

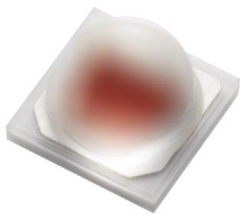
EVERLIGHT
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DATASHEET

Shwo(N)

ELSWN-R32E1-0EPNM-AD3D8

“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.510mW @ 350mA
- ◆ Photosynthetic Photon Flux : 2.8 umole/s
- ◆ Moisture Sensitivity Level: 1
- ◆ Radiant Efficiency : 55.8%
- ◆ 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)

Applications

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

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Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Max. DC Forward Current (mA)	I_F	700 ^[1]	mA
Max. Peak Pulse Current (mA)	I_{Pulse}	1500 ^[2]	mA
Max. ESD Resistance	V_B	8000	V
Reverse Voltage	V_R	Note 3	V
Thermal Resistance	R_{th}	10	°C/W
Max. Junction Temperature	T_J	125 ^[4]	°C
Operating Temperature	T_{Opr}	-40 ~ +100 ^[5]	°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. Maximum peak pulse current for 1W is 1500mA (Duty cycle = 1/10@1KHZ)
3. The Shwo series LEDs are not designed for reverse bias use.
4. Maximum junction temperature of Red LEDs is 125°C.
5. Maximum Operating Temperature (Thermal Pad) of Red LEDs is 100°C.

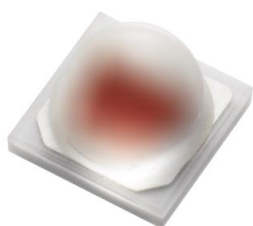
JEDEC Moisture Sensitivity

Level	Floor Life		Soak Requirements Standard	
	Time (hours)	Conditions	Time (hours)	Conditions
1	Unlimited	$\leq 30^\circ\text{C} / 85\% \text{ RH}$	168 (+5/-0)	85°C / 85% RH

PN of the Shwo series: Color LEDs

The table below is a list of the binning options for the Everlight Shwo 1W 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 90°. 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 ELSWN-R32E1-0EPNM-AD3D8, 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) 2.35~2.55(U3)	420

Color	Order Code of Shwo	Minimum Radiant Flux (mW)	Typ. Radiant Flux (mW)	Peak Wavelength (nm)	PPF (umole/s)	PPE (umole/J)	Typ. Forward Voltage (V)
Deep Red	ELSWN-R32E1-0EPNM-AD3D8	420	510	655~665	2.8	3.56	2.15

Product Binning

Radiant Flux Bins

Group Bin	Minimum Radiometric Power(mW)	Maximum Radiometric Power(mW)
R3R4	430	530
R5R6	530	700

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 $I_f=350mA$ operation.

Color Bins

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

Notes:

1. Peak wavelength measurement tolerance: $\pm 1nm$.
2. Peak wavelength bins are defined at $I_f=350 mA$ operation.

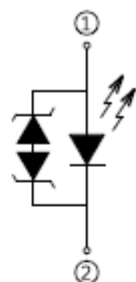
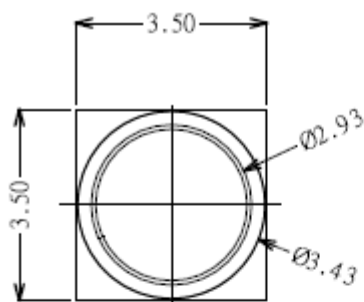
Optical Characteristics

Color	Part Number	Wavelength (nm) λ_p			Typical Temperature Coefficient of Peak Wavelength (nm/°C)-($\Delta\lambda_D/\Delta T_J$)	Typical Viewing Angle (degrees) $2\theta_{1/2}$
		Min.	Typ.	Max.		
Deep-Red	ELSWN-R32E1-0EPNM-AD3D8	645	660	675	0.08	90

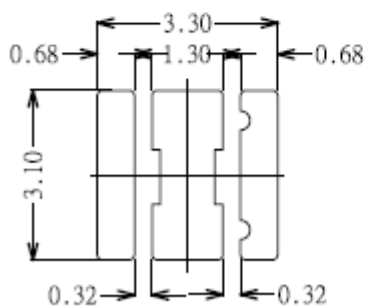
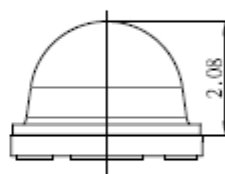
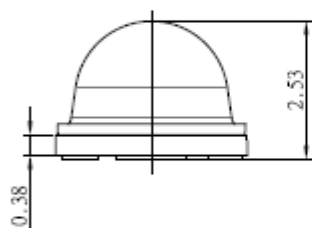
Notes:

1. The test tolerance of Everlight is $\pm 0.5\text{nm}$ for peak wavelength.
2. Viewing angle is the width of half the light output intensity in all directions of 180° .

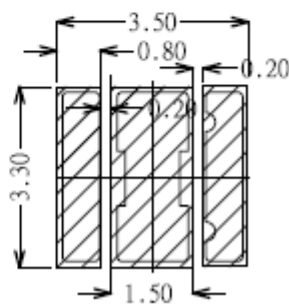
Mechanical Dimension



Polarity



Solder pad design

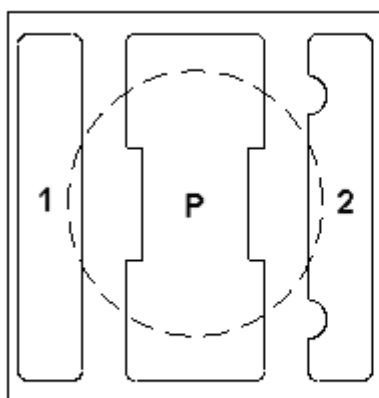


Soldering patterns

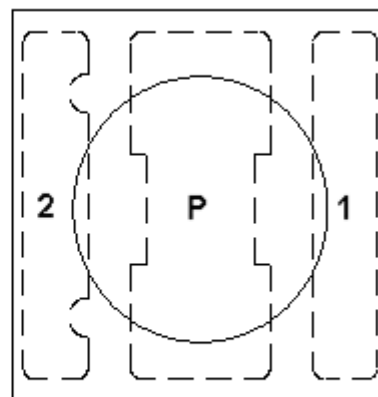
Notes:

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



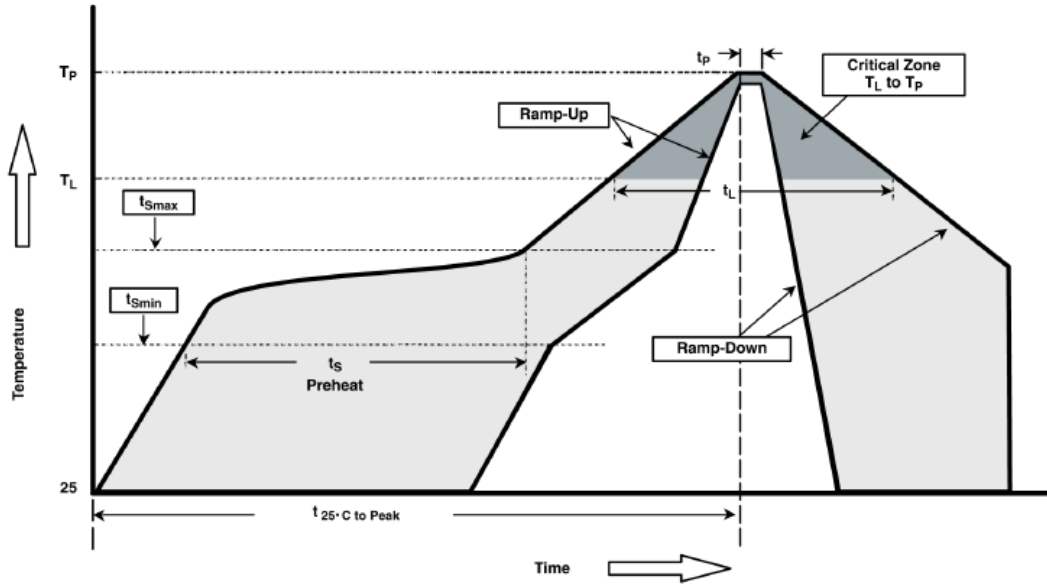
TOP VIEW

PAD	FUNCTION
1	ANODE
2	CATHODE
P	THERMAL PAD

Reflow Soldering Characteristics

For Reflow Process

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

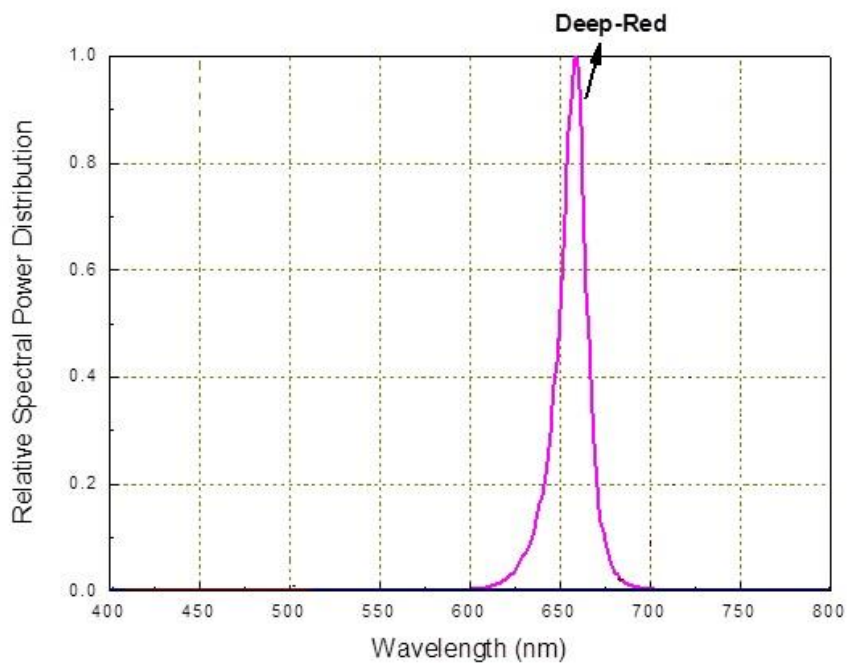


Profile Feature	Pb-Free Assembly	Unit Einheit
Average Ramp-up Rate 25 °C to 150 °C	2-3	°C /sec
Preheat Temperature Min.	150	sec
Preheat Temperature Max.	200	sec
Preheat Time	60-120	sec
Time Maintained Above Temperature	217	°C
Time Maintained Above Time	60-90	sec
Peak Temperature (max.)	260	°C

- 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.

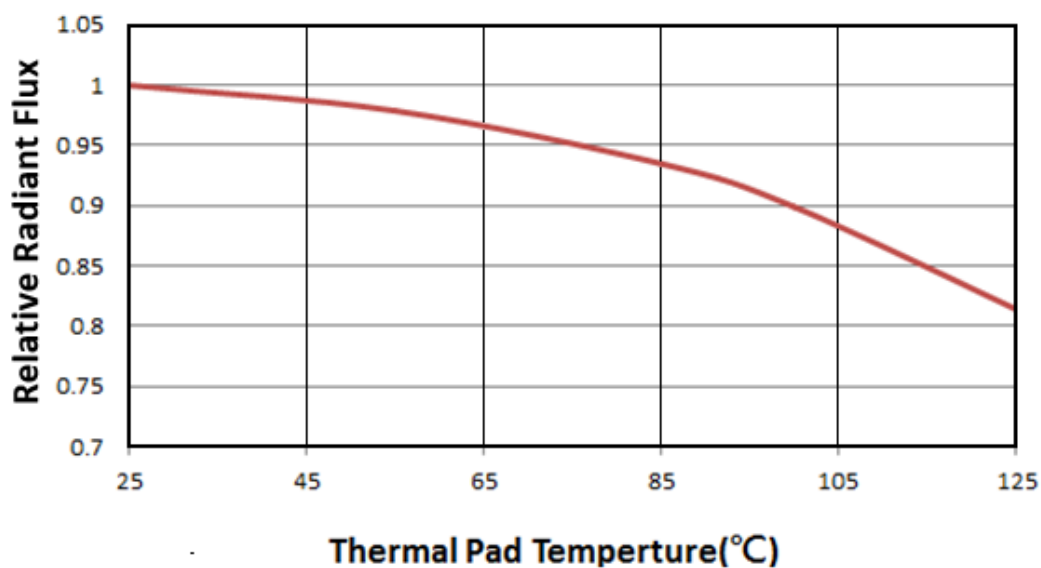
Wavelength Characteristics

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



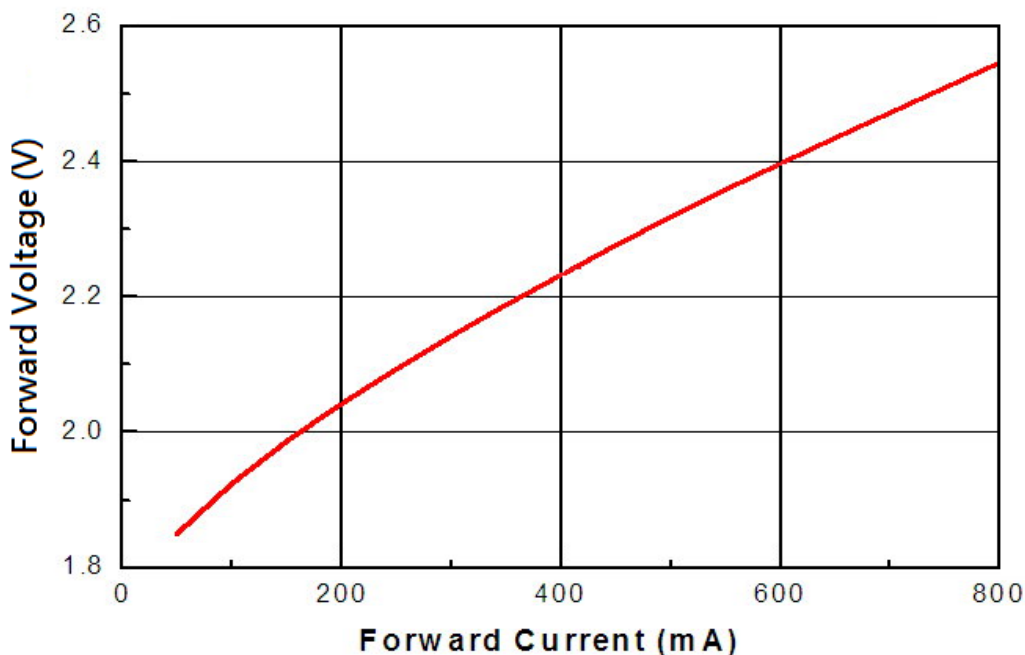
Typical Light Output Characteristic V.S. Thermal Pad Temperature

Red for 350mA Drive Current



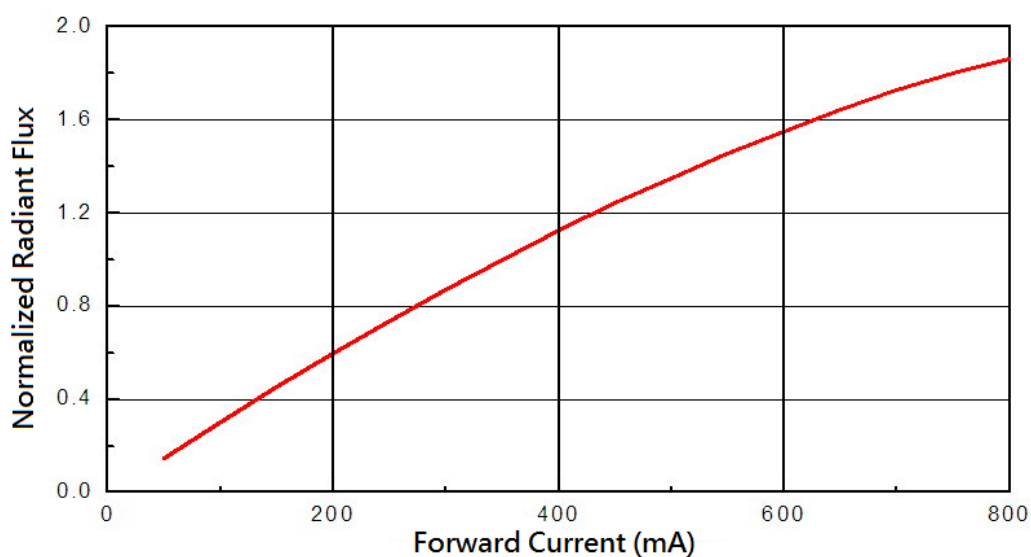
Typical Electrical Characteristics

For Red @ Thermal Pad Temperature = 25°C



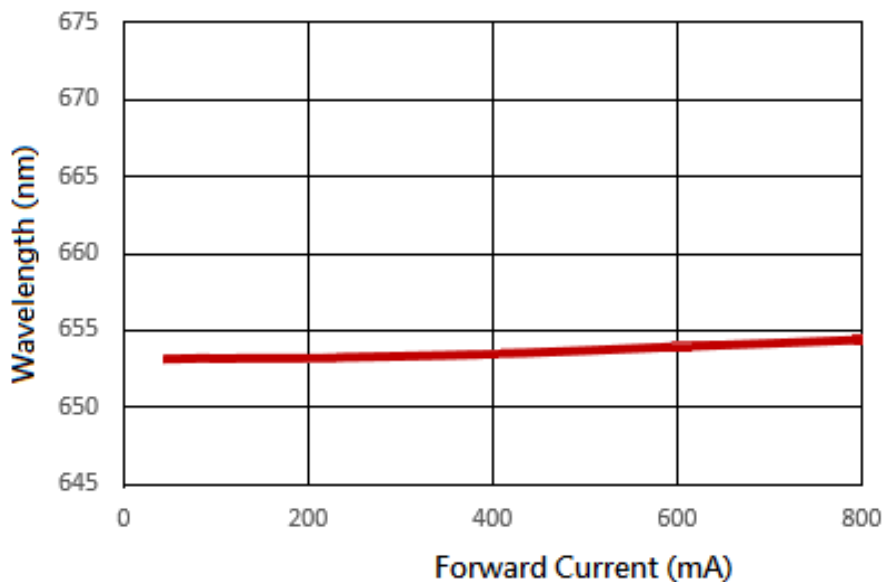
Typical Relative Radiant Flux V.S. Forward Current

For Red @ Thermal Pad Temperature = 25°C



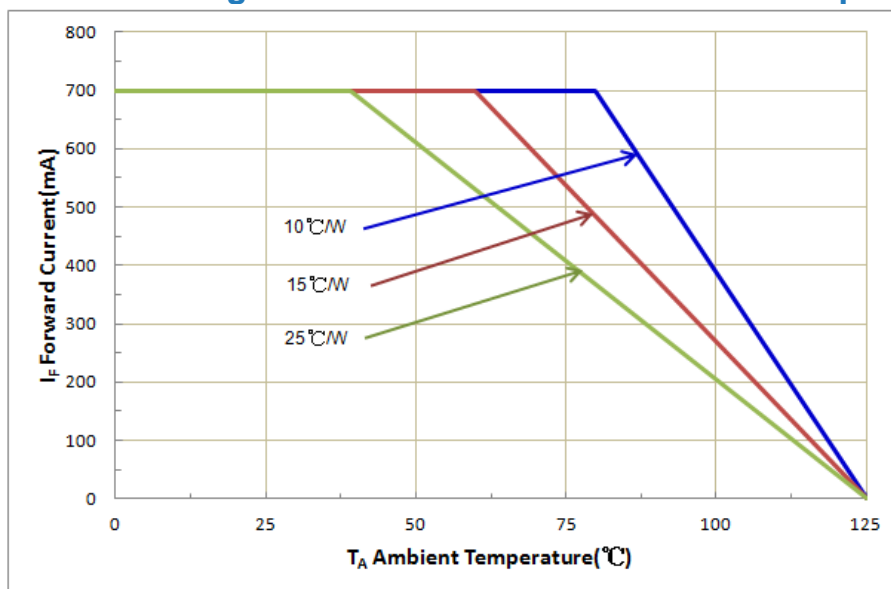
Typical Wavelength Shift Characteristics V.S. Forward Current

For Red @ Thermal Pad Temperature = 25°C



Current Derating Curves

Current Derating Curve for 700mA Drive Current Deep-Red



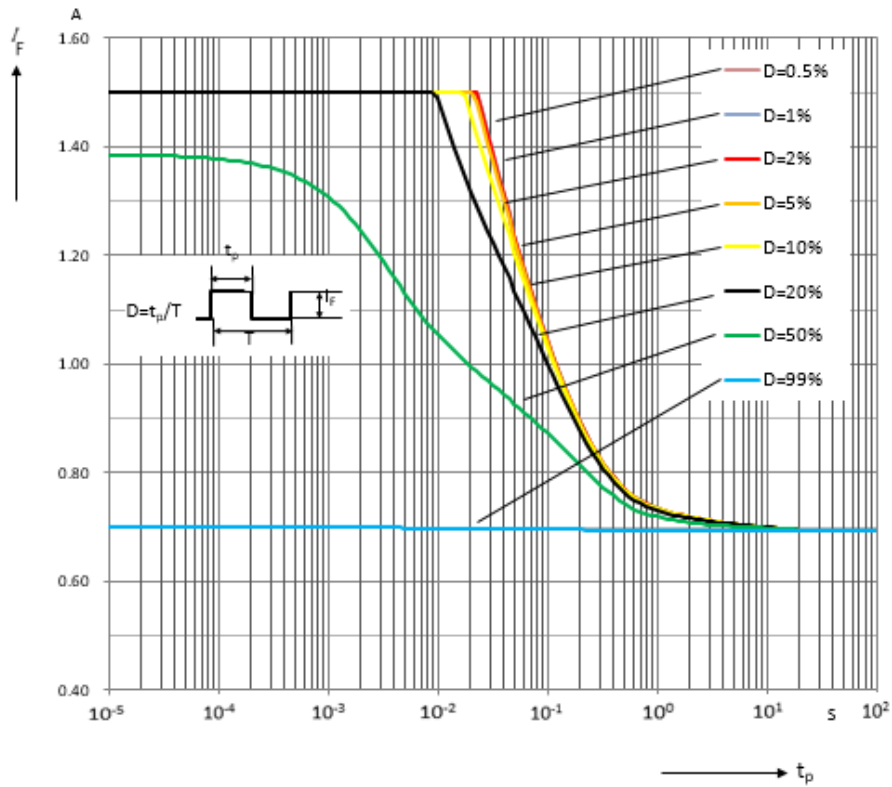
Note:

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

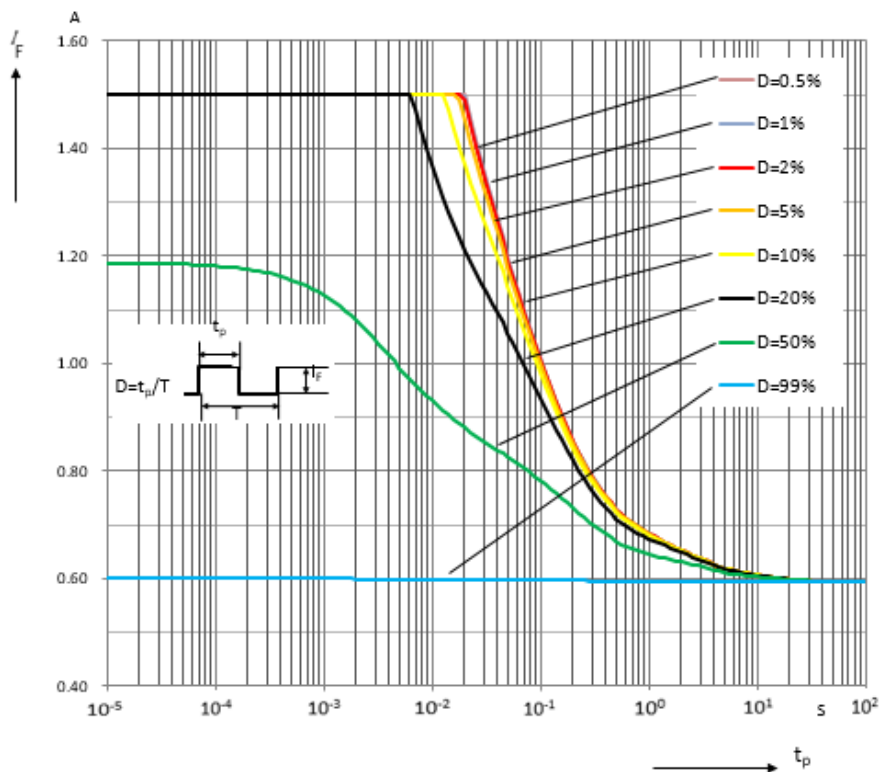
Permissible Pulse Handling Capability

$$I_F = f(t_p)$$

D=Duty cycle, TS=25°C

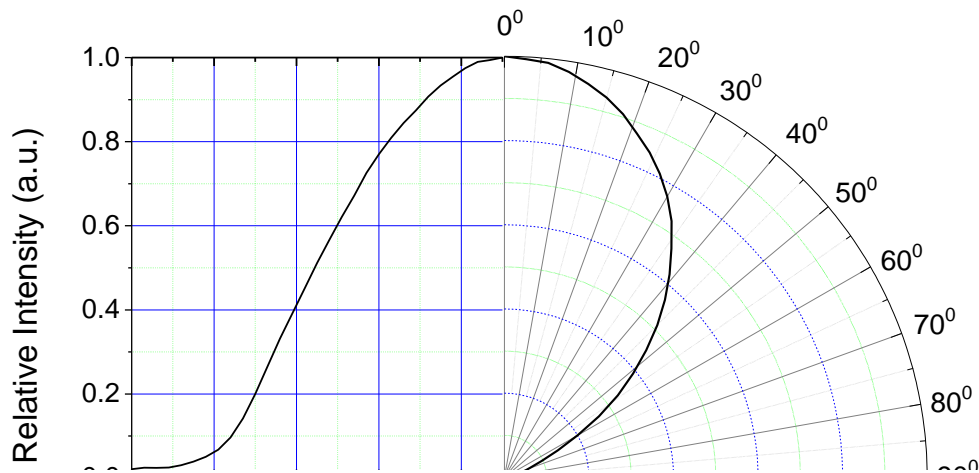


D=Duty cycle, TS=85°C



Typical Radiation Patterns

ShwoN series: Typical Diagram Characteristics of Radiation



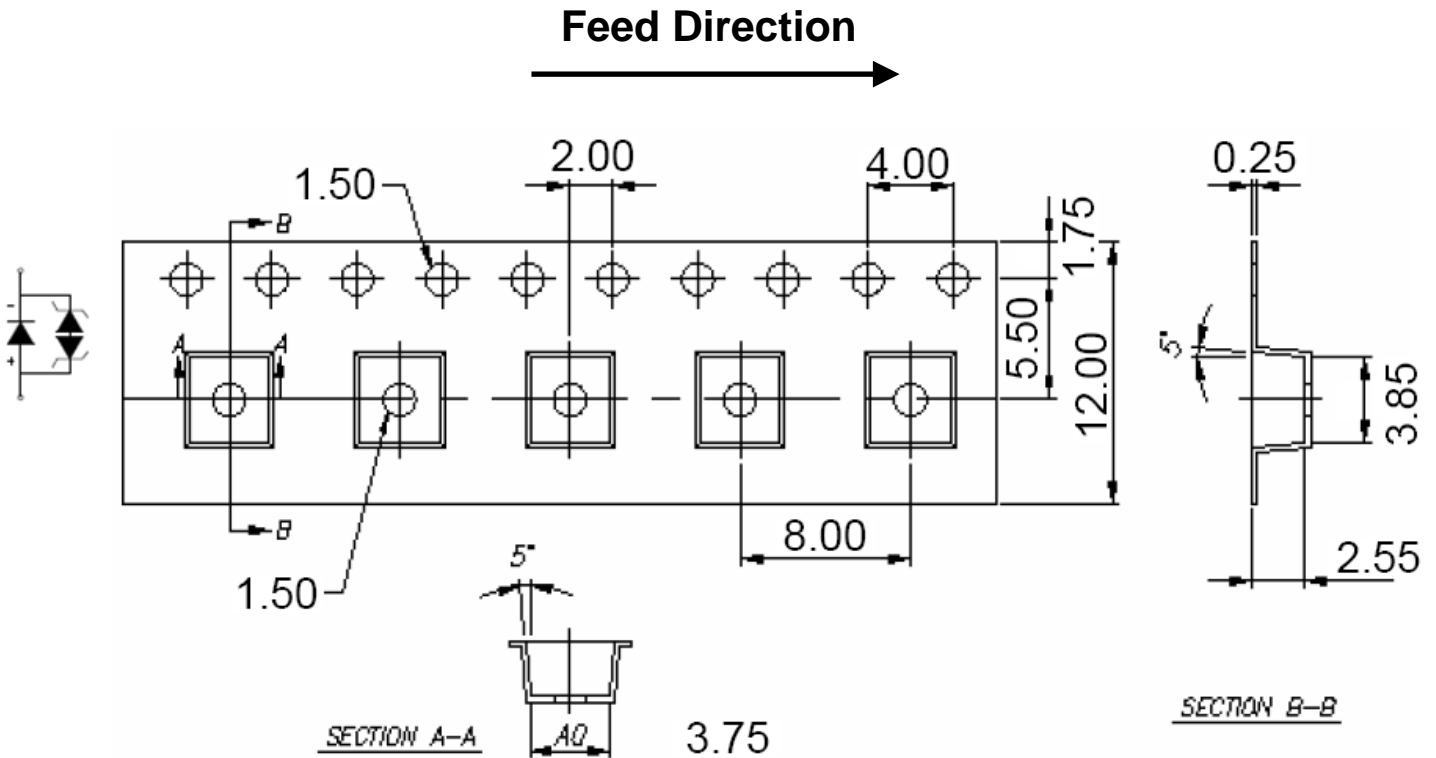
Notes:

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 Tape Packaging

Carrier Tape Dimensions as the following:

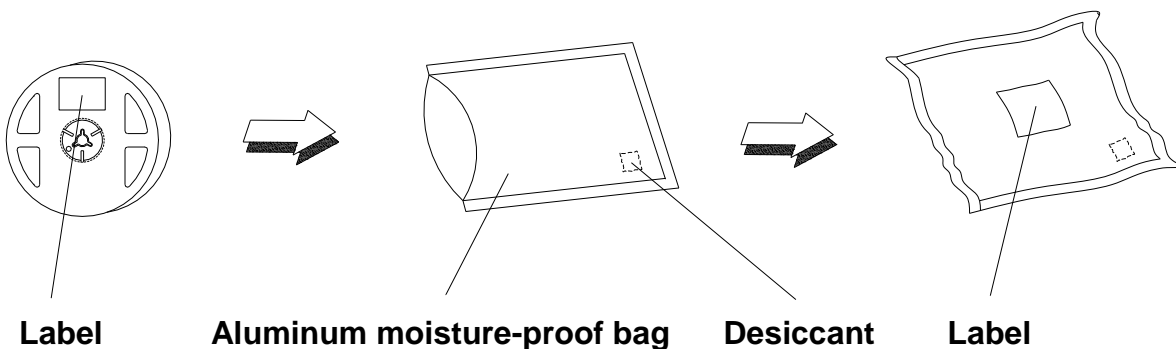
Order Qty.: > 2Kpcs, MPQ: min. 400pcs (incl. 400pcs / 800pcs) per reel.



Notes:

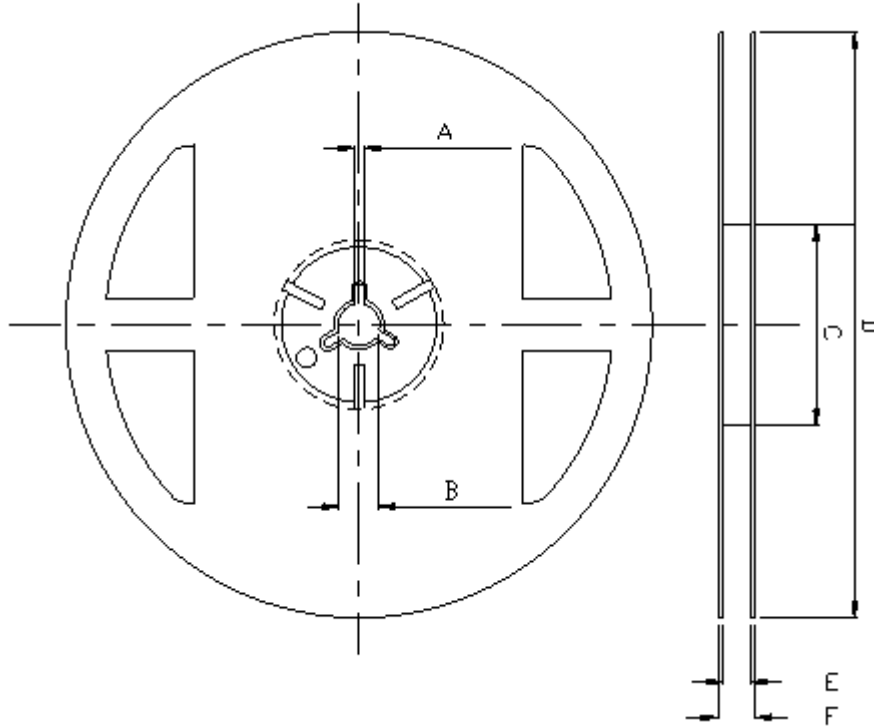
1. Dimensions are in millimeters.
2. Tolerances for fixed dimensions are $\pm 0.1\text{mm}$.

Moisture Resistant Packaging



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

Note:

- Dimensions are in millimeters.

Product Labeling

Label Explanation

CPN: Customer Specification (when required)

P/N : Everlight Production Number

QTY: Packing Quantity

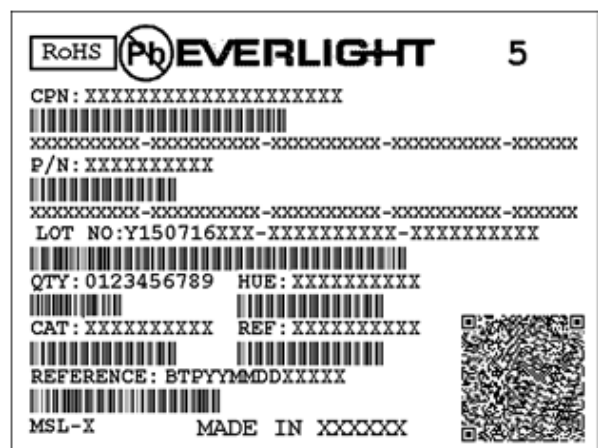
CAT: Radiometric Power Bin

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

- 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.

Revision History

Current version: 2020/02/18
Device No: DHE-0003707
Version. 1

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