飛瑞達科技股份有限公司

FLEDA Technology Corporation

~ A LED Lighting Integration Provider

About FLEDA

Company Profile

- Establishment：April, 2011
- C.E.O.：Mr. Fred Chuang
- Capital：USD3,500,000
- Employee：30 persons
- Main Product：

  LED Lighting Products, LED Modules

  UV LED and Modules

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FLEDA Worldwide

China Branch

- Su Zhou GreatSun Electronics Technologies Co.,
- Room 802, Building North, Runjie Plaza,No.9, Dengwei Road, Gaoxin District, Suzhou City, Jiangsu Prov. 215011, China

Taiwan Headquarters

- FLEDA Technology Corporation
- 16F., No.866 Zhongzheng Rd., Zhonghe Dist., New Taipei City 23586, Taiwan

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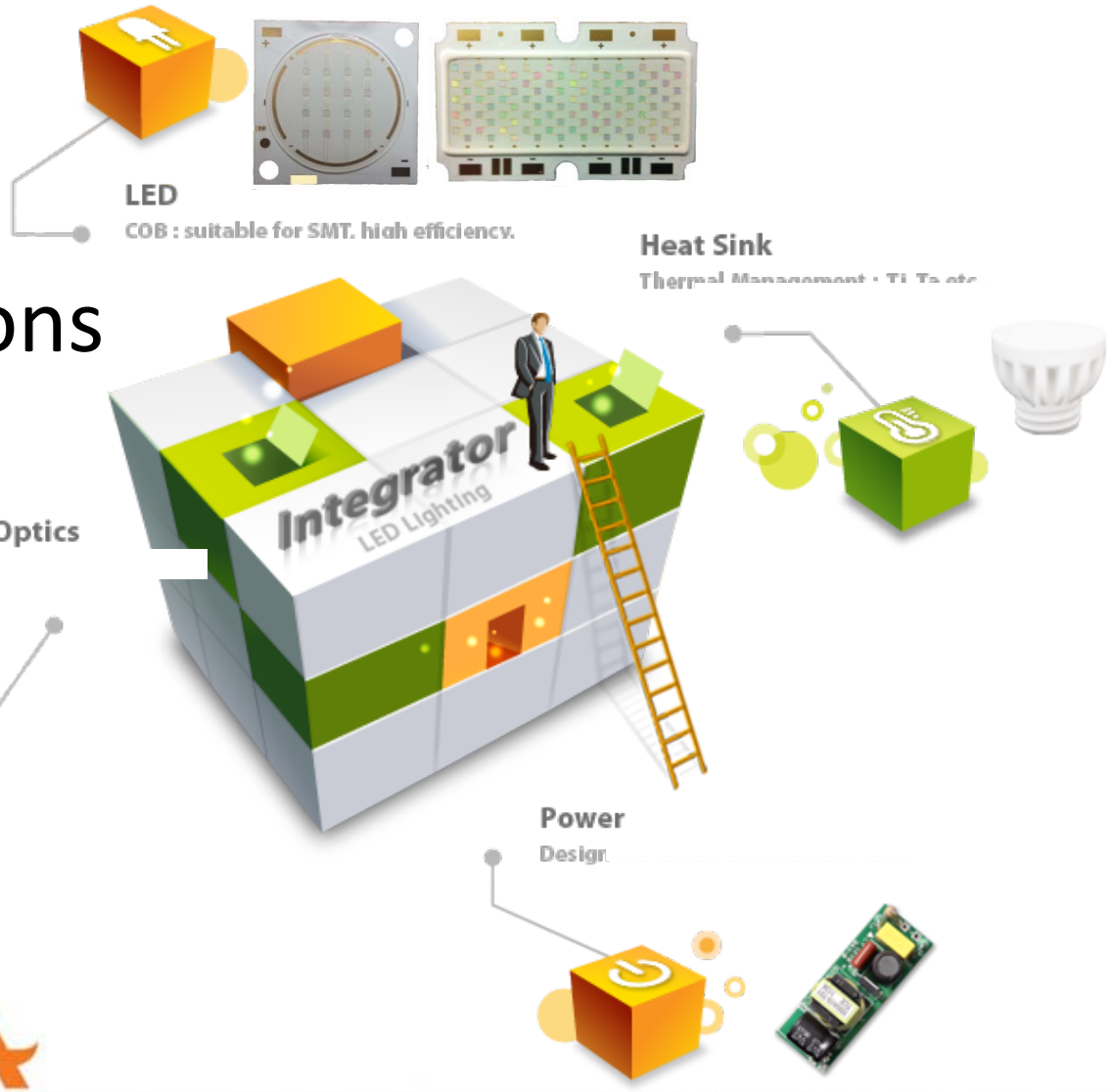
Technology

- Total Solutions



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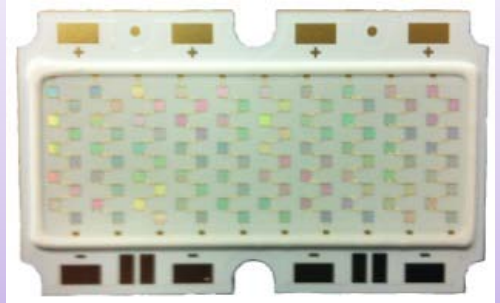
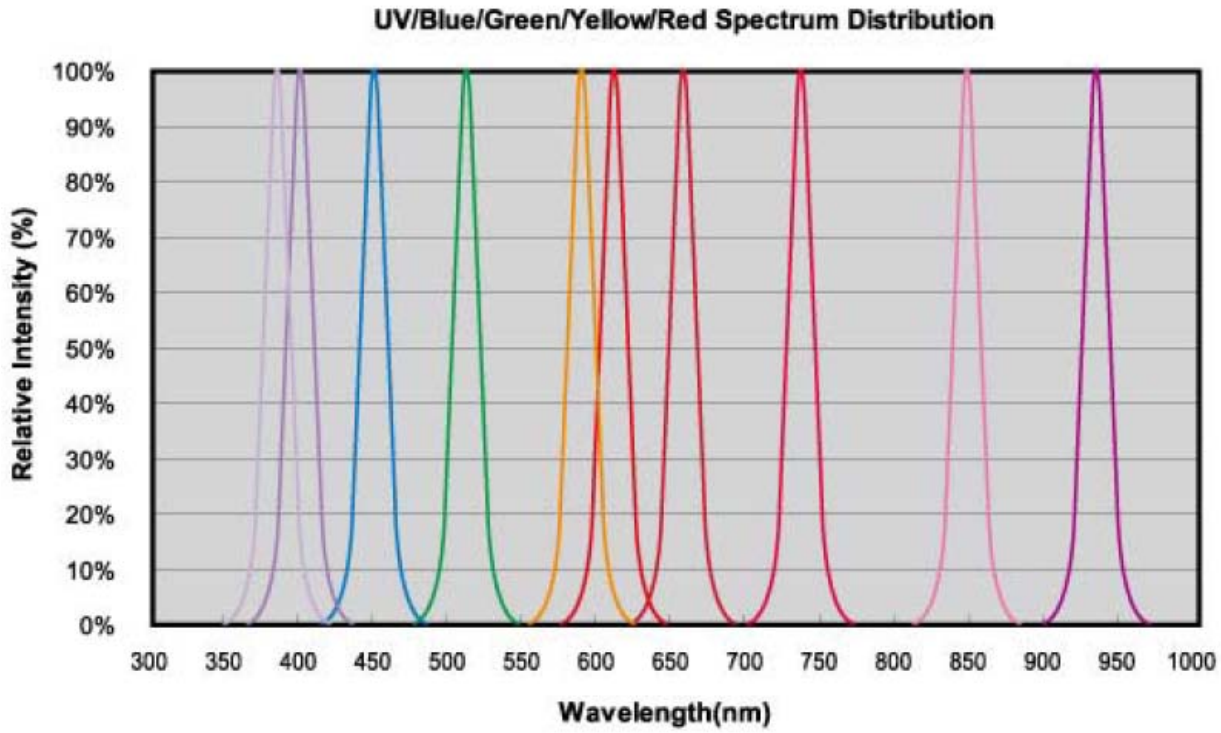
Core Technology

- High Wattage COB LED Package with Copper Base
- 365nm-940nm All Series Chip Supplier with Cooperation





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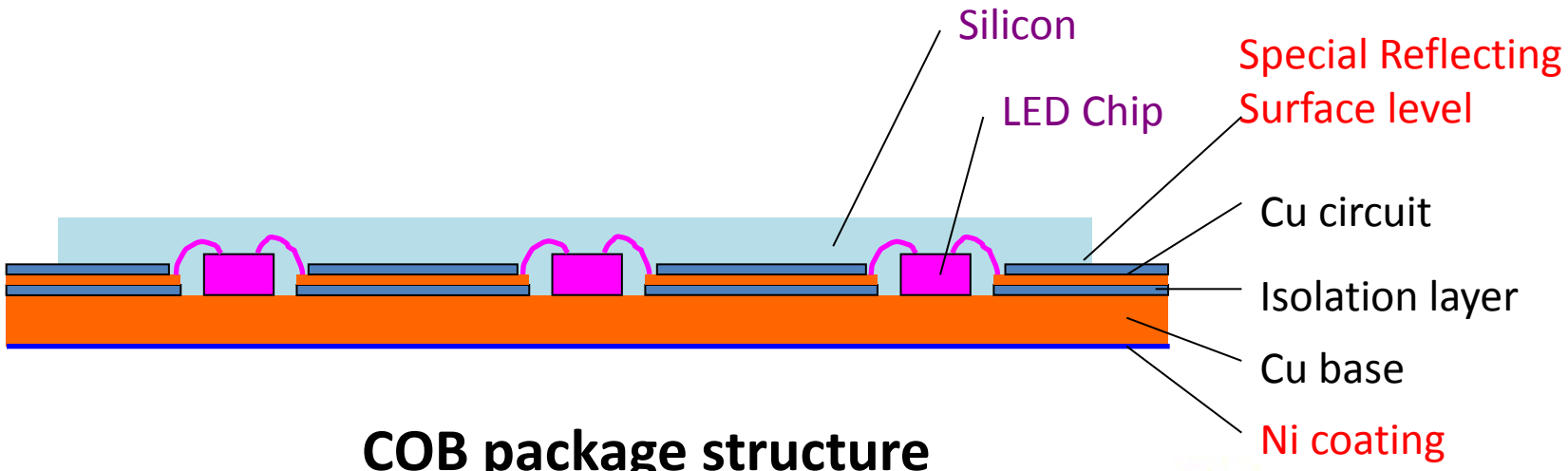
The Advantage of LED COB Package

- Cu substrate and LED Chip Direct Bonding on Cu Base:
  Low Thermal Resistance <0.16℃/W, and High thermal conductivity 401W/(m.K)
- Special Reflecting Surface: No Ag plating, Anti-Sulfide, and Low Light decay.
- Ni Coating at the Cu substrate bottom: Anti-Oxidized and SMT Compatible.



COB package structure

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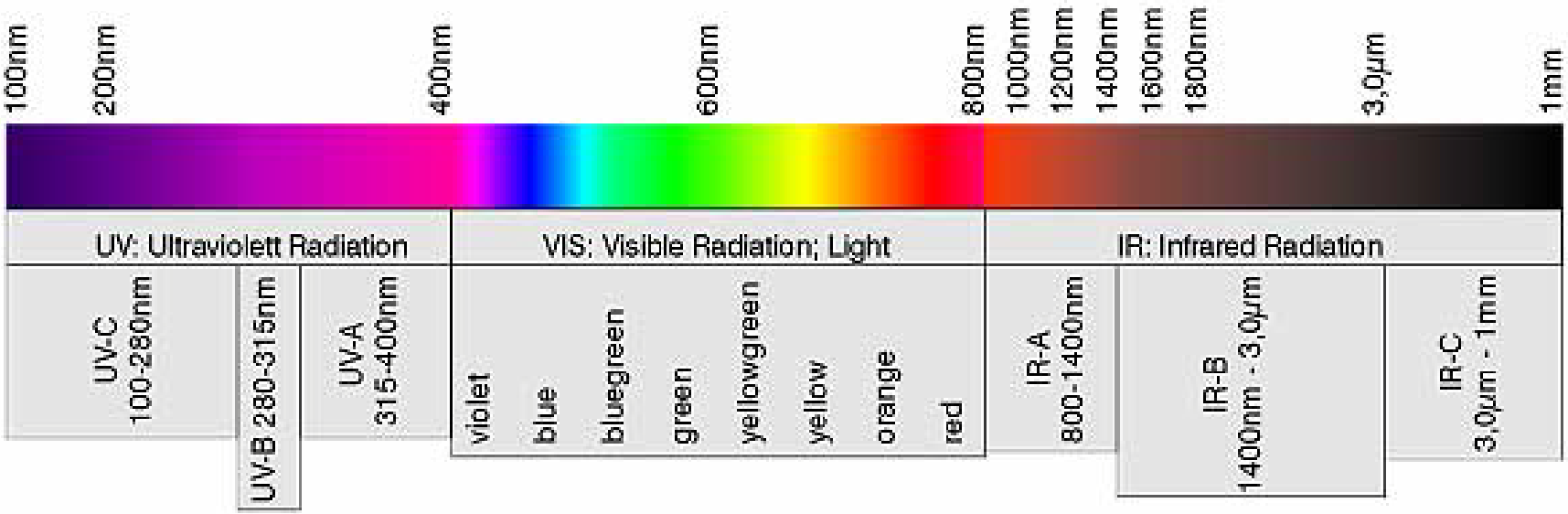
The spectrum of the Electromagnetic Waves

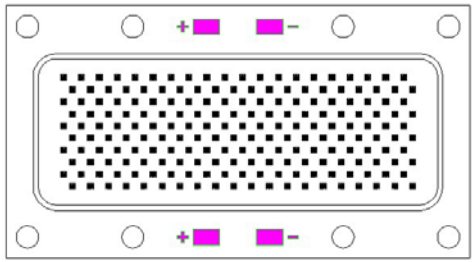


UltraViolet Type	UV-C	UV-B	UV-A	UV-G
Wavelength Range	100-280nm	280-310nm	310-400nm	400-450nm
UV LED	-	-	Good	Good
Tube	Good	Good	-	-

Table of distinctions(LAMP V.S. LED)

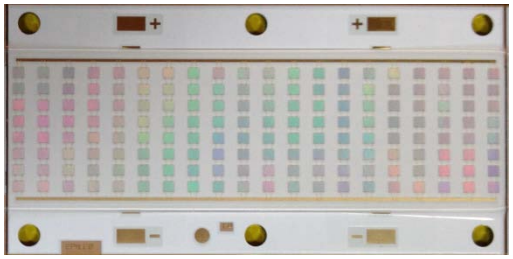
Basic parameters	UV-LAMP	UV LED
Life cycle, hours	600-1500	5000-10000
Warm-up period	Several minutes	Fractions of seconds
Ozone release	Available	Not available
Efficiency coefficient	<1%	~15%
Consumption of electrical power	High	Low
Weight of device	Heavy	Light
Heat release	Up to 99% of input power	Minimum
Price of device	Medium price	high

UV LED Package Products Road Map

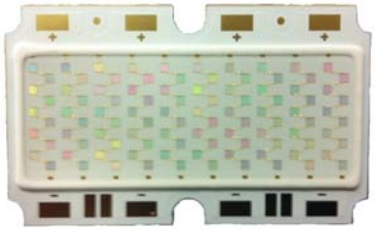


88mmx48mm
200W
Under developing

200W

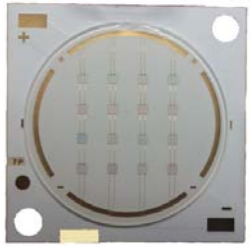


28mmx56mm
160W



46mmx28mm
100W

100W



28mmx28mm
16W

19mmx19mm
18W
Available in June

10W

K1 Emitter
1-4W

1~3W

13.5mmx13.5mm
12W
Available in June

0.1-0.5W

3020
0.06W

5630
0.5W

2012

2013

2014

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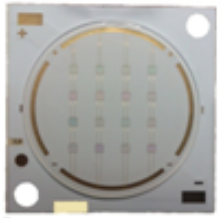
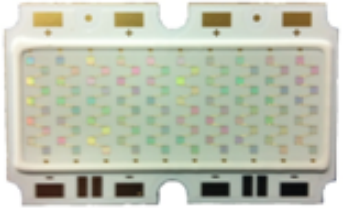
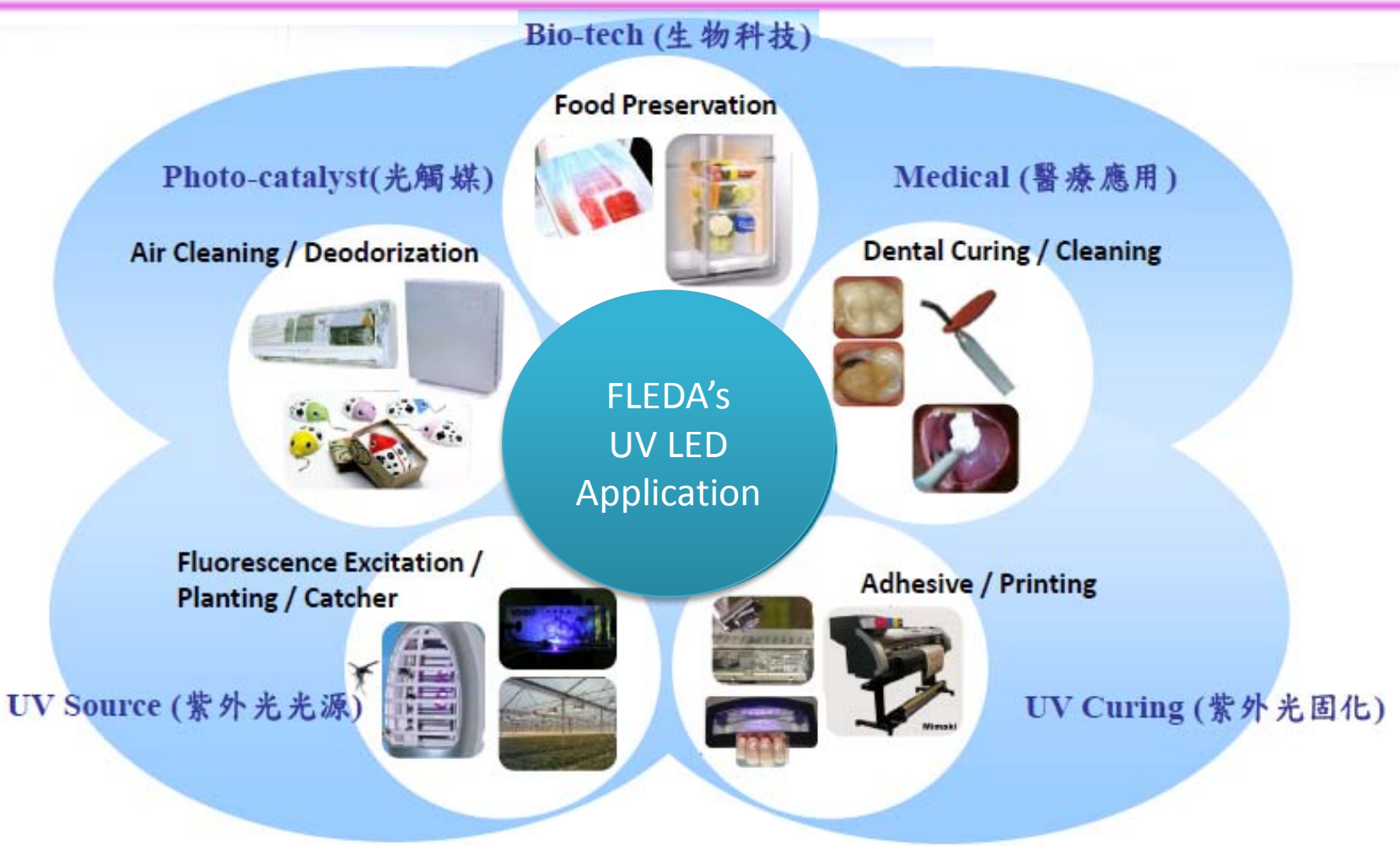
UV LED Wavelength

Package Type	Picture	Power (W)	Wavelength(nm)			
			365-370	370-380	380-390	390-430
3020		0.1W				
5630		0.2W				
		0.5W				
K1 Emitter		1-3W	130mW	220mW	320mW	450mW
COB 2828		16-32W				
COB 4628		100W				

UV LED Application



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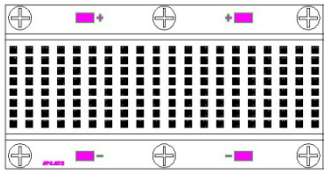
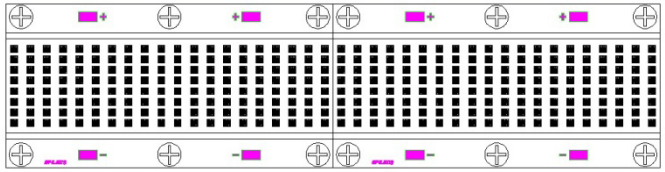
FLEDA's UV LED Application

2856 Type – 160W

Circuit: 8s20p

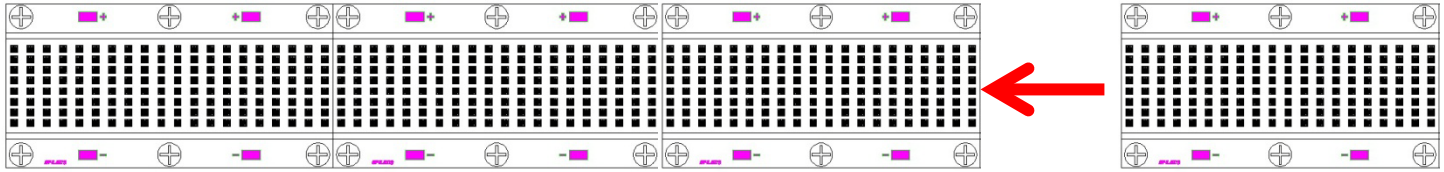
365-410nm Available





For

1. Liquid Cooling
2. Linear Light Source



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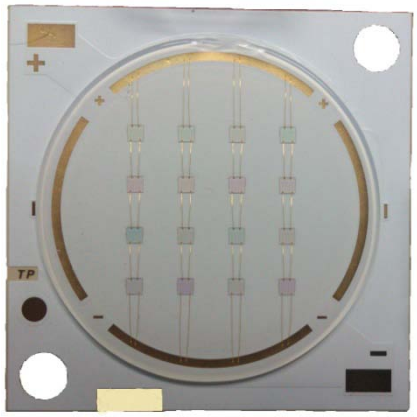
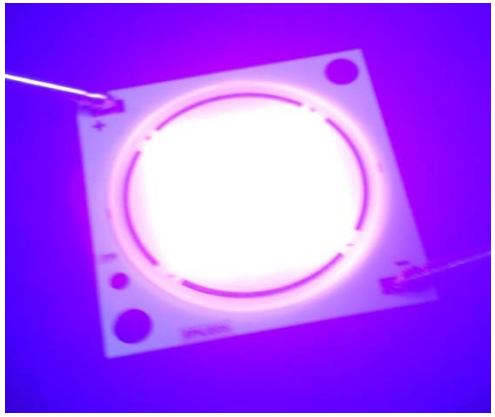
FLEDA's UV LED Application

2828 Type – 16W

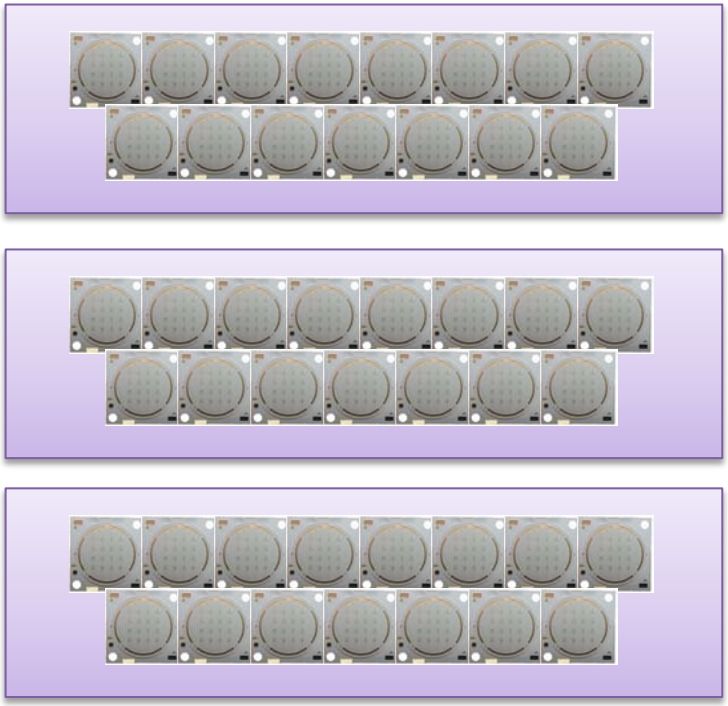
Circuit: 4s4p

365-410nm Available





Object Move Direction



2828 UV LED Linear Modules

Increase UV LED modules to enhance the UV light.

For

1. **Air Cooling**
2. **Linear Light Source**
3. **Spot Light Source**

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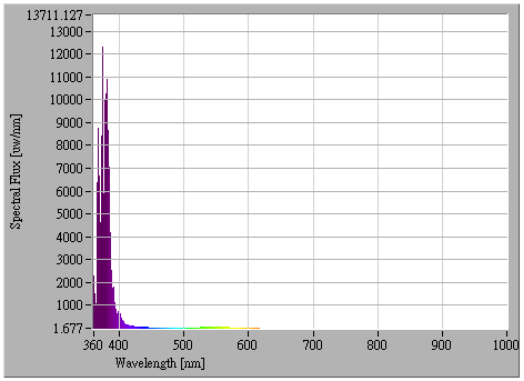
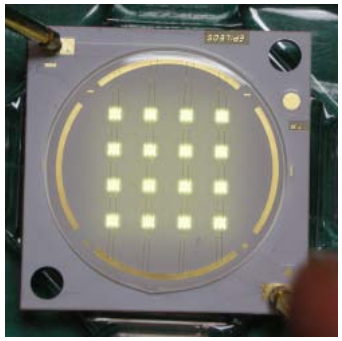
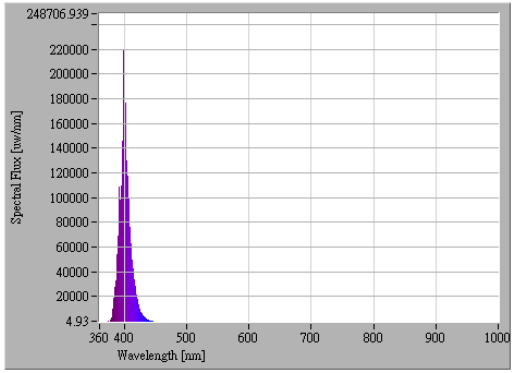
The Spectrum of UV LED 2828

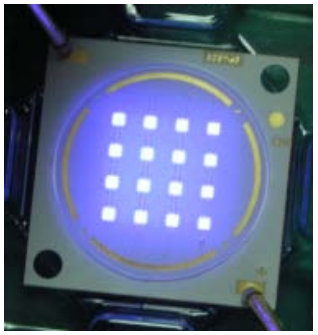
365-370nm



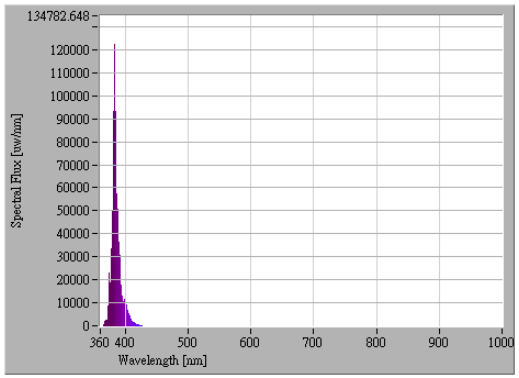


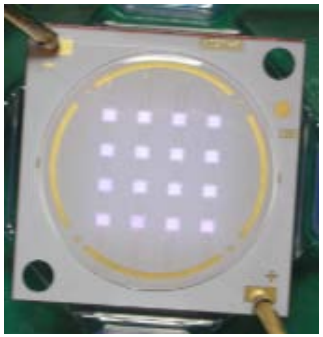
400-410nm



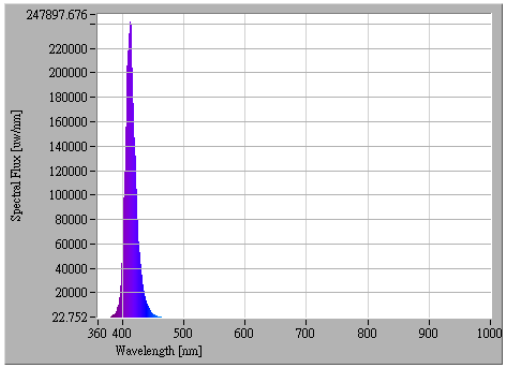


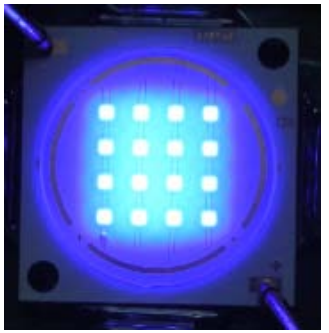
380-390nm





410-420nm





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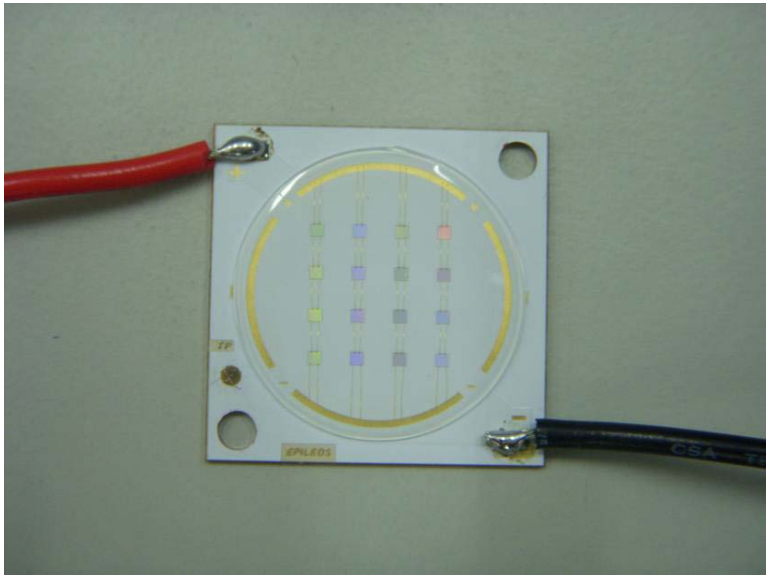
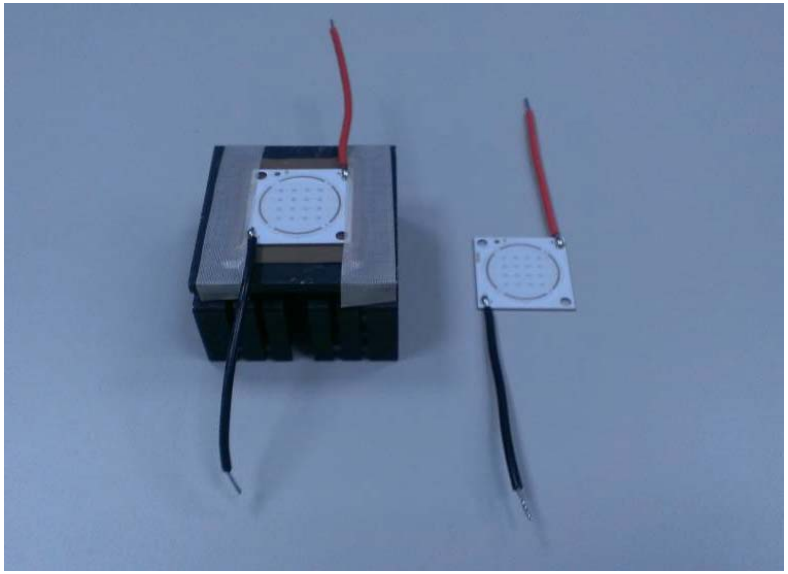
The Measured Data of UV LED 2828

UV 波長	365-370nm	380-385nm	400-405nm	410-415nm
光通量[Lumen]	7.98282	7.64283	16.4349	32.2247
輻射通量[W]	0.248328	1.35343	3.6577	5.14536
主波長[nm]	485.485	459.763	440.181	433.485
峰波長[nm]	369	383.535	400.332	414.703
半波寬[nm]	18.8547	5.87509	8.17294	17.0481
量子效率[%]	5.68451	30.5261	85.6286	124.337
電壓[V]	13.7572	13.6346	13.1496	12.8721
電流[A]	1.40051	1.4006	1.40058	1.40058
消耗功率[W]	19.2671	19.0967	18.4172	18.0285
發光效率[Lumen/Watt]	0.414324	0.400218	0.89237	1.78744
輻射效率[Watt(O)/Watt(E)]	0.0128887	0.0708723	0.198602	0.285402

飛瑞達 4s4p UV COB LED 燈板
溫度與幅射照度分析（紅外線熱像儀 與 UV幅射照度計）





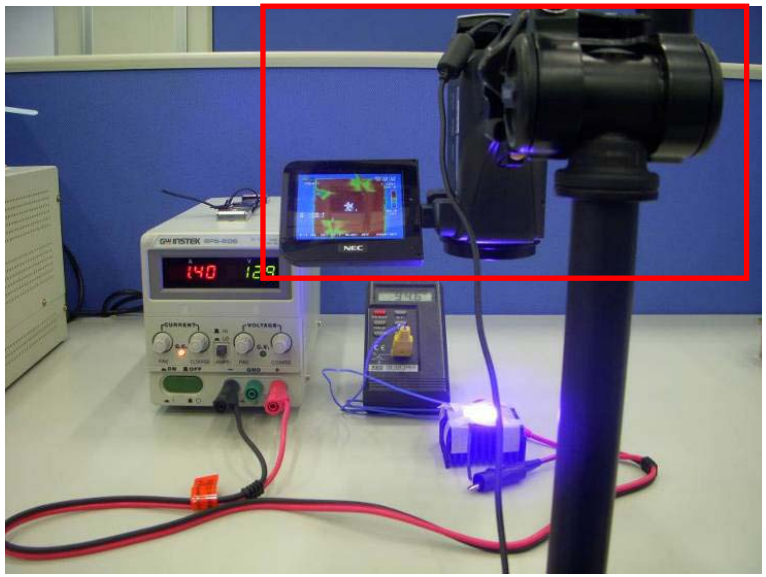
- 量測儀器與手法

- 20min 1400mA 點亮熱平衡 溫度與點亮時間曲線

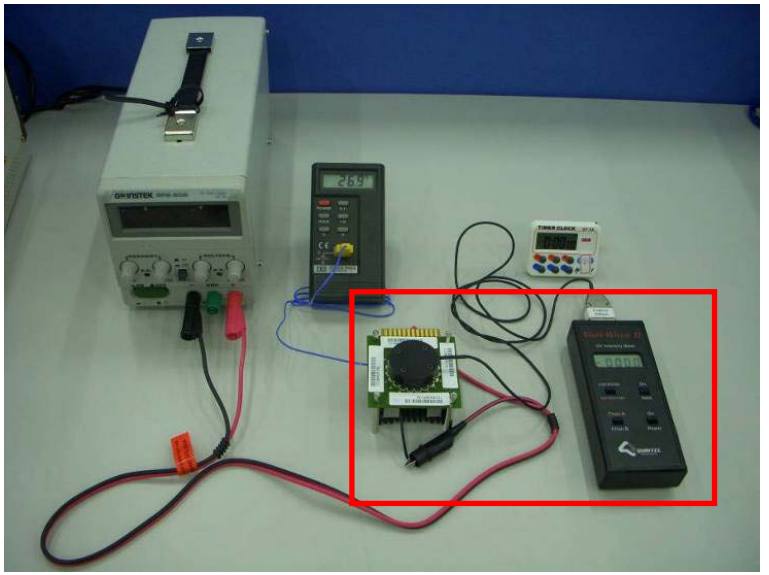
- 20min 1400mA 點亮熱平衡 幅射照度與點亮時間曲線

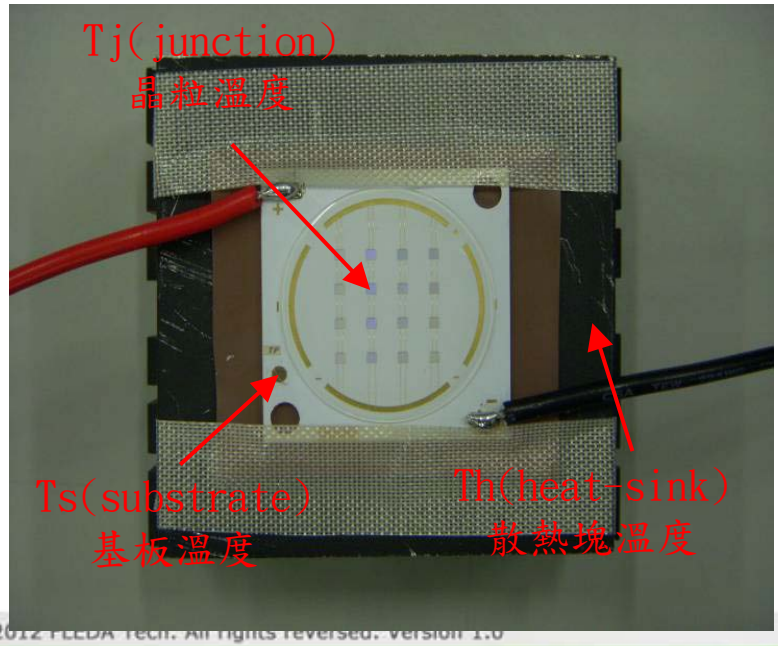
量測儀器與手法

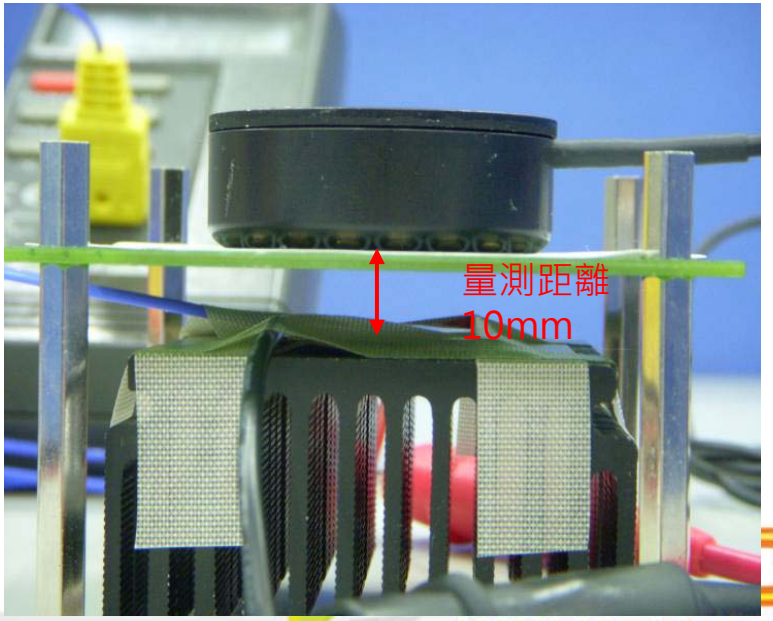
溫度- 紅外線熱影像儀



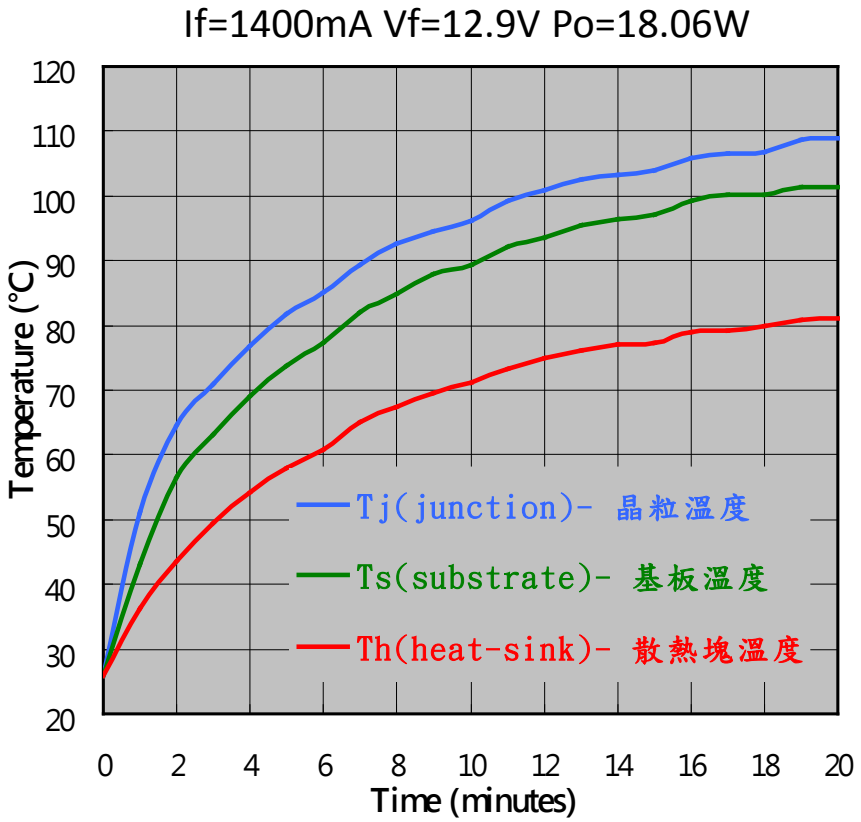
照度-UV輻射照度計（量測距離10mm）

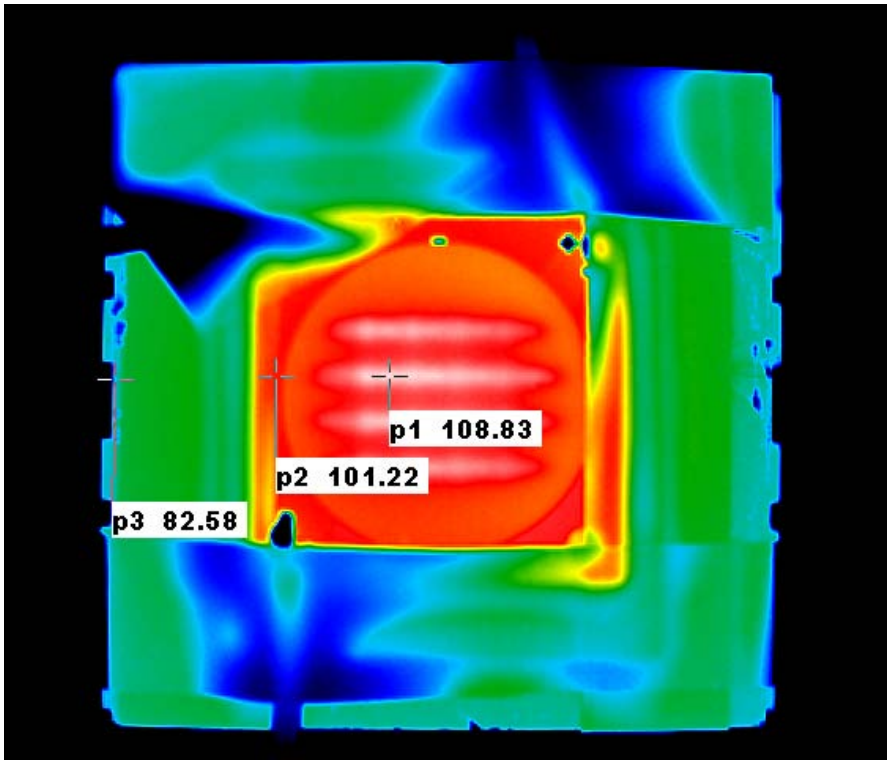






20min 1400mA點亮熱平衡 溫度與點亮時間曲線

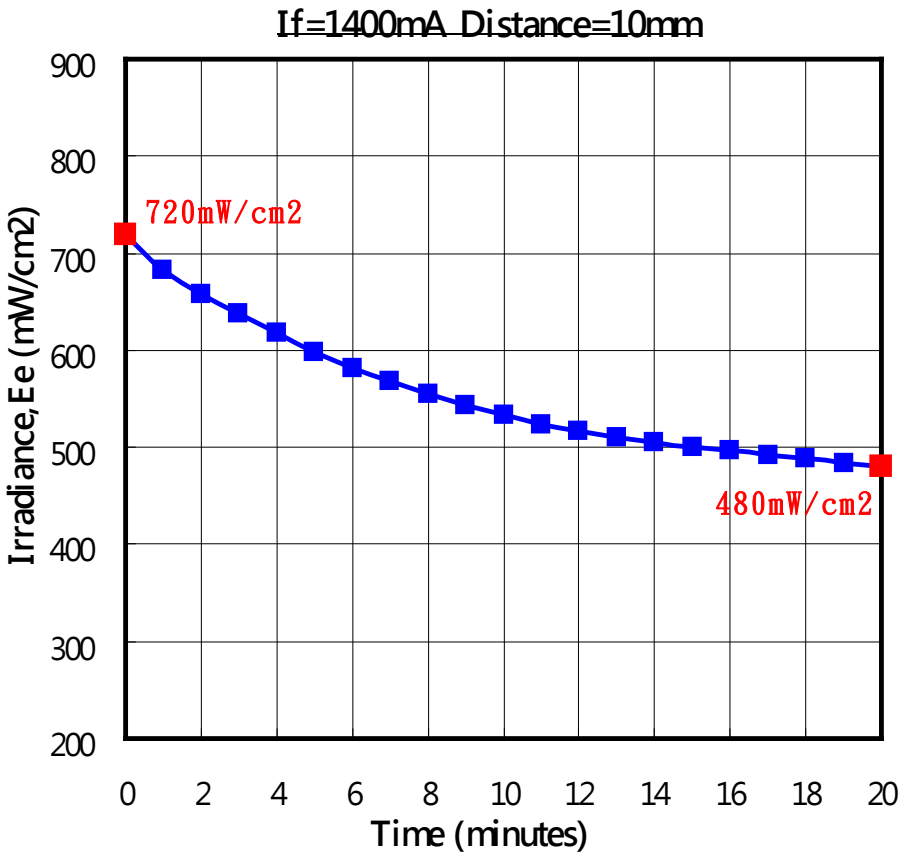


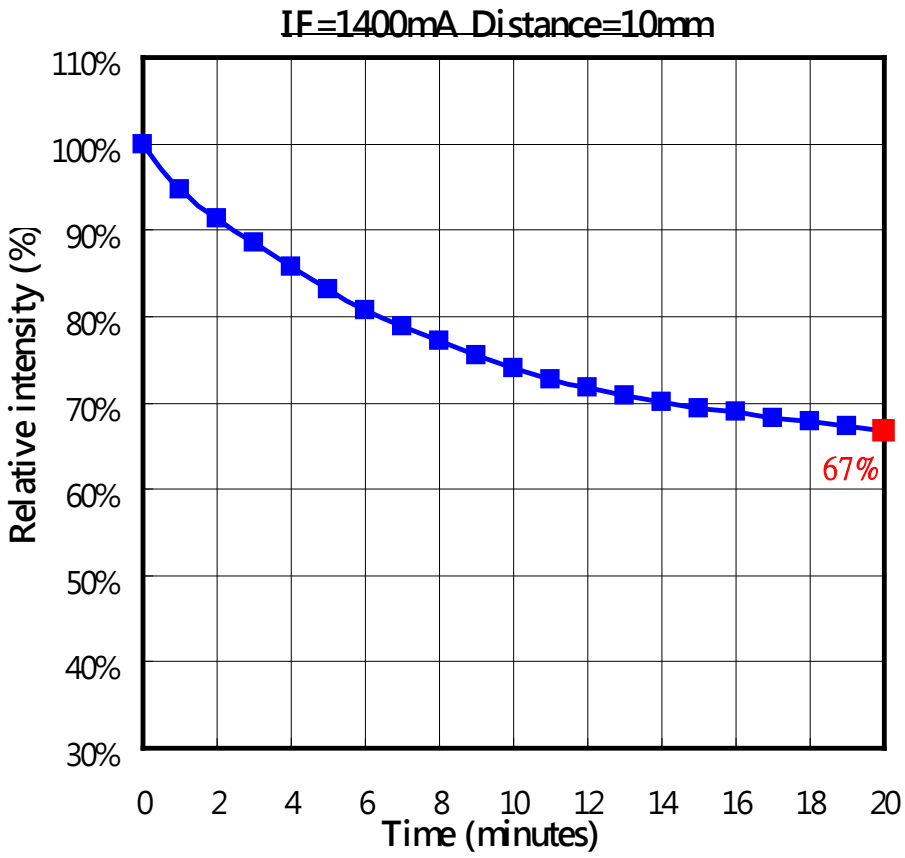


小結 ：

以廠內 50x50x30mm散熱塊，在1.4A/12.9V/18.06W 操作條件下，於 20min 點亮熱平衡時， Tj（junction）晶粒溫度 108.83℃，Ts（substrate）基板溫度 101.22℃

20min 1400mA點亮熱平衡 幅射照度與點亮時間曲線





小結 ：

在1.4A/12.9V/18.06W 操作條件下，當量測距離為10mm，於 20min 點亮熱平衡時幅射照度 Ee 由 720mW/cm2 下降至 480mW/cm2 ，降低 33%

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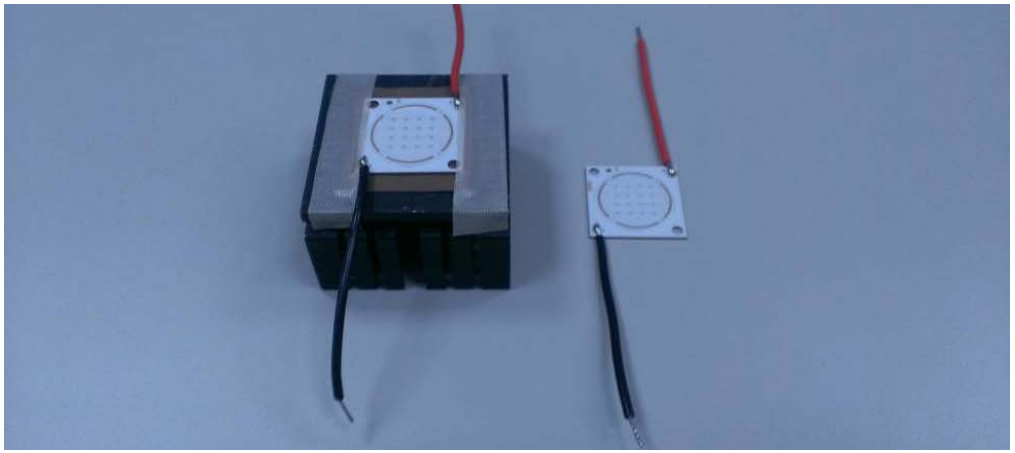
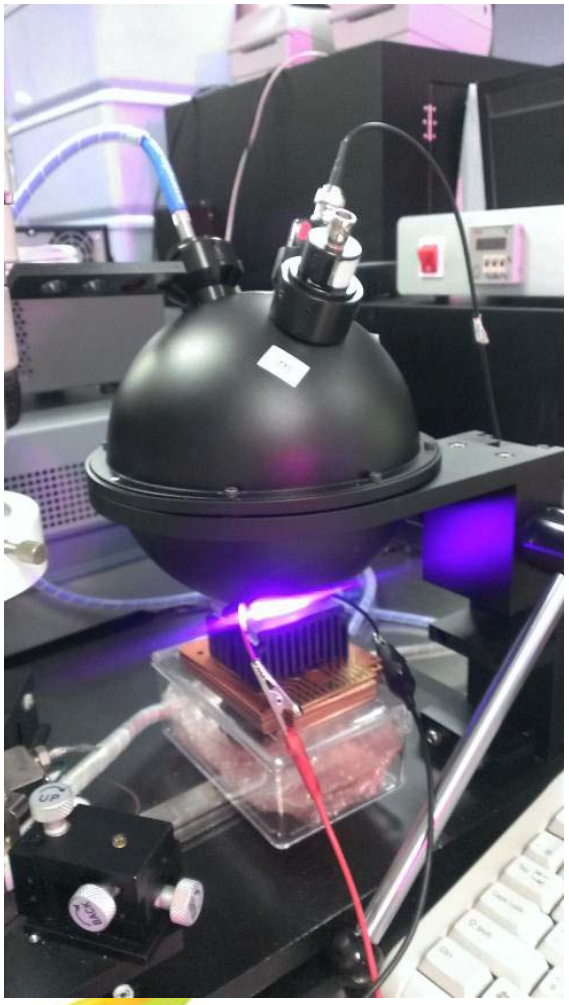
飛瑞達 4s4p UV COB LED 燈板
光電特性曲線分析（宏綱積分球量測）





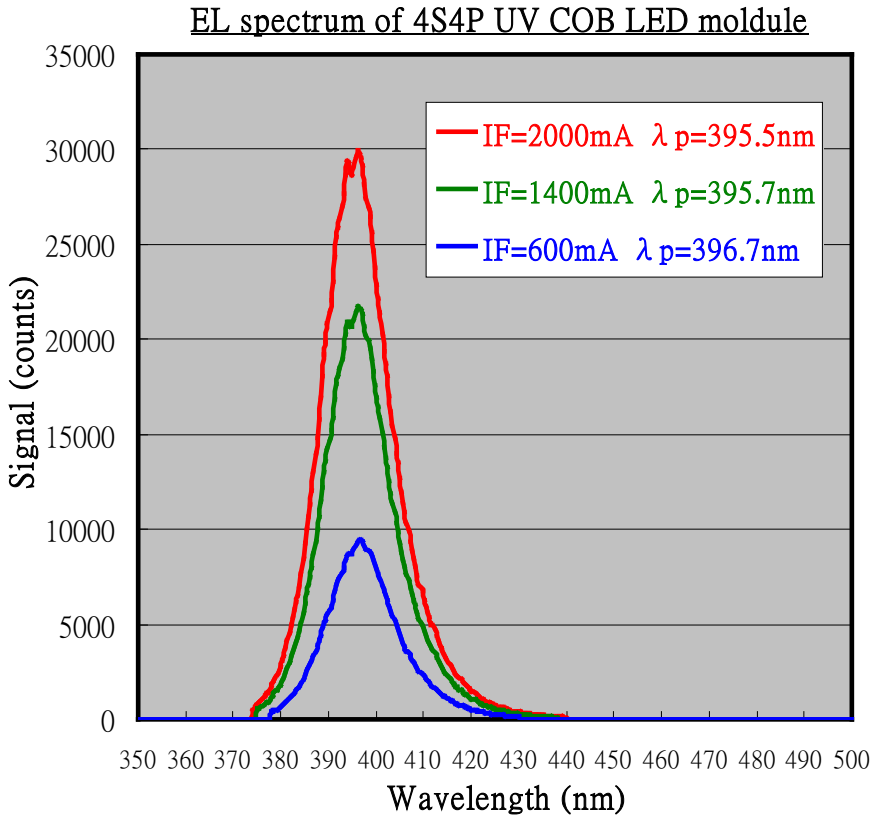
- 三種電流下（ 600/1400/2000mA）之光電特性
- 三種電流下（ 600/1400/2000mA）之發光光譜
- 電流特性曲線（ L-I / V-I / λp-I Curve）
- 溫度特性曲線（ L-Ts / V-Ts / λp-Ts Curve）
- 30min 1400mA 點亮熱平衡 光電特性變化曲線

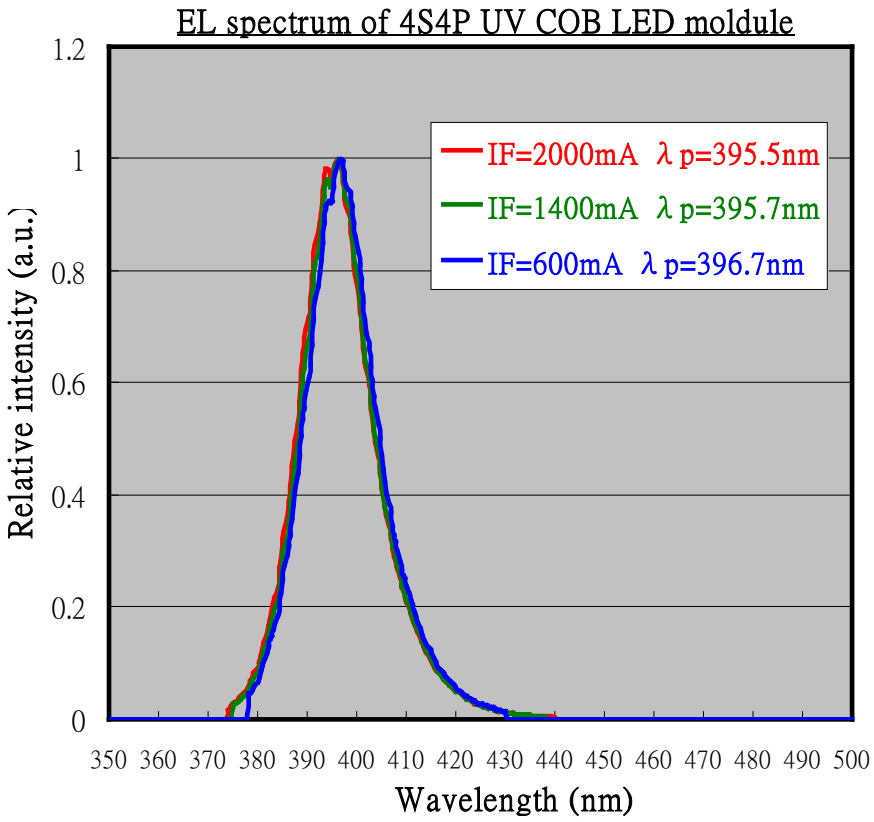
三種電流下（ 600/1400/2000mA）之光電特性

If(mA)	Vfin(V) @10uA	Vf(V) @If	Φe(mW) @If	λd(nm) @If	λp(nm) @If	Δλ(nm) @If
600	10.2	12.4	1448.6	413.1	396.7	15.8
1400	10.2	12.9	2305.2	415.6	395.6	15.9
2000	10.2	13.3	2644.4	416.8	395.4	16.2

* 光鋐廠內 宏綱積分球 量測數據

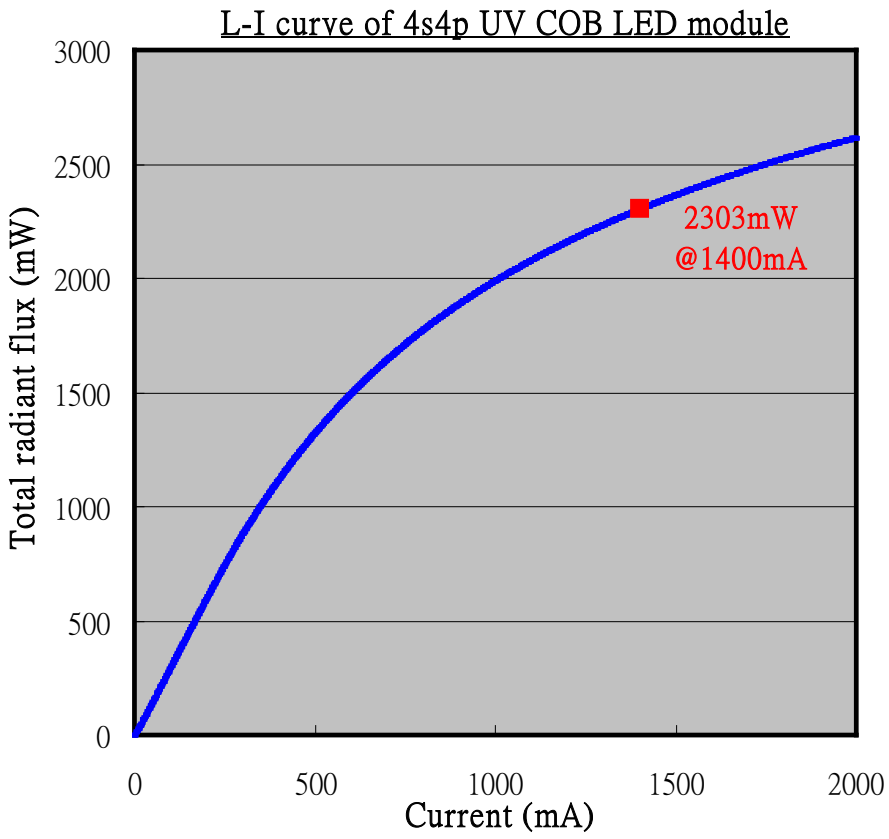
三種電流下（ 600/1400/2000mA）之發光光譜

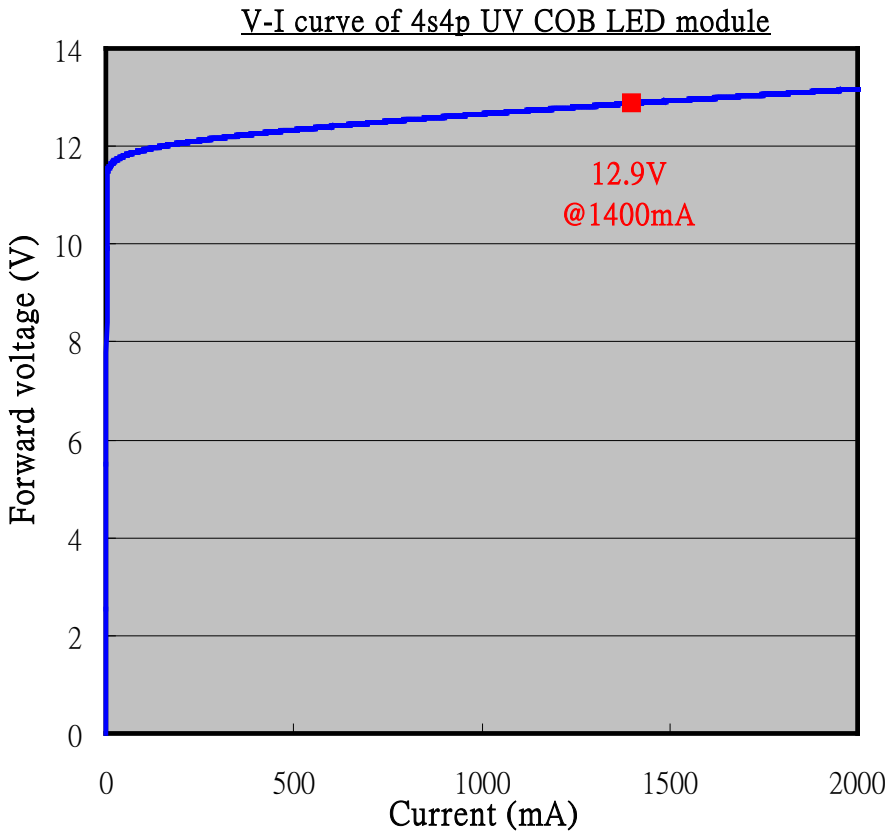




小結 ： IF 上升，λp 下降

電流特性曲線 (L-I / V-I Curve)





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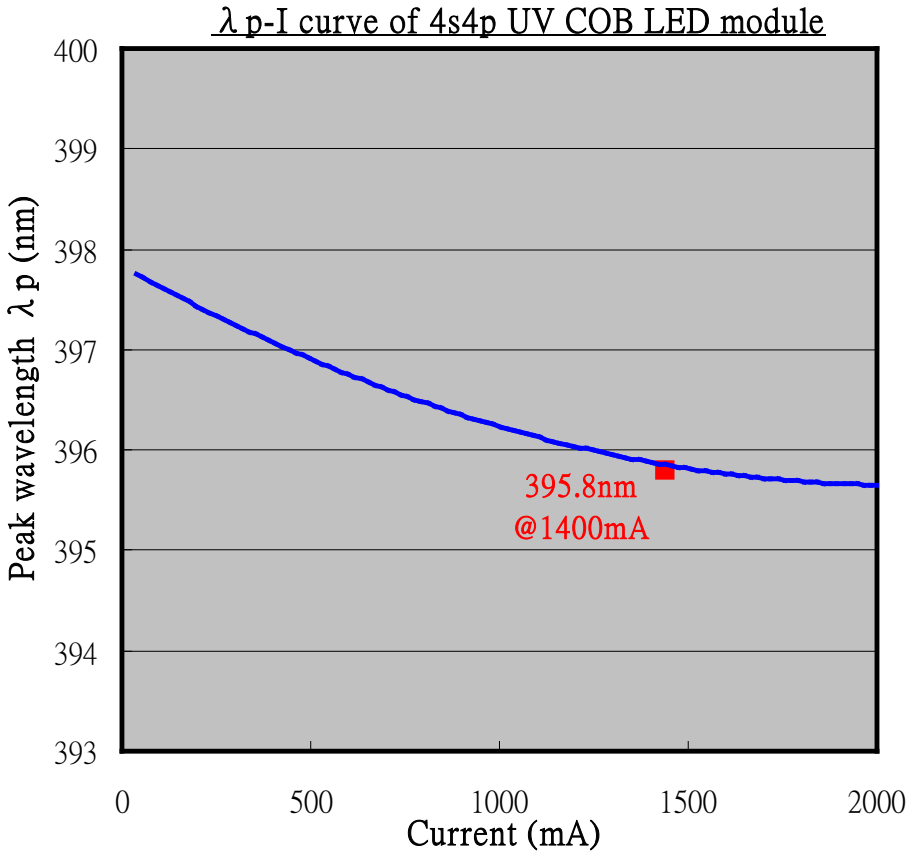
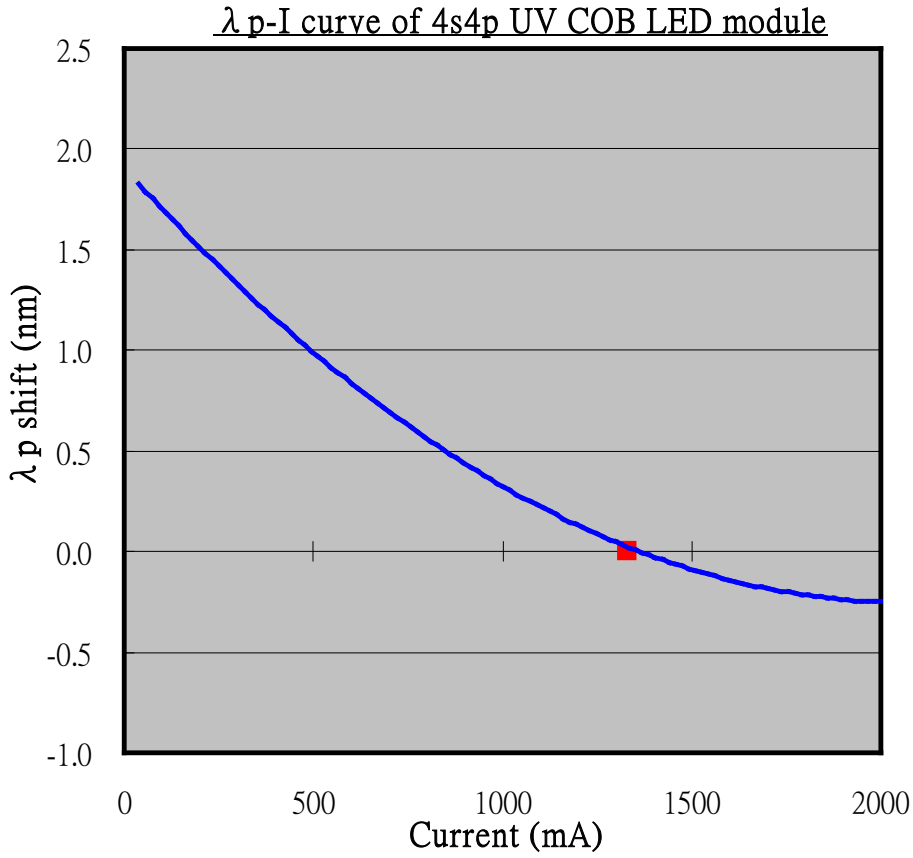
電流特性曲線（λp-I Curve）





小結 ： IF 上升，λp 下降

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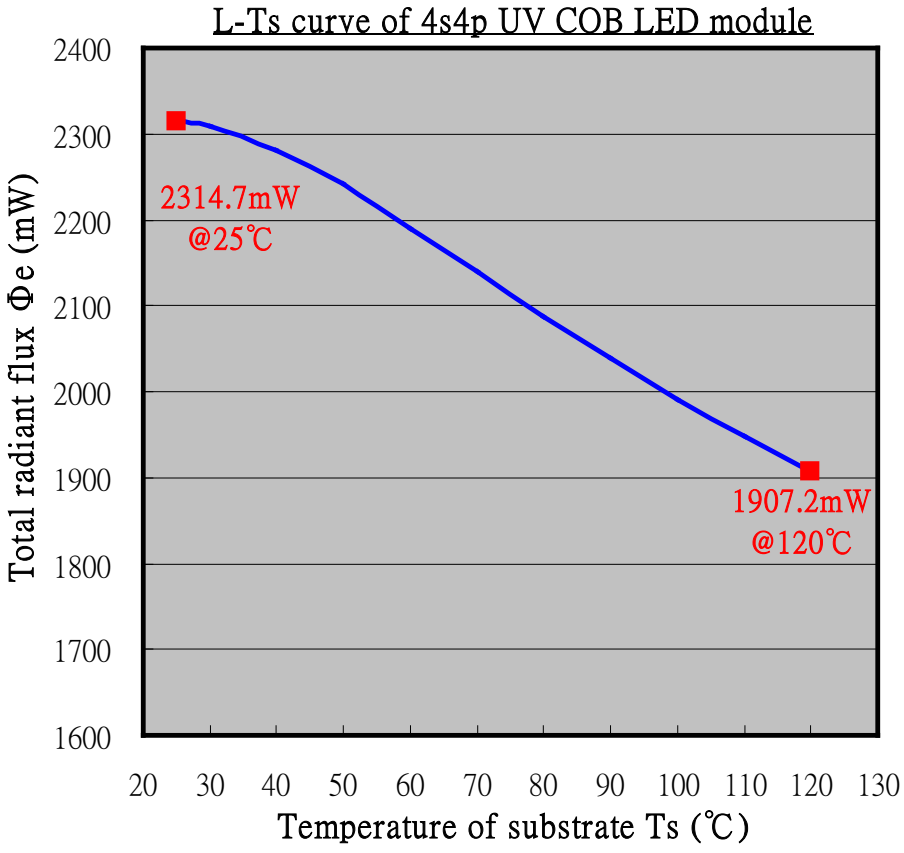
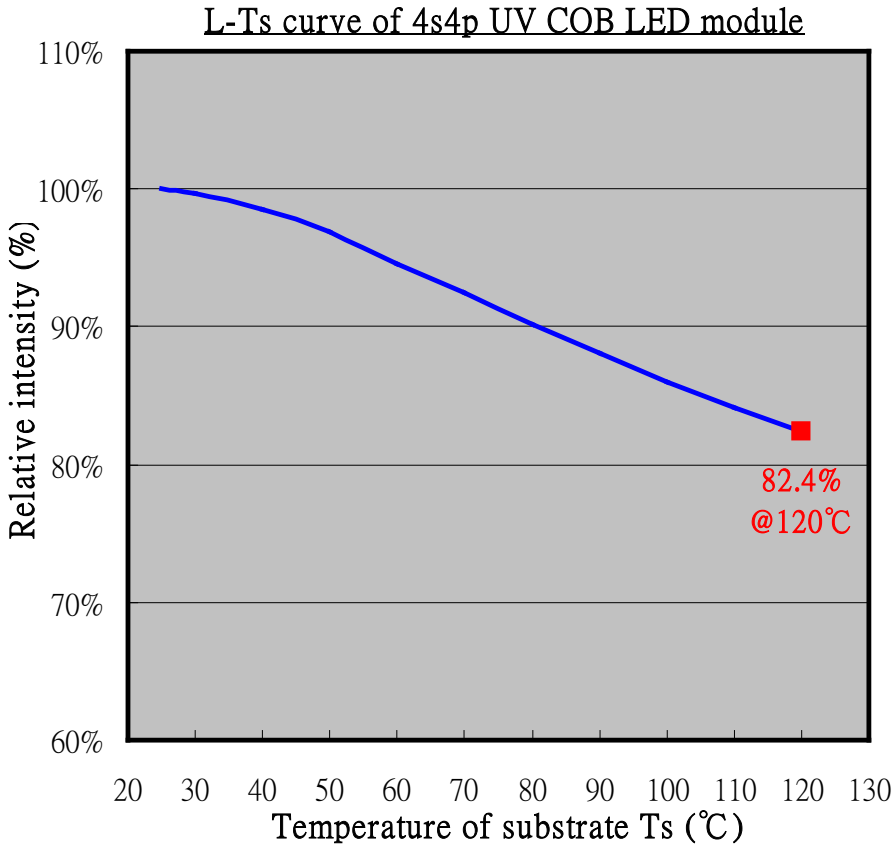
幅射通量Φe 溫度特性曲線（L-Ts Curve）





小結 ： 基板溫度 Ts 由 25℃ 上升至 120℃，幅射通量 Φe 降低 17.6%

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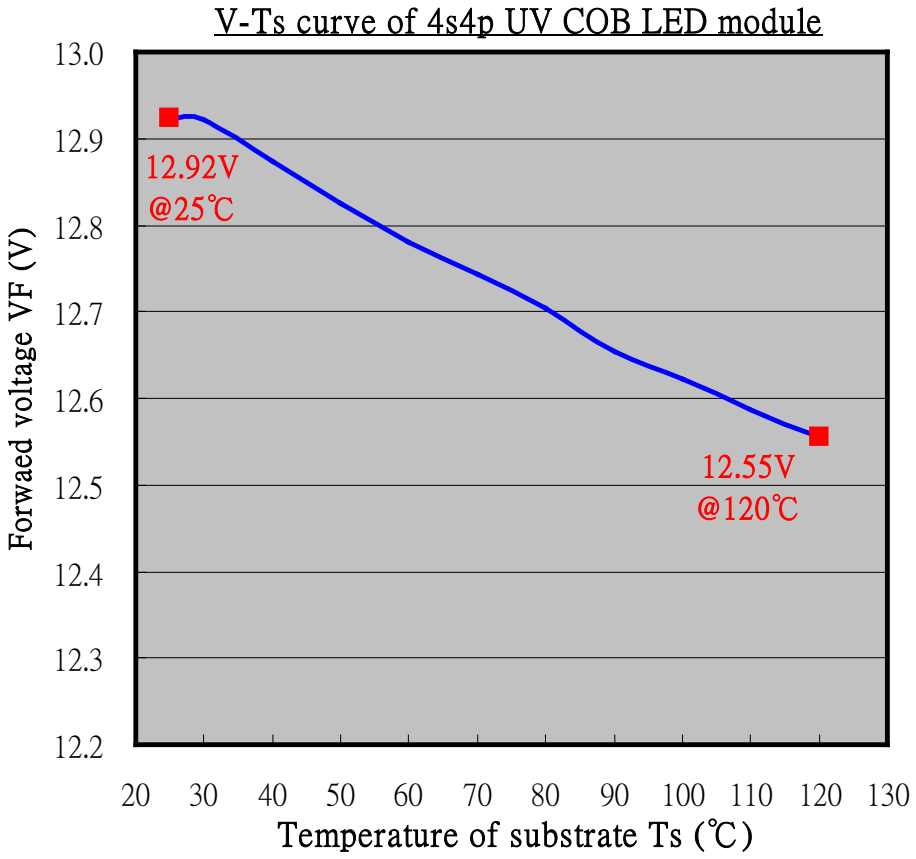
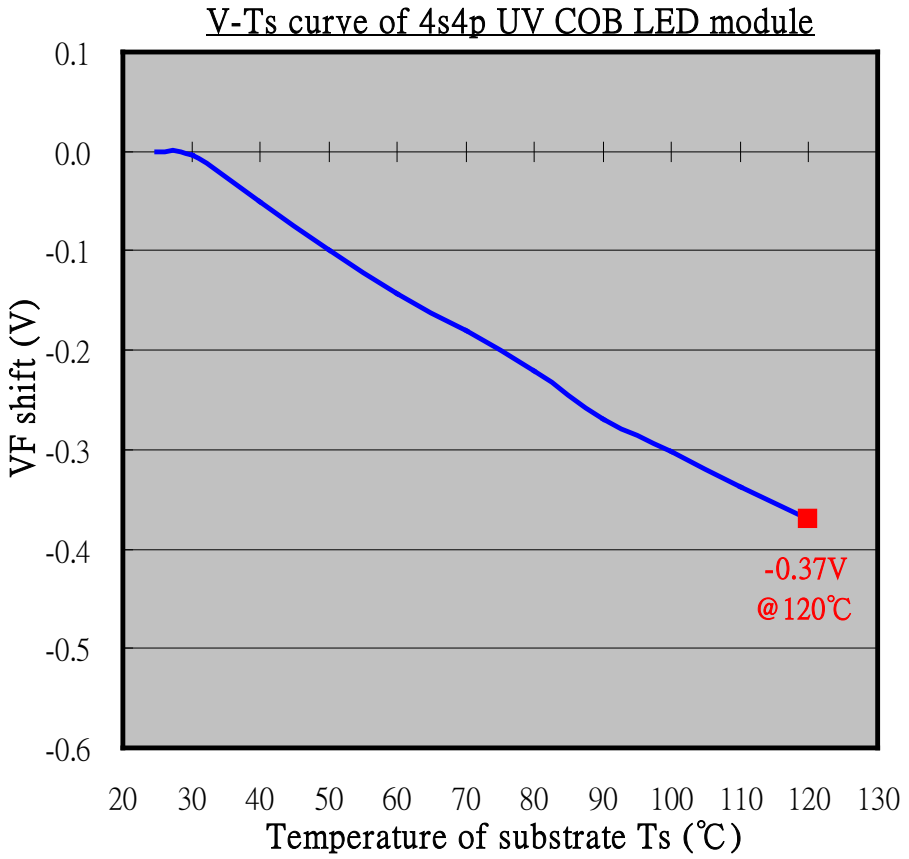
操作電壓VF 溫度特性曲線（V-Ts Curve）





小結 ： 基板溫度 Ts 由 25℃ 上升至 120℃，操作電壓 VF 降低 0.37V

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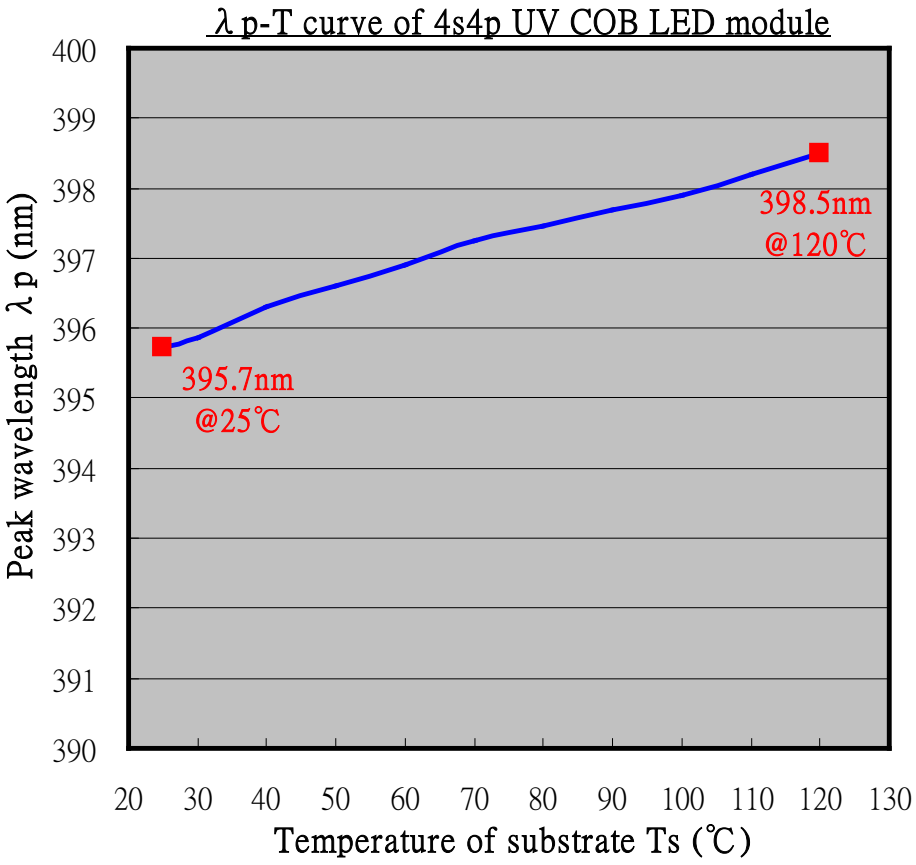
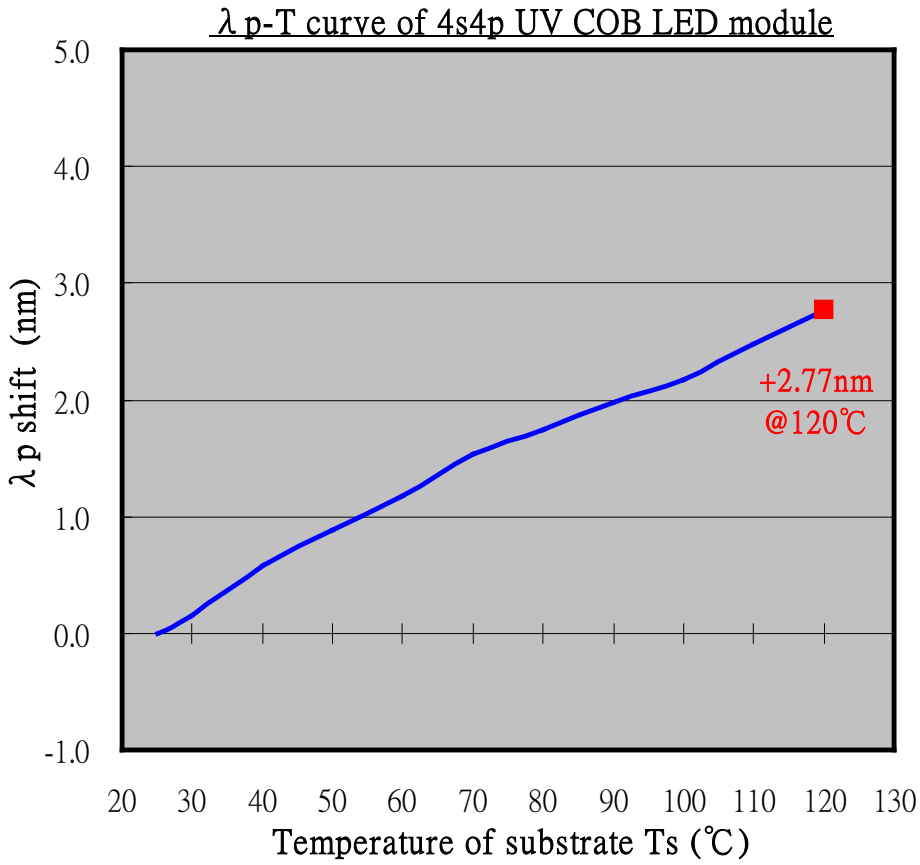
峰波長 λp 溫度特性曲線（λp-Ts Curve）





小結 ： 基板溫度 Ts 由 25℃ 上升至 120℃，峰波長 λp 上升 2.77nm

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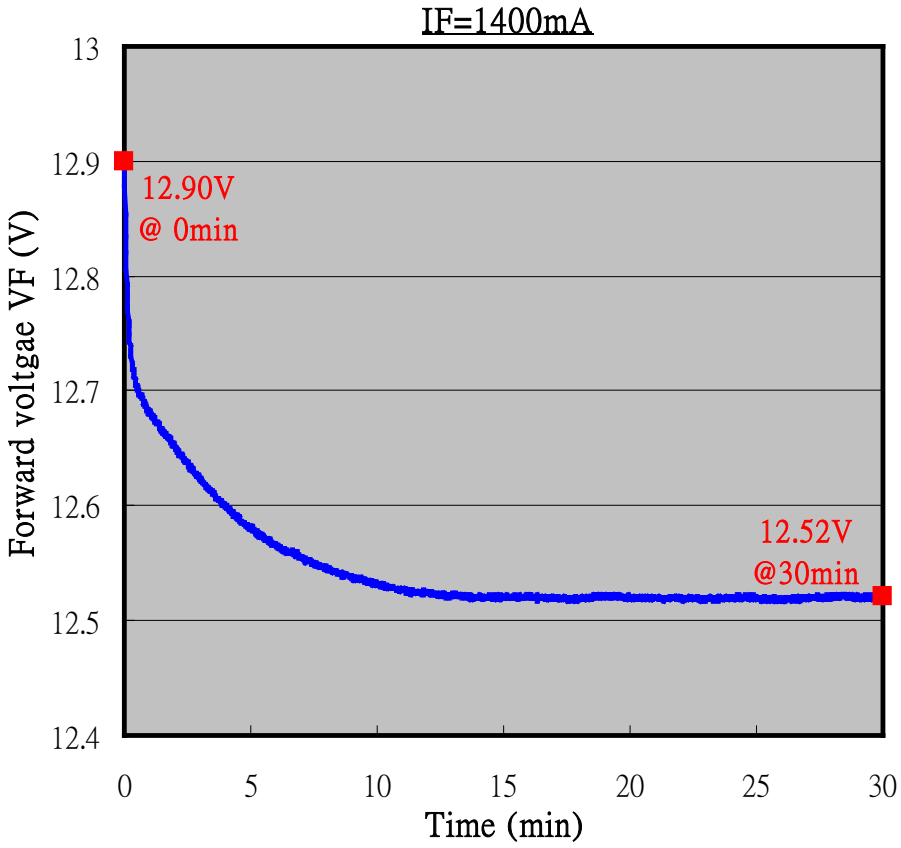
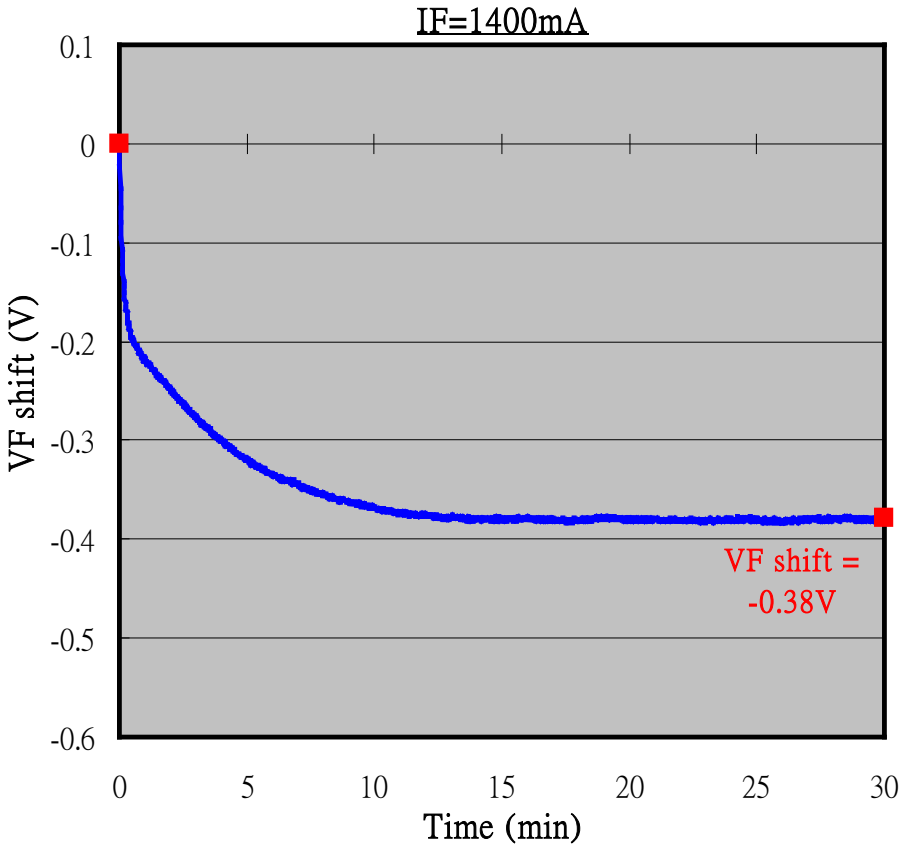
30min 1400mA 點亮熱平衡 操作電壓VF 變化曲線





小結 ：

30min 1400mA 點亮熱平衡下，順向電壓由 12.90V下降至 12.52V，下降 0.38V

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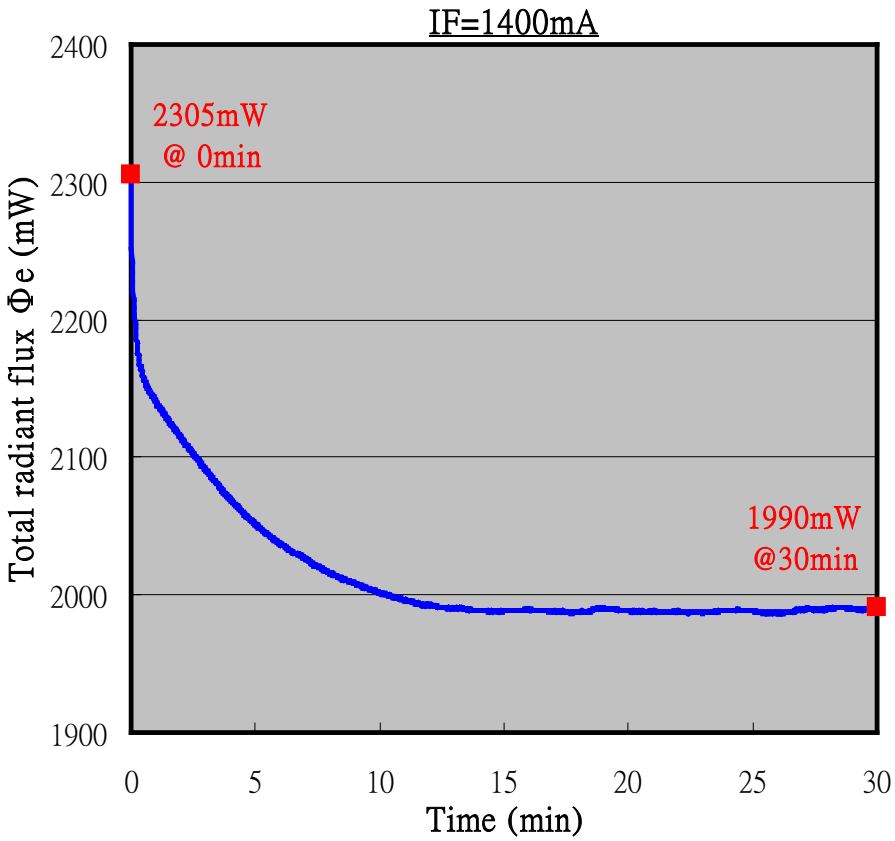
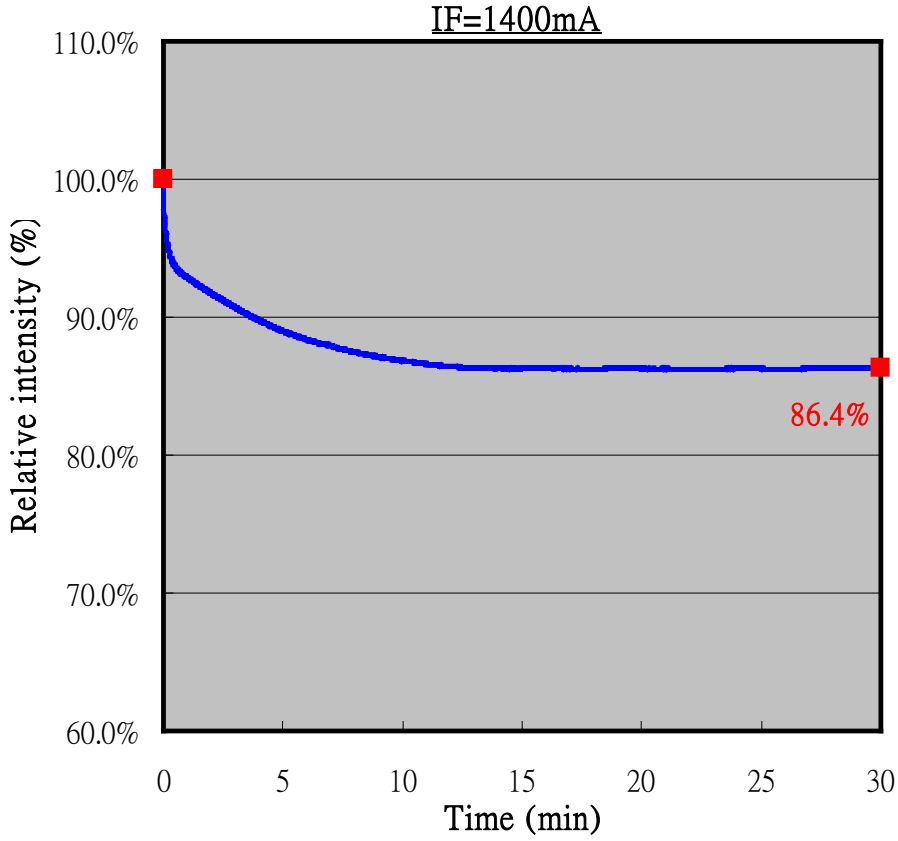
30min 1400mA 點亮熱平衡 幅射通量Φe 變化曲線



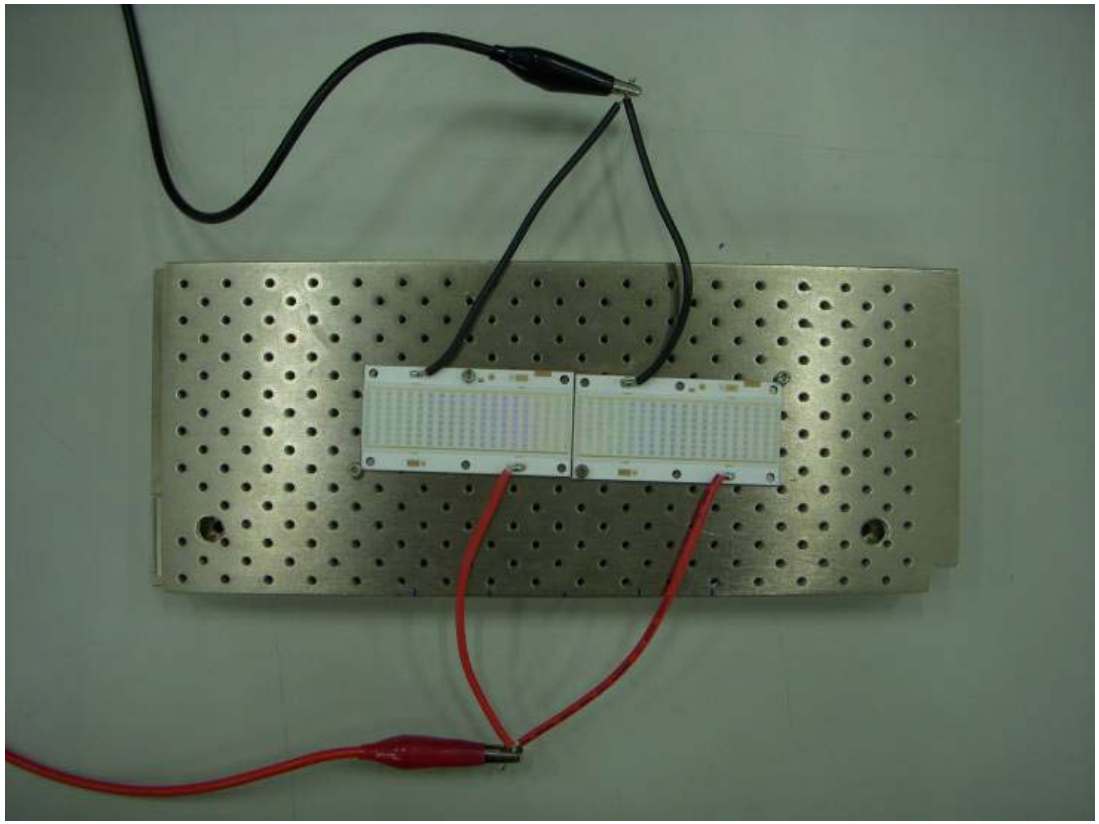


小結 ：

30min 1400mA 點亮熱平衡下，幅射通量由 2305mW 下降至 1990mW，下降 13.6%

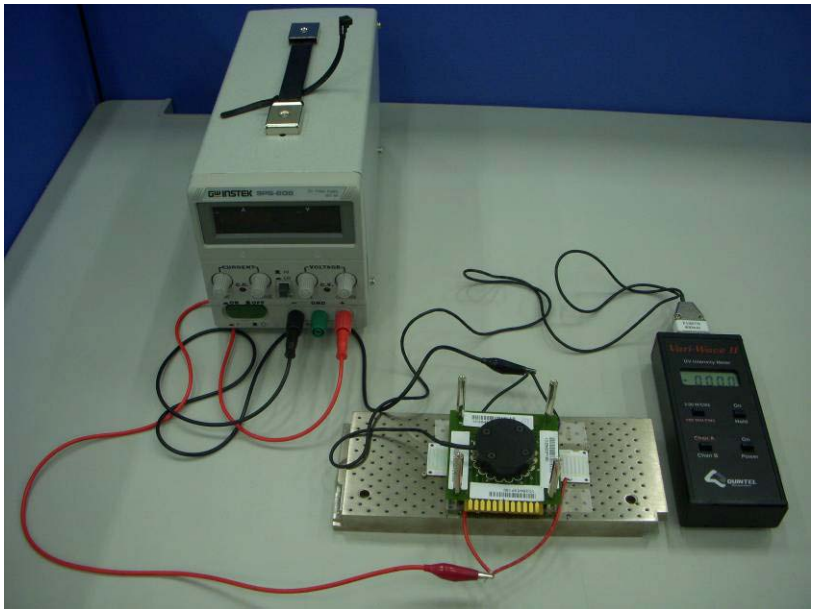
飛瑞達2856 UV COB模組

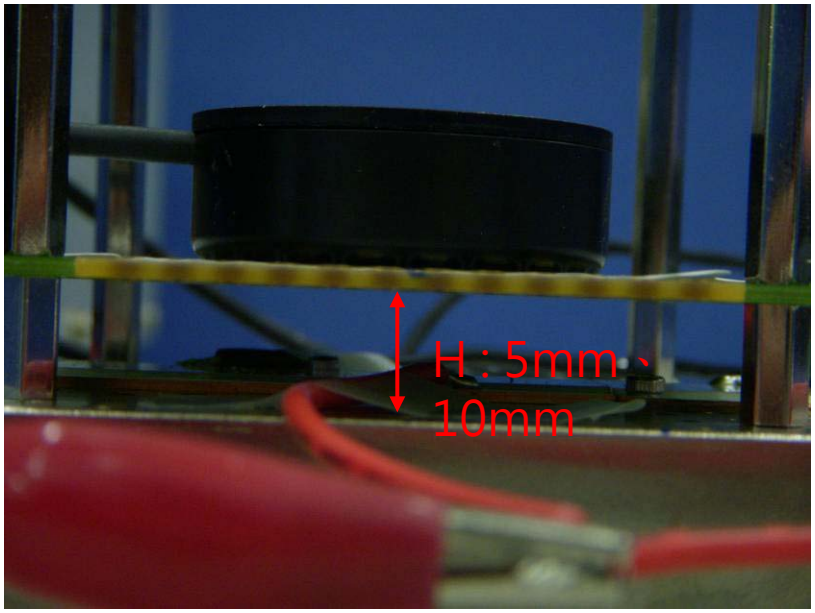
輻射照度量測



UV 輻射照度計

量測距離 (5mm、10mm)

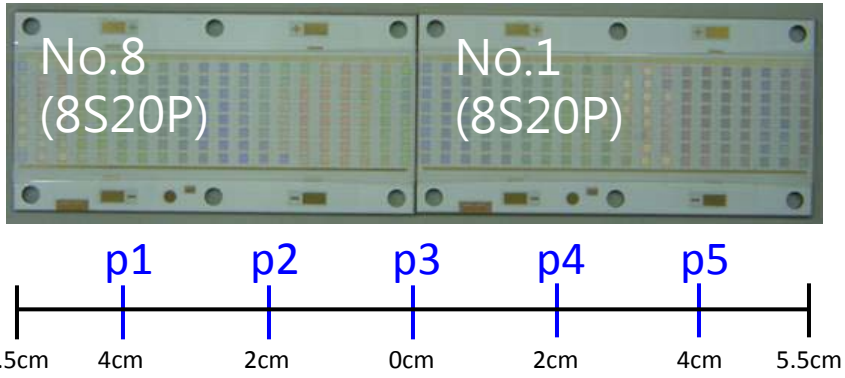




量測條件 : 輸入電流4A 、瞬間量測

輻射照度量測數據

不同位置下量測之示意圖



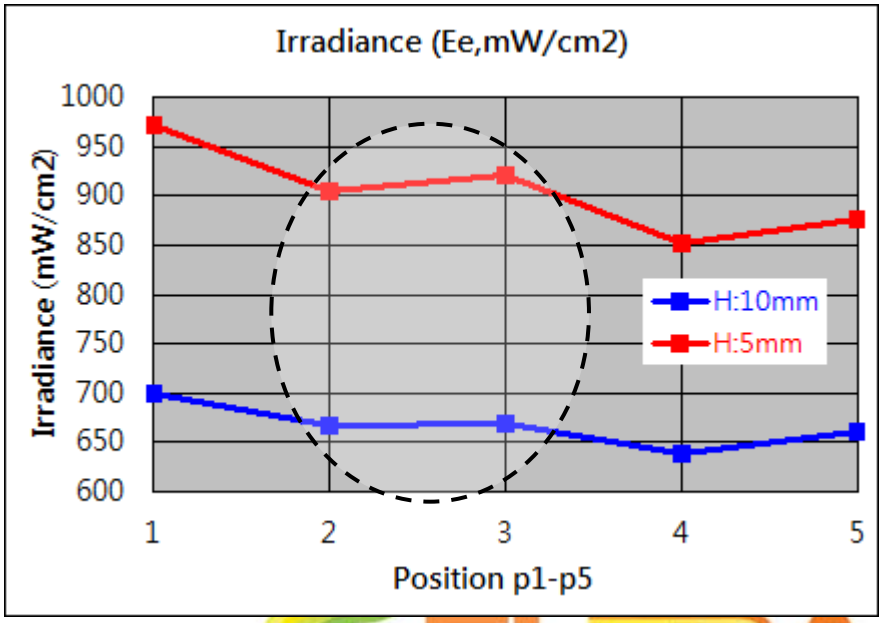
結　論：

- No.1與No.2兩樣品之平均輻射照度不同。
- 兩片樣品接合處p3點輻射照度並無偏低現象。

量測數據

Irradiance, Ee (mW/cm2)　@4A / 25.2V						
distance	Test	p1	p2	p3	p4	p5
H:10mm	test 1	700	667	670	639	661
	test 2	706	675	673	629	663
	avg	703	671	672	634	662
H:5mm	test1	975	909	923	849	883
	test2	969	901	919	855	871
	avg	972	905	921	852	877

No.8　　No.1



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Thanks for Listening

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