DATASHEET

Shwo

ELSW-R21E1-0EPNM-AD3D8(OR)

"Shwo [Shuo] is the English translation for the Chinese word meaning Twinkle and is often used as a description of stars or other bright, celestial objects as seen from Earth. This word is a relevant description for this bright, compact Everlight LED package."

Introduction

The Shwo series is the latest version of our 3535 high-power surface-mount package, featuring an improved lens design for high brightness and photon emission.

The Shwo series is one of the most efficient and competitive packages for horticultural applications.

Features

- Small ceramic SMD package
- ESD protection up to 8KV
- Color : 660nm (Deep Red)
- Radiant Flux : Typ.460mW @ 350mA
- Photosynthetic Photon Flux : 2.53 umole/s
- Moisture Sensitivity Level: 1
- Radiant Efficiency : 57%
- RoHS compliant
- The product itself will remain within RoHS compliant version.
- Compliance with EU REACH
- Compliance Halogen Free (Br < 900 ppm, CI < 900 ppm, Br+CI < 1500 ppm)

Applications

- Decorative and Entertainment Lighting
- Signal and Symbol Lighting
- Agriculture Lighting

Table of Contents

Product Nomenclature

The product name is designated as below:

ELSW – ABCDE – FGHIJ – V1234(OR)

Designation:

AB = min. radiation power (mW) performance
C = radiation pattern [1]
D = color [2]
E = power consumption [3]
F = reserved for future product offerings
G = Internal code
H = packaging type [4]
IJ = internal code
V = forward voltage bin
1234 = color bin

Notes

1. Table of radiation patterns

Symbol	Description
1	Lambertian

2. Table of color offerings:

Symbol	Color	Dominant wavelength range
E	Deep Red	645~675nm

3. Table of power consumptions:

Symbol	Description
1	1W

4. Table of packaging types:

Symbol	Description
P	Tape

Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Max. DC Forward Current (mA)	I_F	700[1]	mA
Max. Peak Pulse Current (mA)	I_{Pulse}	1000[2]	mA
Max. ESD Resistance	V_B	8000	V
Reverse Voltage	V_R	Note 3	V
Thermal Resistance	R_{th}	10 ~ 12[4]	°C/W
Max. Junction Temperature	T_J	125[5]	°C
Operating Temperature	T_{Opr}	-40 ~ +100[6]	°C
Storage Temperature	T_{Stg}	-40 ~ +100	°C
Max. Soldering Temperature	T_{Sol}	260	°C
Max. Allowable Reflow Cycles	n/a	2	cycles

Notes:

1. Maximum forward current for 1W is 700mA (Thermal Pad=25°C).
2. Duty cycle = 1/10@1KHZ
3. The Shwo series LEDs are not designed for reverse bias use.
4. Thermal Resistance is 12°C/W for Red LEDs.
5. Maximum junction temperature of Red LEDs is 125°C.
6. Maximum Operating Temperature (Thermal Pad) of Red LEDs is 100°C.

JEDEC Moisture Sensitivity

Level	Floor Life		Soak Requirements Standard	
	Time (hours)	Conditions	Time (hours)	Conditions
1	Unlimited	≦30°C / 85% RH	168 (+5/-0)	85°C / 85% RH

Radiant Flux Characteristics for the Shwo (OR)series

Color	Part Number	1W	
		Minimum Radiant Flux (mW)[1]	Drive Current (mA)
Deep Red	ELSW – R21EX	430	350

Notes:

1. Radiant Flux measurement tolerance: ±10%.
2. The data of Radiant Flux measured at thermal pad=25℃
3. Typical Radiant Flux or light output performance is operated within the condition guided by this datasheet.

PN of the Shwo 1W(OR): Color LEDs

The table below is a list of the binning options for the Everlight Shwo 1W (OR) Color LED. Standard Everlight color bins are listed according to wavelength and represent the standard primary colors of the spectrum. Typical view angle is 120°. These clearly listed binning options allow for proper design and implementation into lighting applications. The Order Codes below are currently available Color Shwo LEDs. For Example: If you order product using P/N **ELSW-R21E1-0EPNM-AD3D8(OR),** you will be specifying:

Color, Shwo series LEDs at 350mA are listed below.

Color Variant	Radiation Pattern	Dominant Wavelength (nm)	Forward Voltage (V)	Minimum Radiant Flux (mW)
Deep Red	Lambertian	645~650(D3) 650~655(D4) 655~660(D5) 650~655(D6) 655~670(D7) 670~675(D8)	1.75~2.05(U1) 2.05~2.35(U2)	430

Color	Order Code of ELSW	Minimum Radiant Flux (mW)	Typ. Radiant Flux (mW)	Peak Wavelength (nm)	PPF (umole/s)	PPE (umole/J)	Typ. Forward Voltage(V)
Deep Red	ELSW-R21E1-0EPNM-AD3D8(OR)	430	460	655~665	2.53	3.21	2.15

Note : 1. Customer code with(OR) only supply Min.430mW

Product Binning

Radiant Flux Bins

Group	Bin	Minimum Radiant Flux (mW)	Maximum Radiant Flux (mW)
R	3	430	480
	4	480	530
	5	530	600

Forward Voltage Bins

Group Name	Bins
A	U1+U2

Group Name	Bin	Minimum Forward Voltage (V)	Maximum Forward Voltage (V)
A	U1	1.75	2.05
	U2	2.05	2.35

Notes:

1.Forward voltage measurement tolerance: ±0.1V.
2.Forward voltage bins are defined at IF=350mA operation.

Color Bins

Color	Bin	Minimum Dominant Wavelength (nm)	Maximum Dominant Wavelength (nm)
(Deep-Red)	3	645	650
	4	650	655
	5	655	660
	6	660	665
	7	665	670
	8	670	675

Notes:

1. Wavelength measurement tolerance: ±1nm.
2. Wavelength bins are defined at IF=350 mA operation.

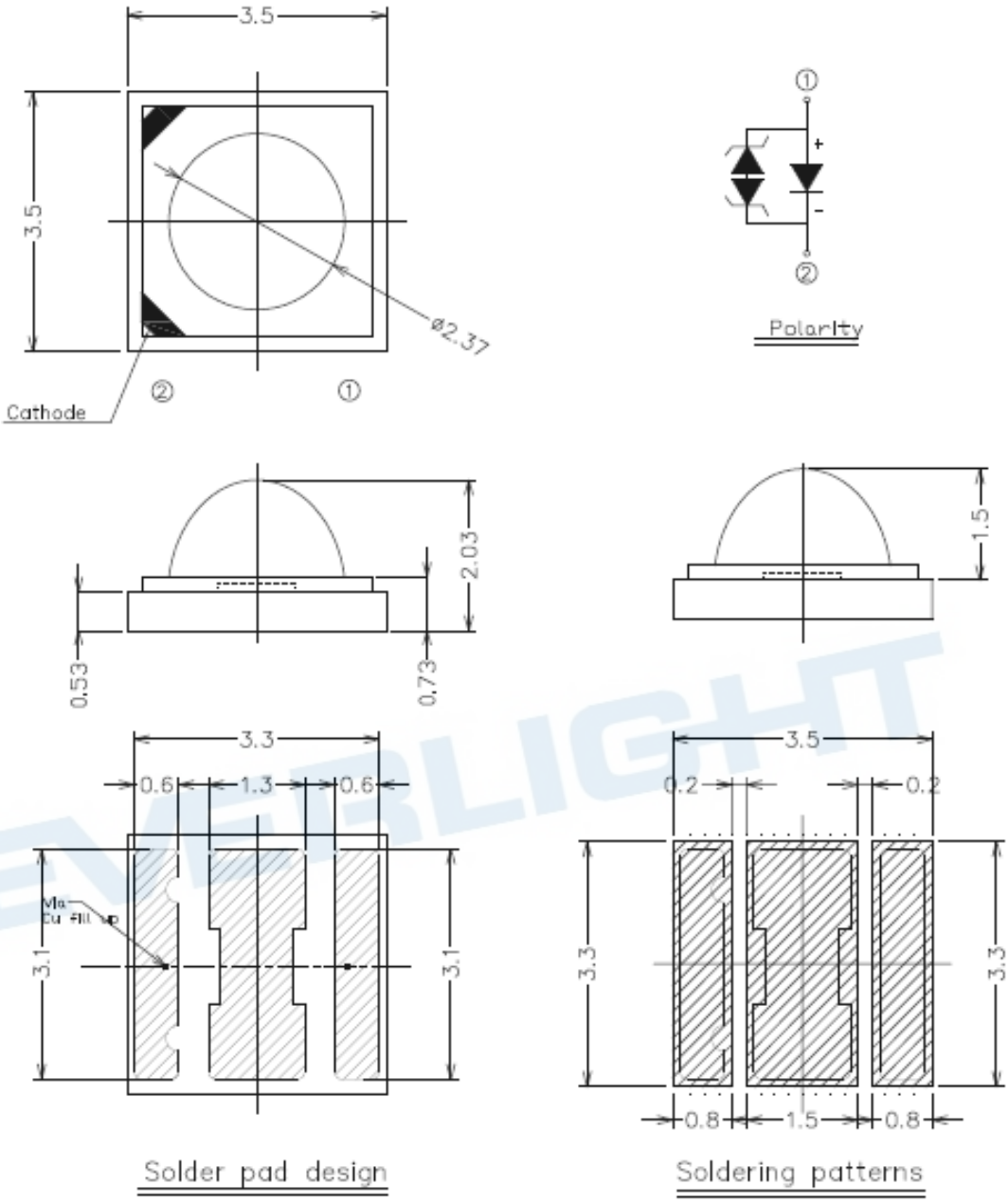
Optical Characteristics

Color	Part Number	Wavelength (nm) λ_P			Typical Temperature Coefficient of Peak Wavelength (nm/°C)-($\triangle\lambda_D/\triangle T_J$)	Typical Viewing Angle (degrees) $2\theta_{1/2}$
		Min.	Typ.	Max.		
Deep-Red	ELSW – XX1EX	645	655~665	675	0.08	120

Notes:

1.The test tolerance of Everlight is ±0.5nm for peak wavelength.
2.Viewing angle is the width of half the light output intensity in all directions of 180°.

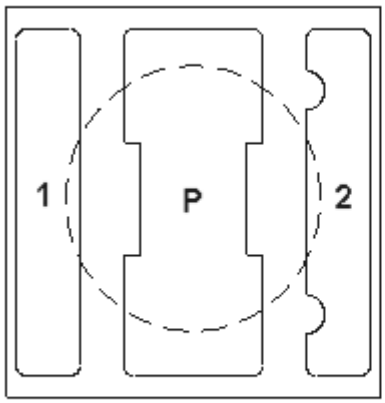
Mechanical Dimension



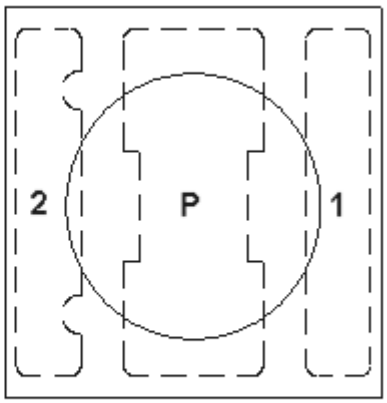
Notes:

1. Dimensions are in millimeters.
2. Tolerances unless mentioned are ± 0.15mm.
3. The thermal pad is electrically isolated from the Anode and Cathode contact pads.
4. Do not handle the device by the lens. Incorrect force applied to the lens may lead to the failure of devices.

Pad Configuration



BOTTOM VIEW



TOP VIEW

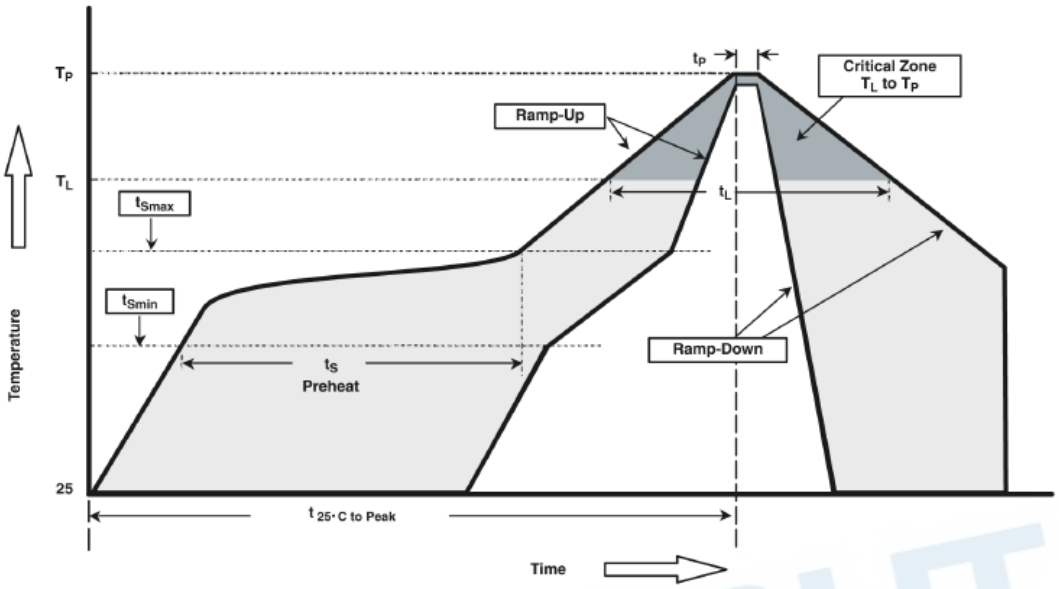
PAD	FUNCTION
1	ANODE
2	CATHODE
P	THERMAL PAD

Reflow Soldering Characteristics

For Reflow Process

a. ELSW series are suitable for SMT processes.

b. Curing of glue in oven must be according to standard operation flow processes.



Profile Feature	Pb-Free Assembly	Unit Einheit
Average Ramp-up Rate 25 °C to 150 °C	2-3	°C /sec
Preheat Temperature Min.	150	sec
Preheat Temperature Max.	200	sec
Preheat Time	60-120	sec
Time Maintained Above Temperature	217	°C
Time Maintained Above Time	60-90	sec
Peak Temperature (max.)	260	°C

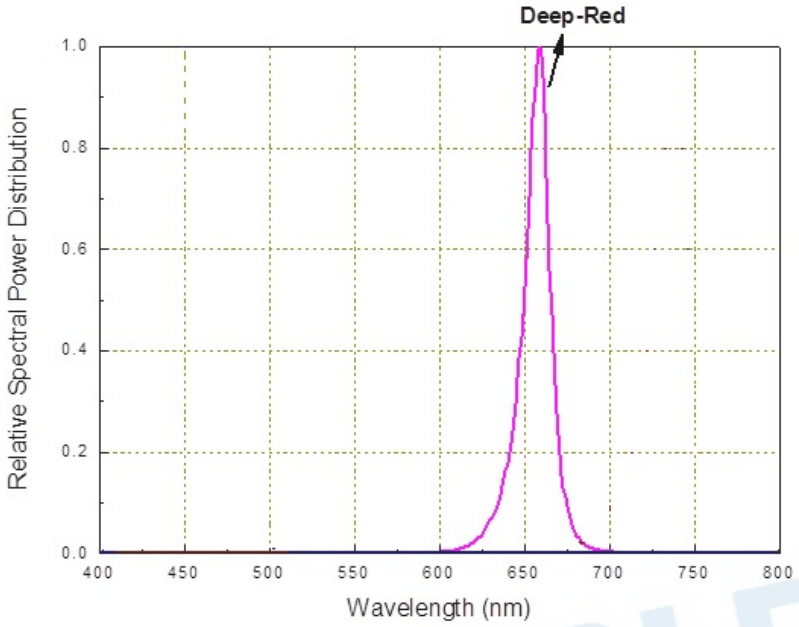
c. Reflow soldering should not be done more than twice.

d. In soldering process, stress on the LEDs during heating should be avoided.

e. After soldering, do not bend the circuit board.

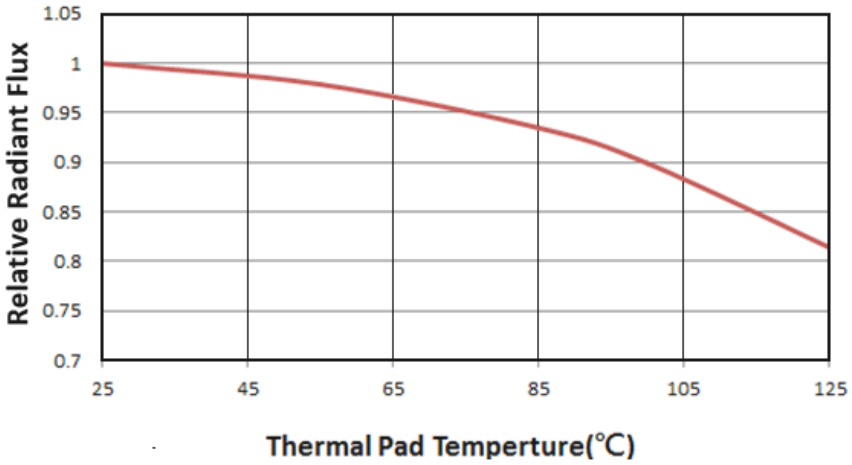
Wavelength Characteristics

For Deep-Red @ Thermal Pad Temperature = 25℃



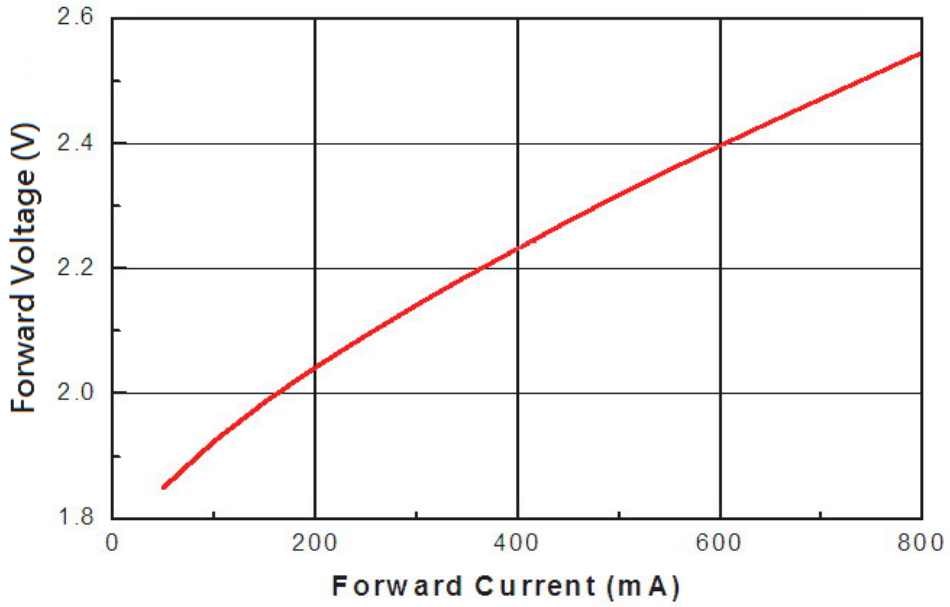
Typical Light Output Characteristic V.S. Thermal Pad Temperature

Deep Red for 350mA Drive Current



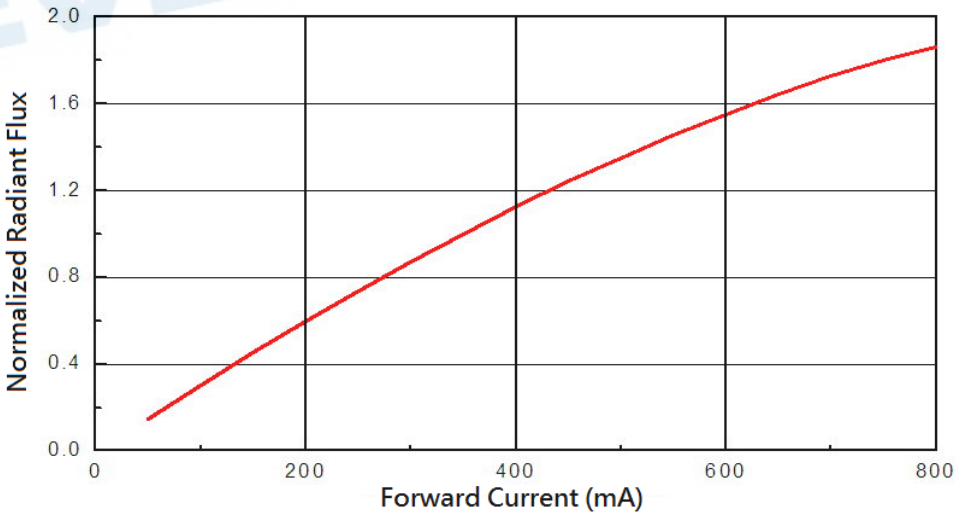
Typical Electrical Characteristics

For Deep-Red @ Thermal Pad Temperature = 25℃



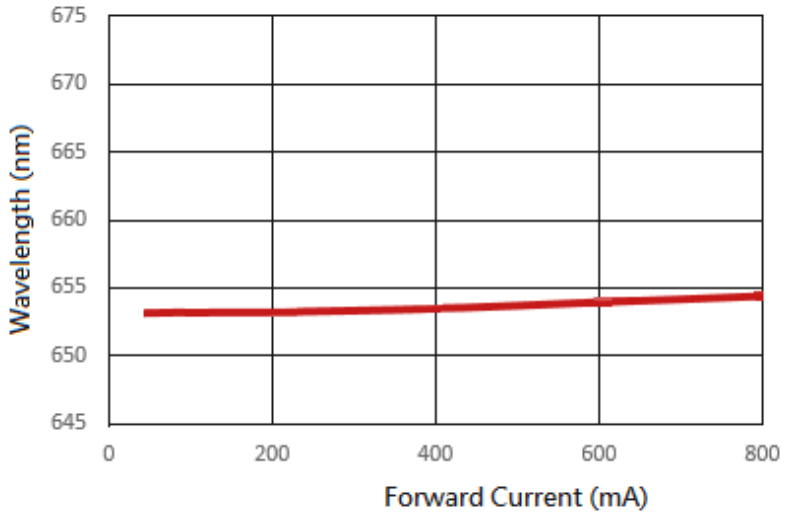
Typical Relative Radiant Flux V.S. Forward Current

For Deep-Red @ Thermal Pad Temperature = 25℃



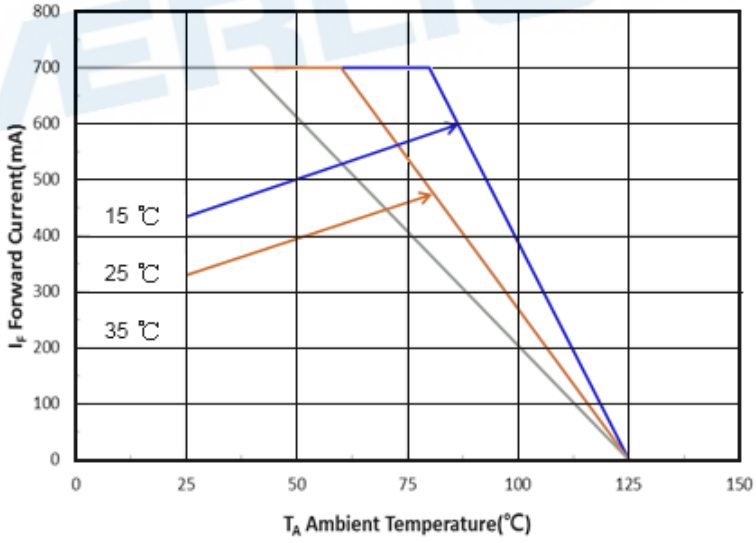
Typical Wavelength Shift Characteristics V.S. Forward Current

For Deep-Red @ Thermal Pad Temperature = 25℃



Current Derating Curves

Current Derating Curve for 700mA Drive Current Deep-Red

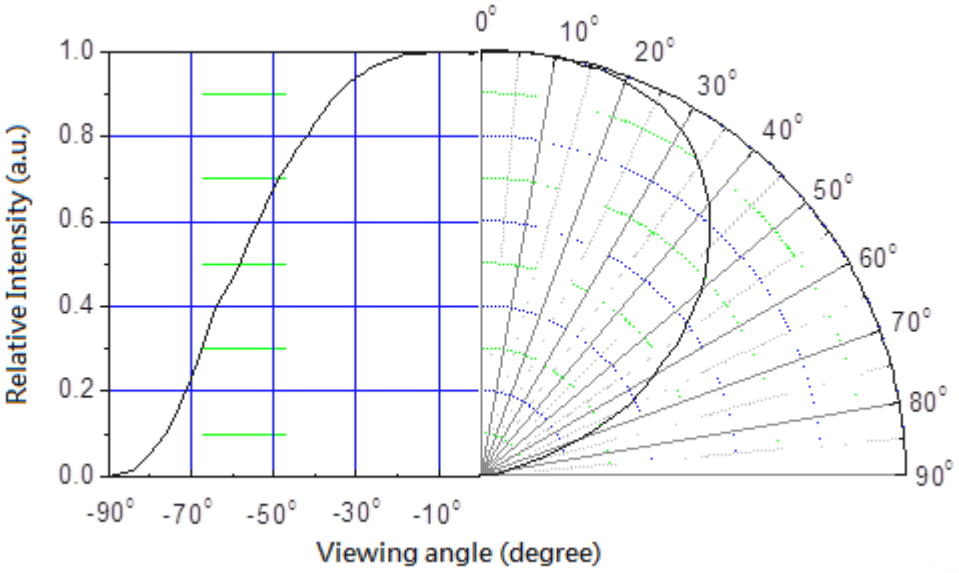


Note:

The current derating curves are depending on the thermal resistance between the junction to the soldering pad.

Typical Radiation Patterns

Shwo 1W: Typical Diagram Characteristics of Radiation



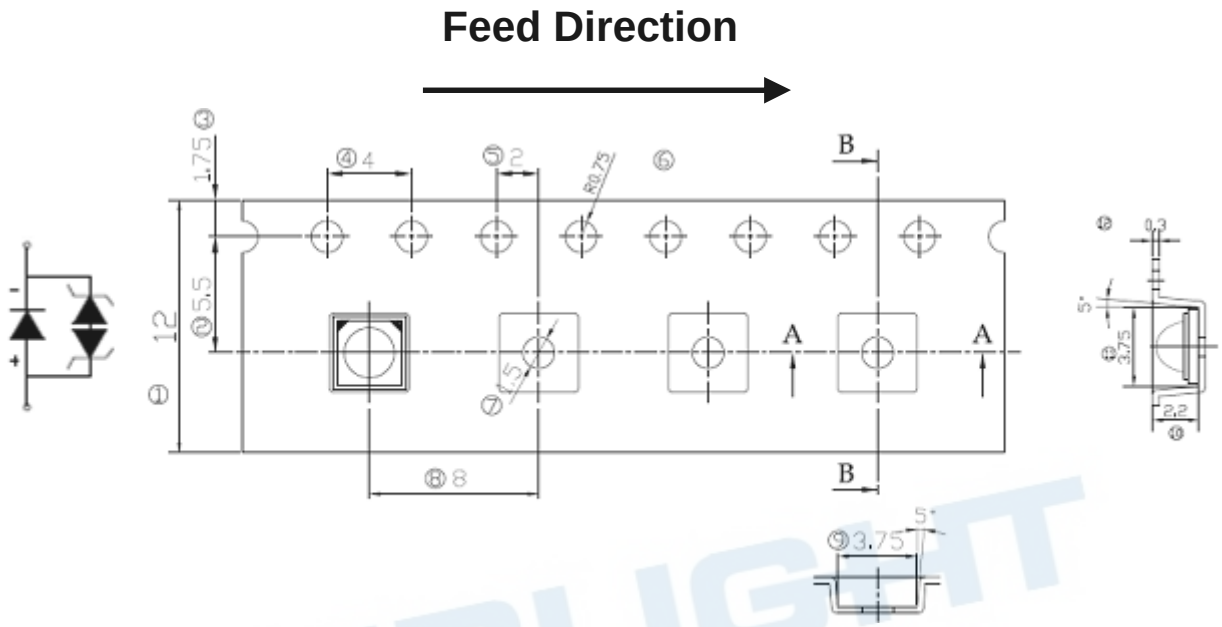
Notes:

1. $2\theta_{1/2}$ is the off axis angle from lamp centerline where the luminous intensity is 1/2 of the peak value.
2. View angle tolerance is ± 5° .

Emitter Tape Packaging

Carrier Tape Dimensions as the following:

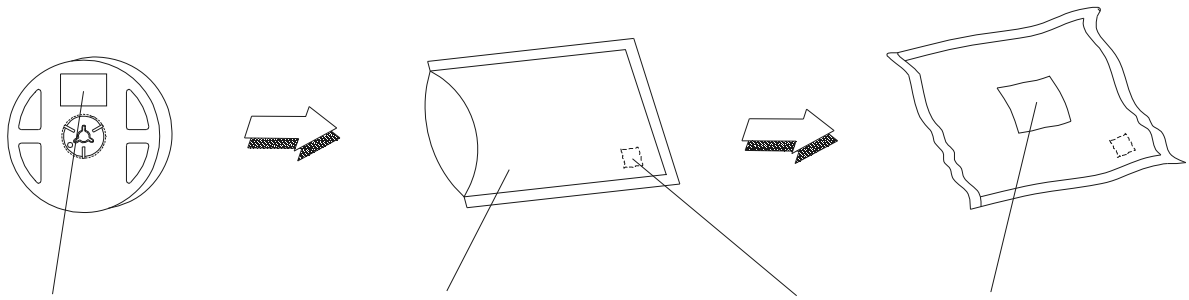
MPQ: 4000pcs per reel.



Notes:

1. Dimensions are in millimeters.
2. Tolerances for fixed dimensions are ±0.1mm.

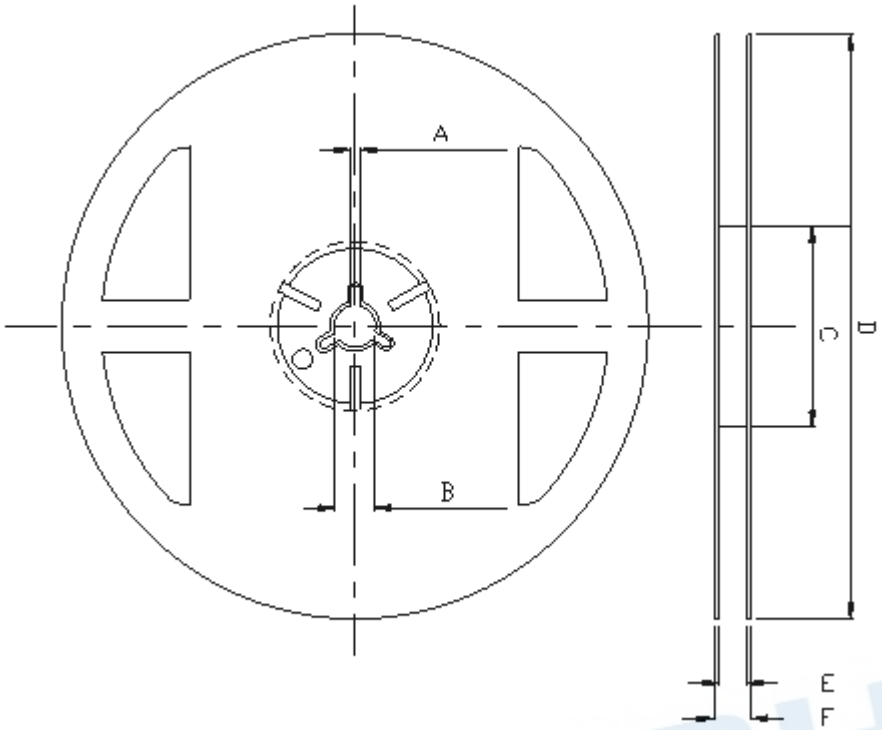
Moisture Resistant Packaging



Label **Aluminum moisture-proof bag** **Desiccant** **Label**

Emitter Reel Packaging

Reel Dimensions



Dimension No.	A	B	C	D	E	F
Std. Dimension Tolerance	2.0±.0.5	ψ13.0±0.2	ψ100.0±1.0	ψ330.0±2.0	13.0±0.3	17.4±1.0

Notes:

1. Dimensions are in millimeters.

Product Labeling

Label Explanation

CPN: Customer Specification (when required)

P/N : Everlight Production Number

QTY: Packing Quantity

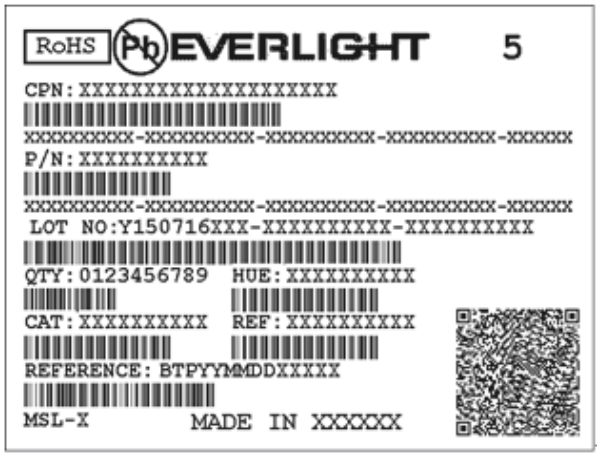
CAT: Radiant Flux Bin

HUE: Color Bin

REF: Forward Voltage Bin

LOT No: Lot Number

MADE IN TAIWAN: Production Place



Storage Conditions

- Before the package is opened. The LEDs should be stored at 30°C or less and 85%RH or less after being shipped from Everlight and the storage life limits are 1 year. The LEDs can be stored up to 3 years If in a sealed container with a nitrogen atmosphere and moisture absorbent material.
- After opening the package: The LED's floor life is 1 year under 30℃ or less and 60%RH or less. The LED should be soldered with 168hrs (7days) after opening the package. If unused LEDs remain, it should be stored in moisture proof packages.
- If the moisture absorbent material (silica gel) has faded away or the LEDs have exceeded the storage time, baking treatment should be performed using the following conditions. Baking treatment: 60±5℃ for 24 hours.

Revision History

Current version: 2019/05/25
Device No: DHE-0003614
Version. 1

Page	Subjects (major change in previous version)	Date of change
All	Creat New Device No: DHE-0003614	2019/05/25