

Dynamic and Cooler

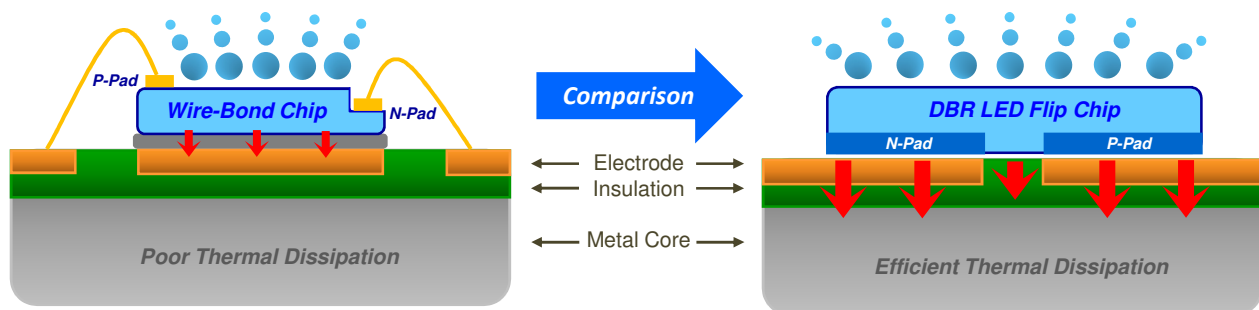
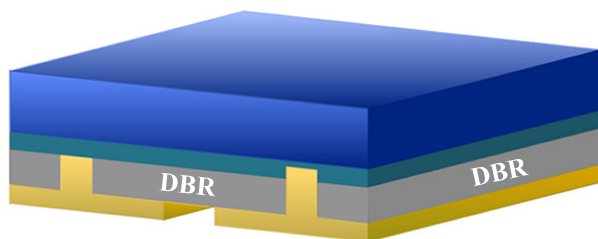
High Efficacy & Lower Thermal Resistance

Duet D60 is a dynamic **Plant Growth** lighting module offering independent and adjustable power control in Royal Blue and Broadband Red spectrums. The lighting module is structured based on patented DBR LED Flip Chips and low temperature bonding technologies to further boost lighting efficacy and decrease the thermal resistance between the LED junction and module's metal substrate.



Features:

- Peak of Blue Spectrum at $450\text{nm} \pm 3\text{nm}$
- Peak Options of Red Spectrum at $650 \pm 2\text{nm}$, $640 \pm 2\text{nm}$, and $627 \pm 2\text{nm}$
- Red Broadband FWHM $\pm 40\text{nm}$
- 30mm Light Emitting Surface
- 81.6W Maximum Red Power
- 54.4W Maximum Blue Power
- 0.3°C/W Thermal Resistance
- Patented DBR 35x35mil Flip Chips
- Low Temperature Bonding
- RoHS Compliant



Absolute Maximum Ratings (Ta=25°C):

Parameter	Symbol	Max. Rating	Conditions
Red / Blue Power Dissipation	P_d	81.6W / 54.4W	$T_j \leq 140^\circ\text{C}$
Red / Blue DC Forward Current	I_F	2,100mA / 1,400mA	$T_j \leq 140^\circ\text{C}$
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 $2\theta_{1/2} = 140^\circ$

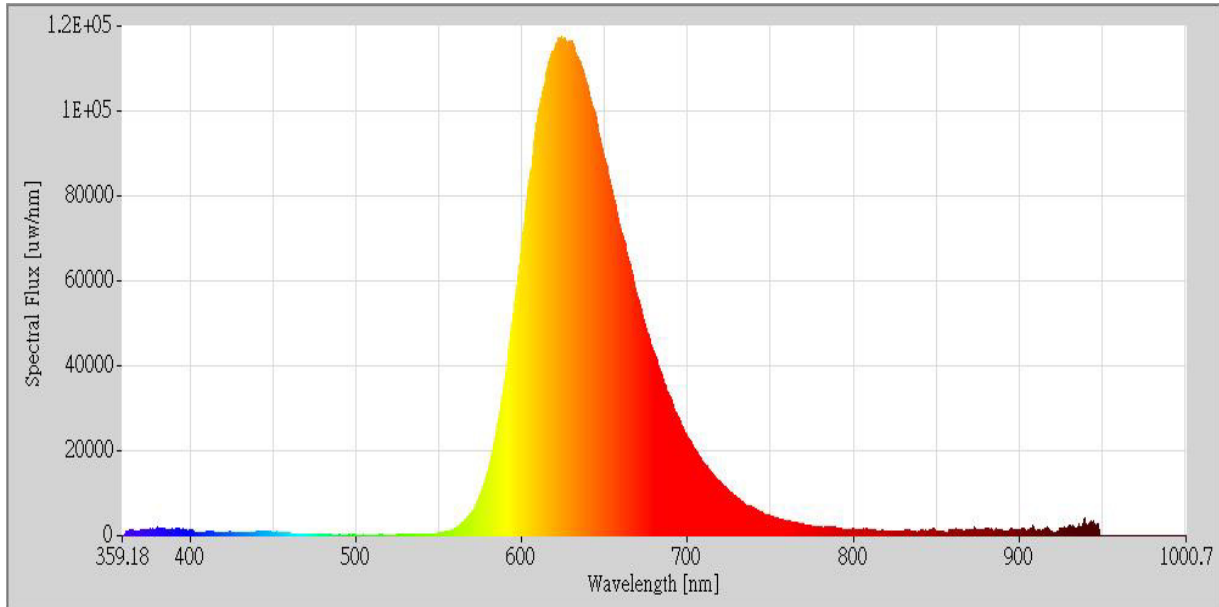
Color	Peak Wavelength (nm)	FWHM (nm)	V_F (V) @ $I_F=1.05\text{A}$	PPFD ($\mu\text{mol/s}$) 400nm~700nm	LES (mm)
Red	627±2	65	36.2	44.0	30
Deep Red	640±2	80	36.2	40.5	
Deep Red	650±2	80	36.2	35.1	
Color	Peak Wavelength (nm)	FWHM (nm)	V_F (V) @ $I_F=0.7\text{A}$	PPFD ($\mu\text{mol/s}$) 400nm~700nm	
Blue	449~452	25	36.2	42.5	

Thermal Characteristics:

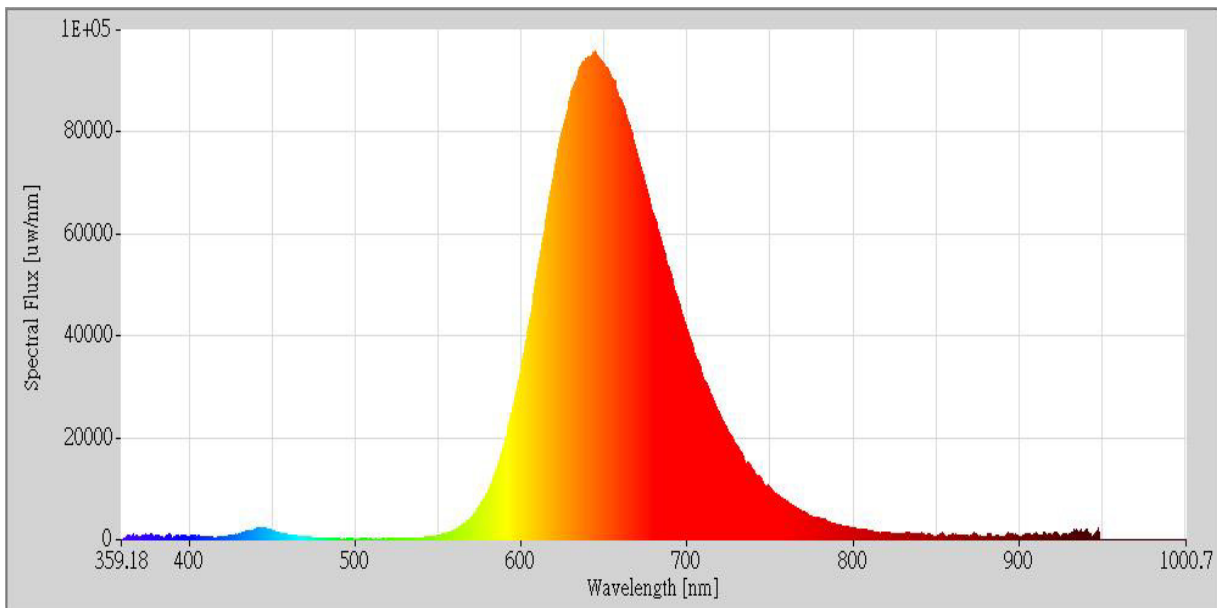
Parameter	Symbol	°C/W	Definition
Thermal Resistance	$R_{th(j-b)}$	0.3	Between LED Junction and COB Bottom Surface

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

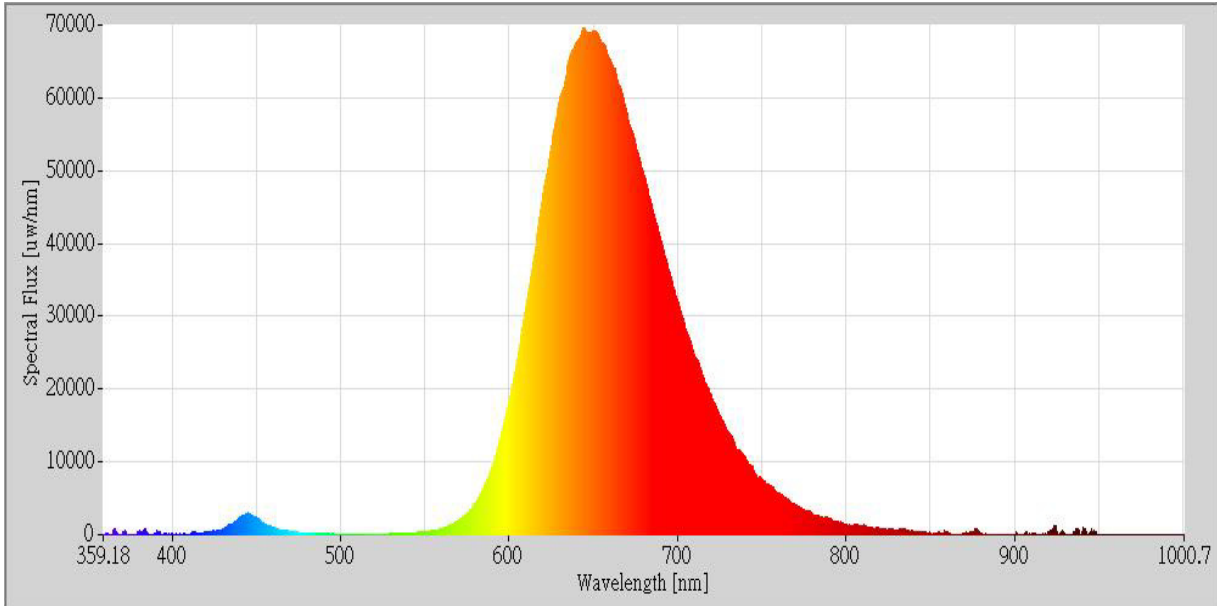
Red Peak 627nm Emitting Spectrum (Ta=25°C):



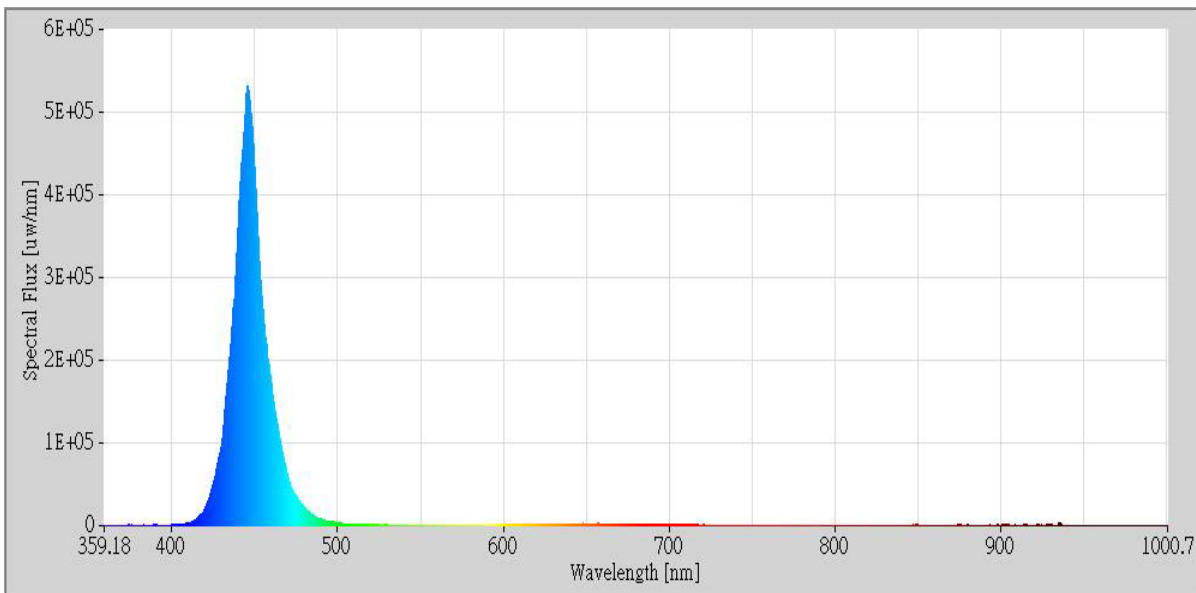
Deep Red Peak 640nm Emitting Spectrum (Ta=25°C):



Deep Red Peak 650nm Emitting Spectrum (Ta=25°C):

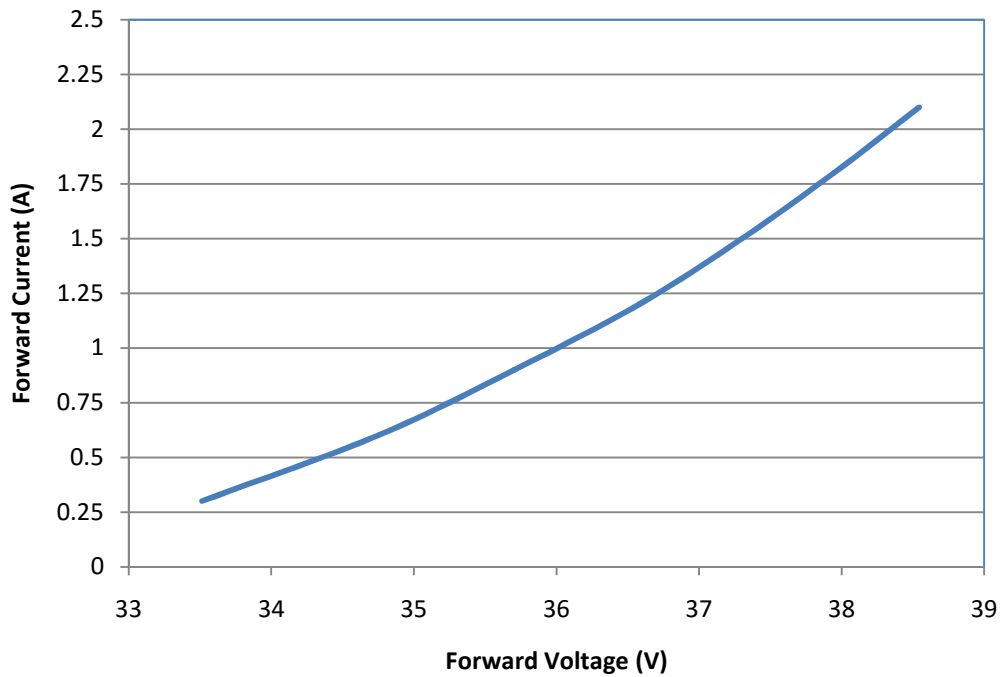


Royal Blue 450nm Emitting Spectrum (Ta=25°C):

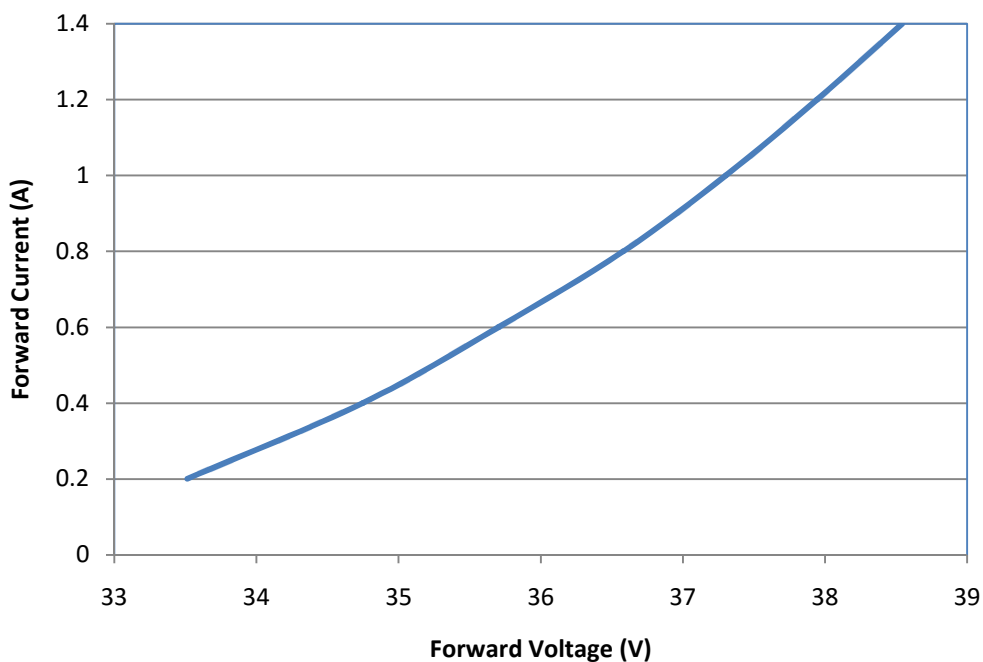


Characteristic Graphs (Ta=25°C):

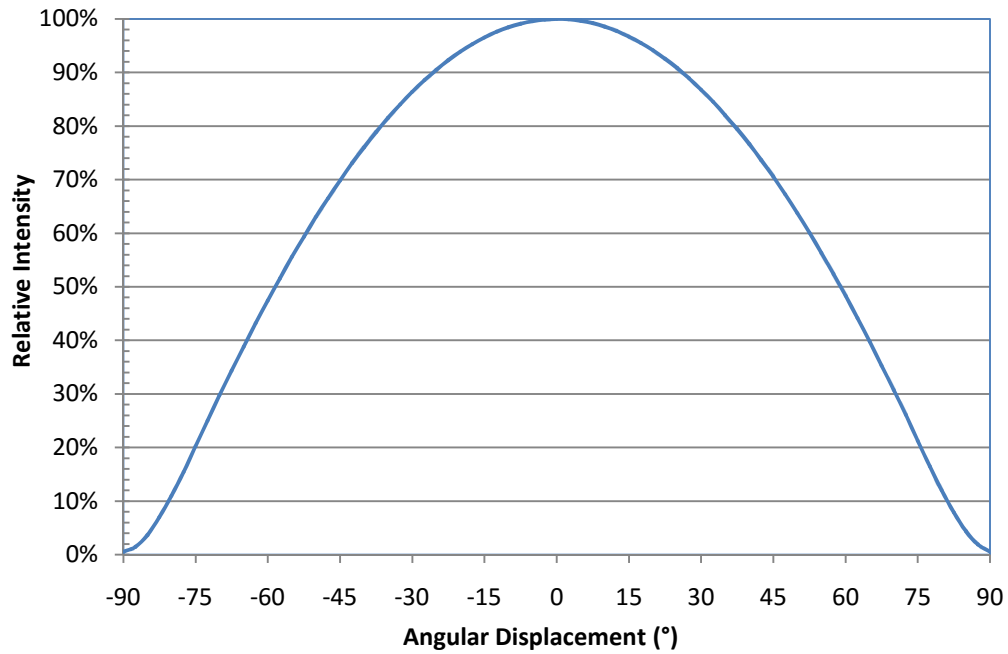
(i) Typical Forward Current (I_F) vs. Forward Voltage (V_F) of Red Section



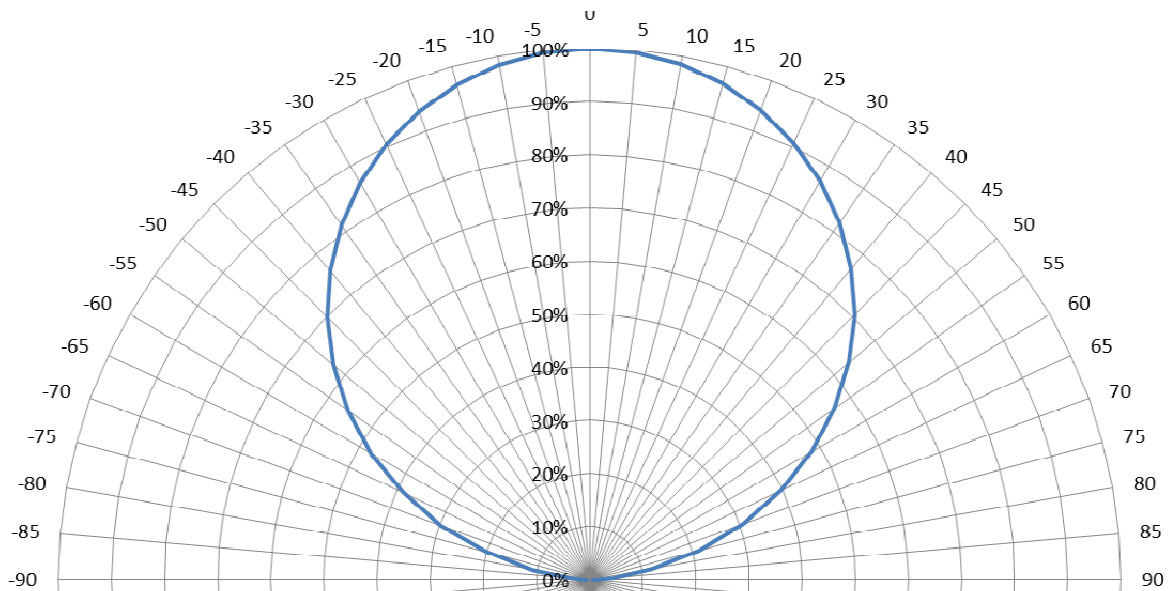
(ii) Typical Forward Current (I_F) vs. Forward Voltage (V_F) of Blue Section



(iii) Typical Spatial Radiation Pattern

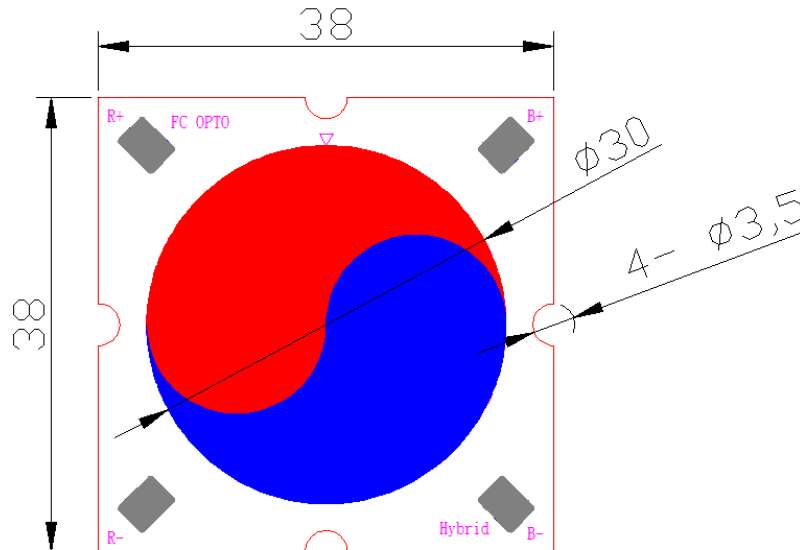


(iv) Typical Polar Radiation Pattern

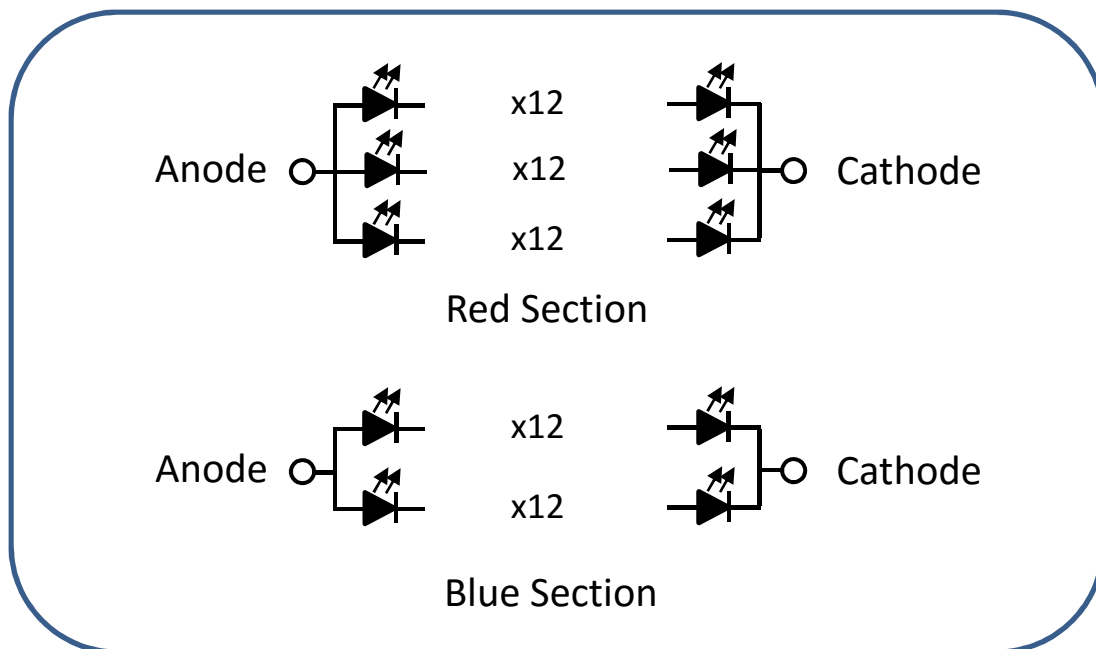


Mechanical Dimensions:

- 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.