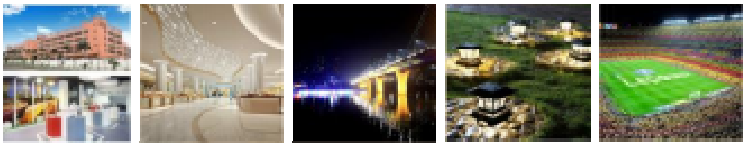
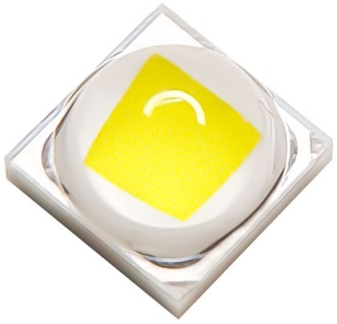
Ceramic 3535 LED



Product Datasheet

GAW35

The latest Ceramic 3535 LED series combines high efficiency performance with long lifespan. It has excellent temperature resistance and anti-corrosion performance, further enhancing high reliability and suitability for outdoor professional lighting. It is available in all ANSI CCT and provides the efficacy and reliability required by high power outdoor lighting markets.



■Feature

- Low Thermal Resistance
- Super High Energy Efficiency
- Half Angle (2Θ1/2):120°
- RoHS Compliant

■Applications

- Architectural lighting
- Industrial Lighting
- Street Lighting
- Stadium Lighting

Contents

1. Product Code Information

Part Number Nomenclature and Selection Guide

e.g.:

G	A	W	3	5	H	D	O	0	3	B	2	W	5	H	T	A	C	2
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S

Digit	Item	Code	Information
AB	Manufacturer	GA	GALUX
C	Color	W	White LED
DE	Package Size	35	3.45*3.45*2.16mm
F	Power Type	H	High Power
G	Lens Type	D	Dome Type
		F	Flat Type
H	Substrate Type	O	AL2O3 Type
		N	ALN Type
IJ	Voltage	03	2.6-3.2V
KL	Version Type	B2	2nd GEN Version 2
MN	Chip Code	W5	W5 Chip
O	CRI	H	Ra 95
		G	Ra 90
		E	Ra 80
		C	Ra 70
P	CCT	A	2200K
		W	2700K
		V	3000K
		U	3500K
		T	4000K
		R	5000K
		Q	5700K
		P	6500K
Q	Color Bin	A	ANSI 4 BIN
		5	5 SDCM
		3	3SDCM
RS	LM Bin	C2	200-220LM

2. Performance

a.) Absolute Maximum Ratings (Tj=25℃)

Parameters	Symbol	Maximum Rating	Unit
Forward Current	If	1500	mA
Reverse Leakage Current (VR=5V)	V	1	uA
Operating Temperature	T opr	-40~105	℃
Storage Temperature	T stg.	-40~125	℃
ESD Classification (HBM)	-	2	kV
Junction Temperature	Tj	150	℃

b.) Electro-Optical Characteristics (IF=350mA, Tj= 25℃)

Item	Symbol	Min.	Typ.	Max.	Unit
Luminous Flux	Φ	200	210	220	LM
Luminous Efficiency	Φe	/	220	/	LM/W
Forward Voltage	VF	2.6	2.8	3.2	V
Thermal Resistance	/	/	4.0	/	℃/W
Viewing Angle	2θ1/2	/	120	/	°

3. Performance Binning

a.) Luminous Flux Binning (IF=350mA @ 25℃)

Bin Code	Min.(LM)	Max.(LM)
A2	160	180
B2	180	200
C2	200	220
D2	220	240

b.) Forward Voltage Binning (IF=350mA @ 25℃)

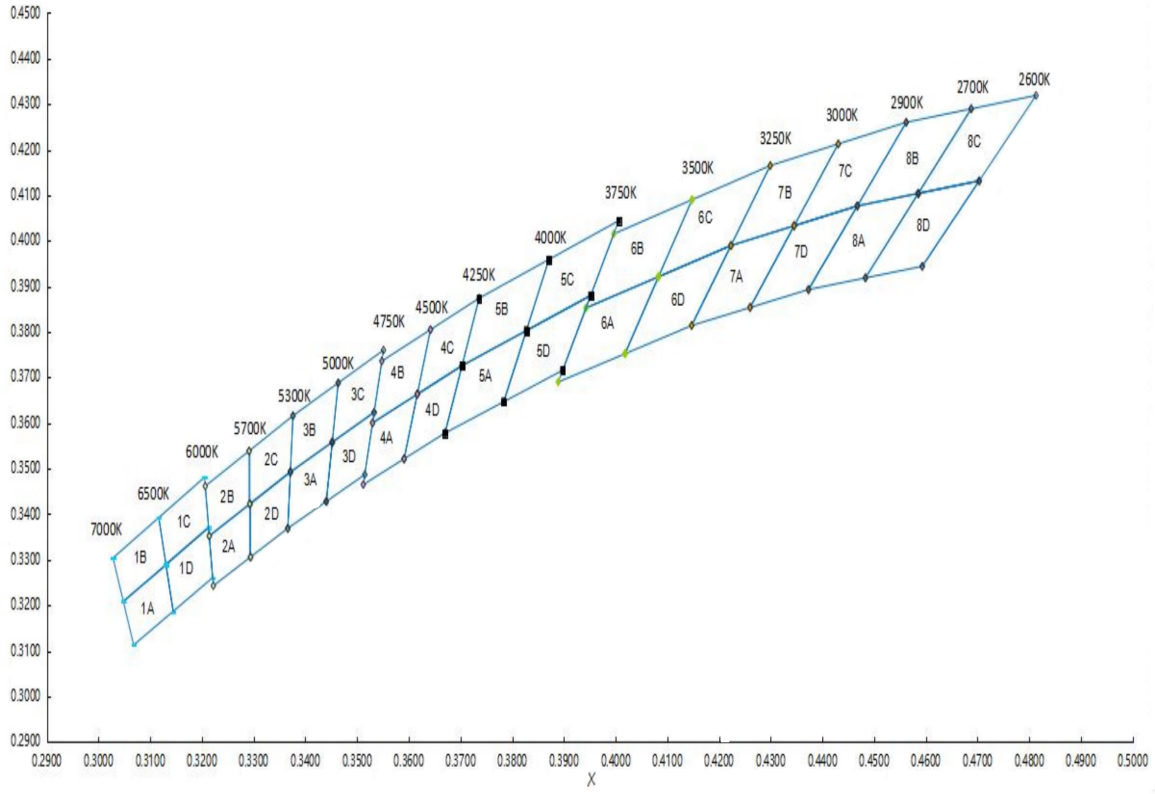
Bin Code	Min.(LM)	Max.(LM)
V0	2.6	2.8
V1	2.8	3.0
V2	3.0	3.2

c.) CRI Binning (IF=350mA @ 25℃)

Bin Code	Symbol	Min.	Max.	R9
C	Ra	70	80	/
E	Ra	80	90	Min. 0
G	Ra	90	100	Min. 50
H	Ra	95	100	Min. 75

4. Color Bin Regulations

a.) CIE Chromaticity Diagram (Tj=25℃)



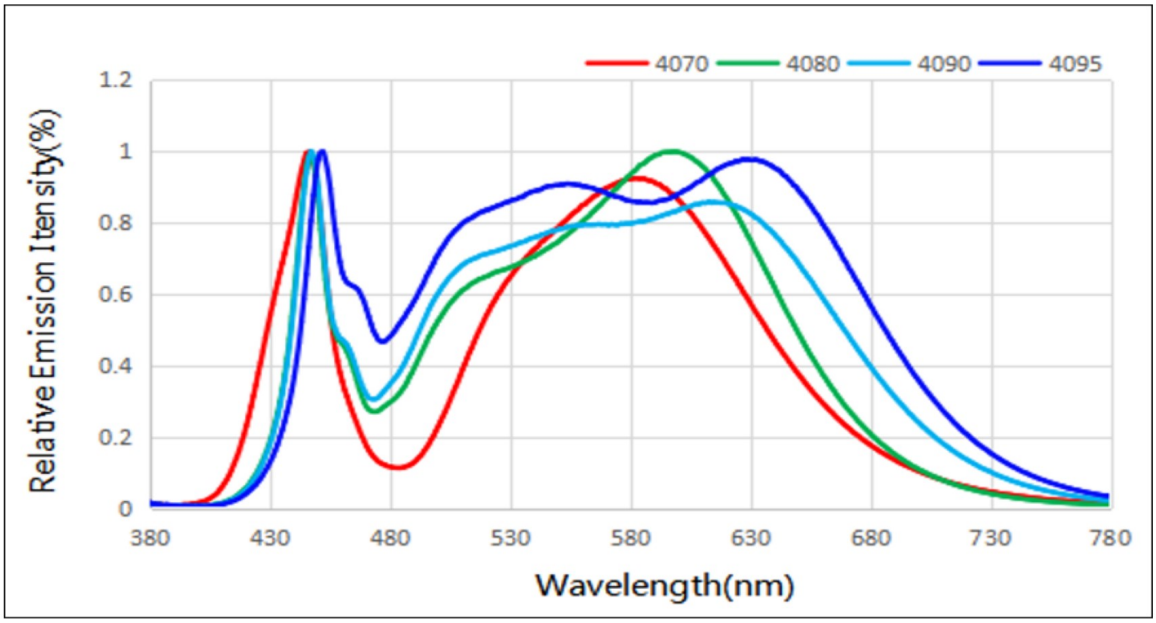
b.) ANSI Color Bin Defination

	X	Y		X	Y		X	Y		X	Y
	X	Y		X	Y		X	Y		X	Y
1A	0.3144	0.3187	1B	0.3130	0.3290	1C	0.3213	0.3371	1D	0.3221	0.3261
	0.3130	0.3288		0.3117	0.3393		0.3205	0.3481		0.3213	0.3371
	0.3048	0.3209		0.3028	0.3304		0.3117	0.3393		0.3130	0.3290
	0.3068	0.3113		0.3048	0.3209		0.3130	0.3290		0.3144	0.3187
	X	Y		X	Y		X	Y		X	Y
2A	0.3294	0.3306	2B	0.3293	0.3422	2C	0.3371	0.3493	2D	0.3366	0.3369
	0.3293	0.3422		0.3291	0.3539		0.3376	0.3616		0.3371	0.3493
	0.3214	0.3352		0.3206	0.3462		0.3291	0.3539		0.3293	0.3422
	0.3222	0.3243		0.3214	0.3352		0.3293	0.3422		0.3294	0.3306
	X	Y		X	Y		X	Y		X	Y
3A	0.3441	0.3428	3B	0.3452	0.3558	3C	0.3452	0.3558	3D	0.3441	0.3428
	0.3452	0.3558		0.3464	0.3688		0.3533	0.3624		0.3515	0.3487
	0.3371	0.3493		0.3376	0.3616		0.3551	0.3760		0.3533	0.3624
	0.3366	0.3369		0.3371	0.3493		0.3464	0.3688		0.3452	0.3558

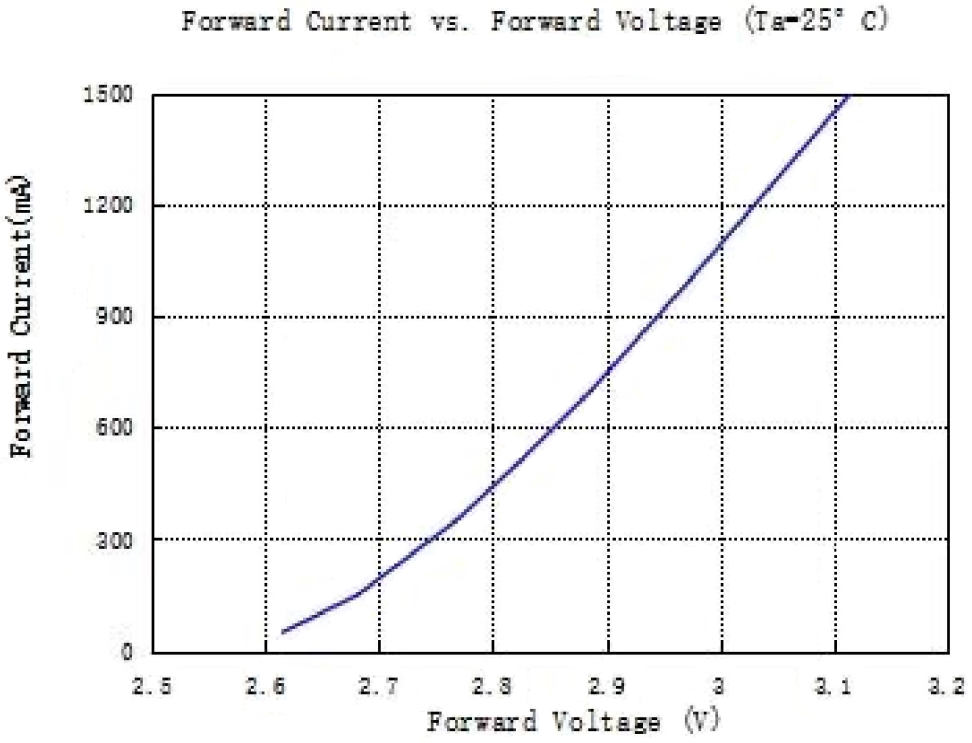
	X	Y		X	Y		X	Y		X	Y
4A	0.3591	0.3522	4B	0.3617	0.3663	4C	0.3703	0.3726	4D	0.3670	0.3578
	0.3617	0.3663		0.3642	0.3805		0.3736	0.3874		0.3703	0.3726
	0.3530	0.3600		0.3548	0.3736		0.3642	0.3805		0.3617	0.3663
	0.3512	0.3465		0.3530	0.3600		0.3617	0.3663		0.3591	0.3522
	X	Y		X	Y		X	Y		X	Y
5A	0.3784	0.3647	5B	0.3827	0.3803	5C	0.3952	0.3880	5D	0.3898	0.3716
	0.3827	0.3803		0.3871	0.3959		0.4006	0.4044		0.3952	0.3880
	0.3703	0.3726		0.3736	0.3874		0.3871	0.3959		0.3827	0.3803
	0.3670	0.3578		0.3703	0.3726		0.3827	0.3803		0.3784	0.3647
	X	Y		X	Y		X	Y		X	Y
6A	0.4018	0.3752	6B	0.4083	0.3921	6C	0.4223	0.3990	6D	0.4147	0.3814
	0.4083	0.3921		0.4148	0.4090		0.4299	0.4165		0.4223	0.3990
	0.3943	0.3853		0.3997	0.4015		0.4148	0.4090		0.4083	0.3921
	0.3889	0.3690		0.3943	0.3853		0.4083	0.3921		0.4018	0.3752
	X	Y		X	Y		X	Y		X	Y
7A	0.4260	0.3854	7B	0.4345	0.4033	7C	0.4468	0.4077	7D	0.4373	0.3893
	0.4345	0.4033		0.4431	0.4213		0.4562	0.4260		0.4468	0.4077
	0.4223	0.3990		0.4299	0.4165		0.4431	0.4213		0.4345	0.4033
	0.4147	0.3814		0.4223	0.3990		0.4345	0.4033		0.4260	0.3854
	X	Y		X	Y		X	Y		X	Y
8A	0.4585	0.4104	8B	0.4585	0.4104	8C	0.4703	0.4132	8D	0.4593	0.3944
	0.4483	0.3919		0.4688	0.4290		0.4813	0.4319		0.4703	0.4132
	0.4373	0.3893		0.4562	0.4260		0.4688	0.4290		0.4585	0.4104
	0.4468	0.4077		0.4468	0.4077		0.4585	0.4104		0.4483	0.3919

5. Photoelectric Characteristics Graph

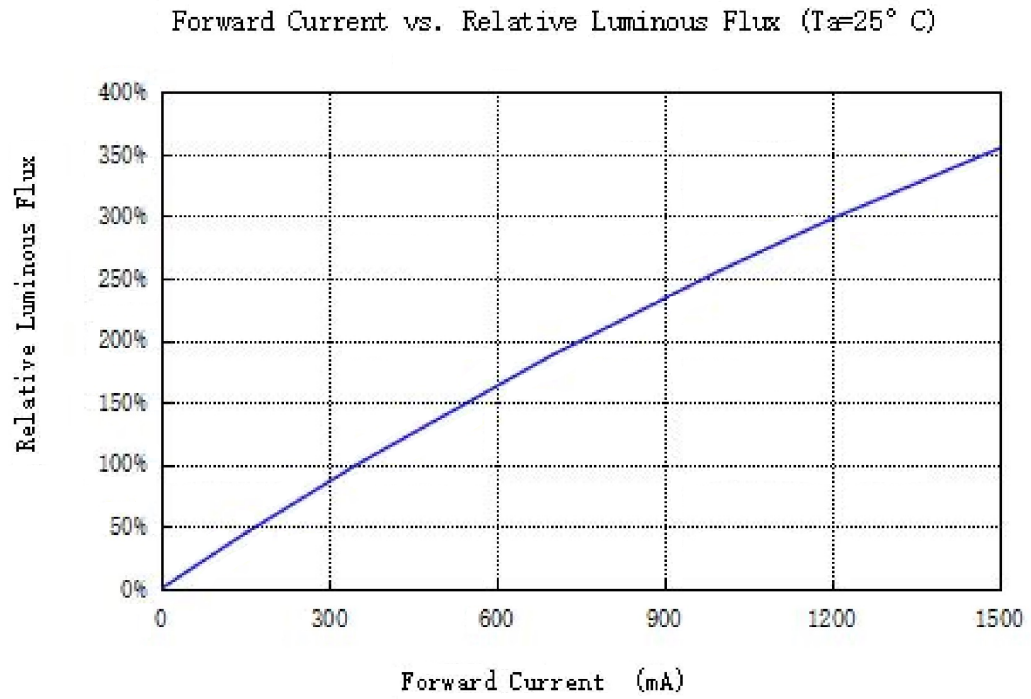
a.) Color Spectrum (Tj=25℃)



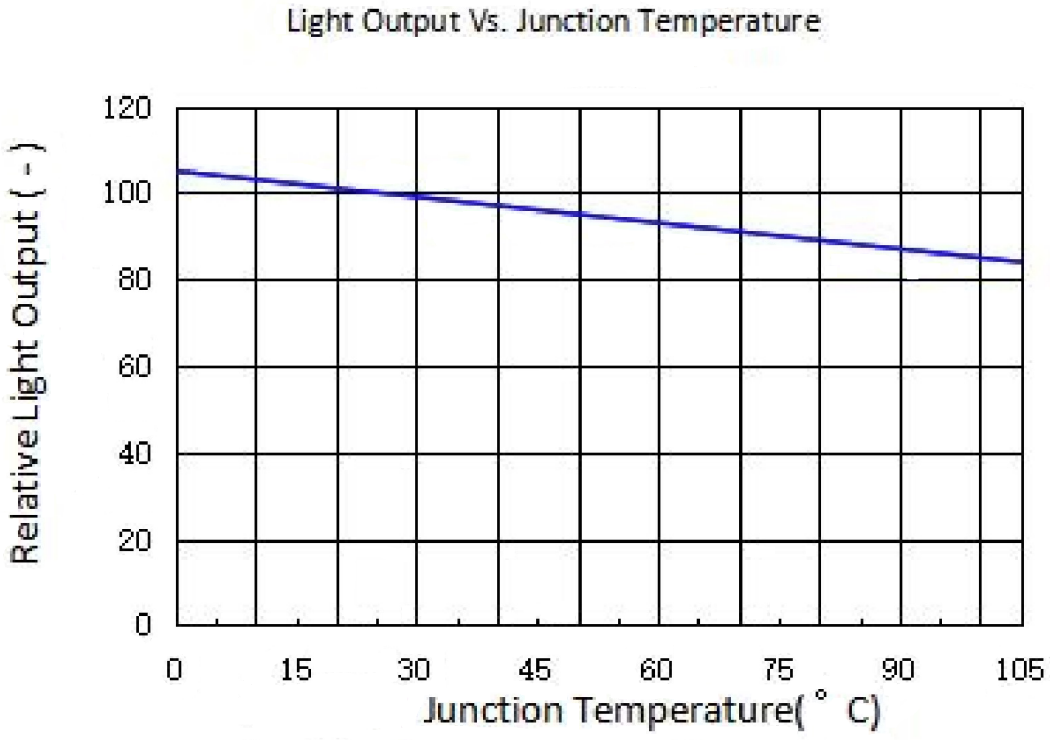
b.) Forward Current vs. Forward Voltage (Tj=25℃)



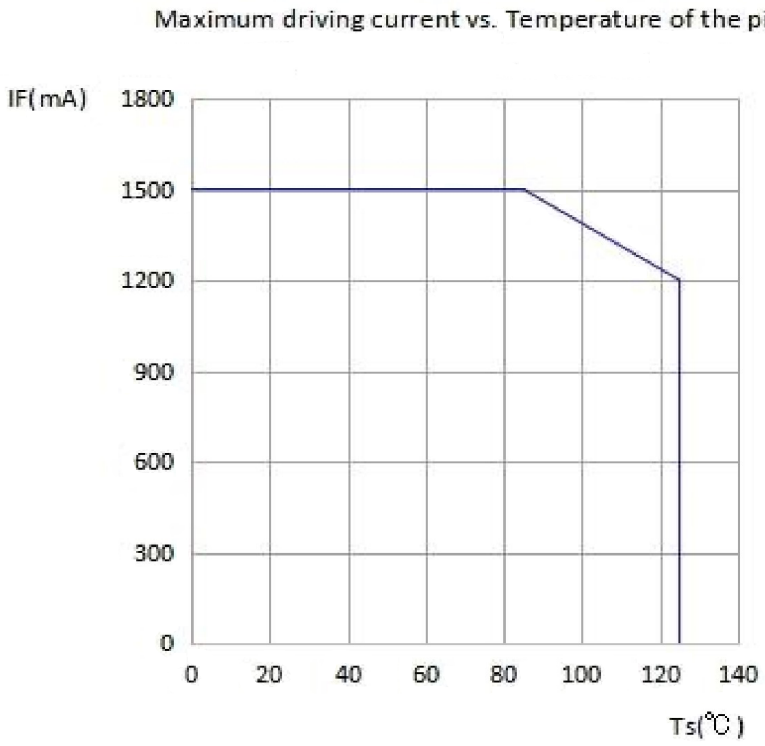
c.) Forward Current vs. Relative Luminous Flux (Tj=25℃)



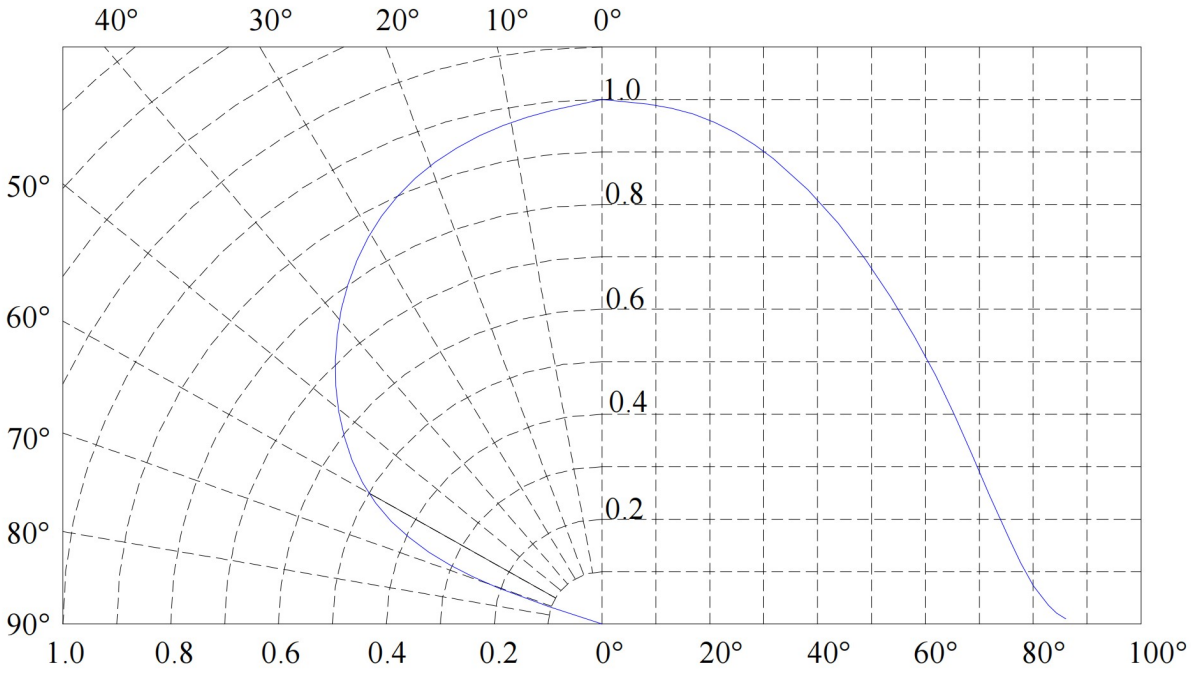
d.) Light Output vs. Junction Temperature (Tj=25℃)



e.) Max Forward Current vs. Temperature of Pin (Tj=25℃)

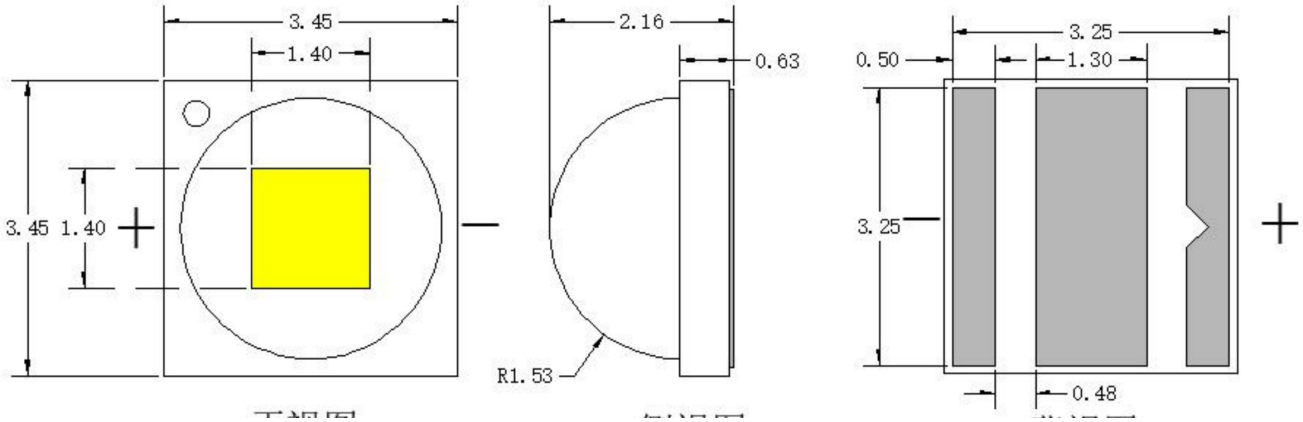


f.) Radiation Characteristics (Tj=25℃)



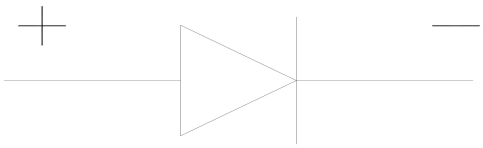
6. Dimensions

a.) Product Dimensions

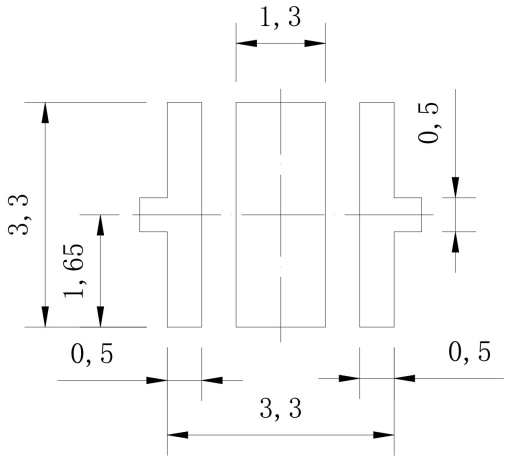


Front View **Side View** **Back View**

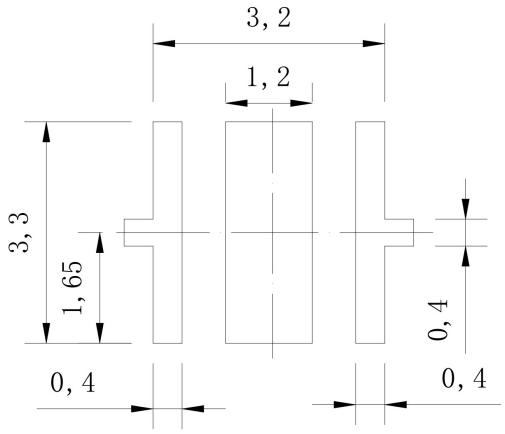
b.) Equivalent Circuit Diagram



c.) PCB Pad Dimensions



Recommended PCB Pad Dimensions



Recommended Stencil Dimensions

Notes:
1. All dimensions are in millimeters.
2. Tolerance is ±0.15 unless otherwise noted.

7. Shipment Label

GALUX

P/N:

VF: IF:

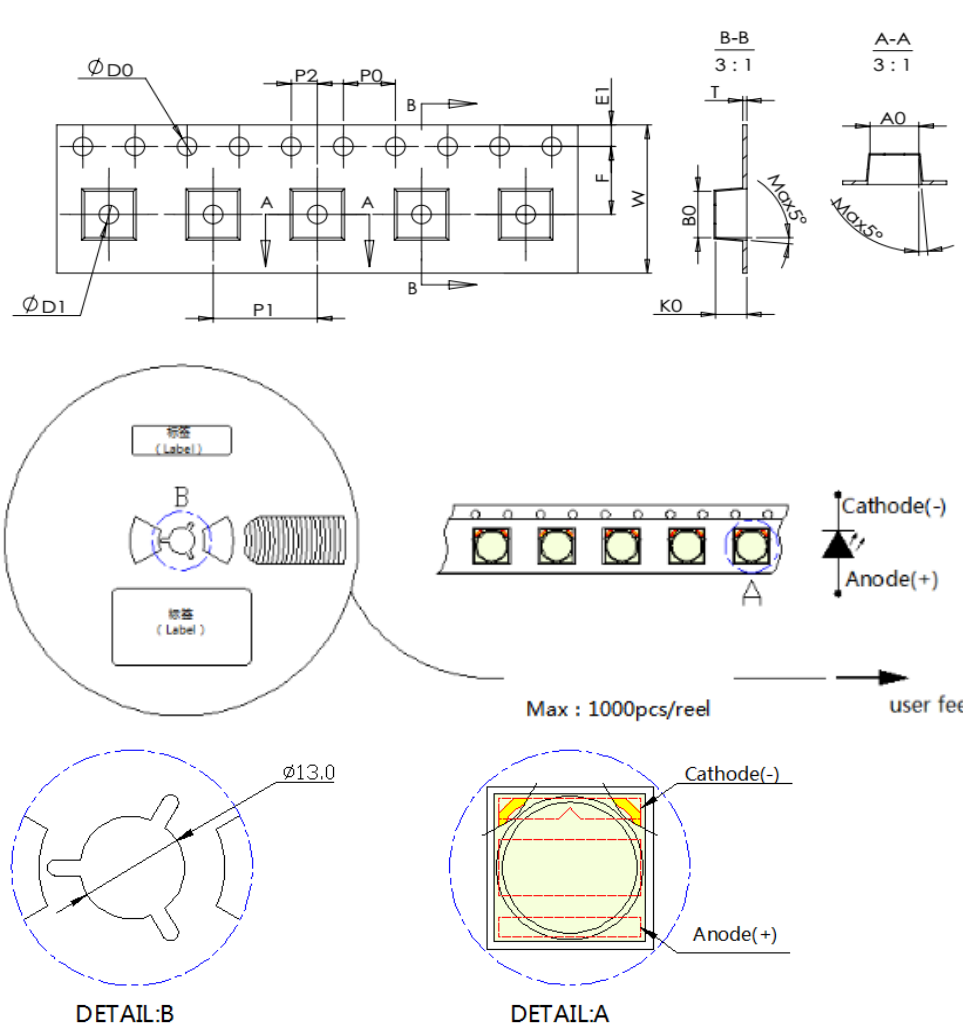
BIN/CCT:

IV: Q'TY:

ROHS

XXXXXXXXXXX

8. Reel Dimensions

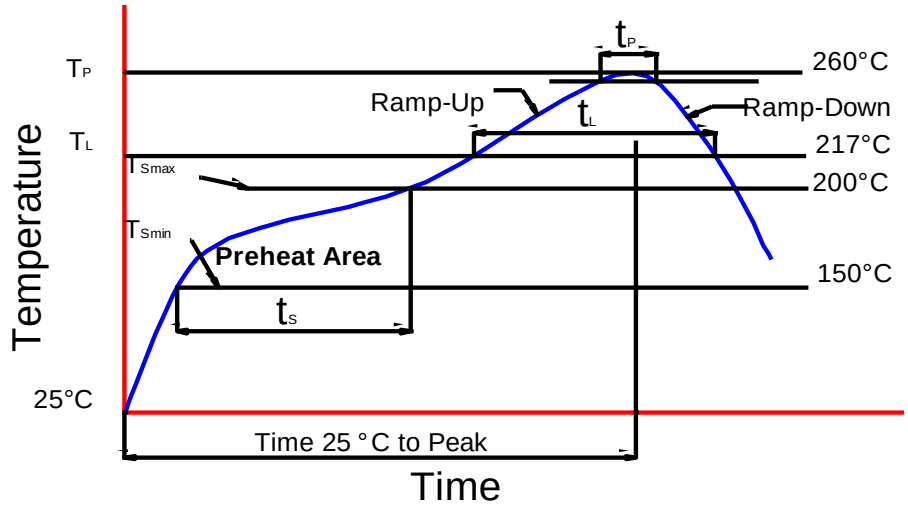


Item	spec
W	12.00±0.30
P1	8.00±0.10
E1	1.75±0.10
F	5.50±0.10
D0	1.50±0.10/0
D1	1.50±0.10/0
P0	4.00±0.10
P010	40.00±0.20
P2	2.00±0.10
A0	3.72±0.10
B0	3.72±0.10
K0	2.60±0.10
T	0.30±0.05
	Unit:mm

Notes:

- ✧ Reel:1000pcs.
- ✧ The tape packing method complies with IJSC0806(Packing of Electronic Components on Continuous Tapes.
- ✧ When the tape is rewound due to work interruptions, no more than 10N should be applied to the embossed carrier tape.The LEDs may stick to the cover tape.

9. Reflow Soldering Characteristics



Compatible with the JEDEC-J-STD-020D,using the parameters listed below.

Profile Feature	Free Solder
Average Ramp-Up Rate (Tsmax to Tp)	3 ℃/sec max.
Preheat:Temperature Min (Tsmin)	150
Preheat:Temperature Max (Tsmax)	200
Preheat:Time (tsmin to tsmax)	60-180 secs
Time Maintained Above:Temperature (TL)	217℃
Time Maintained Above:Time (tL)	60-150 secs
Peak/Classification Temperature(Tp)	255±5℃℃
Time Within 5℃ of Actual Peak Temperature (tp)	20~40 secs
Ramp-Down Rate	5℃/sec max.

10. Reliability

a.) Tests and Results

Test Item	Reference Standard	Test Conditions	Test Duration	Failure Criteria#	Units Failed/ Tested
Solderability(Reflow Soldering)	JEITA ED=4701 303 303A	T_{sld}=255± 5℃,5sec,Lead-free Solder(Sn-3.0Ag-0.5Cu)	3times	#2	0/22
Temperature Cycle	JEITA ED=4701 100 105	-40℃(30min)~25℃ (5min)~ 85℃(30min)~25℃(5min)	100cycles	#1	0/22
High/Low Temperature Storage	JEITA ED=4701 200 201/ JEITA ED=4701 200 202	T_A=120℃/TA=-40℃	1000h	#1	0/22
Room Temperature Operating		T_A=25℃, I_F=1500mA	1000h	#1	0/22
High Temperature Operating		T_A=85℃, I_F=1500mA	1000h	#1	0/22
Temperature Humidity Operating		85℃, RH=85%, I_F=1500mA	1000h	#1	0/22

f.) Failure Criteria

Criteria #	Items	Conditions	Failure Criteria
	Forward Voltage (VF)	IF	> Initial value×1.1
#1	Luminous Flux (Φv)	IF	< Initial value×0.7
	Reverse Current (IR)	VR=5V	> 1uA > 1uA
#2	Solderability	-	Less than 80% solder coverage

11. Cautions

a.) Handling Precautions

1) Pressure on the LEDs will influence to the reliability of the LEDs. Precautions should be taken to avoid strong pressure on the LEDs. Do not put stress on the LEDs during heating.

2) Re-soldering should not be done after the LEDs have been soldered. If re-soldering is unavoidable, LED`s characteristics should be carefully checked before and after such repair.

3) Do not stack assembled PCBs together. Since materials of LEDs is soft, abrasion between two PCB assembled with LED might cause catastrophic failure of the LEDs.

4) Compared to standard encapsulants, silicone is generally softer, and the surface is more likely to attract dust, In cases where a minimal level of dirt and dust particles cannot be guaranteed, a suitable cleaning solution must be applied to the surface after the soldering of components.

5) VOCs (Volatile organic compounds) emitted from materials used in the construction of fixtures can penetrate silicone encapsulants of LED and discolor when exposed to heat and photonic energy. The result can be a significant loss of light output from the fixture.

6) Attaching LEDs, do not use adhesives that outgas organic vapor.

7） LED is sensitive to Electro-Static Discharge (ESD), below is a list of suggestions that we propose to minimize these effects.

a. ESD (Electro Static Discharge)
Electrostatic discharge (ESD) is the defined as the release of static electricity when two objects come into contact. While most ESD events are considered harmless, it can be an expensive problem in many industrial environments during production and storage. The damage from ESD to an LED may cause the product to demonstrate unusual characteristics such as: - Increase in reverse leakage current lowered turn-on voltage.

-Abnormal emissions from the LED at low current
The following recommendations are suggested to help minimize the potential for an ESD event.

One or more work area suggestions:
- Ionizing fan setup
- ESD table/shelf mat made of conductive materials
- ESD safe storage containers

One or more personnel suggestion options:
-Antistatic wrist-strap
-Antistatic material shoes
-Antistatic clothes

Environmental controls:
-Humidity control (ESD gets worse in a dry environment.

b.) Cleaning

We suggests using isopropyl alcohol for cleaning. In case other solvents are used, it must be assured that these solvents do not dissolve the package or resin. Ultrasonic cleaning is not recommended. Ultrasonic cleaning may cause damage to the LED.

c.) Storage

1) Do not place the LED in damp places, Storage temperature between 5 ℃and 30 ℃, Relative humidity under 30%.

2) Use Precaution after Opening the Packaging
a) Recommend conditions after opening the package
- Sealing / Temperature : 5 ~ 30℃ Humidity : less than RH60%

b) If the package has been opened more than 168 hours (MSL 3) or the color of the humidity indicator card changes, components should be dried for 10-24hr at 65±5℃.