Kingbright



# APHF1608LSEEQBDZGKC

1.6 x 0.8 mm Full-Color Surface Mount LED

## DESCRIPTIONS

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

- 1.6 x 0.8 mm SMD LED, 0.5 mm thickness
- Low power consumption
- Package in 8mm tape on 7" diameter reel, 4000 pcs / reel
- Can produce any color in visible spectrum, including white light
- Moisture sensitivity level: 3
- Halogen-free
- RoHS compliant

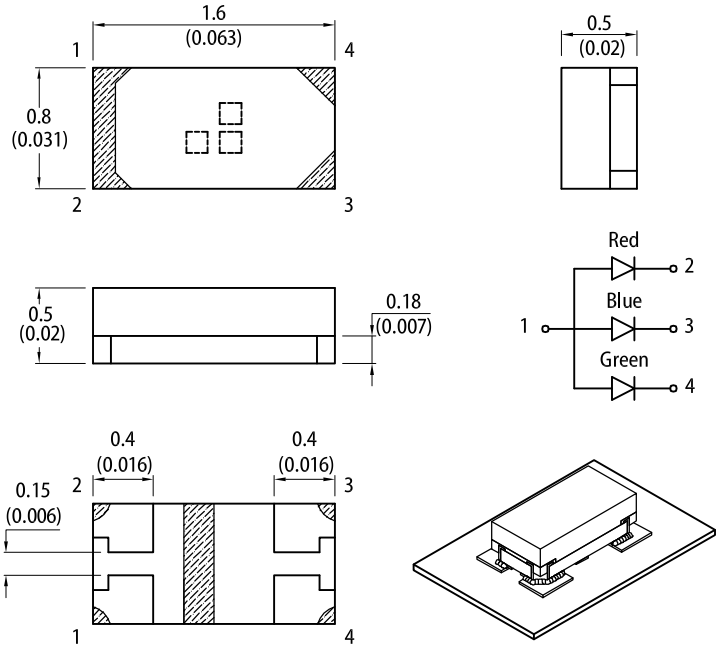
## APPLICATIONS

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

## ATTENTION

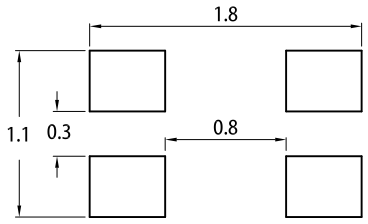
Observe precautions for handling electrostatic discharge sensitive devices

## PACKAGE DIMENSIONS




**RECOMMENDED SOLDERING PATTERN**

(units : mm; tolerance : ± 0.1)




*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.*

## SELECTION GUIDE

| Part Number | Emitting Color (Material) | Lens Type | Iv (mcd) @ 2mA [2] | | Viewing Angle [1] |
|---|---|---|---|---|---|
| | | | Min. | Typ. | 2θ1/2 |
| APHF1608LSEEQBDZGKC | Hyper Red (AlGaInP) | Water Clear | 4 | 15 | 140° |
| | Blue (InGaN) | | 4 | 10 | |
| | Green (InGaN) | | 50 | 90 | |

*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.*

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## ELECTRICAL / OPTICAL CHARACTERISTICS at $T_A$=25°C

| Parameter | Symbol | Emitting Color | Value | | Unit |
|---|---|---|---|---|---|
| | | | Typ. | Max. | |
| Wavelength at Peak Emission $I_F$ = 2mA | $\lambda_{peak}$ | Hyper Red<br>Blue<br>Green | 630<br>460<br>515 | - | nm |
| Dominant Wavelength $I_F$ = 2mA | $\lambda_{dom}$ [1] | Hyper Red<br>Blue<br>Green | 621<br>465<br>525 | - | nm |
| Spectral Bandwidth at 50% Φ REL MAX<br>$I_F$ = 2mA | Δλ | Hyper Red<br>Blue<br>Green | 20<br>25<br>35 | - | nm |
| Forward Voltage $I_F$ = 2mA | $V_F$ [2] | Hyper Red<br>Blue<br>Green | 1.8<br>2.65<br>2.65 | 2.1<br>3.1<br>3.1 | V |
| Reverse Current ($V_R$ = 5V) | $I_R$ | Hyper Red<br>Blue<br>Green | - | 10<br>50<br>50 | μA |
| Temperature Coefficient of $\lambda_{peak}$<br>$I_F$ = 2mA, -10°C ≤ T ≤ 85°C | $TC_{\lambda peak}$ | Hyper Red<br>Blue<br>Green | 0.13<br>0.04<br>0.05 | - | nm/°C |
| Temperature Coefficient of $\lambda_{dom}$<br>$I_F$ = 2mA, -10°C ≤ T ≤ 85°C | $TC_{\lambda dom}$ | Hyper Red<br>Blue<br>Green | 0.06<br>0.03<br>0.03 | - | nm/°C |
| Temperature Coefficient of $V_F$<br>$I_F$ = 2mA, -10°C ≤ T ≤ 85°C | $TC_V$ | Hyper Red<br>Blue<br>Green | -1.9<br>-2.9<br>-2.9 | - | 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

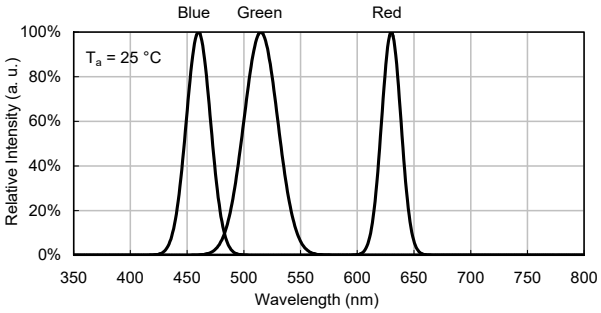
| Parameter | Symbol | Value | | | Unit |
|---|---|---|---|---|---|
| | | Hyper Red | Blue | Green | |
| Power Dissipation | $P_D$ [1] | 75 | 80 | 82 | mW |
| Reverse Voltage | $V_R$ | 5 | 5 | 5 | V |
| Junction Temperature | $T_j$ | 115 | 115 | 115 | °C |
| Operating Temperature | $T_{op}$ | -40 to +85 | | | °C |
| Storage Temperature | $T_{stg}$ | -40 to +85 | | | °C |
| DC Forward Current | $I_F$ [1] | 30 | 20 | 20 | mA |
| Peak Forward Current | $I_{FP}$ [2] | 195 | 100 | 100 | mA |
| Electrostatic Discharge Threshold (HBM) | - | 3000 | 250 | 450 | V |
| Thermal Resistance (Junction / Ambient) | $R_{th\ JA}$ [3] | 730 | 720 | 700 | °C/W |
| Thermal Resistance (Junction / Solder point) | $R_{th\ JS}$ [3] | 610 | 620 | 590 | °C/W |

*Notes:*
*1. 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*
*2. 1/10 Duty Cycle , 0.1ms Pulse Width .*
*3. $R_{th\ JA}$ ,$R_{th\ JS}$ Results from mounting on PC board FR4 (pad size ≥ 16 mm$^2$ per pad).*
*4. 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.*

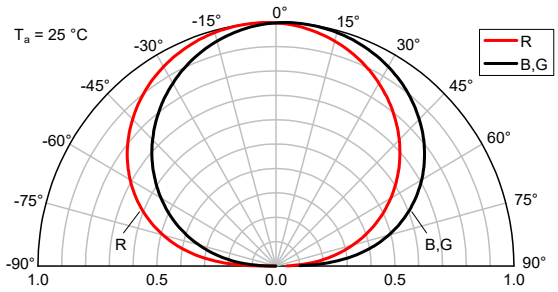
RoHS © 2025 Kingbright. All Rights Reserved. 

## TECHNICAL DATA

### RELATIVE INTENSITY vs. WAVELENGTH

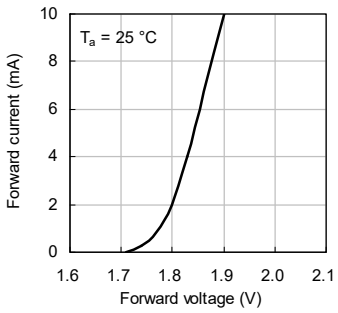



### SPATIAL DISTRIBUTION

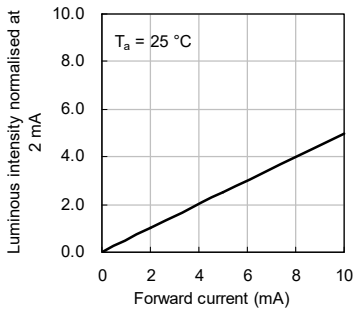



## HYPER RED

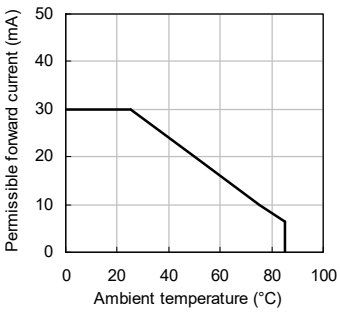
**Forward Current vs. Forward Voltage**



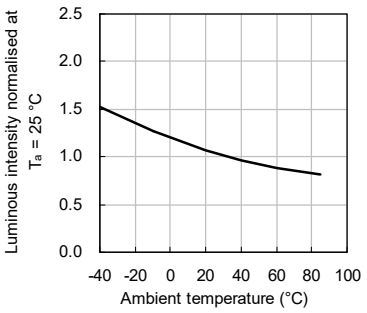

**Luminous Intensity vs. Forward Current**




**Forward Current Derating Curve**

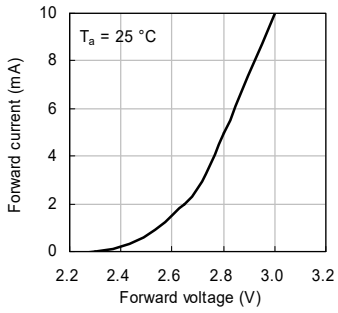



**Luminous Intensity vs. Ambient Temperature**

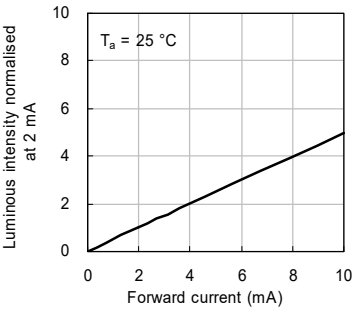



## BLUE

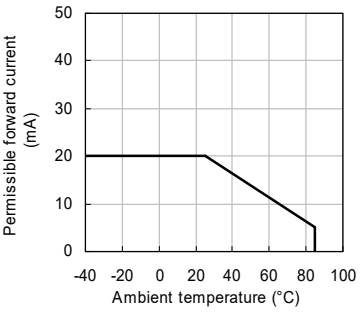
**Forward Current vs. Forward Voltage**



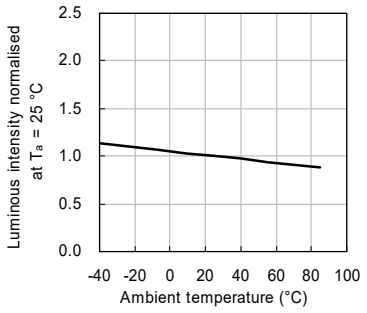

**Luminous Intensity vs. Forward Current**




**Forward Current Derating Curve**

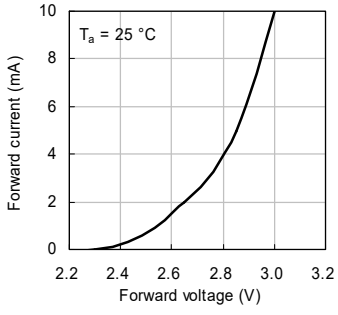



**Luminous Intensity vs. Ambient Temperature**

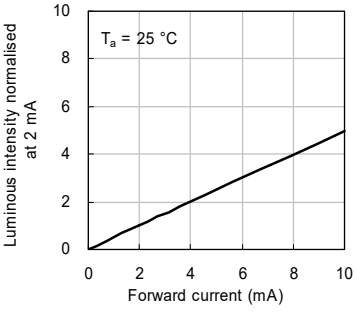



## GREEN

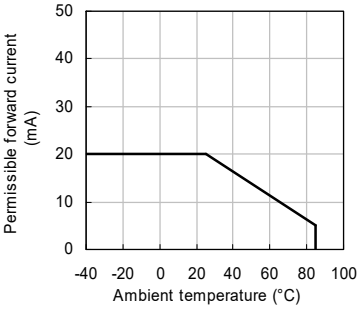
**Forward Current vs. Forward Voltage**



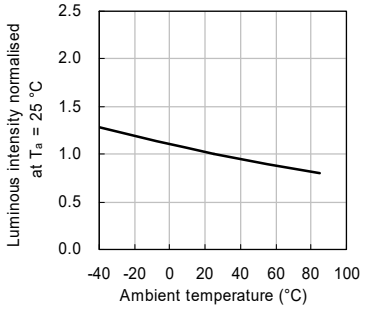

**Luminous Intensity vs. Forward Current**




**Forward Current Derating Curve**

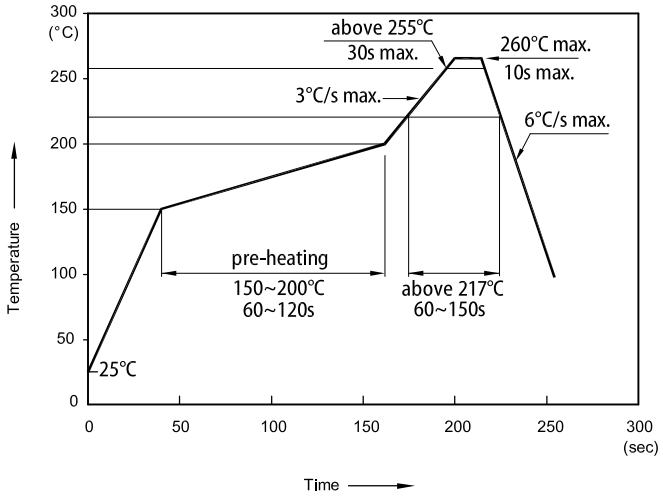



**Luminous Intensity vs. Ambient Temperature**



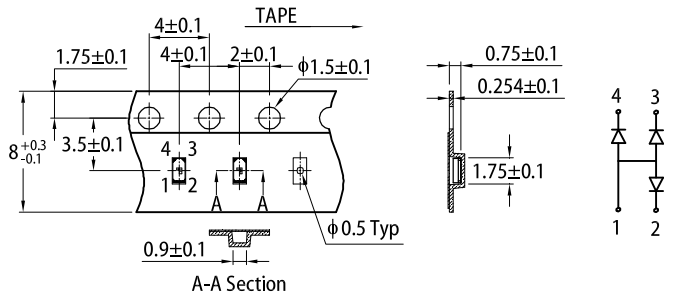

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**REFLOW SOLDERING PROFILE for LEAD-FREE SMD PROCESS**

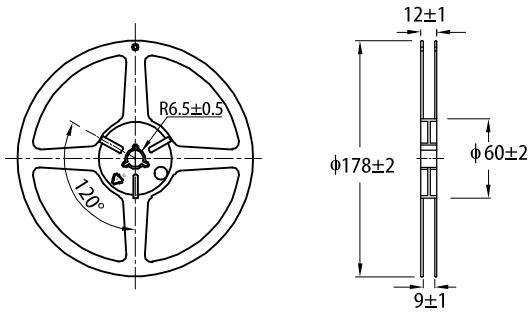



*Notes:*
*1. Don't cause stress to the LEDs while it is exposed to high temperature.*
*2. The maximum number of reflow soldering passes is 2 times.*
*3. Reflow soldering is recommended. Other soldering methods are not recommended as they might cause damage to the product.*

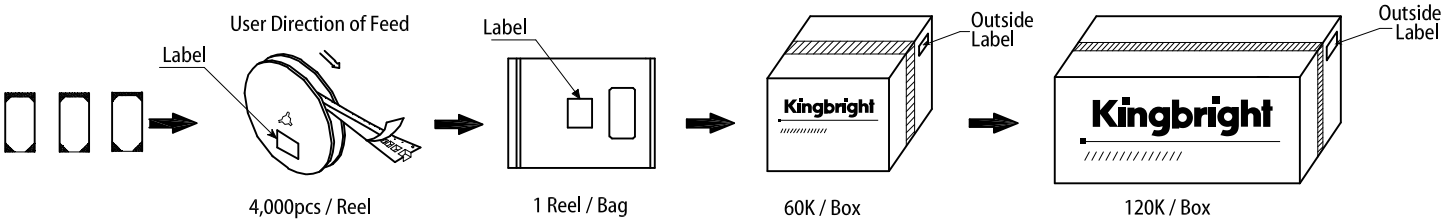
**TAPE SPECIFICATIONS** (units : mm)




**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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