

EL ALFS series

Preliminary

ALFS2BD-C0PA07001L1-AM

Features

- Package : LEDs on Ceramic substrate
- Typ. Cool White Temperature : 5180K ~ 6680K
- Typ. PC Amber Wavelength : 590~610 nm
- Typ. Luminous Flux Cool White : 190 lm @ 700mA
- Typ. Luminous Flux PC Amber : 110 lm @ 700mA
- Viewing angle : 120°
- ESD up to 8KV
- MSL Level 2
- Preconditioning; According to JEDEC J-STD 020D Level 1.
- Qualifications; According to AEC-Q101
- Compliance with RoHS & REACH

Applications

- Automotive Exterior Lighting, Headlamp, DRL, Fog lamp

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1. Characteristics

| Parameter | | Symbol | Min. | Typ. | Max. | Unit | Condition |
|--|----------------|-------------------|-------|------|------|------|-------------|
| Luminous Flux ^{[2][3][4]} | Cool White | Φ_v | 140 | 190 | 240 | lm | $I_F=700mA$ |
| | PC Amber | Φ_v | 60 | 110 | 160 | lm | $I_F=700mA$ |
| Forward Voltage ^[5] | Cool White | V_F | 3 | 3.35 | 3.75 | V | $I_F=700mA$ |
| | PC Amber | | | | | | |
| Viewing Angle | Cool White | ϕ | --- | 120 | --- | deg | $I_F=700mA$ |
| | PC Amber | | | | | | |
| Color | Cool White CCT | K | 5180 | --- | 6680 | K | $I_F=700mA$ |
| | PC Amber Bin | Wd | YA-YB | | | Wd | $I_F=700mA$ |
| Thermal Resistance (Junction to Solder) | Real | $R_{th,JS\ real}$ | --- | TBD | --- | K/W | $I_F=700mA$ |
| | Electrical | $R_{th,JS\ el}$ | --- | TBD | --- | | |

Notes:

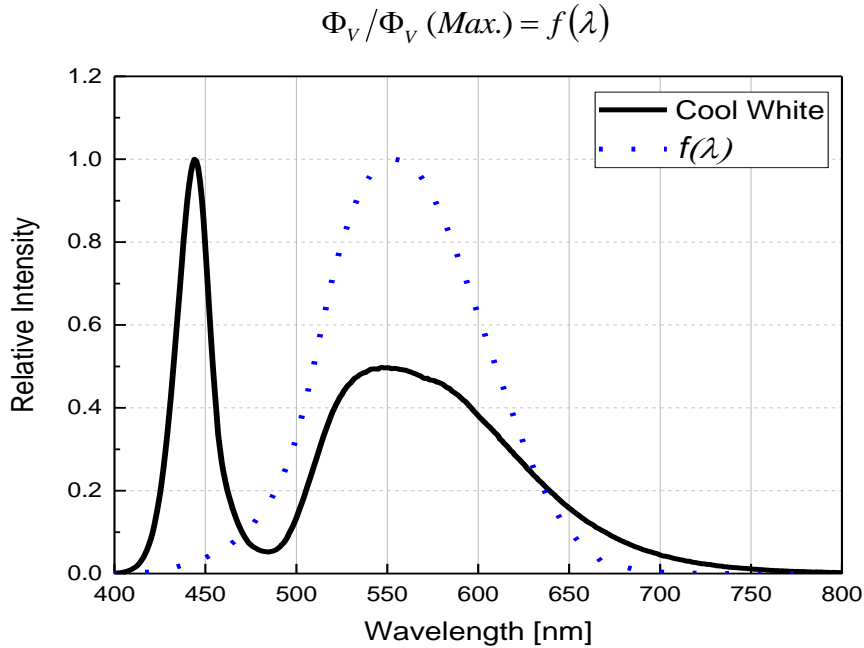
1. Forward conditon by each of LED.
2. Luminous flux measurement tolerance: $\pm 8\%$.
3. The data of luminous flux measured at thermal pad= $25^{\circ}C$
4. Typical luminous flux or light output performance is operated within the condition guided by this datasheet.
5. Forward voltage measurement tolerance: $\pm 0.05V$
6. The Vf range shown in the table above indicates 99% output.

2. Absolute Maximum Ratings

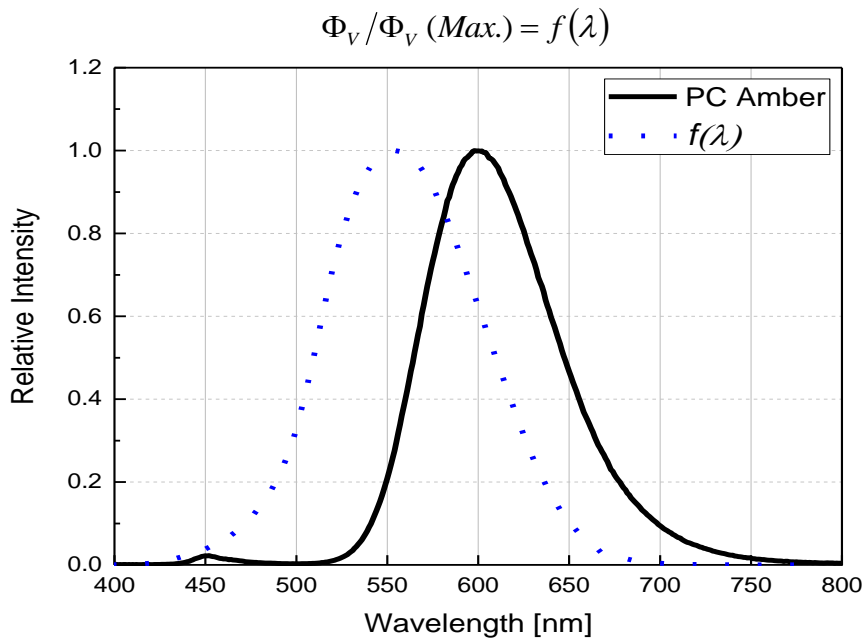
| Parameter | Symbol | Ratings | Unit |
|---|-------------|------------------------------------|------|
| Reverse Voltage | V_R | Not designed for reverse operation | V |
| Power Dissipation | P_d | 5.6 | W |
| Forward Current | I_F | 50 ~ 1500 | mA |
| Junction Temperature | T_J | 150 | °C |
| Operating Temperature | T_{opr} | -40 ~ +125 | °C |
| Storage Temperature | T_{stg} | -40 ~ +125 | °C |
| ESD Sensitivity (R=1.5k Ω , C= 100pF) | ESD_{HBM} | 8 | KV |
| Soldering Temperature | Reflow | 260 | °C |

3. Characteristics Graph

**Wavelength Characteristics Relative Spectral Distribution
@ Solder Pad Temperature = 25°C (CW)**

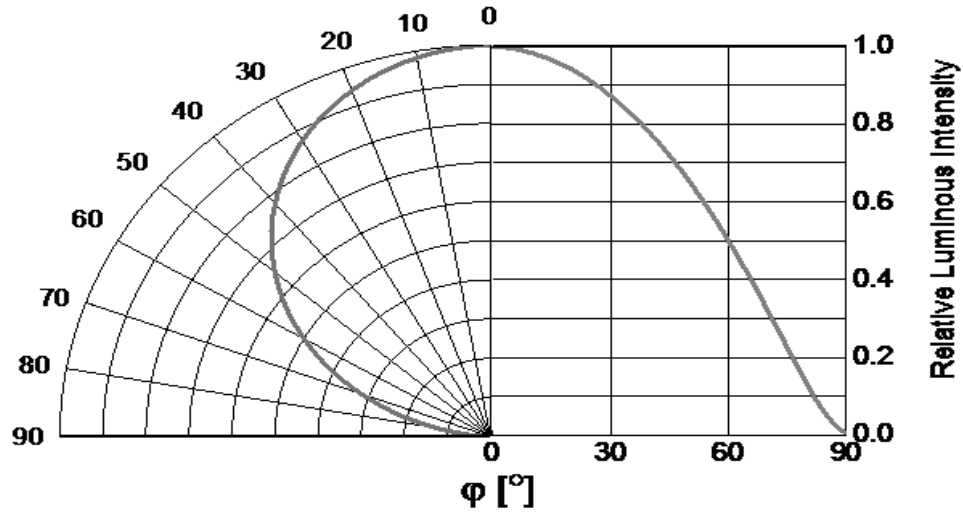


**Wavelength Characteristics Relative Spectral Distribution
@ Solder Pad Temperature = 25°C (PC Amber)**



Typical Diagram Characteristics of Radiation (CW · PC Amber)

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

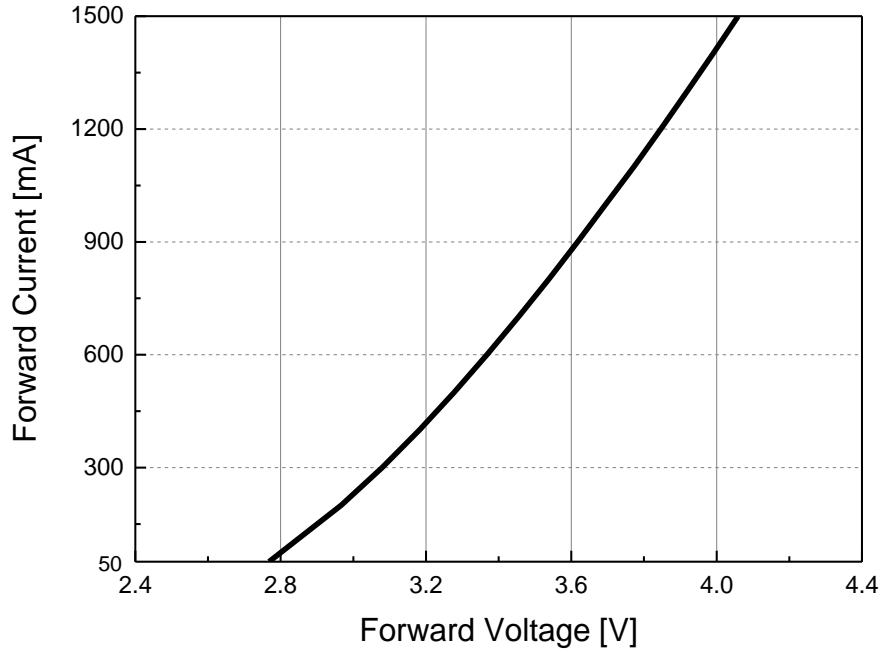


Notes:

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 $\pm 5^\circ$

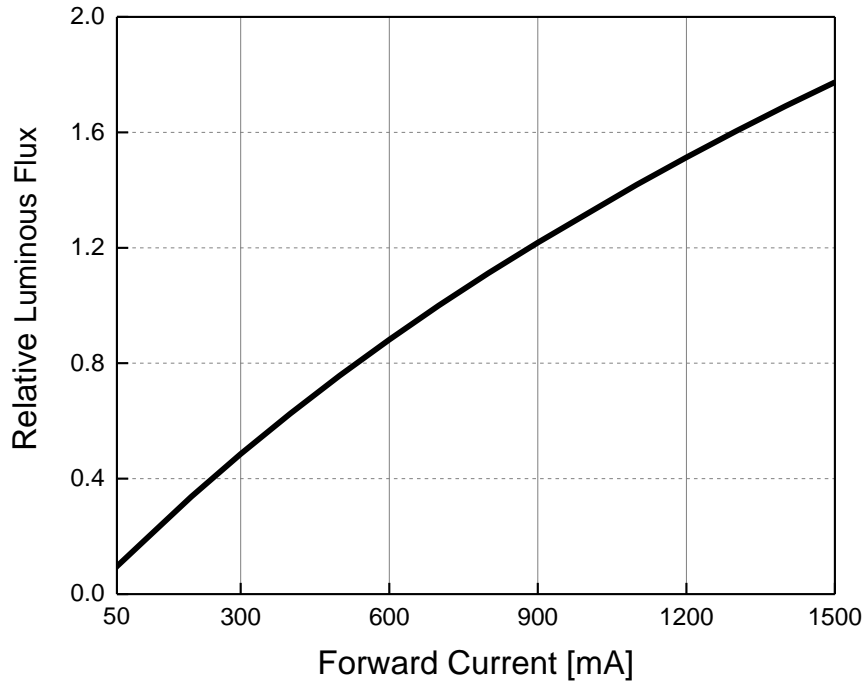
Forward Current vs. Forward Voltage
@ Solder Pad Temperature = 25°C (CW / PC Amber)

$$I_F = f(V_F)$$



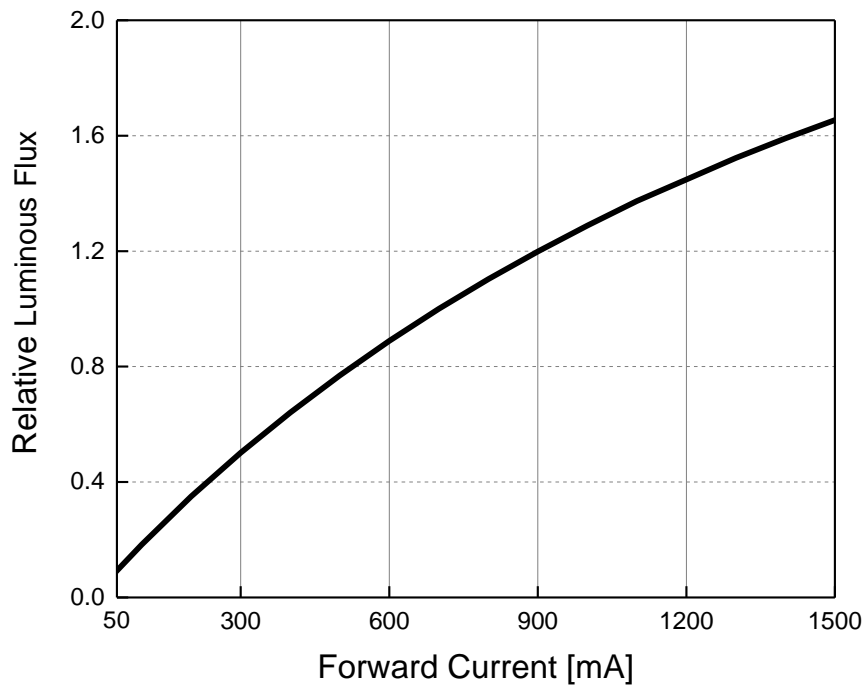
**Relative Luminous Flux vs. Forward Current
@Solder Pad Temperature = 25°C (CW)**

$$\Phi_V / \Phi_V (700mA) = f(I_F)$$



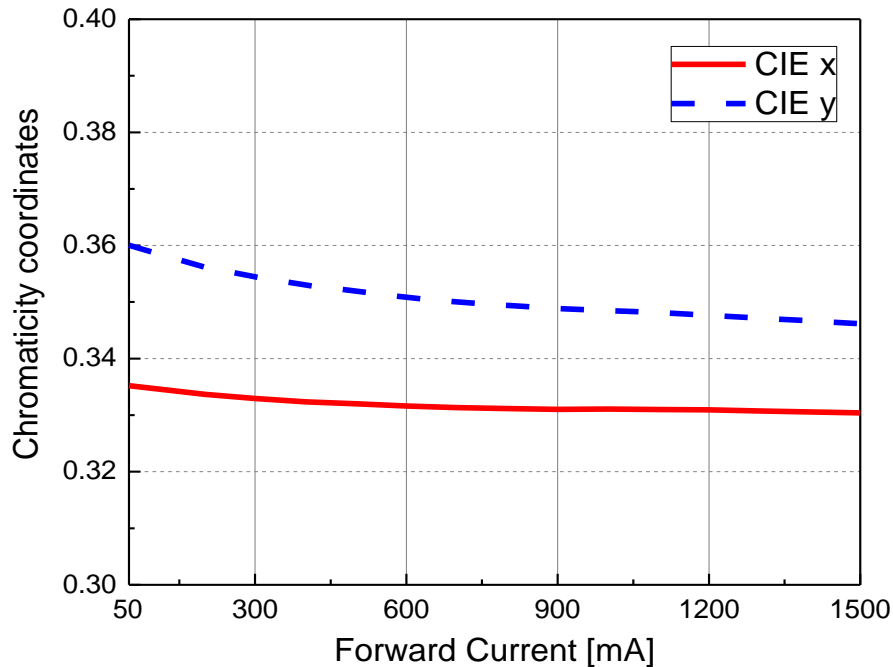
**Relative Luminous Flux vs. Forward Current
@Solder Pad Temperature = 25°C (PC Amber)**

$$\Phi_V / \Phi_V (700mA) = f(I_F)$$



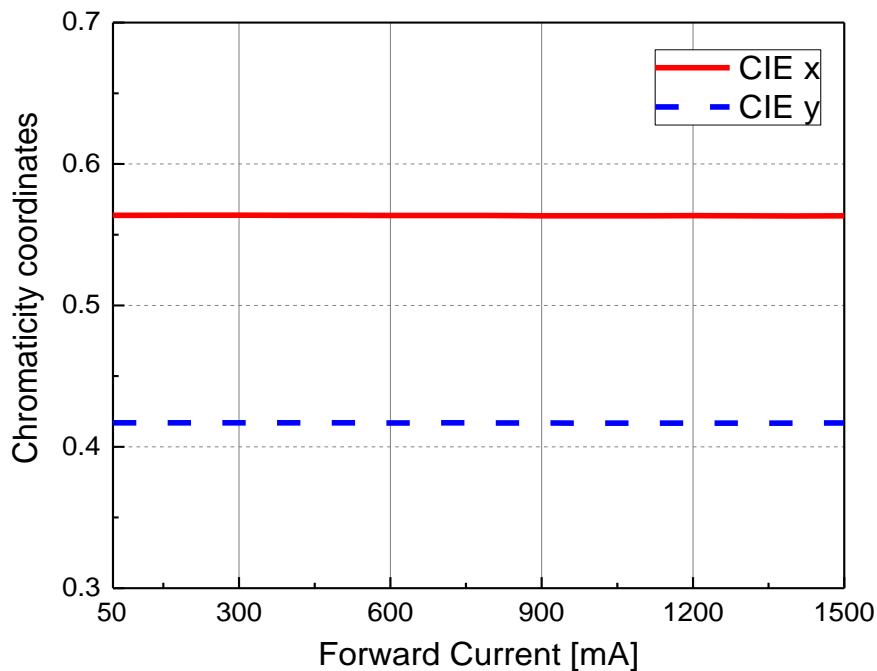
**Chromaticity Coordinates vs. Forward Current
@Solder Pad Temperature = 25°C (CW)**

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



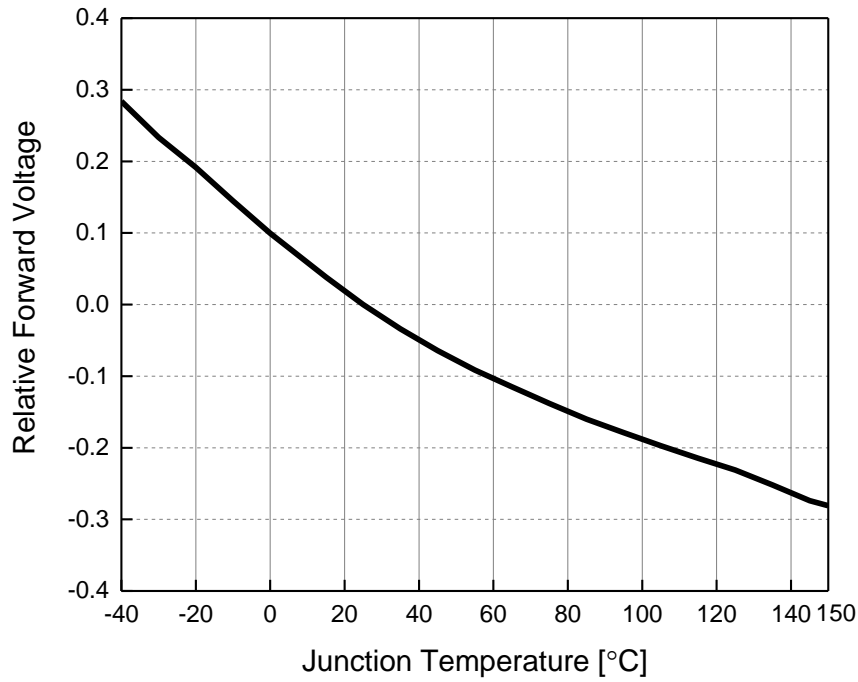
**Chromaticity Coordinates vs. Forward Current
@Solder Pad Temperature = 25°C (PC Amber)**

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



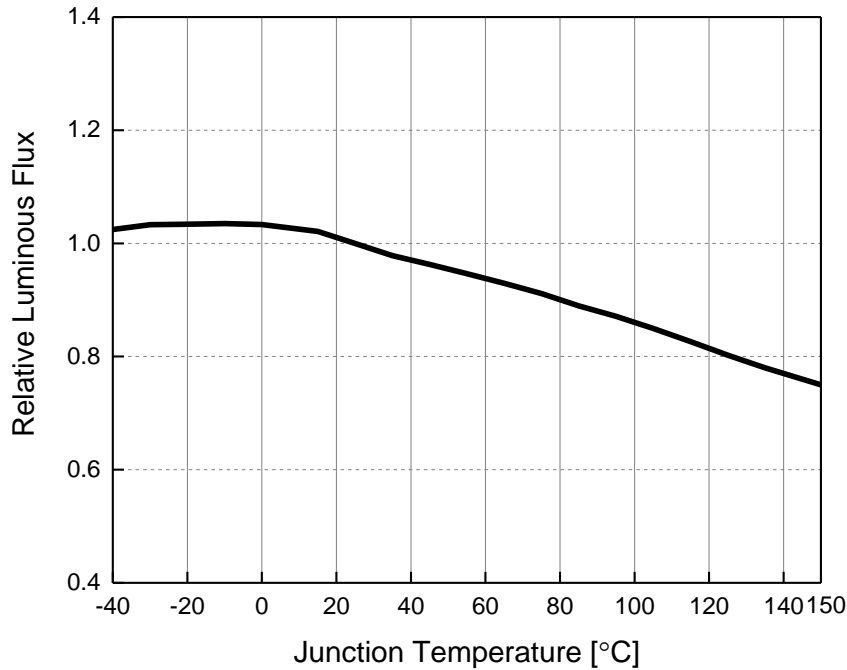
Relative Forward Voltage vs. Junction Temperature**@Forward Current = 700mA (CW / PC Amber)**

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



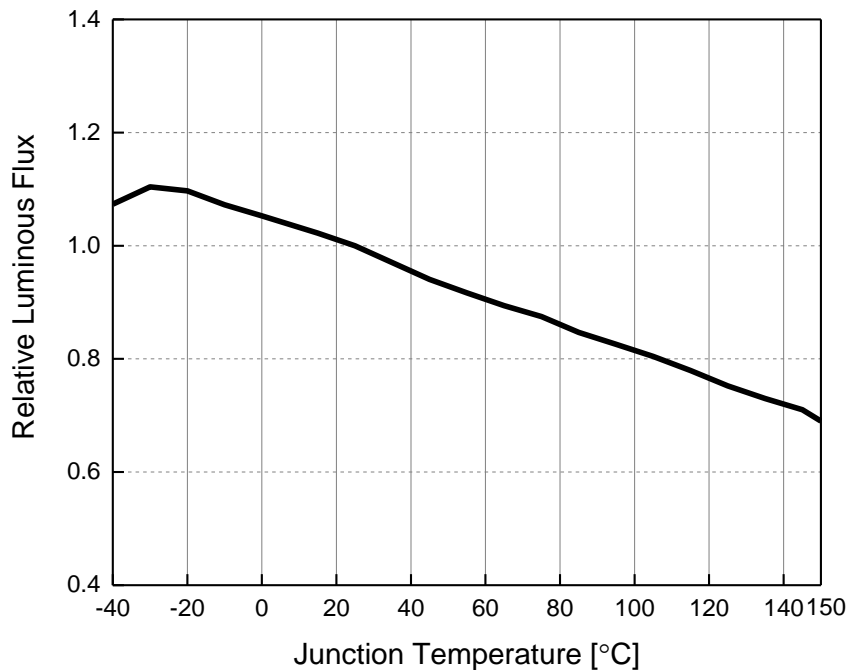
**Relative Luminous Flux vs. Junction Temperature
@Forward Current = 700mA (CW)**

$$\Phi_v / \Phi_v(25^\circ C) = f(T_j)$$

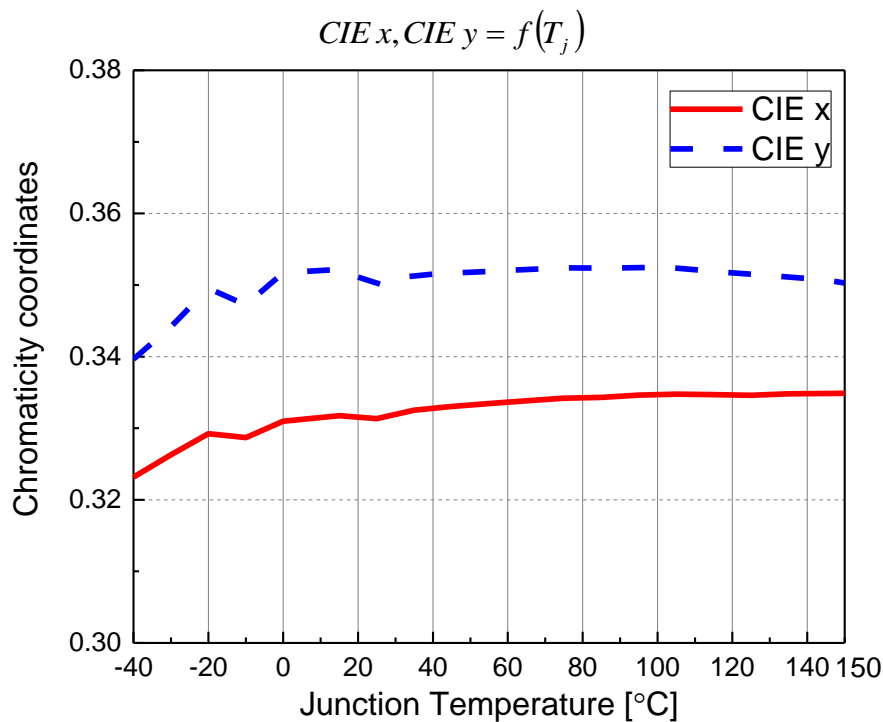


**Relative Luminous Flux vs. Junction Temperature
@Forward Current = 700mA (PC Amber)**

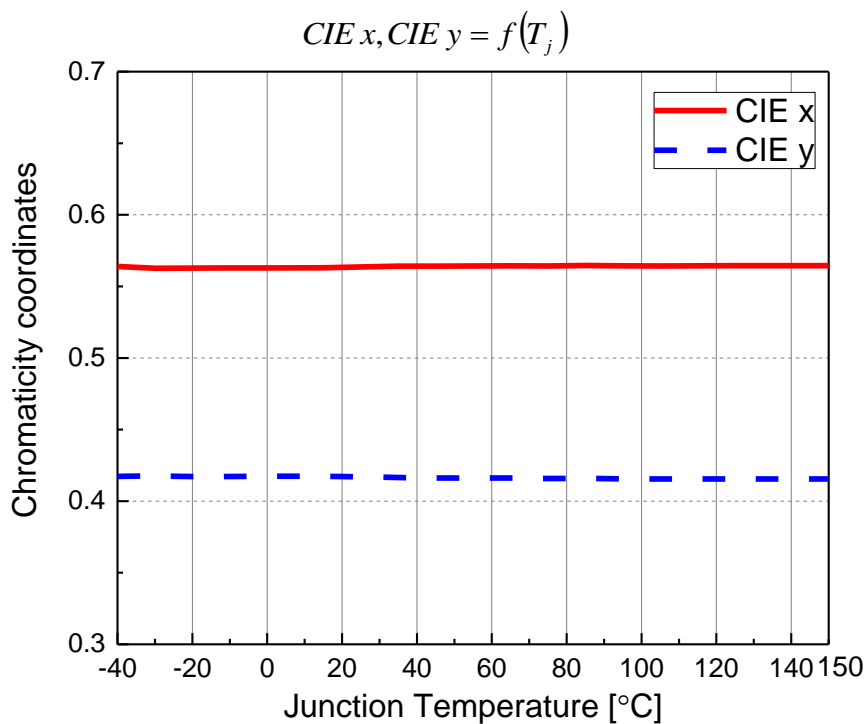
$$\Phi_v / \Phi_v(25^\circ C) = f(T_j)$$



**Chromaticity Coordinates Shift CIE X/Y vs. Junction Temperature
@Forward Current = 700mA (CW)**

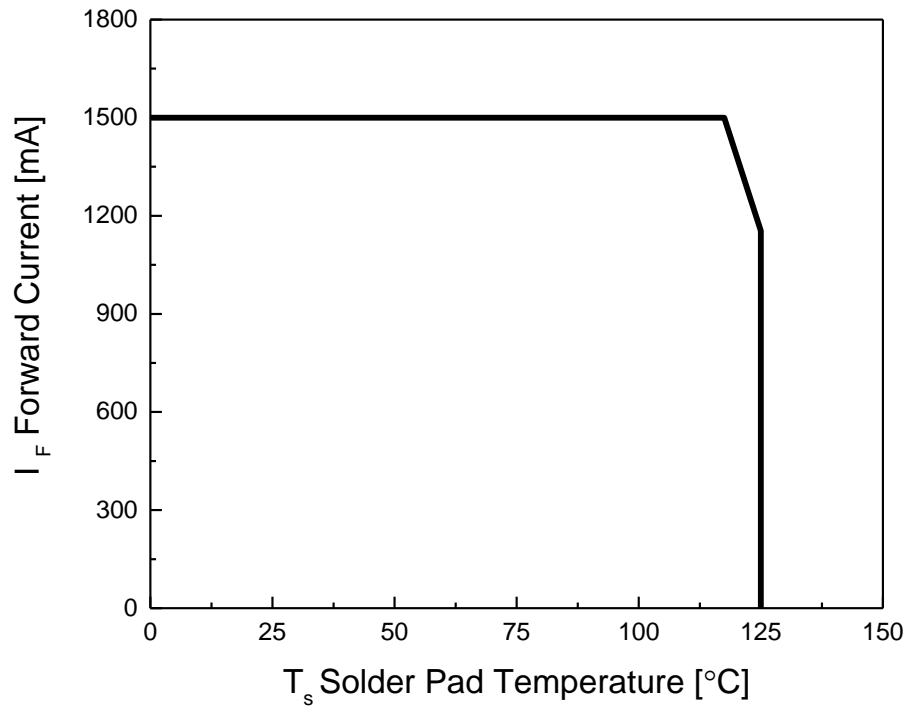


**Chromaticity Coordinates Shift CIE X/Y vs. Junction Temperature
@Forward Current = 700mA (PC Amber)**



Forward Current Derating Curve @ Soldering Temperature

$$I_F = f(T_S)$$



4.Binning Information

Luminous Intensity Bins

| [Cool White] | | | |
|----------------|-----|-------------------------------|-------------------------------|
| Group | Bin | Minimum Photometric Flux (lm) | Maximum Photometric Flux (lm) |
| B | 1 | 100 | 120 |
| | 2 | 120 | 140 |
| | 3 | 140 | 160 |
| | 4 | 160 | 180 |
| | 5 | 180 | 200 |
| | 6 | 200 | 220 |
| | 7 | 220 | 240 |
| | 8 | 240 | 260 |

| [PC Amber] | | | |
|--------------|-----|-------------------------------|-------------------------------|
| Group | Bin | Minimum Photometric Flux (lm) | Maximum Photometric Flux (lm) |
| B | 6 | 20 | 40 |
| | 7 | 40 | 60 |
| | 8 | 60 | 80 |
| | 9 | 80 | 100 |
| | 1 | 100 | 120 |
| | 2 | 120 | 140 |
| | 3 | 140 | 160 |
| | 4 | 160 | 180 |

Notes:

1. Luminous flux measurement tolerance: $\pm 8\%$.
2. Highlighted Black Box is available bins.

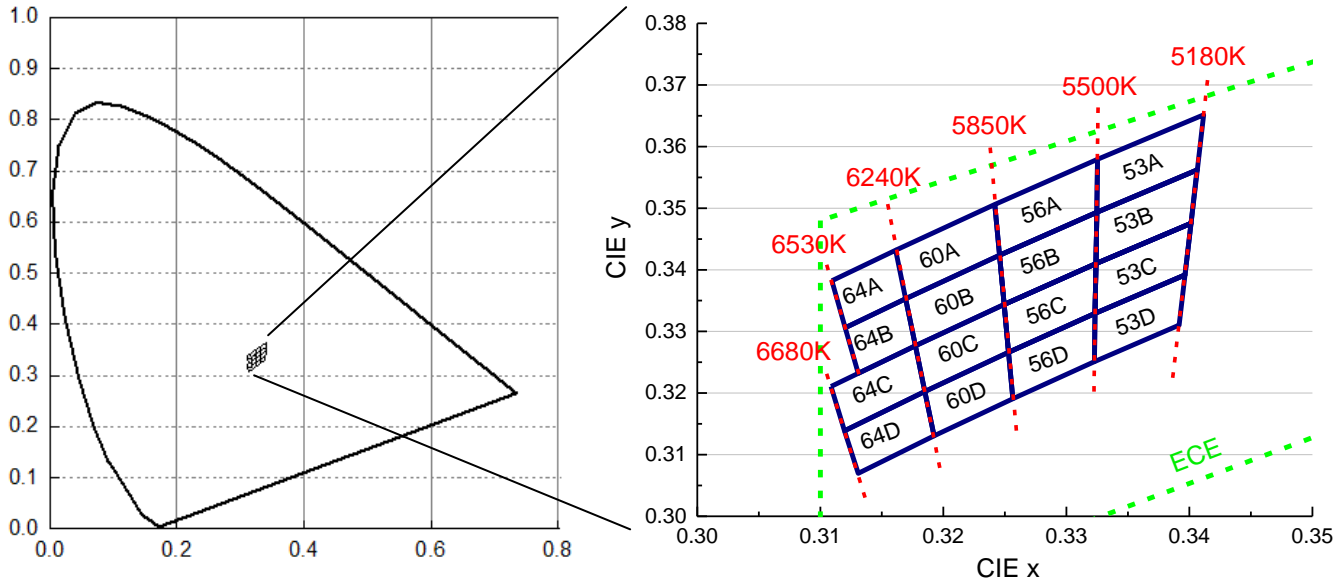
Forward Voltage Bins

| Group | Minimum Forward Voltage(V) | Maximum Forward Voltage(V) |
|-------|----------------------------|----------------------------|
| 1A | 3.00 | 3.25 |
| 1B | 3.25 | 3.50 |
| 1C | 3.50 | 3.75 |

Notes:

1. Forward Voltage measurement tolerance: $\pm 0.1V$.

Cool White Color Bin Structure
ECE White Bin Structure



Cool White Bin Coordinates

| Bin | CIE x | CIE y |
|-----------------------------|--------|--------|
| 64A | 0.3109 | 0.3382 |
| | 0.3161 | 0.3432 |
| | 0.3169 | 0.3353 |
| | 0.3120 | 0.3306 |
| Reference Range: 6240~6530K | | |

| Bin | CIE x | CIE y |
|-----------------------------|--------|--------|
| 64B | 0.3120 | 0.3306 |
| | 0.3169 | 0.3353 |
| | 0.3177 | 0.3277 |
| | 0.3131 | 0.3232 |
| Reference Range: 6240~6530K | | |

| Bin | CIE x | CIE y |
|-----------------------------|--------|--------|
| 64C | 0.3109 | 0.3211 |
| | 0.3177 | 0.3277 |
| | 0.3185 | 0.3203 |
| | 0.3120 | 0.3139 |
| Reference Range: 6240~6680K | | |

| Bin | CIE x | CIE y |
|-----------------------------|--------|--------|
| 64D | 0.3120 | 0.3139 |
| | 0.3185 | 0.3203 |
| | 0.3192 | 0.3131 |
| | 0.3131 | 0.3070 |
| Reference Range: 6240~6680K | | |

| Bin | CIE x | CIE y |
|-----------------------------|--------|--------|
| 60A | 0.3161 | 0.3432 |
| | 0.3242 | 0.3506 |
| | 0.3246 | 0.3424 |
| | 0.3169 | 0.3353 |
| Reference Range: 5850~6240K | | |

| Bin | CIE x | CIE y |
|-----------------------------|--------|--------|
| 60B | 0.3169 | 0.3353 |
| | 0.3246 | 0.3424 |
| | 0.3249 | 0.3344 |
| | 0.3177 | 0.3277 |
| Reference Range: 5850~6240K | | |

| Bin | CIE x | CIE y |
|-----------------------------|--------|--------|
| 60C | 0.3177 | 0.3277 |
| | 0.3249 | 0.3344 |
| | 0.3253 | 0.3266 |
| | 0.3185 | 0.3203 |
| Reference Range: 5850~6240K | | |

| Bin | CIE x | CIE y |
|-----------------------------|--------|--------|
| 60D | 0.3185 | 0.3203 |
| | 0.3253 | 0.3266 |
| | 0.3256 | 0.3191 |
| | 0.3192 | 0.3131 |
| Reference Range: 5850~6240K | | |

| Bin | CIE x | CIE y |
|-----------------------------|--------|--------|
| 56A | 0.3242 | 0.3506 |
| | 0.3325 | 0.3579 |
| | 0.3325 | 0.3493 |
| | 0.3246 | 0.3424 |
| Reference Range: 5500~5850K | | |

| Bin | CIE x | CIE y |
|-----------------------------|--------|--------|
| 56B | 0.3246 | 0.3424 |
| | 0.3325 | 0.3493 |
| | 0.3324 | 0.3410 |
| | 0.3249 | 0.3344 |
| Reference Range: 5500~5850K | | |

| Bin | CIE x | CIE y |
|-----------------------------|--------|--------|
| 56C | 0.3249 | 0.3344 |
| | 0.3324 | 0.3410 |
| | 0.3323 | 0.3329 |
| | 0.3253 | 0.3266 |
| Reference Range: 5500~5850K | | |

| Bin | CIE x | CIE y |
|-----------------------------|--------|--------|
| 56D | 0.3253 | 0.3266 |
| | 0.3323 | 0.3329 |
| | 0.3323 | 0.3251 |
| | 0.3256 | 0.3191 |
| Reference Range: 5500~5850K | | |

| Bin | CIE x | CIE y |
|-----------------------------|--------|--------|
| 53A | 0.3325 | 0.3579 |
| | 0.3412 | 0.3652 |
| | 0.3406 | 0.3562 |
| | 0.3325 | 0.3493 |
| Reference Range: 5180~5500K | | |

| Bin | CIE x | CIE y |
|-----------------------------|--------|--------|
| 53B | 0.3325 | 0.3493 |
| | 0.3406 | 0.3562 |
| | 0.3401 | 0.3476 |
| | 0.3324 | 0.3410 |
| Reference Range: 5180~5500K | | |

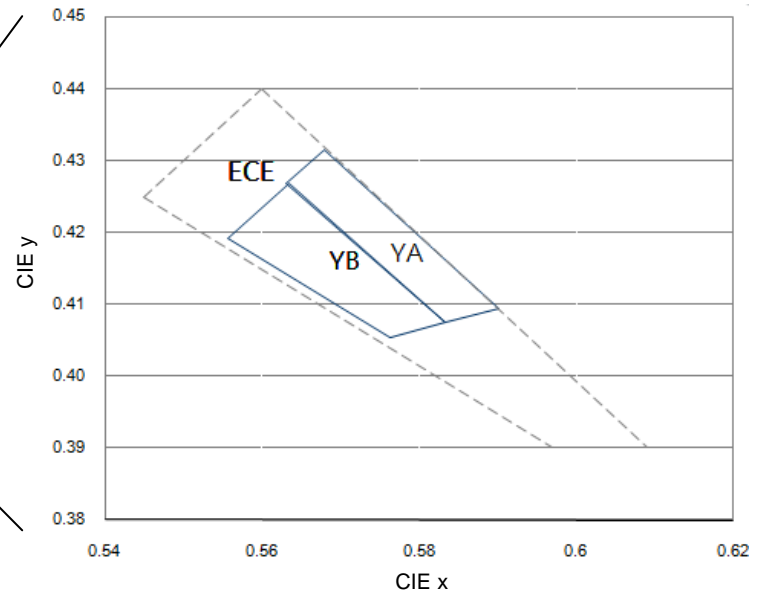
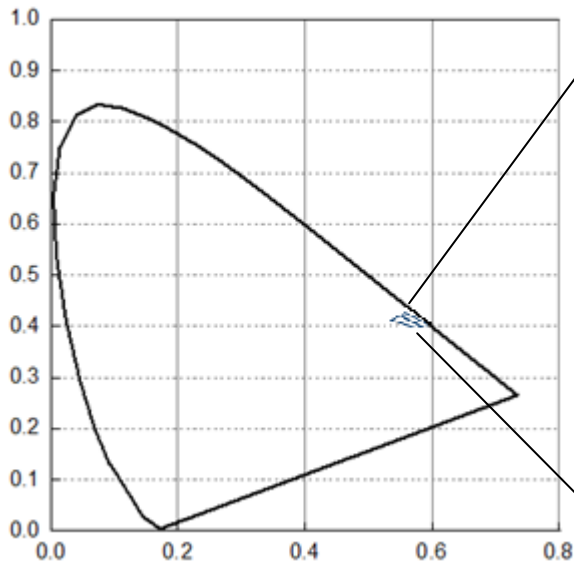
| Bin | CIE x | CIE y |
|-----------------------------|--------|--------|
| 53C | 0.3324 | 0.3410 |
| | 0.3401 | 0.3476 |
| | 0.3396 | 0.3392 |
| | 0.3323 | 0.3329 |
| Reference Range: 5180~5500K | | |

| Bin | CIE x | CIE y |
|-----------------------------|--------|--------|
| 53D | 0.3323 | 0.3329 |
| | 0.3396 | 0.3392 |
| | 0.3392 | 0.3310 |
| | 0.3323 | 0.3251 |
| Reference Range: 5180~5500K | | |

Notes:

1. Color coordinates measurement allowance: ± 0.005 .

**PC Amber Color Bin Structure
ECE White Bin Structure**



PC Amber Bin Coordinates

| Bin | CIE x | CIE y |
|-----|--------|--------|
| YA | 0.5680 | 0.4315 |
| | 0.5634 | 0.4269 |
| | 0.5833 | 0.4075 |
| | 0.5901 | 0.4094 |

| Bin | CIE x | CIE y |
|-----|--------|--------|
| YB | 0.5763 | 0.4054 |
| | 0.5833 | 0.4075 |
| | 0.5634 | 0.4269 |
| | 0.5557 | 0.4192 |

Notes:

Color coordinates measurement allowance: ± 0.005 .

5. Part Number

ALFS2AD-C0PA07001L1-AM

Part number is designated with below details.

ALFS = product family name.

2 = chip number

A = Product type

D = Device

C0PA= color ^[1]

0700 = test current [mA]

1 = internal code

L1 = Brightness Level

AM = automotive application

Note:

^[1] Color :

| Symbol | Description |
|--------|--------------------|
| C0 | No CRI restriction |
| PA | PC Amber |

6. Ordering Information

ALFS2BD-C0PA07001L1-**ABCDEFGHIJKLMN**-OP-AM

Order code contains information with below details :

ABCDEF = min/max wavelength or CCT

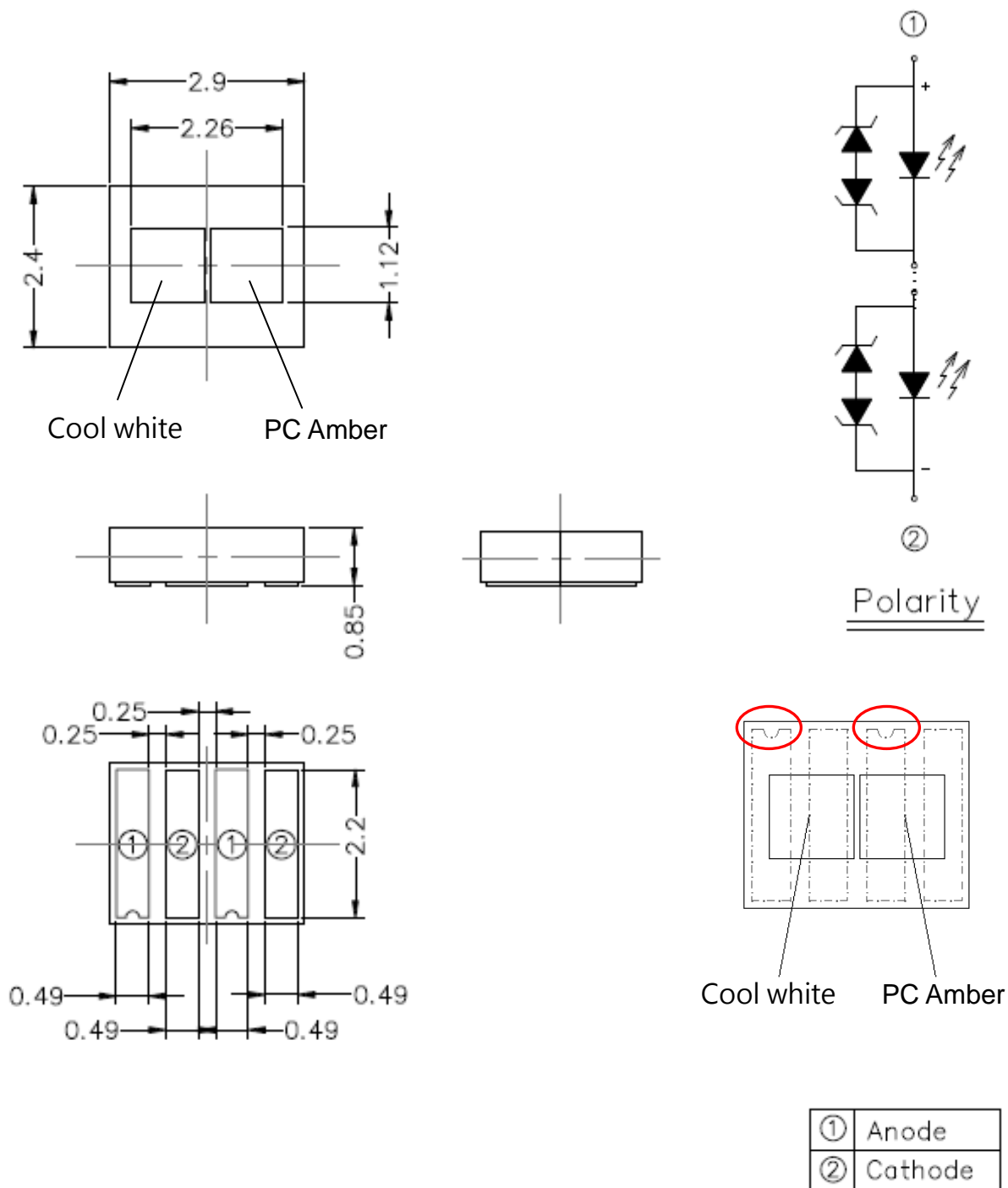
GHIJ = min./max. luminous flux in [lm] or luminous intensity in [mcd]

KLMN = min./max. Forward Voltage

OP = Packing quantity (Minimum package)

| Part Number of the ALFS | Order Code |
|-------------------------|--|
| ALFS2BD-C0PA07001L1-AM | ALFS2BD-C0PA07001L1-64D53AA8B31A1C-2T-AM |

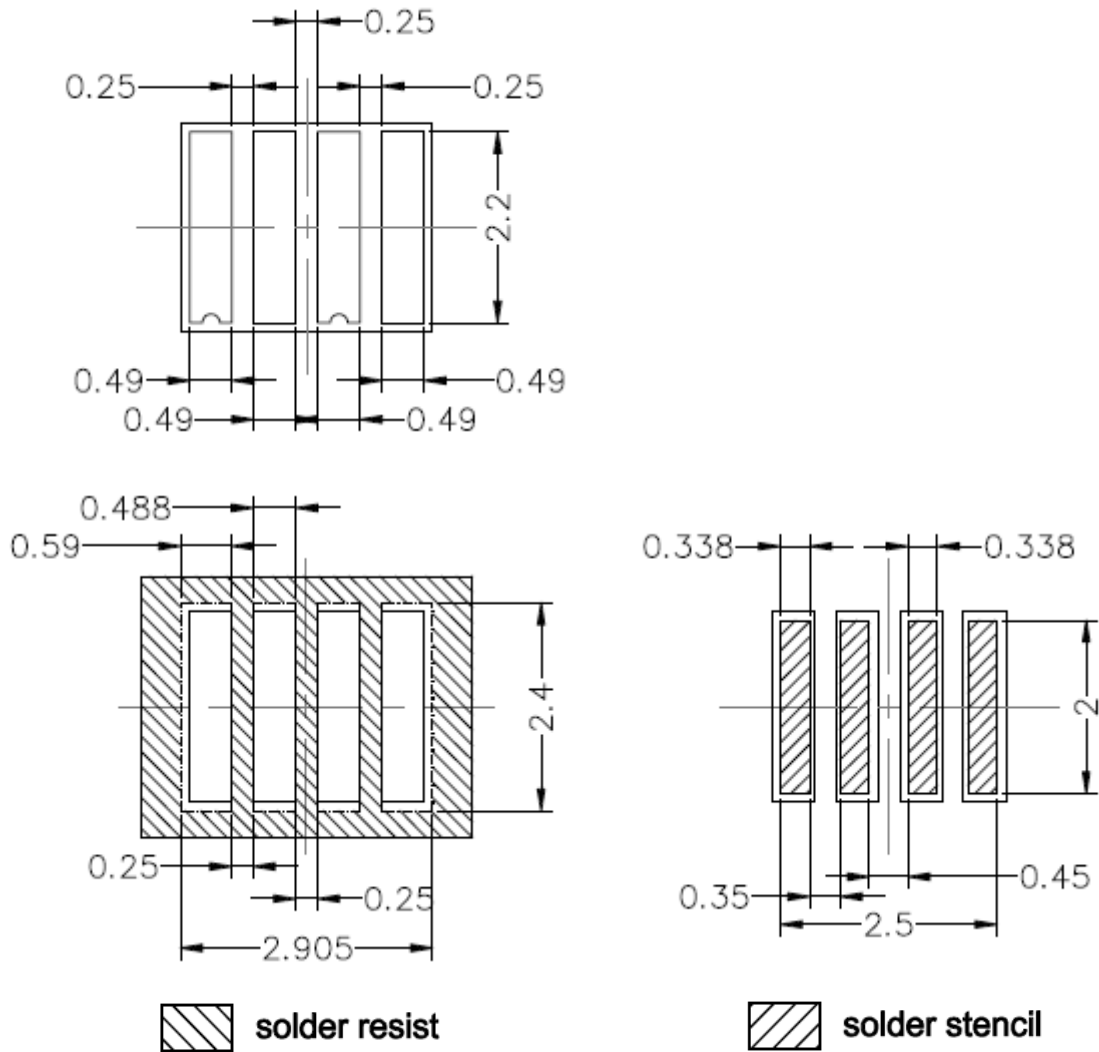
7. Mechanical Dimension



Notes:

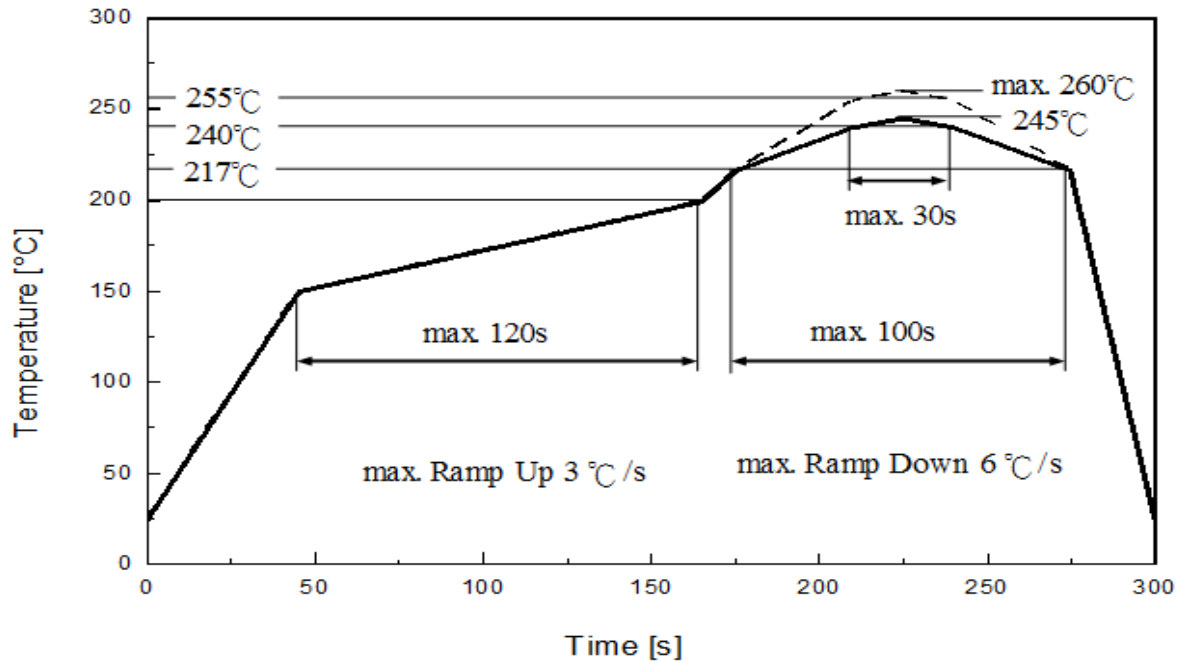
1. Dimensions are in millimeters.
2. Tolerances unless mentioned are $\pm 0.1\text{mm}$.
3. The thermal pad is electrically connected to the Anode soldering pad.

8. Recommended Soldering Pad



9. Reflow Soldering Profile

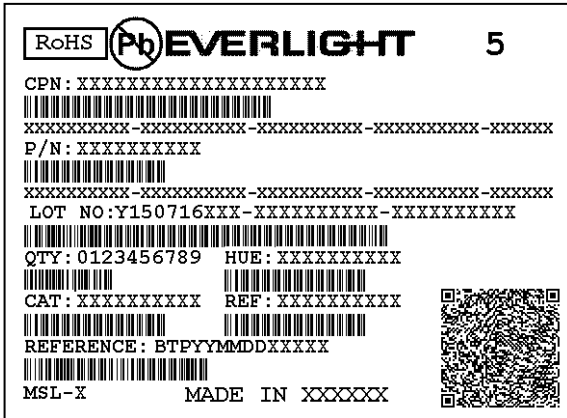
Soldering Condition (Reference: IPC/JEDEC J-STD-020D)



| Profile Feature | Pb-Free Assembly | Unit Einheit |
|--|------------------|--------------|
| 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 |

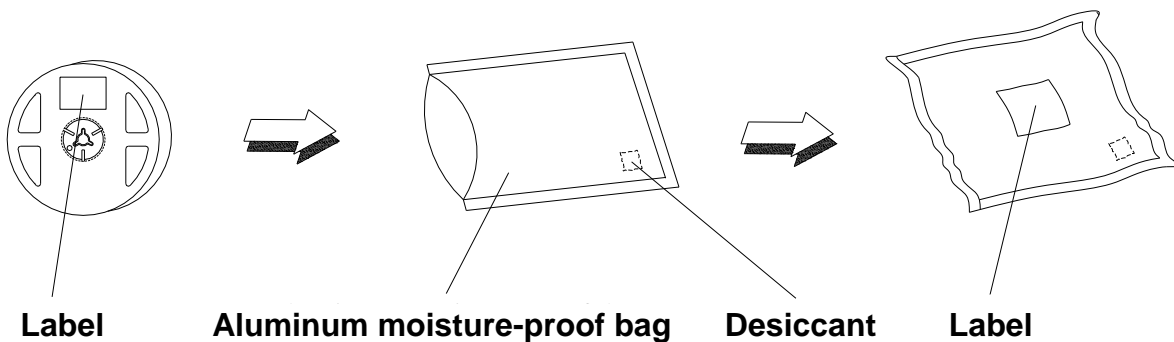
10. Packaging Information

• Product Labeling



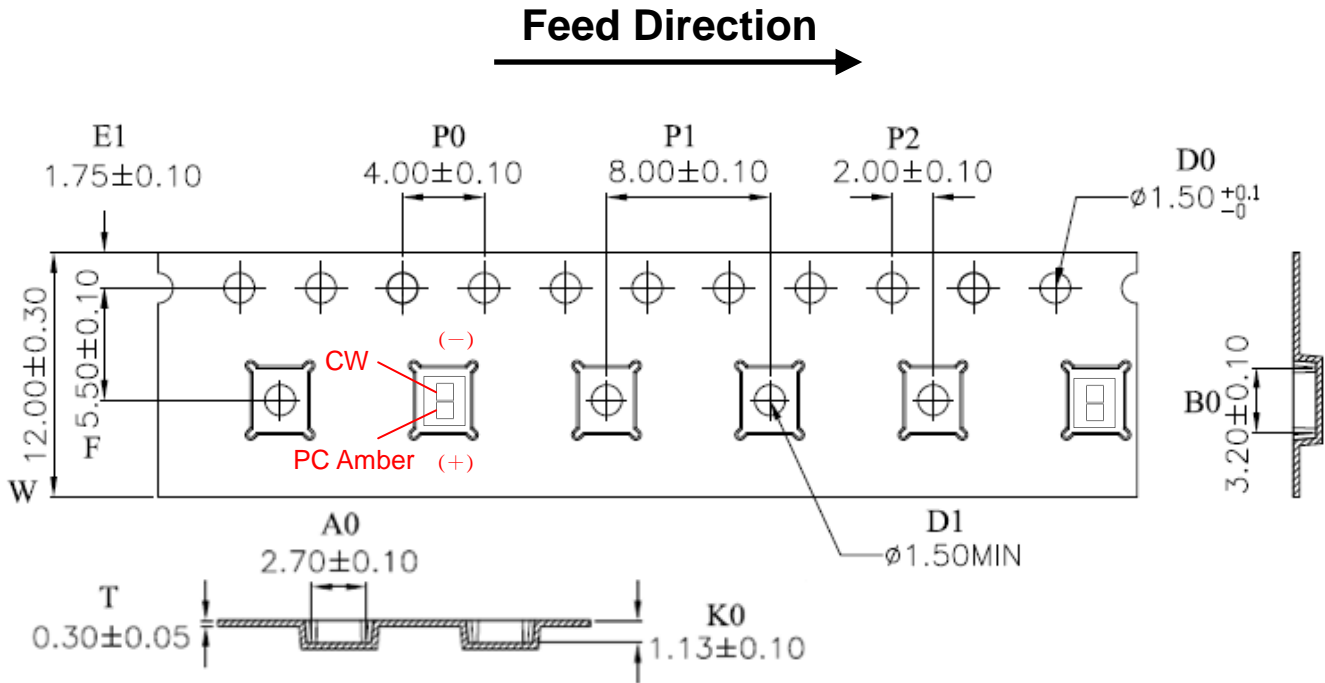
- CPN : Customer's Product Number
- P/N : Everlight Part Number
- LOT NO : Lot Number
- QTY : Packing Quantity
- HUE : Color Bin
- CAT : Luminous Flux (Brightness) Bin
- REF : Forward Voltage Bin

• Moisture Resistant Packing Process

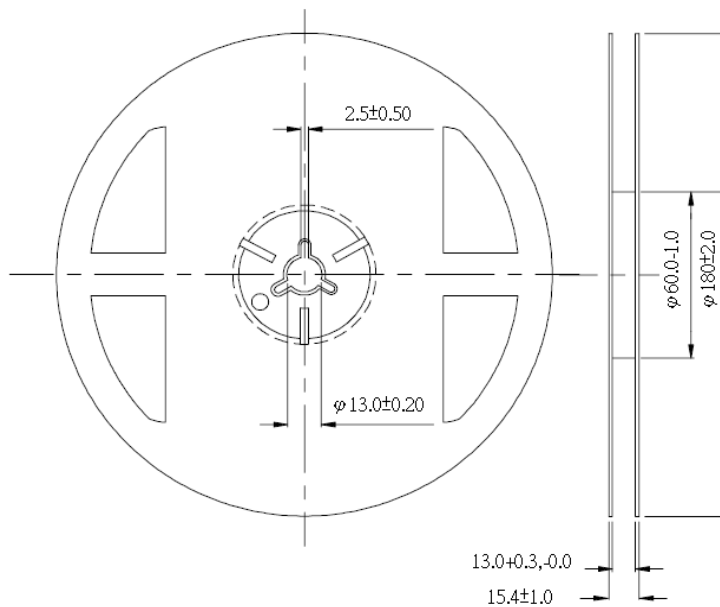


Carrier Tape Dimensions as the following:

Reel: 1000pcs, MOQ_≥ 100pcs (has to be a multiple of 100pcs)



Reel Dimensions

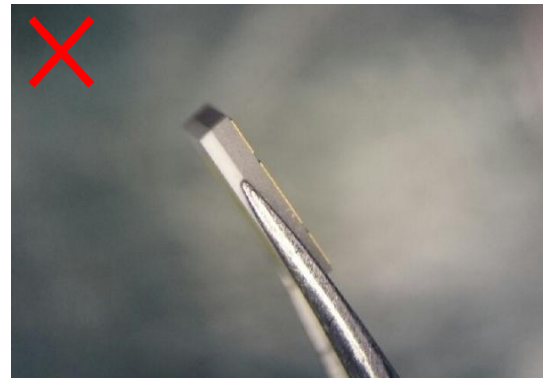
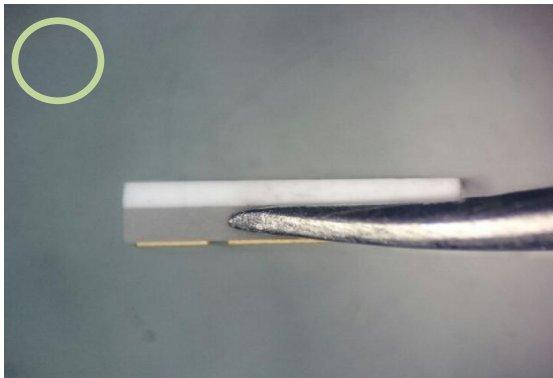
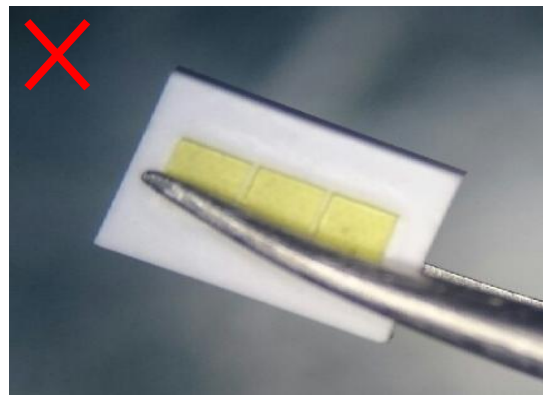


Notes:

1. Dimensions are in millimeters.
2. Tolerances unless mentioned are ±0.2mm.

11. Handling of Silicon Resin for LEDs

- Do not put mechanical stress on the LED.
- When handling the product, do not apply direct pressure on the optical surface. The LED surface could be damaged, which could affect the optical performance of the LED.
- In low-humidity work environment, please keep handling the LEDs with appropriate ESD grounding.
- It is recommended to handle the LED with powder-less latex gloves.
- Do not touch the resin with tweezers to avoid scratching or other damage.



12. Precaution for Use

- Before the package is opened, the LEDs should be stored at 30°C or less and 60%RH or less after being shipped from Everlight and the storage life limits are 12 months.
- After opening the package, all unused LEDs are recommended to be stored in moisture proof packages.
- If the moisture absorbent material (silica gel) has exceeded effectiveness or the LEDs have exceeded the storage time, baking treatment should be performed using the following conditions. Baking treatment: $60\pm 5^{\circ}\text{C}$ for 24 hours.