



5W module

EdiPower™ Module

Approved By Customer	Designer	Checker	Approval

Date : 2006/07/11

Version : 1.1

Device No. : 3-RD2-01-H0003
EDISON OPTO CORPORATION

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EdiPower Module



EdiPower module series can provide different light patterns. These modules provide customer to design head light for motor, light source for exterior lighting module.

Features

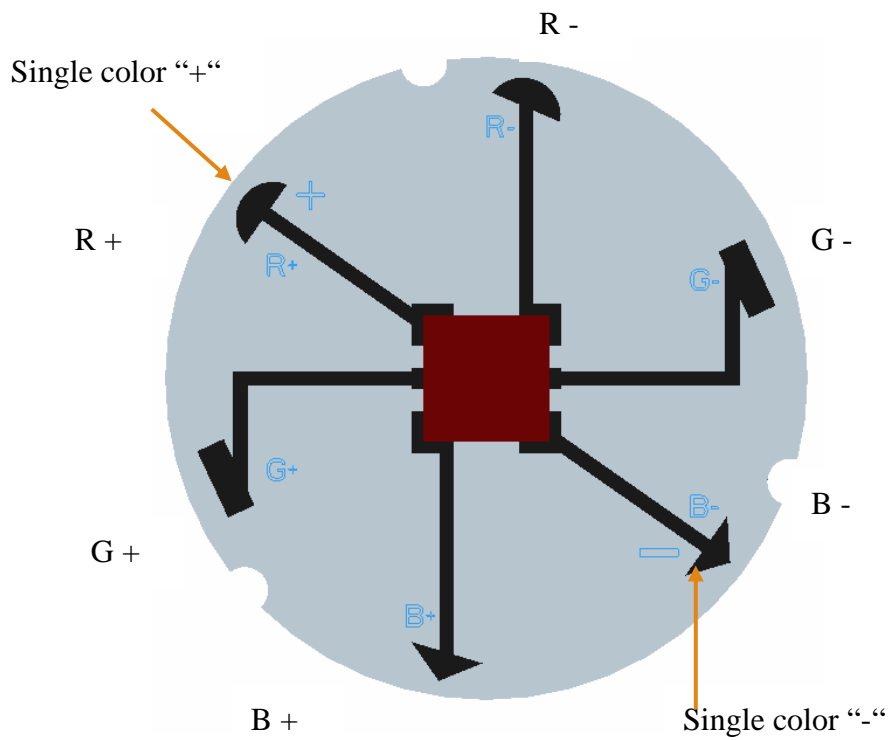
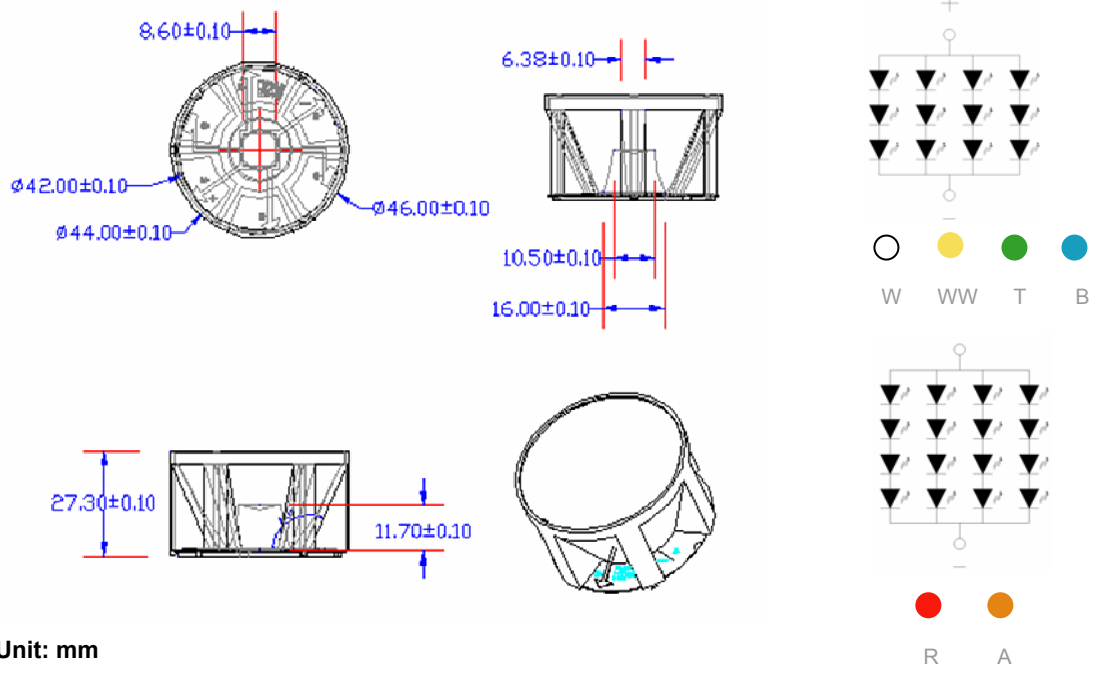
- High power consumption
- Excellent thermal performance
- No UV

Typical Applications

- Portable flashlight
- LEDs lighting engine
- Bollards / Security / Garden lighting
- Exterior Commercial lighting
- Architectural lighting



Package Outlines: 5W



Thickness: 2 mm

Absolute Maximum Ratings

Parameter	Symbol	Rating	Units
DC Forward Current	I _F	500	mA
		600 (Red, Amber)	
Peak pulse current;(t _p ≤100μs, Duty cycle=0.005)	I _{pulse}	1000	mA
		1200 (Red, Amber)	
LED junction Temperature	T _j	125	°C
Operating Temperature	T _{opr}	-30 ~ +110	°C
Storage Temperature	T _{stg}	-40 ~ +120	°C
Manual Soldering Time at 400°C (Max.)	T _{sol}	10	seconds
LED Substrate Temperature	T _s	<100	°C
Transient Surge Voltage	TSv	28	V

Luminous Flux and Electrical Characteristics

Power Consumption	Part Name	Color	Typ. Voltage (V)	Test Current (A)	Luminous Flux (lm)	Thermal Resistance To Board (°C/W)
5W	EP5W-2H01(10°)					
	EP5W-2H02(38°)	White	10.4	0.50	200	5
	EP5W-2H03(60°)					
	EP5X-2H01(10°)					
	EP5X-2H02(38°)	Warm White	10.4	0.50	130	5
	EP5X-2H03(60°)					
	EP5R-2H01(10°)					
	EP5R-2H02(38°)	Red	8.4	0.60	130	5
	EP5R-2H03(60°)					
	EP5A-2H01(10°)					
	EP5A-2H02(38°)	Amber	8.4	0.60	130	5
	EP5A-2H03(60°)					
	EP5T-2H01(10°)					
	EP5T-2H02(38°)	True Green	10.4	0.50	130	5
	EP5T-2H03(60°)					
	EP5B-2H01(10°)					
	EP5B-2H02(38°)	Blue	10.4	0.50	60	5
	EP5B-2H03(60°)					

Chip Characteristics for single color

Color	Dominant Wavelength (λ_d)nm	Forward Voltage (V)
Red	620~630	1.90~2.35
Amber	585~595	1.90~2.35
True Green	520~530	3.20~3.65
Blue	465~475	3.20~3.65

CCT ranks

CCT Group	CCT (°K)
Warm White	2700 ~ 3300
X1	2700 ~ 2900
X2	2900 ~ 3100
X3	3100 ~ 3300
White	5200 ~ 7200
W1	5200 ~ 5600
W2	5600 ~ 6000
W3	6000 ~ 6400
W4	6400 ~ 6800
W5	6800 ~ 7200

Chip Characteristics for RGB in one(EP3M-4HXX , 40 mil chip size)

Color	Dominant Wavelength (λ_d)nm	Forward Voltage (V)	Test current (A)	Luminous Flux (lm)
Red	625~630	1.9~2.2	0.35	15
True Green	520~525	3.2~3.5	0.35	35
Blue	455~460	3.4~3.7	0.35	12

Electrical Characteristics

Power Consumption	Part Name	Color	Min. Voltage (V)	Typ. Voltage (V)	Max. Voltage (V)
5W	EP5W-2H0X	White	9.3	10.2	11.4
	EP5X-2H0X	Warm White	9.3	10.2	11.4
	EP5R-2H0X	Red	8.0	9.2	10.8
	EP5A-2H0X	Amber	8.0	9.2	10.8
	EP5T-2H0X	True Green	9.3	10.2	11.4
	EP5B-2H0X	Blue	9.3	10.2	11.4

JEDEC Moisture Sensitivity:

Level	Floor Life		Soak Requirements			
	Time	Conditions	Standard		Accelerated Environment	
			Time (hours)	Conditions	Time (hours)	Conditions
2a	4Weeks	≤30°C / 60% RH	696 +2/-0	30°C / 60% RH	120 +1/-0	60°C / 60% RH

LEVEL	FLOOR LIFE		SOAK REQUIREMENTS			
			STANDARD		ACCELERATED EQUIVALENT ¹	
	TIME	CONDITIONS	TIME (hours)	CONDITIONS	TIME (hours)	CONDITIONS
1	Unlimited	≤30°C/85% RH	168 +5/-0	85°C/85% RH		
2	1 year	≤30°C/60% RH	168 +5/-0	85°C/60% RH		
2a	4 weeks	≤30°C/60% RH	696 ² +5/-0	30°C/60% RH	120 +1/-0	60°C/60% RH
3	168 hours	≤30°C/60% RH	192 ² +5/-0	30°C/60% RH	40 +1/-0	60°C/60% RH
4	72 hours	≤30°C/60% RH	96 ² +2/-0	30°C/60% RH	20 +0.5/-0	60°C/60% RH
5	48 hours	≤30°C/60% RH	72 ² +2/-0	30°C/60% RH	15 +0.5/-0	60°C/60% RH
5a	24 hours	≤30°C/60% RH	48 ² +2/-0	30°C/60% RH	10 +0.5/-0	60°C/60% RH
6	Time on Label (TOL)	≤30°C/60% RH	TOL	30°C/60% RH		

Note

- The standard soak time includes a default value of 24 hours for semiconductor manufacturer's exposure time (MET) between bake and bag and includes the maximum time allowed out of the bag at the distributor's facility.

EdiPower Module Reliability

When we talk about MTBF of EdiPower, we can provide a formula for customers.

$$\log(\text{Life}) = \frac{1600}{T_j(^{\circ}\text{C}) + 273}$$

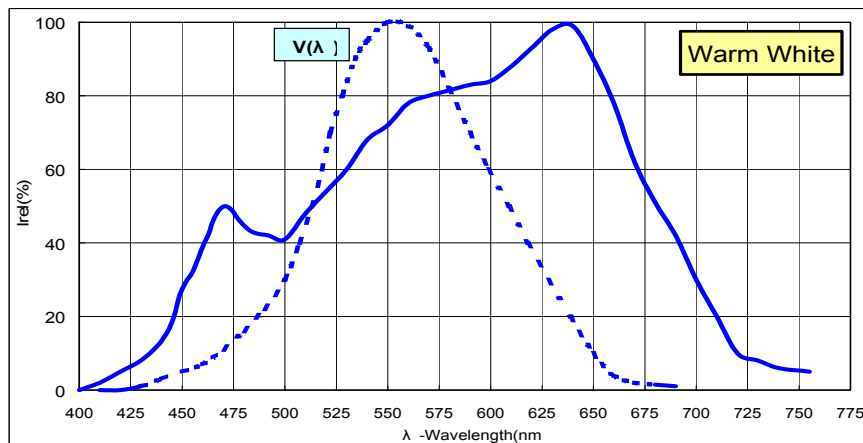
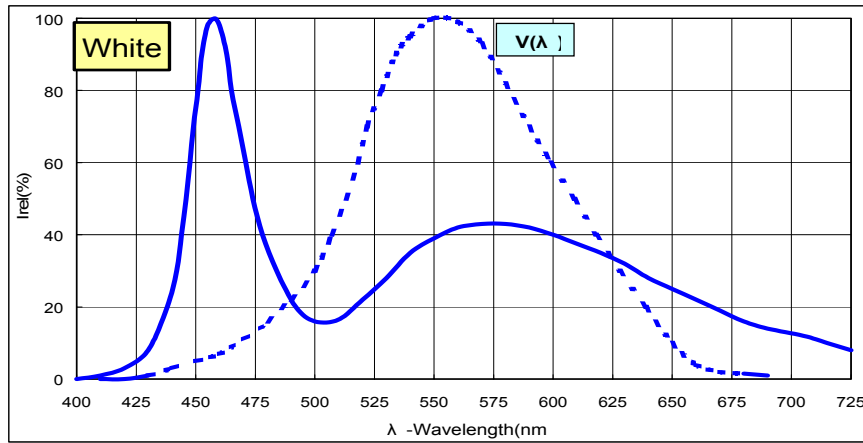
Life means the time light output decay 30% (L70%)

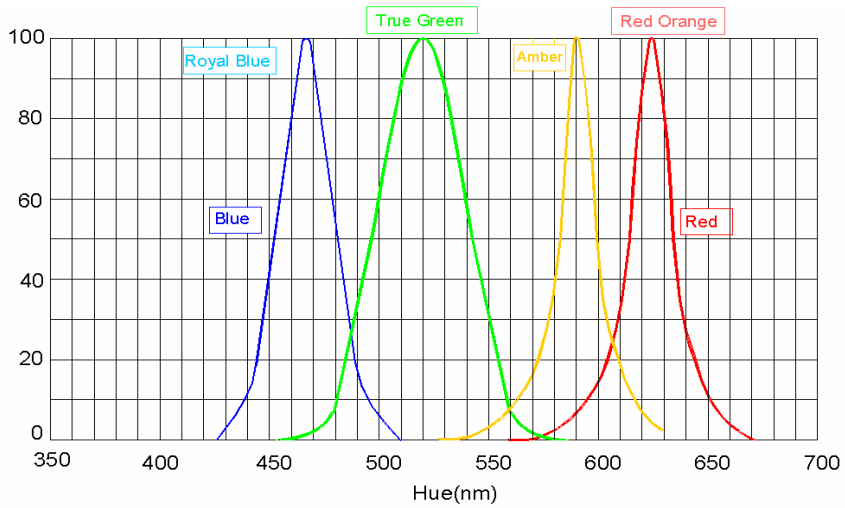
T _j (°C)	Life (hours)
25	234,000
30	191,000
35	157,000
40	129,000
45	107,000
50	90,000
55	75,000
60	64,000
65	54,000
70	46,000
75	39,600
80	34,000
85	29,500
90	25,700
100	19,500
105	17,100
110	15,100
115	13,300
120	11,700
125	10,500
130	9,300
135	8,300
140	7,500
150	6,000

ASSIST FORM about High Power LED Reliability(5W EdiPower White, Warm White, Blue, Green) T_s =ceramic substrate temperature

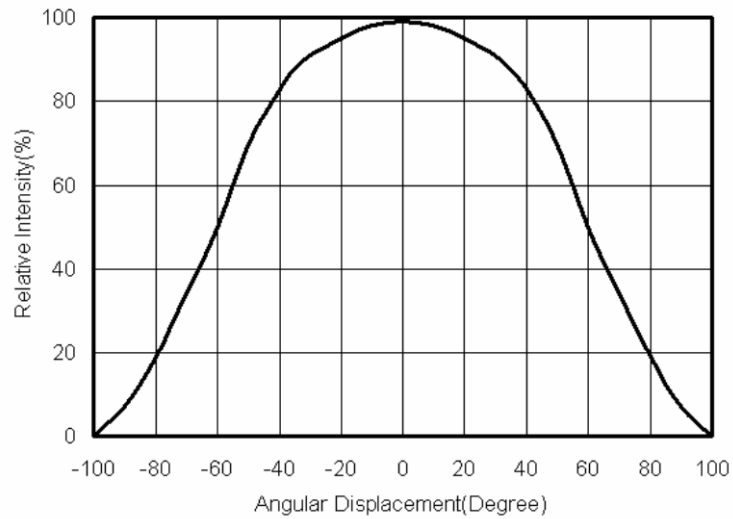
	$T_s=45^{\circ}\text{C}$	$T_s=65^{\circ}\text{C}$	$T_s=85^{\circ}\text{C}$
Voltage	10.2V	10.2V	10.2V
Current	500mA	500mA	500mA
Wattage	5.1W	5.1W	5.1W
Heat	5.0W	5.0W	5.0W
Rth	5.0 °C/W	5.0 °C/W	5.0 °C/W
T_j	70 °C	90 °C	100 °C
$L_{70\%}$	46,000hrs	25,700hrs	19,500hrs

Electrical & Optical Curves-Spectrum

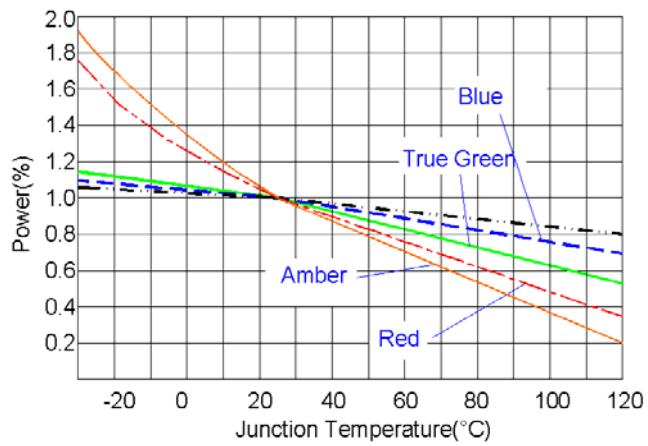




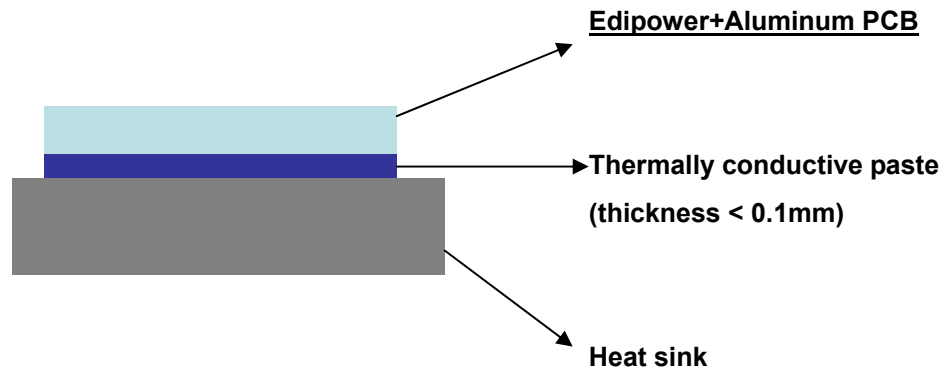
Typical Radiation Pattern



Luminous Flux vs Junction Temperature



Thermal Management



Thermally conductive paste: $K > 2\text{W/m}\cdot\text{K}$

Aluminum PCB thickness: 2.0mm

Thermal Grease Application:

Company: YONYU APPLIED TECHNOLOGY MATERIAL (<http://www.yatm.com.tw>)

Grease Name: TG-6800-1 ($K=2.6\text{ W/m}\cdot\text{K}$)

Step1: Spread grease on the rear surface of emitter

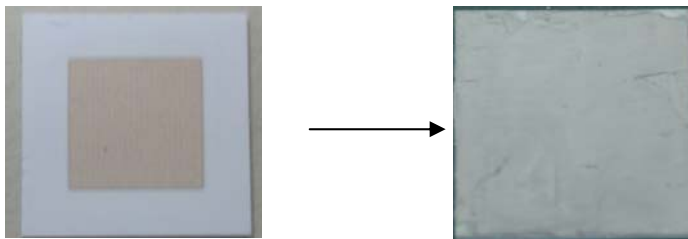
Company: SHINETSU (<http://www.shinetsu.co.jp>)

Grease Name: KJR-9086-1 ($K=2.3\text{ W/m}\cdot\text{K}$)

Step1: Spread grease on the rear surface of emitter

Step2: Fix emitter on Al board.

Step3: Put emitter and Al board in oven 150°C 20 minutes



Note: Package storage condition will be limited in temperature $20\sim 30^{\circ}\text{C}$, RH 40~50%

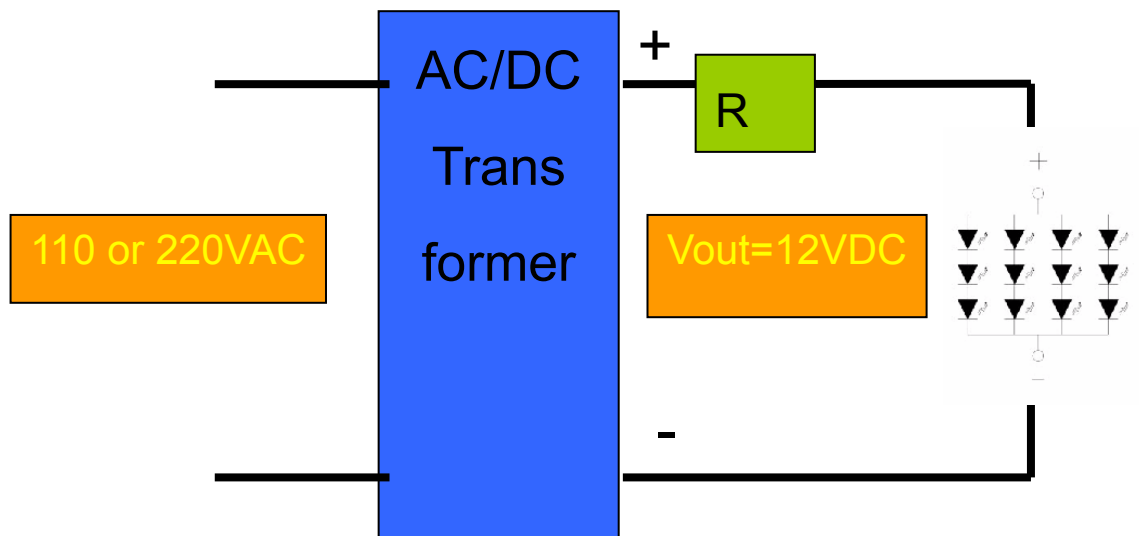
Manual Soldering: It is strongly recommended that solder tip temperature is limited under 350°C 5 seconds. Damage to the silicone layer can cause emitter failure.

Emitter Assembly Note:

1. Please do not use tweezers to touch the surface of silicone (emitting area).
2. Please do not press or touch the surface of silicone (emitting area).
3. Please wear anti-static wrist or glove to prevent ESD damage when assembling.
4. Please do not let EdiPower emitter fall down or press the surface of ceramic

Simple Test Method

5W EdiPower



$R=4\Omega$ for white, warm white, Green and Blue

$R=6\Omega$ for red and Amber

Package dimensions



Dimension: ϕ 4.5x2.8 cm

Weight: 20 g



Package

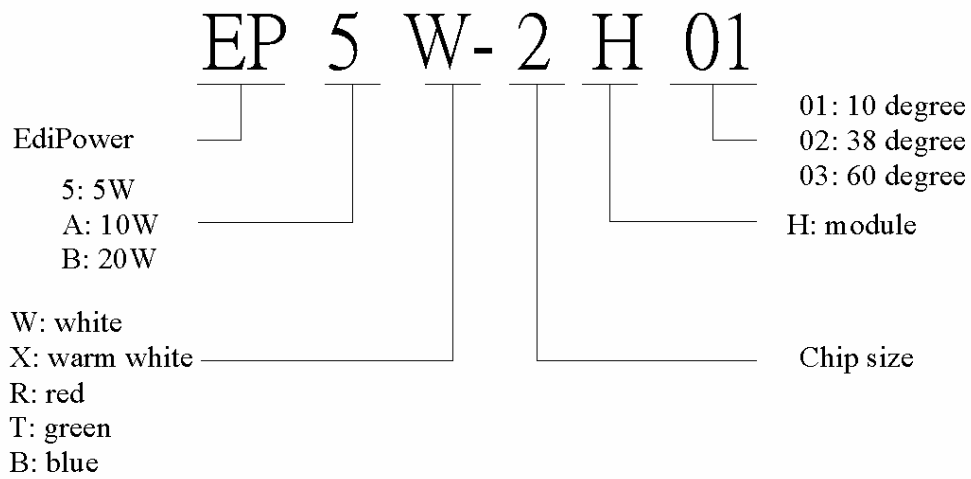
Dimension: 24x17x9.5 cm

2 layers 24 pcs

Weight: 550 g

Label

艾笛森光電股份有限公司 EDISON OPTO CORPORATION Part No: _____	Group: _____ Color: _____	Quantity: _____ Pcs Lot No: _____
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Revised History

Rev.	Issue Date	Revised Item	Note
1.0	2006/05/02	New Version	
1.1	2006/07/11	1. Add white and warm white CCT group 2. Add JEDEC data 3. Add Tj information 4. Add assist recommends information 5. Add Rth calculation 6 Add package dimension	P.4 P.5 P.6 P.11