DATASHEET

EHP-A24

1W ANSI BIN Series

Features

- Moisture Sensitivity Level: 3
- Main Parameters: Luminous Flux, Forward Voltage , Chromaticity and Color Rendering Index
- RoHS compliant
- Typical viewing angle: 115°

Applications

- High Wattage Replacement Bulb
- Down Light
- Recessed Can Light
- Low/High Bay Light

Materials

Items	Description
Encapsulating Resin	Silicone resin
Electrodes	Ag plating copper alloy
Die attach	Silver paste
Chip	InGaN

Product Nomenclature

The product name is designated as below:

EHP-A24/ ABCDE –FGH/IJKL/MNO/PQ

Designation:

AB = color [1]
CDE = internal coding
FGH = power consumption [2]
IJKL = color range or CCT Range
MNO = luminous flux bin
PQ = packaging type [3]

Notes

1. Table of color offerings:

Symbol	Color	CCT range	Color Rendering Index
GT	Cool-White	4745~7050K	>65
KT	Cool-White	4745~7050K	>80
LM	Warm-White	2580~3710K	>70
	Neutral-White	3710K-4745K	
KM	Warm White	2580~3710K	>80
	Neutral-White	3710K-4745K	

2. Table of power consumption :

Symbol	Description
P01	1W

3. Table of packaging types:

Symbol	Description
TR	Tapping Reel

Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Max. DC Forward Current (mA)	I_F	350	mA
Max. Peak Pulse Current (mA)	I_{Pulse}	400[1]	mA
Thermal Resistance	R_{th}	15	°C/W
Max. Junction Temperature	T_J	125	°C
Operating Temperature	T_{Opr}	-40 ~ +85	°C
Storage Temperature	T_{Stg}	-40 ~ +100	°C
Max. Soldering Temperature	T_{Sol}	260	°C

Notes:

1. tp ≦100ms, Duty cycle = 25%

PN of the A24 series: Warm White LEDs

Order Code of A24	Min. Luminous Flux (lm)	Typ. Luminous Flux (lm)	CCT (K) Wavelength (nm)	Forward Voltage (V)	Forward Current (mA)	CRI (Min.)	CRI (Typ.)
EHP-A24/KM21H-P01/40K/K33/TR	80	87	40K-1,40K-2 40K-3,40K-4	2.95~3.85	350	80	81
EHP-A24/KM21H-P01/30K/K33/TR	80	85	30K-1,30K-2 30K-3,30K-4	2.95~3.85	350	80	81

Notes:

1. Luminous flux measurement tolerance: ±10%.
2. The data of luminous flux measured at thermal pad=25°C
3. Typical luminous flux or light output performance is operated within the condition guided by this datasheet
4. The CRI value is based on the Everlight testing instrument.
5. CRI measurement tolerance: ±2

PN of the A24 series: Cool White LEDs

Order Code of A24	Min. Luminous Flux (lm)	Typ. Luminous Flux (lm)	CCT (K) Wavelength (nm)	Forward Voltage (V)	Forward Current (mA)	CRI (Min.)	CRI (Typ.)
EHP-A24/GT21H-P01/65K/K51/TR	100	106	65K-1,65K-2 65K-3,65K-4	2.95~3.85	350	65	70
EHP-A24/GT21H-P01/57K/K51/TR	100	108	57K-1,57K-2 57K-3,57K-4	2.95~3.85	350	65	70
EHP-A24/GT21H-P01/50K/K51/TR	100	104	50K-1,50K-2 50K-3,50K-4	2.95~3.85	350	65	70

Notes:

1. Luminous flux measurement tolerance: ±10%.
2. The data of luminous flux measured at thermal pad=25°C
3. Typical luminous flux or light output performance is operated within the condition guided by this datasheet
4. The CRI value is based on the Everlight testing instrument.
5. CRI measurement tolerance: ±2

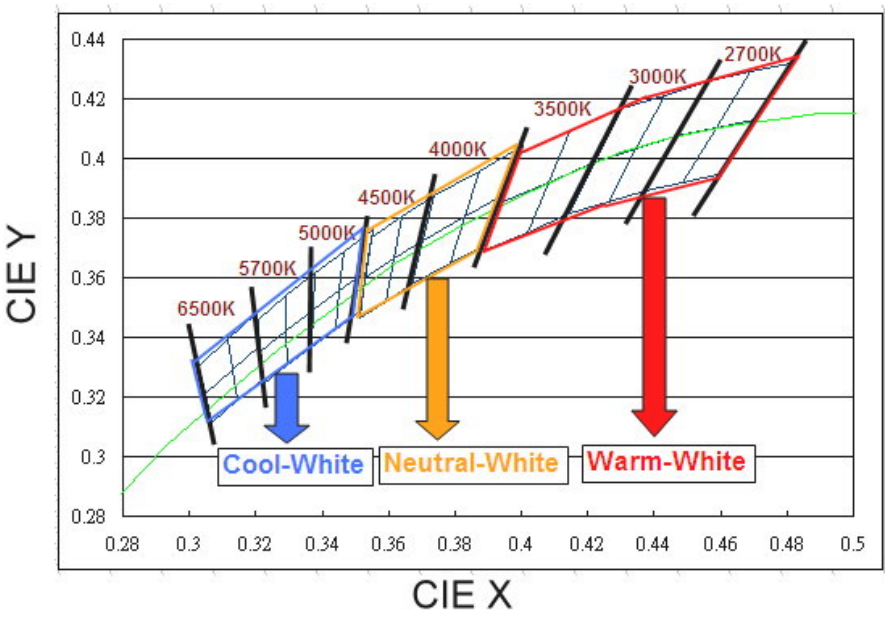
Product Binning

Luminous Flux Bins

Group	Bin	Min	Typ.	Max
E	1	1.5	----	3
	2	3	----	4
	3	4	----	5
	4	5	----	6
	5	6	----	8
F	1	8	----	10
	2	10	----	13
	3	13	----	17
	4	17	----	20
	5	20	----	23
J	1	23	----	27
	2	27	----	33
	3	33	----	39
	4	39	----	45
	5	45	----	52
K	1	52	----	60
	2	60	----	70
	31	70	----	75
	32	75	----	80
	33	80	----	85
	41	85	----	90
	42	90	----	95
	43	95	----	100
	51	100	----	110
	52	110	----	120
	53	120	----	130

Group	Bin	Min	Typ.	Max
N	11	130	----	140
	12	140	----	150
	13	150	----	160
	21	160	----	180
	22	180	----	200
	31	200	----	225
	32	225	----	250
	41	250	----	275
	42	275	----	300
	51	300	----	350
	52	350	----	400
R	1	400	----	500
	2	500	----	600
	3	600	----	750
	4	750	----	1000
	5	1000	----	1300

White Bin Structure

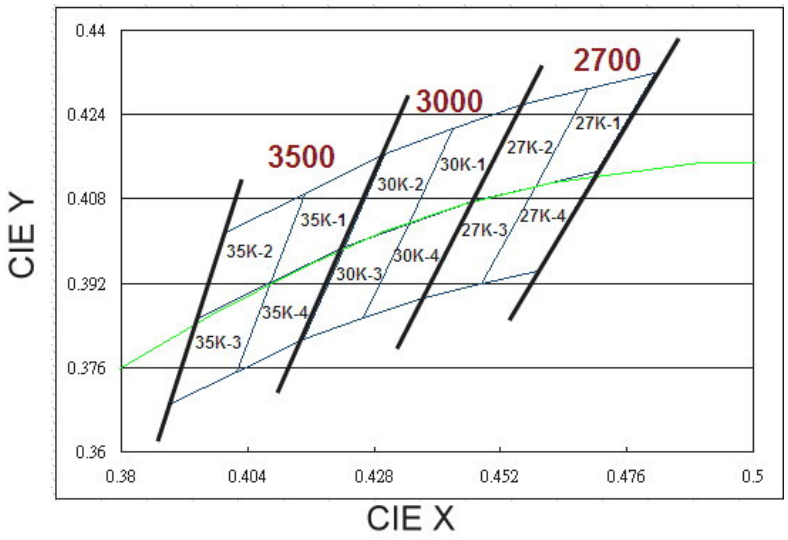


Chromaticity specification defined by ANSI

Notes:

1. The CCT range of Cool-White varies from 4745K to 7050K.
2. The CCT range of Neutral-White varies from 3710K to 4745K.
3. The CCT range of Warm-White varies from 2580K to 3710K
4. Color coordinates measurement allowance : ±0.01
5. Color bins are defined at I_F=80mA operation.

Warm-White Bin Structure



Warm-White Bin Coordinates

2700K

Bin	CIE X	CIE Y
27K-1	0.469	0.429
	0.459	0.410
	0.470	0.413
	0.481	0.432
Reference Range: 2580~2700K		

Bin	CIE X	CIE Y
27K-2	0.456	0.426
	0.447	0.408
	0.459	0.410
	0.469	0.429
Reference Range: 2700~2870K		

Bin	CIE X	CIE Y
27K-4	0.459	0.410
	0.448	0.392
	0.459	0.394
	0.470	0.413
Reference Range: 2580~2700K		

Bin	CIE X	CIE Y
27K-3	0.447	0.408
	0.437	0.389
	0.448	0.392
	0.459	0.410
Reference Range: 2700~2870K		

3000K

Bin	CIE X	CIE Y
30K-1	0.443	0.421
	0.435	0.403
	0.447	0.408
	0.456	0.426
Reference Range: 2870~3000K		

Bin	CIE X	CIE Y
30K-2	0.430	0.417
	0.422	0.399
	0.435	0.403
	0.443	0.421
Reference Range: 3000~3220K		

Bin	CIE X	CIE Y
30K-4	0.435	0.403
	0.426	0.385
	0.437	0.389
	0.447	0.408
Reference Range: 2870~3000K		

Bin	CIE X	CIE Y
30K-3	0.422	0.399
	0.415	0.381
	0.426	0.385
	0.435	0.403
Reference Range: 3000~3220K		

3500K

Bin	CIE X	CIE Y
35K-1	0.415	0.409
	0.408	0.392
	0.422	0.399
	0.430	0.417
Reference Range: 3220~3500K		

Bin	CIE X	CIE Y
35K-2	0.400	0.402
	0.394	0.385
	0.408	0.392
	0.415	0.409
Reference Range: 3500~3710K		

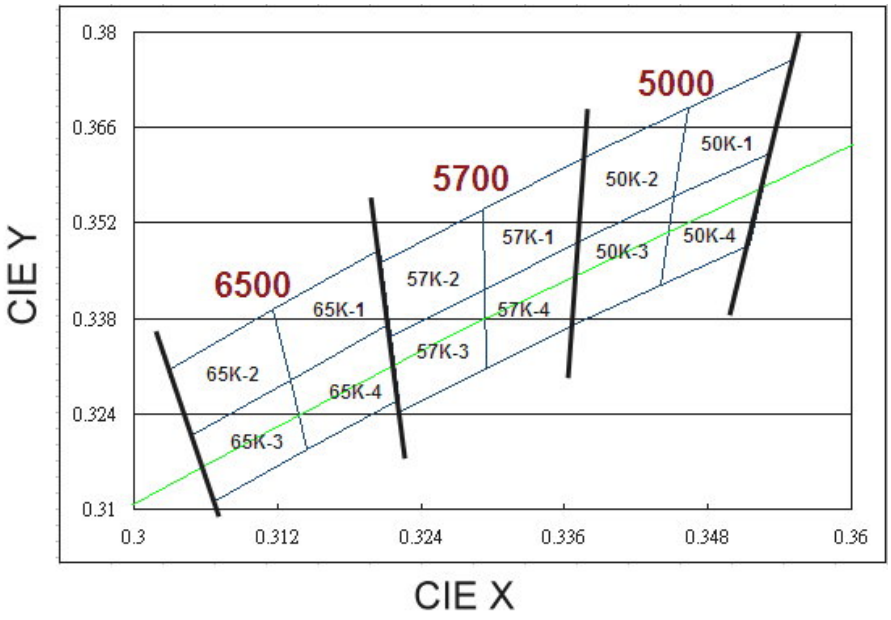
Bin	CIE X	CIE Y
35K-4	0.408	0.392
	0.402	0.375
	0.415	0.381
	0.422	0.399
Reference Range: 3220~3500K		

Bin	CIE X	CIE Y
35K-3	0.394	0.385
	0.389	0.369
	0.402	0.375
	0.408	0.392
Reference Range: 3500~3710K		

Notes:

1. Color coordinates measurement allowance : ±0.01.

Cool-White Bin Structure



5000K

Bin	CIE X	CIE Y
50K-1	0.346	0.369
	0.345	0.356
	0.353	0.362
	0.355	0.376
Reference Range: 4745~5000K		

Bin	CIE X	CIE Y
50K-2	0.338	0.362
	0.337	0.349
	0.345	0.356
	0.346	0.369
Reference Range: 5000~5310K		

Bin	CIE X	CIE Y
50K-4	0.345	0.356
	0.344	0.343
	0.352	0.349
	0.353	0.362
Reference Range: 4745~5000K		

Bin	CIE X	CIE Y
50K-3	0.337	0.349
	0.337	0.337
	0.344	0.343
	0.345	0.356
Reference Range: 5000~5310K		

5700K

Bin	CIE X	CIE Y
57K-1	0.329	0.354
	0.329	0.342
	0.337	0.349
	0.338	0.362
Reference Range: 5310~5700K		

Bin	CIE X	CIE Y
57K-2	0.321	0.346
	0.322	0.335
	0.329	0.342
	0.329	0.354
Reference Range: 5700~6020K		

Bin	CIE X	CIE Y
57K-4	0.329	0.342
	0.329	0.331
	0.337	0.337
	0.337	0.349
Reference Range: 5310~5700K		

Bin	CIE X	CIE Y
57K-3	0.322	0.335
	0.322	0.324
	0.329	0.331
	0.329	0.342
Reference Range: 5700~6020K		

Cool-White Bin Coordinates

6500K

Bin	CIE X	CIE Y
65K-1	0.312	0.339
	0.313	0.329
	0.321	0.337
	0.321	0.348
Reference Range: 6020~6500K		

Bin	CIE X	CIE Y
65K-2	0.303	0.330
	0.305	0.321
	0.313	0.329
	0.312	0.339
Reference Range: 6500~7050K		

Bin	CIE X	CIE Y
65K-4	0.313	0.329
	0.315	0.319
	0.322	0.326
	0.321	0.337
Reference Range: 6020~6500K		

Bin	CIE X	CIE Y
65K-3	0.305	0.321
	0.307	0.311
	0.315	0.319
	0.313	0.329
Reference Range: 6500~7050K		

Notes:

1. Color coordinates measurement allowance : ±0.01.

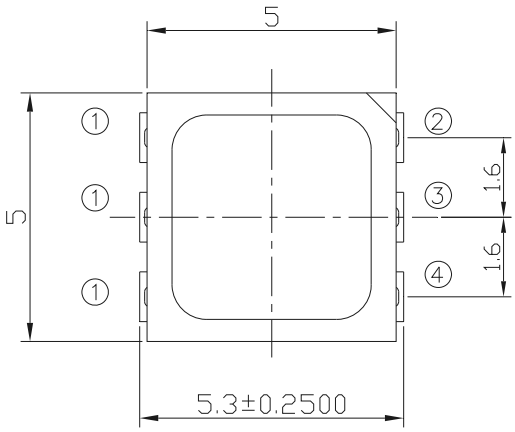
Forward Voltage Bins

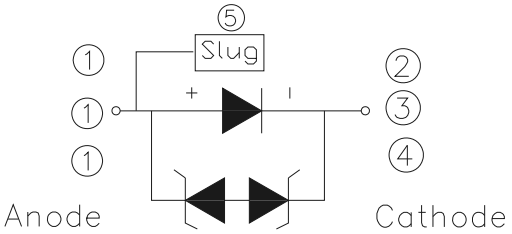
Bin	Minimum Forward Voltage (V)	Maximum Forward Voltage (V)
V1	2.95	3.25
V2	3.25	3.55
V3	3.55	3.85

Notes:

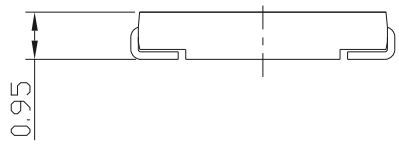
1. Forward voltage measurement tolerance: ±0.1V.
2. Forward voltage bins are defined at IF=350mA operation.

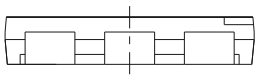
Mechanical Dimension

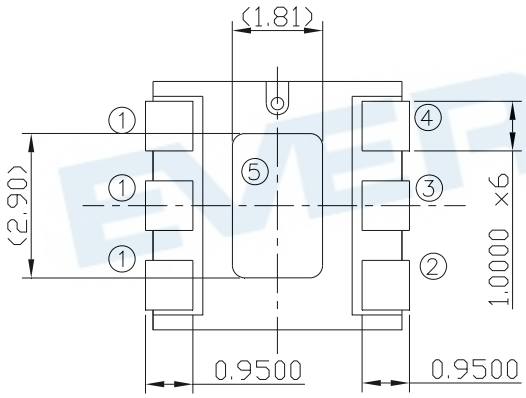




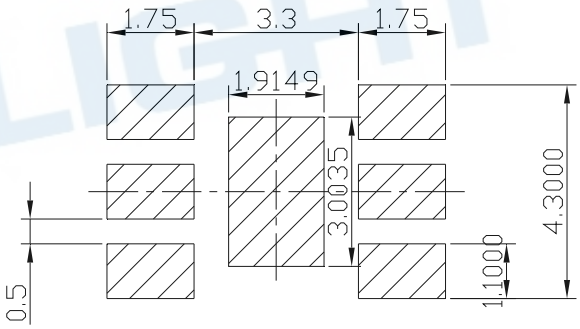
Polarity







Bot. view



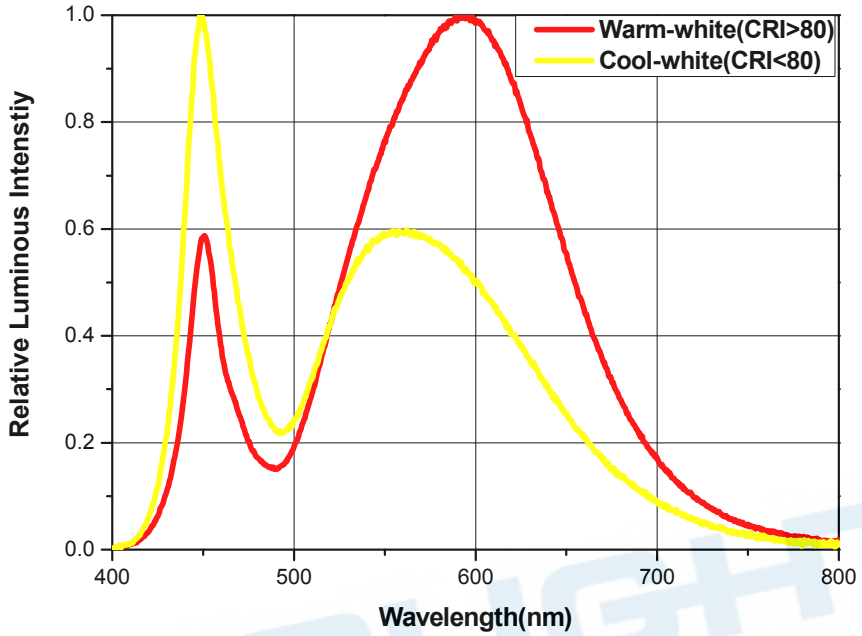
Soldering patterns

Notes.

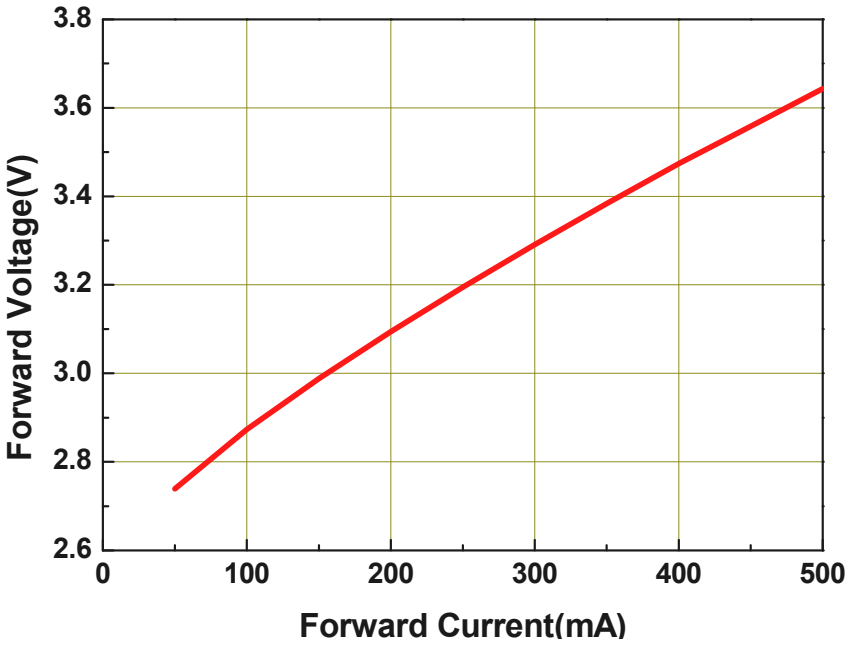
1. Dimensions are in millimeters.
2. Tolerances for fixed dimensions are ± 0.25mm

Typical Electro-Optical Characteristic Curve

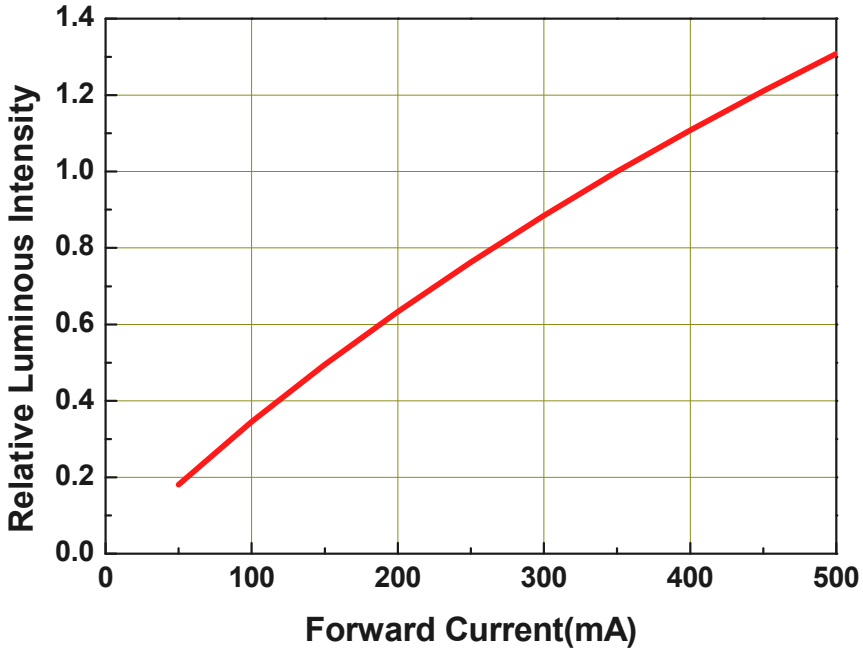
Relative Spectral Distribution
@ Soldering Temperature = 25℃



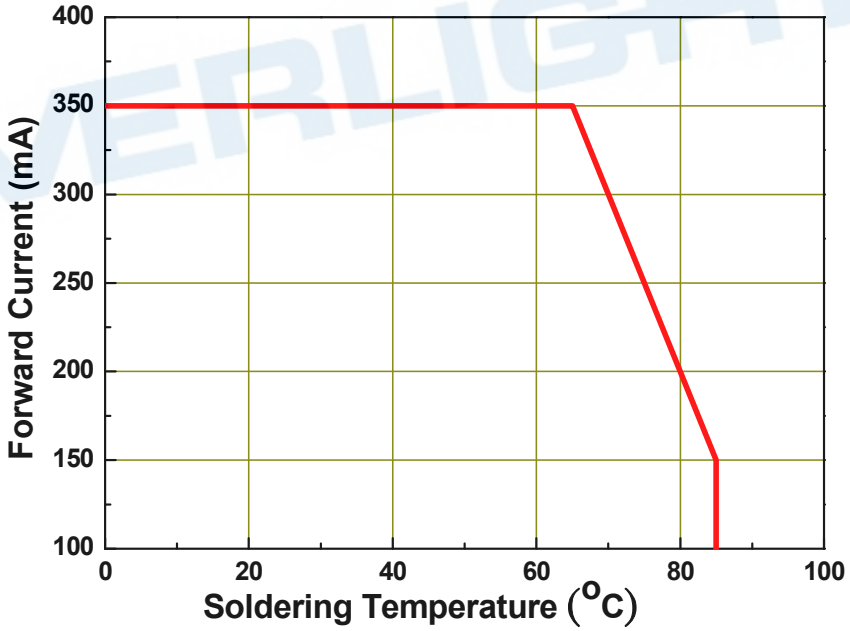
Forward Voltage vs. Forward Current
@ Soldering Temperature = 25℃



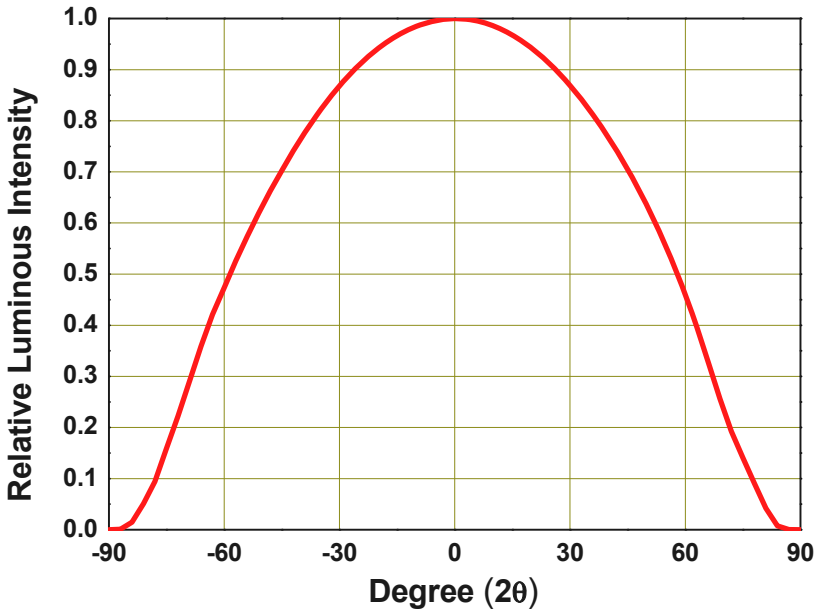
Relative Luminous Flux vs. Forward Current @ Soldering Temperature = 25℃



Forward Current Derating Curve @ Junction Temperature <125℃



Typical Diagram Characteristics of Radiation Patterns



Note:

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. Viewing angle tolerance is ± 5° .

Product Labeling

Label Explanation

CPN: Customer Specification (when required)

P/N : Everlight Production Number

QTY: Packing Quantity

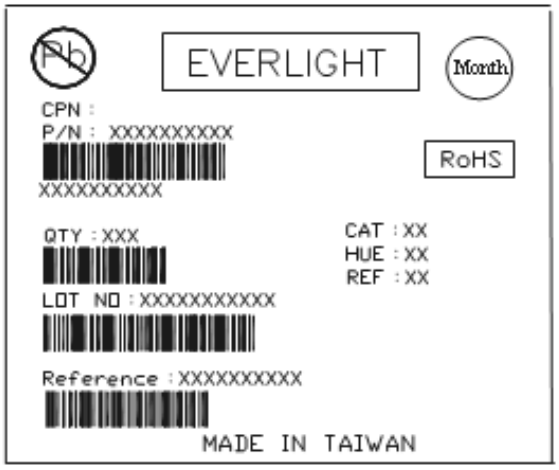
CAT: Luminous Flux (Brightness) Bin

HUE: Color Bin

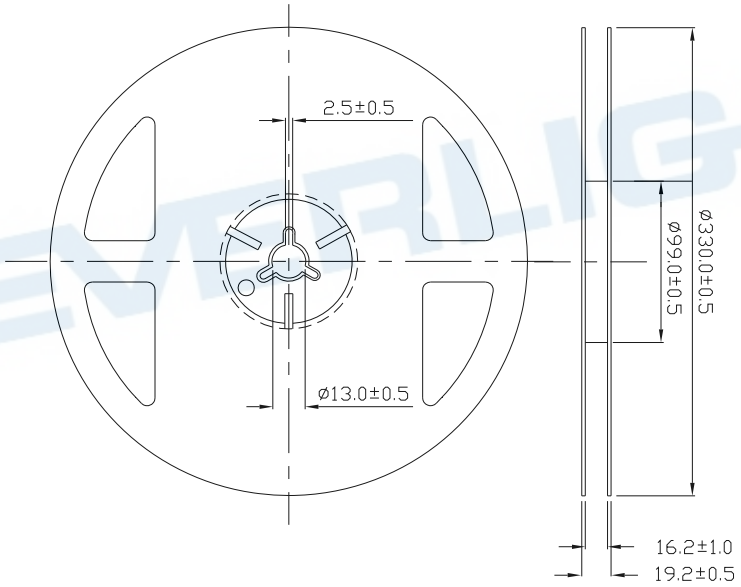
REF: Forward Voltage Bin

LOT No: Lot Number

MADE IN TAIWAN: Production Place



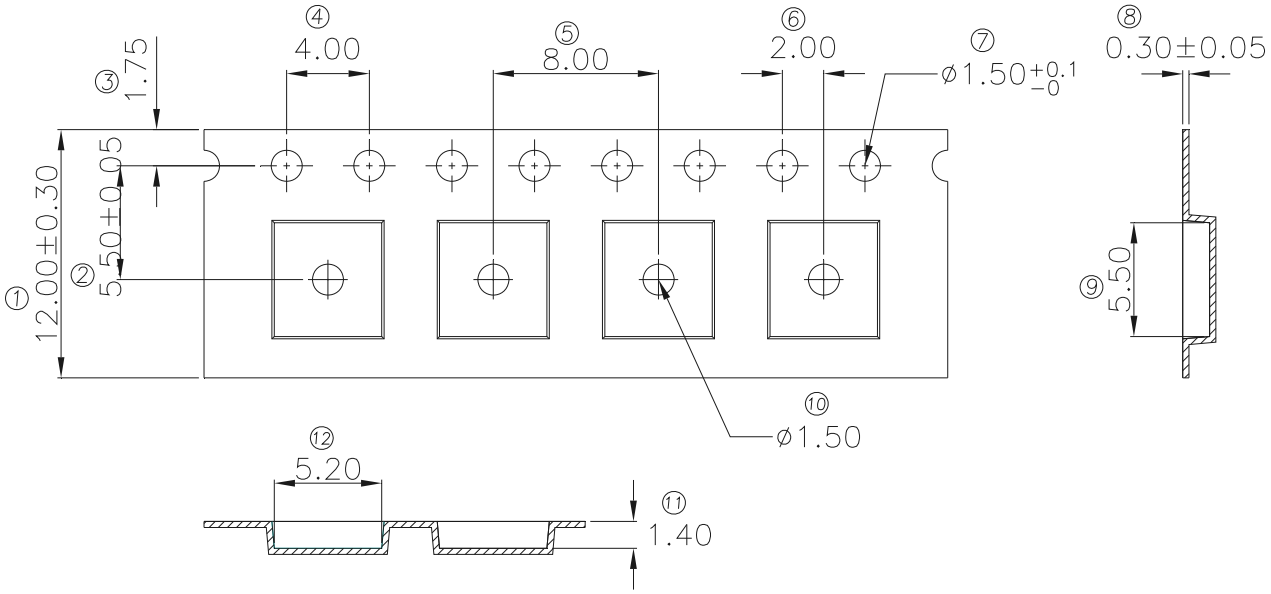
Reel Dimensions



Note:

1. Dimensions are in millimeters.
2 Tolerances for fixed dimensions are ± 0.1mm.

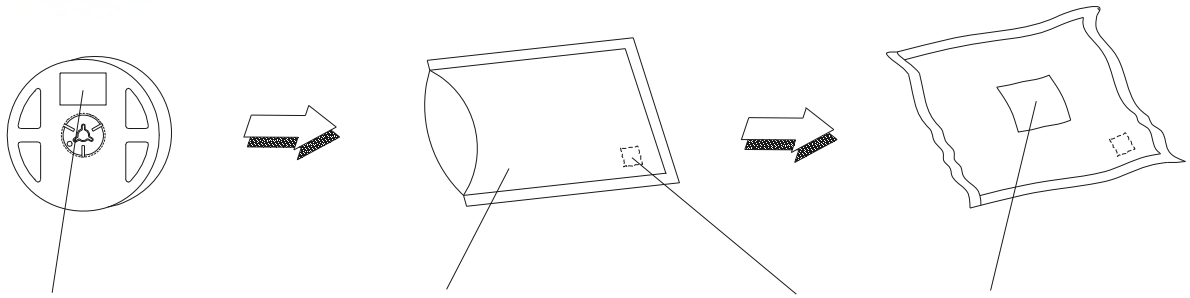
Carrier Tape Dimension: Loaded Quantity 250pcs Per Reel



Note:

1. Dimensions are in millimeters.
2. Tolerances for fixed dimensions are ± 0.1mm.

Moisture Resistant Packaging



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

Precautions of Use

Over-Current-Proof

- Thought the Everlight A24 has a conducted ESD protection mechanism, customers must not use the device in reverse and should apply resistors for extra protection. Otherwise slight voltage shift may cause significant current changes and bum out failure may happen.

Storage Conditions

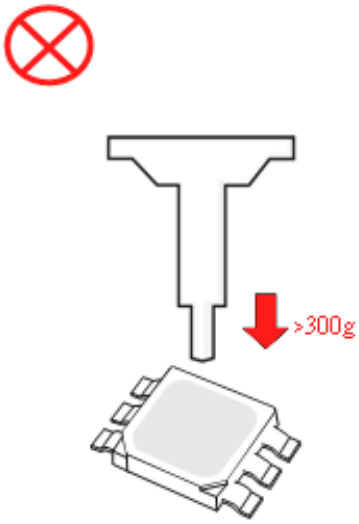
- Before the package is opened. The LEDs should be stored at 30°C or less and 90%RH or less after being shipped from EVERLIGHT and the storage life limits are 12 months.
- If the moisture absorbent material (silica gel) has faded away or the LEDs have exceeded the storage time, baking treatment should be performed using the following conditions. Baking treatment: 60±5℃ for 24 hours.

DISCLAIMER

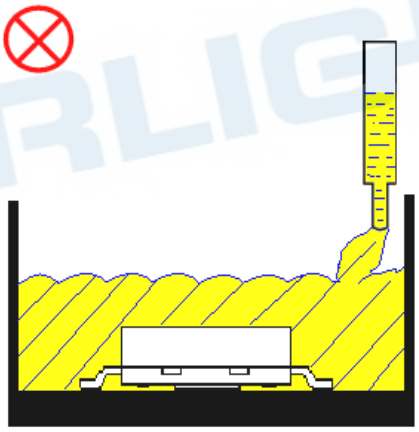
- EVERLIGHT reserves the right(s) on the adjustment of product material mix for the specification.
- The product meets EVERLIGHT published specification for a period of twelve (12) months from date of shipment.
- The graphs shown in this datasheet are representing typical data only and do not show guaranteed values.
- When using this product, please observe the absolute maximum ratings and the instructions for using outlined in these specification sheets. EVERLIGHT assumes no responsibility for any damage resulting from the use of the product which does not comply with the absolute maximum ratings and the instructions included in these specification sheets.
- These specification sheets include materials protected under copyright of EVERLIGHT. Reproduction in any form is prohibited without obtaining EVERLIGHT's prior consent.
- This product is not intended to be used for military, aircraft, automotive, medical, life sustaining or life saving applications or any other application which can result in human injury or death. Please contact authorized EVERLIGHT sales agent for special application request.

Handling

- Don not putting mechanical stress on the LED.
- Never touch the optical surface with finger or sharp object. The LED surface could be soiled or damaged, which could affect the optical performance of the LED.
- Avoid directly contacting the lens with downward force of more than 300g



- Sealing process with water proof silicone is not suitable for EHP-A24 products.



- 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.

Manual Handling

- When handling the product, do not apply direct pressure on the optical surface.

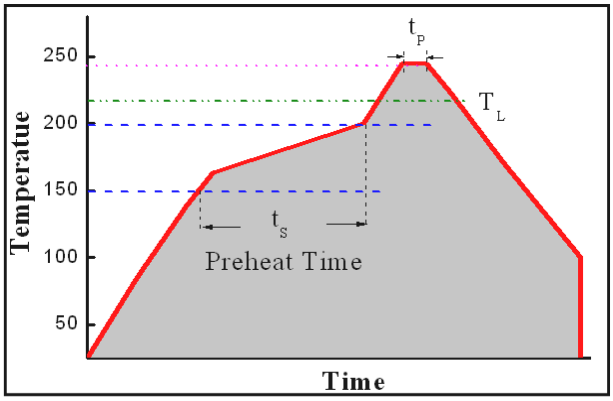
- Do not touch the resin with tweezers to avoid scratching or other damage.

Thermal Management

- For maintaining the high flux output and achieving maximum reliability, EHP-A24 series LEDs should be mounted on a metal core printed circuit board (MCPCB) or other kinds of heat sink with proper thermal connection to dissipate approximately 1W of thermal energy at 350mA operation.
- Heat dissipation or thermal conduction design is strongly recommended on PCB or MCPCB for reflow soldering purposes. Please refer to soldering patterns on Page 12.
- Sufficient thermal management must be implemented. Please refer to the graph “Forward Current Derating Curve “ on Page 14 The soldering temperature must be kept under 65℃ at the driving current 350mA.Otherwise, the junction temperature of die may exceed over the limit at high current driving conditions and the LEDs’ lifetime may be decrease dramatically.
- Sufficient thermal management must be conducted, or the die junction temperature will be over the limit under large electronic driving and LED lifetime will decrease critically.

Soldering Ion for Reflow Process

- EHP-A24 series are suitable for SMT process.
- Curing of glue in oven according to standard operation flow processes.



Profile Feature	Lead Free Assembly
Ramp-Up Rate	2-3 ℃/S
Preheat Temperature	150-200 ℃
Preheat Time (t_S)	60-120 S
Liquid Temperature (T_L)	217 ℃
Time maintained above T_L	60-90 S
Peak Temperature (T_P)	240±5 ℃
Peak Time (t_P)	Max 20 S
Ramp-Down Rate	3-5 ℃/S

- Reflow soldering should not be done more than twice.
- In soldering process, stress on the LEDs during heating should be avoided.
- After soldering, do not warp the circuit board.

Soldering Ion for Manual Soldering Process

- For prototype builds or small series production runs it is possible to place and solder the LED by hand.
- Dispense thermal conductive glue or grease on the substrates and follow its curing specifications. Gently press LED housing to closely connect LED and substrate.
- It is recommended to hand solder the leads with a solder tip temperature of 280°C for less than 3 second, at a time with a soldering iron of less than 25W. Solder at intervals of two seconds or more.
- Take caution and be aware that damaged products are often a result of improper hand soldering technique.

Revision History

Current version: 11.21.2016
Issue No: DHE-0002117
Version: 2

Page	Subjects (major change in previous version)	Date of change
18	Addition Disclaimer and change Storage Conditions	11-21-2016