

## DATASHEET

# EVERLIGHT AUTOMOTIVE

## 2820-SR2001H-AM



### Features

- Package : SMD package
- Color : Super Red
- Typ. Luminous Flux : 27 lm @ 200mA
- Viewing angle : 120°
- ESD : 2KV
- MSL : 2
- Qualified AEC-Q102 Rev A
- Sulfur Test Criteria Class: A1
- Compliance with RoHS and REACH
- Compliance Halogen Free .(Br <900 ppm ,Cl <900 ppm , Br+Cl < 1500 ppm)

### Applications

- Automotive exterior lighting

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## 1. Characteristics

| Parameter                                  |            | Symbol                   | Min. | Typ. | Max. | Unit | Condition          |
|--------------------------------------------|------------|--------------------------|------|------|------|------|--------------------|
| Forward Current                            |            | $I_F$                    | 50   | 200  | 250  | mA   | ---                |
| Luminous Flux                              |            | $I_v$                    | 17   | 27   | 33   | lm   | $I_F=200\text{mA}$ |
| Forward Voltage                            |            | $V_F$                    | 1.75 | 2.3  | 2.75 | V    | $I_F=200\text{mA}$ |
| Viewing Angle                              |            | $\varphi$                | ---  | 120  | ---  | deg  | $I_F=200\text{mA}$ |
| Dominant Wavelength                        |            | $\lambda_d$              | 627  | 632  | 639  | nm   | $I_F=200\text{mA}$ |
| Thermal Resistance<br>(Junction to Solder) | Real       | $R_{th JS \text{ real}}$ | ---  | 18   | 24   | K/W  | $I_F=200\text{mA}$ |
|                                            | Electrical | $R_{th JS \text{ el}}$   | ---  | 12   | 16   |      |                    |

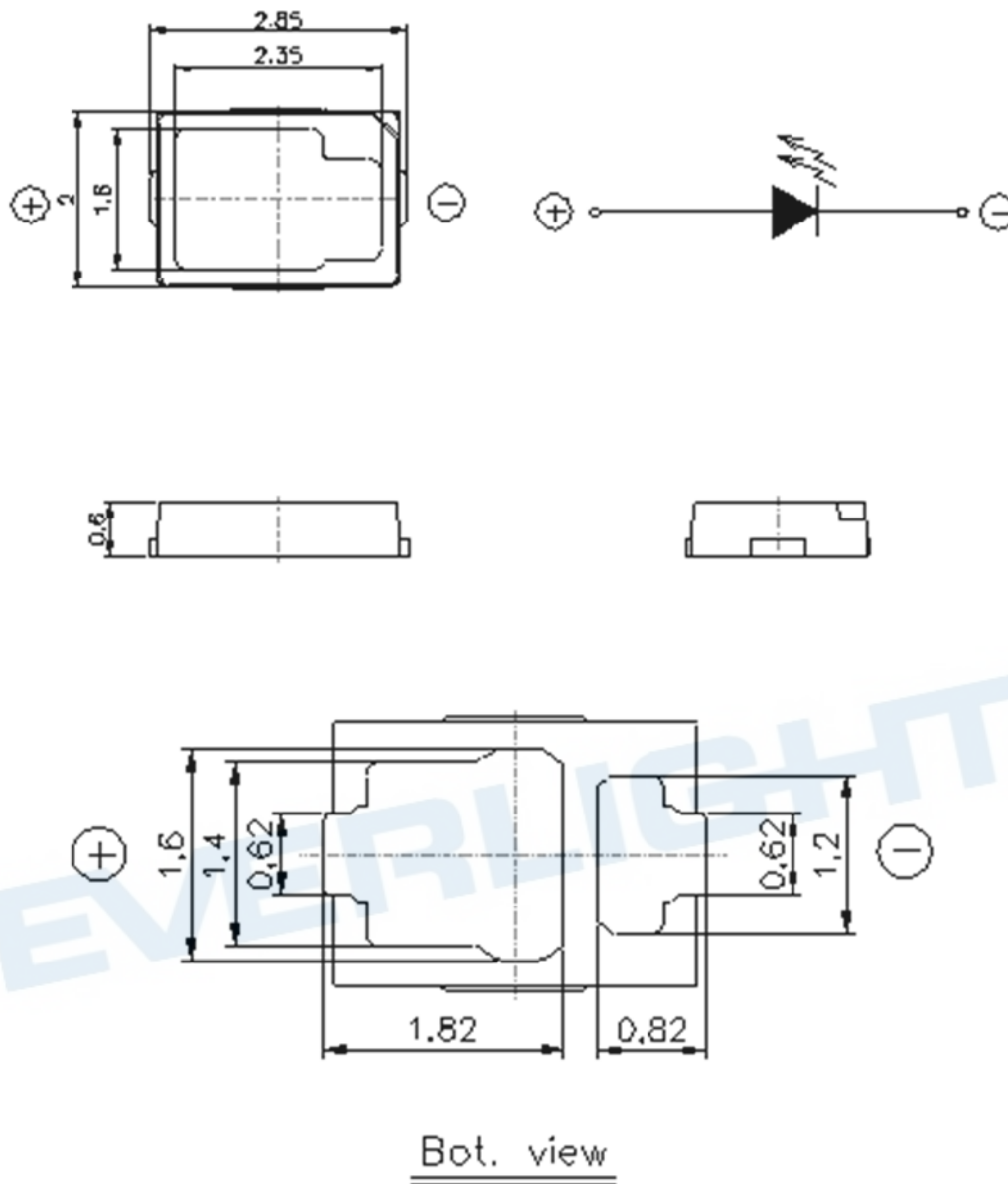
### Notes:

1. Luminous flux measurement tolerance:  $\pm 8\%$ .
2. The data of luminous flux measured at thermal pad= $25^\circ\text{C}$
3. Forward voltage measurement tolerance:  $\pm 0.05\text{V}$
4. Tolerance of Dominant Wavelength :  $\pm 1\text{nm}$ .

## 2. Absolute Maximum Ratings

| Parameter                                                             | Symbol      | Ratings                            | Unit       |
|-----------------------------------------------------------------------|-------------|------------------------------------|------------|
| Power Dissipation                                                     | $P_d$       | 700                                | mW         |
| Forward Current                                                       | $I_F$       | 250                                | mA         |
| Surge Current<br>( $t \leq 10 \mu s$ ; $D=0.005$ ; $T_s=25^\circ C$ ) | $I_{FM}$    | 1000                               | mA         |
| Reverse Voltage                                                       | $V_R$       | Not designed for reverse operation | V          |
| Junction Temperature                                                  | $T_J$       | 150                                | $^\circ C$ |
| Operating Temperature                                                 | $T_{opr}$   | -40 ~ +125                         | $^\circ C$ |
| Storage Temperature                                                   | $T_{stg}$   | -40 ~ +125                         | $^\circ C$ |
| ESD Sensitivity<br>( $R=1.5k\Omega$ , $C=100pF$ )                     | $ESD_{HBM}$ | 2                                  | kV         |
| Soldering Temperature                                                 | Reflow      | 260 $^\circ C$ for 30sec           | $^\circ C$ |

### 3. Mechanical Dimension



**Notes:**

1. Dimensions are in millimeters.
2. Tolerances unless mentioned are  $\pm 0.1\text{mm}$ .

Technical drawing of a mechanical part with the following dimensions:

- Overall width: 1,58
- Overall height: 1,6
- Top flange width: 1,23
- Top flange height: 0,82
- Bottom flange width: 1,23
- Bottom flange height: 0,63
- Central hole diameter: 0,37
- Right side flange width: 1,4
- Right side flange height: 0,82

1. Dimensions are in millimeters.  
2. Tolerances unless mentioned are  $\pm 0.1\text{mm}$

## 5. Binning Information

### Luminous Flux Bins

| Group Bin | Minimum Photometric Flux (lm) | Maximum Photometric Flux (lm) |
|-----------|-------------------------------|-------------------------------|
| E7        | 17                            | 20                            |
| E8        | 20                            | 23                            |
| E9        | 23                            | 27                            |
| F1        | 27                            | 33                            |

**Notes:**

1. Luminous flux measurement tolerance:  $\pm 8\%$
2. Test current: Typical forward current
3. Current pulse time: 25ms

### Forward Voltage Bins

| Bin code | Min Forward Voltage (V) | Max Forward Voltage (V) |
|----------|-------------------------|-------------------------|
| 1720     | 1.75                    | 2.00                    |
| 2022     | 2.00                    | 2.25                    |
| 2225     | 2.25                    | 2.50                    |
| 2527     | 2.50                    | 2.75                    |

**Notes:**

1. Forward voltage measurement tolerance:  $\pm 0.05V$

### Dominant Wavelength Bins

| Group Bin | Minimum<br>Dominant Wavelength<br>(nm) | Maximum<br>Dominant Wavelength<br>(nm) |
|-----------|----------------------------------------|----------------------------------------|
| 2730      | 627                                    | 630                                    |
| 3033      | 630                                    | 633                                    |
| 3336      | 633                                    | 636                                    |
| 3639      | 636                                    | 639                                    |

**Notes:**

1. Dominant wavelength measurement tolerance:  $\pm 1\text{nm}$

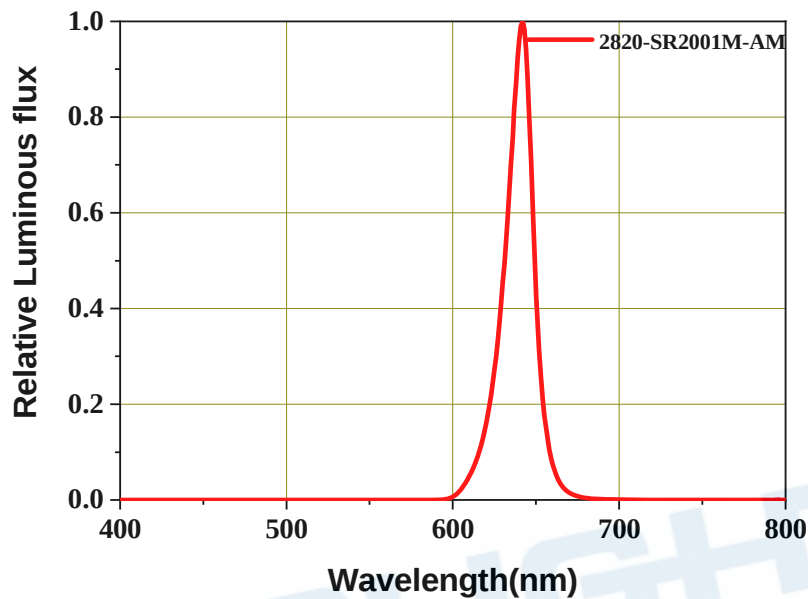
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## 6. Characteristics Graph

### Wavelength Characteristics Relative Spectral Distribution

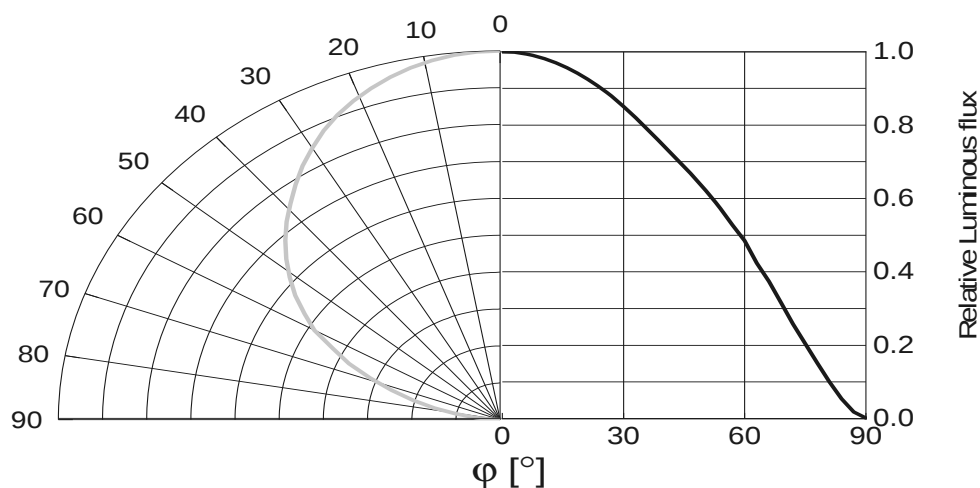
@ Ts = 25°C, IF=200mA

$$\Phi_V / \Phi_V (Max.) = f(\lambda)$$



### Typical Diagram Characteristics of Radiation

$$\Phi_V / \Phi_V (0^\circ) = f(\varphi)$$

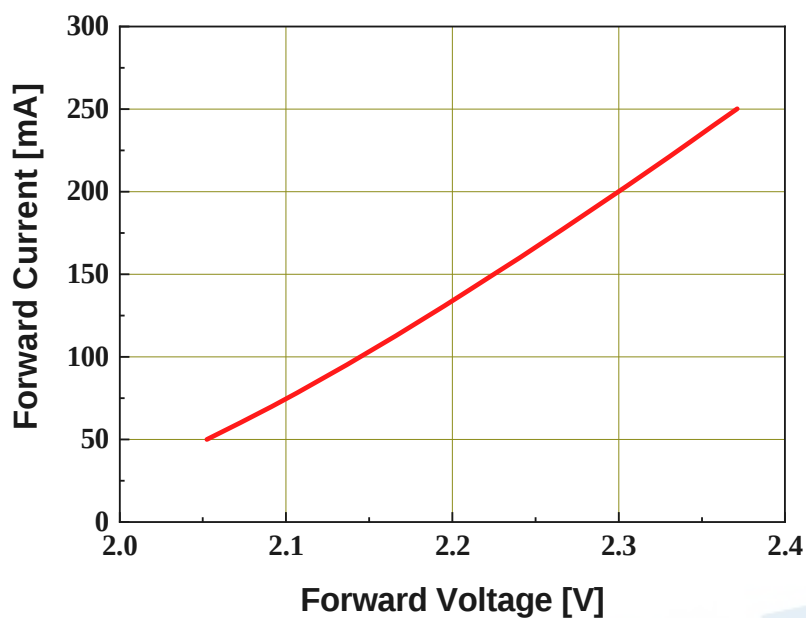


#### Notes:

1.  $\varphi$  is the off axis angle from lamp centerline where the luminous intensity is 1/2 of the peak value.
2. View angle tolerance is  $\pm 5^\circ$ .

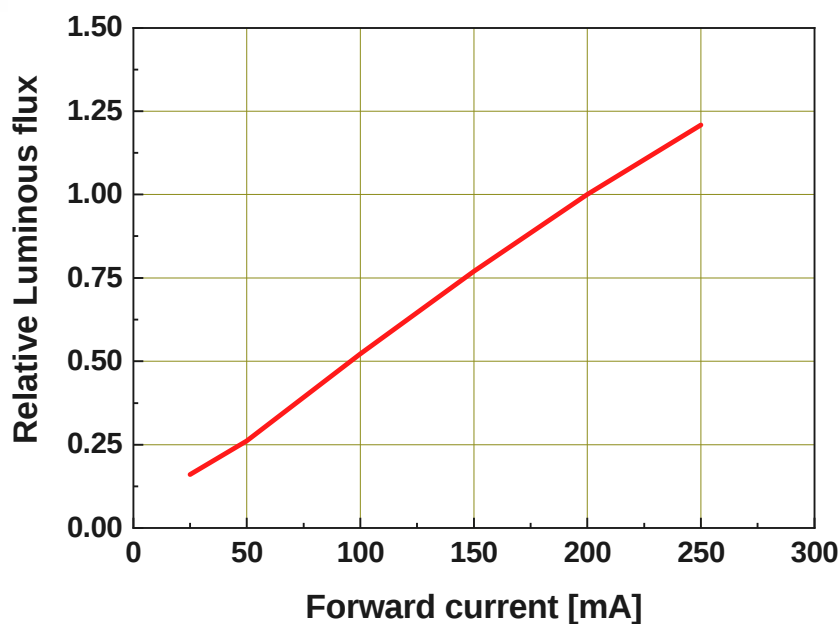
**Forward Current vs. Forward Voltage**  
**@ Ts = 25°C**

$$I_F = f(V_F)$$



**Relative Luminous Flux vs. Forward Current**  
**@ Ts = 25°C**

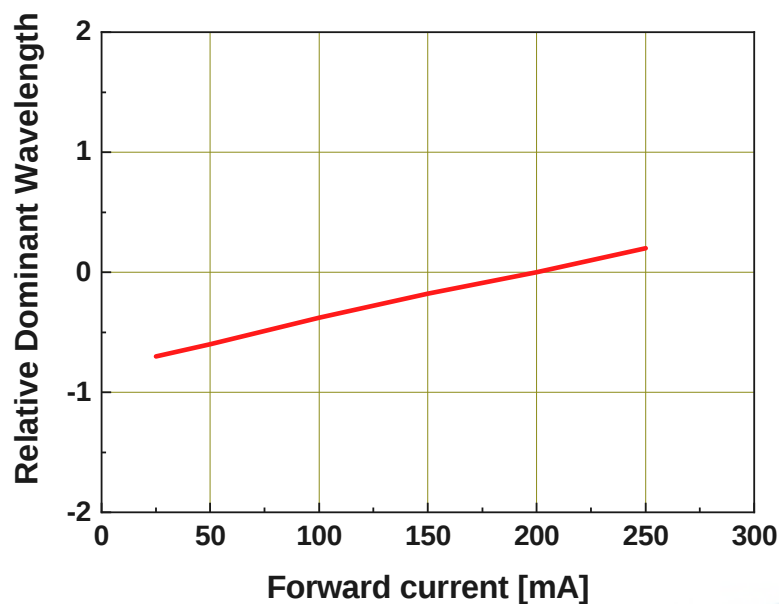
$$\Phi_V / \Phi_V(200mA) = f(I_F)$$



## Dominant Wavelength vs. Forward Current

@ Ts = 25°C

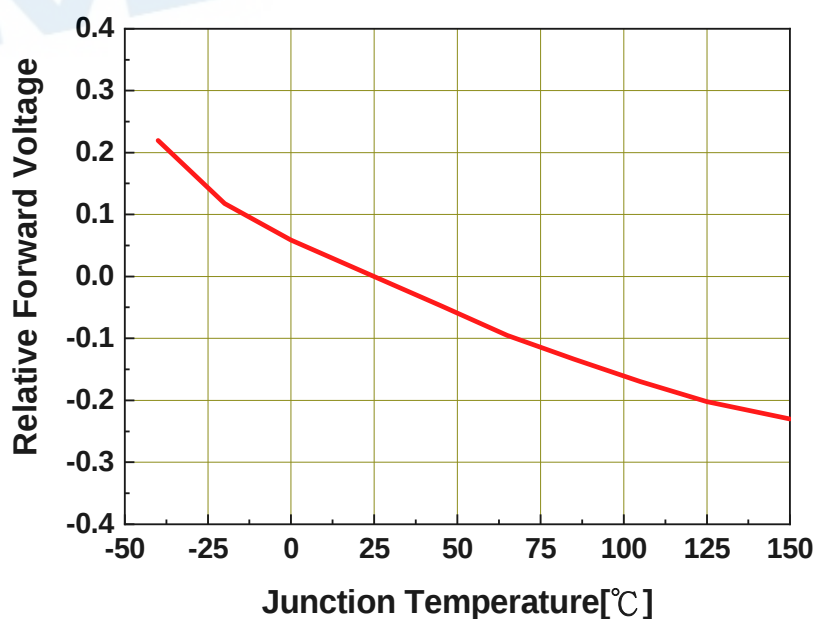
$$\Delta\lambda_d = \lambda_d - \lambda_d(200\text{mA}) = f(I_F)$$



## Relative Forward Voltage vs. Junction Temperature

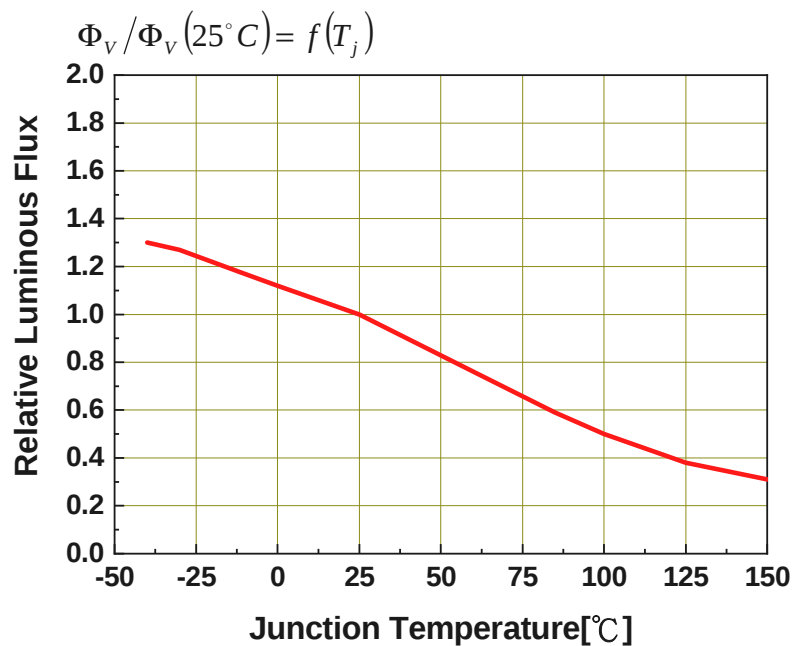
@ IF=200mA

$$\Delta V_F = V_F - V_F(25^\circ\text{C}) = f(T_j)$$



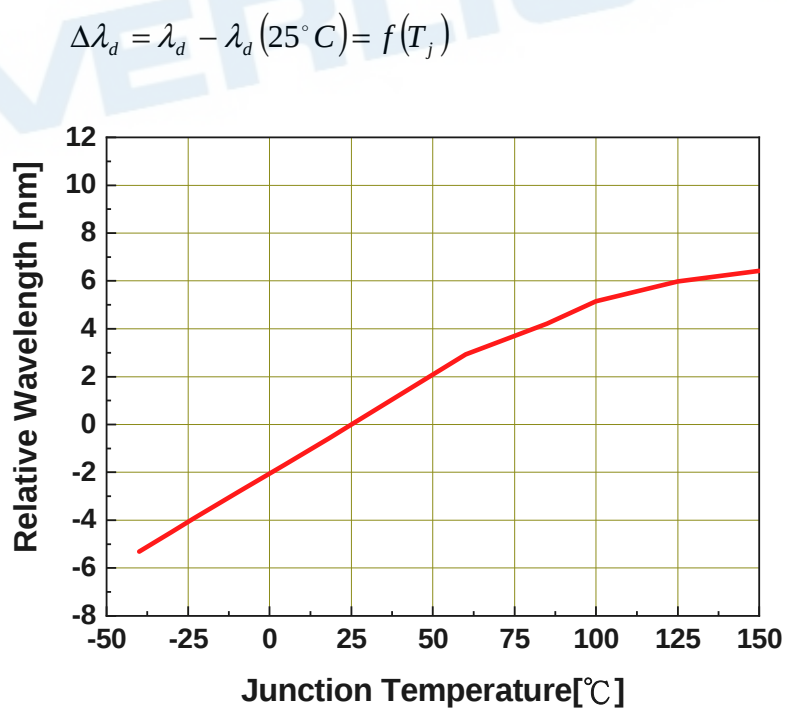
## Relative Luminous flux vs. Junction Temperature

@  $I_F=200\text{mA}$

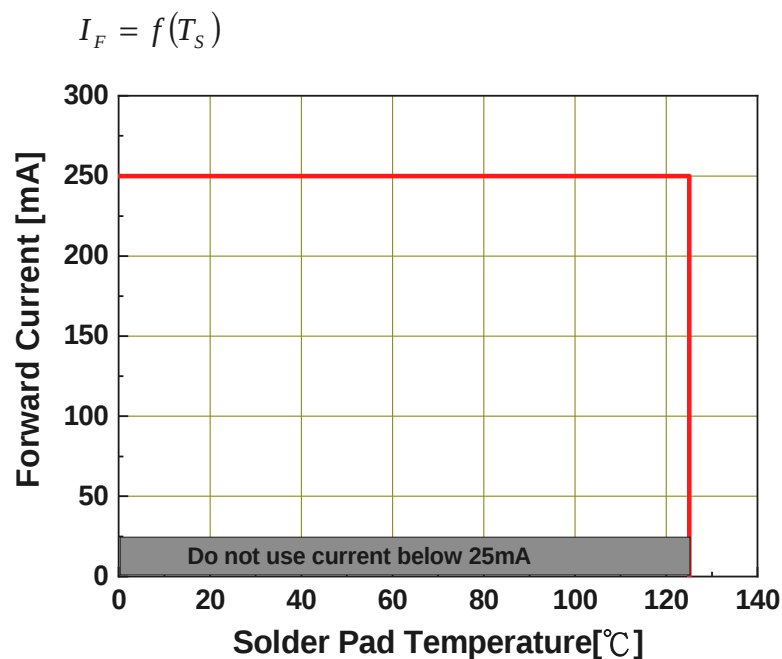


## Relative Wavelength vs. Junction Temperature

@  $I_F=200\text{mA}$

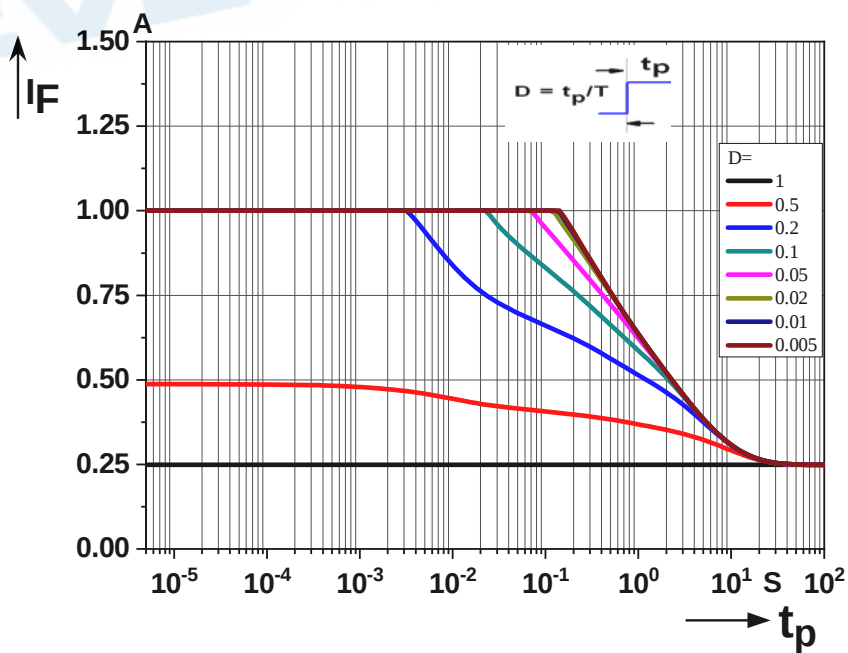


## Forward Current Derating Curve



## Permissible Pulse Handling Capability

D=Duty cycle ,  $T_s = 25^\circ\text{C}$



## 7. Part Number

### 2820-SR2001H-AM

Part number is designated with below details.

- 2820 = Product family name.
- SR= Color <sup>[1]</sup>
- 200 = Test current [mA]
- 1 = Lead Frame Type ( 0=Ag ; 1=Au )
- H = Brightness Level (H=High ; M=Medium ; L=Low)
- AM = Automotive application
- Note

<sup>[1]</sup> Color :

| Symbol | Description                     |
|--------|---------------------------------|
| C      | Cool White                      |
| N      | Neutral White                   |
| W      | Warm White                      |
| PA     | Phosphor Converted Amber        |
| PR     | Phosphor Converted Red          |
| UB     | Blue                            |
| IB     | Ice Blue                        |
| SB     | Sky Blue                        |
| UP     | Purple                          |
| UG     | Green                           |
| UY     | Yellow                          |
| UYG    | Brilliant Yellow Green          |
| UPG    | Pale Green                      |
| UA     | Amber                           |
| UR     | Red                             |
| SR     | Super Red                       |
| RGB    | RGB-Color                       |
| PYG    | Phosphor Converted Yellow Green |

## 8. Ordering Information

| Part Number     | Order Code                       |
|-----------------|----------------------------------|
| 2820-SR2001H-AM | 2820-SR2001H- ABCDEFGHJKLM-NO-AM |

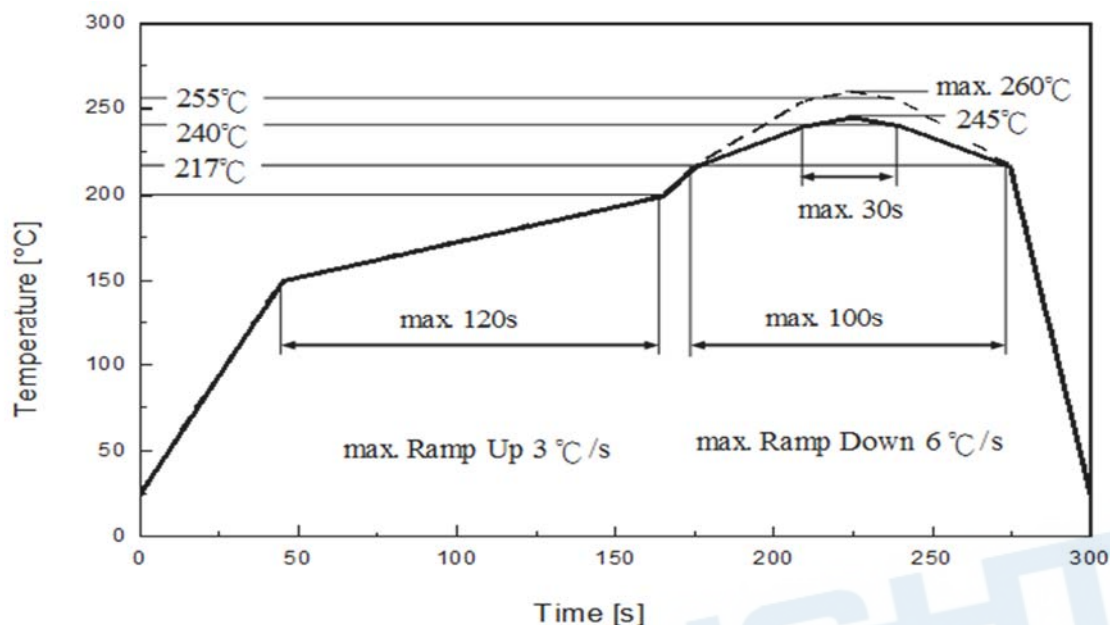
Order code contains information with below details :

1. ABCD = min/max wavelength or CCT
2. EFGH = min./max. luminous flux in [lm] or luminous intensity in [mcd]
3. JKLM = min./max. forward voltage
4. NO = Packing code
5. AM = Automotive Application

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## 9. Reflow Soldering Profile

Soldering Condition (Reference: IPC/JEDEC J-STD-020D)



| Profile Feature                                   | Pb-Free Assembly | Unit    |
|---------------------------------------------------|------------------|---------|
|                                                   | Recommendation   |         |
| Ramp-up rate to preheat 25 °C to 150 °C           | 3                | °C /sec |
| Time of soaking zone 150 °C to 200 °C             | 120              | sec     |
| Ramp-up rate to peak                              | 3                | °C /sec |
| Liquidus temperature                              | 217              | °C      |
| Time above liquidus temperature                   | 100              | sec     |
| Peak temperature (max.)                           | 260              | °C      |
| Time within 5°C of the specified peak temperature | 30               | sec     |
| Ramp-down Rate (max.)                             | 6                | °C /sec |

## 10. Packaging Information

### ● Product Labeling



3. CPN : Customer's Product Number

4. P/N : Everlight Part Number

5. QTY : Packing Quantity

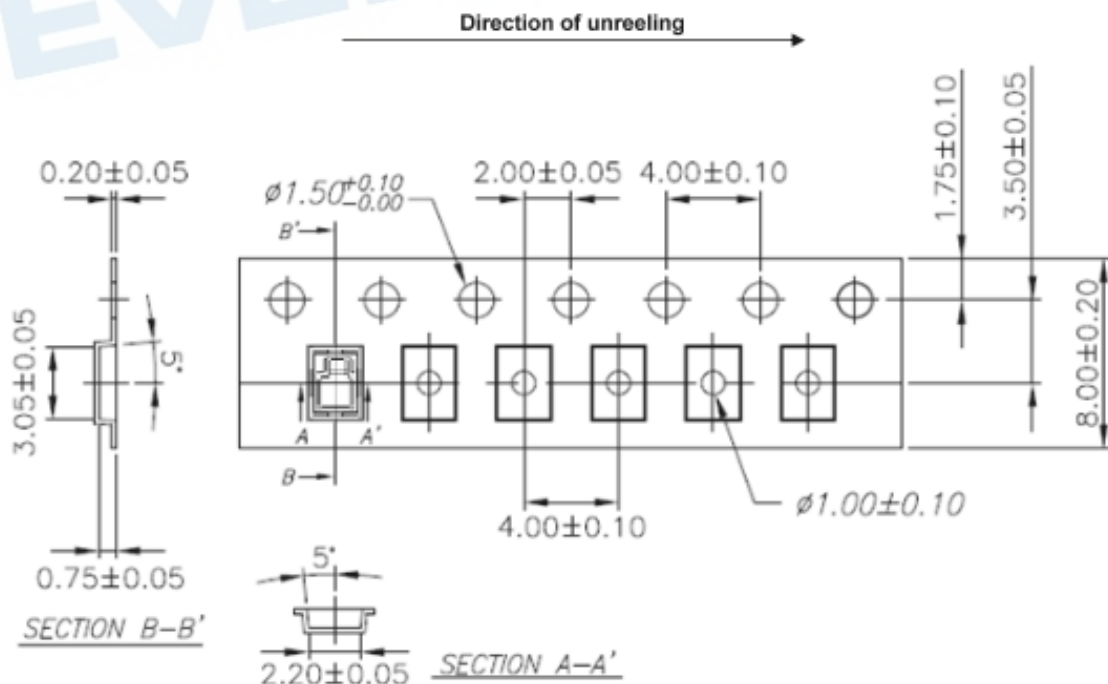
6. CAT : Luminous Flux (Brightness) Bin

7. HUE : Color Bin

8. REF : Forward Voltage Bin

9. LOT No : Lot Number

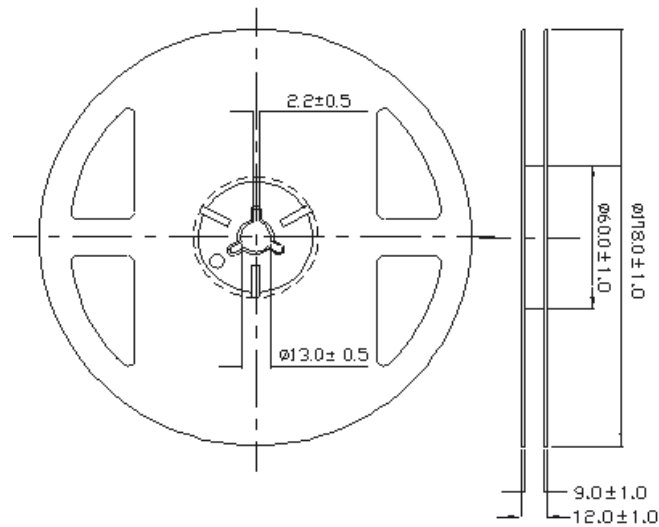
### ● Packing: Loaded Quantity 2000 pcs Per Reel



#### Notes:

Dimensions are in millimeters.

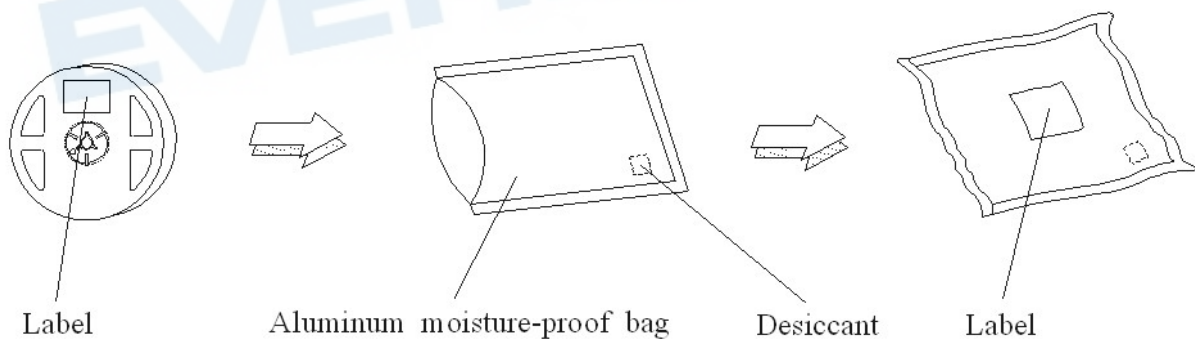
## ● Reel Dimensions



### Notes:

1. Dimensions are in millimeters.

## ● Moisture Resistant Packing Process



## 11. Precaution for Use

### 1. Over-current-proof

Customer must apply resistors for protection; otherwise slight voltage shift will cause big current change (burn out will happen).

### 2. Assemblies

Do not stack assemblies containing LEDs to prevent damage to the optical surface of LEDs. Forces applied to the optical surface may result in the surface being damaged.

### 3. Soldering Condition

3.1 When soldering, do not put stress on the LEDs during heating.

3.2 After soldering, do not warp the circuit board.

### 4. Soldering Iron

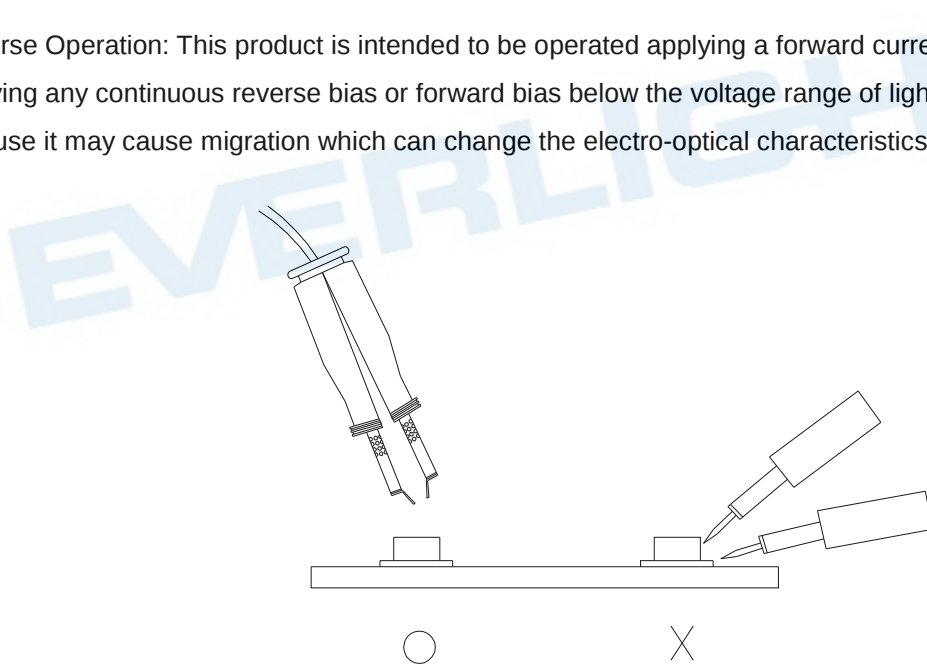
Each terminal is to go to the tip of soldering iron temperature less than 350°C for 3 seconds within once in less than the soldering iron capacity 25W. Leave two seconds and more intervals, and do soldering of each terminal. Be careful because the damage of the product is often started at the time of the hand solder.

### 5. 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 the LEDs will or will not be damaged by repairing.

### 6. Reverse Operation: This product is intended to be operated applying a forward current within the specified range.

Applying any continuous reverse bias or forward bias below the voltage range of light emission shall be avoided because it may cause migration which can change the electro-optical characteristics or damage the LED.



## 12. Sulfur Test Criteria

| Products                   | Failure Criteria                                                                                                                                                                                          |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Exterior Lighting products | Luminous Flux +/-20%, forward voltage +/-10%, color coordinates x,y +/-0.01,<br>color wavelength +/- 2 nm<br>Visual defect issue following Everlight's inspection criteria                                |
| Interior lighting products | Luminous Flux +/-30% or +/-50% for some application, forward voltage +/-10%,<br>color coordinates x,y +/-0.02, color wavelength +/- 2 nm<br>Visual defect issue following Everlight's inspection criteria |

| H2S test | Grade A0                                                                    | Grade A1                                                                                                                      | Grade B0                                                                    | Grade B1                                                                                                                      |
|----------|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Class A  | Pass $\Delta IV$ , $\Delta Color$ ,<br>$\Delta VF$ criteria<br>No Corrosion | Pass $\Delta IV$ , $\Delta Color$ ,<br>$\Delta VF$ criteria<br>Corrosion without the<br>impact on reliability<br>and lifetime |                                                                             |                                                                                                                               |
| Class B  |                                                                             |                                                                                                                               | Pass $\Delta IV$ , $\Delta Color$ ,<br>$\Delta VF$ criteria<br>No Corrosion | Pass $\Delta IV$ , $\Delta Color$ ,<br>$\Delta VF$ criteria<br>Corrosion without the<br>impact on reliability<br>and lifetime |

| Condition<br>for H2S and FMG | Description                                       |                                                                                                                                                       |
|------------------------------|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
|                              | H2S                                               | FMG                                                                                                                                                   |
| Class A                      | 15 ppm with duration 336 h at 40 °C and<br>90% RH | Duration 500 h at 25 °C and 75% RH.<br>H2S concentration: 10ppb<br>SO2 concentration: 200ppb<br>NO2 concentration: 200ppb<br>Cl2 concentration: 10ppb |
| Class B                      | 10 ppm with duration 500 h at 25 °C and<br>75% RH |                                                                                                                                                       |

| Grade for H2S Test | Description                                              |
|--------------------|----------------------------------------------------------|
| 0                  | No Corrosion                                             |
| 1                  | Corrosion without the impact on reliability and lifetime |

## Revision History

Current version: 11.January.2023

Issue No: DSE-0028082

Version: 3.0

Created by: Tom Xaio

| Rev. | Subjects (major change in previous version) | Modified date |
|------|---------------------------------------------|---------------|
| 1    | Standard data sheet                         | 2021/10/26    |
| 2    | Approved data sheet                         | 2022/08/25    |
| 3    | Update information                          | 2023/01/11    |
|      |                                             |               |
|      |                                             |               |
|      |                                             |               |

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