Kingbright

APFA3010R2G2C-C6-AMT

3.0 x 1.0 mm Right Angle SMD Chip LED Lamp

DESCRIPTIONS

- The Hyper Red source color devices are made with AlGaInP on GaAs substrate Light Emitting Diode
- The Green source color devices are made with AlGaInP on GaAs substrate 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

- High reliability LED package
- 3.0 x 1.5 x 1.0 mm right angle SMD LED, 1.0 mm thickness
- Low power consumption
- Wide viewing angle
- Ideal for backlight and indicator
- Package: 2000pcs / reel
- Moisture sensitivity level: 3
- Tinned pads for improved solderability
- Halogen-free
- RoHS compliant

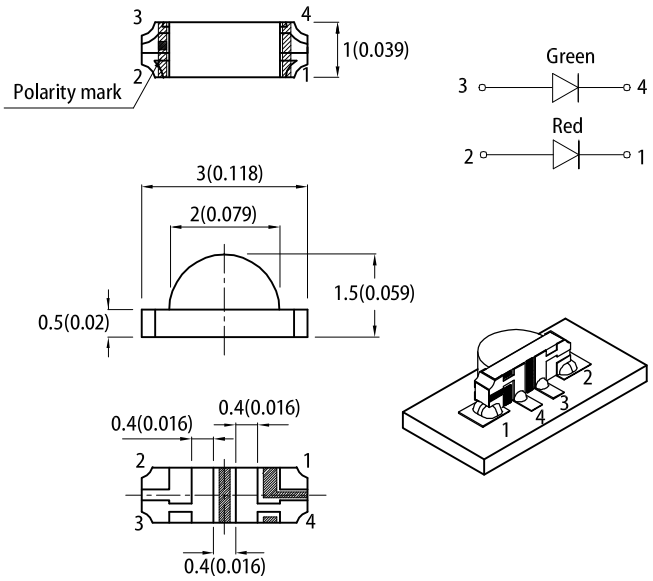
APPLICATIONS

- 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

ATTENTION

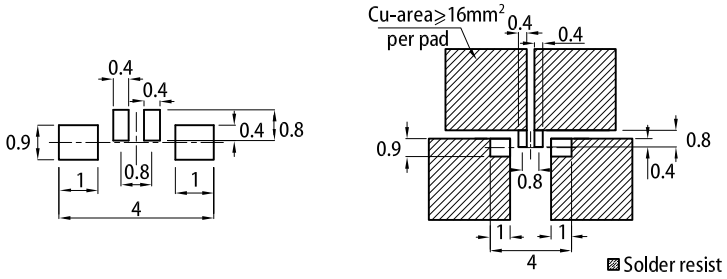
Observe precautions for handling electrostatic discharge sensitive devices

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.*
5. *For right angle SMD LEDs, the solder stencil should be at least 5mil in thickness, to prevent poor solder wetting due to insufficient solder paste.*

SELECTION GUIDE

Part Number	Emitting Color (Material)	Iv (mcd) @ 20mA [2]			Lens Type	Viewing Angle [1]
		Code.	Min.	Max.		2θ1/2
APFA3010R2G2C-C6-AMT	Hyper Red (AlGaInP)	N	120	200	Water Clear	150°
		P	200	300		
		Q	300	400		
		*H	*55	*80		
		*M	*80	*120		
		*N	*120	*200		
	Green (AlGaInP)	F	20	40		
		G	40	55		
		H	55	80		
		*F	*20	*40		
		*G	*40	*55		
		*H	*55	*80		

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 value is traceable to CIE127-2007 standards.*
3. LEDs will be provided from the listed bin codes. The bins delivered to the customer will be at Kingbright's discretion.

ELECTRICAL / OPTICAL CHARACTERISTICS at T_A=25°C

Parameter	Symbol	Emitting Color	Value				Unit
			Code	Min.	Typ.	Max.	
Wavelength at Peak Emission I_F = 20mA	λ_{peak}	Hyper Red Green	-	-	645 574	-	nm
Dominant Wavelength I_F = 20mA	λ_{dom} [1]	Hyper Red	-	620	-	640	nm
		Green	4	565	-	567	nm
			5	567	-	569	
			6	569	-	571	
Spectral Bandwidth at 50% Φ REL MAX I_F = 20mA	Δλ	Hyper Red Green	-	-	28 20	-	nm
Capacitance	C	Hyper Red Green	-	-	35 15	-	pF
Forward Voltage I_F = 20mA	V_F [2]	Hyper Red Green	-	-	1.95 2.1	2.5 2.5	V
Reverse Current (V_R = 5V)	I_R	Hyper Red Green	-	-	-	10 10	μA
Temperature Coefficient of λ_{peak} I_F = 20mA, -10°C ≤ T ≤ 100°C	$TC_{\lambda peak}$	Hyper Red Green	-	-	0.14 0.12	-	nm/°C
Temperature Coefficient of λ_{dom} I_F = 20mA, -10°C ≤ T ≤ 100°C	$TC_{\lambda dom}$	Hyper Red Green	-	-	0.05 0.08	-	nm/°C
Temperature Coefficient of V_F I_F = 20mA, -10°C ≤ T ≤ 100°C	TC_V	Hyper Red Green	-	-	-1.9 -1.9	-	mV/°C

Notes:
1. The dominant wavelength (λd) above is the setup value of the sorting machine. (Tolerance λd: ±1nm.)
2. Forward voltage: ±0.1V.
3. Wavelength value is traceable to CIE127-2007 standards.
4. Excess driving current and / or operating temperature higher than recommended conditions may result in severe light degradation or premature failure.
5. LEDs will be provided from the listed bin codes. The bins delivered to the customer will be at Kingbright's discretion.

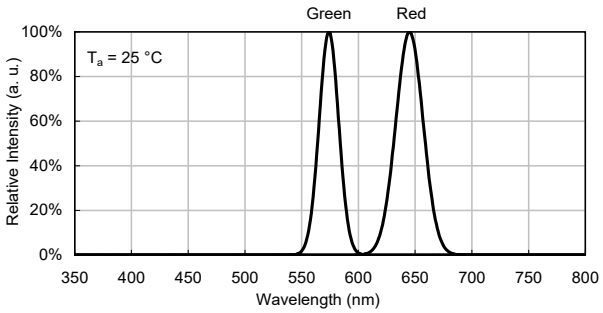
ABSOLUTE MAXIMUM RATINGS at T_A=25°C

Parameter	Symbol	Value		Unit
		Hyper Red	Green	
Power Dissipation	P_D	75	75	mW
Reverse Voltage	V_R	5	5	V
Junction Temperature	T_j	115	115	°C
Operating Temperature	T_{op}	-40 to +100		°C
Storage Temperature	T_{stg}	-40 to +115		°C
DC Forward Current	I_F	30	30	mA
Peak Forward Current	I_{FM} [1]	185	150	mA
Electrostatic Discharge Threshold (HBM)	-	3000	3000	V
Thermal Resistance (Junction / Ambient)	$R_{th\ JA}$ [2]	500	650	°C/W
Thermal Resistance (Junction / Solder point)	$R_{th\ JS}$ [2]	400	550	°C/W

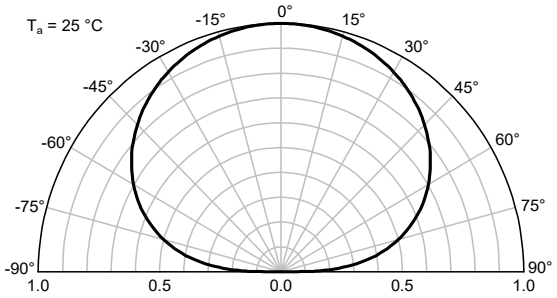
Notes:
1. 1/10 Duty Cycle , 0.1ms Pulse Width .
2. $R_{th\ JA}$, $R_{th\ JS}$ Results from mounting on PC board FR4 (pad size≥16 mm^2 per pad).
3. Relative humidity levels maintained between 40% and 60% in production area are recommended to avoid the build-up of static electricity – Ref JEDEC/JESD625-A and JEDEC/J-STD-033.

TECHNICAL DATA

RELATIVE INTENSITY vs. WAVELENGTH

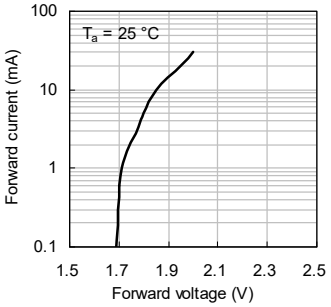


SPATIAL DISTRIBUTION

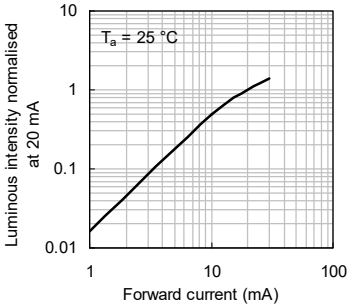


HYPER RED

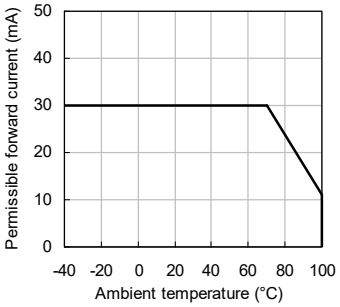
Forward Current vs. Forward Voltage



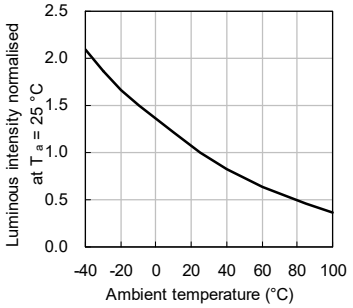
Luminous Intensity vs. Forward Current



Forward Current Derating Curve

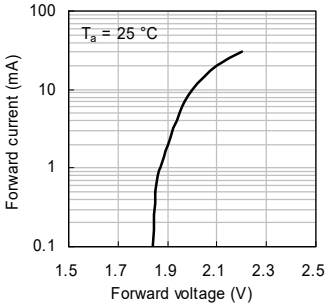


Luminous Intensity vs. Ambient Temperature

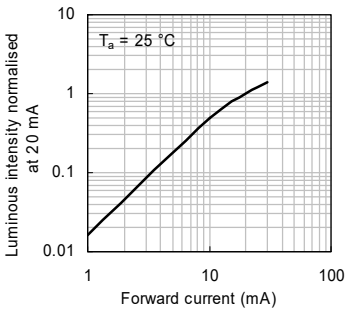


GREEN

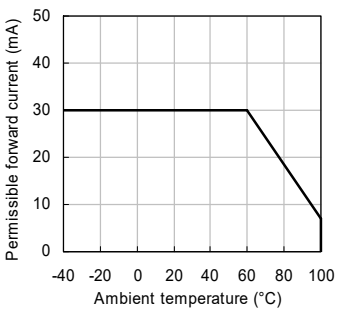
Forward Current vs. Forward Voltage



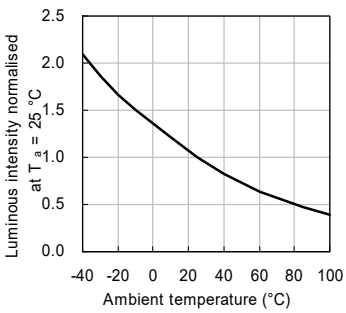
Luminous Intensity vs. Forward Current



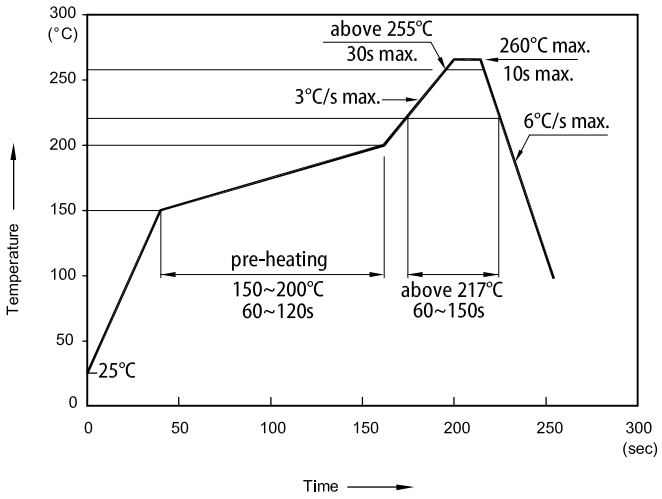
Forward Current Derating Curve



Luminous Intensity vs. Ambient Temperature

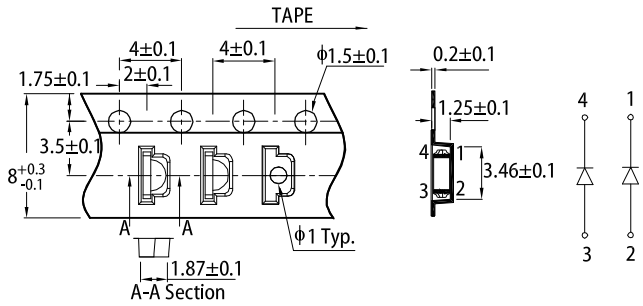


REFLOW SOLDERING PROFILE for LEAD-FREE SMD PROCESS

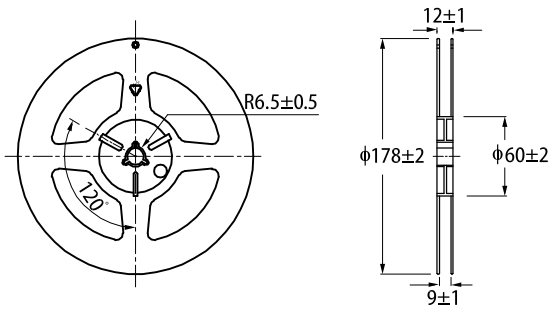


Notes:
1. Don't cause stress to the LEDs while it is exposed to high temperature.
2. The maximum number of reflow soldering passes is 2 times.
3. Reflow soldering is recommended. Other soldering methods are not recommended as they might cause damage to the product.

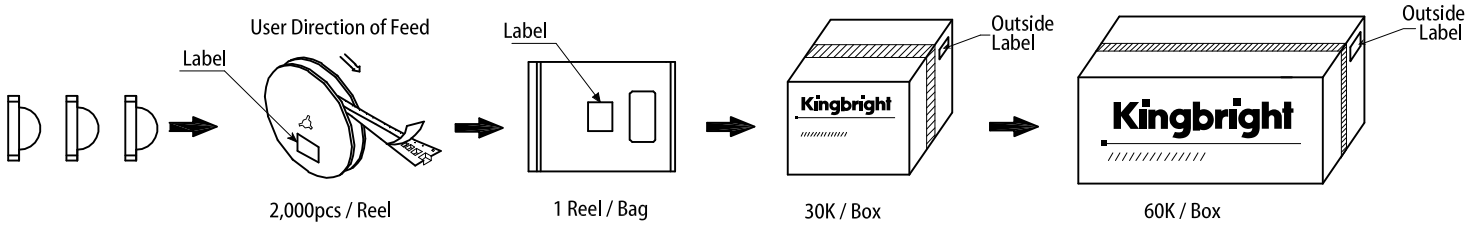
TAPE SPECIFICATIONS (units : mm)

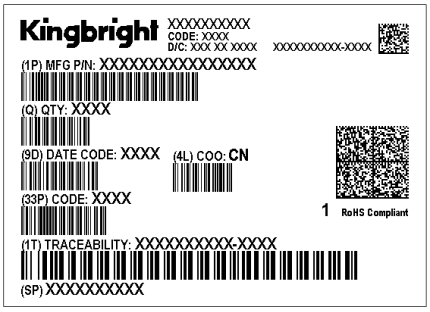


REEL DIMENSION (units : mm)



PACKING & LABEL SPECIFICATIONS





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	-	T_a = 25°C, I_F = maximum rated current *	1,000 h	0 / 22
2	High Temp. operating test	EIAJ ED-4701/100(101)	T_a = 100°C, I_F = maximum rated current *	1,000 h	0 / 22
3	Low Temp. operating test	-	T_a = -40°C, I_F = maximum rated current *	1,000 h	0 / 22
4	High temp. storage test	EIAJ ED-4701/100(201)	T_a = maximum rated storage temperature	1,000 h	0 / 22
5	Low temp. storage test	EIAJ ED-4701/100(202)	T_a = -40°C	1,000 h	0 / 22
6	High temp. & humidity storage test	EIAJ ED-4701/100(103)	T_a = 60°C, RH = 90%	1,000 h	0 / 22
7	High temp. & humidity operating test	EIAJ ED-4701/100(102)	T_a = 60°C, RH = 90% I_F = maximum rated current *	1,000 h	0 / 22
8	Soldering reliability test	EIAJ ED-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	-	T_a = -40°C(15min) ~ 100°C(15min) I_F = derated current at 100°C	1,000 cycles	0 / 22
10	Thermal shock test	-	T_a = -40°C(15min) ~ maximum rated Storage temperature(15min)	1,000 cycles	0 / 22
11	Electric Static Discharge (ESD)	EIAJ ED-4701/100(304)	C = 100pF, R2 = 1.5KΩ V = 3000V(Hyper Red) V=3000V (Green)	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*

CRITERIA FOR JUDGING DAMAGE

Items	Symbols	Conditions	Failure Criteria
luminous Intensity	I_V	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

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.
4. The information in this document applies to typical usage in consumer electronics applications. If customer's application has special reliability requirements or have life-threatening liabilities, such as automotive or medical usage, please consult with Kingbright representative for further assistance.
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