

SMD High Power LED

HPL3535CZ12 Series



Introduction

The **HPL3535CZ12Series** is a surface-mount high-power device • featuring high brightness combined with a compact size that is suitable for all kinds of lighting applications such as general illumination, flash, spot, signal, industrial and commercial lighting. The thermal pad of this device is electrically isolated providing convenience in thermal and electrical design. The **HPL3535CZ12Series** is one of the most promising devices in Everlight's high power product offering and is ready to face the challenges of today's Solid-State Lighting requirements.

Features

- ◆ Small ceramic SMD package
- ◆ Luminous Flux : Typ.204lm @350mA
- ◆ Moisture Sensitivity Level: 3
- ◆ RoHS compliant
- ◆ The product itself will remain within RoHS compliant version.
- ◆ Compliance with EU REACH
- ◆ Compliance Halogen Free (Br < 900 ppm, Cl < 900 ppm, Br+Cl < 1500 ppm)

Applications

- ◆ Decorative and Entertainment Lighting
- ◆ Signal and Symbol Lighting
- ◆ Agriculture Lighting

Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Max. DC Forward Current (mA)	I_F	2000 ^[1]	mA
Max. Peak Pulse Current (mA)	I_{Pulse}	2400 ^[2]	mA
Thermal Resistance	R_{th}	3 ^[3]	°C/W
Max. Junction Temperature	T_J	150	°C
Operating Temperature	T_{Opr}	-40 ~ +105 ^[5]	°C
Storage Temperature	T_{Stg}	-40 ~ +125	°C
Max. Soldering Temperature	T_{Sol}	260	°C
Max. Allowable Reflow Cycles	n/a	2	cycles

Notes:

1. Maximum forward current for 2000mA (Thermal Pad=25°C).
2. Duty cycle = 1/10@1KHZ
3. Thermal Resistance is 3°C/W for LEDs.
4. The HPL3535CZ12Series LEDs are not designed for reverse bias use.

JEDEC Moisture Sensitivity

Level	Floor Life		Soak Requirements Standard	
	Time (hours)	Conditions	Time (hours)	Conditions
1	Unlimited	$\leq 30^{\circ}\text{C}$ / 85% RH	168 (+5/-0)	85°C / 85% RH

Luminous Flux Characteristics

CCT	Part Number	CRI	Flux		Condition	
		Typ. @350mA	Typ.	Min.	IF(mA)	Tj(°C)
3000	HPL3535CZ12-LW30170X33350-1T	70	194	170	350	25
			175	155	350	85
			325	285	700	85
			440	388	1000	85
			510	450	1200	85

CCT	Part Number	CRI	Flux		Condition	
		Typ. @350mA	Typ.	Min.	IF(mA)	Tj(°C)
4000	HPL3535CZ12-LW40175X33350-1T	70	200	175	350	25
			181	160	350	85
			335	295	700	85
			455	400	1000	85
			527	465	1200	85

CCT	Part Number	CRI	Flux		Condition	
		Typ. @350mA	Typ.	Min.	IF(mA)	Tj(°C)
5000	HPL3535CZ12-LW50180X33350-1T	70	204	180	350	25
			184	160	350	85
			341	300	700	85
			461	405	1000	85
			536	470	1200	85

CCT	Part Number	CRI	Flux		Condition	
		Typ. @350mA	Typ.	Min.	IF(mA)	Tj(°C)
5700	HPL3535CZ12-LW57180X33350-1T	70	204	180	350	25
			184	160	350	85
			341	300	700	85
			461	405	1000	85
			536	470	1200	85

CCT	Part Number	CRI	Flux		Condition	
		Typ. @350mA	Typ.	Min.	IF(mA)	Tj(°C)
6500	HPL3535CZ12-LW65180X33350-1T	70	204	180	350	25
			184	160	350	85
			341	300	700	85
			461	405	1000	85
			536	470	1200	85

Notes:

1. Radiometric power measurement tolerance: $\pm 10\%$.
2. The data of radiometric power measured at thermal pad=25°C

HPL3535CZ12 Series

The table below is a list of the binning options for the Everlight series Color LED. Standard Everlight color bins are listed according to wavelength and represent the standard primary colors of the spectrum. Typical view angle is 120°. These clearly listed binning options allow for proper design and implementation into lighting applications. The Order Codes below are currently available Color LEDs. For Example:

If you order product using P/N **HPL3535CZ12**, you will be specifying:

Color, series LEDs at 350mA are listed below.

Product Binning Luminous Flux Bins

Group	Bin	Minimum Luminous Flux(lm)	Maximum Luminous Flux(lm)
White	170L20	170	190
	190L20	190	210
	210L20	210	230
	230L20	230	250

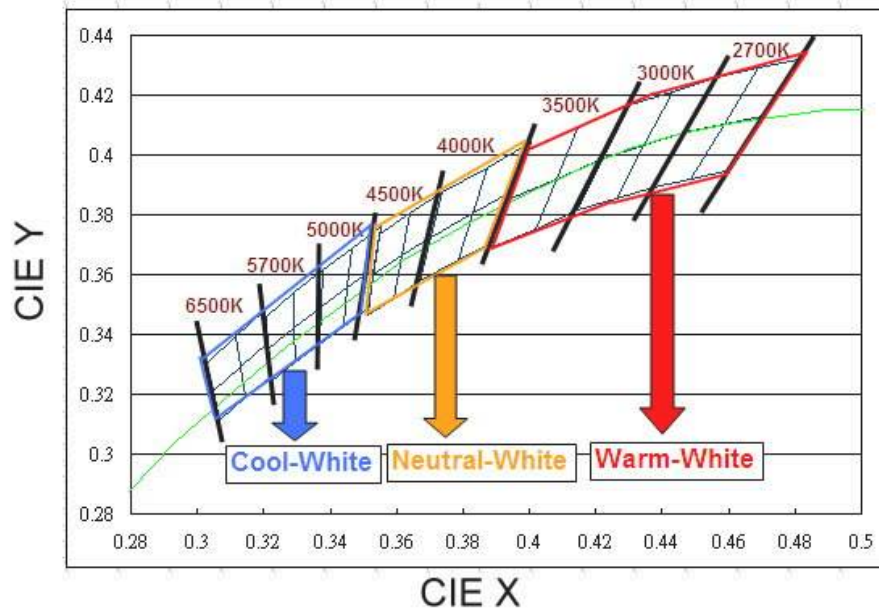
Forward Voltage Bins

Bin	Minimum Forward Voltage (V)	Maximum Forward Voltage (V)
U1	2.5	2.7
U2	2.7	2.9
U3	2.9	3.1
U4	3.1	3.2
U5	3.2	3.3

Notes:

1. Forward voltage measurement tolerance: $\pm 0.1V$.
2. Forward voltage bins are defined at $I_F=350mA$ operation.

White Bin Structure

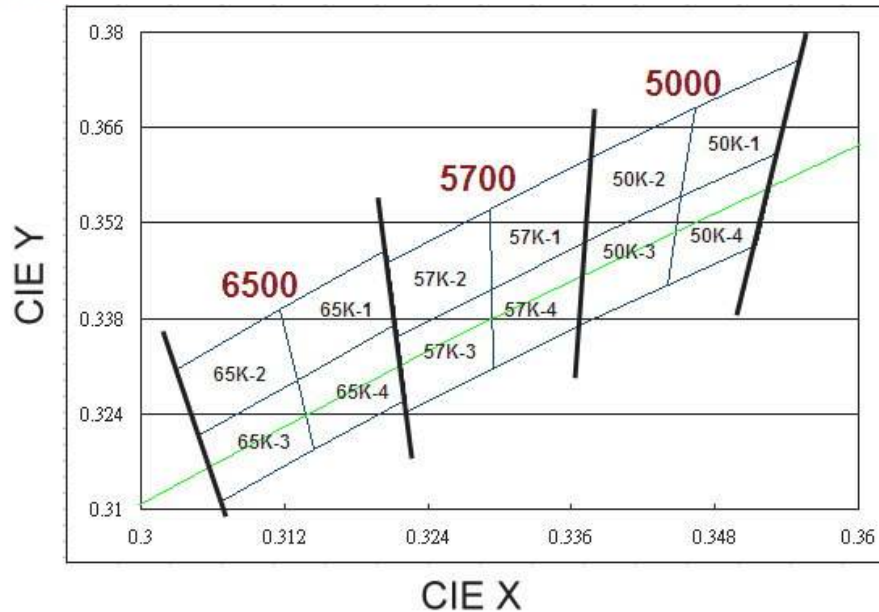


Chromaticity specification defined by ANSI

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 $I_F=350\text{mA}$ operation.

Cool-White Bin Structure



Cool-White Bin Coordinates

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
	0.321	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	0.321	0.335
	0.322	0.324
	0.329	0.331
	0.329	0.342
Reference Range: 5700~6020K		

6500K

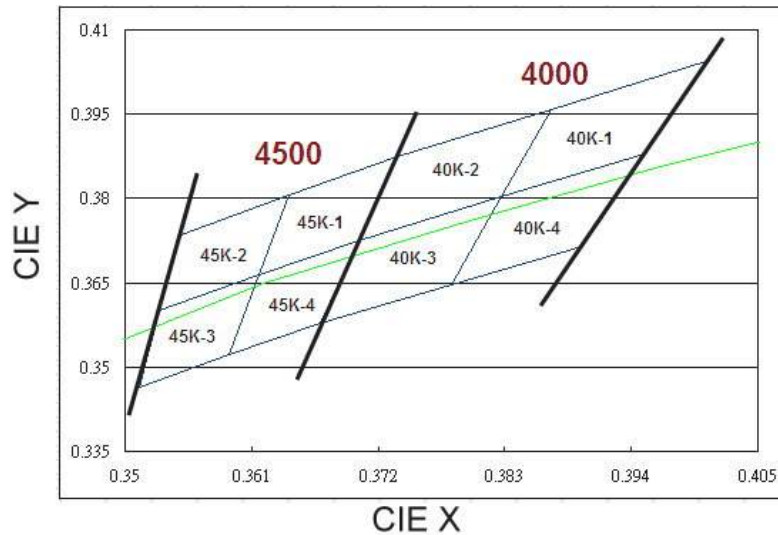
Bin	CIE X	CIE Y
65K-1	0.312	0.339
	0.313	0.329
	0.321	0.337
	0.321	0.348
Reference Range: 6020~6500K		

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		

Neutral-White Bin Structure



Neutral-White Bin Coordinates

4000K

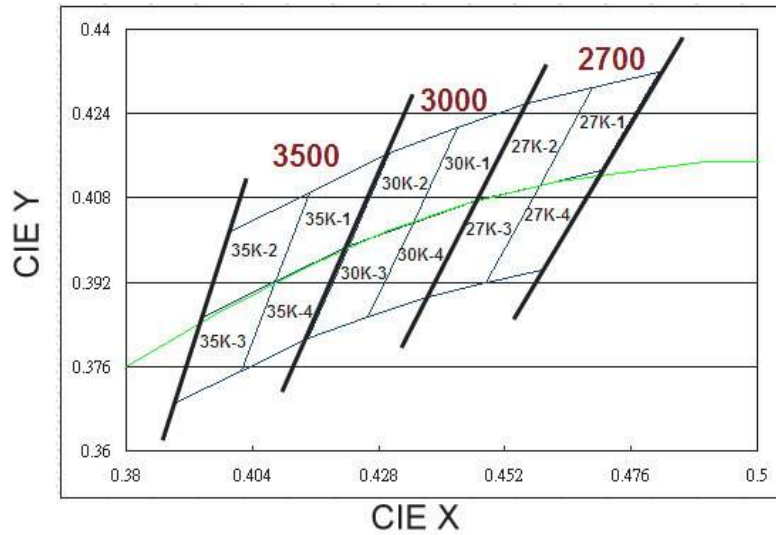
Bin	CIE X	CIE Y
40K-1	0.387	0.396
	0.383	0.380
	0.395	0.388
	0.401	0.404
Reference Range: 3710~4000K		

Bin	CIE X	CIE Y
40K-2	0.374	0.387
	0.370	0.373
	0.383	0.380
	0.387	0.396
Reference Range: 4000~4260K		

Bin	CIE X	CIE Y
40K-4	0.383	0.380
	0.378	0.365
	0.390	0.372
	0.395	0.388
Reference Range: 3710~4000K		

Bin	CIE X	CIE Y
40K-3	0.370	0.373
	0.367	0.358
	0.378	0.365
	0.383	0.380
Reference Range: 4000~4260K		

Warm-White Bin Structure



Warm-White Bin Coordinates

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		

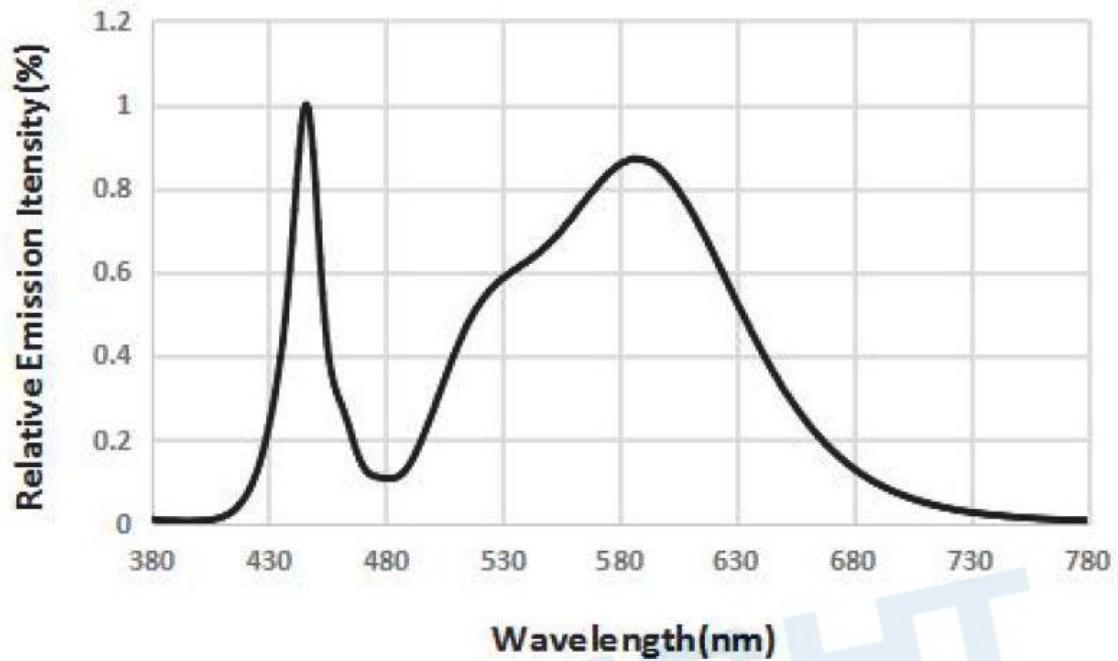
Bin	CIE X	CIE Y
30K-2	0.430	0.417
	0.422	0.399
	0.435	0.403
	0.443	0.421
Reference Range: 3000~3220K		

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		

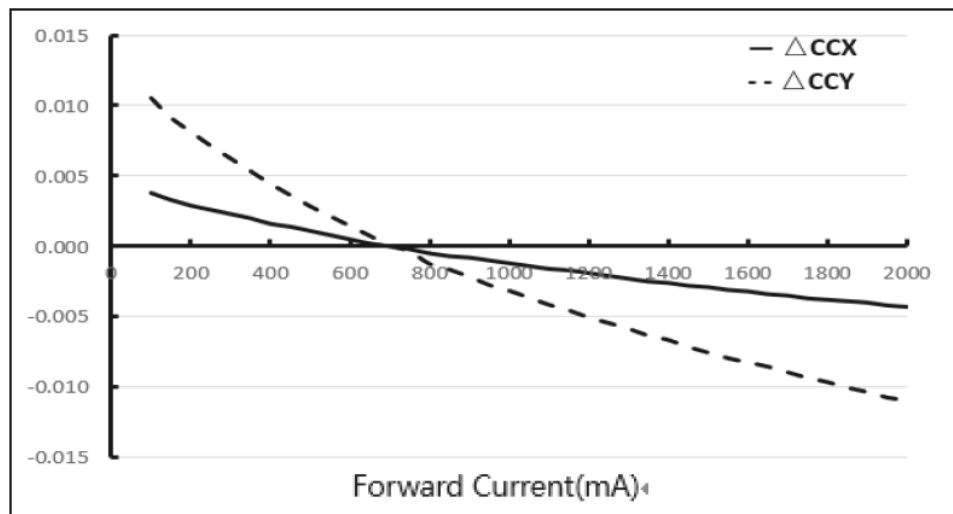
Bin	CIE X	CIE Y
30K-3	0.422	0.399
	0.415	0.381
	0.426	0.385
	0.435	0.403
Reference Range: 3000~3220K		

Wavelength Characteristics

Thermal Pad Temperature 85°C

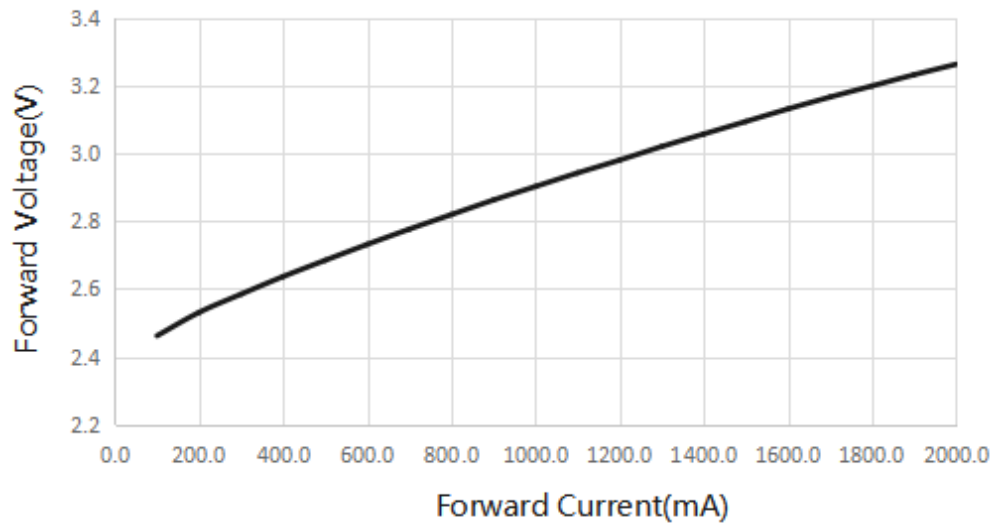


Typical Light Output Characteristic V.S. Thermal Pad Temperature



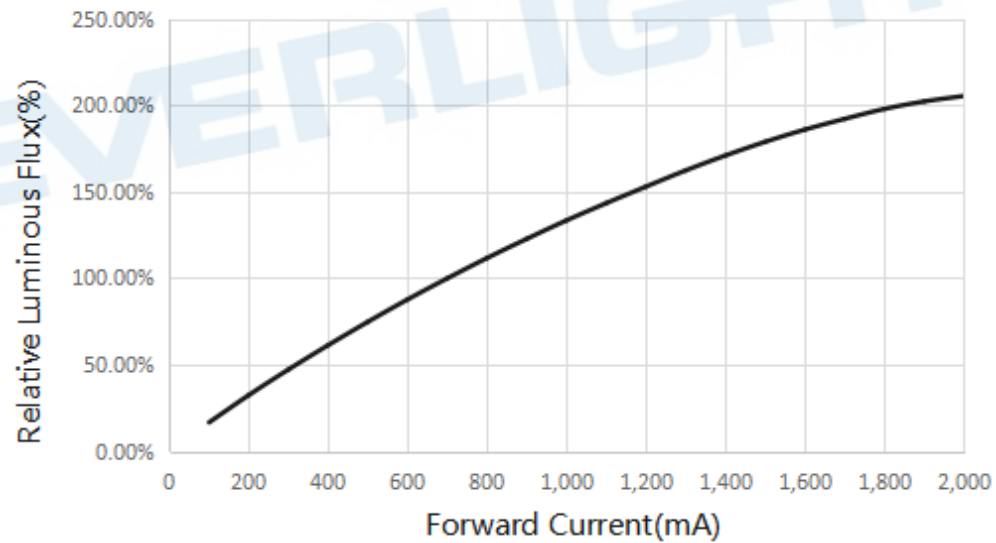
Typical Electrical Characteristics

Thermal Pad Temperature = 85°C



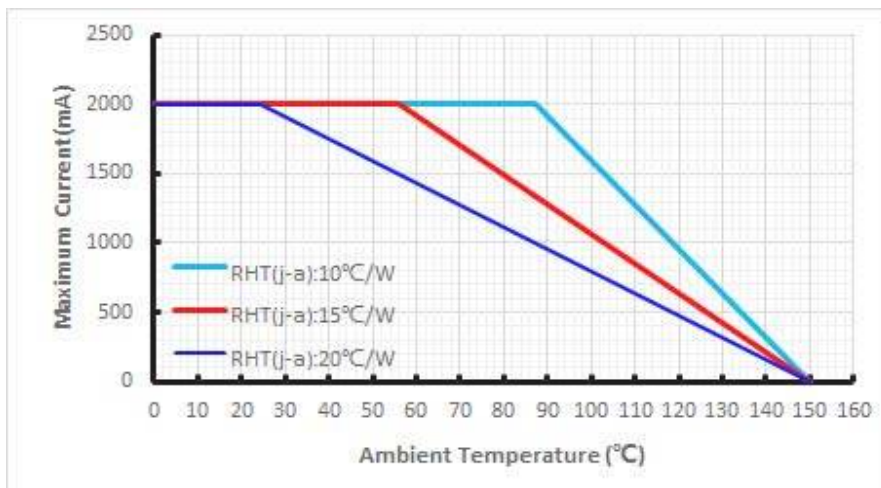
Typical Relative Radiant Flux V.S. Forward Current

Thermal Pad Temperature = 85°C



Current Derating Curves

for 2000mA Drive Current

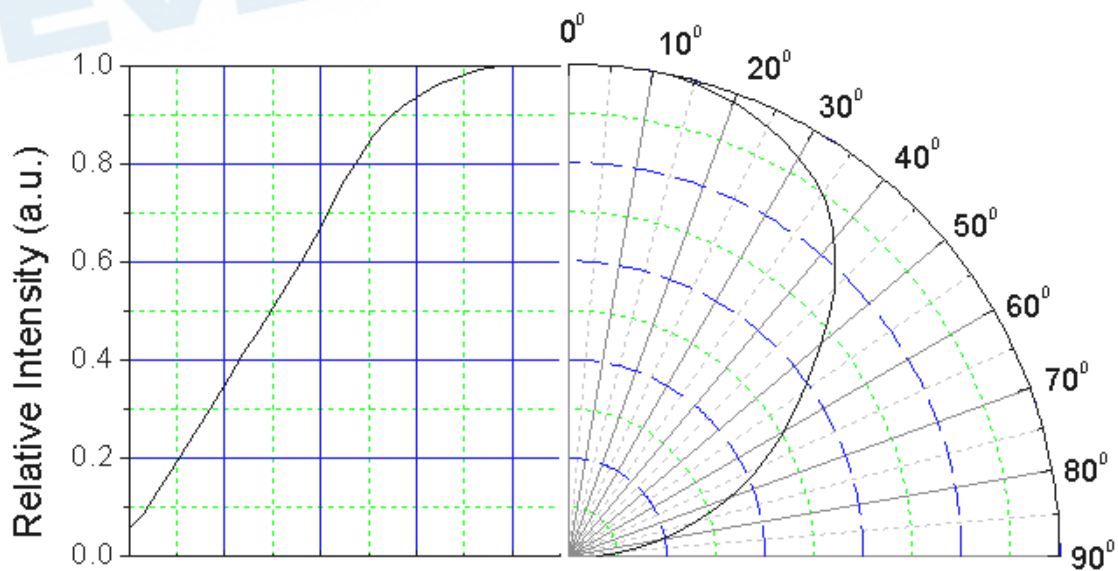


Note:

The current derating curves are depending on the thermal resistance between the junction to the soldering pad

Typical Radiation Patterns

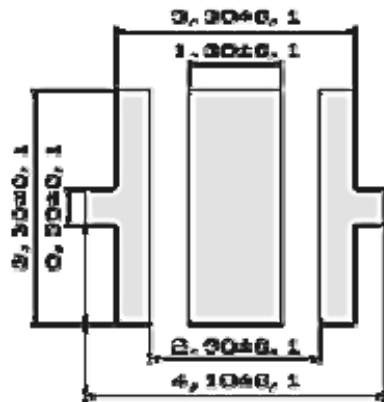
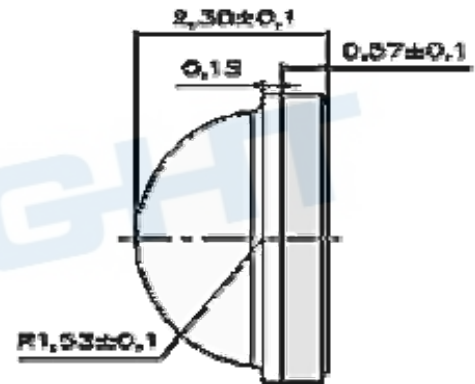
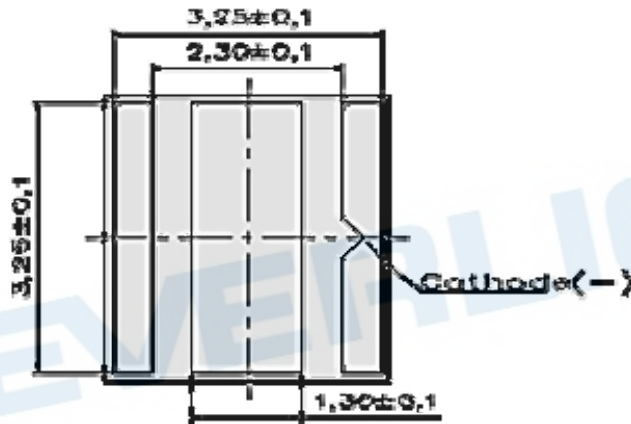
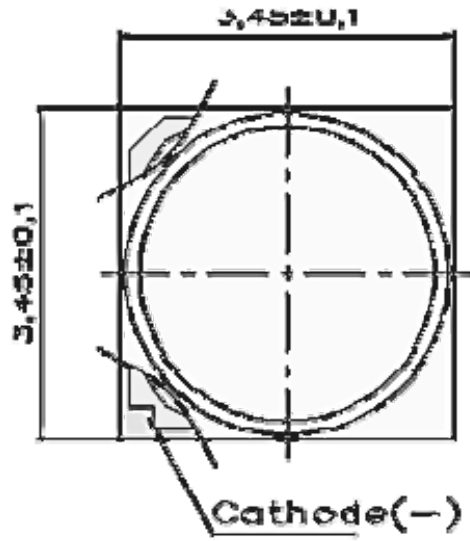
Typical Diagram Characteristics of Radiation



Notes:

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. View angle tolerance is $\pm 5^\circ$

Mechanical Dimension



Recommend Soldering pad

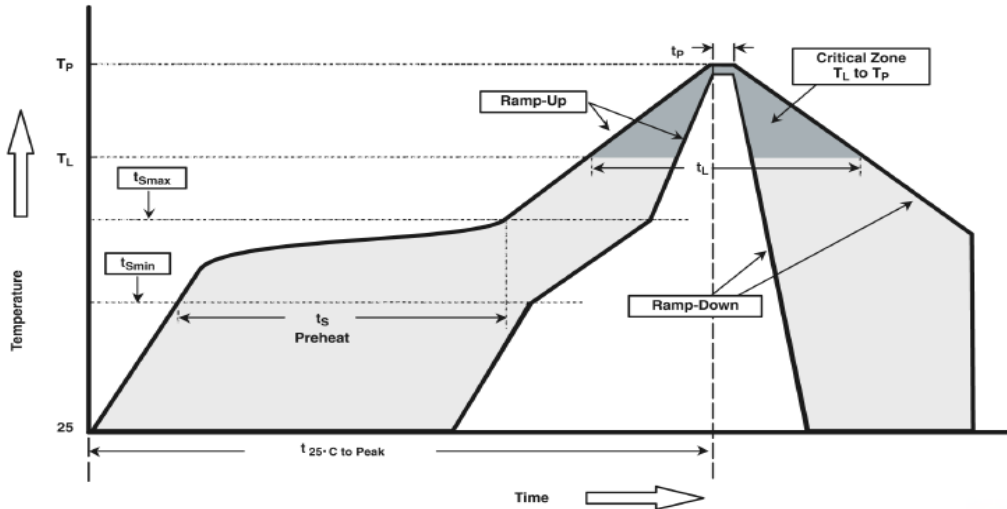
Notes:

1. Dimensions are in millimeters.
2. Tolerances unless mentioned are ± 0.15 mm.
3. The thermal pad is electrically isolated from the Anode and Cathode contact pads.
4. Do not handle the device by the lens. Incorrect force applied to the lens may lead to the failure of devices.

Reflow Soldering Characteristics

For Reflow Process

- HPL3535CZ12Series are suitable for SMT processes.
- Curing of glue in oven must be according to standard operation flow processes.



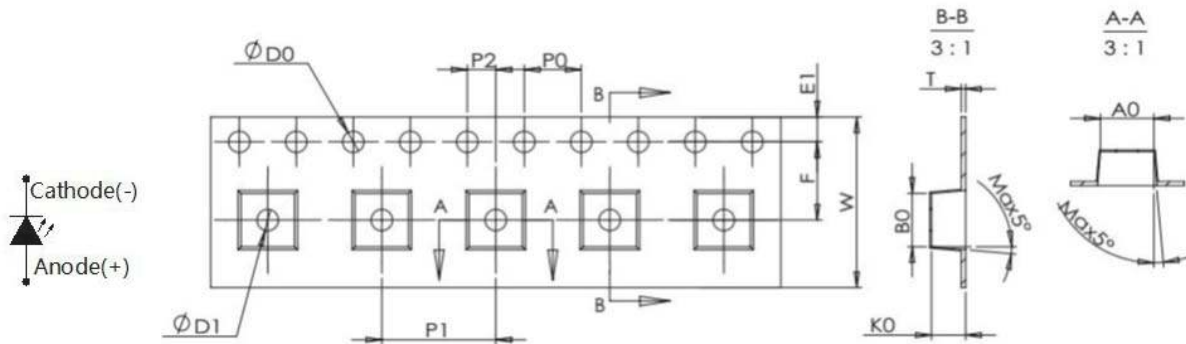
Profile Feature	Pb-Free Assembly	Unit Einheit
Average Ramp-up Rate 25 °C to 150 °C	2-3	°C /sec
Preheat Temperature Min.	150	sec
Preheat Temperature Max.	200	sec
Preheat Time	60-120	sec
Time Maintained Above Temperature	217	°C
Time Maintained Above Time	60-90	sec
Peak Temperature (max.)	260	°C
Time within 5°C of Actual Peak temperature	20-40	sec
Ramp-down Rate (max.)	3-5	°C /sec

- 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 bend the circuit board

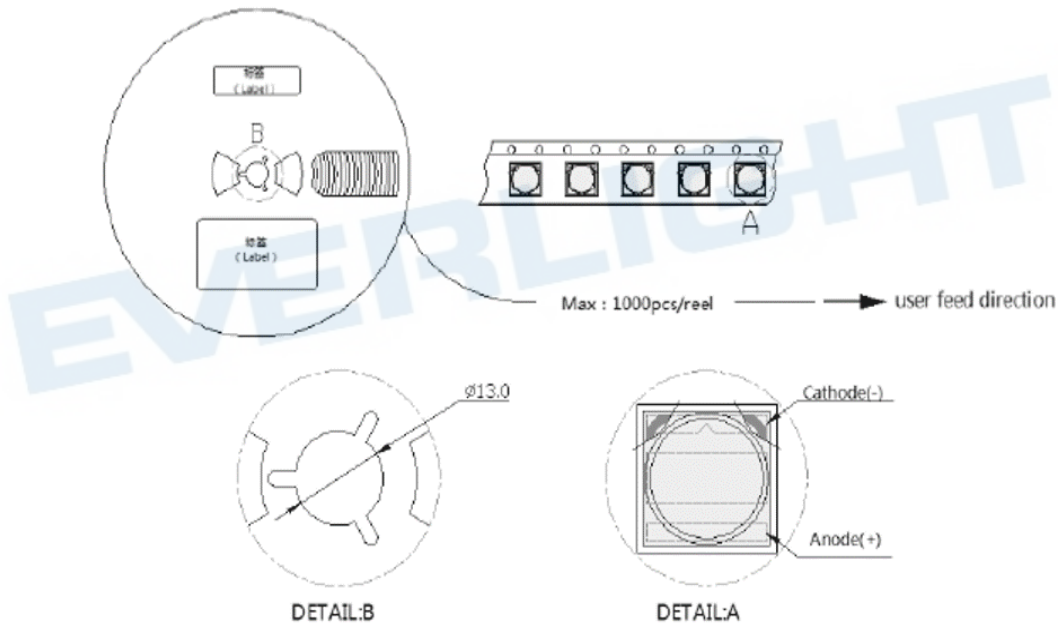
Emitter Tape Packaging

Carrier Tape Dimensions as the following:

MPQ: 1000pcs per reel.



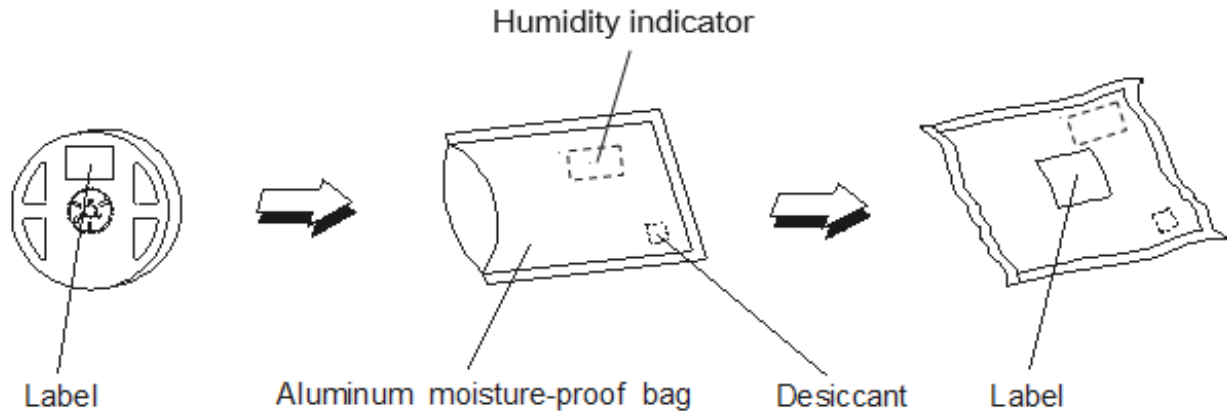
Item	spec
W	12.00±0.30
P1	8.00±0.10
E1	1.75±0.10
F	5.50±0.10
D0	1.50±0.10/0
D1	1.50±0.10/0
P0	4.00±0.10
P010	40.00±0.20
P2	2.00±0.10
A0	3.72±0.10
B0	3.72±0.10
K0	2.60±0.10
T	0.30±0.05
Unit:mm	



Notes:

1. Dimensions are in millimeters.
2. Tolerances for fixed dimensions are $\pm 0.1\text{mm}$.

Moisture Resistant Packaging



Product Labeling

Label Explanation

CPN: Customer Specification (when required)

P/N : Everlight Production Number

QTY: Packing Quantity

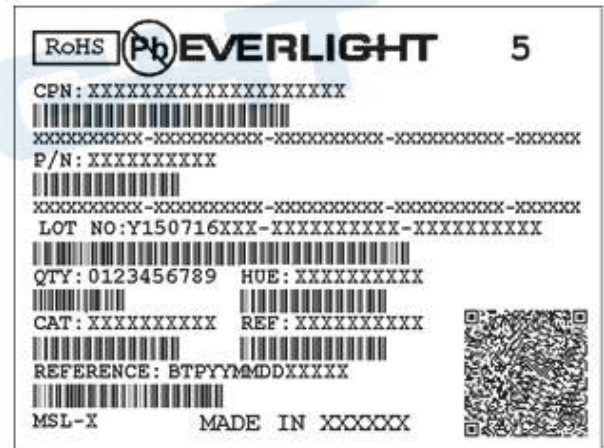
CAT: Radiometric Power Bin

HUE: Color Bin

REF: Forward Voltage Bin

LOT No: Lot Number

MADE IN XXXXXX: Production Place



Storage Conditions

- Before the package is opened. The LEDs should be stored at 30°C or less and 85%RH or less after being shipped from Everlight and the storage life limits are 1 year. The LEDs can be stored up to 3 years If in a sealed container with a nitrogen atmosphere and moisture absorbent material.
- After opening the package: at 30 °C or lower temperature and 85% relative humidity or lower temperature, the floor life of LED is unlimited. If unused LEDs are still present, it is recommended that they be stored in moisture-proof packaging
- 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°C for 24 hours.

EVERLIGHT