

EL 2820

2820-C03501H-AM



Features

- Package : SMD package
- Color Temperature range : 5180K~6680K
- Typ. Luminous Flux : 136 lm @ 350mA
- Viewing angle : 120°
- ESD : 8kV
- MSL : 2
- Qualifications : According to AEC-Q102
- Sulfur robustness: B1
- Compliance with RoHS and REACH
- Compliance Halogen Free .(Br <900 ppm ,Cl <900 ppm , Br+Cl < 1500 ppm)

Applications

- Automotive lighting

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1. Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Condition
Forward Current		I_F	50	350	500	mA	---
Luminous Flux		I_v	130	152	180	lm	$I_F=350\text{mA}$
Forward Voltage		V_F	2.75	3.4	3.75	V	$I_F=350\text{mA}$
Viewing Angle		φ	---	120	---	deg	$I_F=350\text{mA}$
Color Temperature		CCT	5180	6100	6680	K	$I_F=350\text{mA}$
Thermal Resistance (Junction to Solder)	Real	$R_{th JS \text{ real}}$	---	20	22	K/W	$I_F=350\text{mA}$
	Electrical	$R_{th JS \text{ el}}$	---	---	20		

Notes:

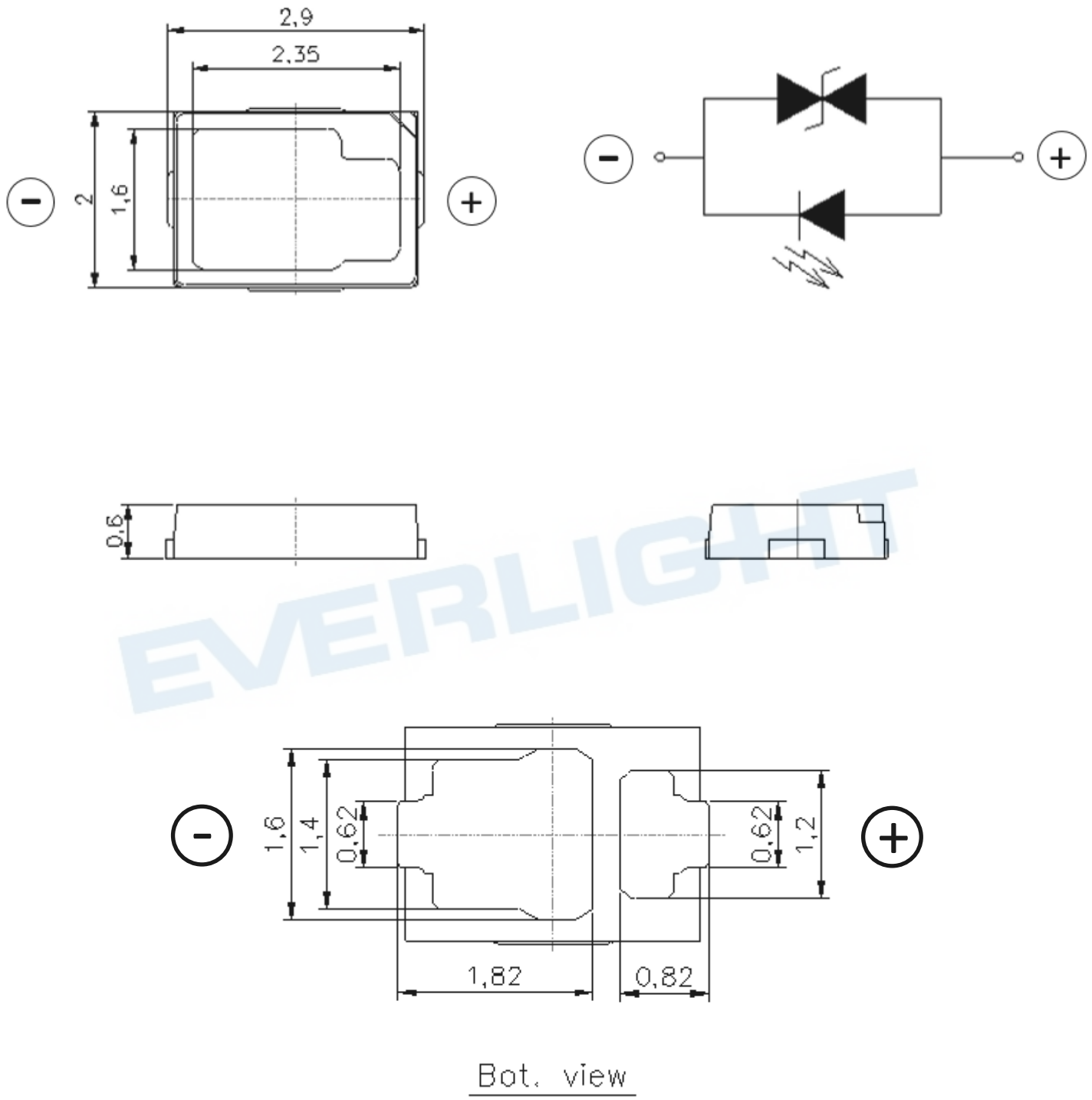
1. Luminous flux measurement tolerance: $\pm 8\%$.
2. The data of luminous flux measured at thermal pad= 25°C
3. Forward voltage measurement tolerance: $\pm 0.05\text{V}$
4. Tolerance of Dominant Wavelength : $\pm 1\text{nm}$.
5. Current pulse time: 25ms

2. Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Power Dissipation	P_d	1875	mW
Forward Current	I_F	500	mA
Surge Current ($t \leq 10 \mu s$; $D=0.005$; $T_s=25^\circ C$)	I_{FM}	N/A	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 ($R=1.5k\Omega$, $C=100pF$)	ESD_{HBM}	8	kV
Soldering Temperature	Reflow	260 $^\circ C$ for 30sec	$^\circ C$

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3. Mechanical Dimension



Notes:

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

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)
J4	130	140
J5	140	150
J6	150	160
J7	160	180

Notes:

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

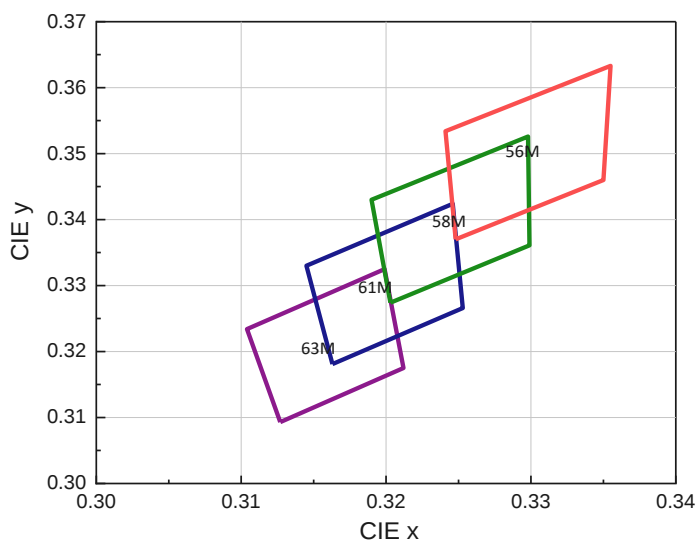
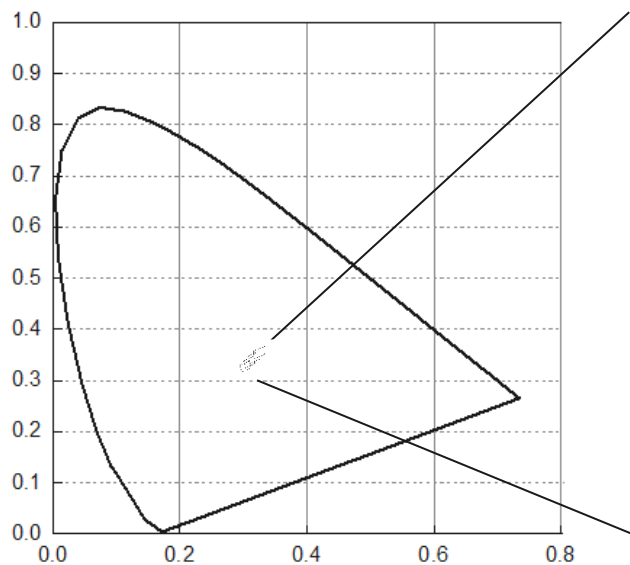
Forward Voltage Bins

Bin code	Min Forward Voltage (v)	Max Forward Voltage (v)
2730	2.75	3.00
3032	3.00	3.25
3235	3.25	3.50
3537	3.50	3.75

Notes:

1. Forward voltage measurement tolerance: $\pm 0.05V$.
2. Current pulse time: 25ms

Color Bin Structure ECE Bin Structure



Cool White Bin Coordinates

Bin	CIE x	CIE y
63M	0.3127	0.3093
	0.3212	0.3175
	0.3199	0.3325
	0.3104	0.3234

Bin	CIE x	CIE y
61M	0.3163	0.3181
	0.3253	0.3266
	0.3246	0.3424
	0.3145	0.3330

Bin	CIE x	CIE y
58M	0.3203	0.3274
	0.3299	0.3361
	0.3298	0.3526
	0.3190	0.3430

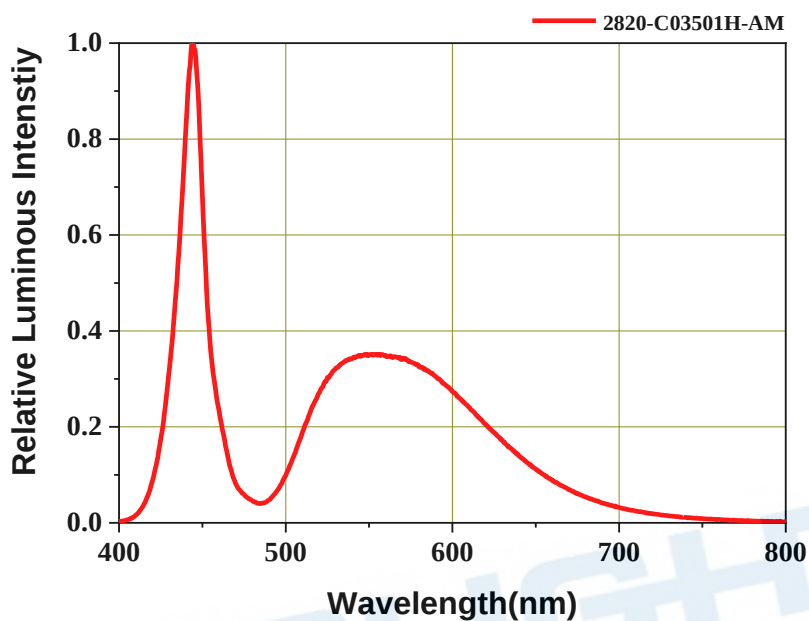
Bin	CIE x	CIE y
56M	0.3248	0.3370
	0.3350	0.3460
	0.3355	0.3633
	0.3241	0.3534

6. Characteristics Graph

Wavelength Characteristics Relative Spectral Distribution

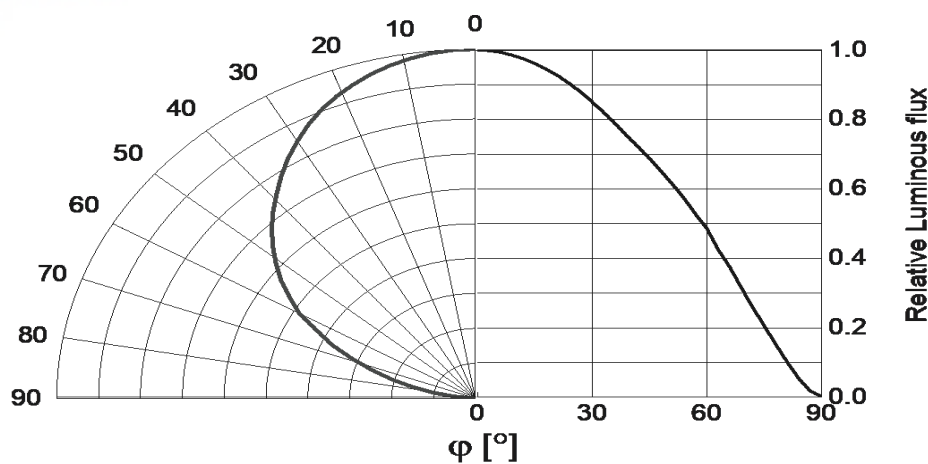
@ Ts = 25°C, IF=350mA

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



Typical Diagram Characteristics of Radiation

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



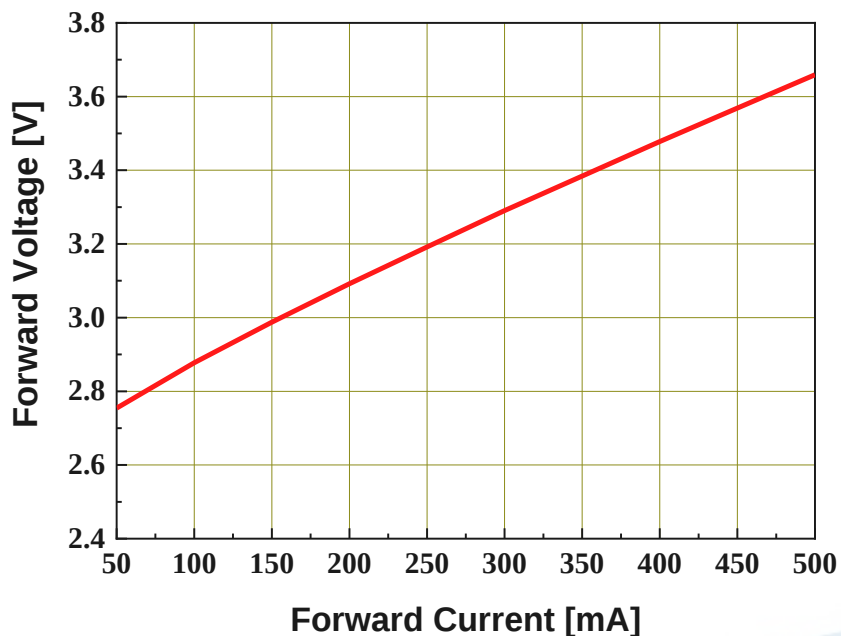
Notes:

1. φ 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

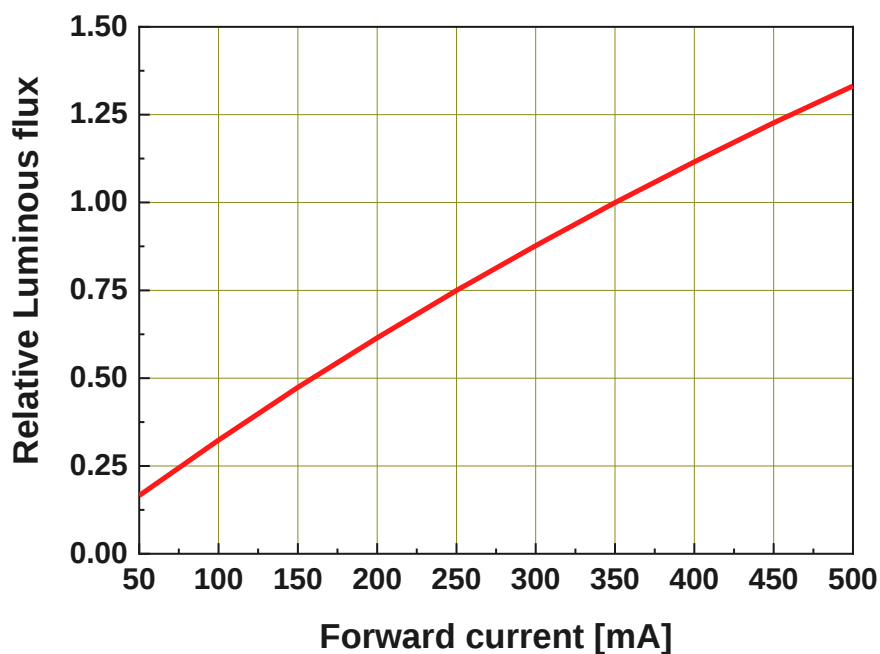
$$I_F = f(V_F)$$



Relative Luminous Flux vs. Forward Current

@ Ts = 25°C

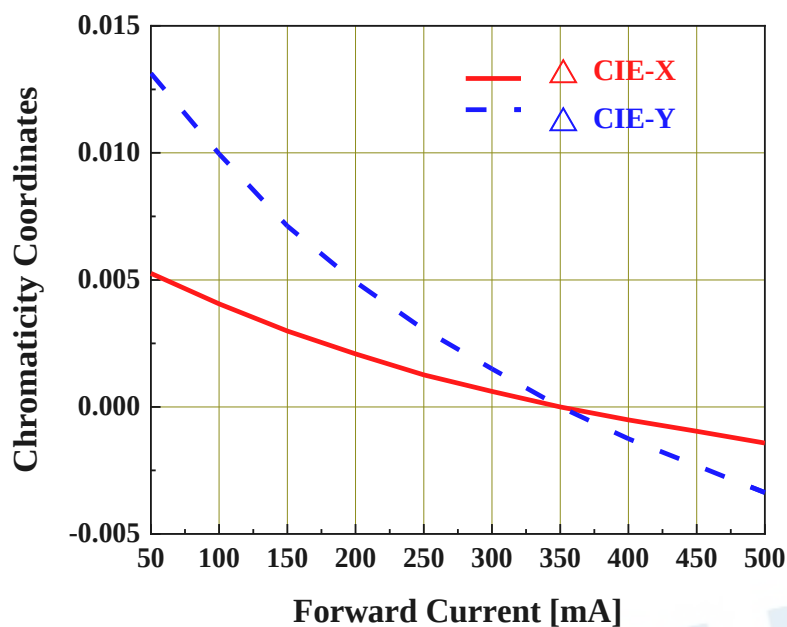
$$\Phi_V / \Phi_V(350mA) = f(I_F)$$



Chromaticity Coordinates Shift vs. Forward Current

@ Ts = 25°C

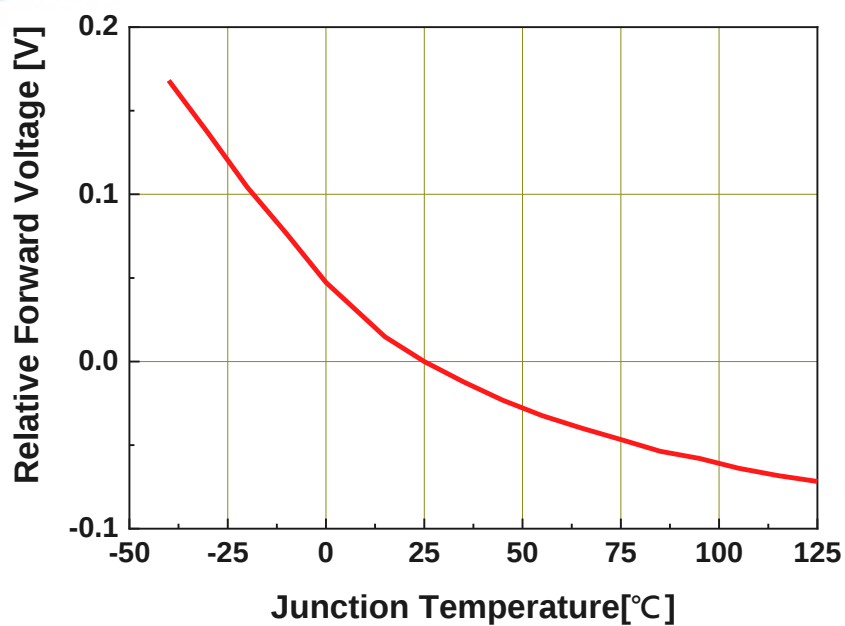
$$\Delta CIE\ x, \Delta CIE\ y = f(I_F)$$



Relative Forward Voltage vs. Junction Temperature

@ I_F=350mA

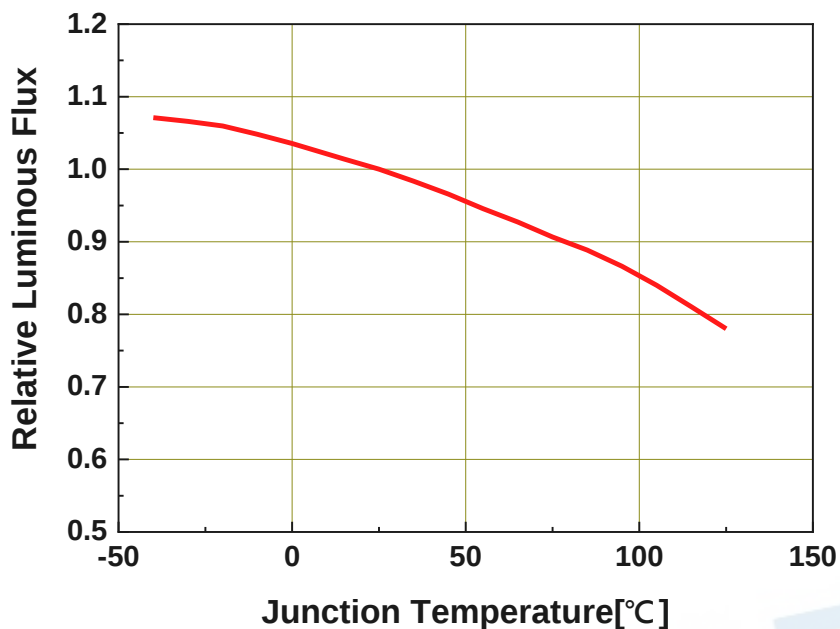
$$\Delta V_F = V_F - V_F(25^\circ C) = f(T_j)$$



Relative Luminous flux vs. Junction Temperature

@ $I_F=350\text{mA}$

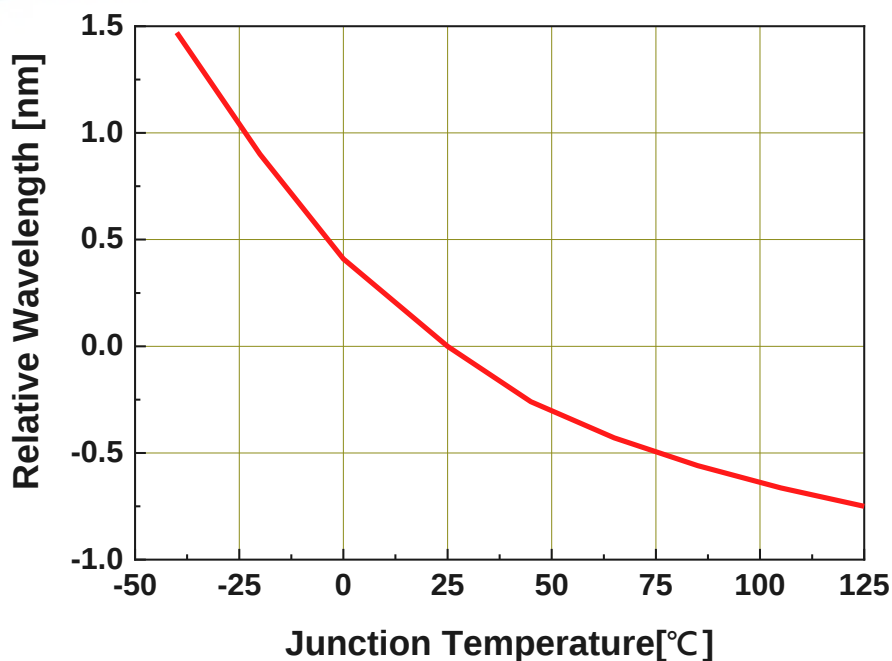
$$\Phi_V / \Phi_V(25^\circ\text{C}) = f(T_j)$$



Relative Wavelength vs. Junction Temperature

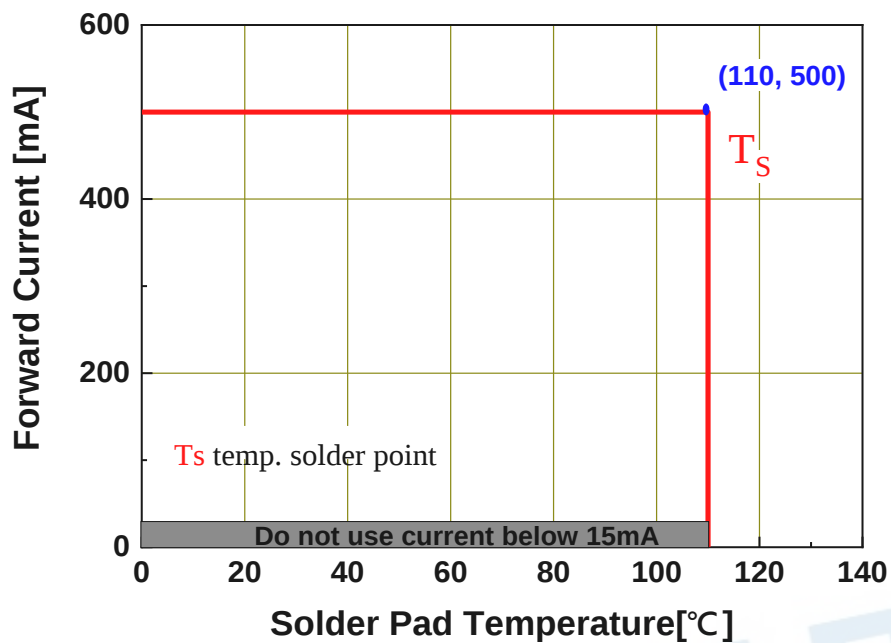
@ $I_F=350\text{mA}$

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



Forward Current Derating Curve

$$I_F = f(T_S)$$



7. Part Number

2820-C03501H-AM

Part number is designated with below details.

- 2820 = Product family name.
- C0= Color ^[1]
- 350 = Test current [mA]
- 1 = Lead Frame Type (0=Ag ; 1=Au)
- H = Brightness Level (H=High ; M=Medium ; L=Low)
- AM = Automotive application
- Note

^[1] 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

2820-C03501H-**ABCDEFGH**IJKL-MN-AM

Part Number	Order Code
2820-C03501H-AM	2820-C03501H-56M63MJ4J72737-2T-AM

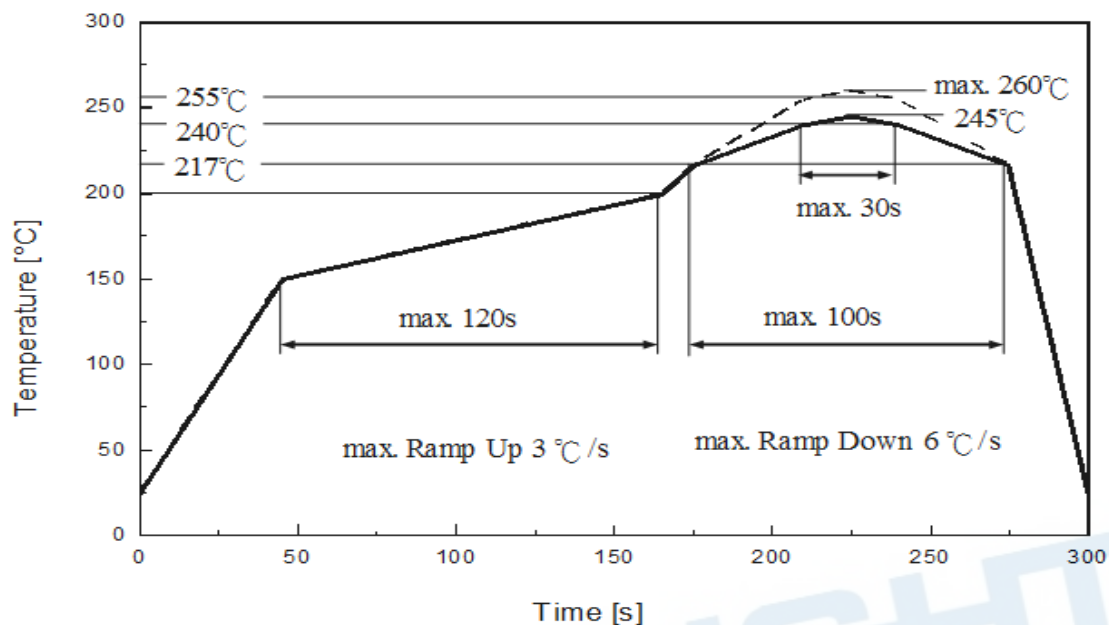
Order code contains information with below details :

1. ABCD = min/max wavelength or CCT
2. EFGH = min./max. luminous flux in [lm] or luminous intensity in [mcd]
3. IJKL = min./max. forward voltage
4. MN = 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

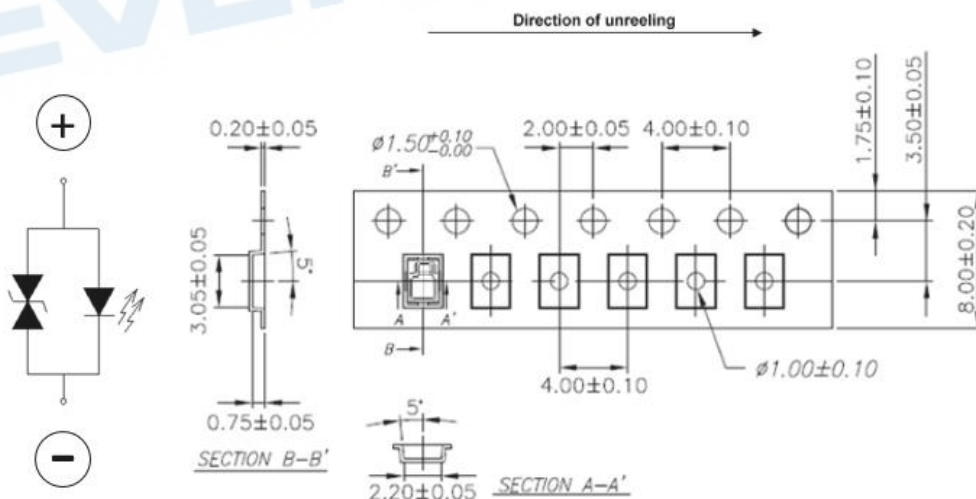
10. Packaging Information

- **Product Labeling**



1. CPN : Customer's Product Number
2. P/N : Everlight Part Number
3. QTY : Packing Quantity
4. CAT : Luminous Flux (Brightness) Bin
5. HUE : Color Bin
6. REF : Forward Voltage Bin
7. LOT No : Lot Number

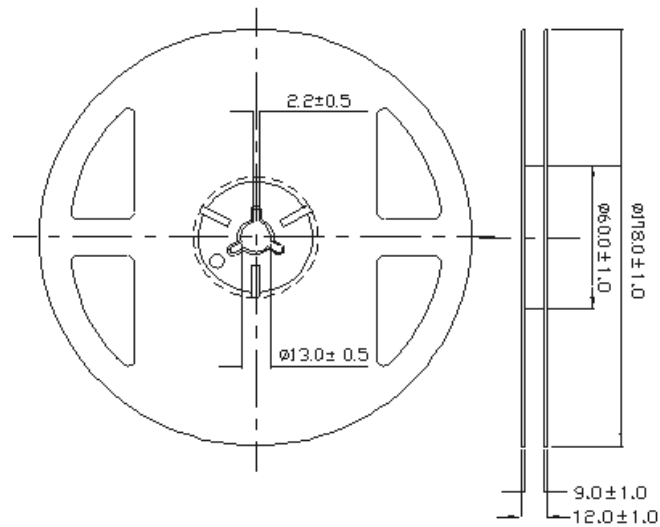
- **Packing: Loaded Quantity 2000 pcs Per Reel**



Notes:

Dimensions are in millimeters.

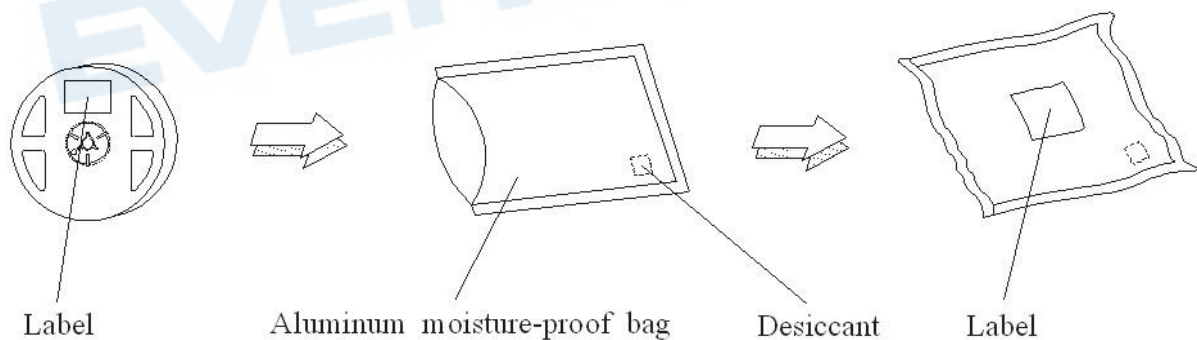
● Reel Dimensions



Notes:

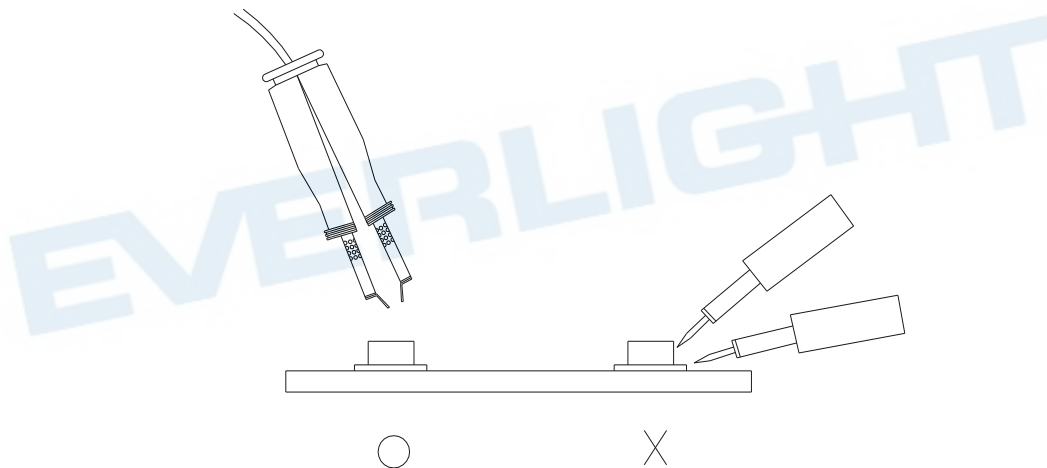
1. Dimensions are in millimeters.

● 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℃ 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.



12.Sulfur Test Criteria

Products	Failure Criteria
Exterior Lighting products	Luminous Flux +/-20%, forward voltage +/-10%, color coordinates x,y +/-0.01, color wavelength +/- 2 nm Visual defect issue following Everlight's inspection criteria
Interior lighting products	Luminous Flux +/-30% or +/-50% for some application, forward voltage +/-10%, color coordinates x,y +/-0.02, color wavelength +/- 2 nm Visual defect issue following Everlight's inspection criteria
Grade of H2S and FMG test	Please refer to the table as below. As for discolor, please refer to the Frame blackening after Grade of H2S and FMG test defect under Everlight's inspection criteria

	Grade A0	Grade A1	Grade B0	Grade B1
C12 H2S Class A C13 FMG	No corrosion	Corrosion without the impact on reliability and life time, following AEC-Q102 rev. A		
C12 H2S Class B C13 FMG			No corrosion	Corrosion without the impact on reliability and life time, following AEC-Q102 rev. A

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

Class for H2S Test & FMG	Description
0	No corrosion found
1	Corrosion without the impact on reliability and life time, following AEC-Q102 rev. A

Revision History

Current version:19.Aug.2022

Issue No: DHE-0004033

Version: 2.0

Created by: Yukun Chen

Rev.	Subjects (major change in previous version)	Modified date
1.0	Preliminary	2022/04/22
2.0	Add Sulfur Test Criteria, Revise Color Bin Structure	2022/08/19

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