VERTICAL FARMING (B+R) LINEAR REFERENCE DESIGN
Horticulture Reference Design: (Blue + Red) Linear

- Incredible performance: up to 3.2 PPF/W
- Long lifetimes proven by LM-80 testing
- Passively cooled design

| LEDs (Count) | (104) XLamp XP-E HE Photo Red
| (4) XLamp XP-G3 Royal Blue |
|-------------|----------------------------------|
| Output Mode | Low | Medium | High |
| PPF ($\mu$mol / s) | 129 | 231 | 314 |
| PPF/W ($\mu$mol / J) * | 3.2 | 2.9 | 2.7 |
| Power | 48.8W | 79.7W | 117.9W |
| Tsp | 45°C | 65°C | 90°C |
| Current | 750 mA | 1400 mA | 2000 mA |
| Dimensions (LWH) | 24” x 2.5” x 3” / 60.9 x 6.4 x 7.6 cm |
| Weight | 2 lbs / 0.91 kg |
| Lifetime | R90(10k) > 60.5k hrs |

* Note: PPF/W excludes driver losses
Blue + Red Linear: Spectral Content

Measured perfect spectral uniformity @ 6” away from fixture.
Vertical Farming | Recipe #1: Chlorophyll Bloom

Perfect Uniformity.

Measurements performed 6" away from fixture.
Vertical Farming | Recipe #1: Chlorophyll Bloom

Unrivaled Performance.
Up to 3.2 PPF/W

Proven Reliability.
R90 > 5.9 years at 105C
R90 > 8.3 years at 105C

### 1 Module Performance

<table>
<thead>
<tr>
<th>Input Power</th>
<th>PAR PPF</th>
<th>PAR PPF/W</th>
<th>Tsp (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>45W</td>
<td>144</td>
<td>3.2</td>
<td>45</td>
</tr>
<tr>
<td>82W</td>
<td>240</td>
<td>2.9</td>
<td>65</td>
</tr>
<tr>
<td>119W</td>
<td>311</td>
<td>2.6</td>
<td>90</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LED Count</th>
<th>Ratio</th>
<th>Reported Lifetime</th>
<th>Color Stability</th>
</tr>
</thead>
<tbody>
<tr>
<td>108</td>
<td>1 : 26 (Blue : Red)</td>
<td>R90 &gt;</td>
<td>&lt;2 nm</td>
</tr>
</tbody>
</table>

1 Does not include driver efficiency
2 1A, 105C 660nm ; 1A, 105C 450nm
## Parts List

<table>
<thead>
<tr>
<th>Part</th>
<th>Description</th>
<th>P/N</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>LED</td>
<td>Cree</td>
<td>XPEEPR</td>
<td>104</td>
</tr>
<tr>
<td>LED</td>
<td>Cree</td>
<td>XP-G3 RB</td>
<td>4</td>
</tr>
<tr>
<td>Optic</td>
<td>Brightview Smoothing Film</td>
<td>Custom</td>
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<tr>
<td>PCB</td>
<td>Galaxy Circuits Inc. MCPCB</td>
<td>Available Gerber files from Cree</td>
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</tr>
<tr>
<td>Heatsink</td>
<td>Aavid</td>
<td>Custom</td>
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<tr>
<td>TIM</td>
<td>Graftech .25 Foil</td>
<td>GMTOEG0015 HT1210</td>
<td>1</td>
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<tr>
<td>Driver</td>
<td>ERP</td>
<td>SLM100W-1.7-56-TA</td>
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