

EVERLIGHT

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DATASHEET

Shwo(N) 2W Series

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“Shwo(N) [Shuo(N)] 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(N) 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(N) 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.1100mW @ 700mA
- ◆ Photosynthetic Photon Flux : 6.05 umole/s
- ◆ Moisture Sensitivity Level: 1
- ◆ Radiant Efficiency : 73%
- ◆ RoHS compliant
- ◆ The product itself will remain within RoHS compliant version.
- ◆ Compliance with EU REACH
- ◆ Compliance Halogen Free (Br < 900 ppm, Cl < 900 ppm, Br+Cl < 1500 ppm)
- ◆ Compliance with EU REACH

Applications

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



Table of Contents

Product Nomenclature.....	3
Absolute Maximum Ratings	4
JEDEC Moisture Sensitivity	4
Luminous Flux Characteristics for the Shwo(N) series	4
PN of the Shwo(N) series: Color LEDs	5
Product Binning	5
Optical Characteristics	6
Mechanical Dimension.....	7
Pad Configuration	8
Reflow Soldering Characteristics	9
Wavelength Characteristics	10
Typical Light Output Characteristic V.S. Thermal Pad Temperature.....	10
Typical Electrical Characteristics	11
Typical Relative Radiant Flux V.S. Forward Current.....	11
Typical Wavelength & Forward Current.....	12
Current Derating Curves.....	12
Typical Radiation Patterns	13
Emitter Tape Packaging.....	14
Emitter Reel Packaging	15
Product Labeling.....	16
Reliability Test Items and Conditions.....	17
Storage Conditions	18
Thermal Management	19
Revision History	20

Product Nomenclature

The product name is designated as below:

ELSWN – ABCDE – FGHIJ – V1234

Designation:

AB = min. luminous flux (lm) or radiation power (mW) performance

C = radiation pattern [1]

D = color [2]

E = proposed operating power [3]

F = reserved for future product offerings

G = Internal code

H = packaging type [4]

IJ = internal code

V = forward voltage bin

1234 = color bin or CCT 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 proposed operating power:

Symbol	Description
1	2W

4. Table of packaging types:

Symbol	Description
P	Tape

Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Max. DC Forward Current (mA)	I _F	700	mA
Max. Peak Pulse Current (mA)	I _{Pulse}	1250	mA
Max. ESD Resistance	V _B	8000	V
Thermal Resistance	R _{th}	8	°C/W
Max. Junction Temperature	T _J	125	°C
Operating Temperature	T _{opr}	-40 ~ +100	°C
Storage Temperature	T _{stg}	-40 ~ +100	°C
Max. Soldering Temperature	T _{sol}	260	°C
Max. Allowable Reflow Cycles	n/a	2	cycles

Notes:

- Show(N) series Maximum forward current is 700mA (Thermal Pad=25°C)
- Show(N) series Maximum peak pulse current is 1250mA (Duty cycle = 1/10@1KHZ)

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

Luminous Flux Characteristics for the Shwo(N) series

Color	Part Number	2W	
		Minimum Radiant Flux (mW) [1]	Drive Current (mA)
Deep-Red	ELSWN – R91EX	1000	700

Notes:

- Luminous flux measurement tolerance: ±10%.
- The data of luminous flux measured at thermal pad=25°C
- Typical luminous flux or light output performance is operated within the condition guided by this datasheet.

PN of the Shwo(N) series: Color LEDs

The table below is a list of the binning options for the Everlight Shwo(N) 2W series 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(N) LEDs. For Example: If you order product using P/N **ELSWN-R91E2-5EPNM-AD3D8**, you will be specifying:



Color, Shwo(N) series LEDs at 700mA 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) 660~665(D6) 655~660(D7) 670~675(D8)	1.75~2.05 (U1) 2.05~2.35 (U2) 2.35~2.55 (U3)	1000

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	ELSWN-R91E2-5EPNM-AD3D8	1000	1200	655~665	5.18	3.04	2.3

Product Binning Radiant flux Bins

Group	Bin	Minimum Radiant Flux (mW)	Maximum Radiant Flux (mW)
S	1	1000	1100
	2	1100	1200
	3	1200	1300
	4	1300	1400

Forward Voltage Bins

Group Name	Bins
A	U1+U2+U3

Group Name	Bin	Minimum Forward Voltage (V)	Maximum Forward Voltage (V)
A	U1	1.75	2.05
	U2	2.05	2.35
	U3	2.35	2.55

Notes:

1. Forward voltage measurement tolerance: $\pm 0.1V$.
2. Forward voltage bins are defined at $I_f=700mA$ operation.

Color Bins

Color	Bin	Minimum Dominant	Maximum Dominant
		Wavelength (nm)	Wavelength (nm)
<div style="background-color: #800000; color: white; padding: 2px; display: inline-block;">D (Deep-Red)</div>	3	645	650
	4	650	655
	5	655	660
	6	660	665
	7	665	670
	8	670	675

Notes:

1. Dominant / Peak wavelength measurement tolerance: $\pm 1.5nm$.
2. Dominant / Peak wavelength bins are defined at $I_f=700mA$ operation.

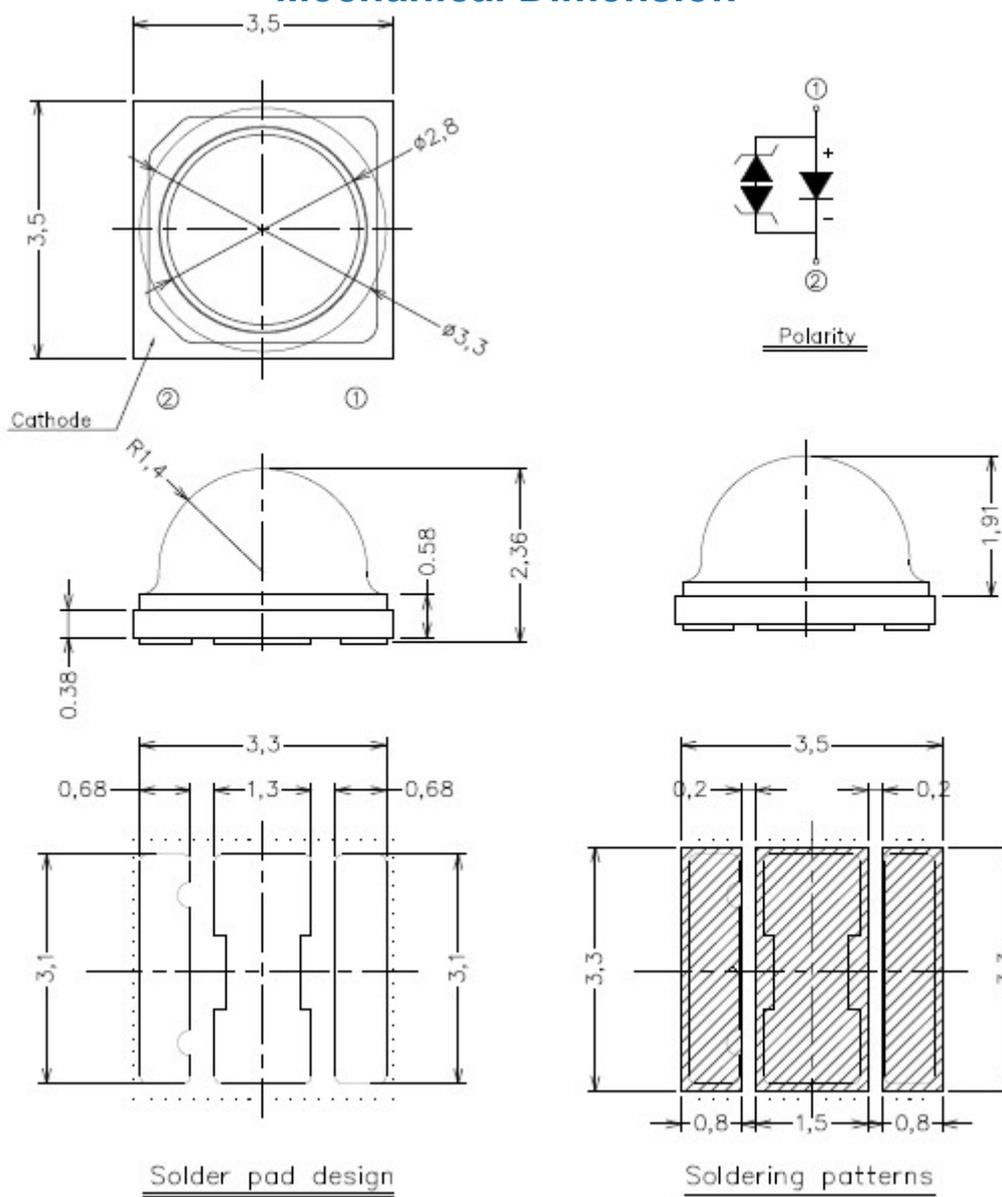
Optical Characteristics

Color	Part Number	Dominant Wavelength λ_D Peak Wavelength λ_P Color Temperature CCT			Typical Temperature Coefficient of Dominant Wavelength ($nm/^\circ C$)-($\Delta\lambda_D/\Delta T_J$)	Typical Viewing Angle (degrees) $2\theta_{1/2}$
		Min.	Typ.	Max.		
Deep-Red	ELSWN – XX1EX	650	655~665	665	0.08	120

Notes:

1. The test tolerance of Everlight is $\pm 1.5nm$ for dominant wavelength, $\pm 5\%$ for CCT.
2. Viewing angle is the width of half the light output intensity in all directions of 180° .

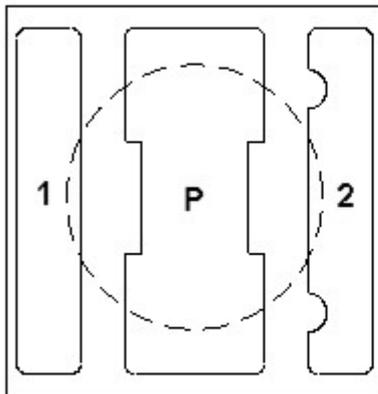
Mechanical Dimension



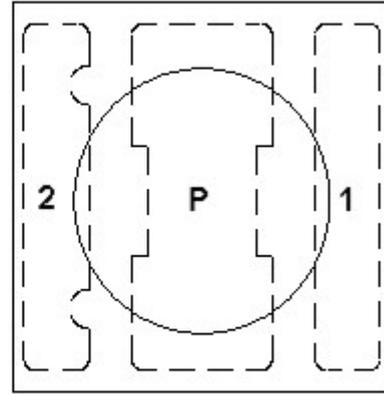
Notes:

1. Dimensions are in millimeters.
2. Tolerances unless mentioned are ± 0.15 mm.
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



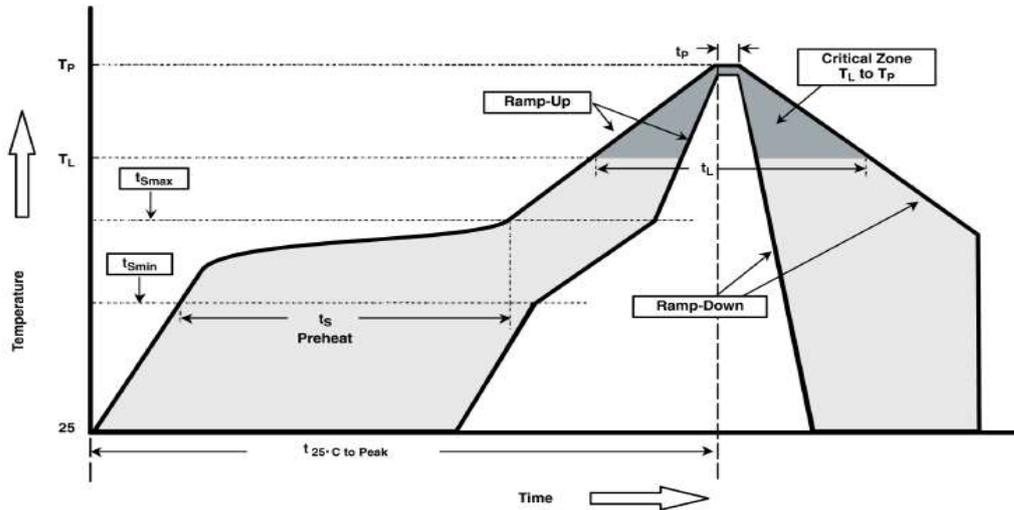
TOP VIEW

PAD	FUNCTION
1	ANODE
2	CATHODE
P	THERMAL PAD

Reflow Soldering Characteristics

For Reflow Process

- Shwo(N) series are suitable for SMT processes.
- Curing of glue in oven must be according to standard operation flow processes.

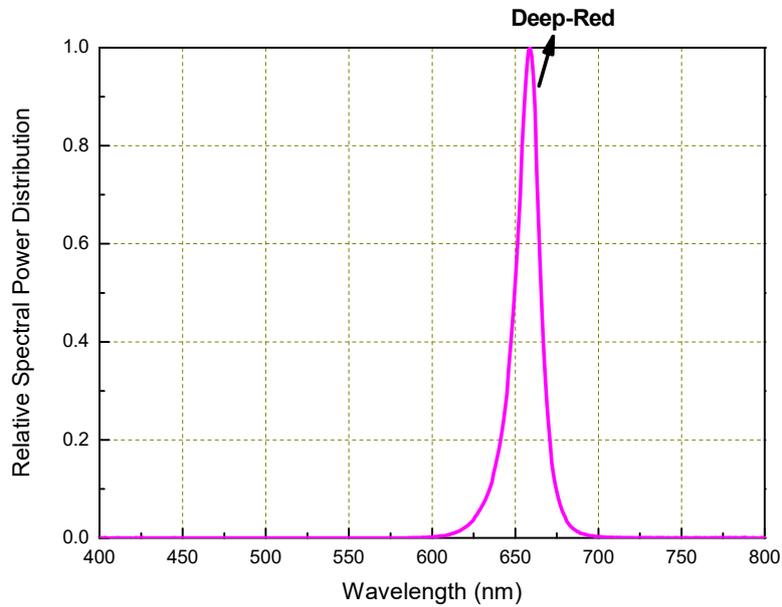


Profile Feature	Pb-Free Assembly	Unit Einheit
Average Ramp-up Rate 25 °C to 150 °C	2-3	°C /sec
Preheat Temperature Min.	150	sec
Preheat Temperature Max.	200	sec
Preheat Time	60-120	sec
Time Maintained Above Temperature	217	°C
Time Maintained Above Time	60-90	sec
Peak Temperature (max.)	260	°C
Time within 5°C of Actual Peak temperature	20-40	sec
Ramp-down Rate (max.)	3-5	°C /sec

- Reflow soldering should not be done more than twice.
- In soldering process, stress on the LEDs during heating should be avoided.
- After soldering, do not bend the circuit board.

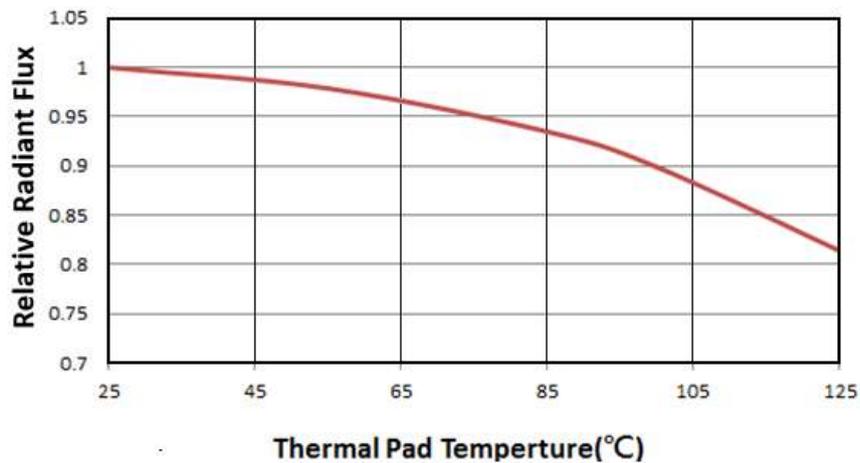
Wavelength Characteristics

For Deep-Red @ Thermal Pad Temperature = 25°C



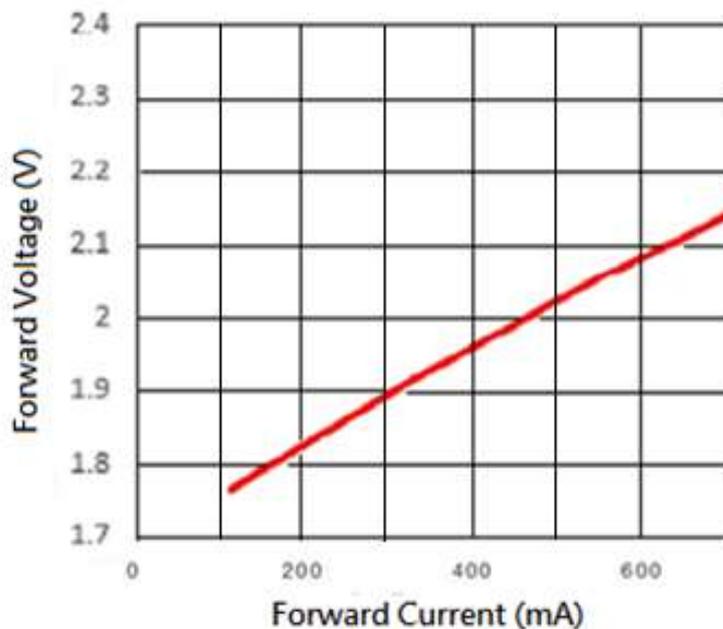
Typical Light Output Characteristic V.S. Thermal Pad Temperature

Deep-Red for 700mA Drive Current



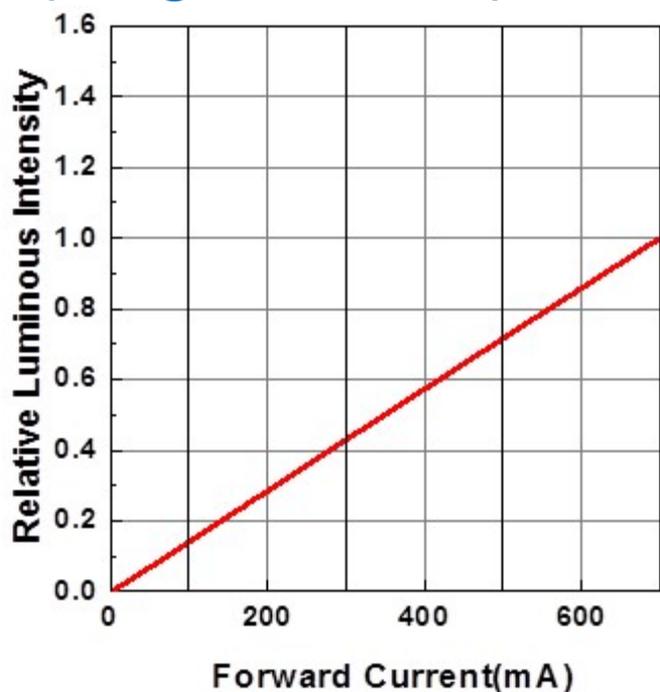
Typical Electrical Characteristics

For Deep-Red @ Thermal Pad Temperature = 25°C



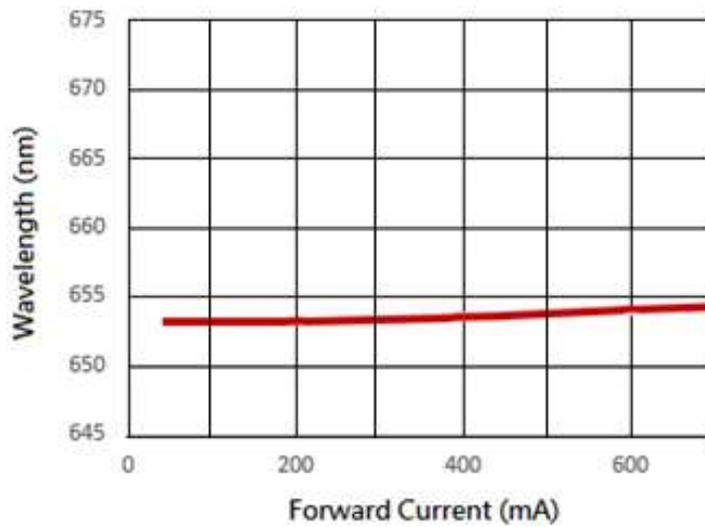
Typical Relative Radiant Flux V.S. Forward Current

For Deep-Red @ Thermal Pad Temperature = 25°C



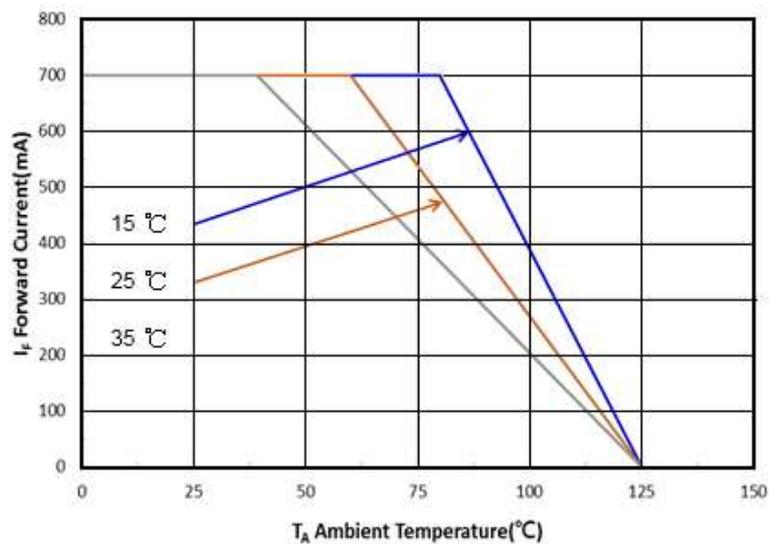
Typical Wavelength & Forward Current

For Deep-Red @ Thermal Pad Temperature = 25°C



Current Derating Curves

Current Derating Curve for 700mA Drive Current Deep-Red

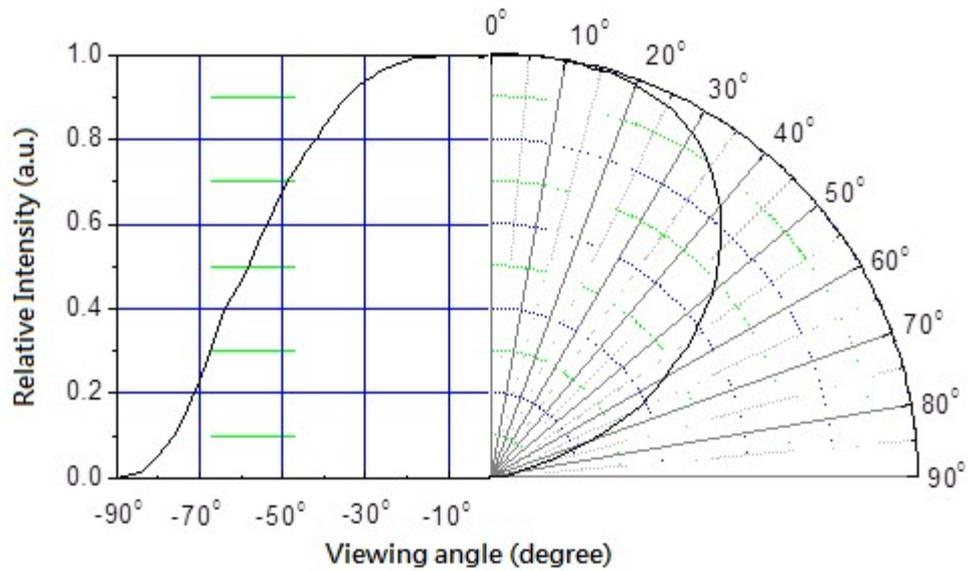


Note:

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

Typical Radiation Patterns

Shwo(N) series: Typical Diagram Characteristics of Radiation

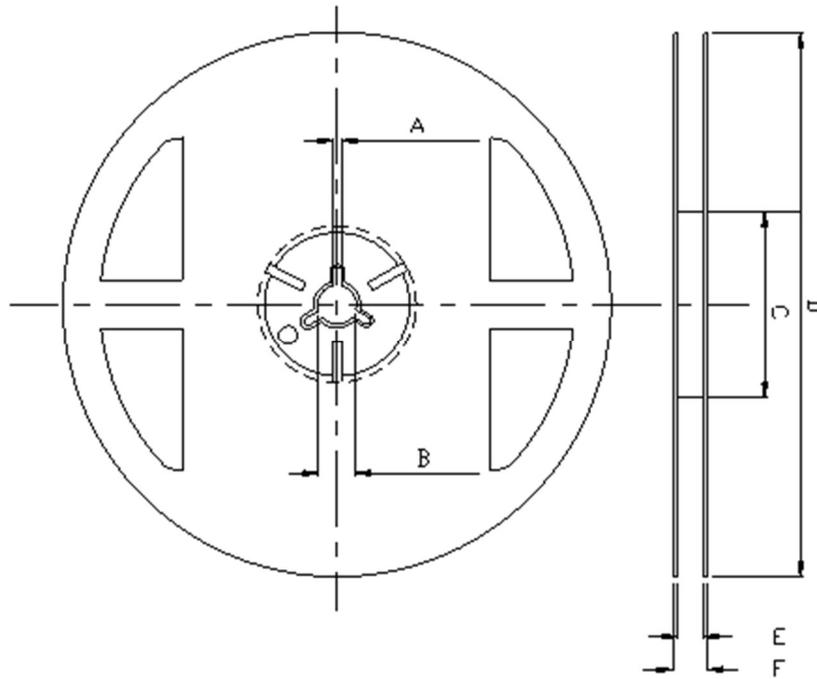


Notes:

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 $\pm 5^\circ$.

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

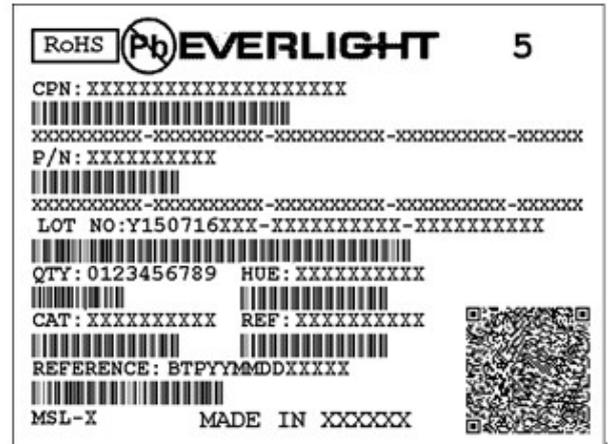
CAT: Radiant flux Bin

HUE: Color Bin

REF: Forward Voltage Bin

LOT No: Lot Number

MADE IN TAIWAN: Production Place



Reliability Test Items and Conditions

The reliability of products shall be satisfied with items listed below.

No.	Items	Stress Condition	Test Hours/Cycles	Sample Size
1	Resistance to Solder Heat	Level 1 / Reflow / 260°C / 10sec	3 times	8 PCS
2	Solderability	Reflow / 245°C / 10sec	1 times	8 PCS
3	Thermal Shock	-40°C~100°C / Dwell time 20min	300 Cycles	8 PCS
4	Power Temperature Cycle	-40°C~100°C / Dwell time 15min	300 Cycles	8 PCS
5	Temperature Cycle	-40°C~100°C / Dwell time 30min	300 Cycles	8 PCS
6	High Temperature / Humidity Life	Ta=85°C, 85%RH	1000hours	8 PCS
7	Low Temperature Life	Ta= -40°C, IF=700mA	1000hours	8 PCS
8	High Temperature Life #1	Ta=60°C, IF=700mA	3000hours	8 PCS
9	High Temperature Life #2	Ta=85°C, IF=600mA	3000hours	8 PCS
10	Pulse	ON 30ms / OFF 2500ms	30000 Cycles	8 PCS
11	High Temperature Life	100°C, 168H	168HRS	8 PCS

Failure Criteria:

1. LEDs are open or short.
2. Im: luminous flux attenuate difference(1000hrs)>±10%
3. VF: forward voltage difference(1000hrs)>±10%
4. CIE-X&Y: coordinates measurement allowance (1000hrs) >±0.02 / Wd±2nm

Storage Conditions

- Recommended to operate in accordance with the following conditions, increased LED life.
- 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°C 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°C for 24 hours.

Thermal Management

- Recommended to operate in accordance with the following conditions, increased LED life.
- For maintaining the high flux output and achieving maximum reliability, EHP-C19 flashlight series LEDs should be mounted on a metal core printed circuit board (MCPCB) or other kinds of heat sink with proper thermal connection to dissipate approximately 1W of thermal energy at 350mA operation.
- Sufficient thermal management must be implemented. Please refer to the graph “Forward Current Derating Curve“ on Page 20. The soldering temperature must be kept under 60°C at the driving current 350mA. Otherwise, the junction temperature of die may exceed over the limit at high current driving conditions and the LEDs’ lifetime may be decrease dramatically.
- Special thermal designs are also recommended to take in outer heat sink design, such as FR4 PCB on Aluminum with thermal vias or FPC on Aluminum with thermal conductive adhesive, etc.
- Sufficient thermal management must be conducted, or the die junction temperature will be over the limit under large electronic driving and LED lifetime will decrease critically.

Revision History

Current version: 2020.01.17

Device No: DHE-0003702

Version. 1

Page	Subjects (major change in previous version)	Date of change