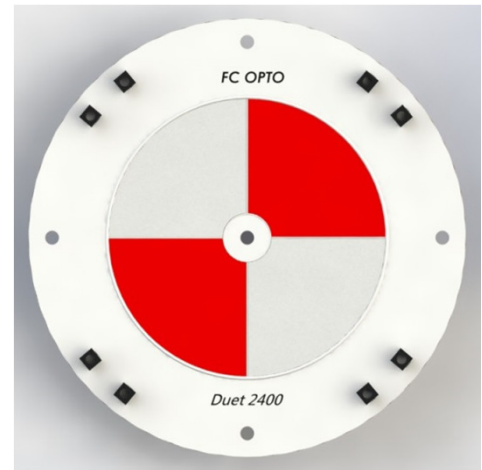
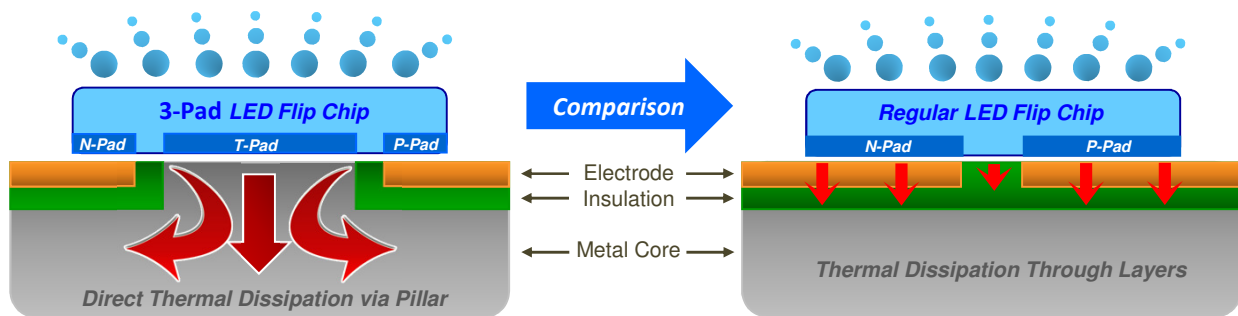
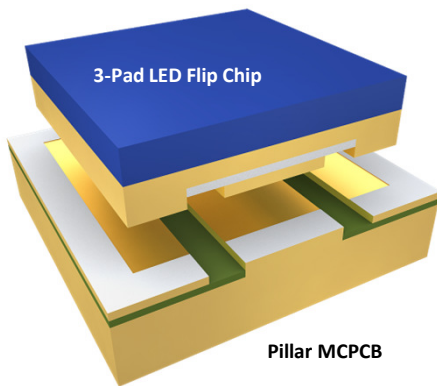


Dynamic and Cooler

High Efficacy & Lower Thermal Resistance

Duet 2400 is a high power **Plant Grow** lighting module offering adjustable and independent photonic emission in Royal Blue and Broadband Red spectrums. The lighting module is structured based on patented **3-Pad LED Flip Chips** and **Pillar MCPCB** to further decrease the thermal resistance and results in minimal thermal decay.



Features:

- Patented COB Technologies
- 4x Independent Illuminating Sections
- 2x Red sections and 2x Blue Sections
- 1216W Maximum Power in Red Sections
- 1216W Maximum Power in Blue Sections
- Peak 660nm \pm 40nm FWHM Red Spectrum
- 106mm Light Emitting Surface
- 0.003°C/W Thermal Resistance
- 45x45mil Patented Flip Chips
- Low Temperature Bonding
- No Wire Bonding
- RoHS Compliant

Absolute Maximum Ratings (Ta=25°C):

| Parameter | Symbol | Max. Rating | Conditions |
|-------------------------------|----------|---------------------|---|
| Red / Blue Power Dissipation | P_d | 1216W / 1216W | $T_j \leq 140^\circ\text{C}$ |
| Red / Blue DC Forward Current | I_F | 24A / 24A | $T_j \leq 140^\circ\text{C}$ |
| Junction Temperature | T_j | 140°C | |
| Reverse Voltage | V_r | -5V | $T_{\text{ambient}} = 25^\circ\text{C}$ |
| Reverse Current | I_r | $\leq 1\mu\text{A}$ | $V_r = -5\text{V}$ |
| Operating Case Temperature | T_C | -40°C to 105°C | |
| Storage Temperature | T_{ST} | -40°C to 120°C | |

Electro-Optical Characteristics (Ta=25°C):

Viewing Angle $2\theta_{1/2} = 140^\circ$

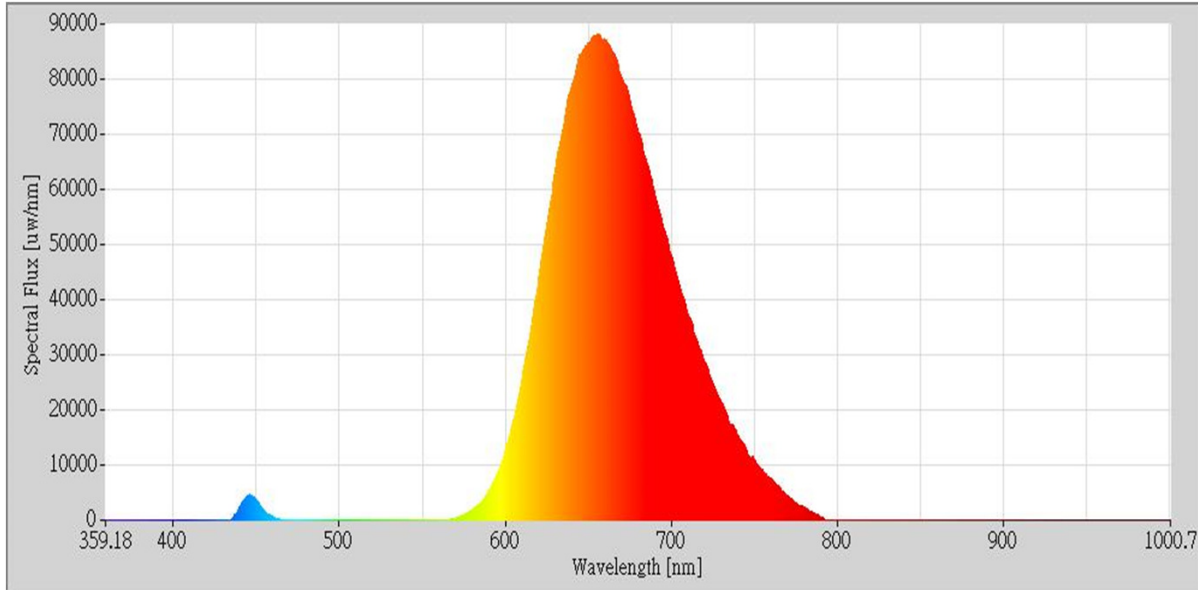
| Section | Peak Wavelength (nm) | FWHM (nm) | Output @ $I_F=6\text{A}$ | V_F (V) @ $I_F=6\text{A}$ | PPFD ($\mu\text{mole/s}$) | LES (mm) |
|---------|----------------------|-----------|--------------------------|-----------------------------|-----------------------------|----------|
| Red 1 | 660±5 | 80 | 5320 lm | 46.1 | 276.2 | 106 |
| Red 2 | 660±5 | 80 | 5320 lm | 46.1 | 276.2 | |
| Blue 1 | 449~455 | 25 | 155W | 46.1 | 518.1 | |
| Blue 2 | 449~455 | 25 | 155W | 46.1 | 518.1 | |

Thermal Characteristics:

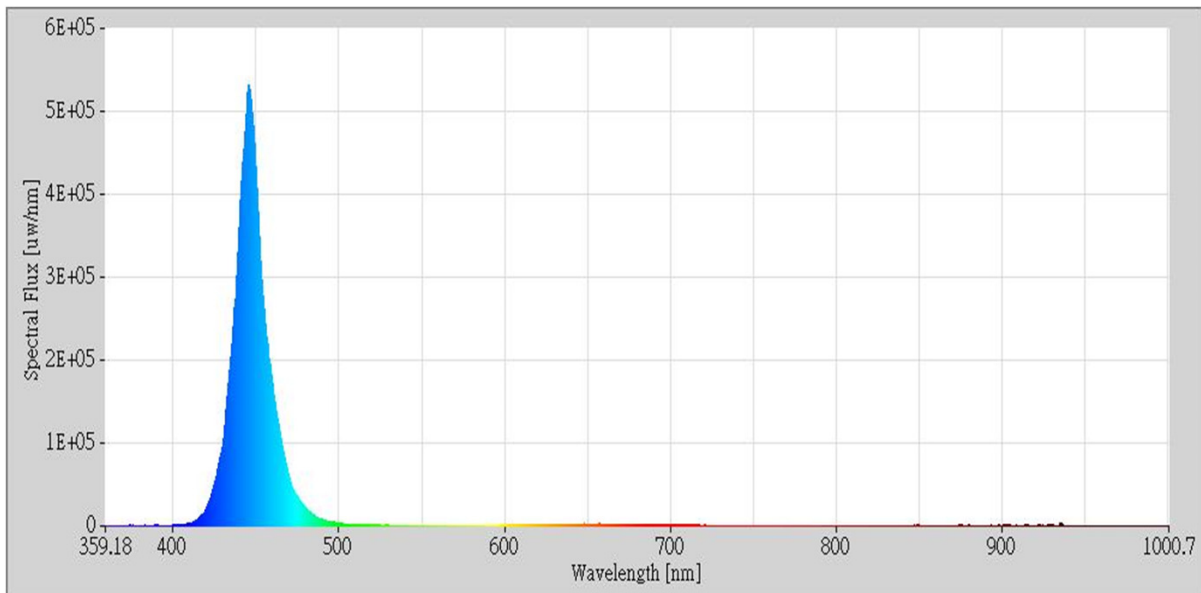
| Parameter | Symbol | °C/W | Definition |
|--------------------|---------------|-------|---|
| Thermal Resistance | $R_{th(j-b)}$ | 0.003 | Between LED Junction and COB Bottom Surface |

- Junction Temperature $T_j = T_b + \text{Power(W)} \times R_{th(j-b)}$, where T_b is the temperature at COB bottom surface.

660nm Deep Red Emitting Spectrum (Ta=25°C):

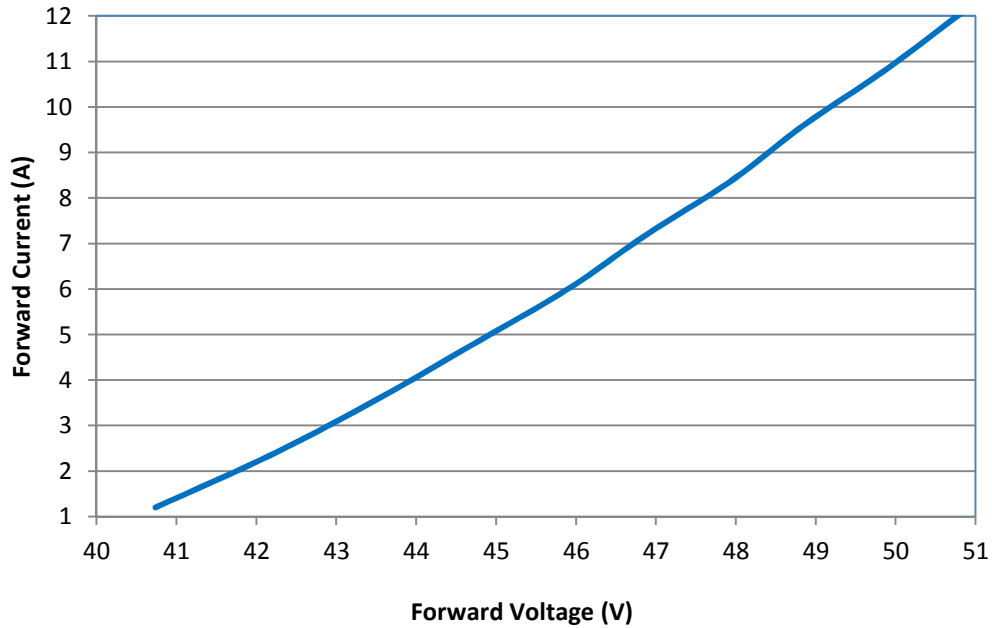


450nm Royal Blue Emitting Spectrum (Ta=25°C):

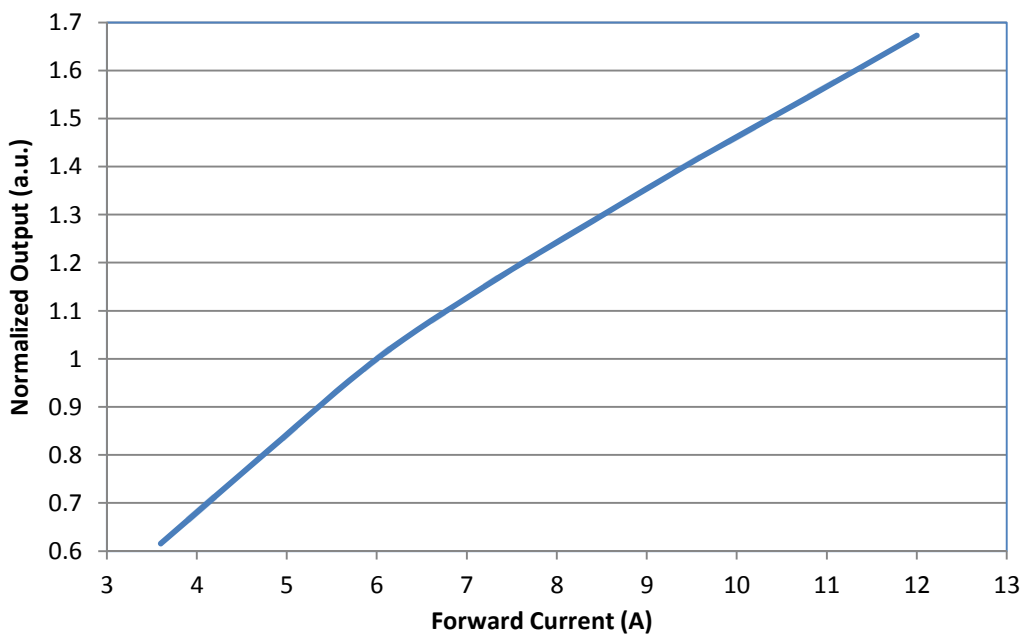


Characteristic Graphs (Ta=25°C):

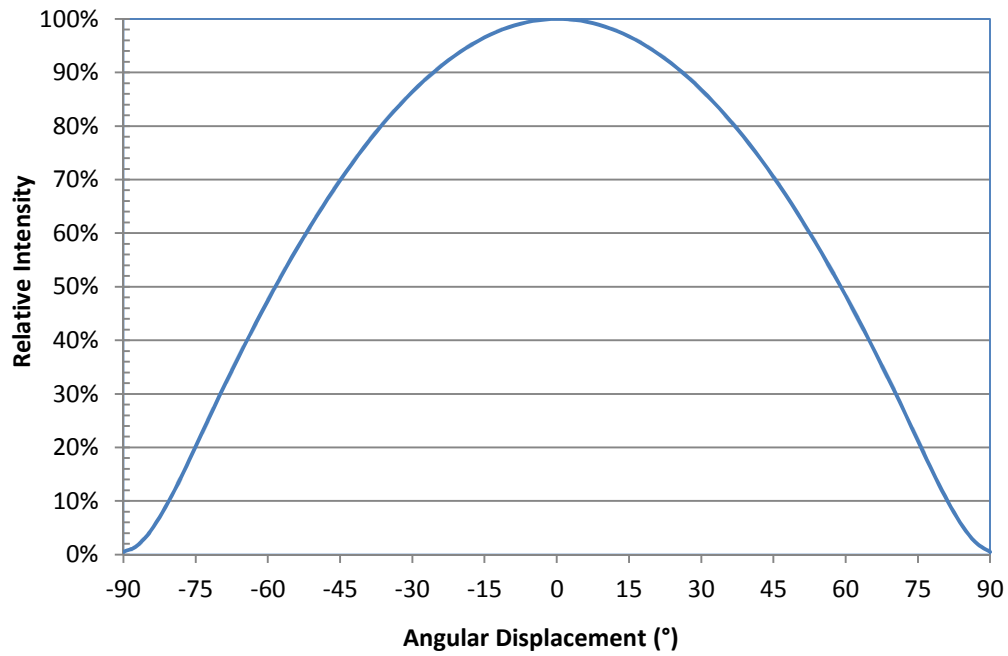
(i) Typical Forward Current (I_F) vs. Forward Voltage (V_F) of Each Section



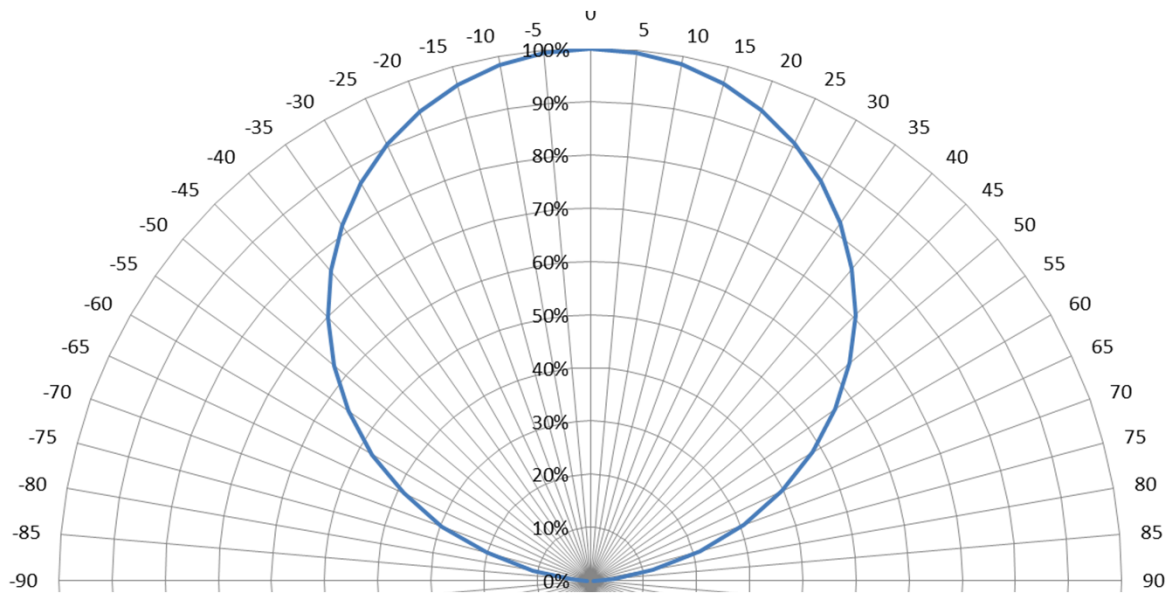
(ii) Typical Normalized Output vs. Forward Current (I_F) of Each Section



(iii) Typical Spatial Radiation Pattern

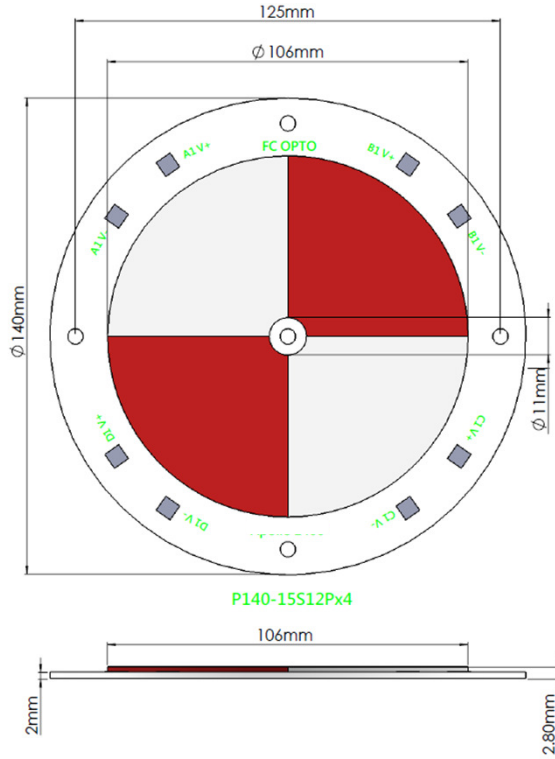


(iv) Typical Polar Radiation Pattern

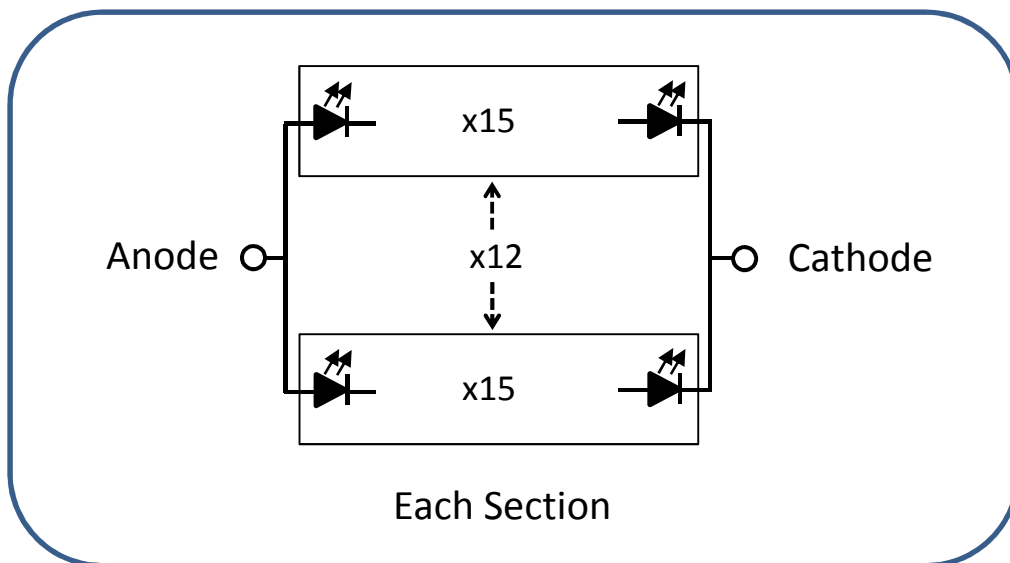


Mechanical Dimensions:

- Solder pads are labeled “+” and “-” to denote positive and negative, respectively.
- Drawing dimensions are in millimeters, and are not to scale.
- Tolerance: $\pm 0.2\text{mm}$
- The optical center of the LED Array is defined by the mechanical center of the array.



Circuit Diagram:



Cautions:

1. Circuit Protection is recommended during the assembly and operation.
 - i. MOV, TVS, current fuse, thermal fuse, capacitor, resistor are options to avoid unexpected circuit faults.

2. Storage Conditions
 - i. Moisture Controlled environment is recommended to avoid COB damages during storage. Moisture may cause circuit damages and result in brightness reduction or failure in circuit contacts.
 - ii. COB in moisture-proof sealed bags should be stored in ambient conditions of temperature less than 30°C and humidity less than 90%RH.
 - iii. COB in open air should be kept in ambient conditions of temperature less than 30°C and humidity less than 60%RH.
 - iv. COB should be restored in moisture-proof bag with moisture absorbent together.

3. Handling Light Emitting Surface (LES)
 - i. LES is a silicone lens and should not have direct contact with sharp tools and human fingers.

4. Recommendation on Assembly with Heat Sink
 - i. Apply thermal grease over the heatsink contact surface to seal the voids and roughness pre-existing on the contact surface.
 - ii. Attach COB onto heatsink contact surface with thermal grease in between. Thermal grease thickness is suggested less than 25um (1 mil)
 - iii. Apply sufficient pressure to secure the COB, and ensure (a) full contact between COB and heatsink, (b) no voids within thermal grease, (c) minimal thermal grease thickness.

5. Flip Chip Opto is not responsible to the damages caused by the operation under the parameters exceeding the values described in the specification.