

## KAAF-5050RGB-13 5.0 mm x 5.0 mm Surface Mount LED Lamp

### DESCRIPTIONS

- The Hyper Red device is based on light emitting diode chip made from AlGaInP
- The Green source color devices are made with InGaN Light Emitting Diode
- The Blue source color devices are made with InGaN Light Emitting Diode
- Electrostatic discharge and power surge could damage the LEDs
- It is recommended to use a wrist band or anti-electrostatic glove when handling the LEDs
- All devices, equipments and machineries must be electrically grounded

### FEATURES

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

### APPLICATIONS

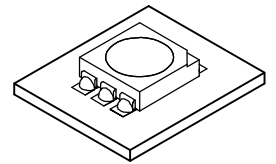
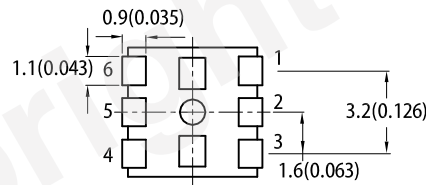
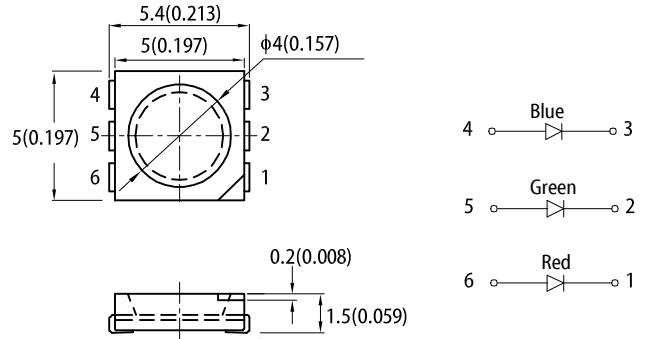
- Backlight
- Status indicator
- Home and smart appliances
- Wearable and portable devices
- Healthcare applications

### ATTENTION

Observe precautions for handling electrostatic discharge sensitive devices

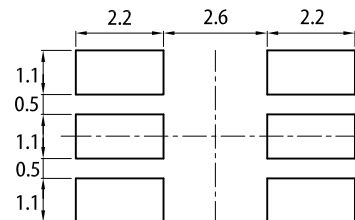


### PACKAGE DIMENSIONS



### RECOMMENDED SOLDERING PATTERN

(units : mm; tolerance : ± 0.1)



#### Notes:

1. All dimensions are in millimeters (inches).
2. Tolerance is ±0.2(0.008") 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.

### SELECTION GUIDE

Part Number	Emitting Color (Material)	Lens Type	Iv (mcd) @ 50mA <sup>[2]</sup>		Iv (mcd) @ 30mA <sup>[2]</sup>		Viewing Angle <sup>[1]</sup>
			Min.	Typ.	Min.	Typ.	2θ1/2
KAAF-5050RGB-13	■ Hyper Red (AlGaInP)	Water Clear	1000	1400	-	-	120°
	■ Green (InGaN)		-	-	1300	2000	
	■ Blue (InGaN)		-	-	300	420	

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%.  
 3. Luminous intensity value is traceable to CIE127-2007 standards.

**ELECTRICAL / OPTICAL CHARACTERISTICS at T<sub>A</sub>=25°C**

Parameter	Symbol	Emitting Color	Value		Unit
			Typ.	Max.	
Wavelength at Peak Emission I <sub>F</sub> = 50mA Wavelength at Peak Emission I <sub>F</sub> = 30mA Wavelength at Peak Emission I <sub>F</sub> = 30mA	λ <sub>peak</sub>	Hyper Red	640	-	nm
Green		520			
Blue		465			
Dominant Wavelength I <sub>F</sub> = 50mA Dominant Wavelength I <sub>F</sub> = 30mA Dominant Wavelength I <sub>F</sub> = 30mA	λ <sub>dom</sub> <sup>[1]</sup>	Hyper Red	625	-	nm
Green		525			
Blue		470			
Spectral Bandwidth at 50% Φ REL MAX I <sub>F</sub> = 50mA Spectral Bandwidth at 50% Φ REL MAX I <sub>F</sub> = 30mA Spectral Bandwidth at 50% Φ REL MAX I <sub>F</sub> = 30mA	Δλ	Hyper Red	25	-	nm
Green		35			
Blue		22			
Capacitance	C	Hyper Red	27	-	pF
Green		100			
Blue		100			
Forward Voltage I <sub>F</sub> = 50mA Forward Voltage I <sub>F</sub> = 30mA Forward Voltage I <sub>F</sub> = 30mA	V <sub>F</sub> <sup>[2]</sup>	Hyper Red	2.5	3.2	V
Green		3.3	4.1		
Blue		3.5	4.5		
Reverse Current (V <sub>R</sub> = 5V)	I <sub>R</sub>	Hyper Red	-	10	uA
Green			50		
Blue			50		
Temperature Coefficient of λ <sub>peak</sub> I <sub>F</sub> = 50mA, -10°C ≤ T ≤ 85°C Temperature Coefficient of λ <sub>peak</sub> I <sub>F</sub> = 30mA, -10°C ≤ T ≤ 85°C Temperature Coefficient of λ <sub>peak</sub> I <sub>F</sub> = 30mA, -10°C ≤ T ≤ 85°C	TC <sub>λ<sub>peak</sub></sub>	Hyper Red	0.13	-	nm/°C
Green		0.05			
Blue		0.04			
Temperature Coefficient of λ <sub>dom</sub> I <sub>F</sub> = 50mA, -10°C ≤ T ≤ 85°C Temperature Coefficient of λ <sub>dom</sub> I <sub>F</sub> = 30mA, -10°C ≤ T ≤ 85°C Temperature Coefficient of λ <sub>dom</sub> I <sub>F</sub> = 30mA, -10°C ≤ T ≤ 85°C	TC <sub>λ<sub>dom</sub></sub>	Hyper Red	0.06	-	nm/°C
Green		0.03			
Blue		0.03			
Temperature Coefficient of V <sub>F</sub> I <sub>F</sub> = 50mA, -10°C ≤ T ≤ 85°C Temperature Coefficient of V <sub>F</sub> I <sub>F</sub> = 30mA, -10°C ≤ T ≤ 85°C Temperature Coefficient of V <sub>F</sub> I <sub>F</sub> = 30mA, -10°C ≤ T ≤ 85°C	TC <sub>V</sub>	Hyper Red	-2.0	-	mV/°C
Green		-2.9			
Blue		-2.9			

**Notes:**

- The dominant wavelength (λ<sub>d</sub>) above is the setup value of the sorting machine. (Tolerance λ<sub>d</sub>: ±1nm.)
- Forward voltage: ±0.1V.
- Wavelength value is traceable to CIE127-2007 standards.
- Excess driving current and / or operating temperature higher than recommended conditions may result in severe light degradation or premature failure.

**ABSOLUTE MAXIMUM RATINGS at T<sub>A</sub>=25°C**

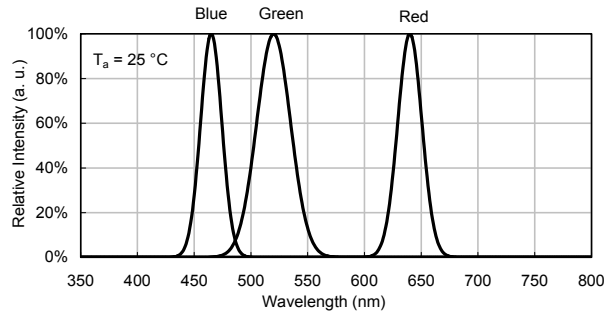
Parameter	Symbol	Value			Unit
		Hyper Red	Green	Blue	
Power Dissipation	P <sub>D</sub> <sup>[1]</sup>	350			mW
Reverse Voltage	V <sub>R</sub>	5	5	5	V
Junction Temperature	T <sub>j</sub>	115	115	115	°C
Operating Temperature	T <sub>op</sub>	-40 to +85			°C
Storage Temperature	T <sub>stg</sub>	-40 to +85			°C
DC Forward Current	I <sub>F</sub>	50	30	30	mA
Peak Forward Current	I <sub>FM</sub> <sup>[2]</sup>	150	100	100	mA
Electrostatic Discharge Threshold (HBM)	-	3000	450	250	V
Thermal Resistance (Junction / Ambient)	R <sub>th JA</sub> <sup>[3]</sup>	210	235	240	°C/W
Thermal Resistance (Junction / Solder point)	R <sub>th JS</sub> <sup>[3]</sup>	130	165	150	°C/W

**Notes:**

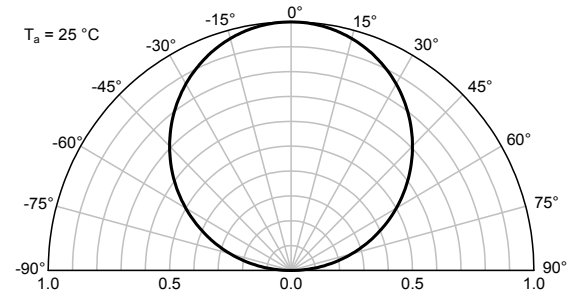
- Within 350mW at all chips are lightened
- 1/10 Duty Cycle, 0.1ms Pulse Width
- R<sub>th JA</sub>, R<sub>th JS</sub> Results from mounting on PC board FR4 (pad size ≥ 16 mm<sup>2</sup> per pad).
- Relative humidity levels maintained between 40% and 60% in production area are recommended to avoid the build-up of static electricity – Ref JEDEC/JESD625-A and JEDEC/J-STD-033.

## TECHNICAL DATA

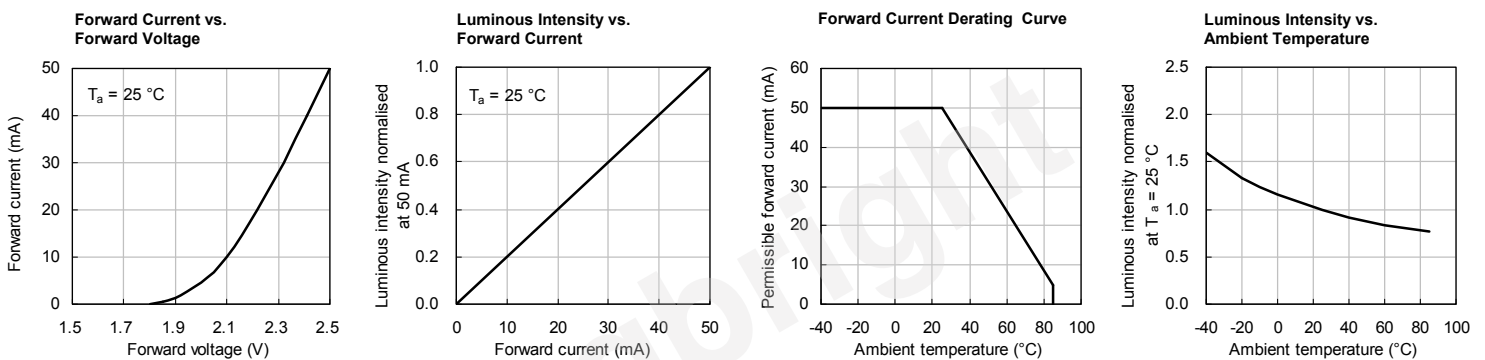
### RELATIVE INTENSITY vs. WAVELENGTH



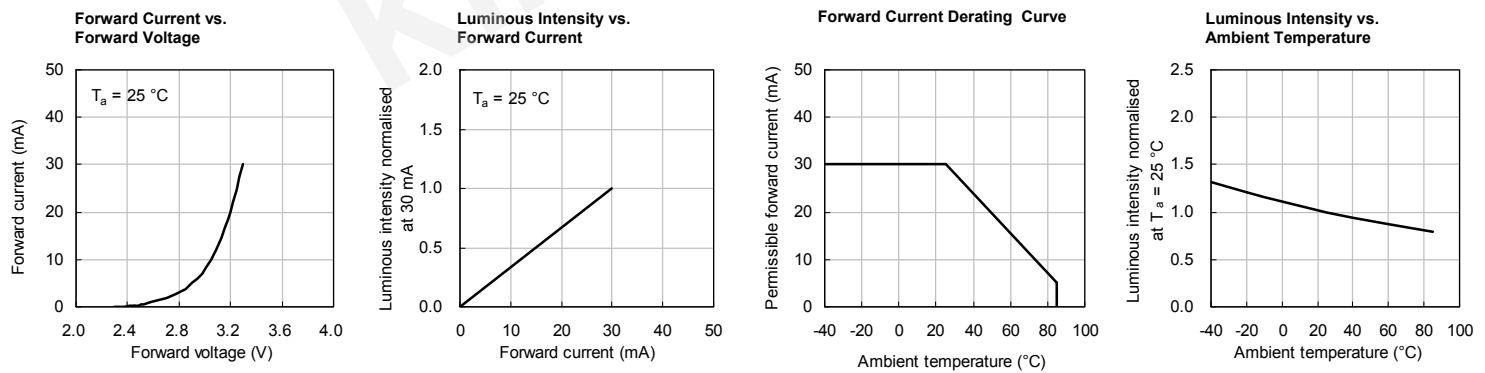
### SPATIAL DISTRIBUTION



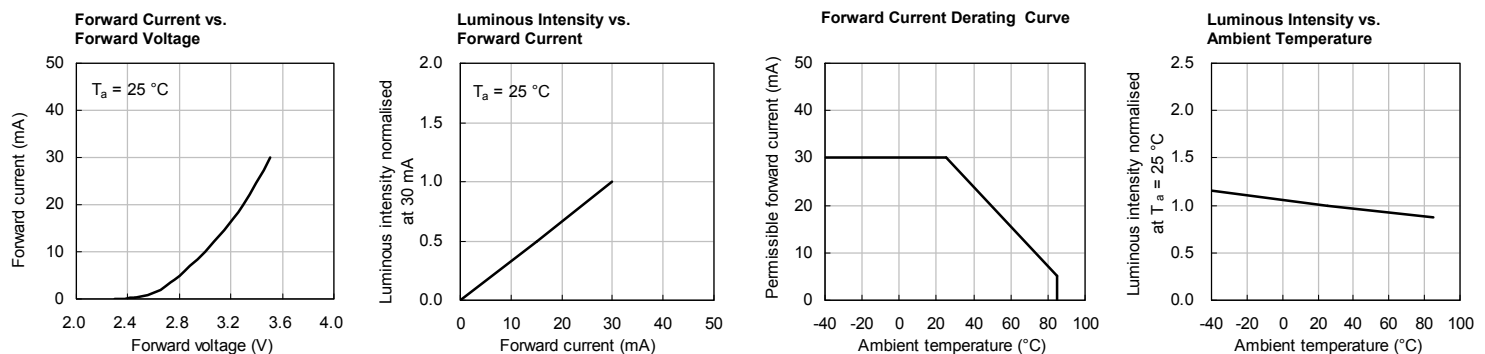
## HYPER RED



## GREEN

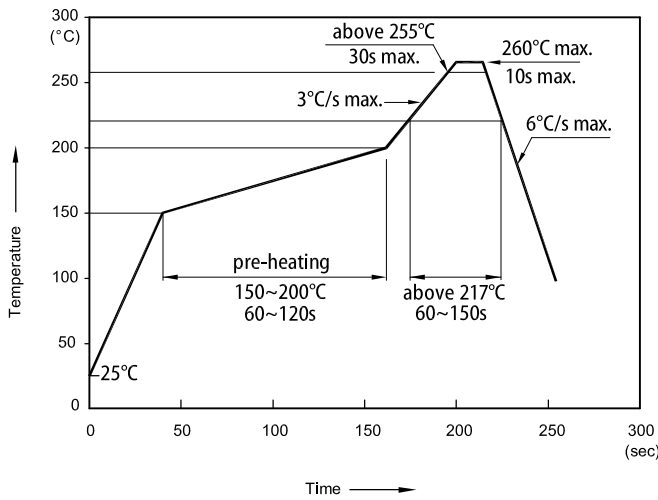


## BLUE



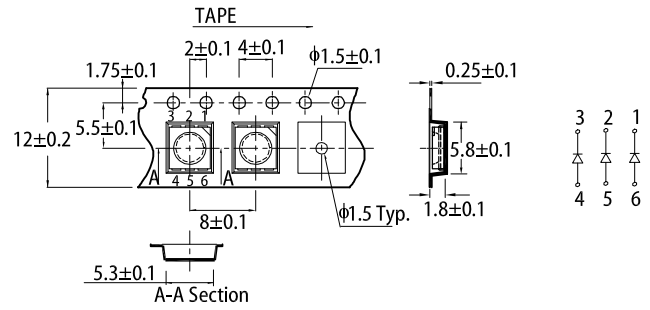
### TECHNICAL DATA

#### REFLOW SOLDERING PROFILE for LEAD-FREE SMD PROCESS

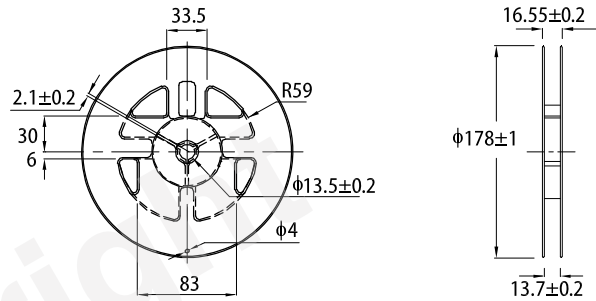


- Notes:
1. Don't cause stress to the LEDs while it is exposed to high temperature.
  2. The maximum number of reflow soldering passes is 2 times.
  3. Reflow soldering is recommended. Other soldering methods are not recommended as they might cause damage to the product.

#### TAPE SPECIFICATIONS (units : mm)



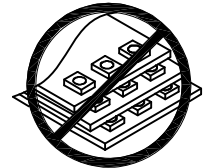
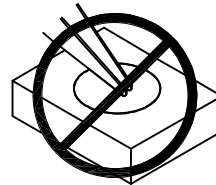
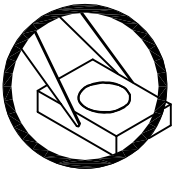
#### REEL DIMENSION (units : mm)



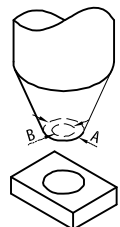
### HANDLING PRECAUTIONS

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.

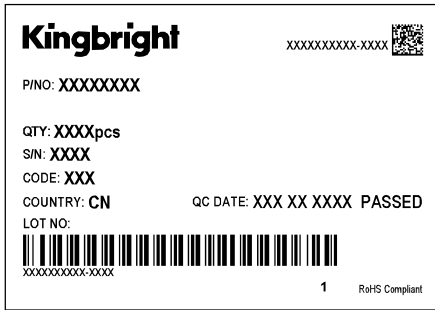
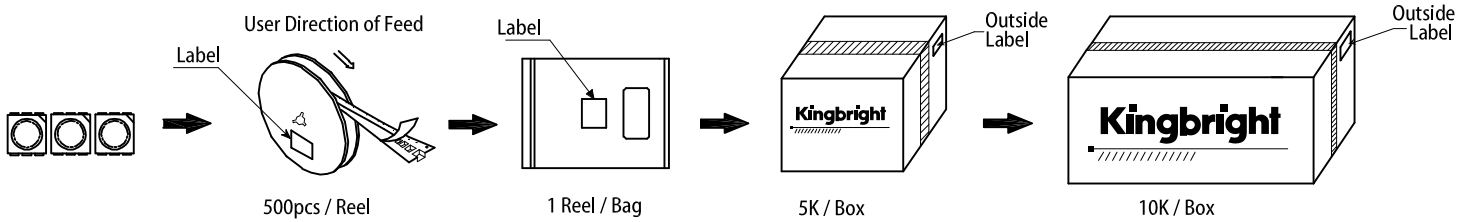
1. Handle the component along the side surfaces by using forceps or appropriate tools.
2. Do not directly touch or handle the silicone lens surface. It may damage the internal circuitry.
3. Do not stack together assembled PCBs containing exposed LEDs. Impact may scratch the silicone lens or damage the internal circuitry.



- 4-1. The inner diameter of the SMD pickup nozzle should not exceed the size of the LED to prevent air leaks.
- 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<sub>2</sub>S might corrode silver plating of leadframe. Special care should be taken if an LED with silicone encapsulation is to be used near such substances.



## PACKING & LABEL SPECIFICATIONS



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### PRECAUTIONARY NOTES

1. The information included in this document reflects representative usage scenarios and is intended for technical reference only.
2. The part number, type, and specifications mentioned in this document are subject to future change and improvement without notice. Before production usage customer should refer to the latest datasheet for the updated specifications.
3. When using the products referenced in this document, please make sure the product is being operated within the environmental and electrical limits specified in the datasheet. If customer usage exceeds the specified limits, Kingbright will not be responsible for any subsequent issues.
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