	2θ 1/2	I_F=30mA		120		Deg.

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■ Bin Grade of Flux (lm)

PN No#: UP3014W-WW

Bin Code	Color Kelvin	1		2		3		4	
		X	Y	X	Y	X	Y	X	Y
WEM1	2670-2850K	0.4705	0.4508	0.4866	0.4542	0.4767	0.4366	0.4614	0.4333
WEM2		0.4614	0.4333	0.4767	0.4366	0.4671	0.4196	0.4525	0.4126
WEM3		0.4525	0.4126	0.4671	0.4196	0.4577	0.4029	0.4436	0.3991
WEM4		0.4436	0.3991	0.4577	0.4029	0.4490	0.3875	0.4356	0.3837
WEN1	2850-3050K	0.4538	0.4460	0.4705	0.4508	0.4614	0.4333	0.4456	0.4287
WEN2		0.4456	0.4287	0.4614	0.4333	0.4525	0.4162	0.4376	0.4116
WEN3		0.4376	0.4116	0.4525	0.4162	0.4436	0.3991	0.4294	0.3943
WEN4		0.4294	0.3943	0.4436	0.3991	0.4356	0.3837	0.4221	0.3970
WEP1	3050-3250K	0.4312	0.4234	0.4385	0.4040	0.4538	0.4460	0.4456	0.4287
WEP2		0.4240	0.4065	0.4312	0.4234	0.4456	0.4287	0.4376	0.4116
WEP3		0.4165	0.3890	0.4240	0.4065	0.4376	0.4116	0.4294	0.3943
WEP4		0.4165	0.3890	0.4294	0.3943	0.4221	0.3790	0.4100	0.3738

PN No#: UP3014W-CW

Bin Code	Color Kelvin	1		2		3		4	
		X	Y	X	Y	X	Y	X	Y
WEV1	5000-5650K	0.3286	0.3690	0.3481	0.3856	0.3469	0.3717	0.3288	0.3102
WEV2		0.3288	0.3569	0.3469	0.3717	0.3458	0.3592	0.3290	0.3569
WEV3		0.3290	0.3451	0.3458	0.3592	0.3444	0.3442	0.3292	0.3451
WEV4		0.3292	0.3313	0.3444	0.3442	0.3434	0.3320	0.3294	0.3313
WEW1	5650-6300K	0.3136	0.3550	0.3286	0.3690	0.3288	0.3569	0.3148	0.3444
WEW2		0.3148	0.3444	0.3288	0.3569	0.3290	0.3451	0.3160	0.3332
WEW3		0.3160	0.3332	0.3290	0.3451	0.3292	0.3313	0.3175	0.3204
WEW4		0.3292	0.3313	0.3294	0.3202	0.3186	0.3102	0.3175	0.3204
WEW5		0.3294	0.3202	0.3295	0.3105	0.3469	0.3013	0.3186	0.3102
WEX1	6300-7000K	0.3031	0.3327	0.3011	0.3422	0.3136	0.3555	0.3148	0.3444
WEX2		0.3052	0.3224	0.3031	0.3327	0.3148	0.3444	0.3160	0.3332
WEX3		0.3076	0.3108	0.3052	0.3224	0.3160	0.3332	0.3175	0.3204
WEX4		0.3196	0.3013	0.3112	0.2932	0.3076	0.3108	0.3175	0.3204

■ Bin Grade Limits (I_F = 30 mA) Forward Voltage

Bin Code	Min	Max	Unit
V26	2.6	2.8	V
V28	2.8	3.0	V
V30	3.0	3.2	V
V32	3.2	3.4	V
V33	3.4	3.6	V
V34	3.6	3.8	V

Note: Tolerance of +/- 0.1V

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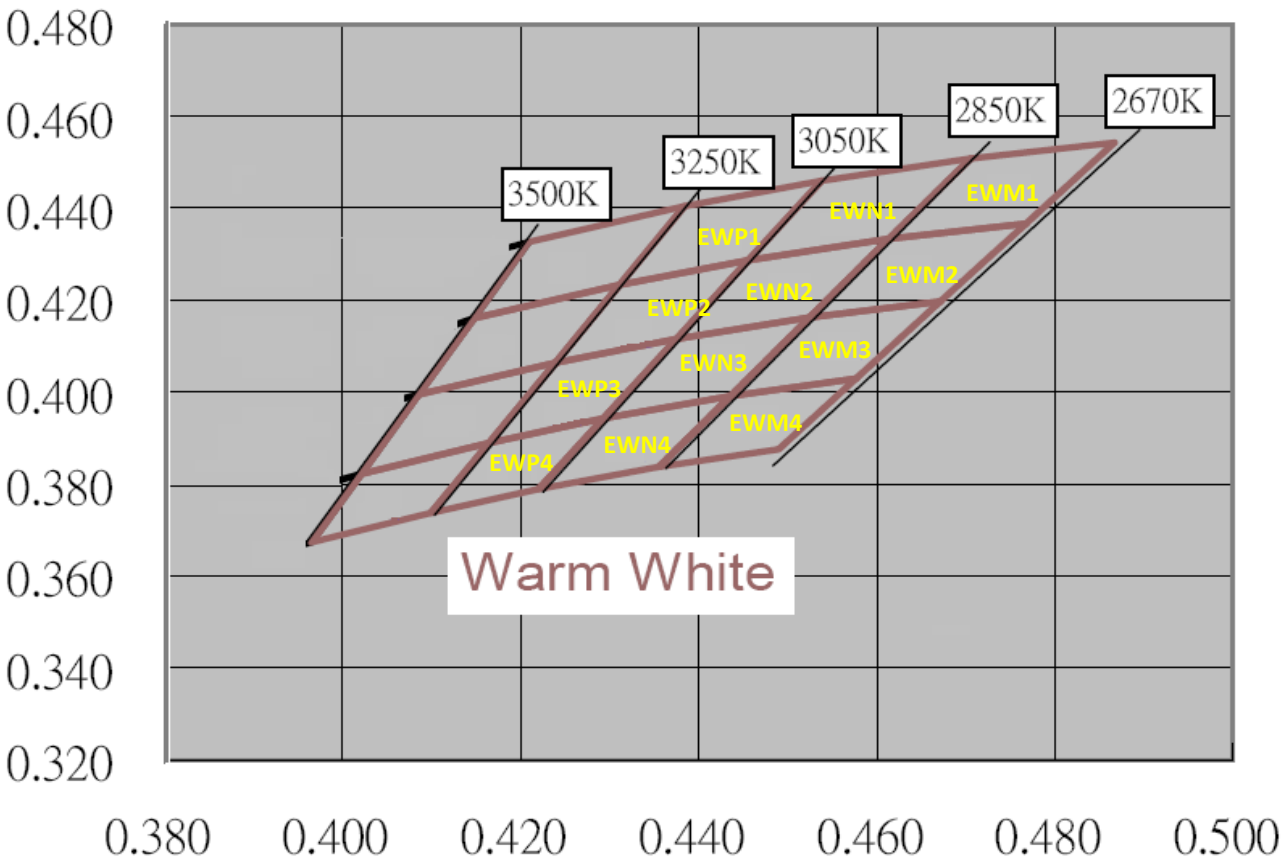
■ **White Color Binning of CCT**



Bin Code	Color Kelvin	1		2		3		4	
		X	Y	X	Y	X	Y	X	Y
WEM1	2670-2850K	0.4705	0.4508	0.4866	0.4542	0.4767	0.4366	0.4614	0.4333
WEM2		0.4614	0.4333	0.4767	0.4366	0.4671	0.4196	0.4525	0.4126
WEM3		0.4525	0.4126	0.4671	0.4196	0.4577	0.4029	0.4436	0.3991
WEM4		0.4436	0.3991	0.4577	0.4029	0.4490	0.3875	0.4356	0.3837
WEN1	2850-3050K	0.4538	0.4460	0.4705	0.4508	0.4614	0.4333	0.4456	0.4287
WEN2		0.4456	0.4287	0.4614	0.4333	0.4525	0.4162	0.4376	0.4116
WEN3		0.4376	0.4116	0.4525	0.4162	0.4436	0.3991	0.4294	0.3943
WEN4		0.4294	0.3943	0.4436	0.3991	0.4356	0.3837	0.4221	0.3970
WEP1	3050-3250K	0.4312	0.4234	0.4385	0.4040	0.4538	0.4460	0.4456	0.4287
WEP2		0.4240	0.4065	0.4312	0.4234	0.4456	0.4287	0.4376	0.4116
WEP3		0.4165	0.3890	0.4240	0.4065	0.4376	0.4116	0.4294	0.3943
WEP4		0.4165	0.3890	0.4294	0.3943	0.4221	0.3790	0.4100	0.3738

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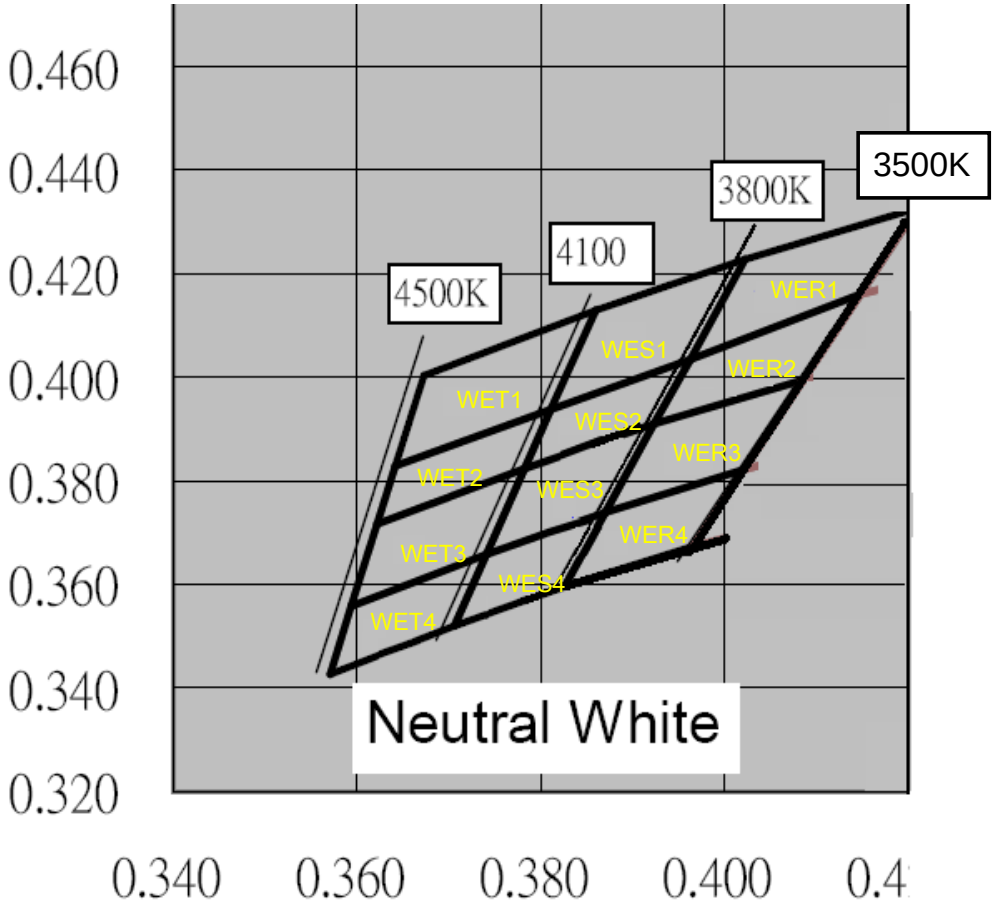
■ White Color Binning of CCT



Bin Code	Color Kelvin	1		2		3		4	
		X	Y	X	Y	X	Y	X	Y
WER1	3500-3800K	0.4023	0.4220	0.4209	0.4326	0.4148	0.4161	0.3963	0.4035
WER2		0.3963	0.4035	0.4148	0.4161	0.4086	0.3955	0.3924	0.3909
WER3		0.3924	0.3909	0.4086	0.3995	0.4021	0.3822	0.3871	0.3739
WER4		0.3871	0.3739	0.4021	0.3822	0.3966	0.3673	0.3826	0.3595
WES1	3800-4100K	0.3811	0.3937	0.3860	0.4130	0.4023	0.4228	0.3963	0.4035
WES2		0.3783	0.3825	0.3811	0.3937	0.3963	0.4035	0.3924	0.3909
WES3		0.3741	0.3658	0.3783	0.3825	0.3924	0.3909	0.3871	0.3739
WES4		0.3741	0.3658	0.3871	0.3739	0.3826	0.3595	0.3706	0.3520
WET1	4100-4500K	0.3811	0.3937	0.3642	0.3829	0.3673	0.4003	0.3860	0.4130
WET2		0.3783	0.3825	0.3622	0.3716	0.3642	0.3829	0.3811	0.3937
WET3		0.3741	0.3658	0.3594	0.3557	0.3622	0.3716	0.3783	0.3825
WET4		0.3741	0.3658	0.3706	0.3520	0.3571	0.3426	0.3594	0.3557

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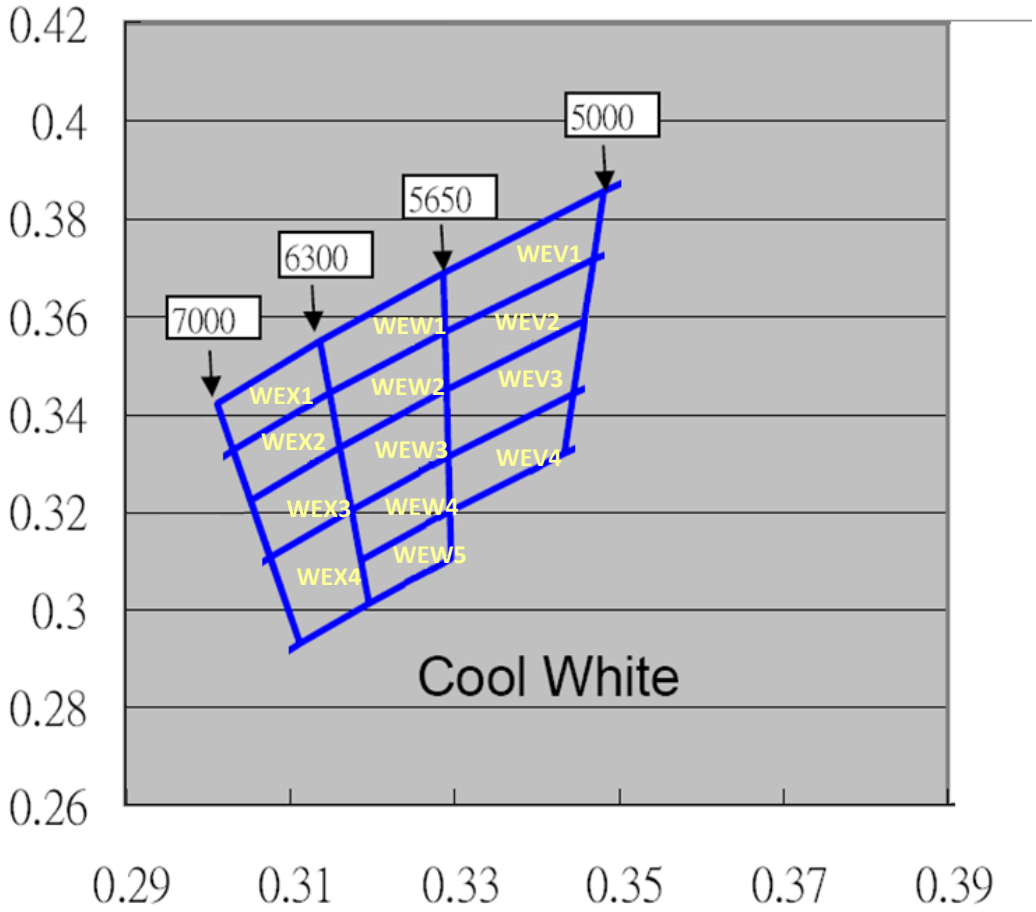
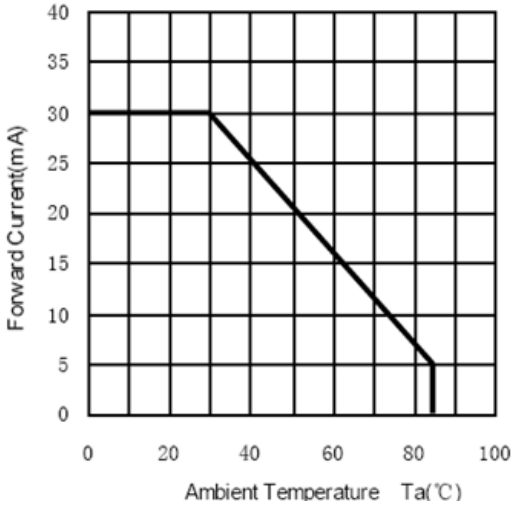
■ White Color Binning of CCT



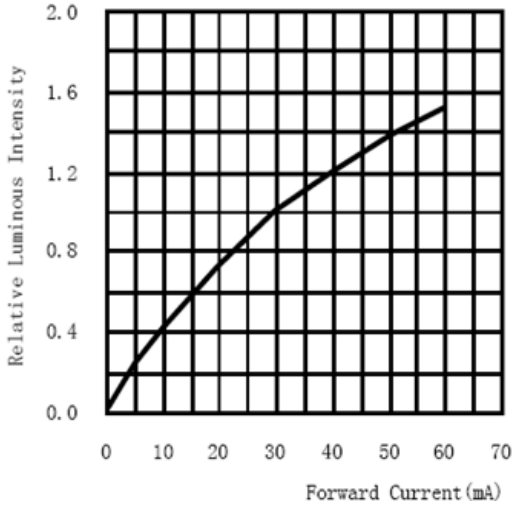
Bin Code	Color Kelvin	1		2		3		4	
		X	Y	X	Y	X	Y	X	Y
WEV1	5000-5650K	0.3286	0.3690	0.3481	0.3856	0.3469	0.3717	0.3288	0.3102
WEV2		0.3288	0.3569	0.3469	0.3717	0.3458	0.3592	0.3290	0.3569
WEV3		0.3290	0.3451	0.3458	0.3592	0.3444	0.3442	0.3292	0.3451
WEV4		0.3292	0.3313	0.3444	0.3442	0.3434	0.3320	0.3294	0.3313
WEW1	5650-6300K	0.3136	0.3550	0.3286	0.3690	0.3288	0.3569	0.3148	0.3444
WEW2		0.3148	0.3444	0.3288	0.3569	0.3290	0.3451	0.3160	0.3332
WEW3		0.3160	0.3332	0.3290	0.3451	0.3292	0.3313	0.3175	0.3204
WEW4		0.3292	0.3313	0.3294	0.3202	0.3186	0.3102	0.3175	0.3204
WEW5		0.3294	0.3202	0.3295	0.3105	0.3469	0.3013	0.3186	0.3102
WEX1	6300-7000K	0.3031	0.3327	0.3011	0.3422	0.3136	0.3555	0.3148	0.3444
WEX2		0.3052	0.3224	0.3031	0.3327	0.3148	0.3444	0.3160	0.3332
WEX3		0.3076	0.3108	0.3052	0.3224	0.3160	0.3332	0.3175	0.3204
WEX4		0.3196	0.3013	0.3112	0.2932	0.3076	0.3108	0.3175	0.3204

■ Typical optical characteristics curves

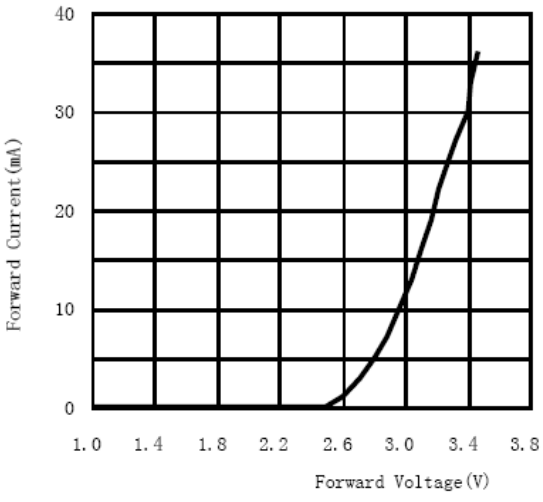
Ambient Temperature vs. Forward Current



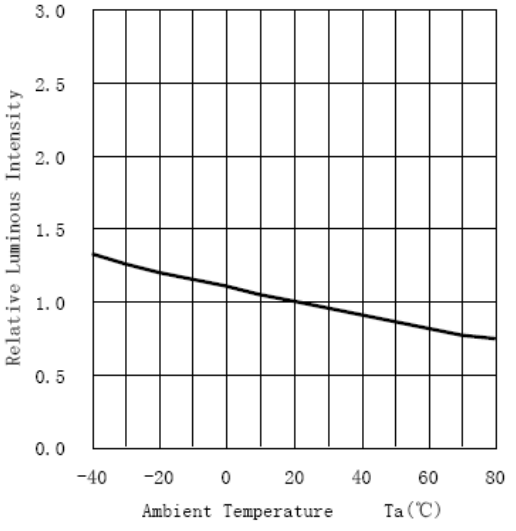
Forward Current VS. Relative Intensity



Forward Voltage VS. Forward Current



Ambient Temperature VS. Relative Intensity

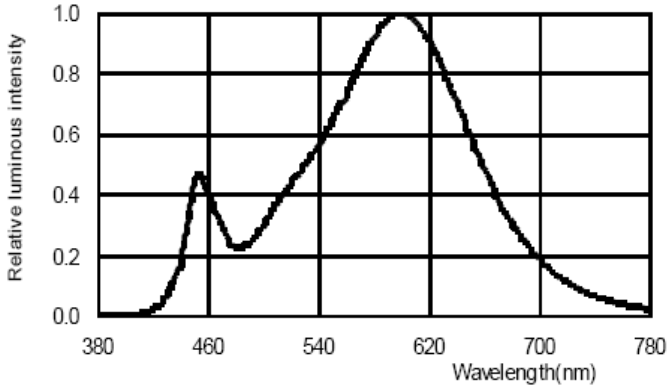


Relative spectral emission

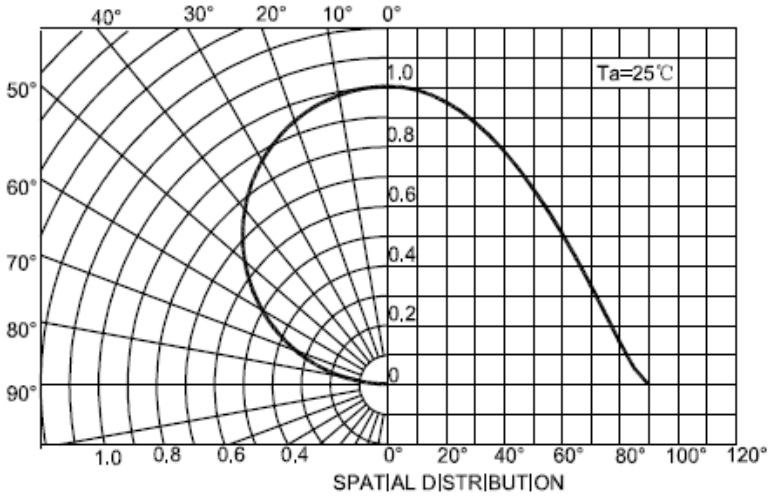
Radiation diagram

■ Typical optical characteristics curves

Relative spectral emission



Radiation diagram



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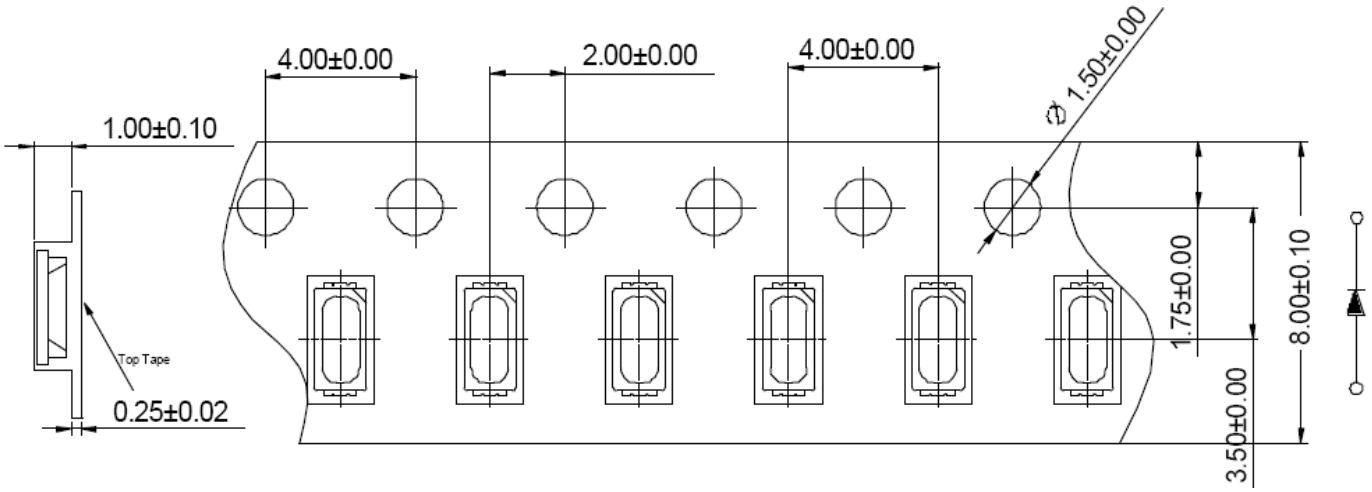
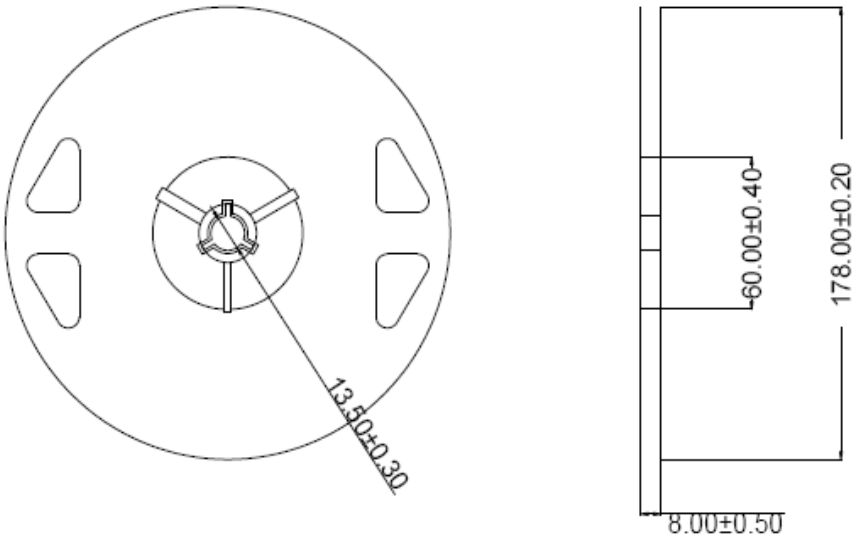
■ Carrier Type Dimensions



■ Reel Dimensions

Q'ty: 2000- 4000pcs / Reel



■ Reliability Test Items and Conditions

(1)TEST ITEMS AND RESULTS

Test Item	Standard Test Method	Test Conditions	Note	Number of Damaged
Resistance to Soldering Heat (Reflow Soldering)	JEITA ED-4701 300 301	Tsd=260℃ , 10secs	3 times	0/30
Thermal Shock	—	-40℃ ~ 100℃ 30min. 30min.	100 cycles	0/30
Temperature Cycle	JEITA ED-4701 100 105	-40℃ ~ 25℃ ~ 100℃ ~ 25℃ 30min. 5min. 30min. 5min.	100 cycles	0/30
High Temperature Storage	JEITA ED-4701 200 201	Ta=100℃	1000 hrs.	0/30
Low Temperature Storage	JEITA ED-4701 200 202	Ta=-40℃	1000 hrs.	0/30
Steady State Operating Life	—	Ta=25℃, I_F=30mA, DC	1000 hrs.	0/30
Steady State Operating Life of High Temperature	—	Ta=85℃, I_F=25mA, DC	1000 hrs.	0/30
Steady State Operating Life of High Humidity Heat	—	60℃, RH=90%, I_F=20mA, DC	1000 hrs.	0/30

(2)CRITERIA FOR JUDGING DAMAGE

Item	Symbol	Test Conditions	Criteria for Judgement
Forward Voltage	V_F	I_F=30mA	Δ % < 10%
Reverse Current	I_R	V_R=5V	Δ % < 30%
Luminous Intensity	I_V	I_F=30mA	< 10μA

Note:

The technical information shown in the data shetts are limited to the typical characteristics and circuit examples of the referenced products. It does not constituted the warranting of industrial property or the granting of any license.

■ Cautions

(1) Moisture Proof Package

A) The moisture proof package, a plastic bag with a zipper, is used to keep moisture to a minimum in the package.
B) A package of a moisture absorbent material (silicone gel) is also inserted into the plastic moisture proof bag and the silica gel changes its color from blue to pink as it absorbs moisture.
C) The absorbed moisture in the SMT package may vaporize and expand during soldering. This may cause exfoliation of the contacts and damage to the optical characteristics of the LEDs.

(2) Storage Conditions

A) Before opening the package：
The LEDs should be kept at 30℃ or less and 45~60% RH or less and should be used within a year. When storing the LEDs, moisture proof package with absorbent material (silica gel) is recommended.
B) After opening the package：
The LEDs should be kept at 30℃ or less and 55% RH or less and should be soldered within 168 hours (7days) after opening the package. The unused LEDs should be stored in moisture proof packages.
C) It's also recommended to return the LEDs to the original moisture proof bag and to reseal the moisture proof bag again.
D) If the moisture absorbent material (silica gel) has faded away or the SMD LEDs have exceeded the storage time, baking treatment （more than 24 hours at 65+/-5℃) should be performed before soldering.

(3) Heat Generation

A) The thermal design of the end product is very important. It is necessary to avoid intense heat generation and operate within the maximum ratings given in this specification.
B) The operating current should be decided after considering the ambient maximum temperature of LEDs.

(4) Cleaning

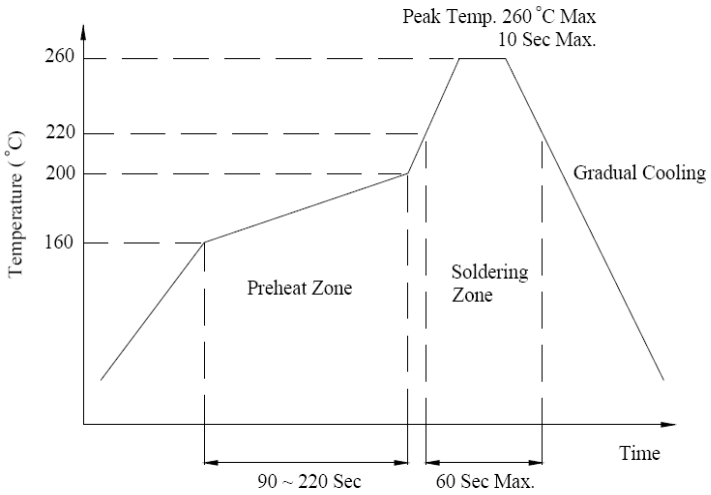
A) Isopropyl alcohol is recommended to be used as a solvent for cleaning the LEDs.
B) Before cleaning, a pre-test should be done to confirm whether any damage to the LEDs will occur.

(5) Soldering

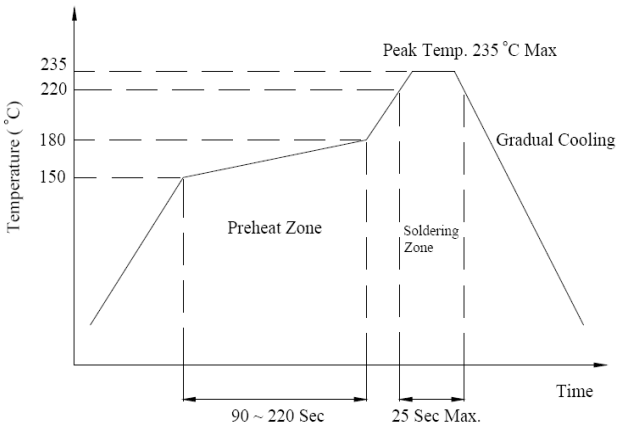
Reflow Soldering (recommended) :

A) To prevent from cracking, please bake (65℃, 24hrs)before soldering.
B) When soldering, do not load stress on the LEDs during heating.
C) Never take next process until the component is cooled down to room temperature after reflow.
D) After soldering, do not warp the circuit board.
E) The recommended reflow soldering profile (measuring on the surface of the LED resin) is the following:

(a) Lead-Free Solder



(b) Lead Solder



Manual Soldering (not recommended) :

A) To prevent from cracking, please bake (65℃, 24hrs) before soldering.
B) Temperature at tip of iron: 250℃ Max. (25W).
C) It's banned to load any stress on the resin during soldering.
D) Soldering time: 3 sec. Max.(one time only).

(6) ESD (eletrostatic discharge) protection (base on machine mode)

A) The product is InGaN based light emitting diode (LED) and is extremely sensitive to ESD. Users are strongly recommended to take necessary meter to test the static electricty and avoid ESD when handling this product.
B) Proper grounding of machines (via 1MΩ), using static disspative mats, containers, working uniforms and shoes are considered to be effective against ESD.
C) An ionizer is recommended in the facility or environment where ESD may be generated easily, and soldering iron with a grounded tip is also recommended.
D) When inspecting the final products in which LEDs are assembled, it is recommended to check whether the assembled LEDs are damaged by ESD or not. It is simple to find damaged LEDs by light-on or VF test at lower current (below 1mA is recommended).
E) ESD damaged LEDs will show some unusual characteristics such as the remarkable increasing of leak current, the decreasing of forward voltage, or the LEDs do not light on at the low current.

(7) Other

A) Care must be taken to ensure that the reverse voltage will not exceed the absolute maximum rating when using the LEDs with matrix drive.
B) The LED light output is strong enough to injure human eyes. Precaution must be taken to prevent looking directly at the LEDs with unaided eyes for more than a few seconds.
C) The LEDs described here are intended to be used for ordinary electronic equipment, please consult Unilite Opto in advance for information on applications.
D) Installing a protection device in the LED driving circuit to avoid surge current exceeding the max rating during on/off switching.
E) The appearance and specifications of the product may be modified for improvement without notice.
F) Please use the product within 168 hours after opening the seal and keep under 30 ℃ and 70% humidity.
G) Unilite Opto Technology will not be responsible for any claim for damage if the user use the product without following the caution or instruction of the specification.

Unilite Opto Technology

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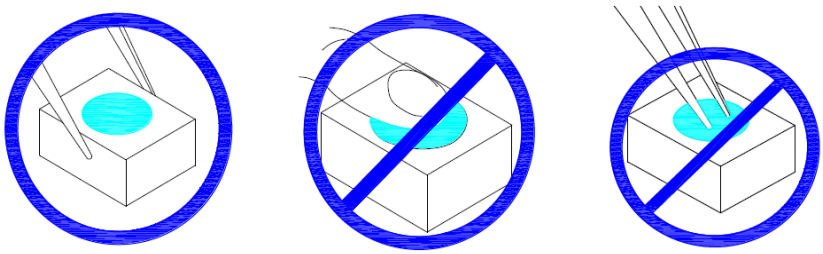
U-P3014W-XX

■ Handling Precautions

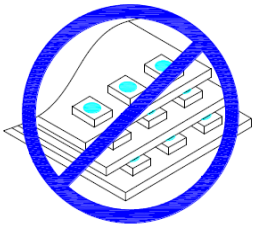
(1) Compare to epoxy encapsulant that is hard and brittle, silicone is softer and flexible. Although its characteristic significantly reduces thermal stress, it is more prone to damage by external mechanical force. As a result, special handling precautions must be observed during assembling using silicone encapsulated LED proucts, failure to comply might leads to damage and premature failure of the LED.

A) Pick up the component along the side surface by using forces or appropriate tools. Do not directly touch or pick the silicone lens surface as it could cause the damage the internal circuit.



B) The outer diameter of the SMD pickup nozzle should not exceed the size of the LED in order to prevent from the air leaking. The inner diameter of the nozzle should be as large as possible. A pliable material is suggested that the nozzle tip to avoid scratching or damaging of the LED surface during pickup. The dimensions of the component must be accurately programmed in the pick-and-place machine to insure precise pickup and avoid damage during producion.

C) Do not stack the assembled PCB with LED together. The impact could scratch the silicone lens or damage the internal circuit.



D) Not suitable to operate in acidic environment, PH<7