Technical Data Sheet
PB3xx301V050A

UBLeds Co., LTD.

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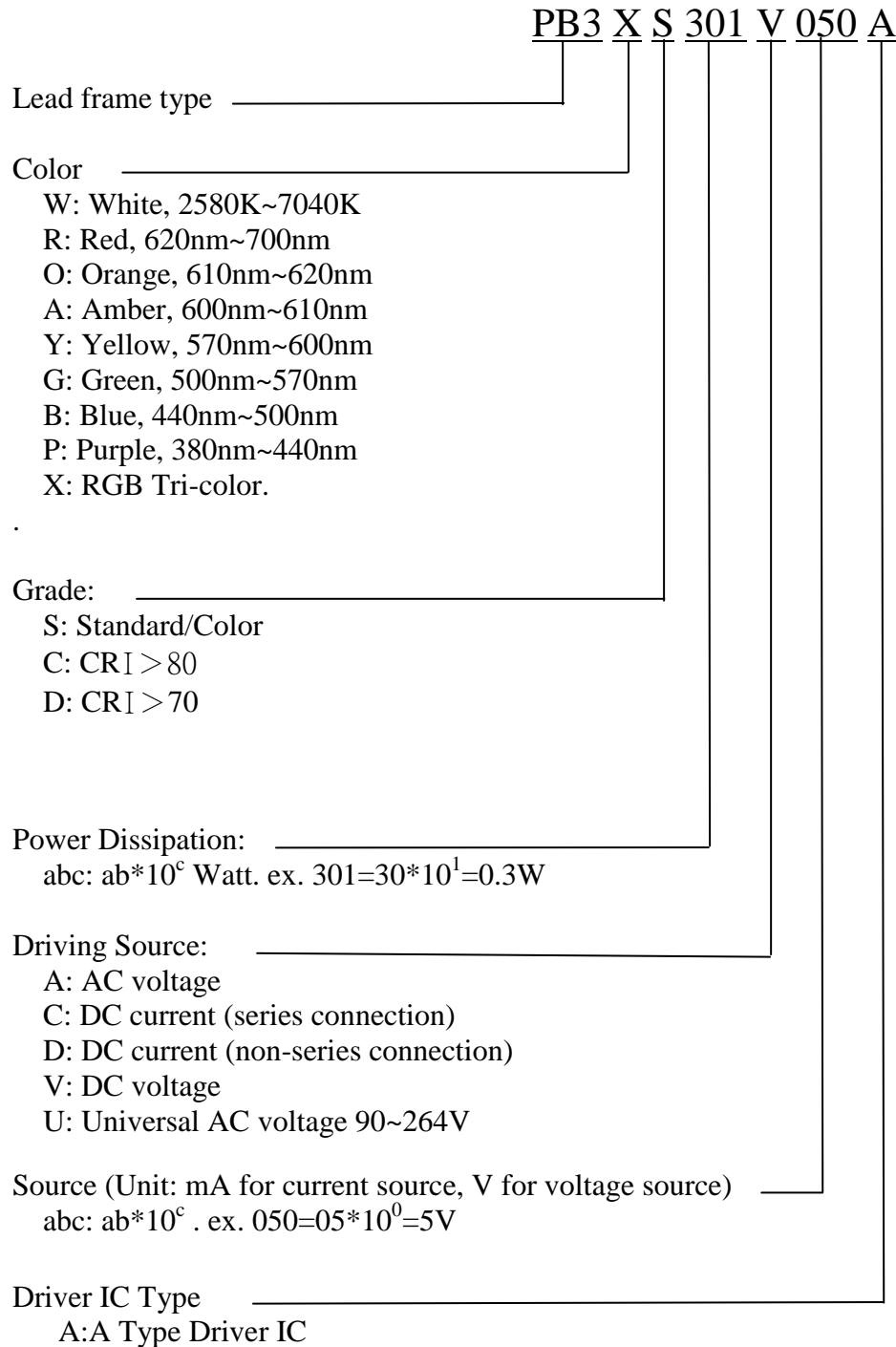Fax: +886-2-2268-2991
http://www.ubleds.com.tw

1. MODEL:

PB3 X S 301 V 050 A

Lead frame type —————

Color —————
   W: White, 2580K~7040K
   R: Red, 620nm~700nm
   O: Orange, 610nm~620nm
   A: Amber, 600nm~610nm
   Y: Yellow, 570nm~600nm
   G: Green, 500nm~570nm
   B: Blue, 440nm~500nm
   P: Purple, 380nm~440nm
   X: RGB Tri-color.
.

Grade: —————
   S: Standard/Color
   C: CRI＞80
   D: CRI＞70

Power Dissipation: —————
   abc: $ab*10^c$ Watt. ex. $301=30*10^1=0.3W$

Driving Source: —————
   A: AC voltage
   C: DC current (series connection)
   D: DC current (non-series connection)
   V: DC voltage
   U: Universal AC voltage 90~264V

Source (Unit: mA for current source, V for voltage source) —————
   abc: $ab*10^c$. ex. $050=05*10^0=5V$

Driver IC Type —————
   A:A Type Driver IC

2.FEARTURES

- Self-addressed led , single point control.
- Ѕmall package with integrated RGB leds and drive IC.
- Easy controlled by MCU.
- Simplifying circuit design and PCB layout for designer.
- Diffused encapsulant to make excellent distribution for luminous intensity and radiation. (patent pending)
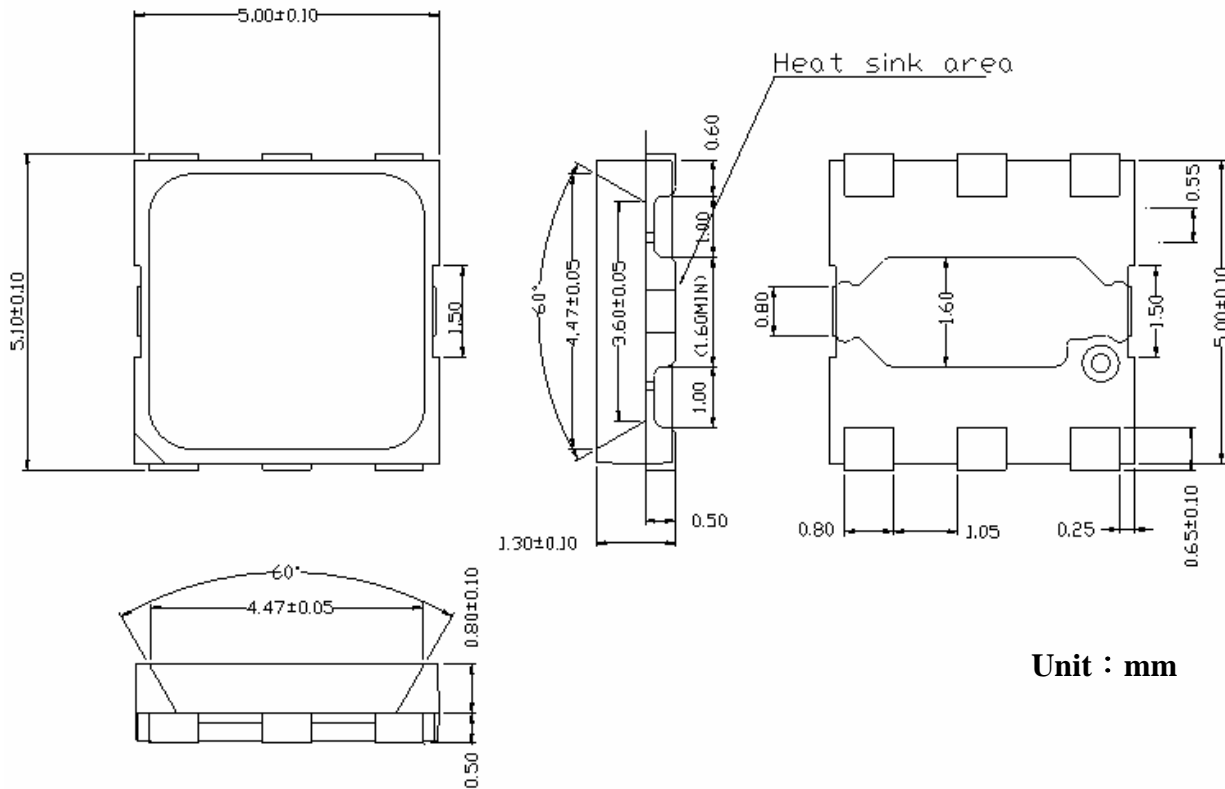- Wide viewing angle. (120°)

3.APPLICATIONS

- Automotive: indoor/outdoor lighting
- Channel Letter
- Decorative Lighting
- Glass panel
- LED Display

4. OUTLINE DRAWING:

4.1 Outline Drawing

Heat sink area

Unit：mm

4.2 Pin Assignment
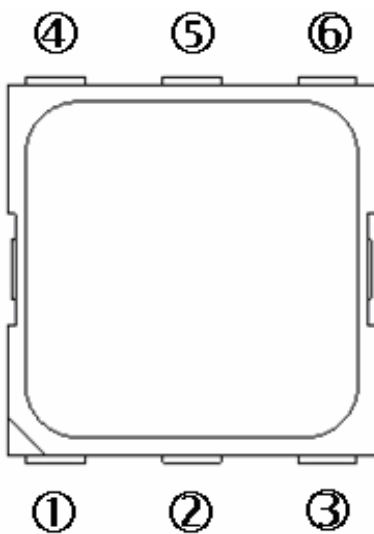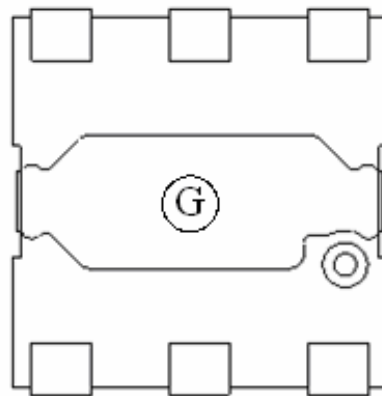
Pin No.	Function
①	Data In
②	Clock In
③	V_{SS}
④	Data Out
⑤	Clock Out
⑥	V_{DD}
Ⓖ	N/A if floating GND & heat dissipation if soldered.

Front View   Back view

5. ABSOLUTE MAXIMUM RATINGS (TA=25℃)

Parameter	Symbol	Range	Unit
Forward Voltage	V_{DD}	9	V
Power Dissipation	P_D	300	mW
Forward Current	I_F	60	mA
Frequency of clock	F_{CLK}	20	MHZ
Soldering Temperature	Tsol	260(5sec)	℃
Junction Temperature	Tj	125	℃

6. ELECTRICAL OPTICAL CHARACTERISTICS

Parameter		Symbol	Min.	Typ.	Max.	Unit
Forward Voltage		V_{DD}	4.5	5.0	7.0	V
High Level Input Voltage		V_{IH}	$0.7V_{DD}$		V_{DD}	V
Low Level Input Voltage		V_{IL}	0		$0.3V_{DD}$	V
Clock Frequency		F_{CLK}	0		15	MHZ
Clock Pulse Width High		T_{CLKH}	30			ns
Clock Pulse Width Low		T_{CLKL}	30			ns
Data Setup Before Clock		T_{SETUP}	10			ns
Data Hold Time		T_{HOLD}	5			ns
Rise Time		T_R			500	ns
Fall Time		T_F			400	ns
LED Wavelength V_{DD}=5V	R	λ_d	620		625	nm
	G		523		528	
	B		465		475	
Luminous Intensity V_{DD}=5V	R	I_V	480	520	550	mcd
	G		900	1000	1200	
	B		200	300	440	
Thermal Resistance		R_{js}			10	℃/W
Operating Temperature		T_{OP}	-30		80	℃
Storge Temperature		T_{STG}	-40		100	℃

7. CHARACTERISTICS

| R Radiation (T_a=25℃, V_{DD}=5V)G	G Radiation (T_a=25℃, V_{DD}=5V)
Radiation (T_a=25℃, V_{DD}=5V)	Spectrum(T_a=25℃, V_{DD}=5V)
Luminous Intensity v.s. Forward Voltage	
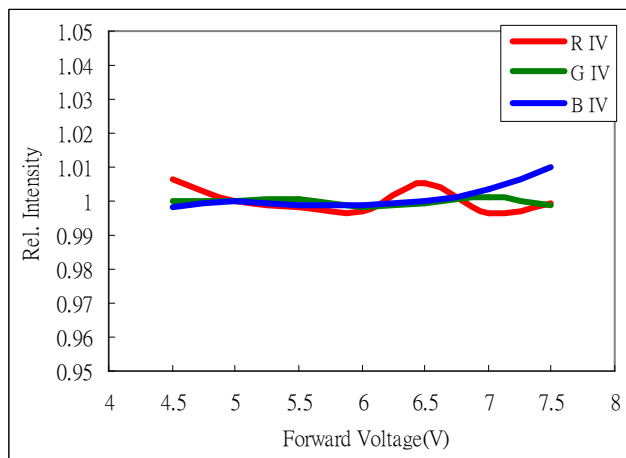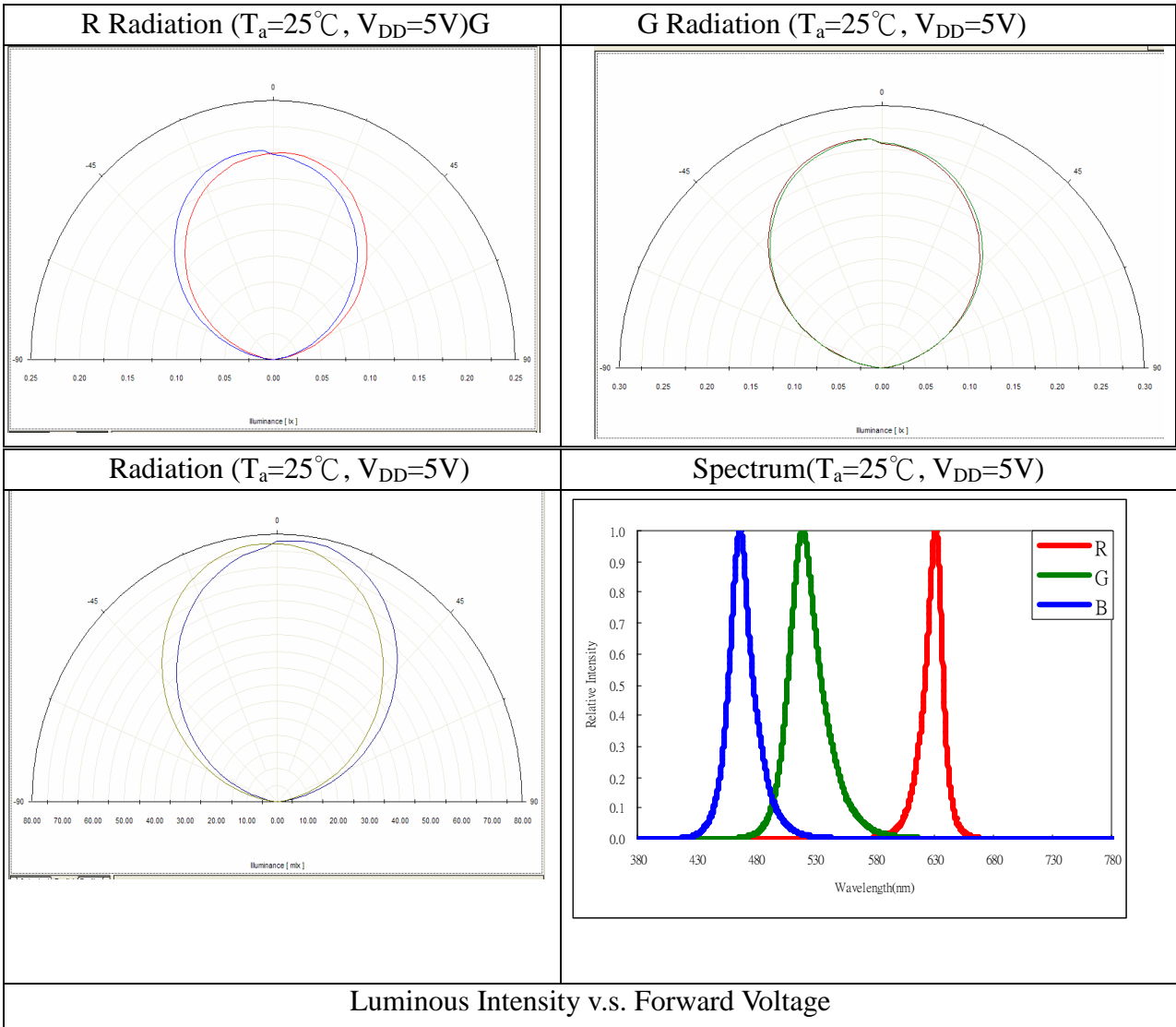
8. PROTOCOL AND APPLICATION NOTES

8.1.A Protocol
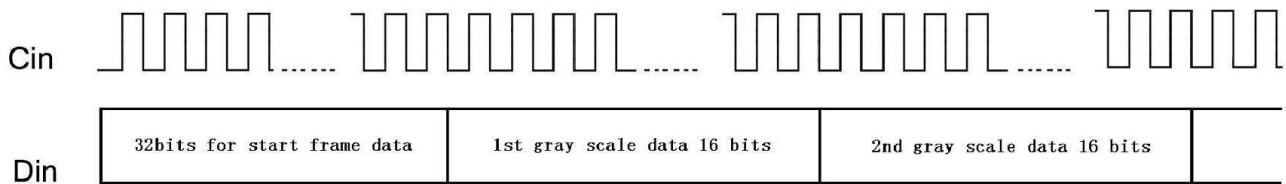
1. The first 32 bits of "0" is the start frame data, followed by data frame. At the rising edge of Cin , the high bit of start frame is sent first, then the low bit.

2. The MCU next to the controller receives the first data frame, the frame contains one start bit of "1" and three sets of 5-bit gray level data for RGB.

3. After the data is read into the MCUs , the controller send the corresponding pulse to MCUs, then the new data goes into effect.

8.1.B Typical Applications：
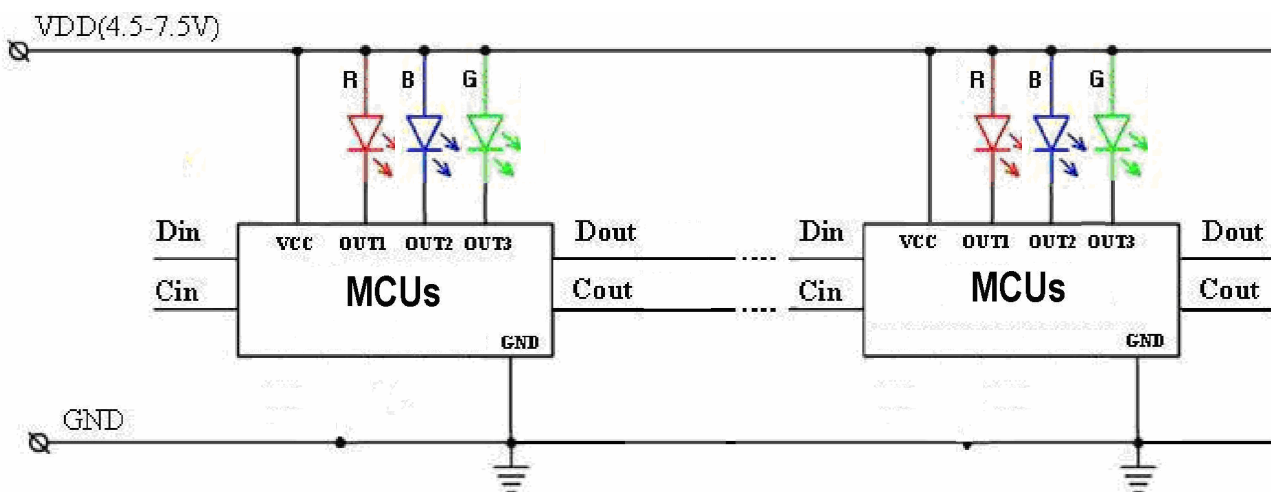
8.2 Application Notes

Example : One RBG unit

Color Pattern: 1RRR RRBB BBBG GGGG

MSB will be transmitted first.

Case I : 100%Red for 1st LED, 100% Blue for 2nd LED, 100% Green for 3rd LED：

0000 0000 0000 0000 0000 0000 0000 0000
1111 1100 0000 0000 1000 0011 1110 0000 1000 0000 0001 1111

Case II : 16/31 Red for 1st LED, 16/31 Blue for 2nd LED, 16/31 Green for 3rd LED：

0000 0000 0000 0000 0000 0000 0000 0000
1100 0000 0000 0000 1000 0010 0000 0000 1000 0000 0001 0000

Case III : 100%White for 1st LED, 16/31 Blue +16/31 Green for 2nd LED, 15/31 Green for 3rd LED：

0000 0000 0000 0000 0000 0000 0000 0000
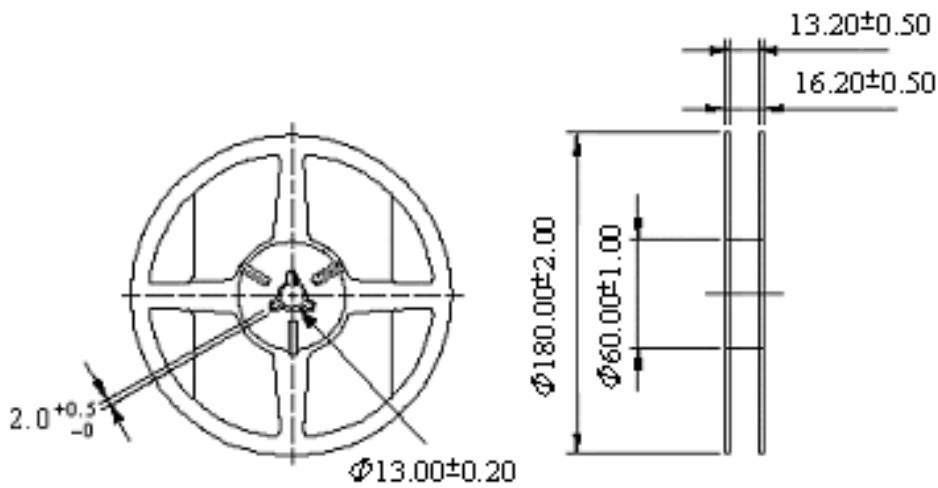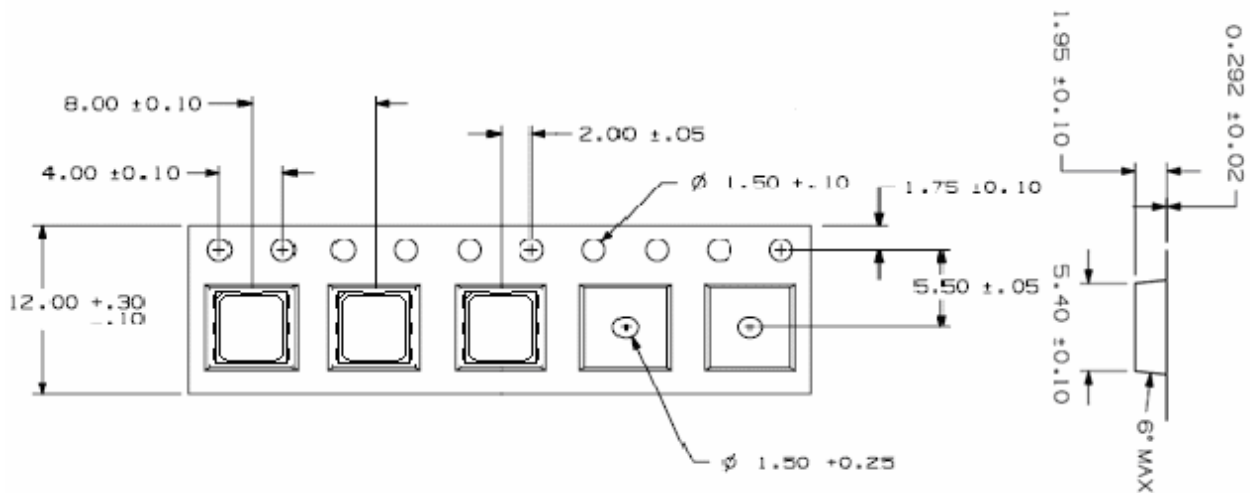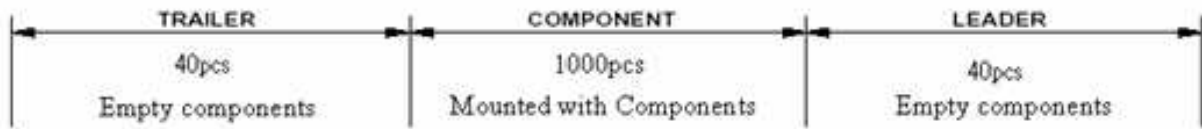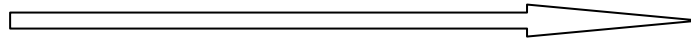1111 1111 1111 1111 1000 0010 0001 0000 1000 0000 0000 1111

9. REEL PACKAGE:

Pull Direction

Note:
1. Unit: mm
2. 1,000 pcs / reel

10. SHIPPING PACKAGE:

Anti-Moisture foil bag

Moisture absorbent agent

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Part No: **PB3XS301V050A**

LOT NO: SRF060404

	MIN.	MAX.	Unit
CCT(WLD):	4900	5100	K
IV(PO):	66.0	73.5	lm
VF(IF):	3.19	3.34	V

Q'TY: 1000 ea

UBLeds

Part No. : PB3XS301V050A

Q'ty : 3000 pcs

Date : 2009.06.04

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Part No. : PB3XS301V050A
Q'ty : 18000 pcs

Date : 2009.06.04

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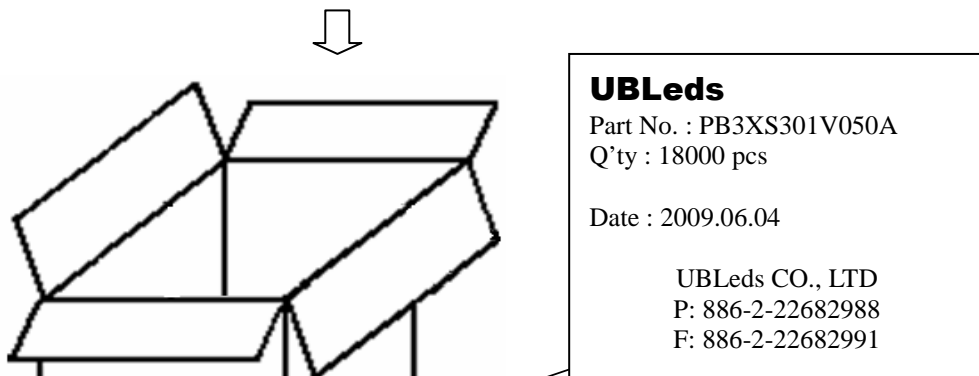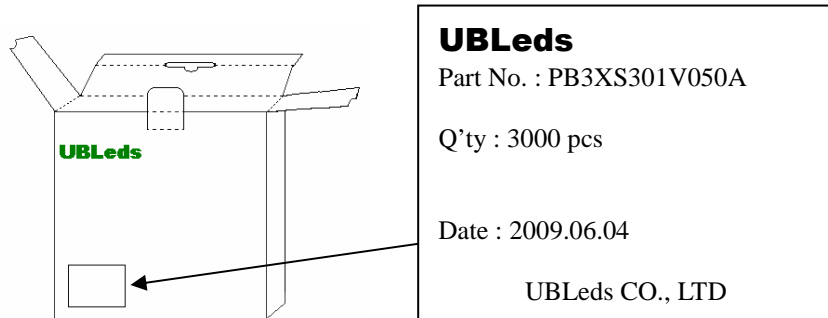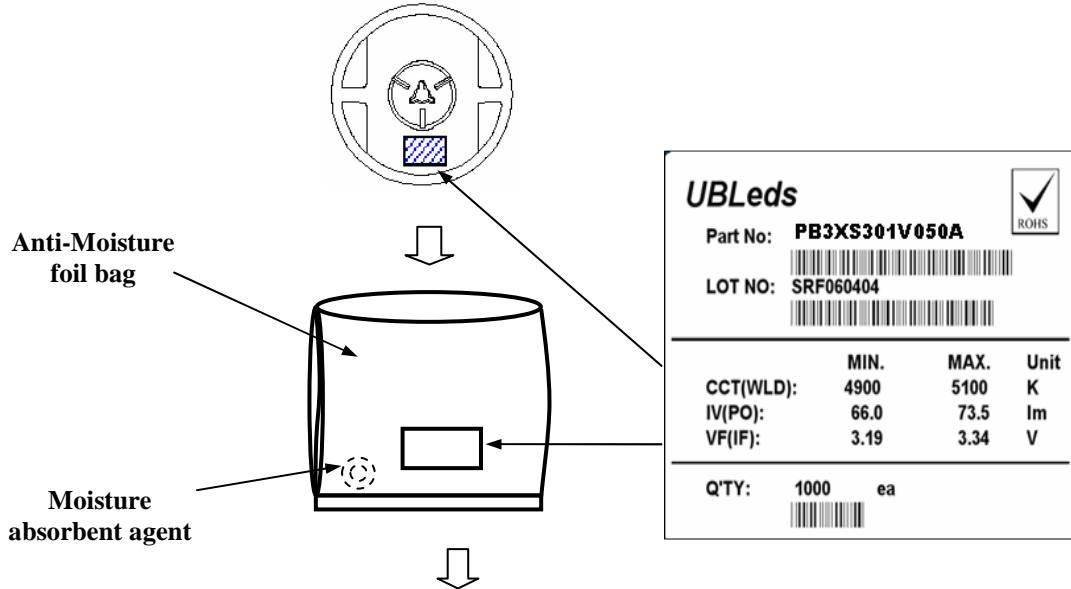
Note:
1. 1000 pcs (max.) / reel
2. 3 reels / box
3. 6 box / carton

11. RELIABILITY PLAN:

* The reliability of products shall be satisfied with items listed below.
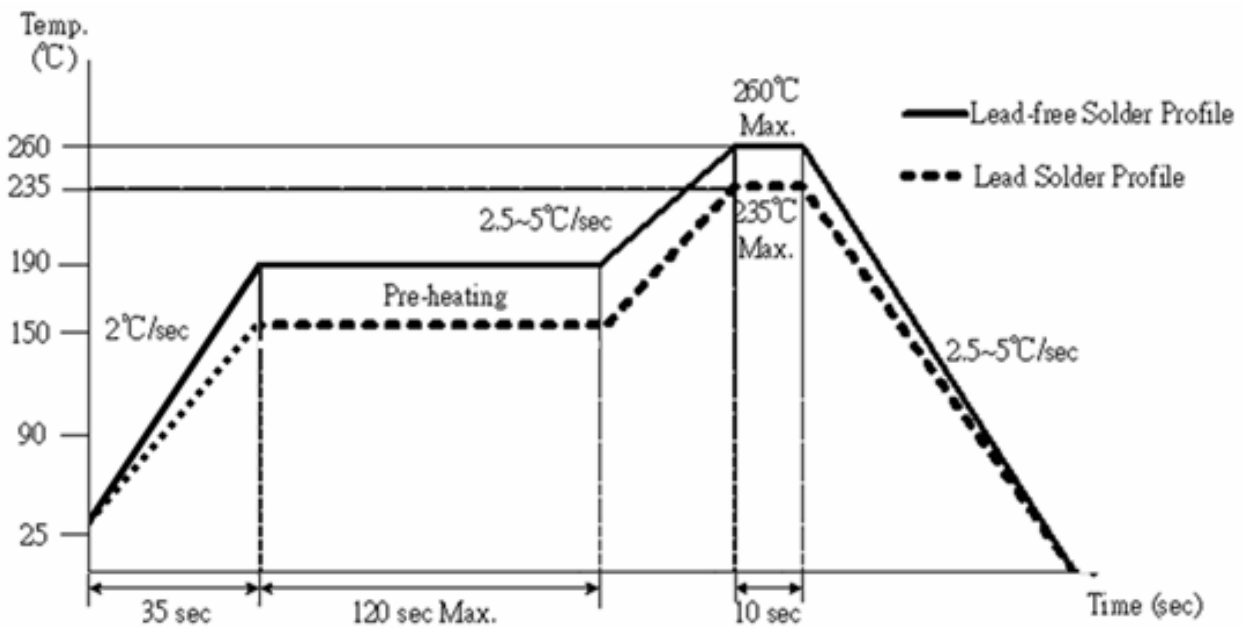
Confidence Level :   90 % ,   LTPD : 10 %

No	Test Item	Description & Condition		Sample size	Ac/Re
1	Solderability	Tsld =235±5℃, 10sec,	1 time	22	0/1
2	Low Temperature Storage	Ta = -40 °C	1000 hrs	22	0/1
3	High Temperature Storage	Ta = 100 °C	1000 hrs	22	0/1
4	Temperature Cycle	-40°C ~ 25°C ~ 100°C ~ 25 °C 30min 5min 30min 5 min	300 cycles	22	0/1

12. SOLDERING CONDITIONS:

(1) Recommended Re-flow profile

Recommended Soldering Pad

(Unit : mm)
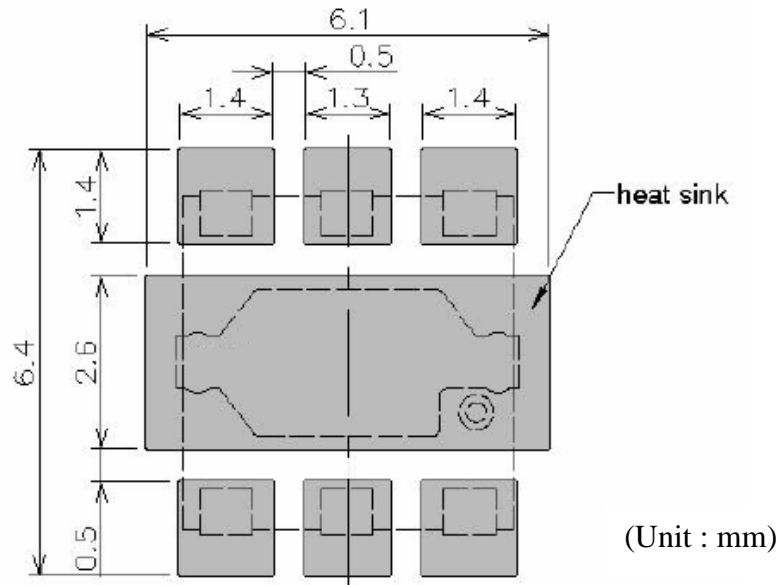
(2) Re-flow soldering should not be done more than two times.
(3) It is recommended that the user use the nitrogen reflow method.
(4) When soldering, don't put stress on the LEDs during heating.
(5) After soldering, don't warp the circuit board.
(6) It is recommended that isopropyl alcohol (IPA) be used as a solvent for cleaning the LEDs.

13.CAUTIONS:

(1)Storage

・Before opening the package :

The LEDs should be kept at 30℃ or less and 30%RH~85%RH. The LEDs should be used within a year. When storing the LEDs, moisture proof packaging with desiccant (Silica gel)is recommended.

・After opening the package :

The LEDs should be kept at 30℃ or less and 30%RH~70%RH.The LEDs should be soldered within 168hours (7days) after opening the package. If unused LEDs remain, they should be stored in moisture proof packages, such as sealed containers with packages of moisture desiccant (Silica ge1), or reseal the moisture proof bag again.

If the moisture desiccant (Silica ge1)has faded away or the LEDs have exceeded the storage time, baking treatment should be performed using the fo1lowing conditions.

Baking treatment: 24 hours at 60℃ on tap and reel, 7 hours at 125℃ have no reel&tap.

Please avoid conditions which may cause the LED to corrode, tarnish or disco1or. This corrosion or discoloration might lower solderability or might effect on optical characteristics.-Please avoid rapid transitions in ambient temperature, especially in high humidity environments where condensation can occur.

・Moisture Proof package

When moisture is absorbed into the SMT package it may vaporize and expand during soldering. There is a possibility that this can cause exfoliation of the contacts and damage to the optical characteristics of the LEDs. For this reason, the moisture proof package is used to keep moisture to a minimum in the package. A package of a moisture desiccant (silica gel)is inserted into the moisture proof bag-The silica gel changes its color from blue to pink as it absorbs moisture.

(2)Static Electricity

・Static electricity or surge voltage damages the LEDs. It is recommended that a wrist band or an anti-electrostatic glove and shoe be used when handling the LEDs.

・All devices, equipment and machinery must be properly grounded. It is recommended that measures be taken against surge voltage to the equipment that mounts the LEDs.

・when inspecting the final products in which LEDs were assembled, it is recommended to check whether the assembled LEDs are damaged by static electricity or not. It is easy to End static-damaged LEDs by a light-on test or a V_F test at a lower current (below l mA).

・Damaged LEDs will show some unusual characteristics such as the leak current remarkably increases, the forward voltage becomes lower, or the LEDs do not light at the low current. (Criteria : $V_F>2.0V$ at $I_F=0.5mA$.)

(3)Heat Generation

・Please consider the heat generation of the LED when making the system design that it's very importance. The coefficient of temperature increase per input electric power is effected by the thermal resistance of the circuit board and density of LED placement on the board, and other components. It is necessary to avoid intense heat generation and operate within the maximum ratings given in this specification.

・The operating current should be decided after considering the ambient maximum temperature of LEDs.

(4)Others

・Care must be taken to ensure that the reverse voltage will not exceed the absolute maximum rating when using the LEDs with matrix drive.

・The LED light output is strong enough to injure human eyes. Precautions must be taken to prevent looking directly for more than a few seconds. Flashing lights have been known to cause discomfort in people; you can prevent this by taking precautions during use. Also, people should be cautious when using equipment that has had LEDs incorporated into it.