Kingbright

5.0mm x 5.0mm FULL-COLOR SURFACE MOUNT LED LAMP

Part Number: AAAF5051-03

Blue
Reddish-Orange
Green

ATTENTION
OBSERVE PRECAUTIONS
FOR HANDLING
ELECTROSTATIC
DISCHARGE
SENSITIVE
DEVICES

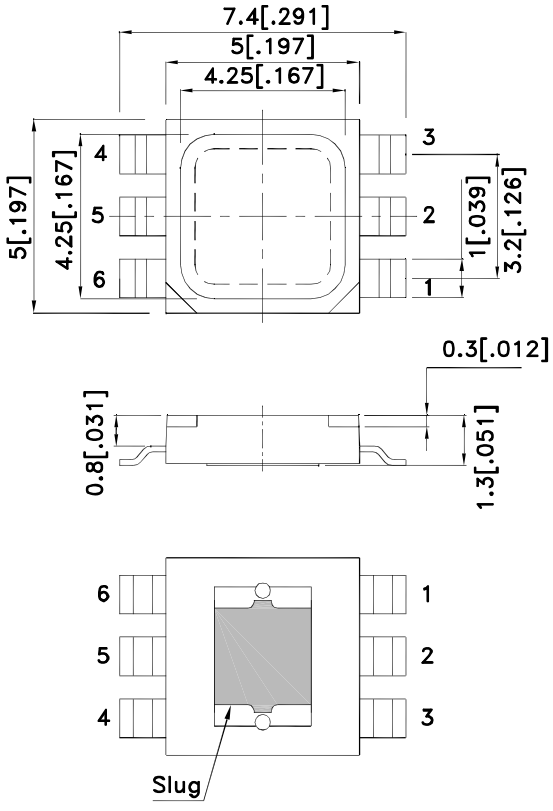
Features

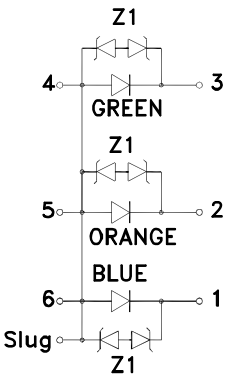
- Chips can be controlled separately.
- Suitable for all SMT assembly and solder process.
- Available on tape and reel.
- White SMD package, silicone resin.
- Package: 500pcs / reel.
- Moisture sensitivity level : level 3.
- RoHS compliant.

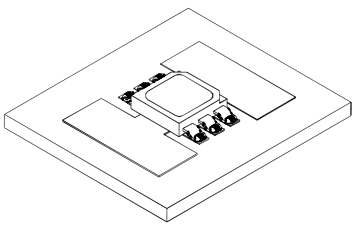
Description

The Blue source color devices are made with InGaN on Al_2O_3 substrate Light Emitting Diode.
This devices are made with AlGaInP.
The Green source color devices are made with InGaN on Al_2O_3 substrate Light Emitting Diode.
Static electricity and surge damage the LEDS.
It is recommended to use a wrist band or anti-electrostatic glove when handling the LEDs.
All devices, equipment and machinery must be electrically grounded.

Package Dimensions





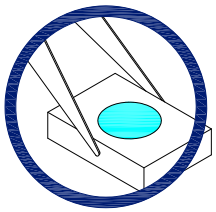


Notes:
1. All dimensions are in millimeters (inches).
2. Tolerance is ±0.15[±0.006]unless otherwise noted.
3. The specifications, characteristics and technical data described in the datasheet are subject to change without prior notice.
4. The device has a single mounting surface. The device must be mounted according to the specifications.

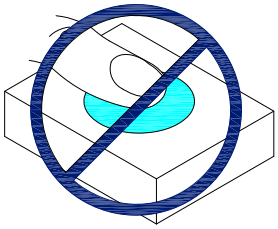
Handling Precautions

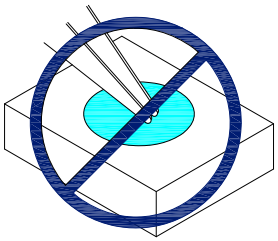
Compare to epoxy encapsulant that is hard and brittle, silicone is softer and flexible. Although its characteristic significantly reduces thermal stress, it is more susceptible to damage by external mechanical force.
As a result, special handling precautions need to be observed during assembly using silicone encapsulated LED products. Failure to comply might lead to damage and premature failure of the LED.

1. Handle the component along the side surfaces by using forceps or appropriate tools.

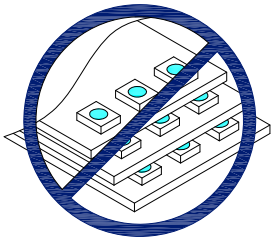


2. Do not directly touch or handle the silicone lens surface. It may damage the internal circuitry.

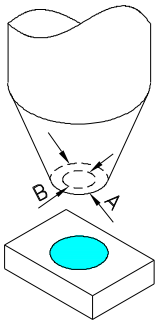




3. Do not stack together assembled PCBs containing exposed LEDs. Impact may scratch the silicone lens or damage the internal circuitry.



4.1. The outer diameter of the SMD pickup nozzle should not exceed the size of the LED to prevent air leaks. The inner diameter of the nozzle should be as large as possible.
4.2. A pliable material is suggested for the nozzle tip to avoid scratching or damaging the LED surface during pickup.
4.3. The dimensions of the component must be accurately programmed in the pick-and-place machine to insure precise pickup and avoid damage during production.



5. As silicone encapsulation is permeable to gases, some corrosive substances such as H_2S might corrode silver plating of leadframe. Special care should be taken if an LED with silicone encapsulation is to be used near such substances.

Selection Guide

Part No.	Dice	Lens Type	Iv (mcd) [2] @ 150mA*120mA		Φv (mlm) [2] @ 150mA*120mA		Viewing Angle [1]
			Min.	Typ.	Min.	Typ.	2θ1/2
AAAF5051-03	Blue (InGaN)	WATER CLEAR	700	1300	3500	5000	120°
	Reddish-Orange (AlGaInP)		*7500	*9600	*7200	*10000	
	Green (InGaN)		4700	6500	14000	20000	

Notes:
1. θ1/2 is the angle from optical centerline where the luminous intensity is 1/2 of the optical peak value.
2. Luminous intensity/ luminous Flux: +/-15%. *Luminous intensity with asterisk is measured at 120mA.

Absolute Maximum Ratings at Ta=25°C

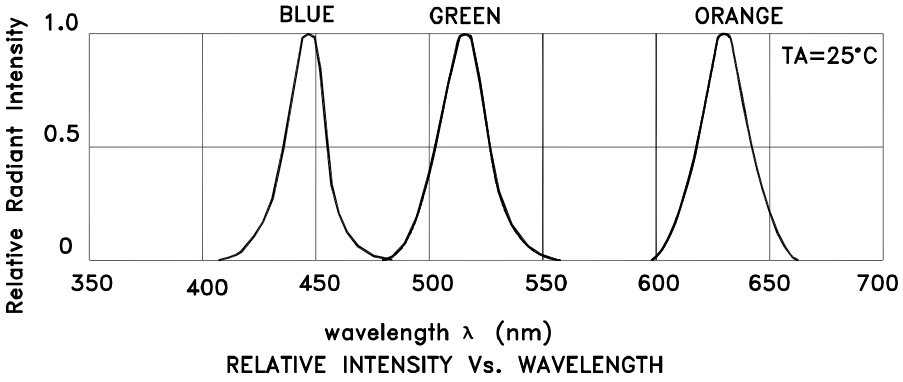
Parameter	Symbol	Device	Value	Unit	Test Conditions
Power dissipation	P_D	Blue	0.6	W	I_F=150mA
		Reddish-Orange	0.336		I_F=120mA
		Green	0.6		I_F=150mA
Junction temperature	T_J	Blue	140	°C	I_F=150mA
		Reddish-Orange	140		I_F=120mA
		Green	140		I_F=150mA
Operating Temperature	Top	Blue	-40 To +85	°C	I_F=150mA
		Reddish-Orange			I_F=120mA
		Green			I_F=150mA
Storage Temperature	Tstg	Blue	-40 To +85	°C	I_F=150mA
		Reddish-Orange			I_F=120mA
		Green			I_F=150mA
DC Forward Current [1]	I_F	Blue	150	mA	I_F=150mA
		Reddish-Orange	120		I_F=120mA
		Green	150		I_F=150mA
Peak Forward Current [2]	I_{FM}	Blue	300	mA	I_F=150mA
		Reddish-Orange	300		I_F=120mA
		Green	300		I_F=150mA
Thermal resistance	Rth j-a	Blue	230	°C/W	I_F=150mA
		Reddish-Orange	300		I_F=120mA
		Green	220		I_F=150mA
Thermal resistance	$R_{th\ j\text{-}s}$	Blue	30	°C/W	I_F=150mA
		Reddish-Orange	50		I_F=120mA
		Green	35		I_F=150mA
Reverse Current	I_R	Blue	10	uA	V_R=5V
		Reddish-Orange	10		
		Green	10		

Notes:
1. Results from mounting on Aluminum Board.
2. 1/10 Duty Cycle, 0.1ms Pulse Width.

Electrical / Optical Characteristics at T_a=25°C

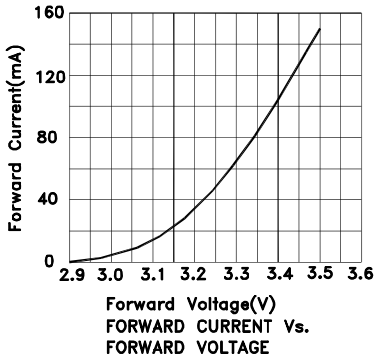
Parameter	Symbol	Device	Value			Unit
			Min.	Typ.	Max.	
Wavelength at peak emission I_F=150mA	λ peak	Blue		445		nm
Wavelength at peak emission I_F=120mA		Reddish-Orange		633		
Wavelength at peak emission I_F=150mA		Green		515		
Dominant Wavelength I_F=150mA	λ dom [1]	Blue		450		nm
Dominant Wavelength I_F=120mA		Reddish-Orange		624		
Dominant Wavelength I_F=150mA		Green		525		
Spectral Line Half-width I_F=150mA	Δλ1/2	Blue		20		nm
Spectral Line Half-width I_F=120mA		Reddish-Orange		30		
Spectral Line Half-width I_F=150mA		Green		30		
Forward Voltage I_F=150mA	V_F [2]	Blue	3.0	3.5	4.0	V
Forward Voltage I_F=120mA		Reddish-Orange	2.0	2.3	2.8	
Forward Voltage I_F=150mA		Green	3.0	3.5	4.0	
Reverse Voltage	V_R	Blue		5		V
		Reddish-Orange		5		
		Green		5		
Temperature coefficient of λ peak I_F=150mA, -10 ° C≤ T≤100 ° C	TC λ peak	Blue		0.12		nm/° C
Temperature coefficient of λ peak I_F=120mA, -10 ° C≤ T≤100 ° C		Reddish-Orange		0.09		
Temperature coefficient of λ peak I_F=150mA, -10 ° C≤ T≤100 ° C		Green		0.13		
Temperature coefficient of λ dom I_F=150mA, -10 ° C≤ T≤100 ° C	TC λ dom	Blue		0.1		nm/° C
Temperature coefficient of λ dom I_F=120mA, -10 ° C≤ T≤100 ° C		Reddish-Orange		0.03		
Temperature coefficient of λ dom I_F=150mA, -10 ° C≤ T≤100 ° C		Green		0.11		
Temperature coefficient of V_F I_F=150mA, -10 ° C≤ T≤100 ° C	TC_V	Blue		-2.3		mV/° C
Temperature coefficient of V_F I_F=120mA, -10 ° C≤ T≤100 ° C		Reddish-Orange		-2.7		
Temperature coefficient of V_F I_F=150mA, -10 ° C≤ T≤100 ° C		Green		-3.9		

Notes:
1.Wavelength: +/-1nm.
2. Forward Voltage: +/-0.2V.

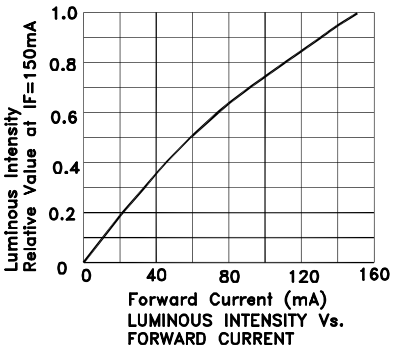


RELATIVE INTENSITY Vs. WAVELENGTH

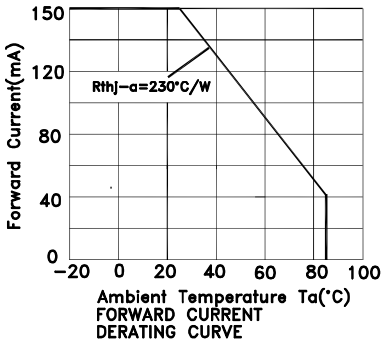
AAAF5051-03
Blue



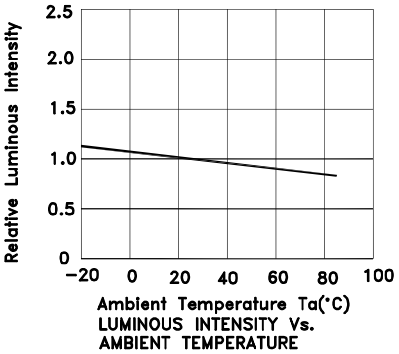
FORWARD CURRENT Vs.
FORWARD VOLTAGE



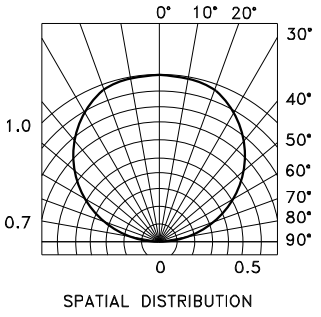
LUMINOUS INTENSITY Vs.
FORWARD CURRENT



FORWARD CURRENT
DERATING CURVE

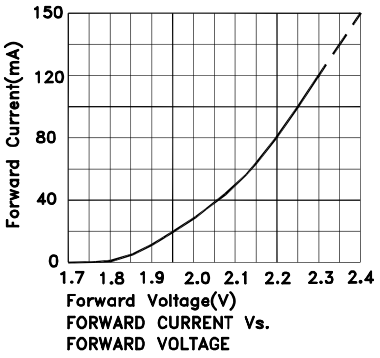


LUMINOUS INTENSITY Vs.
AMBIENT TEMPERATURE

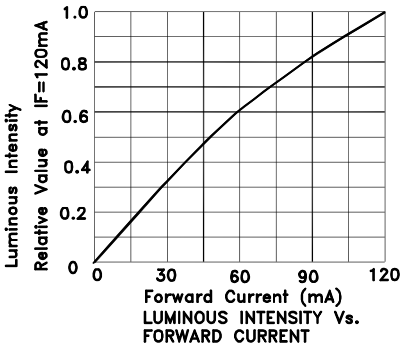


SPATIAL DISTRIBUTION

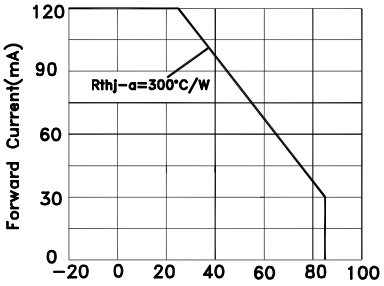
Reddish-orange



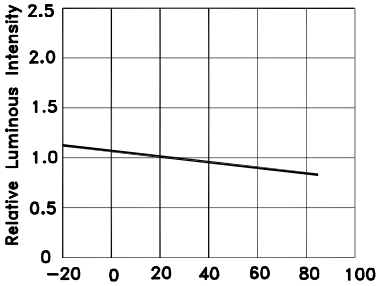
FORWARD CURRENT Vs.
FORWARD VOLTAGE



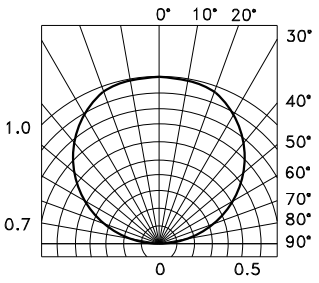
LUMINOUS INTENSITY Vs.
FORWARD CURRENT



FORWARD CURRENT
DERATING CURVE

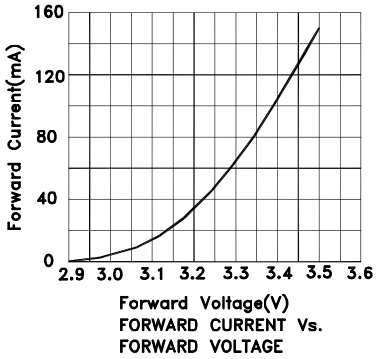


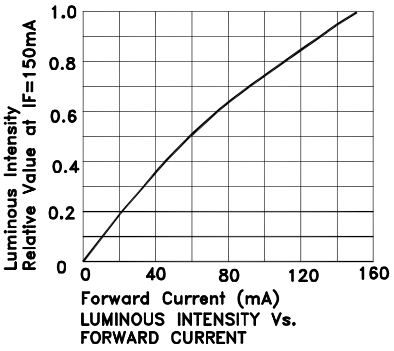
LUMINOUS INTENSITY Vs.
AMBIENT TEMPERATURE

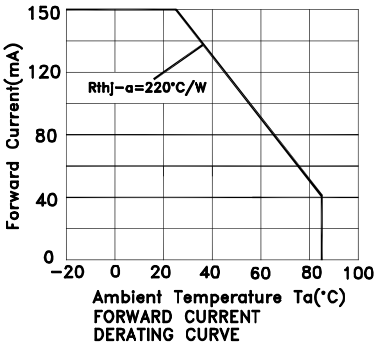


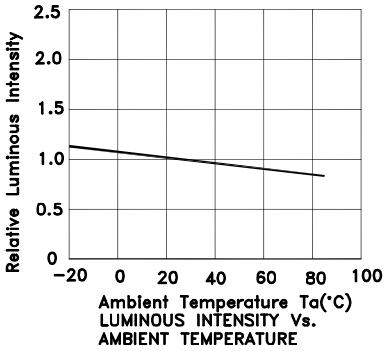
SPATIAL DISTRIBUTION

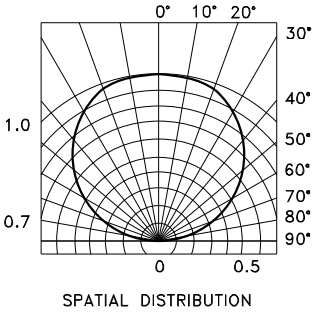
Green


160
120
80
40
0
Forward Current(mA)
2.9 3.0 3.1 3.2 3.3 3.4 3.5 3.6
Forward Voltage(V)
FORWARD CURRENT Vs.
FORWARD VOLTAGE


1.0
0.8
0.6
0.4
0.2
0
Luminous Intensity
Relative Value at IF=150mA
0 40 80 120 160
Forward Current (mA)
LUMINOUS INTENSITY Vs.
FORWARD CURRENT


150
120
80
40
0
Forward Current(mA)
Rthj-a=220°C/W
−20 0 20 40 60 80 100
Ambient Temperature Ta(°C)
FORWARD CURRENT
DERATING CURVE

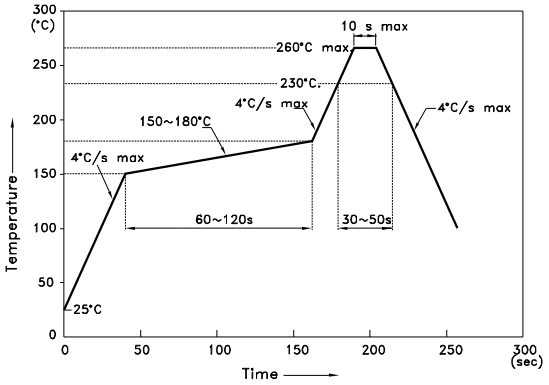

2.5
2.0
1.5
1.0
0.5
0
Relative Luminous Intensity
−20 0 20 40 60 80 100
Ambient Temperature Ta(°C)
LUMINOUS INTENSITY Vs.
AMBIENT TEMPERATURE


0° 10° 20°
30°
40°
50°
60°
70°
80°
90°
1.0
0.7
0
0.5
SPATIAL DISTRIBUTION

AAAF5051-03

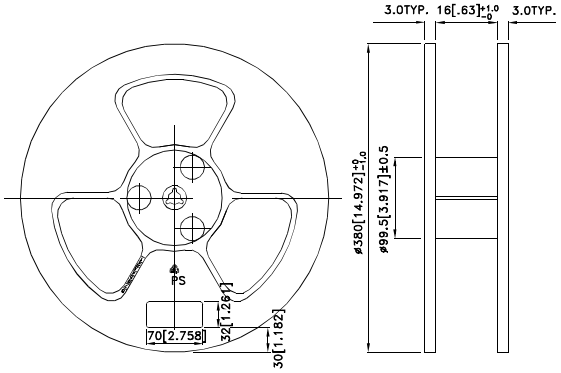
Reflow soldering is recommended and the soldering profile is shown below.
Other soldering methods are not recommended as they might cause damage to the product.

Reflow Soldering Profile For Lead-free SMT Process.

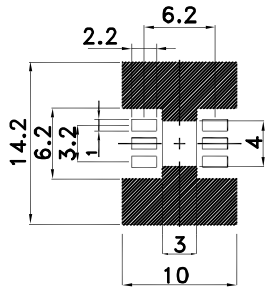


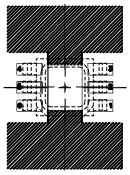
NOTES:
1.We recommend the reflow temperature 245°C(+/-5°C).The maximum soldering temperature should be limited to 260°C.
2.Don't cause stress to the epoxy resin while it is exposed to high temperature.
3.Number of reflow process shall be 2 times or less.

Reel Dimension



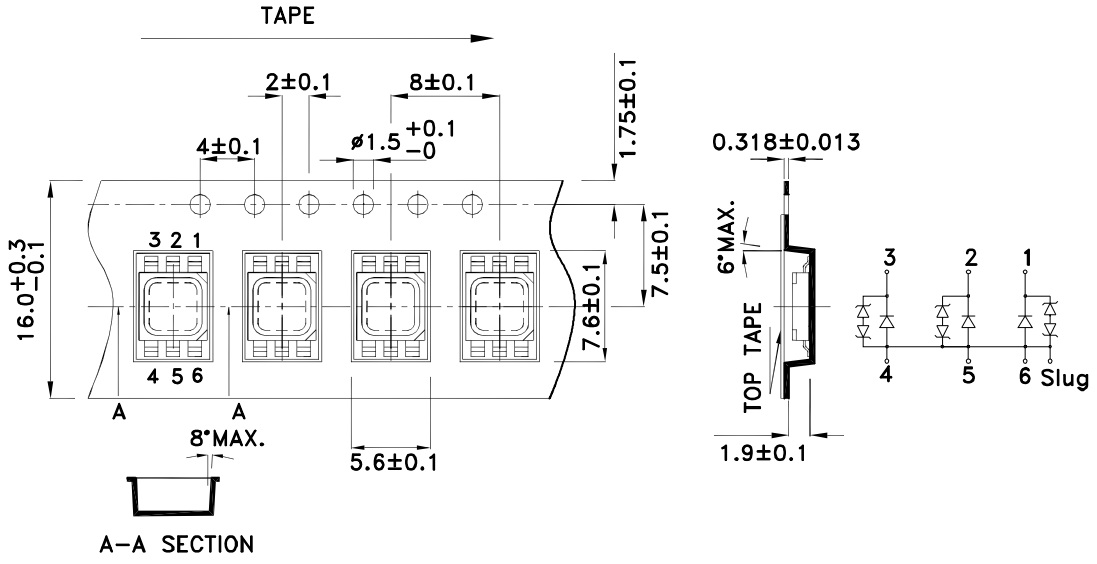
Recommended Soldering Pattern
(Units : mm; Tolerance: ± 0.1)





Solder Mask

Tape Specifications
(Units : mm)



PACKING & LABEL SPECIFICATIONS **AAAF5051-03**