

PHOTRON 5W POWER LED

5W High Power Light Emitting Diode For Application

DEVICE : White, Warm White color

FORMING DATE. 2008 년 03 월 22 일
CUSTOMER .

DESIGN	CHECK	APPROVAL

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Anseong-City, Kyungg-DO, korea

◆ Specification Contents

- POWER LED Series Feature

- Feature

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- High Power led Part Explanation

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- Luminous Flux Characteristics

- Forward Voltage Characteristics

- Dominant Wavelength Characteristics

- Wavelength spectrum

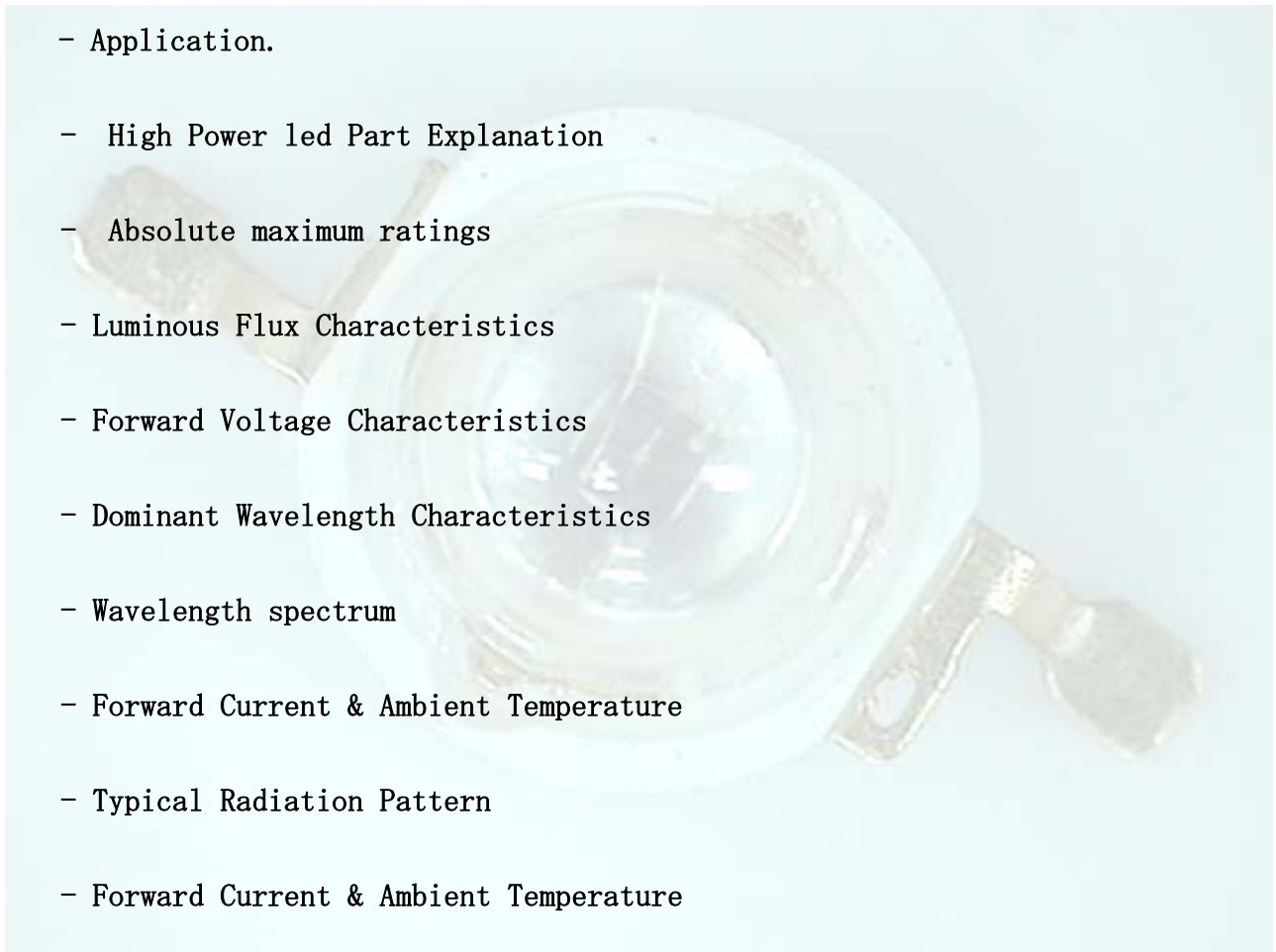
- Forward Current & Ambient Temperature

- Typical Radiation Pattern

- Forward Current & Ambient Temperature

- Relative Luminous Flux & Forward Current

- Outline Dimensions



1. POWER LED Series Feature

High power LED is a revolutionary, energy efficient and compact new light source, combining the Lifetime and reliability advantages of Light Emitting Diodes with brightness of conventional lighting.

2. Feature

- ▷ Super high Flux output and Luminance
- ▷ High current operation
- ▷ Low forward voltage operation
- ▷ Superior Thermal Stability.
- ▷ ESD Class(Mil Std-883d Method 3017.7)based on Human Body Model (HBM) :**Class1**
- ▷ ROHS Compliant

3. Application.

- ▷ Automotive Lighting System
- ▷ Outdoor / Indoor Lighting System
- ▷ Sign Board
- ▷ Architectural Lighting
- ▷ Projector Light source
- ▷ Traffic Signals



4. High Power led Part Explanation

Full Part Code : P P ◇◇◇ - ◇ ◇ ◇ ◇ - ◇◇ ◇ ◇ ◇

① ② ③ ④ ⑤ ⑥ ⑦ ⑨ ⑩ ⑪ ⑫

(1) P - Photron initial

(2) P - Photron Power LED LAMP

(3) ◇◇◇ - Wavelength (Dominant / peak)

White led lamp code : 00W

- Neutral white led lamp code : ONW

- Warm led white lamp code : OWW

(4)(5) ◇◇ - Size of lens

L: Lambertian, B: Batwing, S: Sid Emitting, I: Silicon Lens, T: Star Pcb

(6) ◇ - Viewing angle(° 1/2)

(7) ◇ - Power Dissipation

1W: 1, 3W: 3, 5W: 5

* Internal Number

(9) ◇◇

(10) ◇

(11) ◇

(12) ◇

5. Absolute maximum ratings.

(Ta = 25°C)

Parameter	Symbol	Ratings	Unit
Forward current	I _F	800	mA
Pulse Forward Current *1	I _{FP}	1200	mA
Reverse voltage	V _R	5	V
Power dissipation	P _D	6.08	w
LED junction Temperature(white)	T _j	121	°C
Viewing angle	Θ _{1/2}	130	deg
Operation temperature	T _{opr.}	-30 ~ + 110	°C
Storage temperature	T _{stg.}	-40 ~ + 120	°C
Manual Soldering Time at 260°C (MAX.)	T _{sol.}	5	seconds

*Notes

*1 IFP Conditions : Pulse Width ≤10usec. And Duty Ratio ≤1/10

* ESD Class based on Human Body Model (HBM) : **Class1.**

* Photron maintains a tolerance of ±10% on power measurements.

6. Luminous Flux Characteristics at 700mA, Ta = 25°C

Color	Part No	Item	Symbol	Luminous Flux			Unit
				MIN	TYP	MAX	
Warm white	PP0WW-1775-EDBI	Luminous Flux	LX	100	150		lm
white	PP00W-1775-EDBI	Luminous Flux	LX	100	170		lm

* Luminous Flux Measurement is $\pm 10\%$.

7. Forward Voltage Characteristics at 700mA, Ta = 25°C

Color	Part No	Item	Symbol	Luminous Flux			Unit
				MIN	TYP	MAX	
Warm white	PP0WW-1775-EDBI	Forward Voltage	Vf	6.0	6.8	7.6	V
white	PP00W-1775-EDBI	Forward Voltage	Vf	6.0	6.8	7.6	V

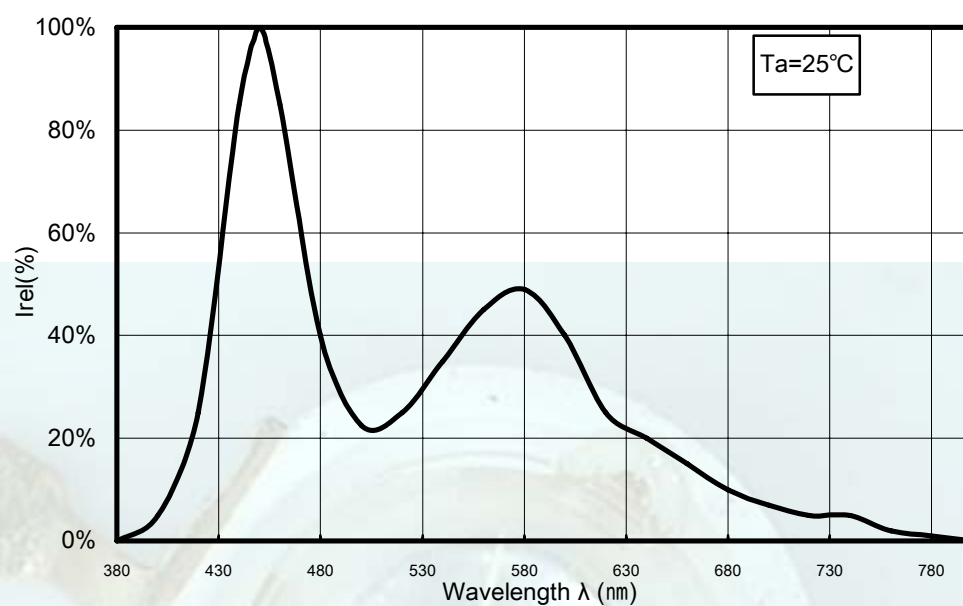
* Forward Voltage Measurement allowance is $\pm 3\%$.

8. Dominant Wavelength or Color Temperature Characteristics at 700mA, Ta = 25°C

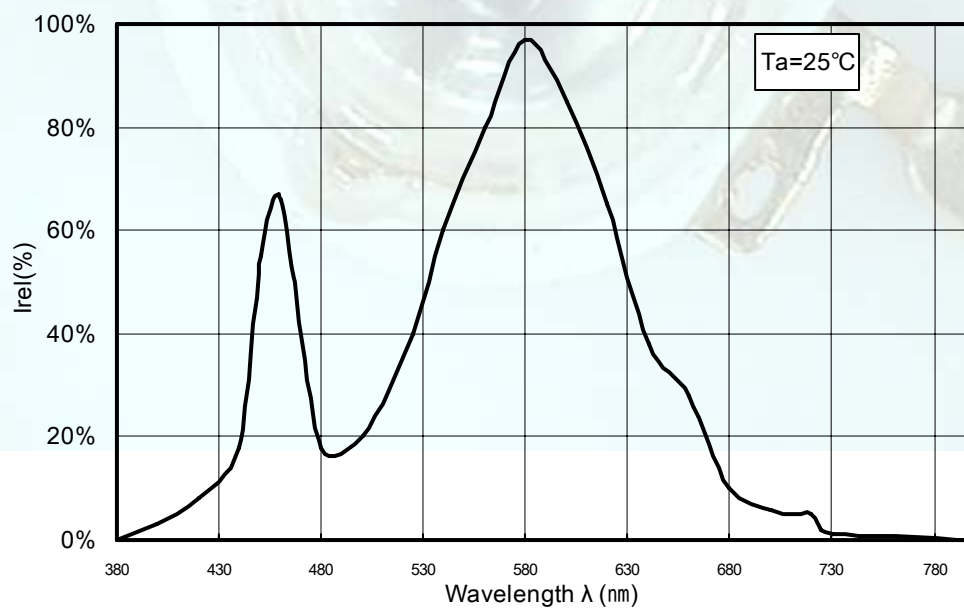
Color	Part No	Item	Symbol	Luminous Flux			Unit
				MIN	TYP	MAX	
Warm white	PP0WW-1775-EDBI	Correlated Color Temperature	CCT	2600	3000	3500	K
white	PP00W-1775-EDBI	Correlated Color Temperature	CCT	4500	6500	10000	K

* Dominant Wavelength Measurement allowance is $\pm 0.5\text{nm}$.

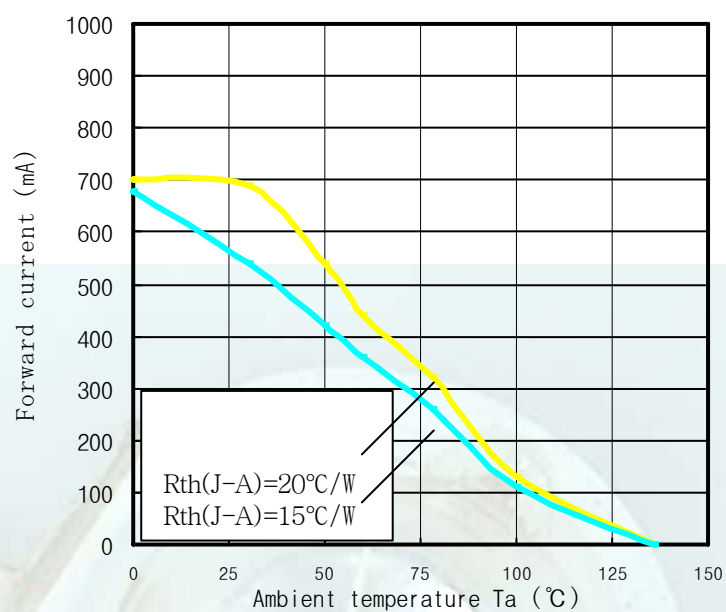
9. White Color Spectrum Curves



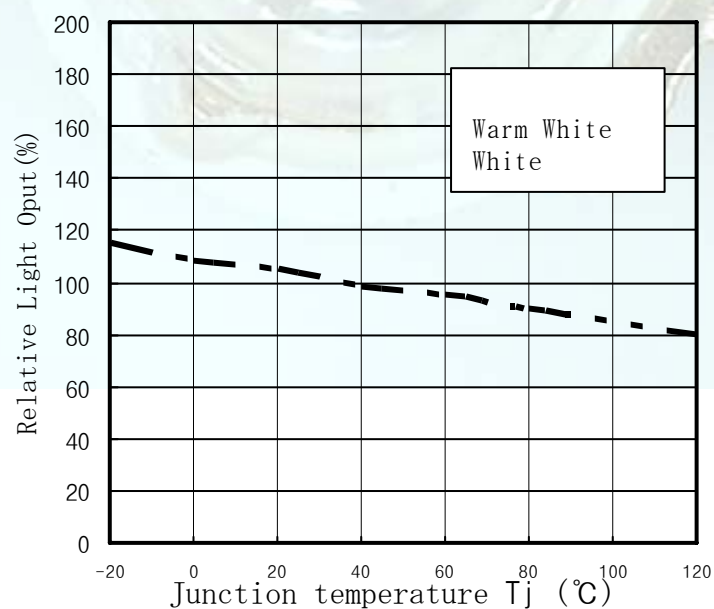
10. Warm White Color Spectrum Curves



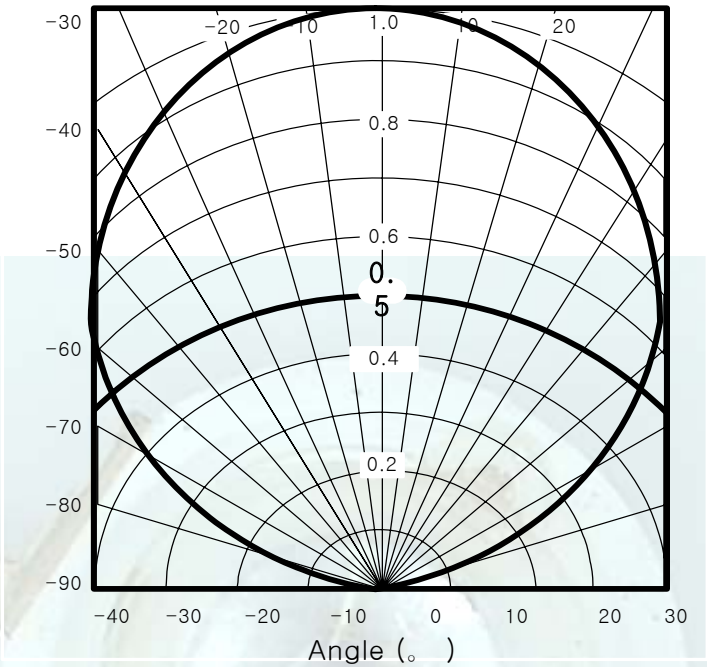
11. Forward Current & Ambient Temperature.



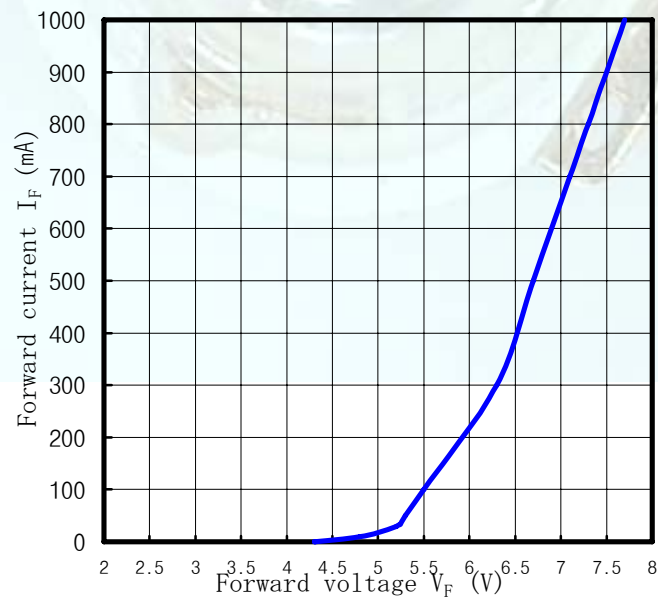
12. Relative Light Output VS Junction Temperature



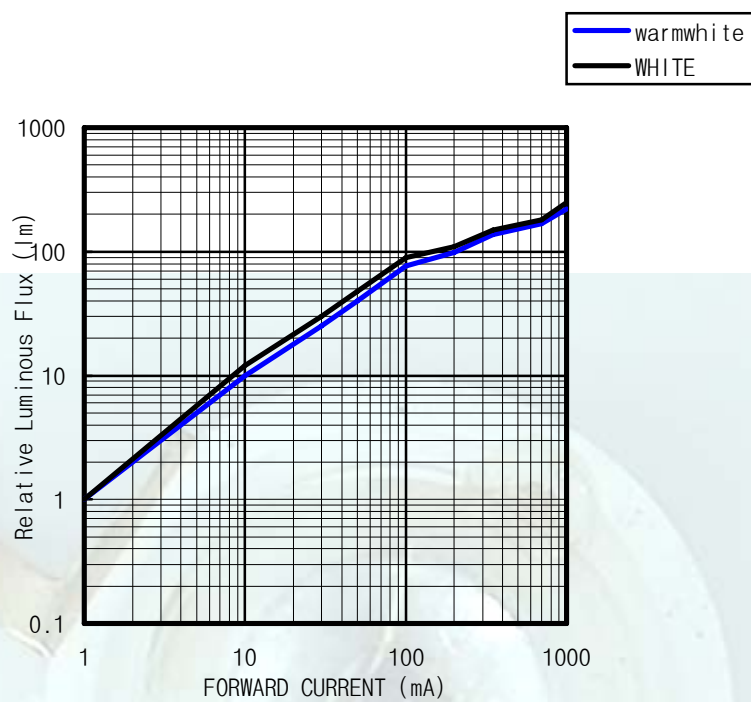
13. Typical Radiation Pattern.



14. White, Warm white Forward Current & Ambient Temperature.



15. Relative Luminous Flux & Forward Current.



1. Wavelength Rank (If=700mA)

Part no	Rank	min	typ	max	Unit
UV	U1	370		375	
	U2	395		405	
Blue	B1	460		465	
	B2	465		470	
	B3	470		475	
Green	G1	515		520	
	G2	520		525	
	G3	525		530	
	G4	530		535	
Amber	A1	585		588	
	A2	588		591	
	A3	591		594	
Red Orange	R1	610		620	
Red	R2	620		630	
IRED		935		945	
		840		860	

2. Flux Ranks

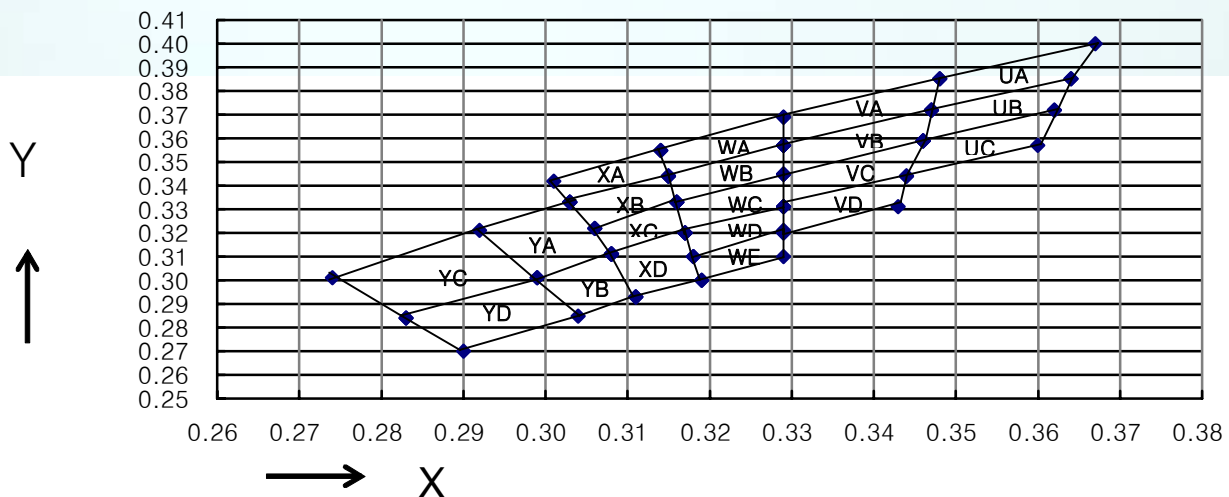
Part no	Flux Rank	Flux(lm)@If=700mA	Unit
RED YELLOW BLUE GREEN WHITE	A	4.0 – 10	lm
	B	10 – 16	lm
	C	16 – 20	lm
	D	20 - 26	lm
	E	20 - 28	lm
	F	28 - 36	lm
	G	36 - 46	lm
	H	46 - 56	lm
	I	56 - 66	lm
	J	66 - 86	lm
	K	86 - 100	lm
	L	100 - 120	lm
	M	120 - 140	lm
	N	140 - 160	lm
	O	160 - 180	lm
	P	180 - 200	lm
	Q	200 - 240	lm
	R	240 - 280	lm
	S	280 - 320	lm
	T	320 - 360	lm
	U	360 - 400	lm
	V	400 - 460	lm

3. Forward Voltage Rank (If=700mA)

Part no	Rank	min	typ	max	Unit
RED YELLOW BLUE GREEN WHITE	V1	1.80		2.00	V
	V2	2.00		2.30	V
	V3	2.30		2.60	V
	V4	2.60		2.90	V
	V5	2.90		3.10	V
	V6	3.10		3.40	V
	V7	3.40		3.70	V
	V8	3.70		4.00	V
	V9	4.00		4.30	V
	V10	4.30		4.60	V
	V11	4.60		5.00	V
	V12	5.00		5.30	V
	V13	5.30		5.60	V
	V14	5.60		6.00	V
	V15	6.00		6.30	V
	V16	6.30		6.60	V
	V17	6.60		7.00	V
	V18	7.00		7.30	V
	V19	7.30		7.60	V
	V20	7.60		8.00	V

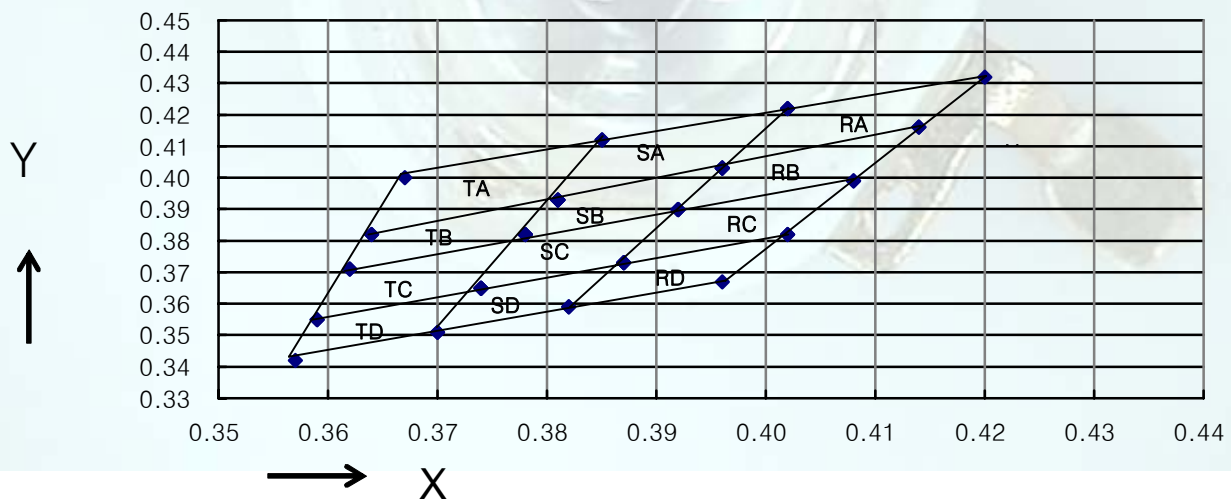
Cool – white Color Rank(If=700mA)

Group	Rank					Group	Rank				
UA	X	0.362	0.360	0.344	0.346	WD	X	0.329	0.316	0.315	0.329
	Y	0.372	0.357	0.344	0.359		Y	0.345	0.333	0.344	0.357
UB	X	0.364	0.362	0.346	0.347	WE	X	0.314	0.329	0.329	0.315
	Y	0.385	0.372	0.359	0.372		Y	0.355	0.369	0.357	0.344
UC	X	0.364	0.367	0.348	0.347	XA	X	0.308	0.317	0.319	0.311
	Y	0.385	0.400	0.385	0.372		Y	0.311	0.320	0.300	0.293
VA	X	0.329	0.344	0.343	0.329	XB	X	0.308	0.306	0.316	0.317
	Y	0.331	0.344	0.331	0.320		Y	0.311	0.322	0.333	0.320
VB	X	0.329	0.329	0.346	0.344	XC	X	0.306	0.303	0.315	0.316
	Y	0.331	0.345	0.359	0.344		Y	0.322	0.333	0.344	0.333
VC	X	0.329	0.329	0.347	0.346	XD	X	0.301	0.314	0.315	0.303
	Y	0.345	0.357	0.372	0.359		Y	0.342	0.355	0.344	0.333
VD	X	0.329	0.329	0.348	0.347	YA	X	0.304	0.299	0.308	0.311
	Y	0.357	0.369	0.385	0.372		Y	0.285	0.301	0.311	0.293
WA	X	0.329	0.329	0.319	0.318	YB	X	0.308	0.299	0.292	0.303
	Y	0.321	0.310	0.300	0.310		Y	0.311	0.301	0.321	0.333
WB	X	0.329	0.329	0.318	0.317	YC	X	0.308	0.283	0.274	0.303
	Y	0.331	0.320	0.310	0.320		Y	0.311	0.284	0.301	0.333
WC	X	0.329	0.329	0.317	0.316	YD	X	0.308	0.311	0.290	0.283
	Y	0.345	0.331	0.320	0.333		Y	0.311	0.293	0.270	0.284



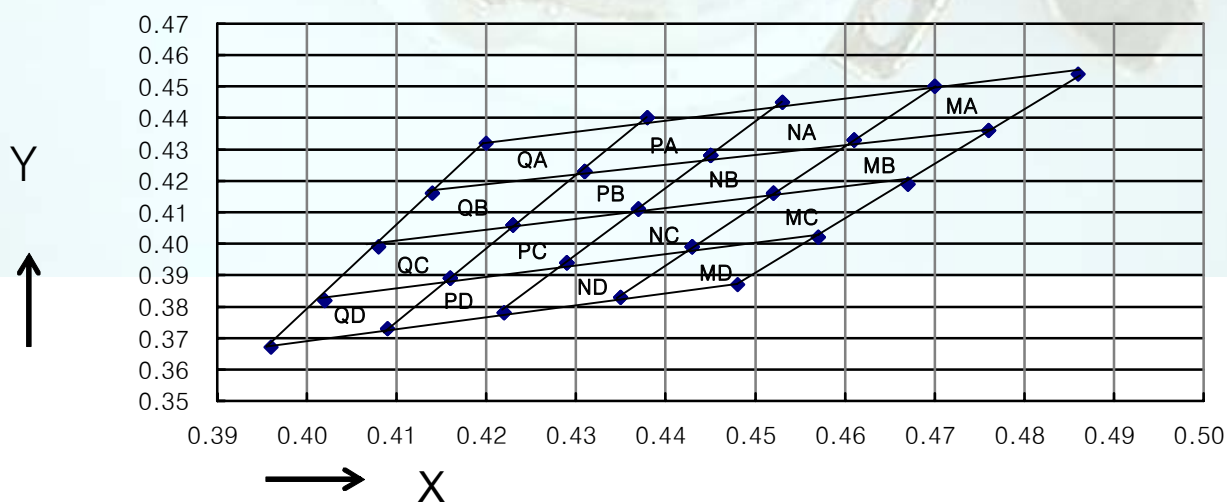
Neutral- White Color Rank Structure(If=700mA)

Group	Rank					Group	Rank				
TA	X	0.367	0.385	0.381	0.364	SC	X	0.378	0.392	0.387	0.374
	Y	0.400	0.412	0.393	0.382		Y	0.382	0.390	0.373	0.365
TB	X	0.364	0.381	0.378	0.362	SD	X	0.374	0.387	0.382	0.370
	Y	0.382	0.393	0.382	0.371		Y	0.365	0.373	0.359	0.351
TC	X	0.362	0.378	0.374	0.359	RA	X	0.402	0.420	0.414	0.396
	Y	0.371	0.382	0.365	0.355		Y	0.422	0.432	0.416	0.403
TD	X	0.359	0.374	0.370	0.357	RB	X	0.396	0.414	0.408	0.392
	Y	0.355	0.365	0.351	0.342		Y	0.403	0.416	0.399	0.390
SA	X	0.385	0.402	0.396	0.381	RC	X	0.392	0.408	0.402	0.387
	Y	0.412	0.422	0.403	0.393		Y	0.390	0.399	0.382	0.373
SB	X	0.381	0.396	0.392	0.378	RD	X	0.387	0.402	0.396	0.382
	Y	0.393	0.403	0.390	0.382		Y	0.373	0.382	0.367	0.359



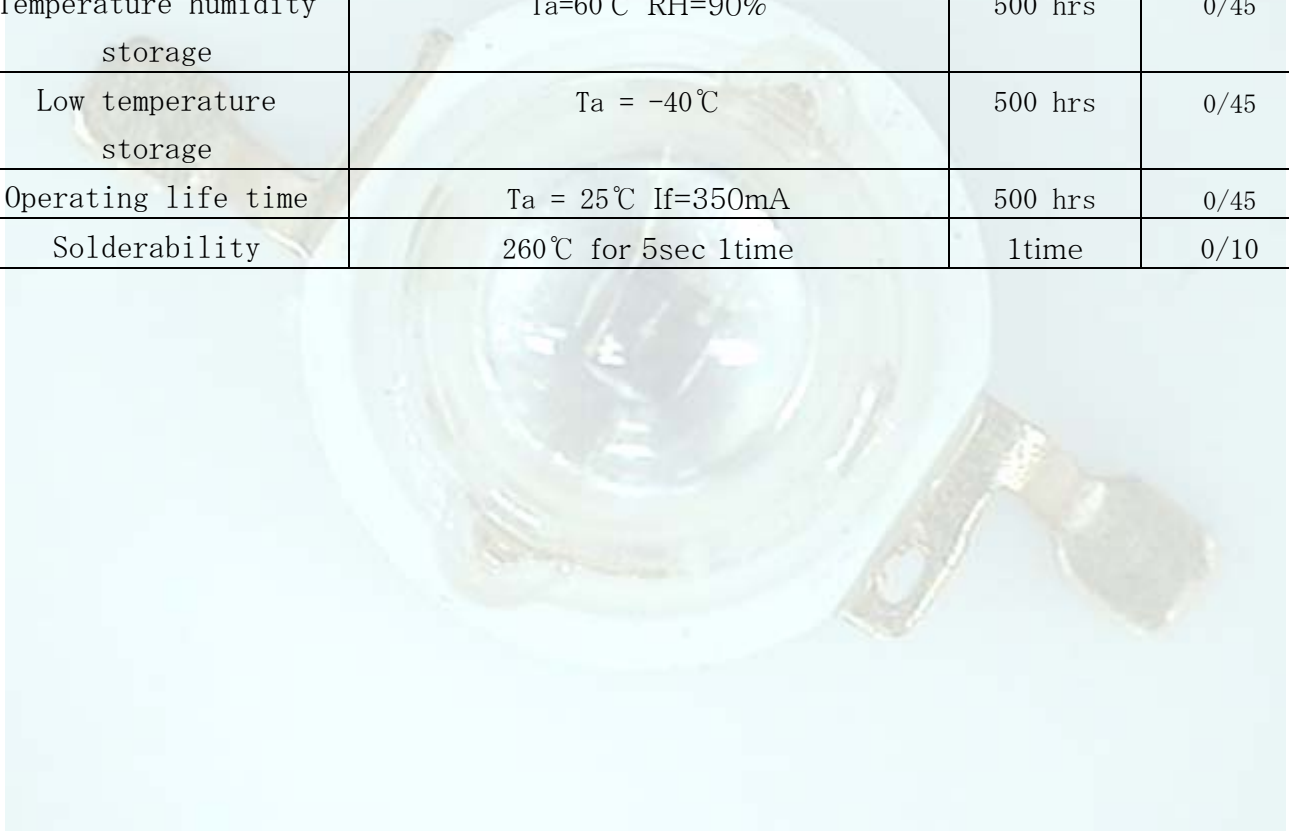
Warm- White Color Rank Structure(If=700mA)

Group	Rank					Group	Rank				
QA	X	0.420	0.438	0.431	0.414	NA	X	0.453	0.470	0.461	0.445
	Y	0.432	0.440	0.423	0.416		Y	0.445	0.450	0.433	0.428
QB	X	0.414	0.431	0.423	0.408	NB	X	0.445	0.461	0.452	0.437
	Y	0.416	0.423	0.406	0.399		Y	0.428	0.433	0.416	0.411
QC	X	0.408	0.423	0.416	0.402	NC	X	0.437	0.452	0.443	0.429
	Y	0.399	0.406	0.389	0.382		Y	0.411	0.416	0.399	0.394
QD	X	0.402	0.416	0.409	0.396	ND	X	0.429	0.443	0.435	0.422
	Y	0.382	0.389	0.373	0.367		Y	0.394	0.399	0.383	0.378
PA	X	0.438	0.453	0.445	0.431	MA	X	0.470	0.486	0.476	0.461
	Y	0.440	0.445	0.428	0.423		Y	0.450	0.454	0.436	0.433
PB	X	0.431	0.445	0.437	0.423	MB	X	0.461	0.476	0.467	0.452
	Y	0.423	0.428	0.411	0.406		Y	0.433	0.436	0.419	0.416
PC	X	0.423	0.437	0.429	0.416	MC	X	0.452	0.467	0.457	0.443
	Y	0.406	0.411	0.394	0.389		Y	0.416	0.419	0.402	0.399
PD	X	0.416	0.429	0.422	0.409	MD	X	0.443	0.457	0.448	0.435
	Y	0.389	0.394	0.378	0.373		Y	0.399	0.402	0.387	0.383



16. Results of Reliability Test

item	Test Condition	Note	Fail / Sample
Temperature cycle	-40℃ 30min ~ 25℃ 5min ~100℃ ~ 25℃30min	100 cycles	0/45
High temperature storage	Ta = 100℃	500 hrs	0/45
Temperature humidity storage	Ta=60℃ RH=90%	500 hrs	0/45
Low temperature storage	Ta = -40℃	500 hrs	0/45
Operating life time	Ta = 25℃ If=350mA	500 hrs	0/45
Solderability	260℃ for 5sec 1time	1time	0/10



◆ Soldering conditions

- When soldering leave minimum clearance between the resin and soldering point
- Maximum allowable soldering conditions
Soldering dipping: 260 degrees C max., 5 seconds max.,
Soldering iron: 340 degrees C max., 3 seconds max., 1 time 40w max.
- Contact between molten solder and the resin must be avoided.
- In soldering, do not apply any stress to the lead frame, particularly heated.

◆ storage

- Storage Conditions

Before opening the package

The LEDs should be kept below 30°C and 70%RH. When storing the LEDs, try to unpack the moisture proof package and store them in a dry place. If the LEDs are stored for 3months or more after being from PHOTRON, a sealed container with a nitrogen atmosphere is recommended for storing.

After opening the package

The LEDs should be kept below 30°C and 70%RH. The LEDs should be soldered within 24hours after opening the package. If there is leftover, they should be stored in moisture proof package with moisture absorbent material(e.g. silica gel) inside.

- It is strongly recommended that the user use the LEDs as soon as possible since there Exist a possibility that unfavorable environmental factors could deteriorate the properties of the LEDs.

◆ Static Electricity

- Static electricity or surge voltage damages the LEDs.

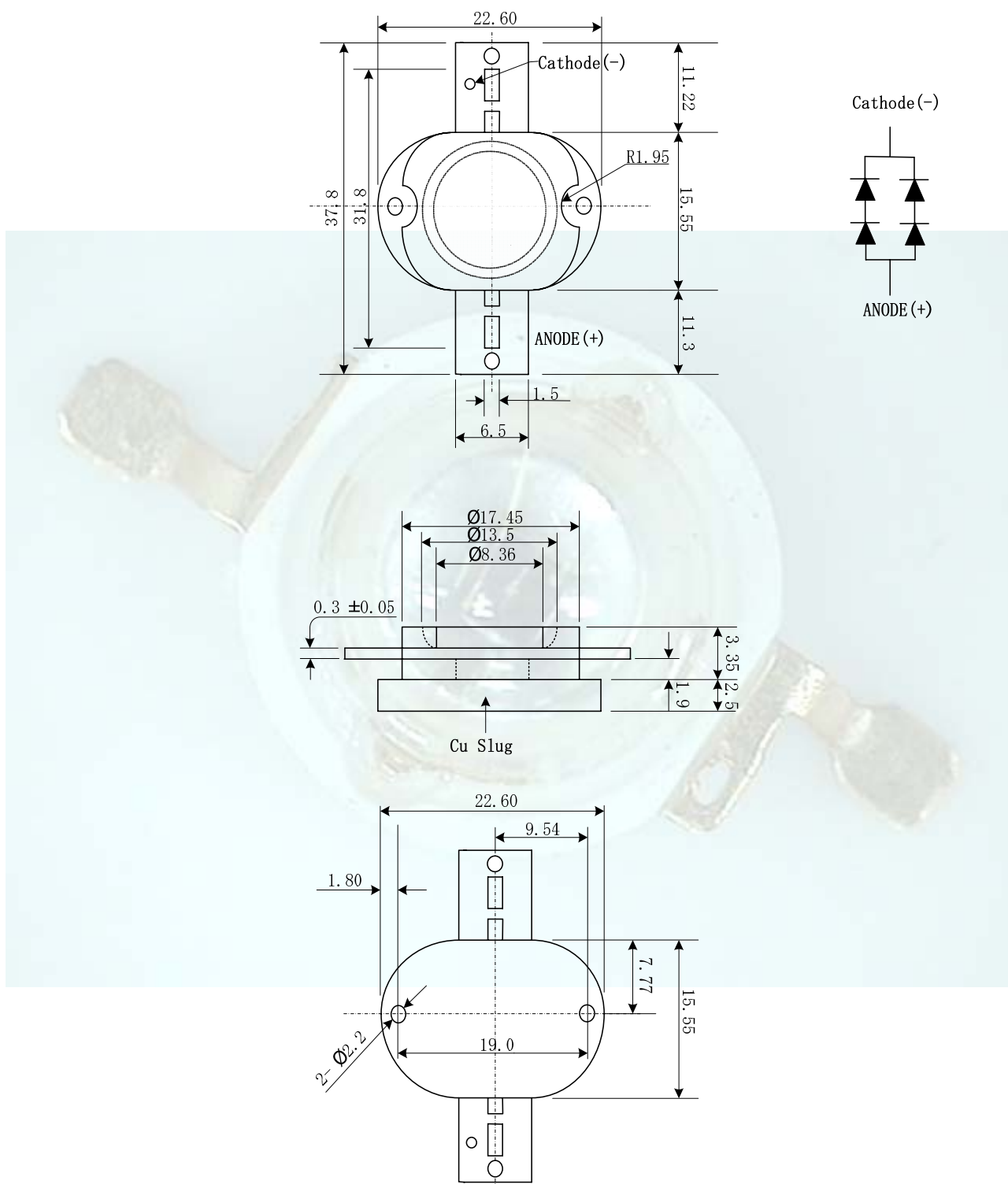
It is recommended that a wrist bond or an anti-electrostatic glove be used when handling the LEDs.

- All devices, equipment and machinery must be properly grounded.

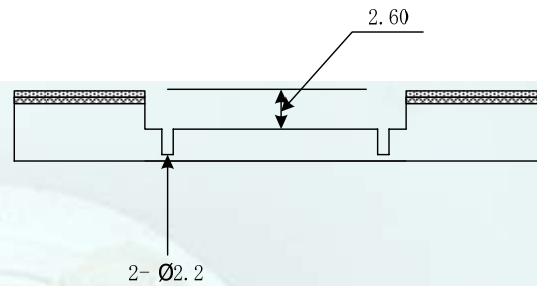
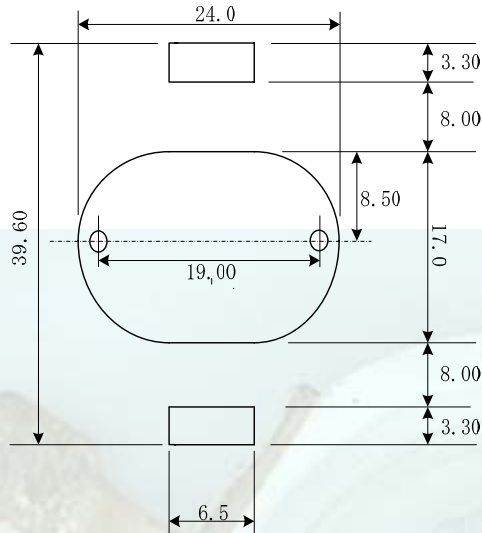
It is recommended that measures be taken against surge voltage to the equipment that mounts the LEDs.

- When inspecyimg the final products in which LEDs were assembled, it is recommended to check whether the assembled LEDs are damaged by static electricity or not. It is easy to find static-damaged LEDs by a light-on test or a VF test at a lower current (below 1mA is recommended).
- Damaged LEDs will show some unusual characteristics such as the forward voltage becomes lower. Or the LEDs do not light at the low current.

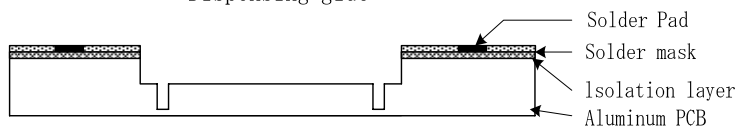
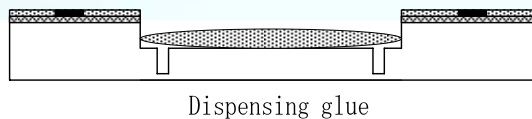
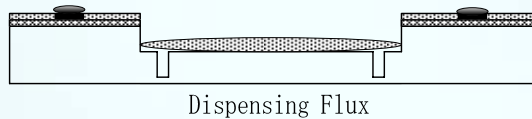
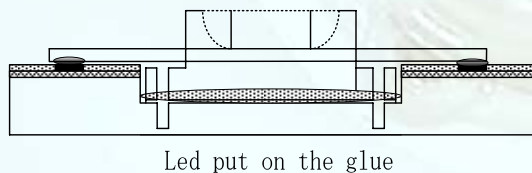
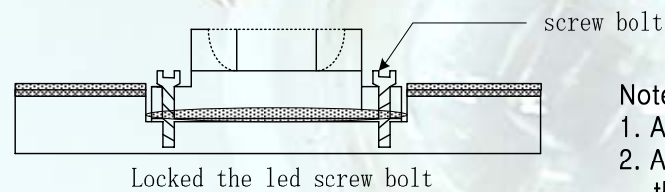
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■ Recommended soldering pad design



Recommend Solder Steps



Notes:

1. All dimensions are in mm.
2. Aluminum PCB material with a thermal conductivity greater 5.0 W/mk.
3. Solder pad can't be connected to slug.
4. Thermal glue with a thermal conductivity greater then 3.0 W/mk and the thickness must be less than 100um.

Revision history sheet

5W POWER

개 정	변경 전	변경 후	변경사유	적용 일자	Page
	품명/규격	품명/규격			
1.0	White,	PP00W-1775-EDBI	임시사양 제정	2008-03-21	21
	Warm White	PP0WW-1775-EDBI	임시사양 제정	2008-03-21	21

