

## HL-A-3528H322W-S2-13L

### Features

- PLCC-2 Package.
- Extremely wide viewing angle
- Suitable for all SMT assembly and solder process
- Available on tape and reel
- Moisture sensitivity level: Level 4
- Package:2000pcs/reel
- RoHS compliant



### Description

The White LED which was fabricated using a blue chip and the phosphor

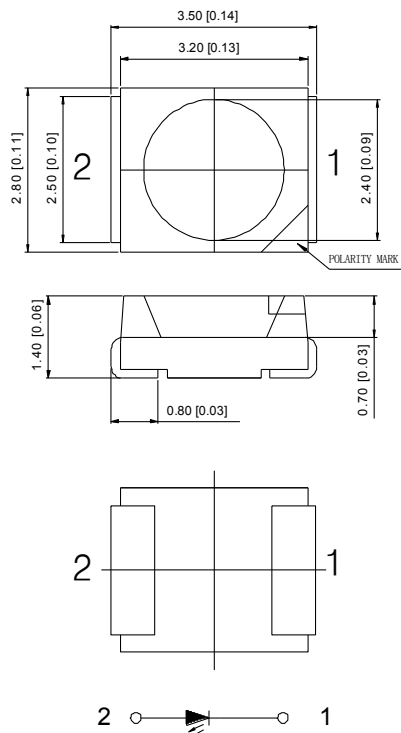
### Applications

- Optical indicator
- Indoor display
- Interior automotive lighting
- Backlight for LCD, switch and Symbol, display
- Light pipe application
- General use
- Can not be used in lighting products

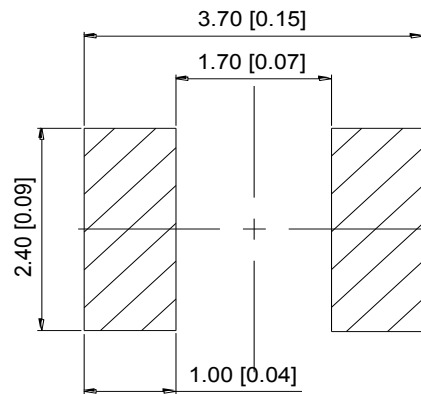


**ATTENTION**  
 OBSERVE PRECAUTIONS  
 FOR HANDLING  
 ELECTROSTATIC  
 DISCHARGE  
 SENSITIVE  
 DEVICES

### Package Dimensions



### Recommended Soldering



#### Notes:

1. All dimension units are millimeters.
2. All dimension tolerance is  $\pm 0.15$ mm unless otherwise noted.

## HL-A-3528H322W-S2-13L

### Selection Guide

Part No.	Dice	Lens Type	Luminous intensity (mcd) @ 20mA		Luminous flux(lm) @ 20mA		Viewing Angle
			Min.	Typ.	Min	Typ	2θ1/2
HL-A-3528H322W-S2-13L	WHITE (InGaN )	Yellow Diffused	--	1200	--	3.8	120°

Note:

1. θ1/2 is the angle from optical centerline where the luminous intensity is 1/2 the optical centerline value.
- 2.the above luminous intensity measurement allowance tolerance ±10%.

### Electrical / Optical Characteristics at Ta=25°C

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Forward Voltage	V <sub>F</sub>	2.8	--	3.6	V	I <sub>F</sub> =20mA
Color Coordinates	X	--	0.43	--	--	I <sub>F</sub> =20mA
	Y	--	0.42	--	--	I <sub>F</sub> =20mA
Color Temperature	T <sub>c</sub>	--	3200	--	K	I <sub>F</sub> =20mA

### Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Rating	Units
Power Dissipation	P <sub>d</sub>	105	mW
DC Forward Current	I <sub>F</sub>	30	mA
Peak Forward Current [1]	I <sub>FP</sub>	100	mA
Operating Temperature	T <sub>opr</sub>	-40 ~ +85	°C
Storage Temperature	T <sub>stg</sub>	-40 ~ +100	°C

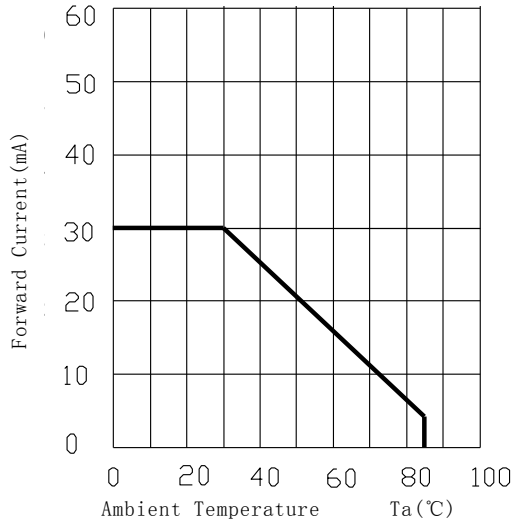
Note:

1. 1/10 Duty Cycle, 0.1ms Pulse Width.
- 2.The above forward voltage measurement allowance tolerance ±0.1V
- 3.The above color temperature measurement allowance tolerance ±0.003

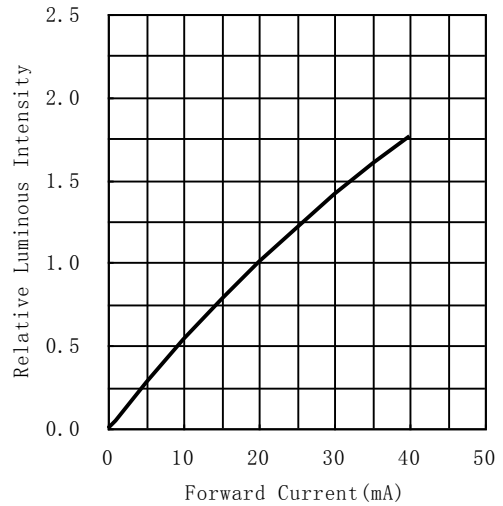
## HL-A-3528H322W-S2-13L

### Typical optical characteristics curves

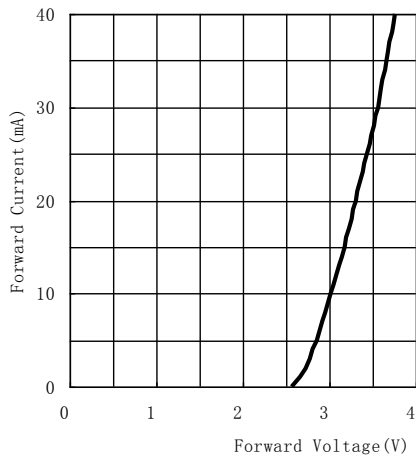
Ambient Temperature VS. Forward Current



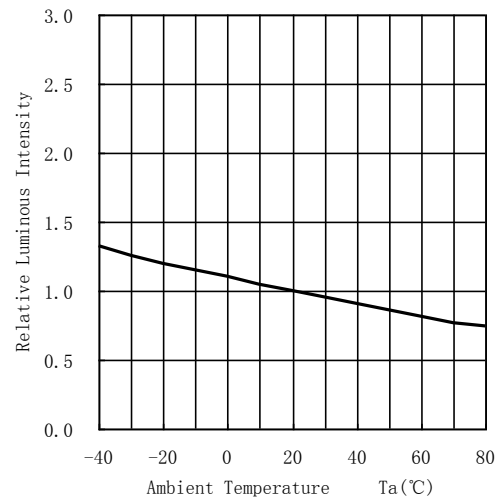
Forward Current VS. Relative Intensity



Forward Voltage VS. Forward Current



Ambient Temperature VS. Relative Intensity



Relative spectral emission

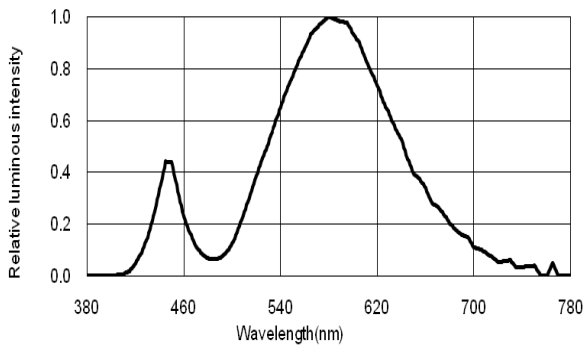
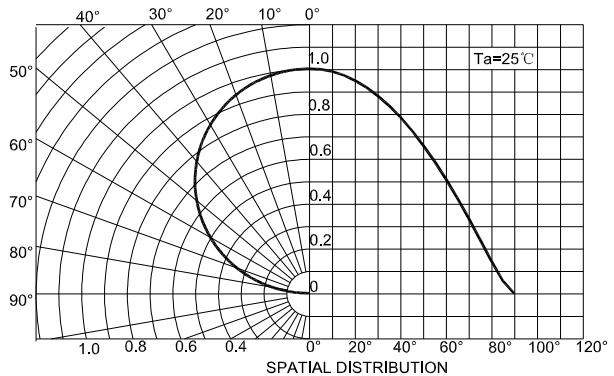
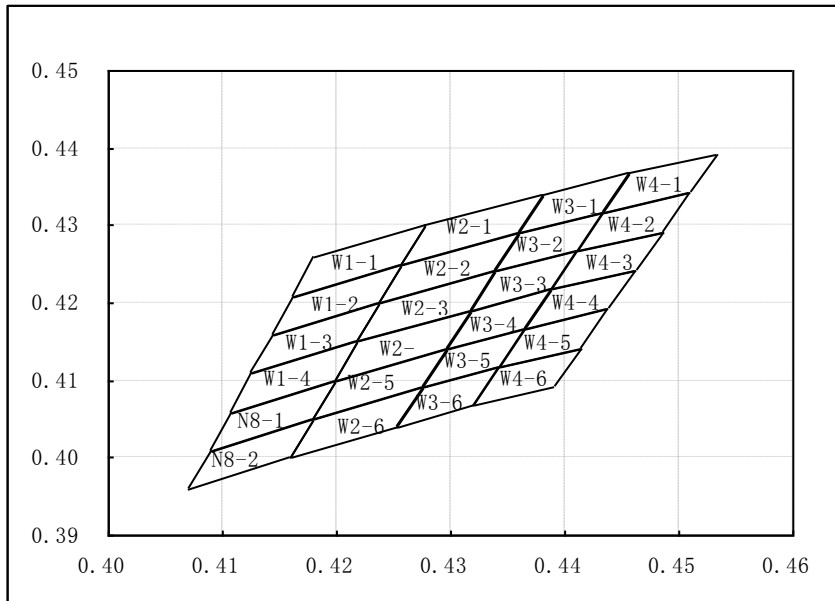


Diagram characteristics of radiation



# HL-A-3528H322W-S2-13L

## CIE Chromaticity Diagram



W1-1 3350-3500K				
X	0.4179	0.4277	0.4257	0.4161
Y	0.4259	0.4300	0.4250	0.4209

W1-2 3350-3500K				
X	0.4161	0.4257	0.4237	0.4143
Y	0.4209	0.4250	0.4200	0.4159

W1-3 3350-3500K				
X	0.4143	0.4237	0.4218	0.4125
Y	0.4159	0.4200	0.4150	0.4109

W1-4 3350-3500K				
X	0.4125	0.4218	0.4198	0.4107
Y	0.4109	0.4150	0.4100	0.4059

N8-1 3350-3500K				
X	0.4107	0.4198	0.4179	0.4089
Y	0.4059	0.4100	0.4050	0.4009

N8-2 3350-3500K				
X	0.4089	0.4179	0.4159	0.4071
Y	0.4009	0.4050	0.4000	0.3959

W2-1 3200-3350K				
X	0.4277	0.4381	0.4360	0.4257
Y	0.4300	0.4341	0.4291	0.4250

W2-2 3200-3350K				
X	0.4257	0.4360	0.4339	0.4237
Y	0.4250	0.4291	0.4241	0.4200

W2-3 3200-3350K				
X	0.4237	0.4339	0.4317	0.4218
Y	0.4200	0.4241	0.4191	0.4150

W2-4 3200-3350K				
X	0.4218	0.4317	0.4296	0.4198
Y	0.4150	0.4191	0.4141	0.4100

W2-5 3200-3350K				
X	0.4198	0.4296	0.4275	0.4179
Y	0.4100	0.4241	0.4191	0.4150

W2-6 3200-3350K				
X	0.4179	0.4275	0.4253	0.4159
Y	0.4050	0.4091	0.4141	0.4000

W3-1 3100-3200K				
X	0.4381	0.4456	0.4433	0.4360
Y	0.4341	0.4367	0.4317	0.4291

W3-2 3100-3200K				
X	0.4360	0.4433	0.4410	0.4339
Y	0.4291	0.4317	0.4267	0.4241

W3-3 3100-3200K				
X	0.4339	0.4410	0.4388	0.4317
Y	0.4241	0.4267	0.4217	0.4191

W3-4 3100-3200K				
X	0.4317	0.4388	0.4365	0.4296
Y	0.4191	0.4217	0.4167	0.4141

W3-5 3100-3200K				
X	0.4296	0.4365	0.4342	0.4275
Y	0.4141	0.4167	0.4117	0.4091

W3-6 3100-3200K				
X	0.4275	0.4342	0.4320	0.4253
Y	0.4091	0.4117	0.4067	0.4041

W4-1 3000-3100K				
X	0.4456	0.4533	0.4509	0.4433
Y	0.4367	0.4392	0.4342	0.4317

W4-2 3000-3100K				
X	0.4433	0.4509	0.4486	0.4410
Y	0.4317	0.4342	0.4292	0.4267

W4-3 3000-3100K				
X	0.4410	0.4486	0.4462	0.4388
Y	0.4267	0.4292	0.4242	0.4217

W4-4 3000-3100K				
X	0.4388	0.4462	0.4438	0.4365
Y	0.4217	0.4242	0.4192	0.4167

W4-5 3000-3100K				
X	0.4365	0.4438	0.4414	0.4342
Y	0.4167	0.4192	0.4142	0.4117

W4-6 3000-3100K				
X	0.4342	0.4414	0.4390	0.4320
Y	0.4117	0.4142	0.4092	0.4067



## HL-A-3528H322W-S2-13L

### Reliability Test Items And Conditions

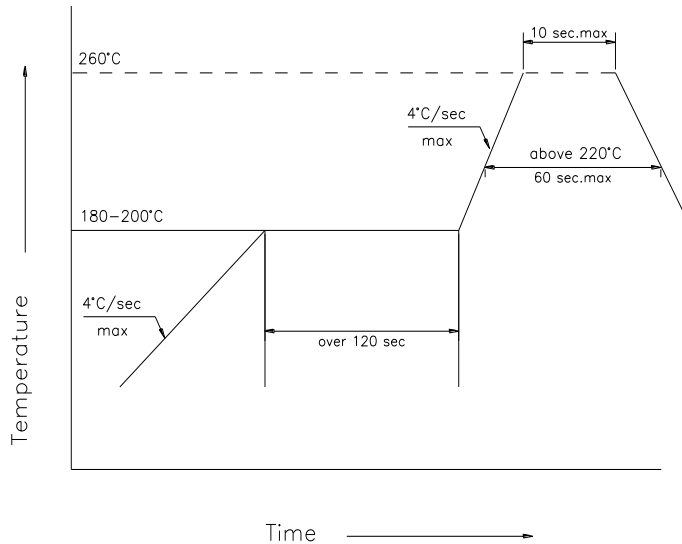
The reliability of products shall be satisfied with items listed below.  
Confidence level :90%  
LTPD :10%

No.	Items	Ref.Standard	Test Condition	Test Hours/ Cycles	Sample Size	Ac/Re
1	Reflow	JESD22-B106	Temp:260°Cmax T=10 sec	3 times.	22Pcs.	0/1
2	Temperature Cycle	JESD22-A104	100°C±5°C 30 min. ↑↓5 min -40°C±5°C 30 min.	100 Cycles	22Pcs.	0/1
3	Thermal Shock	JESD22-A106	100°C±5°C 5 min. ↑↓ -40°C±5°C 5 min.	100 Cycles	22Pcs.	0/1
4	High Temperature Storage	JESD22-A103	Temp:100°C±5°C	1000Hrs.	22Pcs.	0/1
5	Low Temperature Storage	JESD22-A119	Temp:-40°C±5°C	1000Hrs.	22Pcs.	0/1
6	DC Operating Life	JESD22-A108	Ta=25°C±5°C IF=20mA	1000Hrs.	22Pcs.	0/1
7	High Temperature High Humidity	JESD22-A101	85°C±5°C/ 85%RH IF=5mA	1000Hrs.	22Pcs.	0/1

\*The technical information shown in the data sheets are limited to the typical characteristics and circuit examples of the referenced products. It does not constitute the warranting of industrial property nor the granting of any license.

## HL-A-3528H322W-S2-13L

### SMT Reflow Soldering Instructions



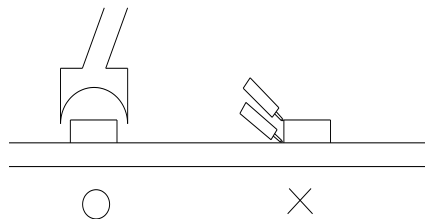
1. Reflow soldering should not be done more than two times
2. When soldering, do not put stress on the LEDs during heating

### Soldering iron

1. When hand soldering, the temperature of the iron must be less than 300°C for 3 seconds
2. The hand solder should be done only one time

### Repairing

Repair should not be done after the LEDs have been soldered. When repairing is unavoidable, a double-head soldering iron should be used (as below figure). It should be confirmed beforehand whether the characteristics of LEDs will or will not be damaged by repairing.



### Cautions

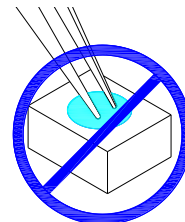
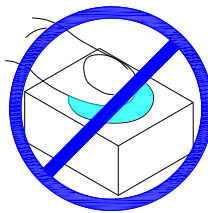
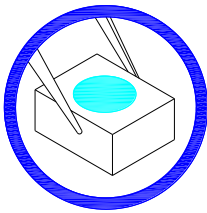
The encapsulated material of the LEDs is silicone. Therefore the LEDs have a soft surface on the top of the package. The pressure applied to the top surface will influence the reliability of the LEDs. Precautions should be taken to avoid strong pressure on the encapsulated part. So when using a picking up nozzle, the pressure on the silicone resin should be proper.

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### Handling Precautions

Compare to epoxy encapsulant that is hard and brittle, silicone is softer and flexible. Although its characteristic significantly reduces thermal stress, it is more susceptible to damage by external mechanical force. As a result, special handling precautions need to be observed during assemble using silicone encapsulated LED products, Failure to comply might leads to damage and premature failure of the LED.

1. Handle the component along the side surface by using forceps or appropriate tools; do not directly touch or Handle the silicone lens surface, it may damage the internal circuitry.

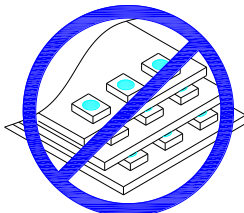


2. The outer diameter of the SMD pickup nozzle should not exceed the size of the LED to prevent air leaks. The inner diameter of the nozzle should be as large as possible. A pliable material is suggested for the nozzle tip to avoid scratching or damaging the LED surface during pickup. The dimensions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



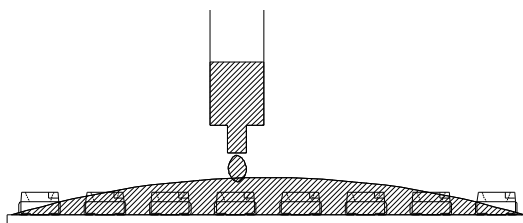
3. Do not stack together assembled PCBs containing LEDs. Impact may scratch the silicone lens or damage the internal circuitry

4. Not available in the situation of acidity for PH



5. LED operating environment and sulfur element composition cannot be over 100PPM in the

6. When we need to use external glue for LED application products, please make sure that the external glue matches the LED packaging glue. Additionally, as most of LED packaging glue is silica gel, and it has strong Oxygen permeability as well as strong moisture permeability; in order to prevent external material from getting into the inside of LED, which may cause the malfunction of LED, the single content of Bromine element is required to be less than 900PPM, the single content of Chlorine element is required to be less than 900PPM, the total content of Bromine element and Chlorine element in the external glue of the application products is required to be less than 1500PPM



7. Other points for attention, please refer to our LED user manual.

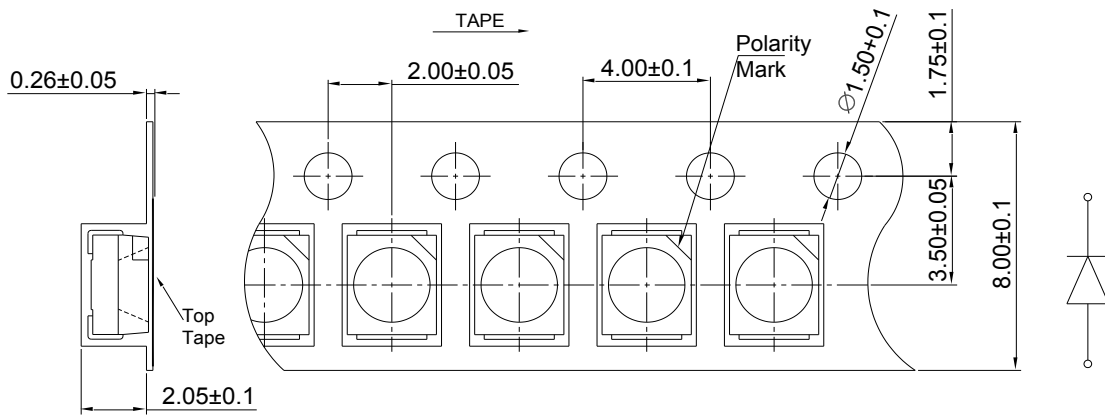
# HL-A-3528H322W-S2-13L

## Label

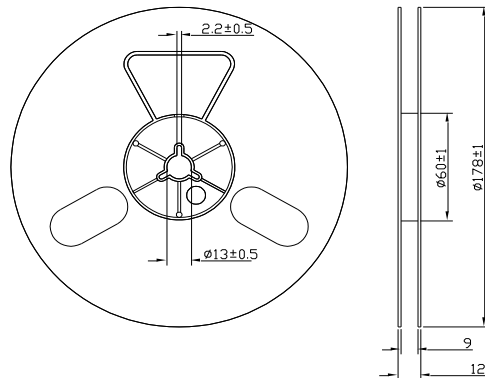
IV: Luminous intensity rank  
 VF: Forward voltage rank  
 X/Y: Coordinate rank  
 TC: Color temperature



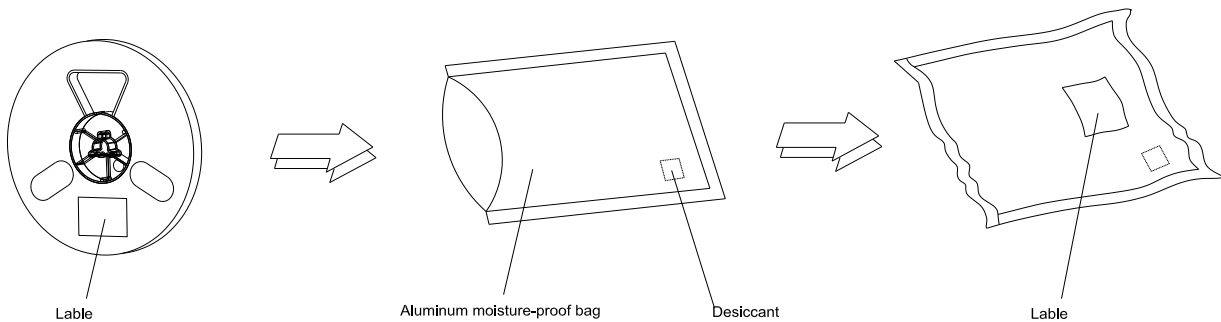
## Tape Specifications (Units : mm)



## Reel Dimensions



## Moisture Resistant Packaging



Note: The tolerances unless mentioned is ±0.1mm, Unit: mm