Kingbright

2.2x1.4mm SURFACE MOUNT LED LAMP

ATTENTION
OBSERVE PRECAUTIONS
FOR HANDLING
ELECTROSTATIC
DISCHARGE
SENSITIVE
DEVICES

Part Number: AA2214QR51S/D-AMT Cyan

Features

- High reliability LED package.
- 2.2mm x 1.4mm, 1.3mm high.
- Low power consumption.
- Available on tape and reel.
- Package : 2000pcs / reel.
- Moisture sensitivity level : level 3.
- RoHS compliant.

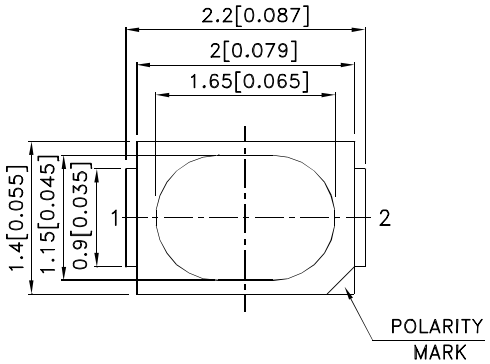
Descriptions

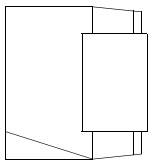
- The source color devices are made with InGaN Light Emitting Diode.
- Electrostatic discharge and power surge could damage the LEDs.
- It is recommended to use a wrist band or anti-electrostatic glove when handling the LEDs.
- All devices, equipments and machineries must be electrically grounded.

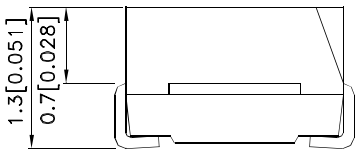
Applications

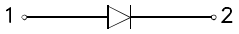
- Traffic signaling.
- Backlighting (illuminated advertising , general lighting).
- Interior and exterior automotive lighting.
- Substitution of micro incandescent lamps.
- Reading lamps.
- Signal and symbol luminaire for orientation.
- Marker lights (e.g. Steps, exit ways, etc).
- Decorative and entertainment lighting.
- Indoor and outdoor commercial and residential architectural lighting.

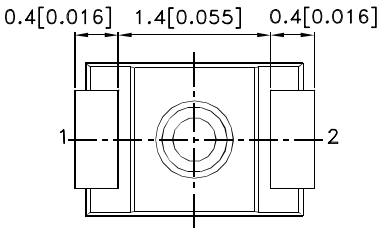
Package Dimensions

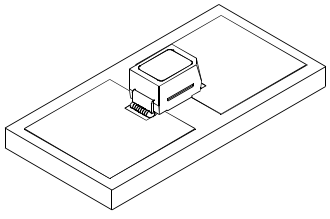










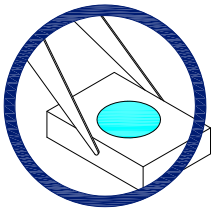


Notes:
1. All dimensions are in millimeters (inches).
2. Tolerance is ±0.2(0.008") unless otherwise noted.
3. The specifications, characteristics and technical data described in the datasheet are subject to change without prior notice.
4. The device has a single mounting surface. The device must be mounted according to the specifications.

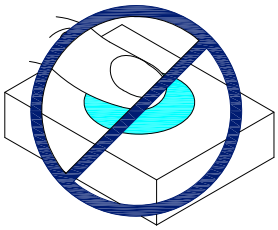
Handling Precautions

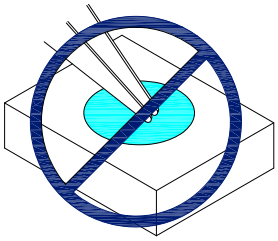
Compare to epoxy encapsulant that is hard and brittle, silicone is softer and flexible. Although its characteristic significantly reduces thermal stress, it is more susceptible to damage by external mechanical force.
As a result, special handling precautions need to be observed during assembly using 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.

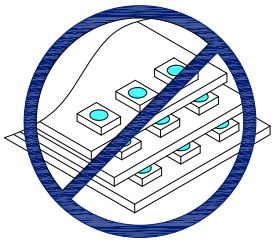


2. Do not directly touch or handle the silicone lens surface. It may damage the internal circuitry.

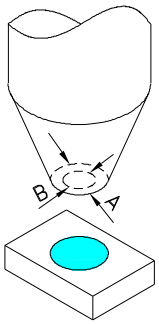




3. Do not stack together assembled PCBs containing exposed LEDs. Impact may scratch the silicone lens or damage the internal circuitry.



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_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] @ 20mA			Viewing Angle [1]
			Code.	Min.	Max.	2θ1/2
AA2214QR51S/D-AMT	Cyan (InGaN)	Water Clear	Q	300	400	120°
			R	400	500	
			S	500	700	

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 the CIE127-2007 compliant national standards.

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Value	Unit
Power dissipation	P_D	80	mW
Junction temperature	T_J	115	°C
Reverse Voltage	V_R	5	V
Operating Temperature	Top	-40 To +100	°C
Storage Temperature	Tstg	-40 To +110	°C
DC Forward Current[1]	I_F	20	mA
Peak Forward Current [2]	I_{FM}	100	mA
Electrostatic Discharge Threshold (HBM)		250	V
Thermal Resistance (Junction/ambient) [1]	$R_{th\ j\text{-}a}$	570	°C/W

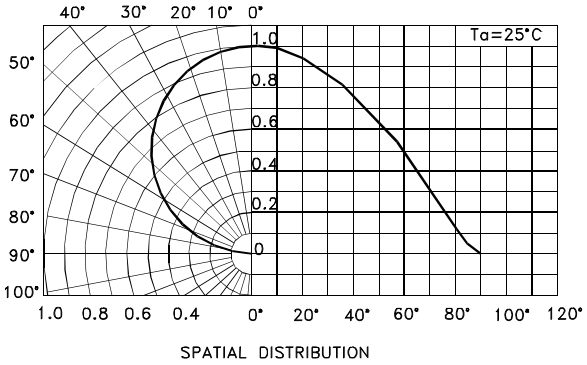
Notes:
1. Rth(j-a) Results from mounting on PC board FR4 (pad size≥16 mm^2 per pad),
2. 1/10 Duty Cycle, 0.1ms Pulse Width.

Electrical / Optical Characteristics at Ta=25°C

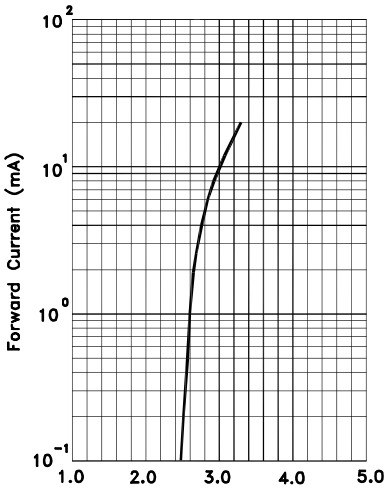
Parameter	Symbol	Value	Unit
Chromaticity Coordinates IF=20mA	X [1]	0.19	-
	Y[1]	0.41	-
Forward Voltage IF=20mA [Min.]	VF [2]	-	V
Forward Voltage IF=20mA [Typ.]		3.3	
Forward Voltage IF=20mA [Max.]		4.0	
Reverse Current (VR = 5V) [Max.]	IR	50	uA
Temperature coefficient of VF IF=20mA, -10°C≤ T≤100°C [Typ.]	TC_V	-0.13	mV/°C
Temperature coefficient of X IF=20mA, -10°C≤ T≤100°C [Typ.]	TC_x	-0.11	10-3/°C
Temperature coefficient of Y IF=20mA, -10°C≤ T≤100°C [Typ.]	TC_y	-2.5	10-3°C

Notes:
1.The dominant Wavelength (λ d) above is the setup value of the sorting machine. (Tolerance λ d : ±1nm.)
2. Forward Voltage: +/-0.1V.
3.Excess driving current and/or operating temperature higher than recommended conditions may result in severe light degradation or premature failure.

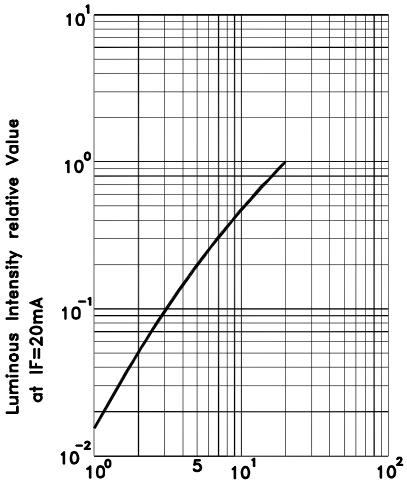
Cyan **AA2214QR51S/D-AMT**



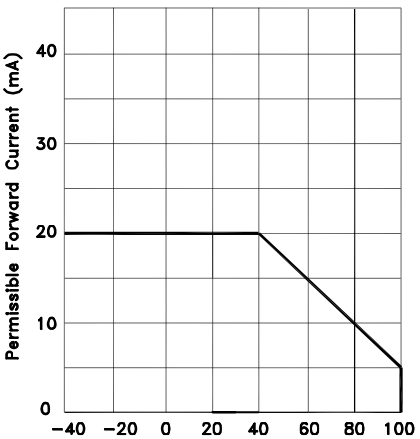
SPATIAL DISTRIBUTION



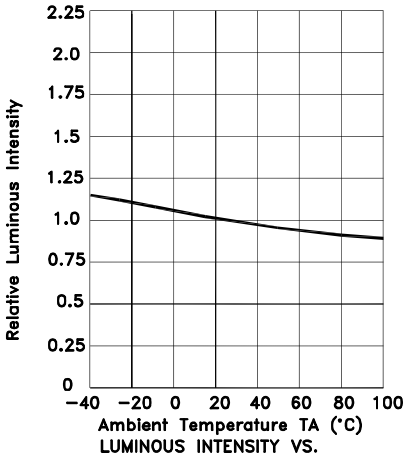
FORWARD CURRENT Vs.
FORWARD VOLTAGE



LUMINOUS INTENSITY Vs.
FORWARD CURRENT

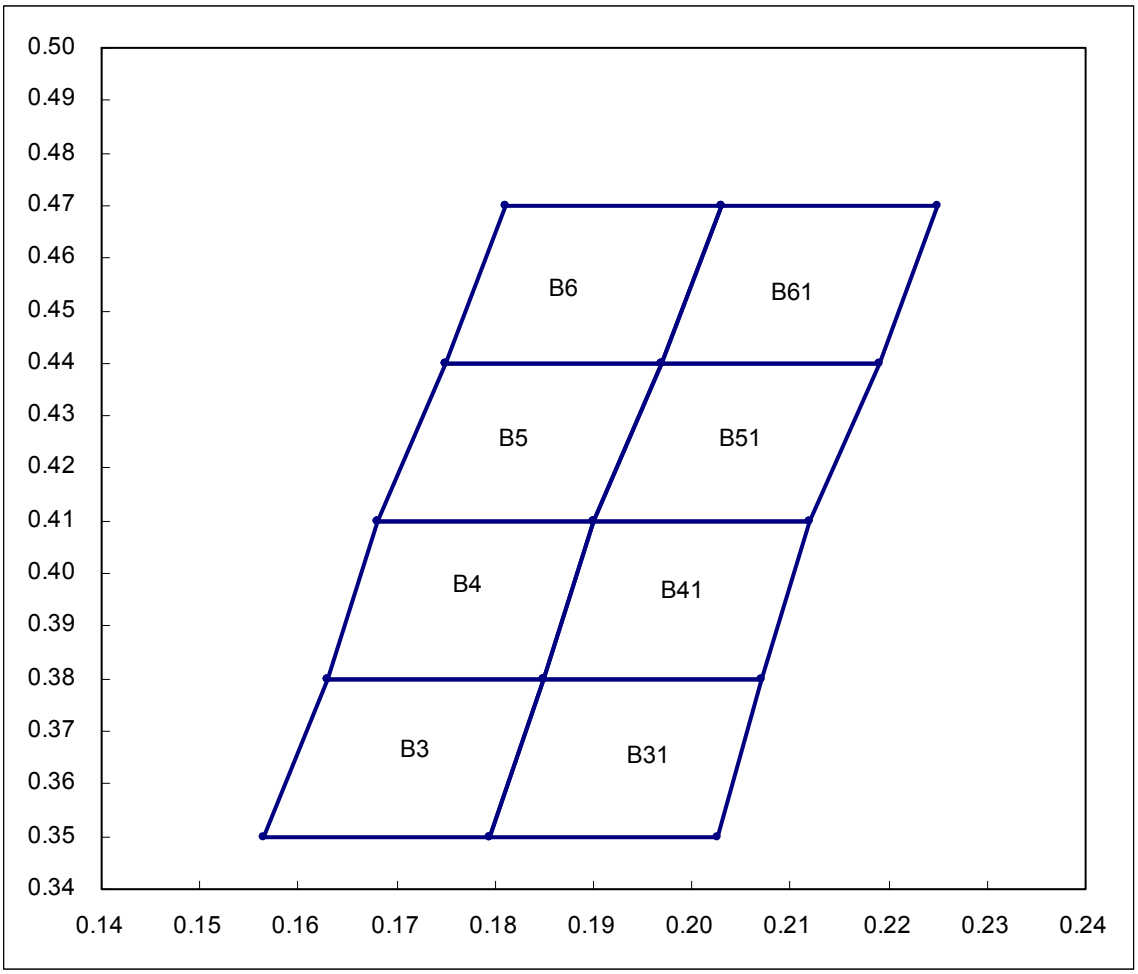


FORWARD CURRENT
DERATING CURVE



LUMINOUS INTENSITY VS.
AMBIENT TEMPERATURE

AA2214QR51S/D-AMT



B3				
X	0.1565	0.1795	0.1850	0.1630
Y	0.3500	0.3500	0.3800	0.3800

B31				
X	0.1795	0.1850	0.2070	0.2025
Y	0.3500	0.3800	0.3800	0.3500

B4				
X	0.1850	0.1630	0.1680	0.1900
Y	0.3800	0.3800	0.4100	0.4100

B41				
X	0.1850	0.2070	0.2120	0.1900
Y	0.3800	0.3800	0.4100	0.4100

B5				
X	0.1680	0.1900	0.1970	0.1750
Y	0.4100	0.4100	0.4400	0.4400

B51				
X	0.2120	0.1900	0.2190	0.1970
Y	0.4100	0.4100	0.4400	0.4400

B6				
X	0.1970	0.1750	0.1810	0.2030
Y	0.4400	0.4400	0.4700	0.4700

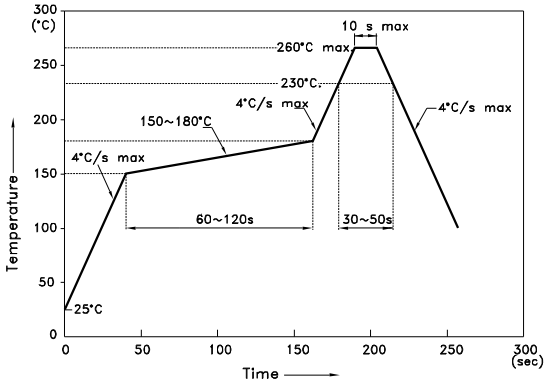
B61				
X	0.2190	0.1970	0.2030	0.2250
Y	0.4400	0.4400	0.4700	0.4700

Notes:
Shipment may contain more than one chromaticity regions.
Orders for single chromaticity region are generally not accepted.
Measurement tolerance of the chromaticity coordinates is ±0.01.

AA2214QR51S/D-AMT

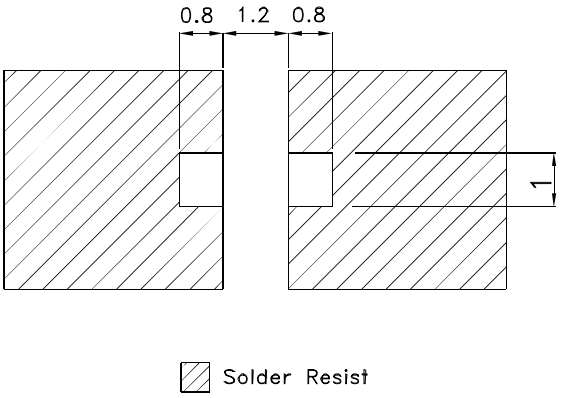
Reflow soldering is recommended and the soldering profile is shown below.
Other soldering methods are not recommended as they might cause damage to the product.

Reflow Soldering Profile For Lead-free SMT Process.

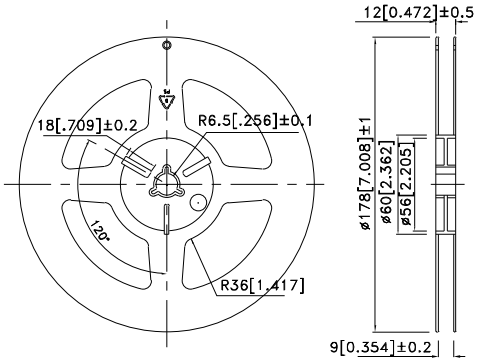


NOTES:
1.We recommend the reflow temperature 245°C(+/-5°C).The maximum soldering temperature should be limited to 260°C.
2.Don't cause stress to the epoxy resin while it is exposed to high temperature.
3.Number of reflow process shall be 2 times or less.

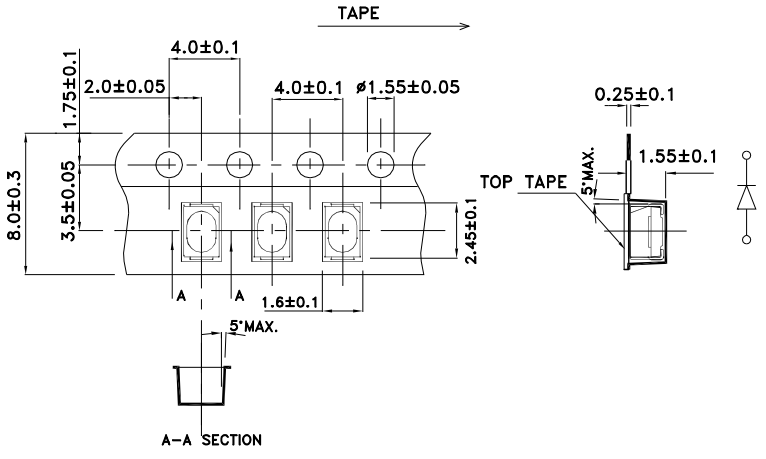
Recommended Soldering Pattern (Units : mm; Tolerance: ± 0.1)



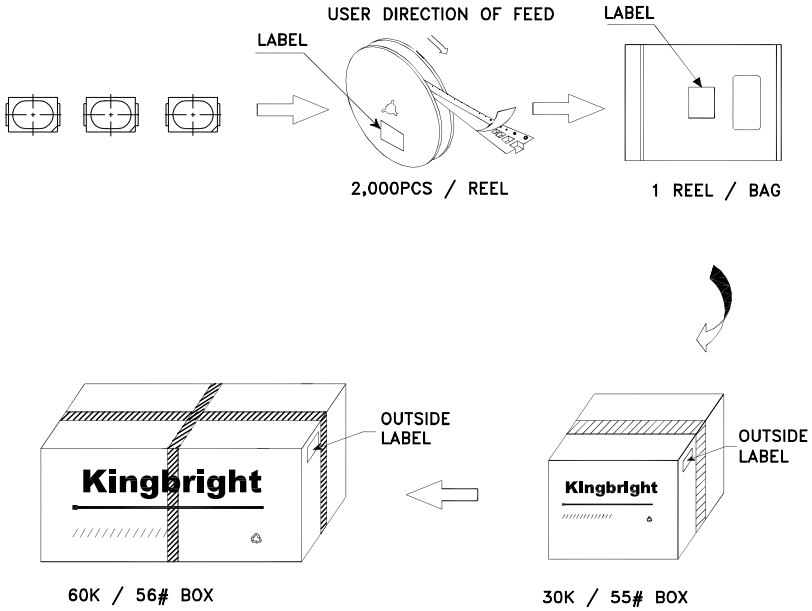
Reel Dimension

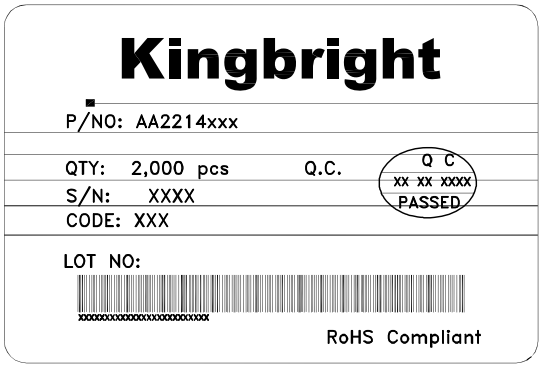


Tape Dimensions (Units : mm)



PACKING & LABEL SPECIFICATIONS **AA2214QR51S/D-AMT**





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Reliability Test Items And Conditions

The reliability of products shall be satisfied with items listed below

Lot Tolerance Percent Defective (LTPD) : 10%

No.	Test Item	Standards	Test Condition	Test Times / Cycles	Number of Damaged
1	Continuous operating test	-	Ta =25°C ,IF = maximum rated current*	1,000 h	0 / 22
2	High Temp. operating test	EIAJED-4701/100(101)	Ta = 100°C IF = derated current at 100°C	1,000 h	0 / 22
3	Low Temp. operating test	-	Ta = -40°C, IF = maximum rated current*	1,000 h	0 / 22
4	High temp. storage test	EIAJED-4701/100(201)	Ta = maximum rated storage temperature	1,000 h	0 / 22
5	Low temp. storage test	EIAJED-4701/100(202)	Ta = -40°C	1,000 h	0 / 22
6	High temp. & humidity storage test		Ta = 60°C, RH = 90%	500 h	0 / 22
7	High temp. & humidity operating test		Ta = 60°C, RH = 90% IF = derated current at 60°C	500 h	0 / 22
8	Soldering reliability test	EIAJED-4701/100(301)	Moisture soak : 30°C,70% RH, 72h Preheat : 150~180°C(120s max.) Soldering temp : 260°C(10s)	2 times	0 / 18
9	Thermal shock operating test	-	Ta = -40°C(15min) ~ 100°C(15min) IF = derated current at 100°C	1,000 cycles	0 / 22
10	Thermal shock test	-	Ta = -40°C(15min) ~ 100°C(15min)	1,000 cycles	0 / 22
11	Electric Static Discharge (ESD)	EIAJED-4701/100(304)	C = 100pF , R2 = 1.5KΩ V = 250V	Once each Polarity	0 / 22
12	Vibration test	-	a = 196m/s² , f = 100~2KHz , t = 48min for all xyz axes	4 times	0 / 22

* : Refer to forward current vs. derating curve diagram

Failure Criteria

Items	Symbols	Conditions	Failure Criteria
luminous Intensity	Iv	I_F = 20mA	Testing Min. Value <Spec.Min.Value x 0.5
Forward Voltage	V_F	I_F = 20mA	Testing Max. Value ≥Spec.Max.Value x 1.2
Reverse Current	I_R	V_R = Maximum Rated Reverse Voltage	Testing Max. Value ≥Spec.Max.Value x 2.5
High temp. storage test	-	-	Occurrence of notable decoloration, deformation and cracking