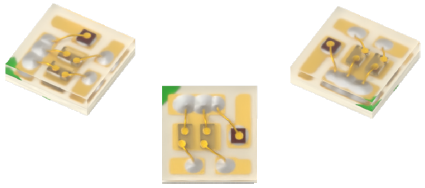
Kingbright



APGF1012GBRC-07

1 x 1 x 0.25 mm Full-Color Surface Mount LED

DESCRIPTIONS

- The Green source color devices are made with InGaN on Sapphire Light Emitting Diode
- The Blue source color devices are made with InGaN Light Emitting Diode
- The Hyper-Red 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

- 1.0 mm x 1.0 mm SMD LED, 0.25 mm thickness
- Low power consumption
- Package: 4000 pcs / reel
- Moisture sensitivity level: 3
- Halogen-free
- RoHS compliant

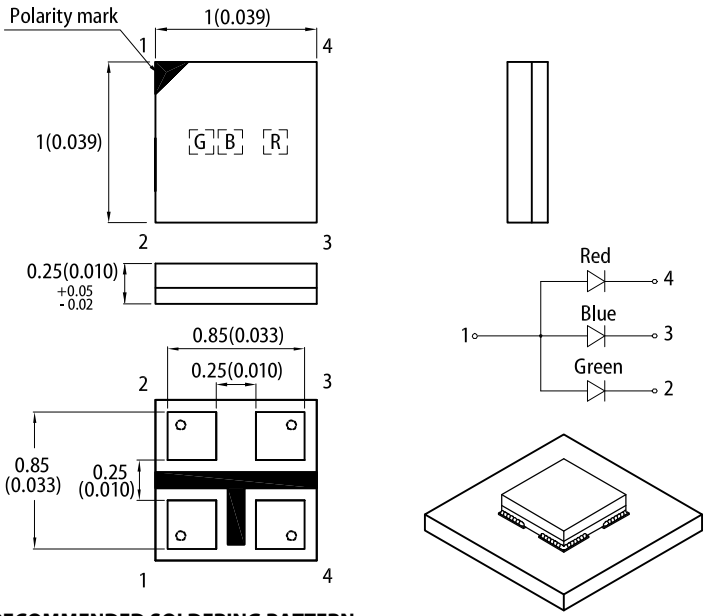
APPLICATIONS

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

ATTENTION

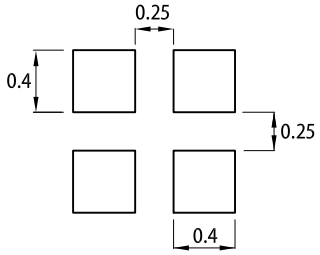
Observe precautions for handling
Electrostatic discharge sensitive devices

PACKAGE DIMENSIONS



RECOMMENDED SOLDERING PATTERN

(units : mm; tolerance : ± 0.1)



Mask open area ratio: 80%
Mask thickness: 80~100um

Notes:
1. All dimensions are in millimeters (inches).
2. Tolerance is ±0.1(0.004") 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) @ 5mA [2]		Viewing Angle [1]
			Min.	Typ.	2θ1/2
APGF1012GBRC-07	Green (InGaN)	Water Clear	80	220	150°
	Blue (InGaN)		10	23	
	Hyper Red (AlGaInP)		15	30	

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_A=25°C

Parameter	Symbol	Emitting Color	Value		Unit
			Typ.	Max.	
Wavelength at Peak Emission I_F = 5mA	λ_{peak}	Green Blue Hyper Red	515 460 632	-	nm
Dominant Wavelength I_F = 5mA	λ_{dom} [1]	Green Blue Hyper Red	525 465 624	-	nm
Spectral Bandwidth at 50% Φ REL MAX I_F = 5mA	Δλ	Green Blue Hyper Red	30 25 20	-	nm
Capacitance	C	Green Blue Hyper Red	45 100 25	-	pF
Forward Voltage I_F = 5mA	V_F [2]	Green Blue Hyper Red	2.85 2.8 1.95	3.3 3.3 2.3	V
Reverse Current (V_R = 5V)	I_R	Green Blue Hyper Red	-	50 50 10	μA
Temperature Coefficient of λ_{peak} I_F = 5mA, -10°C ≤ T ≤ 85°C	$TC_{\lambda peak}$	Green Blue Hyper Red	0.05 0.04 0.13	-	nm/°C
Temperature Coefficient of λ_{dom} I_F = 5mA, -10°C ≤ T ≤ 85°C	$TC_{\lambda dom}$	Green Blue Hyper Red	0.03 0.03 0.06	-	nm/°C
Temperature Coefficient of V_F I_F = 5mA, -10°C ≤ T ≤ 85°C	TC_V	Green Blue Hyper Red	-3 -3 -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.

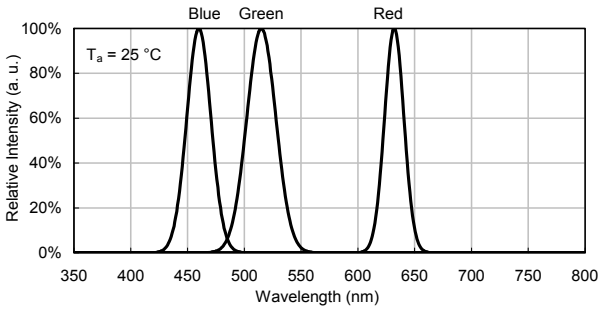
ABSOLUTE MAXIMUM RATINGS at T_A=25°C

Parameter	Symbol	Value			Unit
		Green	Blue	Hyper Red	
Power Dissipation	P_D [1]	35			mW
Reverse Voltage	V_R	5	5	5	V
Junction Temperature	T_j	115	115	115	°C
Operating Temperature	T_{op}	-40 to +85			°C
Storage Temperature	T_{stg}	-40 to +100			°C
DC Forward Current	I_F [2]	10	10	10	mA
Peak Forward Current	I_{FM} [3]	50	50	50	mA
Electrostatic Discharge Threshold (HBM)	-	450	250	3000	V
Thermal Resistance (Junction / Ambient)	$R_{th\ JA}$ [4]	740	690	770	°C/W
Thermal Resistance (Junction / Solder point)	$R_{th\ JS}$ [4]	650	610	630	°C/W

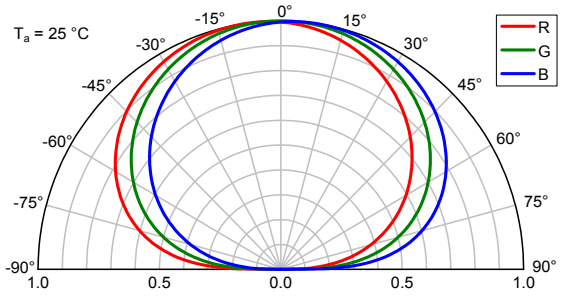
Notes:
1. Within 35mW when multiple chips are lightened
2. The maximum ratings are valid for the case of lighting a single chip
When two chips are lit at the same time, each chip should be driven at a current lower than 50% of the absolute maximum ratings
When three chips are lit at the same time, each chip should be driven at a current lower than 30% of the absolute maximum ratings
3. Duty Cycle ≤ 1/20 , Pulse Width = 1ms.
4. $R_{th\ JA}$,$R_{th\ JS}$ Results from mounting on PC board FR4 (pad size ≥ 16 mm^2 per pad).
5. 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

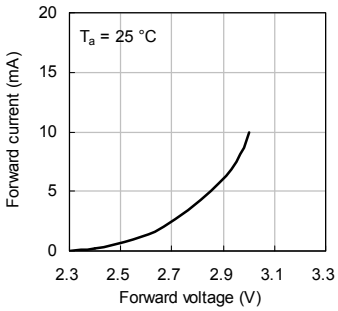


SPATIAL DISTRIBUTION

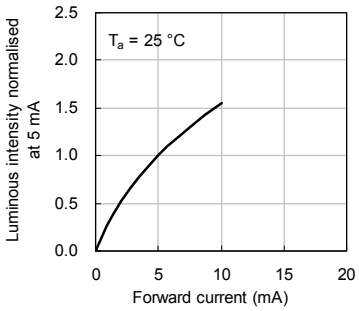


GREEN

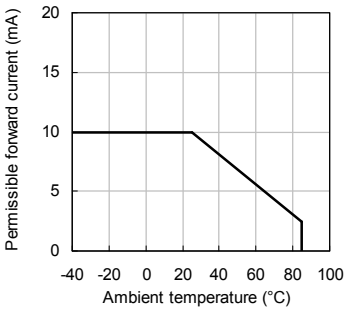
Forward Current vs. Forward Voltage



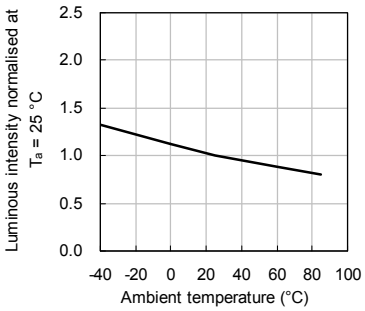
Luminous Intensity vs. Forward Current



Forward Current Derating Curve

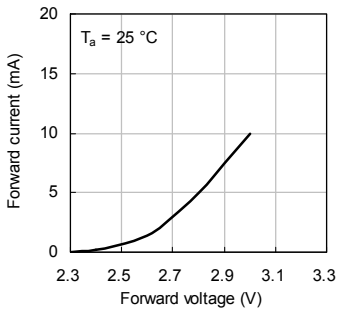


Luminous Intensity vs. Ambient Temperature

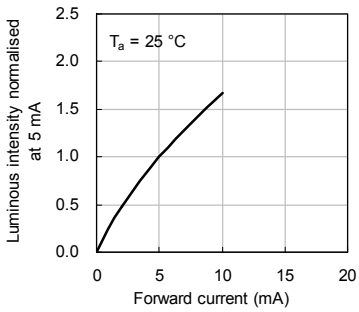


BLUE

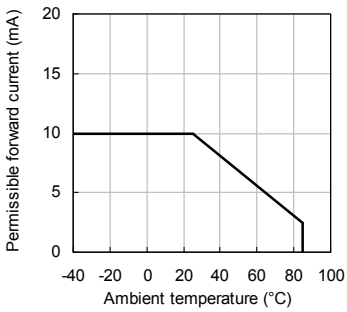
Forward Current vs. Forward Voltage



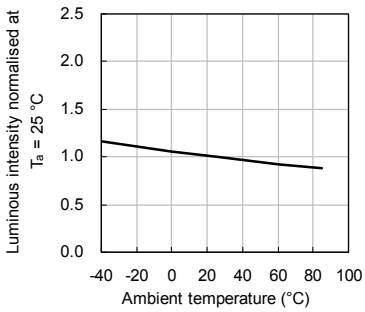
Luminous Intensity vs. Forward Current



Forward Current Derating Curve

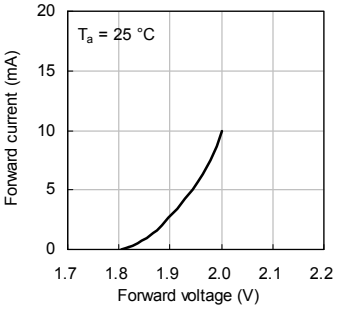


Luminous Intensity vs. Ambient Temperature

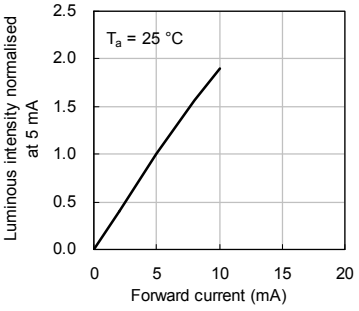


HYPER RED

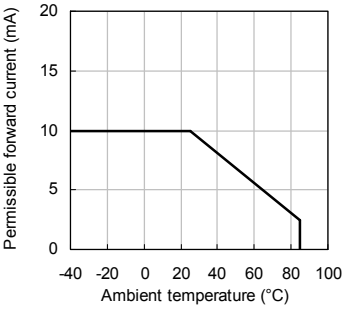
Forward Current vs. Forward Voltage



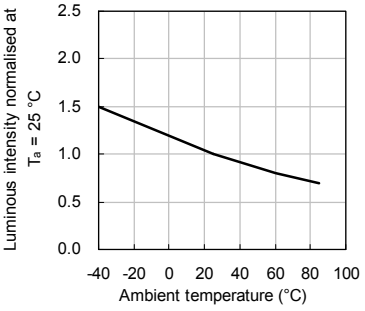
Luminous Intensity vs. Forward Current



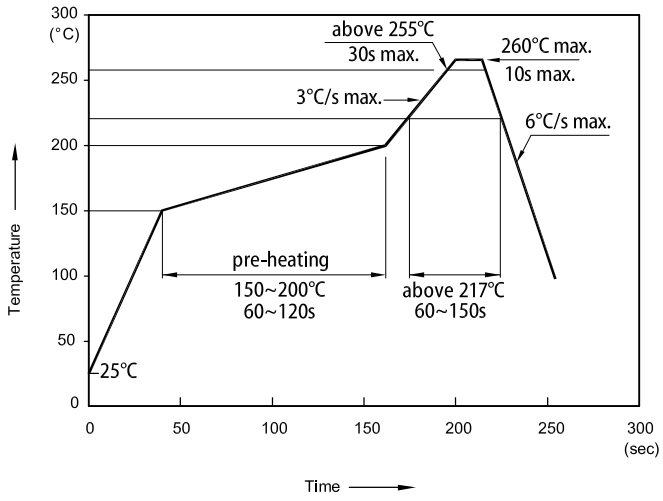
Forward Current Derating Curve



Luminous Intensity vs. Ambient Temperature

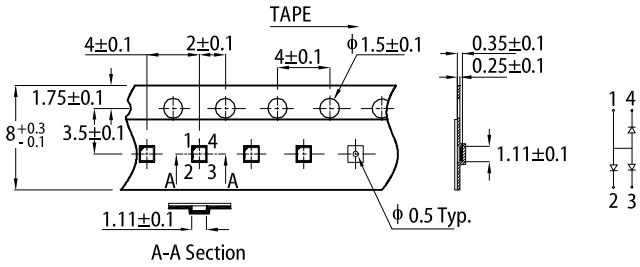


REFLOW SOLDERING PROFILE for LEAD-FREE SMD PROCESS

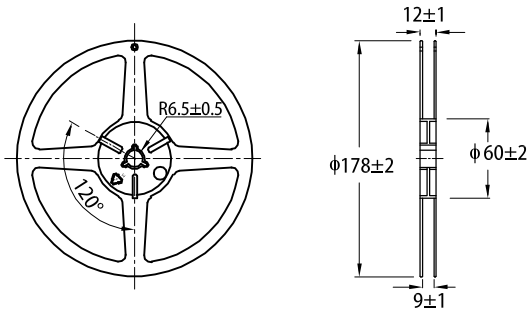


Notes:
1. *Don't cause stress to the LEDs while it is exposed to high temperature.*
2. *The maximum number of reflow soldering passes is 2 times.*
3. *Reflow soldering is recommended. Other soldering methods are not recommended as they might cause damage to the product.*

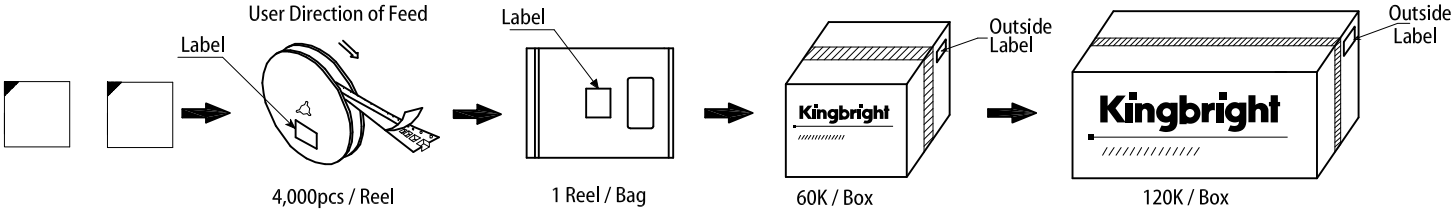
TAPE SPECIFICATIONS (units : mm)

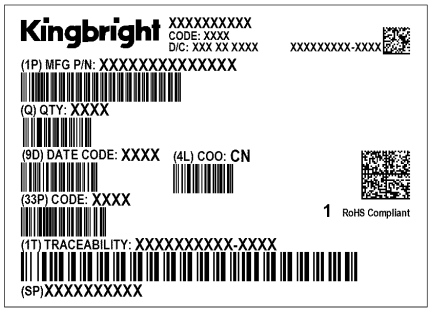


REEL DIMENSION (units : mm)



PACKING & LABEL SPECIFICATIONS





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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