

JiangXi LatticePower Semiconductor Corporation Specification

Product Name: LRA

Product P/N: RA

Client name: _____

Client P/N: _____

Version No.: V4.1

Sending Date: 2019.8.20

Client Approval	
Approval	Audit

Confirmation: _____ **Approval:** _____

Address: No.699 Aixihu North Road, Nanchang, Jiangxi Province, China

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1. Features

- ✧ PLCC package , High brightness ,High efficiency
- ✧ Size: 3.5mm*2.8mm*1.85mm
- ✧ RoHS compliant
- ✧ MSL 2a
- ✧ AECQ-102
- ✧ Compatible with SMT
- ✧ Viewing angle 120°
- ✧ Package: Max: 2000pcs /reel



2. Applications

Automotive Exterior Lighting

Stop tail Lamp, CHMSL

3. Performance

a) Absolute Maximum Ratings

Parameter	Symbol	Maximum Rating	Unit
DC Forward Current	I_F	70	mA
Power Dissipation	P	0.2	W
Pulsed Forward Current	I_{FP}	100	mA
LED Junction Temperature(DC mode)	T_j	125	°C
Operating Temperature Range	T_{opr}	-40~110	°C
Storage Temperature	T_{stg}	-40~125	°C
ESD Human Body Mode	----	2000	V

Notes :

- ✧ Absolute Maximum Ratings at $T_a=25^{\circ}\text{C}$
- ✧ I_{FP} Conditions with pulse width $\leq 10\mu\text{s}$ and $D=0.1$

b) Electro-Optical Characteristics (T solder pad =25 °C, I_F =50mA)

Item	Symbol	Condition	Min	Typ	Max	Unit
Forward voltage	V _F	I _F =50mA	1.90	----	2.65	V
Luminous Flux	Φ _v	I _F =50mA	----	10	----	lm
View Angle	2θ1/2	I _F =50mA	----	120	----	deg
Reverse Current	I _R	V _R =25V	----	----	5	μA
Dominant wavelength	WLD	I _F =50mA	610	615	620	nm
Thermal Resistance	R _{th}	I _F =50mA	----	60	----	°C/W

Notes :

- ✧ Luminous flux measurement tolerance: ±6%
- ✧ Electric and optical data is tested at 20 ms pulse condition

c) Luminous Flux Characteristics (T solder pad = 25 °C, I_F =50mA)

Product	WLD	Luminous Code	Luminous Flux		Order Code (e. g.)
			min	max	
RA	610-615	M2	6.4	8	RA-R1-M4-DG4
		M3	8	10	
		M4	10	12.5	
		M5	12.5	15.8	
	615~620	M2	6.4	8	RA-R2-M4-DG4
		M3	8	10	
		M4	10	12.5	
		M5	12.5	15.8	

4. Product Order Code

RA - R1 - M3 - DG2
 ① ② ③ ④

- ① Product Type
- ② Dominant wavelength
- ③ Brightness Level
- ④ V_F Level

Shipping label (e.g.)



LatticePower (JiangXi) Corporation

Item RA-R2-M3-DG6 LRA



Reel ID: ARAA00000001



Qty:2000



6RAXAAAA

Date:2019-09-20

5. Bin Regulations (T solder pad = 25 °C, I_F =50mA)

a) Dominant wavelength Groups

Group Code	Min.	Max.
R1	610	615
R2	615	620

b) Luminous Flux Groups

Group Code	Min.	Max.
M2	6.4	8
M3	8	10
M4	10	12.5
M5	12.5	15.8

c) Voltage Groups

Group Code	Range
DG5	2.1~2.25
DG6	2.25~2.4
DG7	2.4~2.55
DG8	2.55~2.7
DG9	2.7~2.85

Notes :

- ✧ It maintains a tolerance of ±10% on luminous flux measurements.
- ✧ Forward voltage(VF) ± 0.1V

6. The Photoelectric Characteristics Graph (T solder pad

= 25 °C, $I_F = 50\text{mA}$)

Fig 1. Color Spectrum

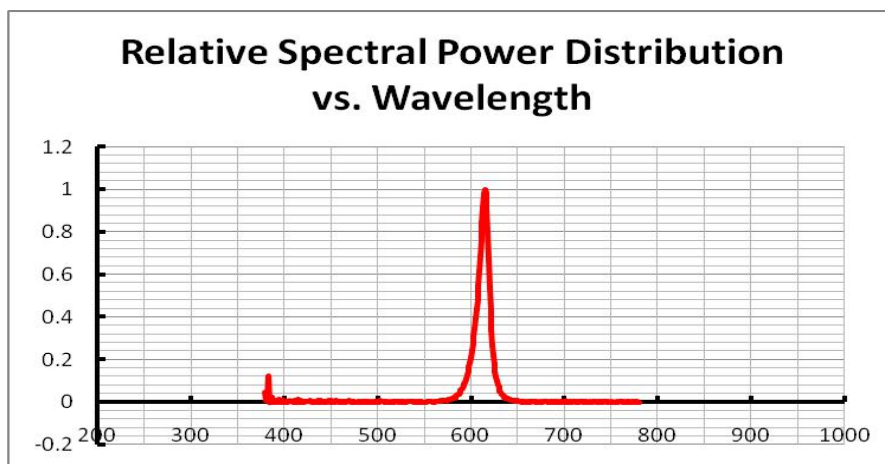


Fig 2. Viewing Angle Distribution

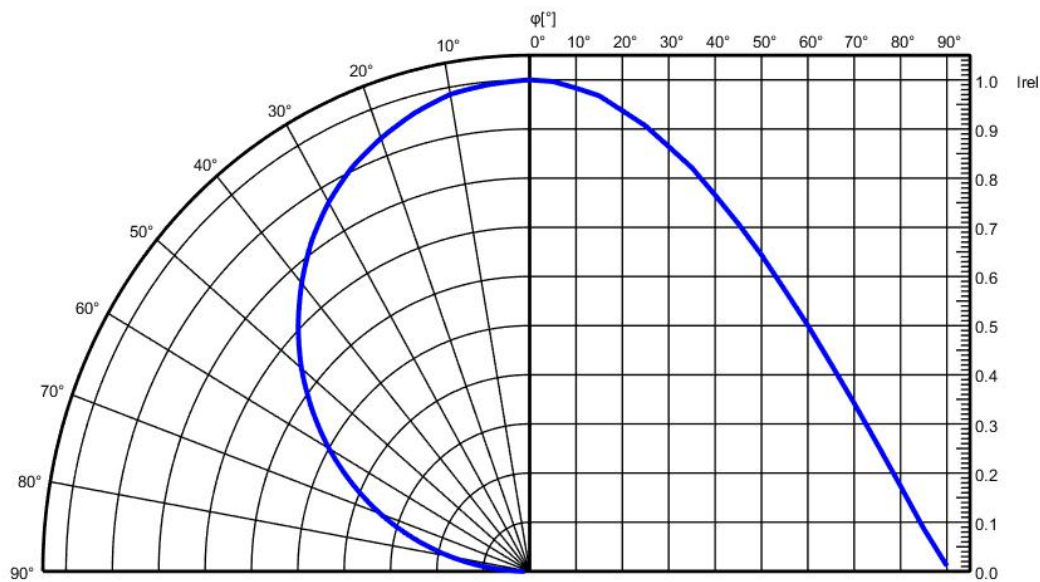


Fig 3. Forward Voltage vs. Forward Current

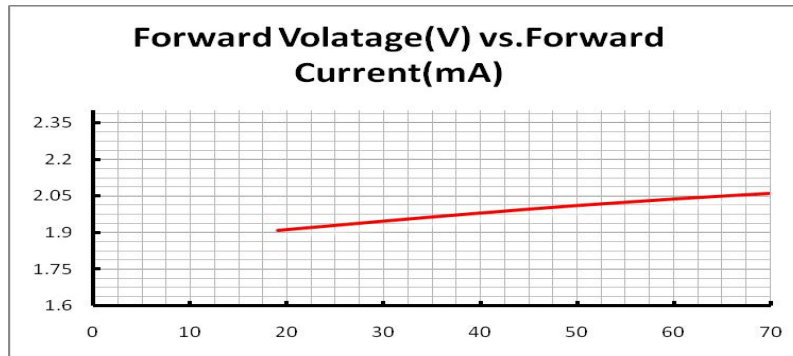


Fig 4. Forward Current vs. Relative Luminous Intensity

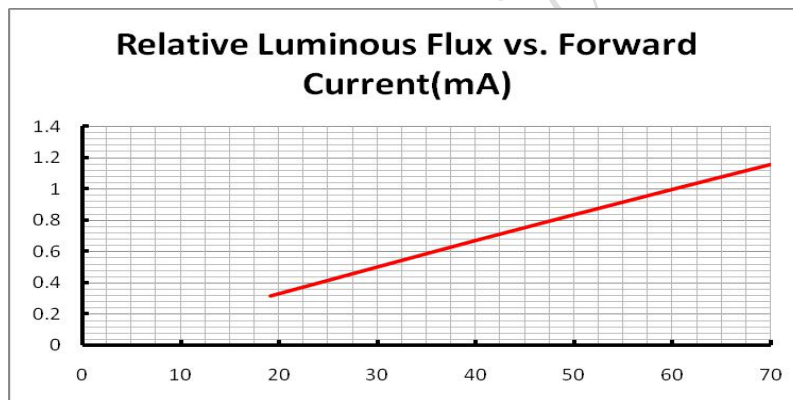


Fig 5. Forward Current vs. Wavelength Shift

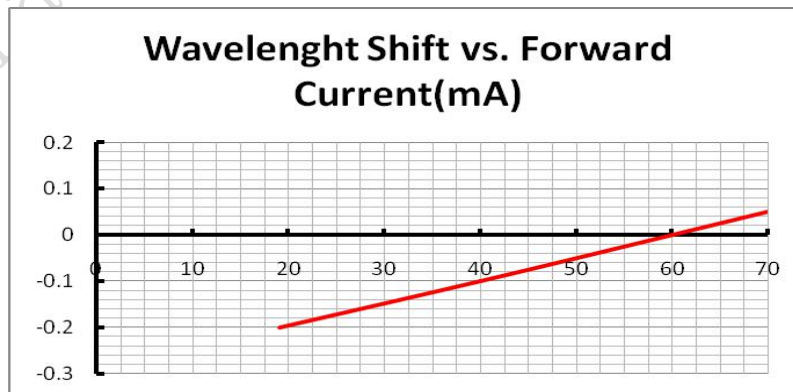


Fig 6. Relative Light Output vs. Junction Temperature

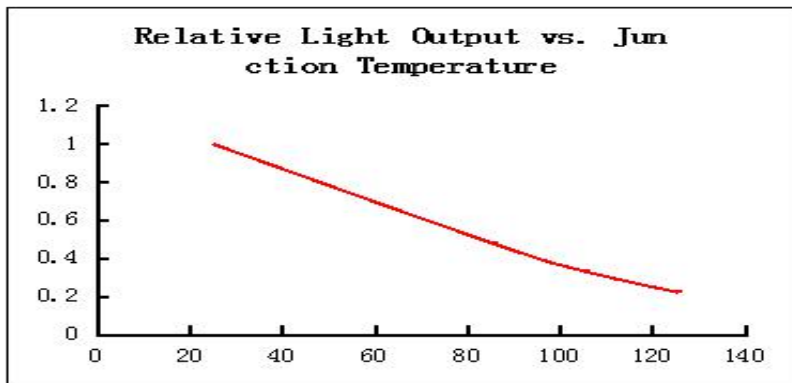


Fig 7. Junction Temperature vs. Forward Voltage shift

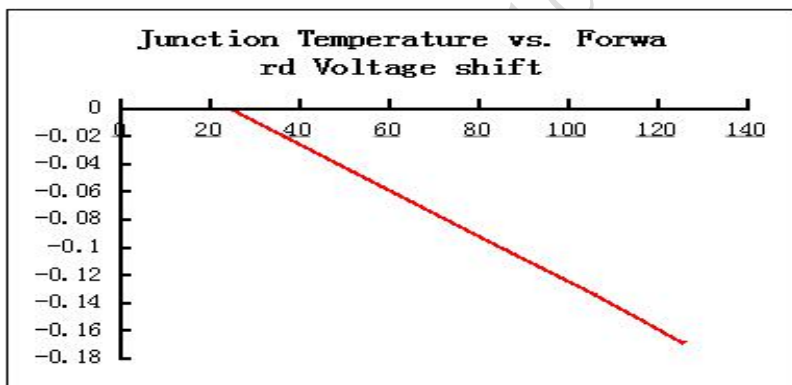


Fig 8. Dominant wavelength shift vs. Junction Temperature

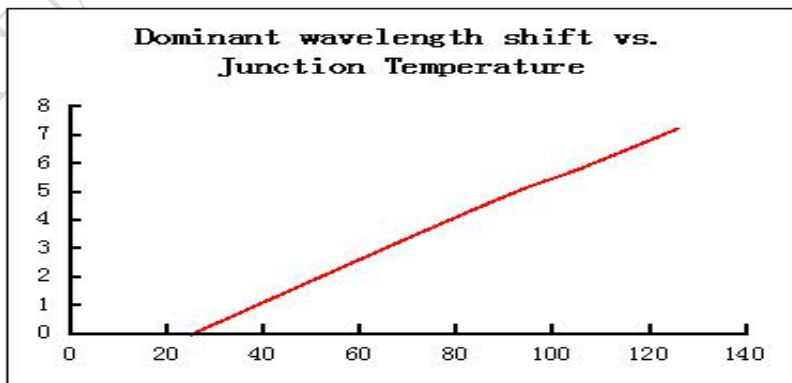
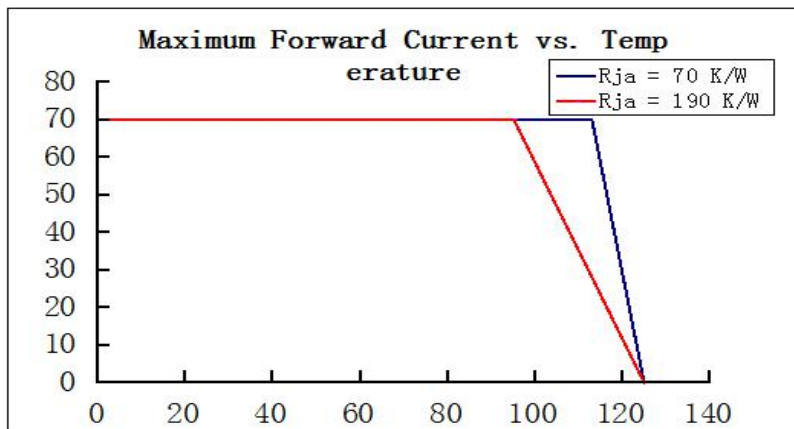
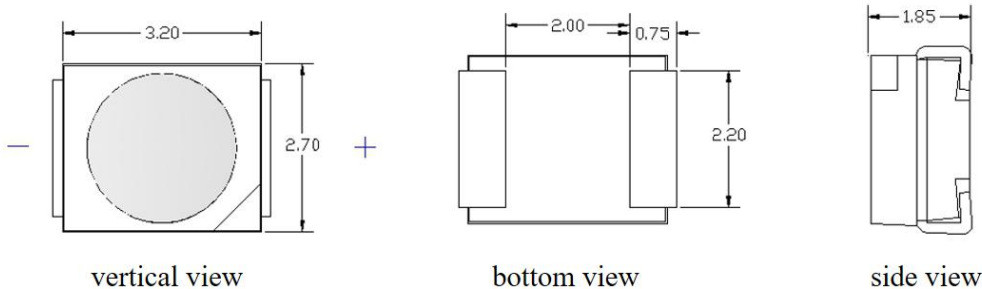


Fig 9. Maximum Forward Current vs. Temperature

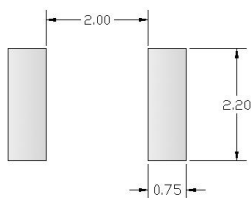


7. Product and PCB Pad Dimensions

Product Dimensions:



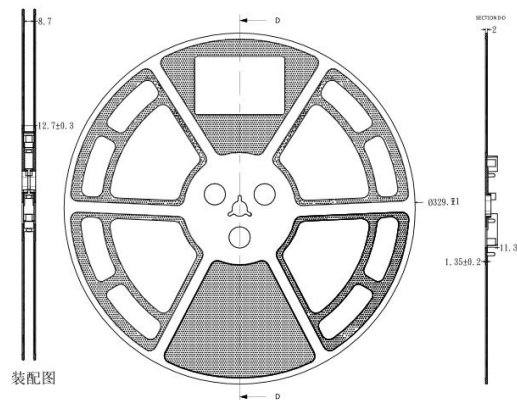
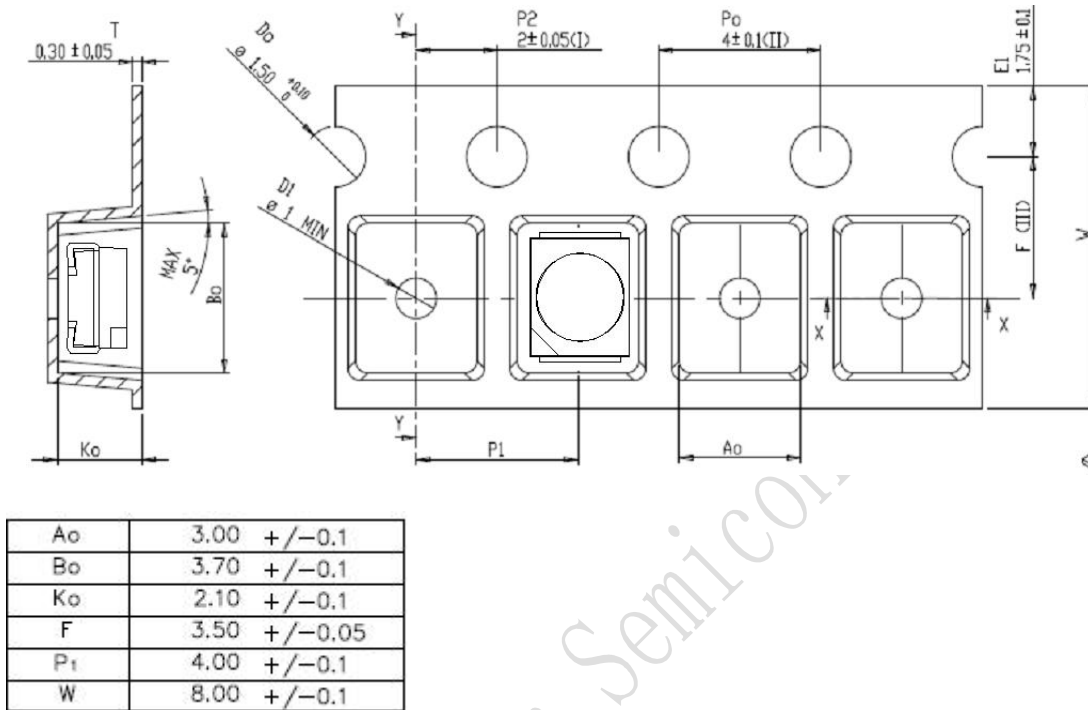
PCB Pad Dimensions



Notes:

- ✧ All dimensions are in millimeters
- ✧ Size is not marked in accordance with tolerance $\pm 0.15\text{mm}$ and dimension tolerances in accordance with drawings

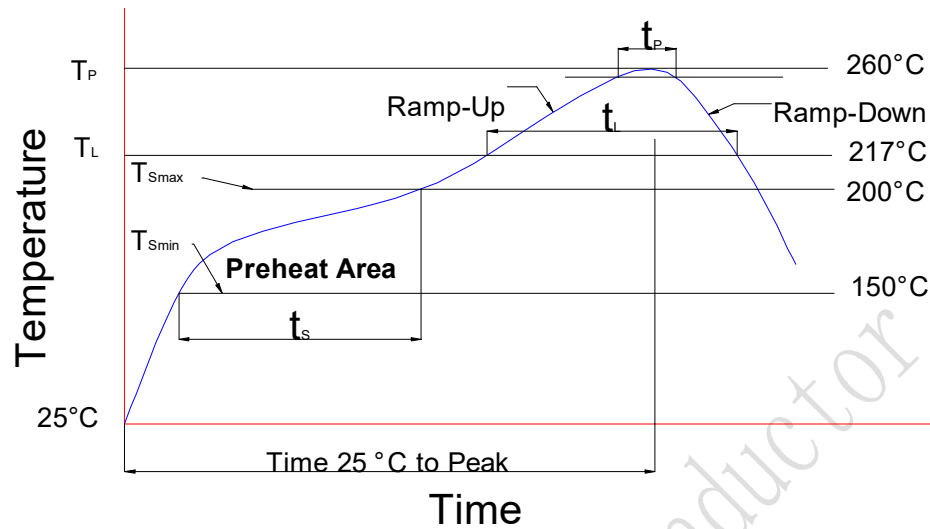
8. Reel Dimensions



Notes:

- ◇ Reel: 2000 pcs.
 - ◇ The tape packing method complies with IJSC0806 (Packing of Electronic Components on Continuous Tapes).
 - ◇ When the tape is rewound due to work interruptions, no more than 10N should be applied to the embossed carrier tape.
- The LEDs may stick to the cover tape.

9. Reflow Soldering Characteristics



Compatible with the JEDEC-J-STD-020D, using the parameters listed below.

Profile Feature	Lead-Free Solder
Average Ramp-Up Rate (T_{Smax} to T_P)	3 °C/sec max.
Preheat:Temperature Min (T_{Smin})	150
Preheat:Temperature Max (T_{Smax})	200
Preheat:Time (t_{Smin} to t_{Smax})	60-180 secs
Time Maintained Above:Temperature (T_L)	217°C
Time Maintained Above:Time (t_L)	60-150 secs
Peak/Classification Temperature(T_P)	255±5°C
Time Within 5°C of Actual Peak Temperature (t_P)	20~40 secs
Ramp-Down Rate	4°C/sec max.

10. Reliability

a) Tests and Results

Test Item	Reference Standard	Test Conditions	Test Duration	Failure Criteria#
External Visual	JESD22 B-101	Visual Inspection	/	#1
D.P.A	AEC-Q101-004	Random Sample HSTRB,HAST,TC	/	#1
Vibration	JESD22 B-103	0.06 inch displacement,20 to 100 Hz,50 g 100 Hz to 2kHz,	4times	#1
ESD	JESD22 A-114	Human-body mode, R = 1.5 k Ω , C = 100pF	3 times Negative/ Positive	#1
Physical Dimension	JESD22 B-100	Verify physical dimensions againstdevice mechanical drawing	3times	#1
Mechanical Shock	JESD22 B-104	1500 g's for 0.5 ms, 5 blows, 3 orientations	3times	#1
Parametric Verification	JESD22 A-108	25°C, 1000 hours @70mA	1000hrs	#1
Temperature Cycling	JESD22 A-104	Tc = -40°C ~ 100°C, 30 min. dwell,5 min transfer, 1000 cycles	1000hrs	#1
Power Temperature Cycle	JESD22 A-105	Ta = -40°C~ 105°C, If = 70mA, 20 min dwell / 20 min transition (1 hour cycle), 2 min ON / 2 min OFF	1000hrs	#1
High Humidity High Temp. Operating Life	JESD22 A-101	85°C/85% RH, @ 70mA	1000hrs	#1
High TemperatureOperating Life	JESD22 A-108C	Ts = 100°C, If = 70mA	1000hrs	#1
Low Temperature Operating Life	JESD22 A-108C	Ta = -40°C, If = 70mA	1000hrs	#1
Low Temperature Storage Life	JESD22 A-119	Ta = -40°C, non-operating	1000hrs	#1
High Temperature Storage Life	JESD22 A-103B	Ta = 100°C, non-operating	1000hrs	#1
Thermal Shock	JESD22 A-104	-40°C ~ 125°C, 1000 cycles	1000cycles	#1

b) Failure Criteria

Criteria #	Items	Conditions	Failure Criteria
#1	Forward Voltage (V_F)	I_F	$> \text{Initial value} \times 1.1$ or $< \text{Initial value} \times 0.9$
	Luminous Flux (Φ_v)	I_F	$< \text{Initial value} \times 0.7$
#2	Solderability	-	Less than 90% solder coverage

11. Cautions

a) Storage

- ◆ Do not place the chips in damp places, Storage temperature between 5 °C and 30 °C, Relative humidity under 30%.
- ◆ After opening the package, it is recommended to finish the reflow within 24 hours. The workshop conditions are $\leq 30^\circ\text{C}/60\%\text{RH}$
- ◆ If it is wet, the patch reel should be baked in a 60 °C oven for 24 hours; after opening, the LED light can be resealed in the original vacuum bag.
- ◆ Don't touch any unknown liquid, In particular, acetone.
- ◆ Prevent electrostatic killed, Manual operation is required to wear rubber gloves and wear electrostatic ring.

b) Soldering Condition

- ◆ Number of reflow process shall be less than 2 times and cooling process to normal temperature is required between first and Second soldering process

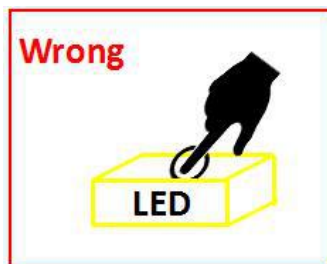
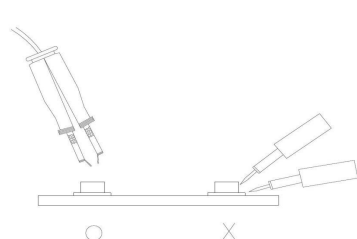
c) Soldering Iron

- ◆ When hand soldering, keep the temperature of iron below less 250°C less than 10 seconds
- ◆ The hand solder should be done only one time.

d) Repairing

- ◆ Repair should not be done after the LEDs have been soldered. When repairing is unavoidable, a double-head soldering iron should be used (as below figure). It should be confirmed beforehand whether the characteristics of the LEDs will or will not be damaged by repairing.

e) Handling Precautions



- ◆ During the handling, care should be taken as well to ensure no pressure on the top surface of component.
- ◆ All types of sharp objects (e.g. forceps, fingernail, etc) should be avoided in order to prevent stress to the silicone, since this can lead to damage of the component.