

SWISSDIS



Swissdis AG
Grasweg 7
CH-4911 Schwarzhäusern

Tel.: +41 62 919 44 00
Fax: +41 62 919 44 01
info@swissdis.ch
www.swissdis.ch



SPECIFICATIONS

LED SMD PLCC2 Power, White

UP3528W-05

Version August 2013

Unilite Opto Technology

email: info@unilite-tech.com

U-P3528W-05-XX-DS



■ Description

The PLCC2 type U-P3528W-05-XX-DS 0.5W White TOP VIEW LED, with its light weight , enables smaller board size, higher packing density, reduced storage space and miniature applications.

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

■ Features

- 1 chips package
- Compatible with automatic placement equipment
- Compatible with reflow soldering process
- Long operating life
- Low forward voltage operated
- Instant light
- Pb -free/ RoHS compliant

■ Applications

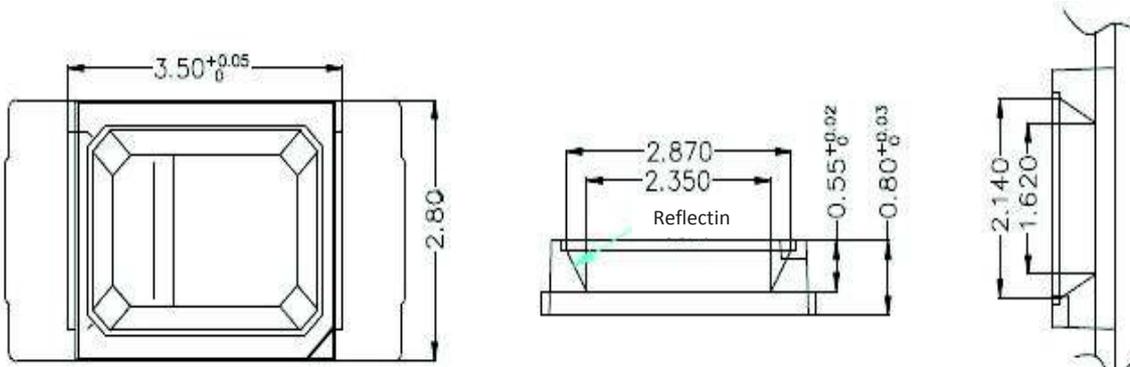
- Information boards
- Automotive Interior Lighting
- Indoor and outdoor display
- Indicator
- Backlighting
- Light bar
- General applications
- T8/T5 Tube
- LED Light Bar

Unilite Opto Technology

email: info@unilite-tech.com

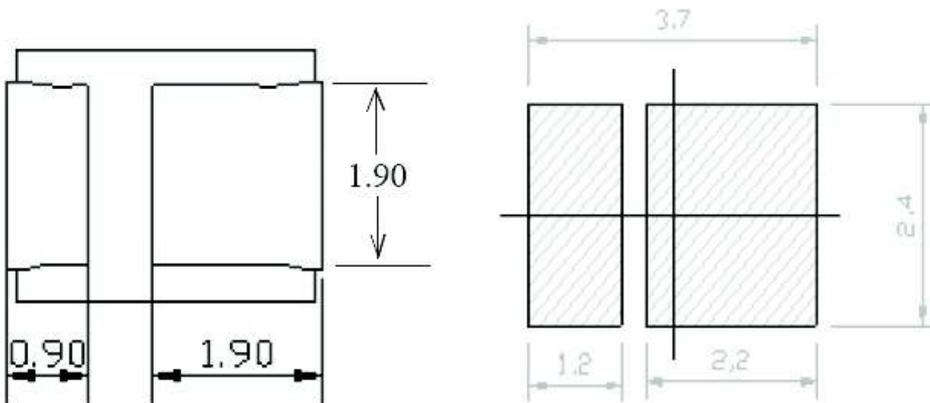
U-P3528W-05-XX-DS

Outline Dimensions (mm)



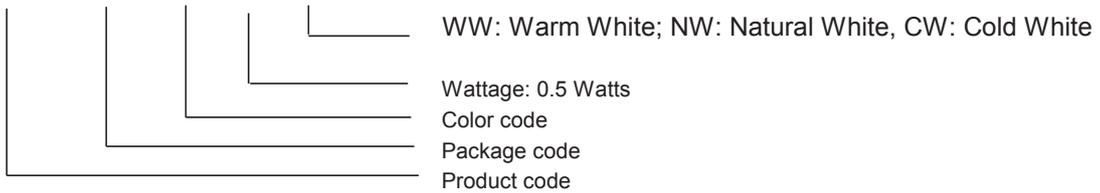
Tolerance : ± 0.25 mm

Recommend Soldering Pad (mm)



Part Numbering System

U - P 3 5 2 8 W - 05 - XX - DS



Unilite Opto Technology

email: info@unilite-tech.com

U-P3528W-05-XX-DS

■ Absolute Maximum Ratings at $T_a = 25\text{ }^\circ\text{C}$

PARAMETER	symbol	MAX.	UNIT
Power Dissipation *	PD	600	mW
Continuous Forward Current *	IF	180	mA
Peak Forward Current (1/10 Duty Cycle , 0.1ms Pulse Width) *	IFP	300	mA
Reverse Voltage	VR	5	V
Operating Temperature Range	Topr	-30 to + 85	$^\circ\text{C}$
Storage Temperature Range	Tstg	-40 to + 100	$^\circ\text{C}$
Thermal Resistance		15.5	$^\circ\text{C}/\text{W}$
Junction / Solder Point		200	KW
Reflow Soldering Condition	Tsld	260 $^\circ\text{C}$ for 10 sec. 2 time.	

■ Electro-Optical Characteristics

Condition : $I_F = 150\text{mA}$, $T_a = 25\text{ }^\circ\text{C}$

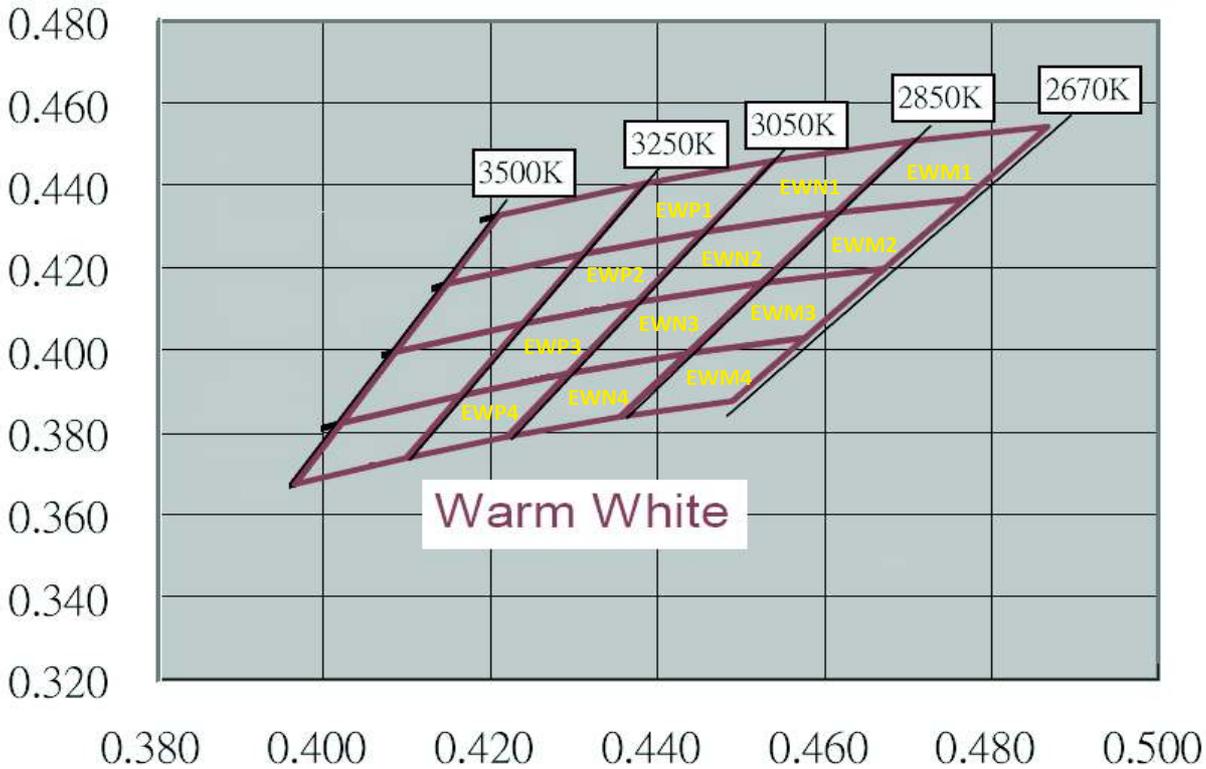
PARAMETER	SYMBOL	TEST CONDITION	VALUES			UNIT
			MIN.	TYP.	MAX.	
* Forward Voltage	V_F	$I_F=150\text{mA}$	3	3.2	3.6	V
Reverse Current	I_R	$V_R= 5\text{V}$			10	μA
Luminous Intensity	lm	$I_F=150\text{mA}$	40	50	55	lm
Viewing Angle at 50% I_v	2 θ 1/2	$I_F=150\text{mA}$		120		Deg.

Unilite Opto Technology

email: info@unilite-tech.com

U-P3528W-05-XX-DS

White Color Binning of CCT



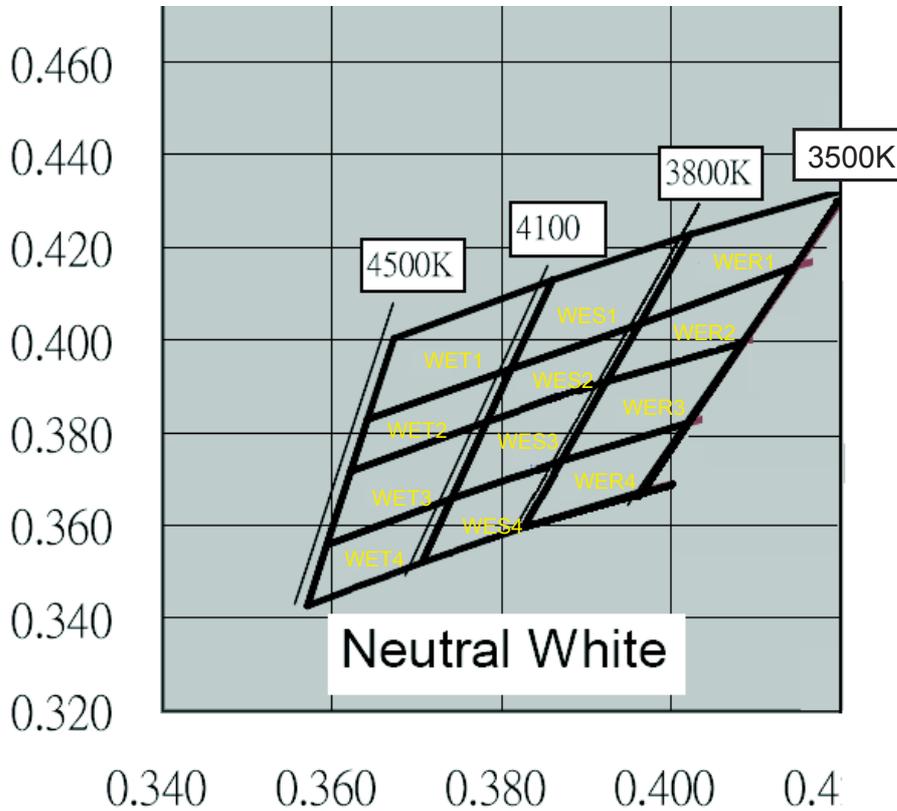
Bin Code	Color Kelvin	1		2		3		4	
		X	Y	X	Y	X	Y	X	Y
WEM1	2670-2850K	0.4705	0.4508	0.4866	0.4542	0.4767	0.4366	0.4614	0.4333
WEM2		0.4614	0.4333	0.4767	0.4366	0.4671	0.4196	0.4525	0.4126
WEM3		0.4525	0.4126	0.4671	0.4196	0.4577	0.4029	0.4436	0.3991
WEM4		0.4436	0.3991	0.4577	0.4029	0.4490	0.3875	0.4356	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

Unilite Opto Technology

email: info@unilite-tech.com

U-P3528W-05-XX-DS

White Color Binning of CCT



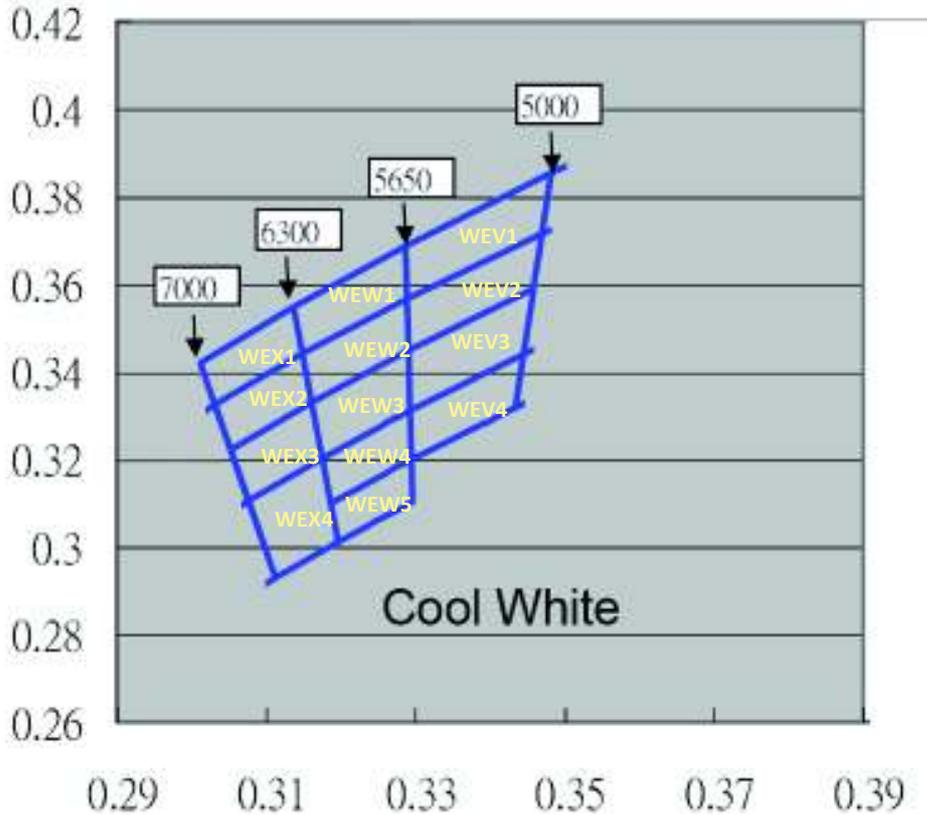
Bin Code	Color Kelvin	1		2		3		4	
		X	Y	X	Y	X	Y	X	Y
WER1	3500-3800K	0.4023	0.4220	0.4209	0.4326	0.4148	0.4161	0.3963	0.4035
WER2		0.3963	0.4035	0.4148	0.4161	0.4086	0.3955	0.3924	0.3909
WER3		0.3924	0.3909	0.4086	0.3995	0.4021	0.3822	0.3871	0.3739
WER4		0.3871	0.3739	0.4021	0.3822	0.3966	0.3673	0.3826	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

Unilite Opto Technology

email: info@unilite-tech.com

U-P3528W-05-XX-DS

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

Unilite Opto Technology

email: info@unilite-tech.com

U-P3528W-05-XX-DS

■ Bin Grade of Flux (Im@ IF = 150 mA)

PN No#: UP3528W-05-WW-DS

PN	Bin Code	Color Kelvin	W51		W52		W53		W54	
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
			40	44	44	48.4	48.4	53.24	53.24	58.5
UP3528W-05-WW-DS	WEM1	2670-2850K	Available		Available		NA		NA	
	WEM2		Available		Available		NA		NA	
	WEM3		Available		Available		NA		NA	
	WEM4		Available		Available		NA		NA	
	WEN1	2850-3050K	Available		Available		NA		NA	
	WEN2		Available		Available		NA		NA	
	WEN3		Available		Available		NA		NA	
	WEN4		Available		Available		NA		NA	
	WEP1	3050-3250K	Available		Available		NA		NA	
	WEP2		Available		Available		NA		NA	
	WEP3		Available		Available		NA		NA	
	WEP4		Available		Available		NA		NA	

PN No#: UP3528W-05-NW-DS

PN	Bin Code	Color Kelvin	W51		W52		W53		W54	
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
			40	44	44	48.4	48.4	53.24	53.24	58.5
UP3528W-05-NW-DS	WER1	3500-3800K	Available		Available		NA		NA	
	WER2		Available		Available		NA		NA	
	WER3		Available		Available		NA		NA	
	WER4		Available		Available		NA		NA	
	WES1	3800-4100K	Available		Available		NA		NA	
	WES2		Available		Available		NA		NA	
	WES3		Available		Available		NA		NA	
	WES4		Available		Available		NA		NA	
	WET1	4100-4500K	Available		Available		Available		NA	
	WET2		Available		Available		Available		NA	
	WET3		Available		Available		Available		NA	
	WET4		Available		Available		Available		NA	

PN No#: UP3528W-05-CW-DS

PN	Bin Code	Color Kelvin	W51		W52		W53		W54	
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
			40	44	44	48.4	48.4	53.24	53.24	58.5
UP3528W-05-CW-DS	WEV1	5000-5650K	Available		Available		Available		NA	
	WEV2		Available		Available		Available		NA	
	WEV3		Available		Available		Available		NA	
	WEV4		Available		Available		Available		NA	
	WEW1	5650-6300K	Available		Available		Available		NA	
	WEW2		Available		Available		Available		NA	
	WEW3		Available		Available		Available		NA	
	WEW4		Available		Available		Available		NA	
	WEW5	6300-7000K	Available		Available		Available		Available	
	WEX1		Available		Available		Available		Available	
	WEX2		Available		Available		Available		Available	
	WEX3		Available		Available		Available		Available	
WEX4		Available		Available		Available		Available		

Unilite Opto Technology

email: info@unilite-tech.com

U-P3528W-05-XX-DS

■ Bin Grade Limits ($I_F = 150 \text{ mA}$) 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

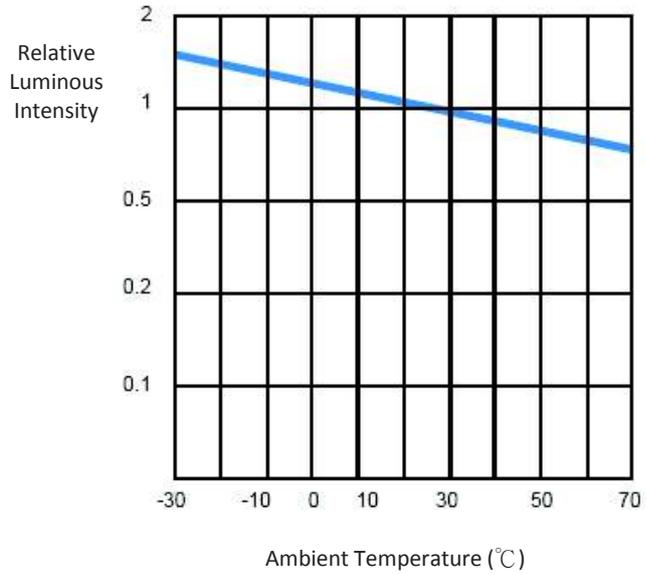
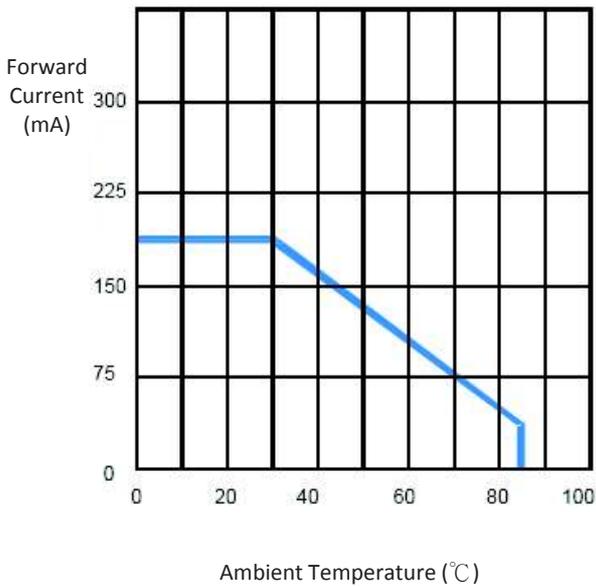
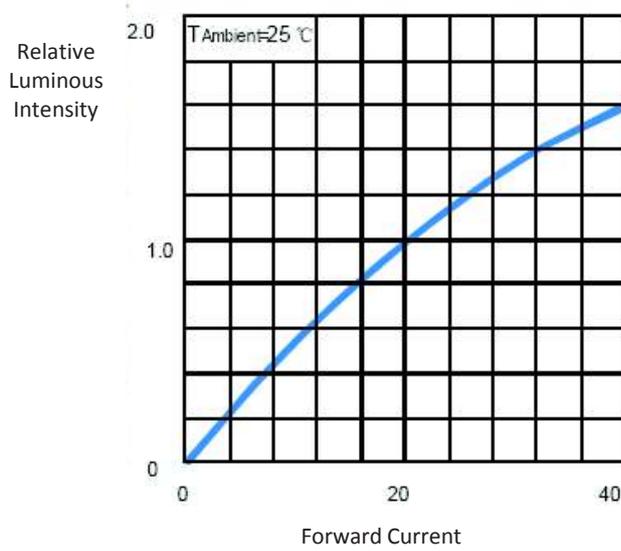
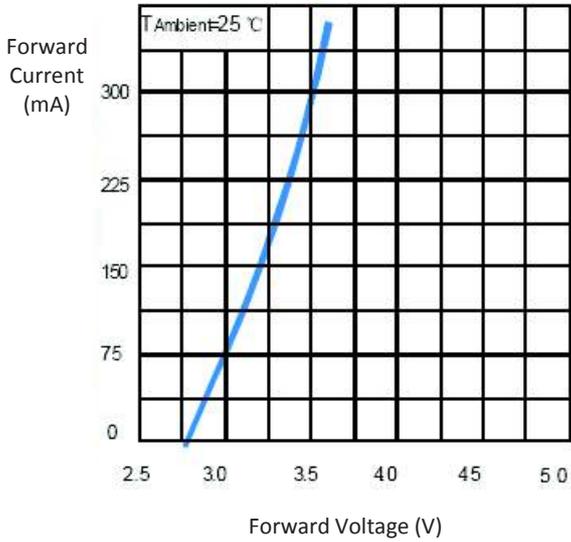
Note: Tolerance of +/- 0.1V

Unilite Opto Technology

email: info@unilite-tech.com

U-P3528W-05-XX-DS

■ Typical Electro-Optical Characteristics Curve

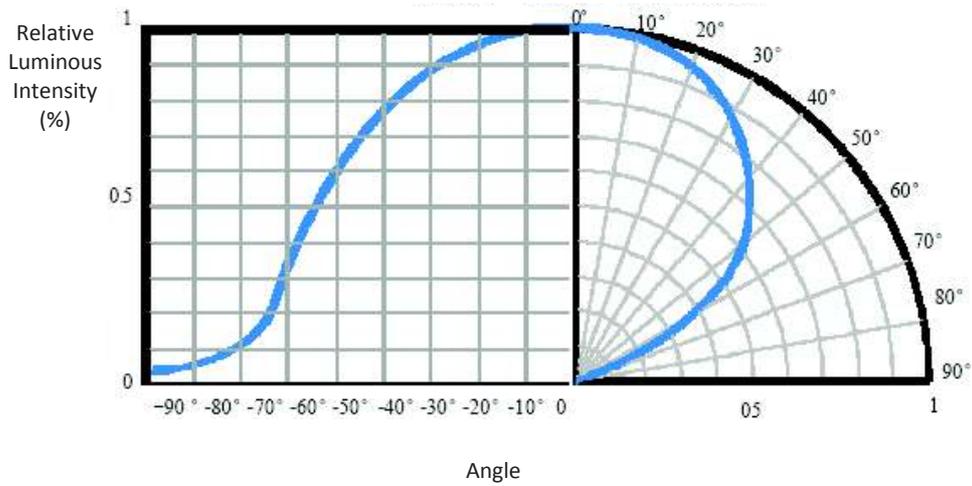
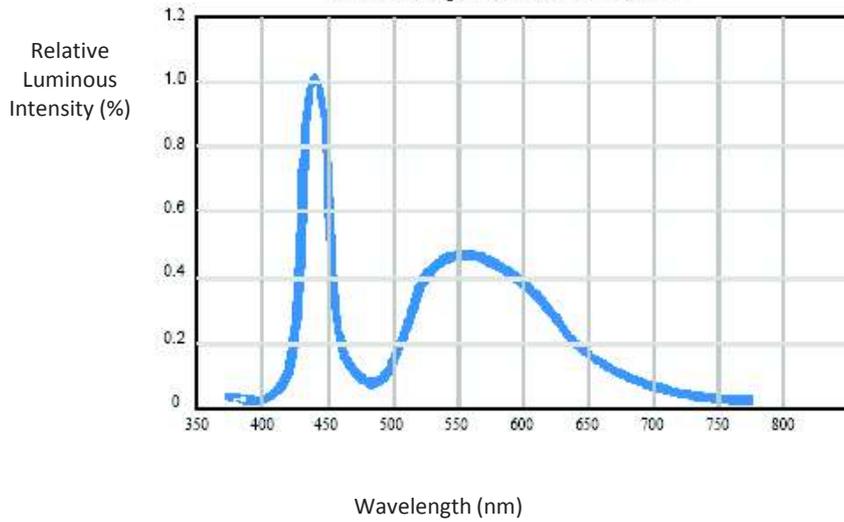


Unilite Opto Technology

email: info@unilite-tech.com

U-P3528W-05-XX-DS

■ Typical Electro-Optical Characteristics Curve

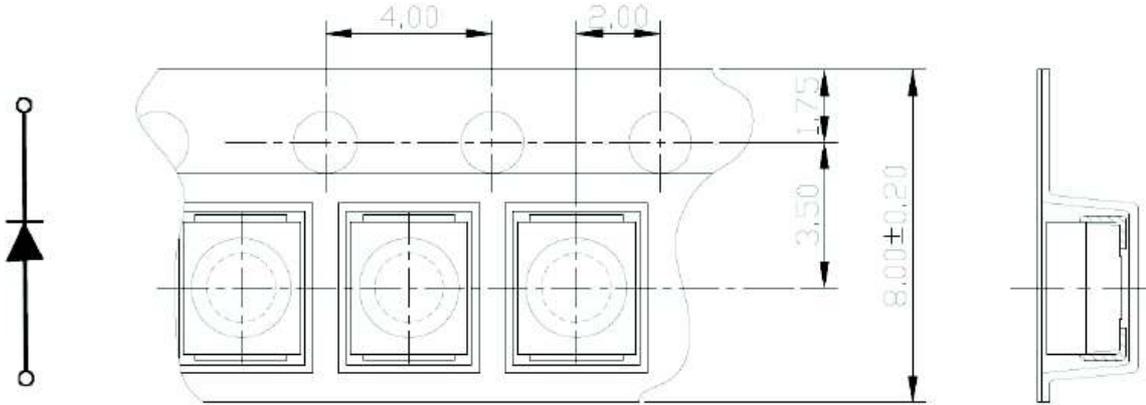


Unilite Opto Technology

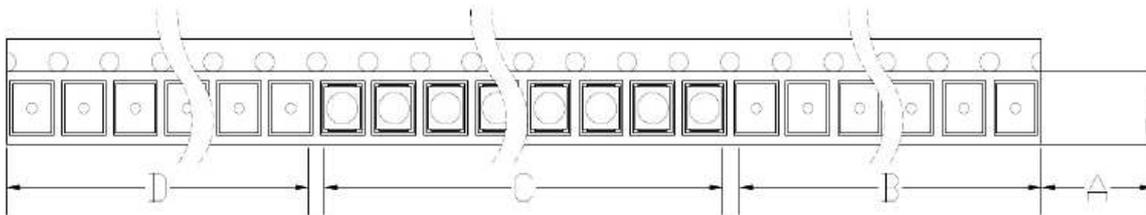
email: info@unilite-tech.com

U-P3528W-05-XX-DS

■ Carrier Type Dimensions



■ Reel Dimensions



A: Top Cover Tape, 300mm; B: Leader, Empty, 200mm; C: 2000 Lamps Loaded; D: Trailer, Empty, 200mm.

- A: The Cover Tape: 300mm
- B: Leader, Empty: 200mm
- C: LED quantity: 2000pcs
- D: Trailer, Empty: 200mm

Unilite Opto Technology

email: info@unilite-tech.com

U-P3528W-05-XX-DS

■ 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 (silica 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°C 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°C 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°C) 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.

Unilite Opto Technology

email: info@unilite-tech.com

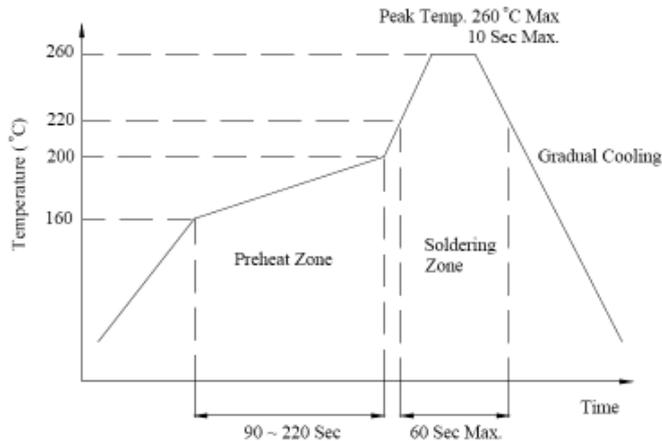
U-P3528W-05-XX-DS

(5) Soldering

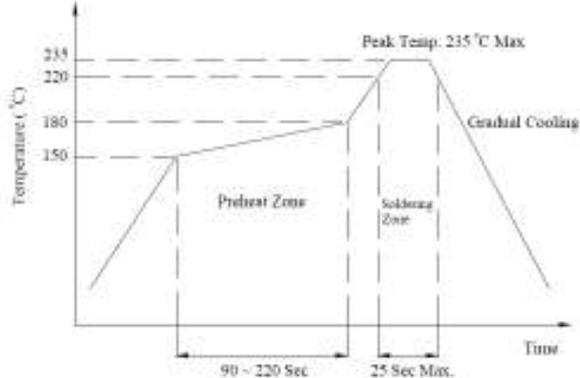
Reflow Soldering (recommended) :

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

Unilite Opto Technology

email: info@unilite-tech.com

U-P3528W-05-XX-DS

- (6) ESD (electrostatic discharge) protection (base on machine mode)
- A) The product is Gallium InGaN based light emitting diode (LED) and is extremely sensitive to ESD. Users are strongly recommended to take necessary meter to test the static electricity and avoid ESD when handling this product.
 - B) Proper grounding of machines (via $1M\Omega$), using static dissipative 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 °C 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

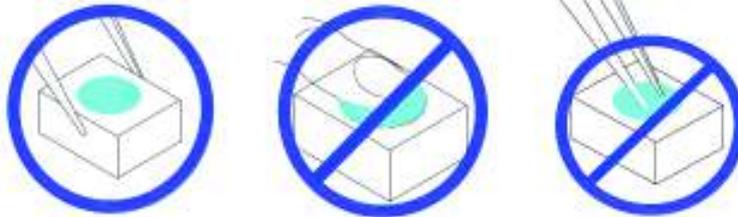
email: info@unilite-tech.com

U-P3528W-05-XX-DS

■ 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 products, 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 production.



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

