EVERLIGHT AUTOMOTIVE

DATASHEET

EL ALFS series

Preliminary

ALFS1AD-C007001H1-AM

Features

- Package：Cool White LEDs on Ceramic substrate
- Typ. Color Temperature：5180K ~ 6680K
- Typ. Luminous Flux：230 lm @ 700mA
- Viewing angle：Cold White 120^{o}
- 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

Contents

1. Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Condition
Luminous Flux[2][3][4]	Cool White	Φ_v	180	230	280	lm	I_F=700mA
Forward Voltage[5]	Cool White	V_F	3	3.35	3.75	V	I_F=700mA
Viewing Angle	Cool White	ϕ	---	120	---	deg	I_F=700mA
Color	Cool White CCT	K	5180	---	6680	K	I_F=700mA
Thermal Resistance (Junction to Solder)	Real	$R_{th\ JS\ real}$	---	4.4	4.8	K/W	I_F=700mA
	Electrical	$R_{th\ JS\ el}$	---	3.4	3.8		

Notes:

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

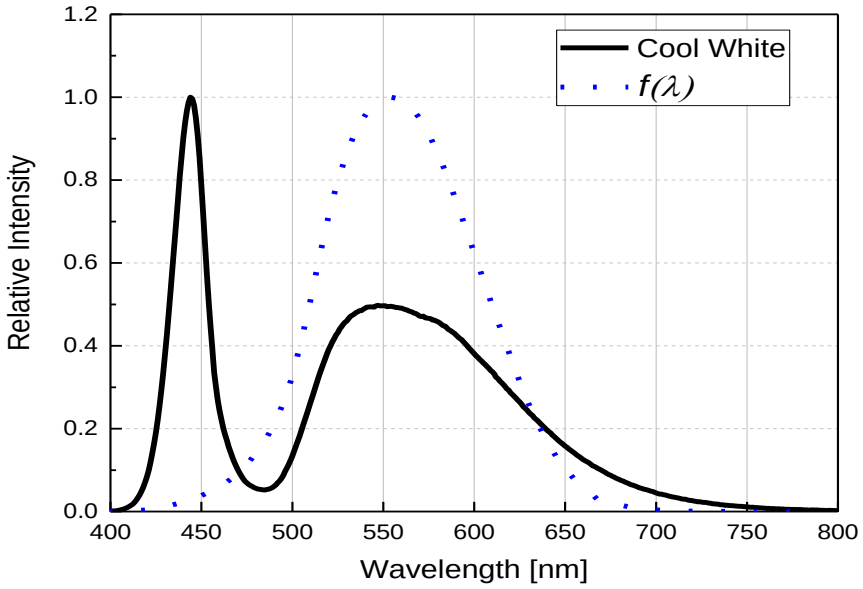
2. Absolute Maximum Ratings

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=1.5kΩ, C= 100pF)	ESD_{HBM}	8	KV
Soldering Temperature	Reflow	260	°C

3. Characteristics Graph

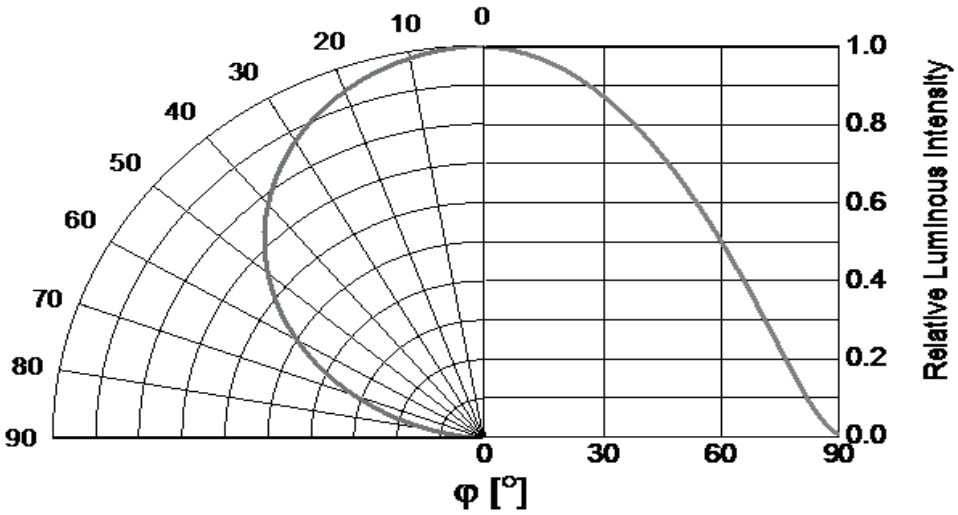
Wavelength Characteristics Relative Spectral Distribution @ Solder Pad Temperature = 25°C (CW)

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



Typical Diagram Characteristics of Radiation (CW)

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

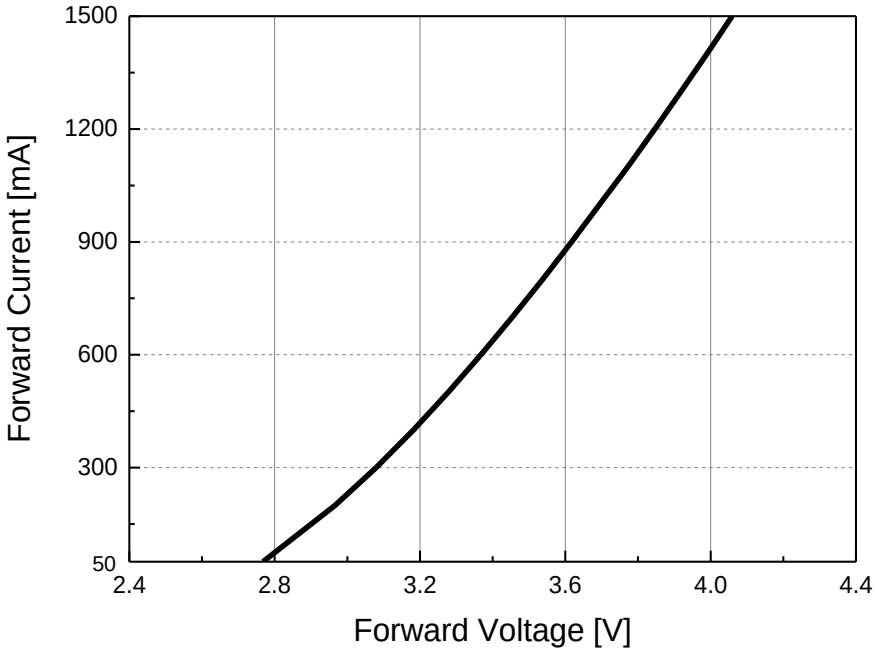


Notes:

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 ± 5°

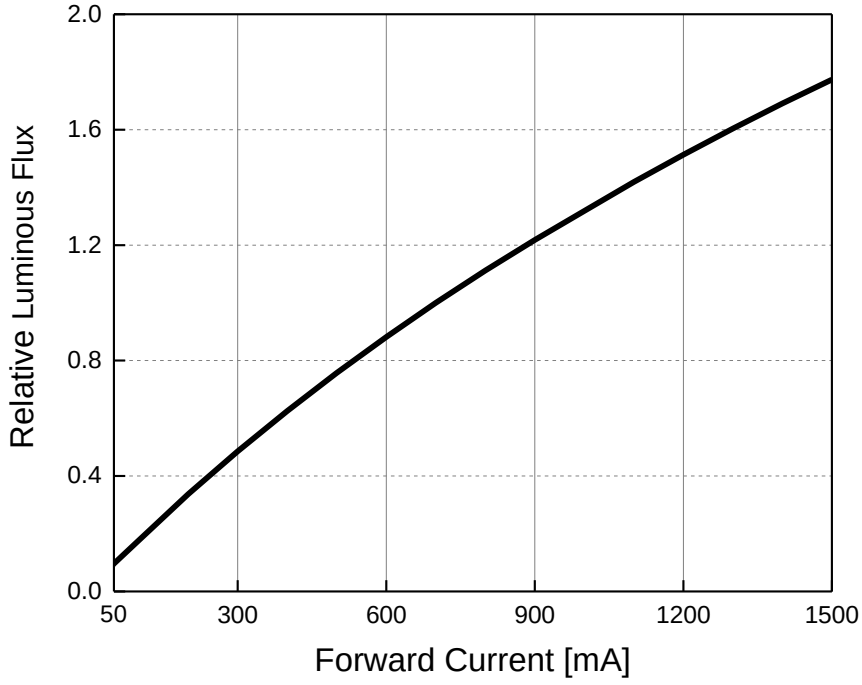
Forward Current vs. Forward Voltage
@ Solder Pad Temperature = 25°C

$$I_F = f(V_F)$$



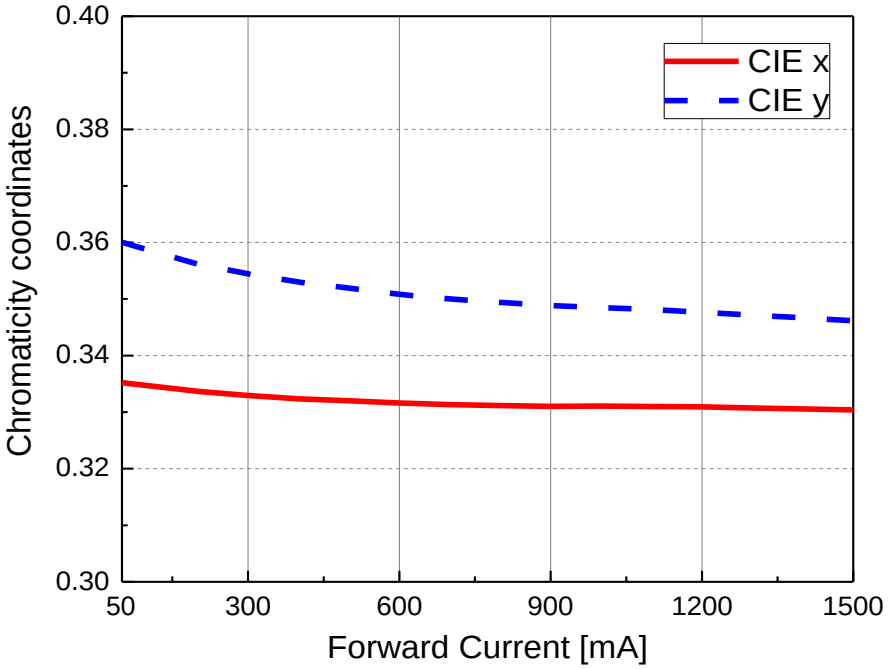
Relative Luminous Flux vs. Forward Current
@Solder Pad Temperature = 25°C

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



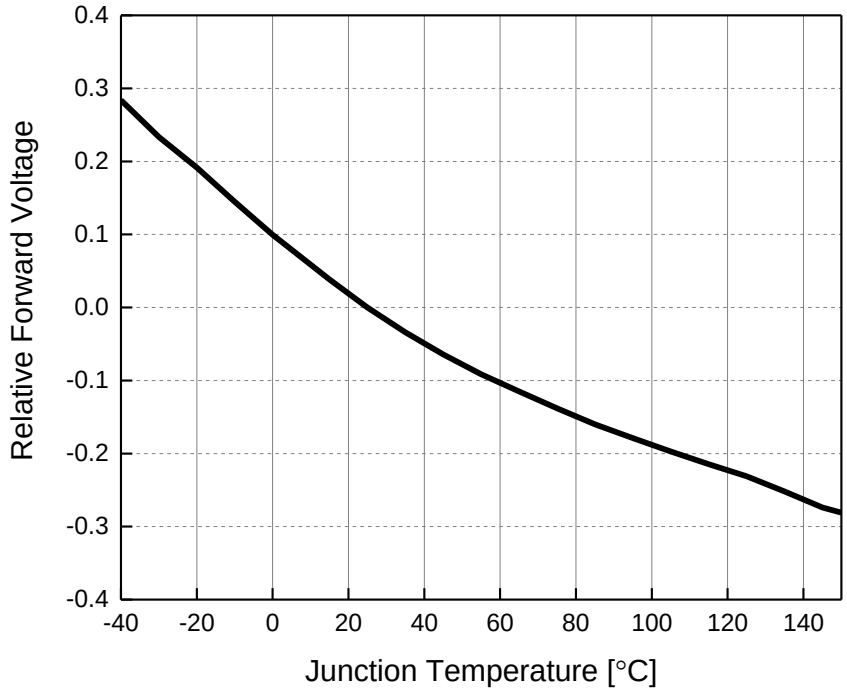
Chromaticity Coordinates vs. Forward Current @Solder Pad Temperature = 25°C

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



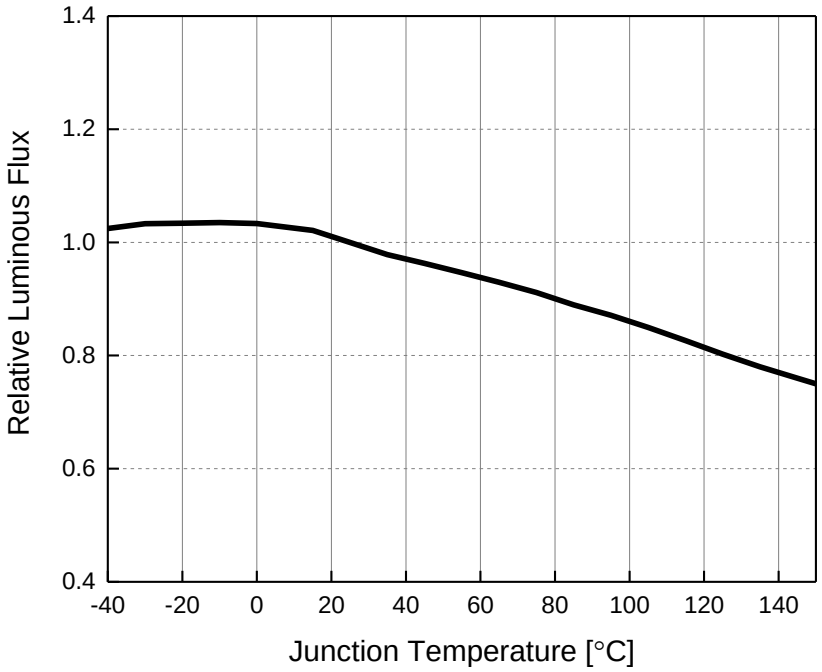
Relative Forward Voltage vs. Junction Temperature @Forward Current = 700mA

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



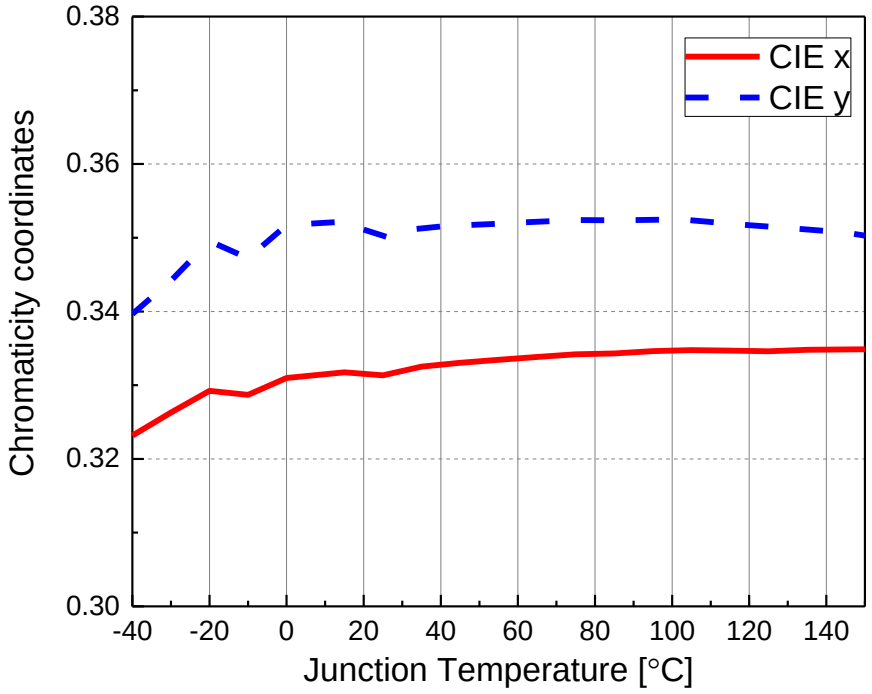
Relative Luminous Flux vs. Junction Temperature @Forward Current = 700mA

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



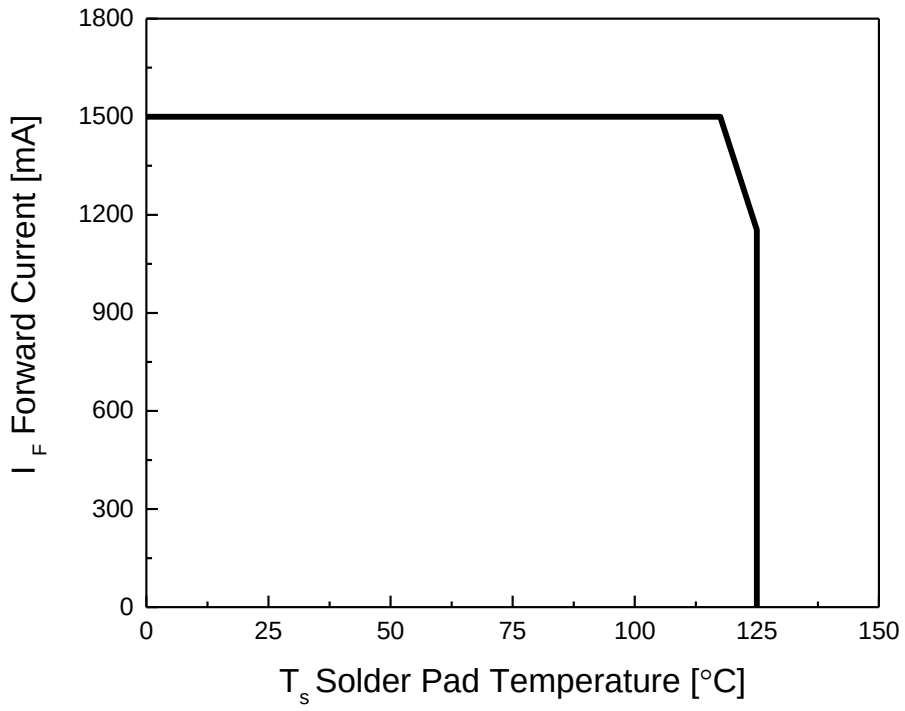
Chromaticity Coordinates Shift CIE X/Y vs. Junction Temperature @Forward Current = 700mA

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



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
	9	260	280

Notes:

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

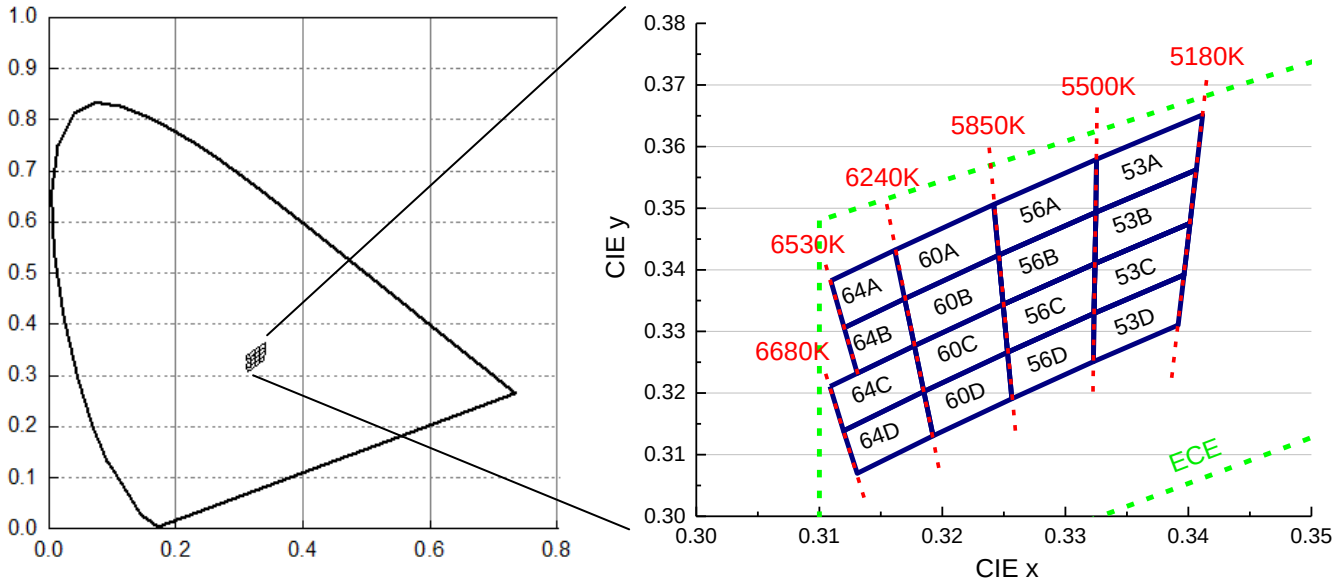
Forward Voltage Bins

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: ±0.1V.

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.

5. Part Number

ALFS1AD-C007001H1-AM

Part number is designated with below details.

ALFS = product family name.

1 = chip number

A = Product type

D = Device

C0= color [1]

0700 = test current [mA]

1 = internal code

H1 = Brightness Level

AM = automotive application

Note

[1] Color：

Symbol	Description
C0	No CRI restriction
PA	PC Amber

6. Ordering Information

ALFS1AD-C007001H1- ABCDEFGHIJKLMN-OP-AM

Order code contains information with below details：

ABCDEF = min/max wavelength or CCT

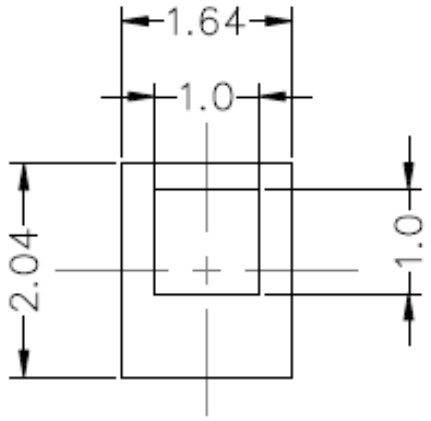
GHIJ = min./max. luminous flux in [lm] or luminous intensity in [mcd]

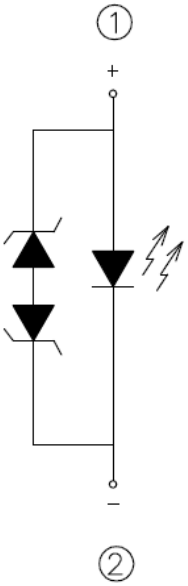
KLMN = min./max. Forward Voltage

OP = Packing quantity (Minimum package)

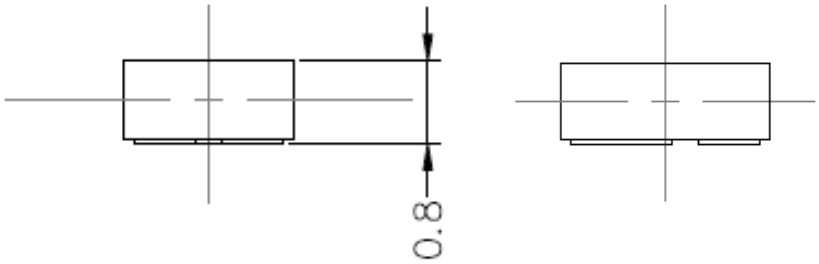
Part Number of the ALFS	Order Code
ALFS1AD-C007001H1-AM	ALFS1AD-C007001H1-64D53AB5B91A1C-2T-AM

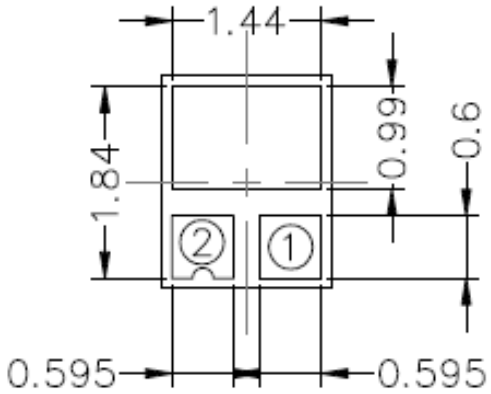
7. Mechanical Dimension





Polarity



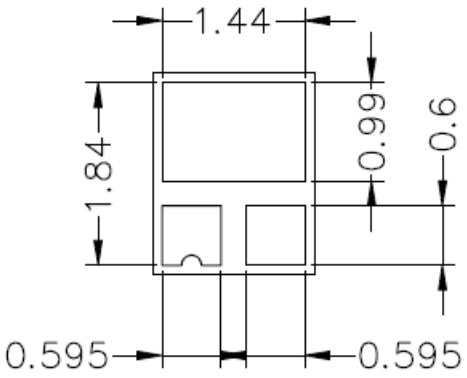


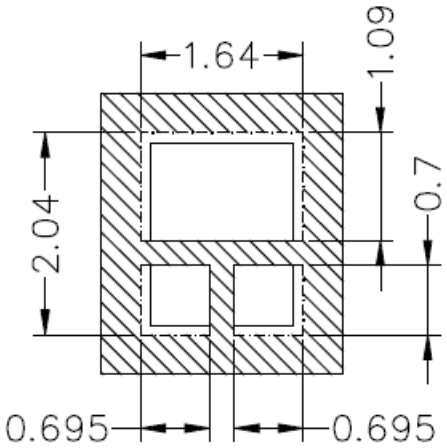
①	Anode
②	Cathode

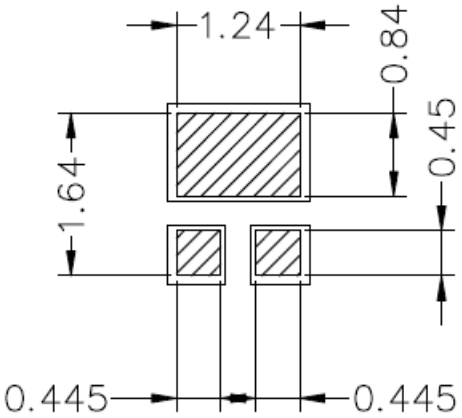
Notes:

1. Dimensions are in millimeters.
2. Tolerances unless mentioned are ± 0.1mm.
3. The thermal pad is electrically connected to the Anode soldering pad.

8. Recommended Soldering Pad



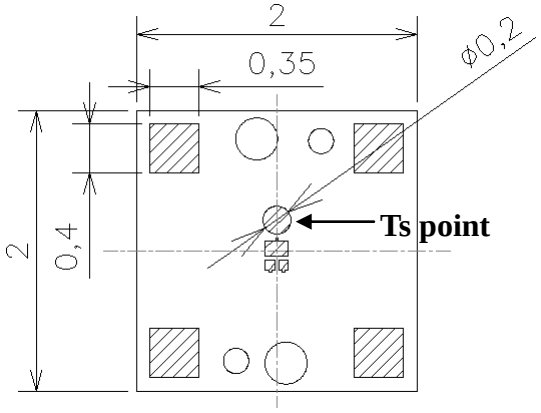




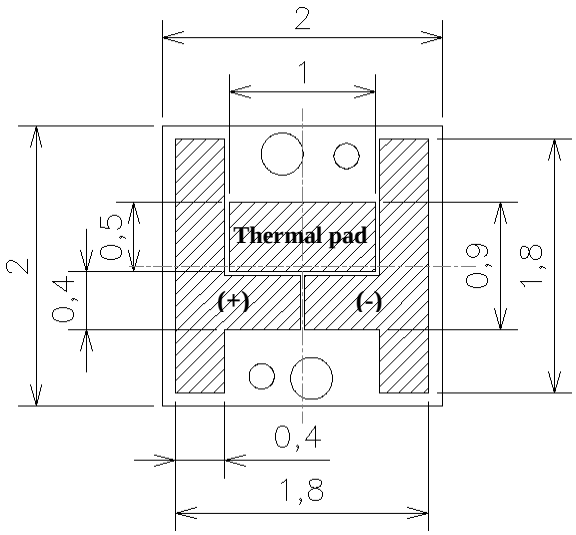
solder resist

solder stencil

We recommend Cu area like below drawing. You can use this recommendation when you draw your module design.
(MCPCB information; Cu thickness 35um, dielectric layer 100um, 2W/mK, Al thickness 1.5mm)



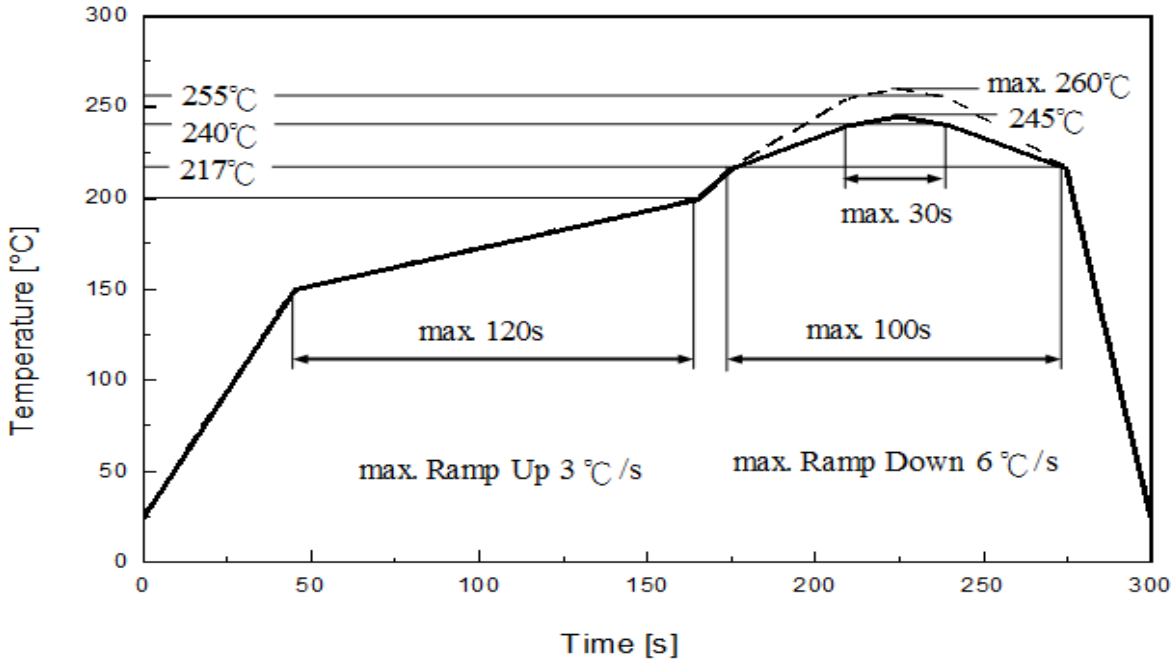
Cu open area



Cu pattern

9. Reflow Soldering Profile

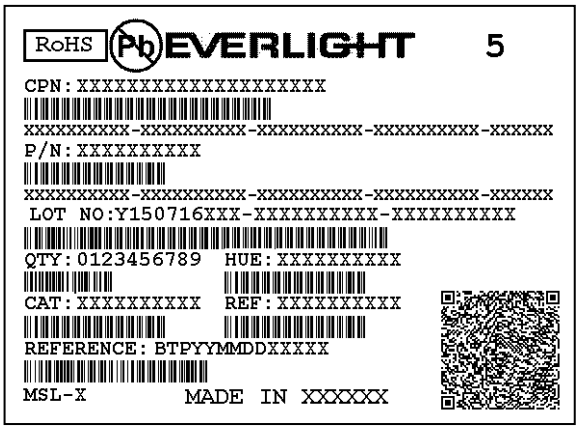
Soldering Condition (Reference: IPC/JEDEC J-STD-020D)



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

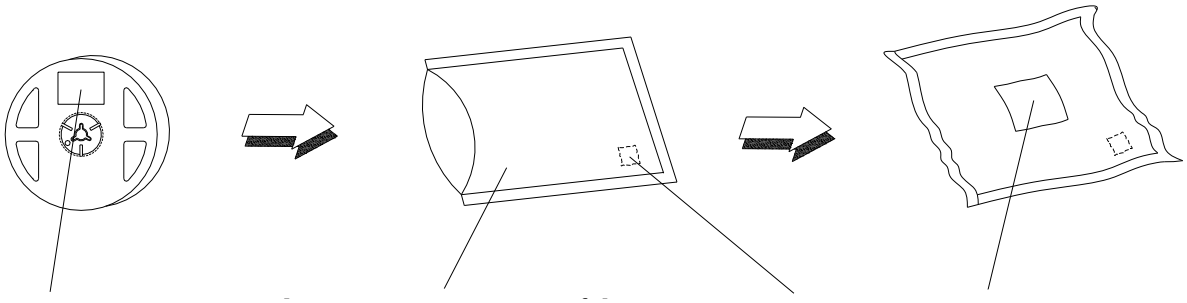
10. Packaging Information

• 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

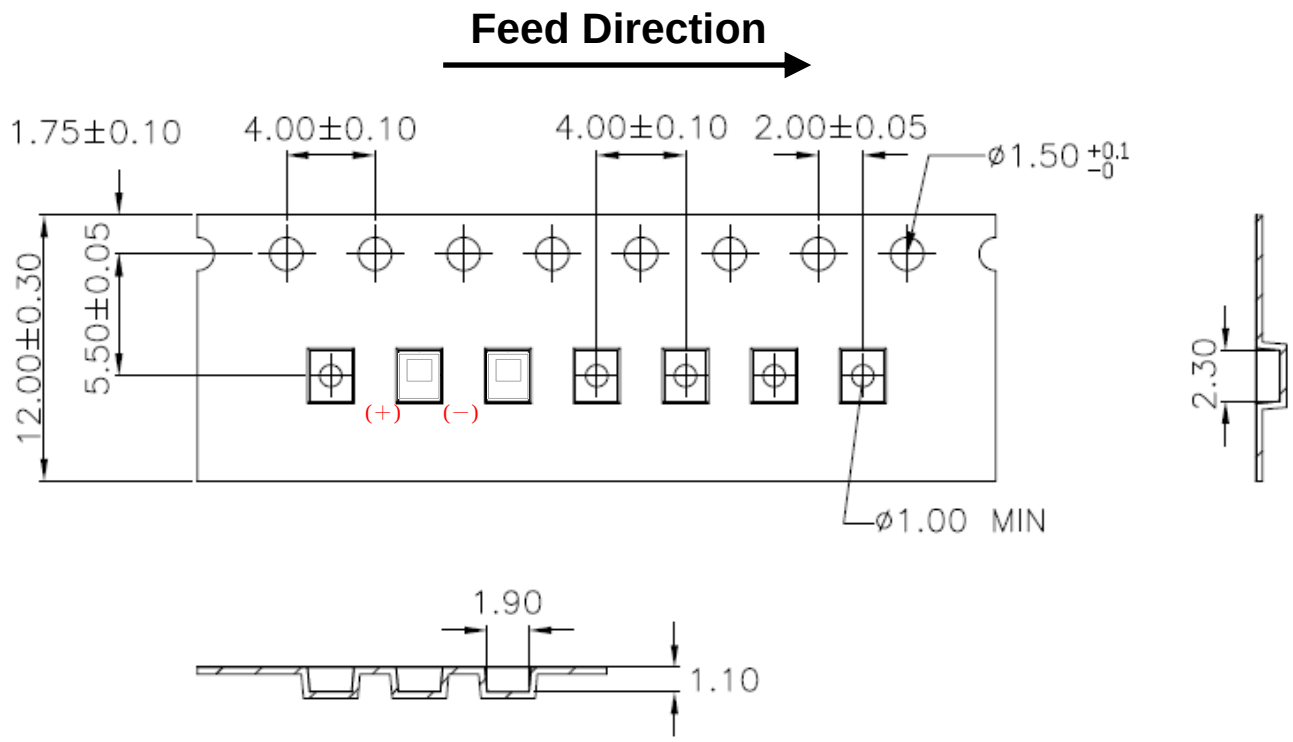
• Moisture Resistant Packing Process



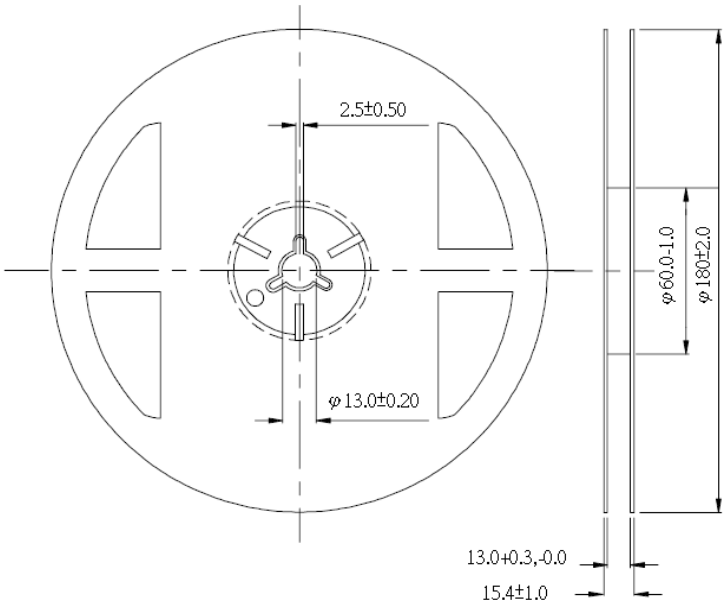
Label **Aluminum moisture-proof bag** **Desiccant** **Label**

Carrier Tape Dimensions as the following:

Reel: 200pcs, MOQ≥ 100pcs (has to be a multiple of 100pcs)



Reel Dimensions

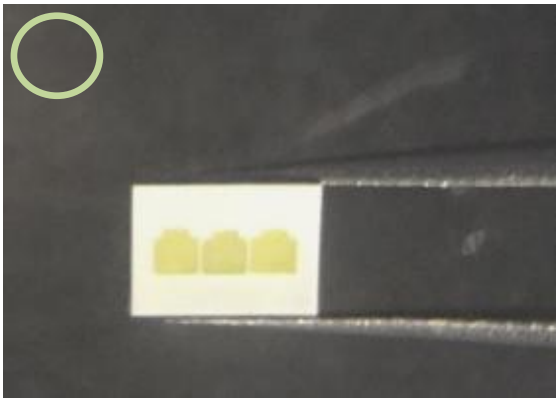
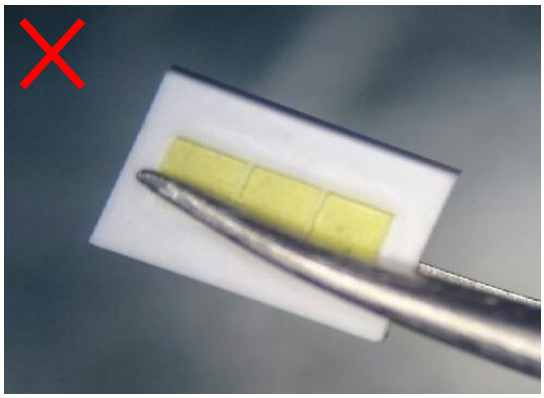
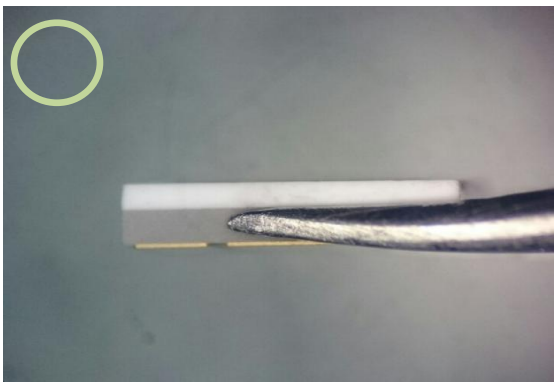
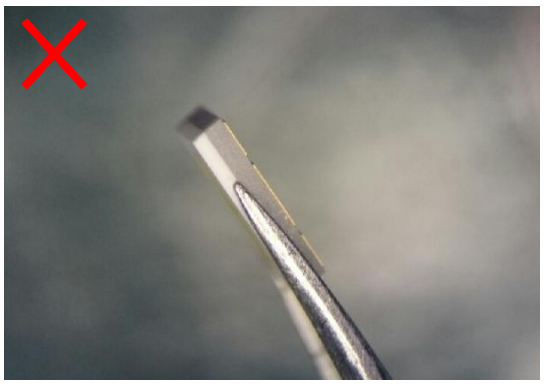


Notes:

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±5°C for 24 hours.