Synonymous with function and performance, enter the Primax, the new era of high intensity illumination in LED. With its high flux output and high luminous intensity, Primax transcends today LED lightings technology and how we perceive it. The small package outline (3.5 x 3.5 x 1.2 mm) and high intensity make it an ideal choice for backlighting, signage, exterior automotive lighting and decorative lighting.

Features:
> Super high brightness surface mount LED
> 120° viewing angle.
> Compact package outline (LxW) of 3.5 x 3.5 mm.
> Ultra low height profile - 1.2mm.
> Low thermal resistance.
> Compatible to IR reflow soldering.
> Environmental friendly; RoHS compliance.

Applications:
> Automotive: interior applications and exterior applications.
> Lighting: garden light, architecture lighting, general lighting, etc
> Backlighting (TFT LCD display), flash light, architectural lighting.
## Optical Characteristics at Tj=25°C

<table>
<thead>
<tr>
<th>Part Ordering Number</th>
<th>Color</th>
<th>Viewing Angle°</th>
<th>Luminous Flux @ 150mA (lm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Min.</td>
</tr>
<tr>
<td>NAW-BSG-QR-1</td>
<td>White</td>
<td>120</td>
<td>30.6</td>
</tr>
<tr>
<td>NAW-BSG-RS-1</td>
<td>White</td>
<td>120</td>
<td>39.8</td>
</tr>
<tr>
<td>NAW-BSG-PQ-1</td>
<td>White</td>
<td>120</td>
<td>23.5</td>
</tr>
<tr>
<td>NAW-BSG-NP-1</td>
<td>White</td>
<td>120</td>
<td>18.1</td>
</tr>
</tbody>
</table>

*Not for new design*

**NOTE**
1. Luminous intensity is measured with an accuracy of ± 11%.
2. Wavelength binning is carried for all units as per the wavelength-binning table. Only one wavelength group is allowed for each reel.

## Electrical Characteristics at Tj=25°C

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Vf @ If = 150 mA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min. (V)</td>
</tr>
<tr>
<td>NAW-BSG</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Forward Voltages are tested using a current pulse of 1 ms and has an accuracy of ± 0.1 V.

## Absolute Maximum Ratings

<table>
<thead>
<tr>
<th></th>
<th>Maximum Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC forward current</td>
<td>180</td>
<td>mA</td>
</tr>
<tr>
<td>Peak pulse current</td>
<td>350</td>
<td>mA</td>
</tr>
<tr>
<td>Reverse voltage</td>
<td>Not designed for reverse bias</td>
<td>V</td>
</tr>
<tr>
<td>ESD threshold (HBM)</td>
<td>2000</td>
<td>V</td>
</tr>
<tr>
<td>LED junction temperature</td>
<td>125</td>
<td>°C</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-40 ... +100</td>
<td>°C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-40 ... +100</td>
<td>°C</td>
</tr>
<tr>
<td>Thermal resistance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Junction / ambient, $R_{th\ JA}$</td>
<td>125</td>
<td>K/W</td>
</tr>
<tr>
<td>- Junction / solder point, $R_{th\ JS}$</td>
<td>45</td>
<td>K/W</td>
</tr>
</tbody>
</table>

(Mounted on dual-sided FR4 in-house PCB; total Cu area > 900 mm²)
<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Symbol</th>
<th>Part Number</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature coefficient of $V_F$ (typ) $I_F = 150\text{mA}; 0 \degree \text{C} &lt;= T &lt;= 85 \degree \text{C}$</td>
<td>$T_{CV}$</td>
<td>NAW-BSG</td>
<td>-3.70</td>
<td>mV / K</td>
</tr>
<tr>
<td>Temperature coefficient of $I_V$ (typ) $I_F = 150\text{mA}; 0 \degree \text{C} &lt;= T &lt;= 85 \degree \text{C}$</td>
<td>$T_{CV}$</td>
<td>NAW-BSG</td>
<td>-0.25</td>
<td>% / K</td>
</tr>
<tr>
<td>Temperature coefficient of $C_x$ (typ) $I_F = 150\text{mA}; 0 \degree \text{C} &lt;= T &lt;= 85 \degree \text{C}$</td>
<td>$T_{Cx}$</td>
<td>NAW-BSG</td>
<td>-0.00022</td>
<td></td>
</tr>
<tr>
<td>Temperature coefficient of $C_y$ (typ) $I_F = 150\text{mA}; 0 \degree \text{C} &lt;= T &lt;= 85 \degree \text{C}$</td>
<td>$T_{Cy}$</td>
<td>NAW-BSG</td>
<td>-0.00016</td>
<td></td>
</tr>
</tbody>
</table>
NAW-BSG, White Color Grouping

Chromaticity coordinate groups are measured with an accuracy of ± 0.01.

<table>
<thead>
<tr>
<th>Bin</th>
<th>Cx</th>
<th>Cy</th>
<th>Cx</th>
<th>Cy</th>
<th>Cx</th>
<th>Cy</th>
<th>Cx</th>
<th>Cy</th>
</tr>
</thead>
<tbody>
<tr>
<td>YU</td>
<td>0.274</td>
<td>0.301</td>
<td>0.283</td>
<td>0.284</td>
<td>0.307</td>
<td>0.316</td>
<td>0.333</td>
<td></td>
</tr>
<tr>
<td>YL</td>
<td>0.283</td>
<td>0.284</td>
<td>0.290</td>
<td>0.270</td>
<td>0.310</td>
<td>0.299</td>
<td>0.316</td>
<td></td>
</tr>
<tr>
<td>XU</td>
<td>0.303</td>
<td>0.333</td>
<td>0.307</td>
<td>0.316</td>
<td>0.317</td>
<td>0.325</td>
<td>0.343</td>
<td></td>
</tr>
<tr>
<td>XL</td>
<td>0.307</td>
<td>0.316</td>
<td>0.310</td>
<td>0.299</td>
<td>0.319</td>
<td>0.310</td>
<td>0.325</td>
<td></td>
</tr>
<tr>
<td>WU</td>
<td>0.315</td>
<td>0.343</td>
<td>0.317</td>
<td>0.325</td>
<td>0.329</td>
<td>0.336</td>
<td>0.354</td>
<td></td>
</tr>
<tr>
<td>WL</td>
<td>0.317</td>
<td>0.325</td>
<td>0.319</td>
<td>0.310</td>
<td>0.329</td>
<td>0.319</td>
<td>0.336</td>
<td></td>
</tr>
<tr>
<td>VU</td>
<td>0.329</td>
<td>0.354</td>
<td>0.329</td>
<td>0.336</td>
<td>0.345</td>
<td>0.350</td>
<td>0.368</td>
<td></td>
</tr>
<tr>
<td>VL</td>
<td>0.329</td>
<td>0.336</td>
<td>0.329</td>
<td>0.319</td>
<td>0.343</td>
<td>0.331</td>
<td>0.350</td>
<td></td>
</tr>
<tr>
<td>UU</td>
<td>0.347</td>
<td>0.368</td>
<td>0.345</td>
<td>0.350</td>
<td>0.361</td>
<td>0.365</td>
<td>0.383</td>
<td></td>
</tr>
<tr>
<td>UL</td>
<td>0.345</td>
<td>0.350</td>
<td>0.343</td>
<td>0.331</td>
<td>0.357</td>
<td>0.343</td>
<td>0.365</td>
<td></td>
</tr>
</tbody>
</table>

Dominant color coordinate is measured with an accuracy of ± 0.01.
## Luminous Intensity Group at Tj=25°C

<table>
<thead>
<tr>
<th>Brightness Group</th>
<th>Luminous Flux @ IV (lm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N2</td>
<td>18.1 ... 20.6</td>
</tr>
<tr>
<td>N3</td>
<td>20.6 ... 23.5</td>
</tr>
<tr>
<td>P2</td>
<td>23.5 ... 26.8</td>
</tr>
<tr>
<td>P3</td>
<td>26.8 ... 30.6</td>
</tr>
<tr>
<td>Q2</td>
<td>30.6 ... 34.8</td>
</tr>
<tr>
<td>Q3</td>
<td>34.8 ... 39.8</td>
</tr>
<tr>
<td>R2</td>
<td>39.8 ... 45.2</td>
</tr>
<tr>
<td>R3</td>
<td>45.2 ... 51.7</td>
</tr>
<tr>
<td>S2</td>
<td>51.7 ... 59.0</td>
</tr>
<tr>
<td>S3</td>
<td>59.0 ... 67.2</td>
</tr>
</tbody>
</table>

Luminous intensity is measured with an accuracy of ±11%.

## Vf Binning (Optional)

<table>
<thead>
<tr>
<th>Vf Bin @ 150mA</th>
<th>Forward Voltage (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1</td>
<td>3.00 ... 3.30</td>
</tr>
<tr>
<td>V2</td>
<td>3.30 ... 3.60</td>
</tr>
</tbody>
</table>

Forward voltage, Vf is measured with an accuracy of ±0.1 V.

Please consult sales and marketing for special part number to incorporate Vf binning.
Primax™ • 150 InGaN White : NAW-BSG Package Outlines

Material

<table>
<thead>
<tr>
<th>Material</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead-frame</td>
<td>Cu Alloy With Ag Plating</td>
</tr>
<tr>
<td>Package</td>
<td>High Temperature Resistant Plastic, PPA</td>
</tr>
<tr>
<td>Encapsulant</td>
<td>Silicone Resin</td>
</tr>
<tr>
<td>Soldering Leads</td>
<td>Sn-Sn Plating</td>
</tr>
</tbody>
</table>
Recommended Solder Pad
Taping and orientation

- Reels come in quantity of 1000 units.
- Reel diameter is 180 mm.
Packaging Specification

Label area with (111mm X 57mm)
depression (0.3mm)
Packaging Specification

### Average 1pc Primax

<table>
<thead>
<tr>
<th>Weight (gram)</th>
<th>1 completed bag (1000pcs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.041</td>
<td>160 ± 10</td>
</tr>
</tbody>
</table>

### For Primax™

<table>
<thead>
<tr>
<th>Cardboard Box Size</th>
<th>Dimensions (mm)</th>
<th>Empty Box Weight (kg)</th>
<th>Reel / Box</th>
<th>Quantity / Box (pcs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>300 x 250 x 250</td>
<td>0.58</td>
<td>15 reels MAX</td>
<td>15,000 MAX</td>
</tr>
<tr>
<td>Large</td>
<td>416 x 516 x 476</td>
<td>1.74</td>
<td>96 reels MAX</td>
<td>96,000 MAX</td>
</tr>
</tbody>
</table>

The reel, moisture absorbent material and moisture indicator are sealed inside the moisture proof foil bag.
Recommended Pb-free Soldering Profile

Classification Reflow Profile (JEDEC J-STD-020C)

- **Ramp-up**: 3˚C/sec max., 217˚C
- **Preheat**: 60-180s
- **Ramp-down**: 6˚C/sec max., 255-260˚C
- **480s max**
## Revision History

<table>
<thead>
<tr>
<th>Page</th>
<th>Subjects</th>
<th>Date of Modification</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Add Vf Binning Option</td>
<td>28 Oct 2009</td>
</tr>
<tr>
<td>1</td>
<td>Update Product Photo</td>
<td>12 Nov 2009</td>
</tr>
<tr>
<td>8,9</td>
<td>Carrier Tape and Reel Dimension Changed</td>
<td>05 Mar 2010</td>
</tr>
<tr>
<td>3</td>
<td>Add Characteristics</td>
<td>12 Nov 2010</td>
</tr>
<tr>
<td>2</td>
<td>Add new partno --&gt; NAW-BSG-PQ-1;</td>
<td>05 Jan 2011</td>
</tr>
<tr>
<td></td>
<td>Not for new design --&gt; NAW-BSG-NP-1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Add new partno --&gt; NAW-BSG-QR-1</td>
<td>27 Jun 2012</td>
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<tr>
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<td>Not for new design --&gt; NAW-BSG-PQ-1</td>
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</tr>
<tr>
<td>2</td>
<td>Add new partno --&gt; NAW-BSG-RS-1</td>
<td>13 Aug 2012</td>
</tr>
<tr>
<td>2, 5, 6</td>
<td>Update Vf Maximum and Vf Binning</td>
<td>08 Sep 2014</td>
</tr>
<tr>
<td></td>
<td>Update graph: Relative Intensity Vs Forward Current</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Update graph: Forward Current Vs Forward Voltage</td>
<td></td>
</tr>
</tbody>
</table>

### NOTE

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About Us

DOMINANT Opto Technologies is a dynamic Malaysian Corporation that is among the world’s leading SMT LED Manufacturers. An excellence – driven organization, it offers a comprehensive product range for diverse industries and applications. Featuring an internationally certified quality assurance acclaim, DOMINANT’s extra bright LEDs are perfectly suited for various lighting applications in the automotive, consumer and communications as well as industrial sectors. With extensive industry experience and relentless pursuit of innovation, DOMINANT’s state-of-art manufacturing, research and testing capabilities have become a trusted and reliable brand across the globe. More information about DOMINANT Opto Technologies can be found on the Internet at http://www.dominant-semi.com.

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