**Features**

- 3.6*3.1*3.1 mm SMD LED
- High Brightness
- InGaN Technology
- Viewing Angle 60°
- High reliability
- MSL Level 3
- Water-Resistant (IPX7)

**Applications**

- Consumer Electronics
- Traffic lights
- Automobile After Market
- Industrial Equipment

**Description**

The IN-P36BTEG is a popular low profile 3631 package with versatile design capabilities. It is a PLCC type silicone style LED which can be used in various applications.

**Recommended Solder Pattern**

![IN-P36BTEG Solder Pattern](image1)

**Package Dimensions** in mm

![IN-P36BTEG Package Dimensions](image2)

*Notice: Tolerance of measurement of Dimension: ±0.2mm*
## Absolute Maximum Rating at 25°C

<table>
<thead>
<tr>
<th>Product</th>
<th>Emission Color</th>
<th>$P_d$ (mW)</th>
<th>$I_{FP^*}$ (mA)</th>
<th>$T_j$ (°C)</th>
<th>$V_R$ (V)</th>
<th>$T_{OP}$ (°C)</th>
<th>$T_{ST}$ (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IN-P36BTEG</td>
<td>Green</td>
<td>95</td>
<td>80</td>
<td>125</td>
<td>5</td>
<td>-40°C~+100°C</td>
<td>-40°C~+100°C</td>
</tr>
</tbody>
</table>

*Condition for IFP is pulse of 1/10 duty and 0.1msec width

## ESD Precaution

**ATTENTION:** Electrostatic Discharge (ESD) protection

The symbol above denotes that ESD precaution is needed. ESD protection for GaP and AlGaAs based chips is necessary even though they are relatively safe in the presence of low static-electric discharge. Parts built with AlInGaP, GaN, or/and InGaN based chips are STATIC SENSITIVE devices. ESD precaution must be taken during design and assembly.

If manual work or processing is needed, please ensure the device is adequately protected from ESD during the process.

Please be advised that normal static precautions should be taken in the handling and assembly of this device to prevent damage or degradation which may be induced by electrostatic discharge (ESD).

## Electrical Characteristics $T_A = 25°C$

<table>
<thead>
<tr>
<th>Product</th>
<th>Emission Color</th>
<th>$I_r$ (mA)</th>
<th>$V_F$ (V)</th>
<th>Luminous Intensity (mcd)</th>
<th>$\lambda$ (nm)</th>
<th>Viewing Angle</th>
<th>$I_r$ (Vr = 5V)</th>
<th>ESD Sensitivity (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IN-P36BTEG</td>
<td>Green</td>
<td>30</td>
<td>3.0</td>
<td>6000</td>
<td>522.5</td>
<td>60</td>
<td>10</td>
<td>HBM</td>
</tr>
</tbody>
</table>

*Notes: Performance guaranteed only under conditions listed in above tables.*
### Luminous Intensity Rank Limits (IF =30mA)

<table>
<thead>
<tr>
<th>Bin Code</th>
<th>32</th>
<th>33</th>
<th>34</th>
<th>35</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flux Rank(mcd)</td>
<td>3000-3900</td>
<td>3900-5100</td>
<td>5100-6600</td>
<td>6600-8600</td>
</tr>
</tbody>
</table>

*Notice: Tolerance of measurement of Luminous Intensity: ±12%

### Forward Voltage Rank Limits (IF =30mA)

<table>
<thead>
<tr>
<th>Bin Code</th>
<th>Min</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>V2B</td>
<td>2.4</td>
<td>2.7</td>
<td>V</td>
</tr>
<tr>
<td>V2C</td>
<td>2.7</td>
<td>3.0</td>
<td>V</td>
</tr>
<tr>
<td>V3A</td>
<td>3.0</td>
<td>3.3</td>
<td>V</td>
</tr>
<tr>
<td>V3B</td>
<td>3.3</td>
<td>3.6</td>
<td>V</td>
</tr>
</tbody>
</table>

*Notice: Tolerance of measurement of Forward Voltage: ±0.1V

### Dominant Wavelength Rank Limits (IF =30mA)

<table>
<thead>
<tr>
<th>Bin Code</th>
<th>Min</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>TG1</td>
<td>515</td>
<td>520</td>
<td>nm</td>
</tr>
<tr>
<td>TG2</td>
<td>520</td>
<td>525</td>
<td>nm</td>
</tr>
<tr>
<td>TG3</td>
<td>525</td>
<td>530</td>
<td>nm</td>
</tr>
</tbody>
</table>

*Notice: Tolerance of measurement of Dominant Wavelength: ±1nm
Typical Characteristic Curves

1. Relative Luminous Intensity vs. Wavelength ($\lambda$) (nm)
2. Relative Luminous Intensity vs. Forward Current ($I_f$) (mA)
3. Forward Current ($I_f$) vs. Forward Voltage ($V_f$) (V)
4. Waveband Shift ($\Delta\lambda$) vs. Ambient Temperature ($T_a$) (°C)
5. Relative Luminous Intensity vs. Ambient Temperature ($T_a$) (°C)
6. $I_f$ vs. $T_a$ (°C)
Ordering Information

<table>
<thead>
<tr>
<th>Product</th>
<th>Emission Color</th>
<th>Technology</th>
<th>Test Current $I_F$ (mA)</th>
<th>Luminous Intensity $I_V$ (mcd) (Typ.)</th>
<th>Forward Voltage $V_F$ (V) (Typ.)</th>
<th>Orderable Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>IN-P36BTEG</td>
<td>Green</td>
<td>InGaN</td>
<td>30</td>
<td>6000</td>
<td>3.0</td>
<td>IN-P36BTEG</td>
</tr>
</tbody>
</table>
## Label Specifications

### Inolux P/N:

<table>
<thead>
<tr>
<th>I</th>
<th>N</th>
<th>P</th>
<th>3</th>
<th>6</th>
<th>B</th>
<th>T</th>
<th>E</th>
<th>G</th>
<th>-</th>
<th>X</th>
<th>X</th>
<th>X</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inolux</td>
<td>Material</td>
<td>Package</td>
<td>Variation</td>
<td>Orientation</td>
<td>Current</td>
<td>Lens</td>
<td>Color</td>
<td>Customized Stamp-off</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P = PLCC Type</td>
<td>36B = 3.6 x 3.1 x 3.1mm (60 Deg)</td>
<td>T = Top Mount</td>
<td>E = 30mA</td>
<td>(Blank) = Clear</td>
<td>U = Diffused</td>
<td>G = 520nm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Lot No.:

<table>
<thead>
<tr>
<th>Z</th>
<th>2</th>
<th>0</th>
<th>1</th>
<th>7</th>
<th>01</th>
<th>24</th>
<th>001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Tracker</td>
<td>Year (2017, 2018, .....)</td>
<td>Month</td>
<td>Date</td>
<td>Serial</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Packaging Information: 2000pcs Per Reel

Tape Dimension

<table>
<thead>
<tr>
<th>Symbol</th>
<th>A0</th>
<th>B0</th>
<th>K0</th>
<th>P0</th>
<th>P</th>
<th>P2</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spec</td>
<td>3.2±0.1</td>
<td>3.7±0.1</td>
<td>3.45±0.1</td>
<td>4.0±0.1</td>
<td>8.0±0.1</td>
<td>2.00±0.1</td>
<td>0.3±0.05</td>
</tr>
<tr>
<td>Symbol</td>
<td>E</td>
<td>F</td>
<td>D0</td>
<td>D1</td>
<td>W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spec</td>
<td>1.75±0.10</td>
<td>5.50±0.05</td>
<td>1.5±0.1</td>
<td>1.5±0.1</td>
<td>12±0.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Reel Dimension

Unit: mm
Packing Dimension

<table>
<thead>
<tr>
<th>Specification</th>
<th>Material</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carrier tape</td>
<td>Per EIA 481-1A specs</td>
<td>Conductive black tape</td>
</tr>
<tr>
<td>Reel</td>
<td>Per EIA 481-1A specs</td>
<td>Conductive black</td>
</tr>
<tr>
<td>Label</td>
<td>IN standard</td>
<td>Paper</td>
</tr>
<tr>
<td>Packing bag</td>
<td>220x240mm</td>
<td>Aluminum laminated bag/ no-zipper</td>
</tr>
<tr>
<td>Carton</td>
<td>IN standard</td>
<td>Paper</td>
</tr>
</tbody>
</table>

Others:
Each immediate box consists of 5 reels. The 5 reels may not necessarily have the same lot number or the same bin combinations of I\textsubscript{v}, λ\textsubscript{0} and V\textsubscript{f}. Each reel has a label identifying its specification; the immediate box consists of a product label as well.

Dry Pack

All SMD optical devices are **MOISTURE SENSITIVE**. Avoid exposure to moisture at all times during transportation or storage. Every reel is packaged in a moisture protected anti-static bag. Each bag is properly sealed prior to shipment.

Upon request, a humidity indicator will be included in the moisture protected anti-static bag prior to shipment.

The packaging sequence is as follows:
Reflow Soldering
- Recommended tin glue specifications: melting temperature in the range of 178~192 °C
- The recommended reflow soldering profile is as follows (temperatures indicated are as measured on the surface of the LED resin):

![Lead-free Solder Profile Diagram]

Precautions
- Avoid exposure to moisture at all times during transportation or storage.
- Anti-Static precaution must be taken when handling GaN, InGaN, and AlInGaP products.
- It is suggested to connect the unit with a current limiting resistor of the proper size. Avoid applying a reverse voltage.
- Avoid operation beyond the limits as specified by the absolute maximum ratings.
- Avoid direct contact with the surface through which the LED emits light.
- If possible, assemble the unit in a clean room or dust-free environment.

Reworking
- Rework should be completed within 5 seconds under 260 °C.
- The iron tip must not come in contact with the copper foil.
- Twin-head type is preferred.

Cleaning
Following are cleaning procedures after soldering:
- An alcohol-based solvent such as isopropyl alcohol (IPA) is recommended.
- Temperature x Time should be 50°C x 30sec. or <30°C x 3min
- Ultra sonic cleaning: < 15W/ bath; bath volume ≤ 1liter
- Curing: 100 °C max, <3min

Cautions of Pick and Place
- Avoid stress on the resin at elevated temperature.
- Avoid rubbing or scraping the resin by any object.
- Electro-static may cause damage to the component. Please ensure that the equipment is properly grounded. Use of an ionizer fan is recommended.
## Reliability

<table>
<thead>
<tr>
<th>Item</th>
<th>Frequency/ lots/ samples/ failures</th>
<th>Standards</th>
<th>Reference</th>
<th>Conditions</th>
</tr>
</thead>
</table>
| **Precondition**                  | For all reliability monitoring tests according to JEDEC Level 3 | J-STD-020  |           | 1.) Baking at 85°C for 24hrs  
2.) Moisture storage at 30°C/ 60% R.H. for 192hrs |
| **Solderability**                 | 1Q/ 1/ 22/ 0                     | JESD22-B102-B  
And CNS-5068 | Accelerated aging 155°C/ 24hrs  
Tinning speed: 2.5+0.5cm/s  
Tinning: A: 215°C/ 3+1s or B: 260°C/ 10+1s |
| **Resistance to soldering heat**  |                                   | CNS-5067    | Dipping soldering terminal only  
Soldering bath temperature  
A: 260+/5°C; 10-/1s  
B: 350+/10°C; 3+/0.5s |
| **Operating life test**           | 1Q/ 1/ 40/ 0                     | CNS-11829   |           | 1.) Precondition: 85°C baking for 24hrs  
85°C/ 60%R.H. for 168hrs  
2.) Temp=25°C; IF=30mA; duration 1000hrs |
| **High humidity, high temperature bias** | 1Q/ 1/ 45/ 0                     | JESD-A101-B | Temp: 85°C  
Humidity: 85% R.H., IF=5mA  
Duration: 1000hrs |
| **High temperature bias**         | 1Q/ 1/ 20                       | IN specs.   |           | Temp: 55°C  
IF=30mA  
Duration: 1000hrs |
| **Pulse life test**               | 1Q/ 1/ 40/ 0                     |            | Temp=25°C, II=30mA, Ip=100mA, Duty cycle=0.125 (tp=125 // s,T=1sec)  
Duration 500hrs |
| **Temperature cycle**             | 1Q/ 1/ 76/ 0                     | JESD-A104-A  
IEC 68-2-14, Nb | A cycle: -40 degree C 15min; +85 degree C 15min  
Thermal steady within 5 min..  
300 cycles  
2 chamber/ Air-to-air type |
| **High humidity storage test**    | 1Q/ 1/ 40/ 0                     | CNS-6117    | 60+3°C  
90+5/-10% R.H. for 500hrs |
| **High temperature storage test** | 1Q/ 1/ 40/ 0                     | CNS-554     | 100+10°C for 500hrs |
| **Low temperature storage test**  | 1Q/ 1/ 40/ 0                     | CNS-6118    | -40+5°C for 500hrs |
## Revision History

<table>
<thead>
<tr>
<th>Changes since last revision</th>
<th>Page</th>
<th>Version No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Release</td>
<td>1.0</td>
<td>02-03-2019</td>
<td></td>
</tr>
</tbody>
</table>

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