凱鼎科技股份有限公司
LightHouse Technology Co., LTD
303新竹縣湖口鄉新竹工業區光復路20號 Tel: 886-3-5971234 FAX: 886-3-597-9055
No. 20, Kuang-Fu Rd., Hsin-Chu Industrial Park, Hu-Kou, Hsin-Chu 303, Taiwan, R.O.C

Approval Sheet

Product	**1206 RGB SMD LED**
Part Number	**LH-12067P3-RGB1-C10-01**
Customer	
Issue Date	**2005/3/15**

Part Number

LH-12067P3-RGB1-C10-01

- Length and width
  - 3.2 x 1.5 mm
- Thickness
  - 0.67 mm
- Substrate Type : PCB
- Quantity of Effective Dies
- Lighting Color : Red, Green, Blue
- Sorting Type : 20 mA
- Intensity Code
- Series No

MAKER			CUSTOMER			
Prepared	Checked	Approved				

Opto-Electronical Characteristics

Chip Type : **R : AlGaInP**

G : InGaN

B : InGaN

Lens Type : **Diffusion Type**

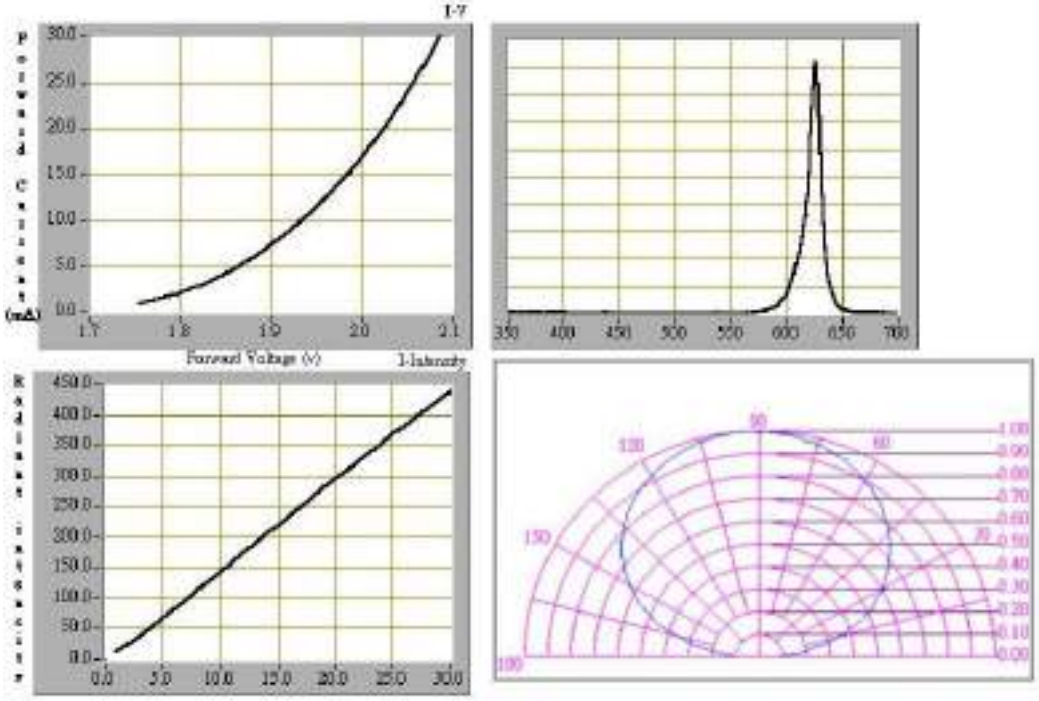
Parameter	Symbol	Condition	Value		Unit
Forward Voltage*	V_F	I_F = 20mA	R	1.8 ~ 2.3	V
			G	2.9 ~ 3.5	
			B	2.9 ~ 3.5	
Wavelength**	λd	I_F = 20mA	R	625 ± 5	nm
			G	515 ~ 525	
			B	465 ~ 475	
Luminous Intensity***	I_v	I_F = 20mA	R	240 ~ 310	mcd
			G	480 ~ 800	
			B	100 ~ 200	
View Angle	θ	I_F = 5mA	150		deg
Leakage current	Ir	-5V	2		μA

* The Forward Voltage tolerance is ± 0.03V.

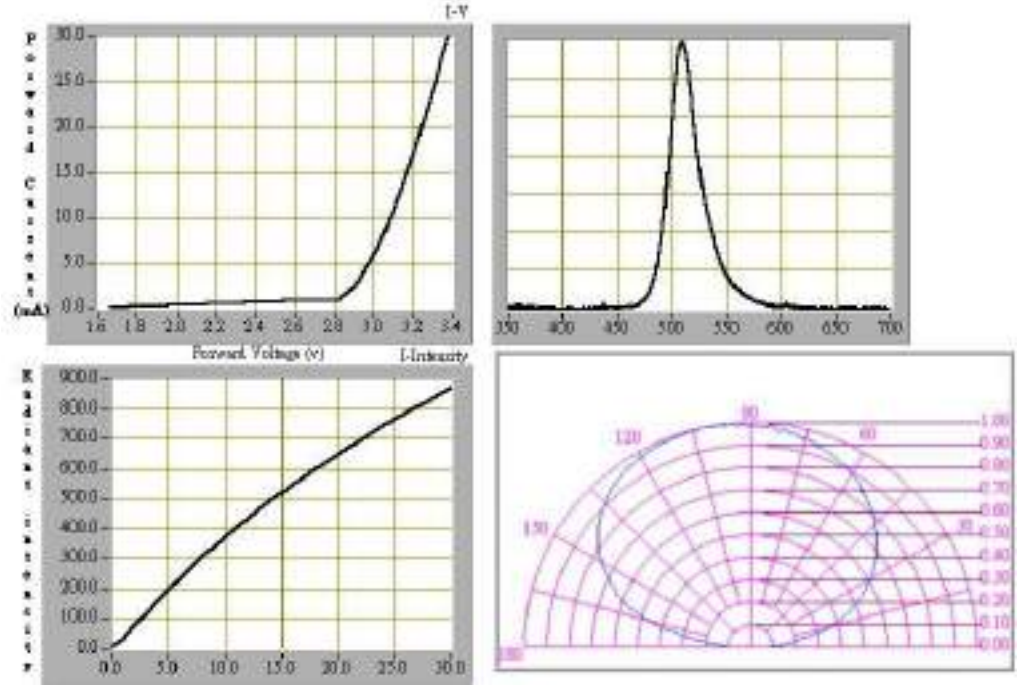
** The wavelength tolerance is ± 1 nm.

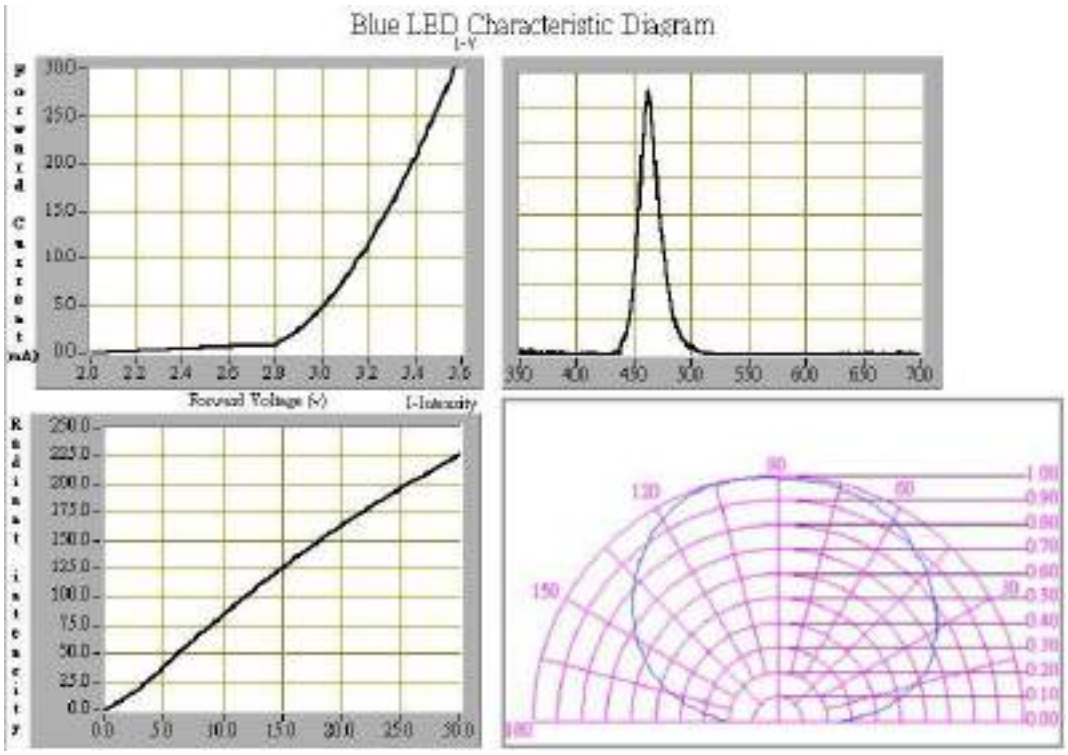
*** The luminous intensity tolerance is ± 5 mcd.

Red LED Characteristic Diagram



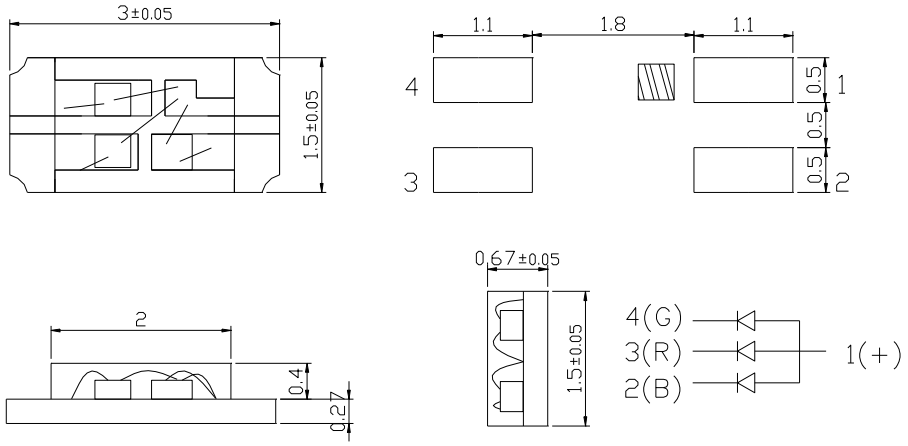
Green LED Characteristic Diagram




Blue LED Characteristic Diagram
I-V
Forward Current (mA)
Forward Voltage (V)
I-Intensity
Radiant intensity

Dimension and Recommend Solder Pattern

UNIT:mm

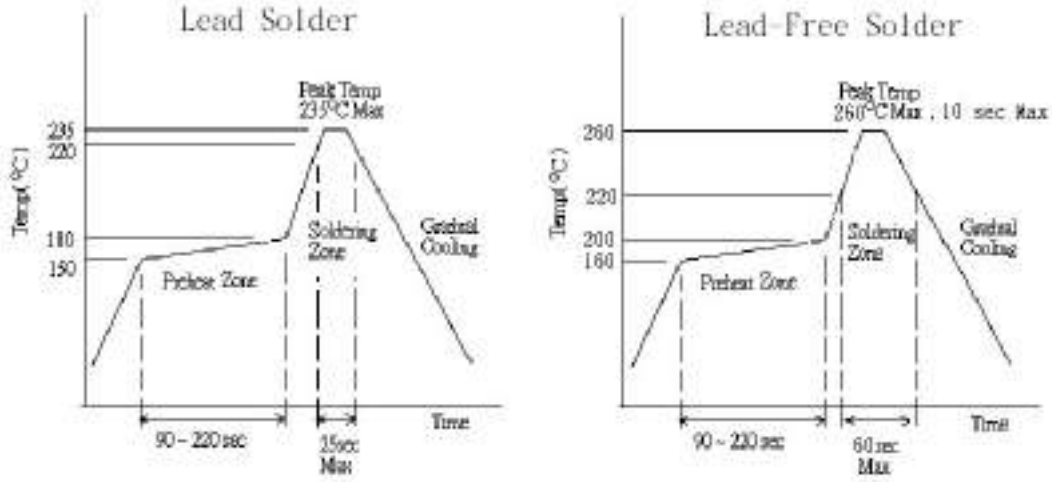


Surface Mounting Condition

In the automatic mounting of the SMD LED to the PCB, any bending, expanding, and pulling forces against the SMD LED should be minimized to prevent the electrical failures or mechanical damaged.

Reflow Soldering and Temperature Profile

The SMD LED is designed for the reflow soldering process. Too high temperature or too large temperature gradient may cause the electrical and optical failures.



Reliability Test Items

No	Item	Condition	Time/Cycle	Sample Size	Ac/Re
1.	Soldering Heat Test	260°C ± 5 °C	10 sec	60	0/1
2	High Temp. Storage	85 °C	1000 Hrs	60	0/1
3	Low Temp. Storage	-40 °C	1000 Hrs	60	0/1
4	Temperature Cycle Test	-40 °C ~ 80 °C	24 Cycles, 48 Hrs	60	0/1
5	High Temp. High Humidity Test	85 °C, 85 % RH	48 Hrs	60	0/1
6	Operation Life Test	Room Temp. 20 mA	1000 Hrs	60	0/1

Absolute Maximum Rating

Parameter	symbol	Rating		Unit
Reverse Voltage	Vr	5		V
Forward Current	If	30		mA
Power Dissipation	Pd	R	48	mW
		G	70	
		B	70	
Pulse Forward Current	I_{FP}*	R	100	mA
		G	100	
		B	100	
Storage Temperature	Ts	-40 ~ +85		°C
Operation Temperature	Topr	-40 ~ +80		°C
Electrostatic Discharge	ESD	2000		V

* Condition : 1/10 duty, 0.1 msec width.

Wavelength, Brightness, and Vf Classification (at 20mA)

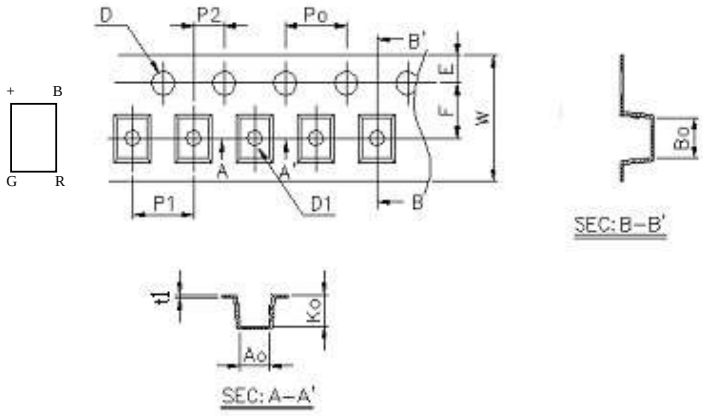
<table>
<tr><th rowspan="2">No</th><th colspan="3">Red</th><th colspan="3">Green</th><th colspan="3">Blue</th></tr>
<tr><th>λ</th><th>Iv</th><th>Vf</th><th>λ</th><th>Iv</th><th>Vf</th><th>λ</th><th>Iv</th><th>Vf</th></tr>
<tr><td>1</td><td rowspan="16">620
~
630</td><td rowspan="16">240
~
310</td><td rowspan="16">1.8
~
2.3</td><td rowspan="16">515
~
525</td><td rowspan="8">480
~
630</td><td rowspan="4">2.9
~
3.2</td><td rowspan="16">465
~
475</td><td rowspan="2">100-150</td><td>2.9-3.2</td></tr>
<tr><td>2</td><td>3.2-3.5</td></tr>
<tr><td>3</td><td rowspan="2">150-200</td><td>2.9-3.2</td></tr>
<tr><td>4</td><td>3.2-3.5</td></tr>
<tr><td>5</td><td rowspan="4">3.2
~
3.5</td><td rowspan="2">100-150</td><td>2.9-3.2</td></tr>
<tr><td>6</td><td>3.2-3.5</td></tr>
<tr><td>7</td><td rowspan="2">150-200</td><td>2.9-3.2</td></tr>
<tr><td>8</td><td>3.2-3.5</td></tr>
<tr><td>9</td><td rowspan="8">630
~
800</td><td rowspan="4">2.9
~
3.2</td><td rowspan="2">100-150</td><td>2.9-3.2</td></tr>
<tr><td>10</td><td>3.2-3.5</td></tr>
<tr><td>11</td><td rowspan="2">150-200</td><td>2.9-3.2</td></tr>
<tr><td>12</td><td>3.2-3.5</td></tr>
<tr><td>13</td><td rowspan="4">3.2
~
3.5</td><td rowspan="2">100-150</td><td>2.9-3.2</td></tr>
<tr><td>14</td><td>3.2-3.5</td></tr>
<tr><td>15</td><td rowspan="2">150-200</td><td>2.9-3.2</td></tr>
<tr><td>16</td><td>3.2-3.5</td></tr>
</table>

Reel Label

1206 RGB SMD LED (Group xx)
Part Number LH-12067P3-RGB1-C10-01

Iv (R:xx–xx,G:xx-xx,B:xx-xx mcd)
WL (R:xx–xx,G:xx-xx,B:xx-xx nm)
Vf (R:xx–xx,G:xx-xx,B:xx-xx V)
Serial No xxxxxxxxxxx Q'ty xxxx ea

Carrier Tape

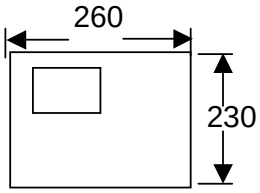


Item	Spec	Tol.(+/-)		Item	Spec	Tol.(+/-)
W	8.00	+0.3,-0.1		P2	2.00	±0.05
E	1.75	±0.10		P0 x 10	40.00	±0.20
F	3.50	±0.05		T1	0.229	±0.02
D	1.50	+0.1,-0		A0	1.78	±0.10
D1	1.00	±0.25		B0	3.40	±0.10
P0	4.00	±0.1		K0	0.79	±0.10

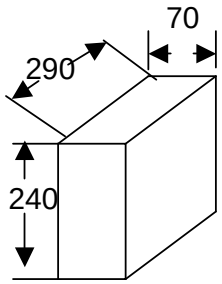
Unit : mm

Package

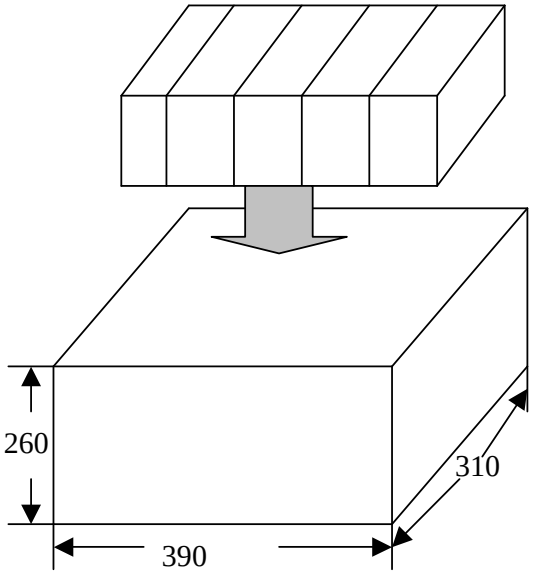
7 inch Anti-Static Reel
Max 4000 pcs / reel



Shielding Bag

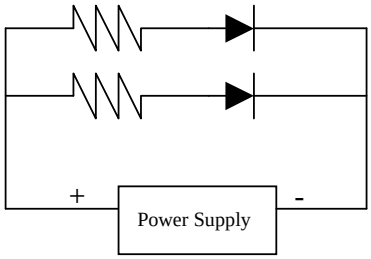


Maximum 5 bags in 1 inner box



5 inner box in one carton

Recommend Circuit Design



Caution

1. After open the package, the LED should be kept at 30°C, 60 % RH environment or less. The LED should be soldered within 48 hours (2 days) after opening the package.
2. The SMD LED is an ESD sensitive device. All the equipment and machine must be properly grounded.
3. Applying proper resistor for the circuit design is recommended. Otherwise slight voltage shift may cause big current change and the LED may be burn out.

Revision History

Rev	Major Change Since Last Revision	Date
1	New specification	2003/6/5
1.1	Correct the unit of Ir to μA.	2003/6/10
2	Add the Forward Voltage tolerance.	2005/3/15