

Technical Data Sheet

High Power LED – 3W

EHP-B02/GRB03-P03

Features

- Feature of the device: small package with high efficiency
- Typical view angle: 130°.
- Typical **Green** light flux output: 35 lm @ 350mA.
- Typical **Red** light flux output: 25 lm @ 350mA.
- Typical **Blue** light flux output: 8 lm @ 350mA.
- ESD protection.
- Soldering methods: SMT.
- Grouping parameter: total luminous flux, dominant wavelength
- The product itself will remain within RoHS compliant version



Descriptions

- The series are specially designed for applications requiring higher brightness.
- LED should mount onto the Aluminum-cored printed circuit board
- Allowing for cooling.
- Thermal Resistance $R_{th,j-L} = 9 \text{ }^{\circ}\text{K/W}$

Applications

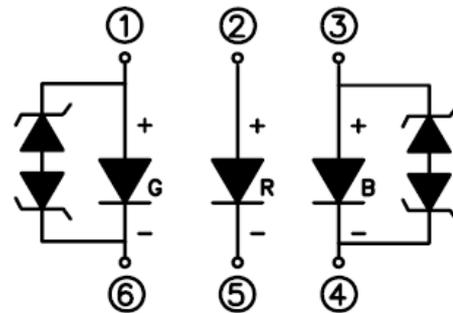
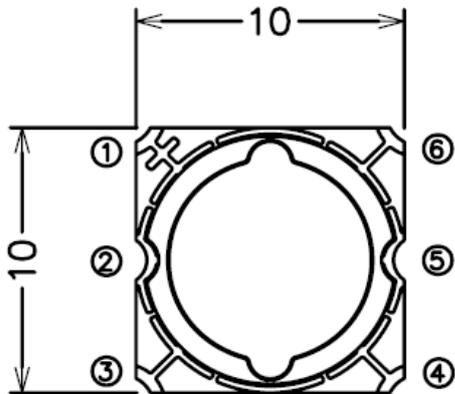
- TFT LCD display backlight
- Decorative and entertainment illumination
- Signal and symbol luminaries for orientation marker lights (e.g. steps, exit ways, etc.)
- Exterior and interior automotive illumination

Materials

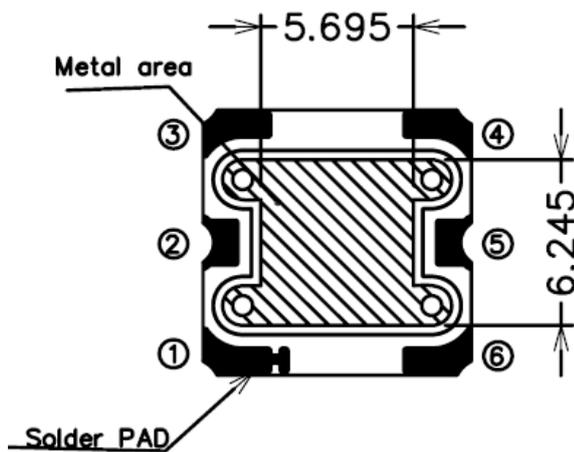
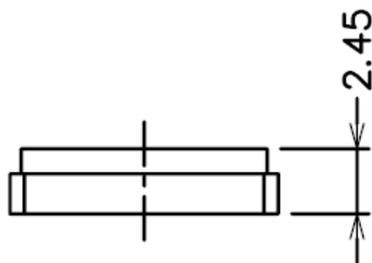
Items	Description
Housing black body	Heat resistant polymer
Encapsulating Resin	Silicone resin
Lens	Silicone
Electrodes	Ag plating copper alloy
Die attach	Silver paste
Chip	AlGaInP—Red InGaN—Green InGaN—Blue

EHP-B02/GRB03-P03

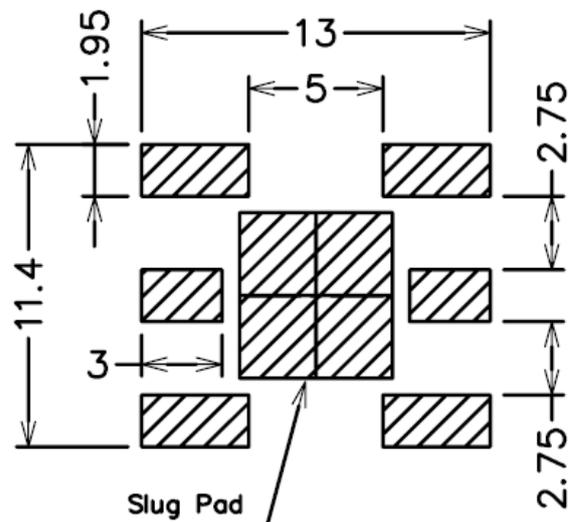
Dimensions



Polarity



Bot. view



Soldering patterns

- Notes:**
1. Dimensions are in millimeters.
 2. Tolerances unless dimensions $\pm 0.25\text{mm}$.

EHP-B02/GRB03-P03
Maximum Ratings ($T_{Ambient}=25^{\circ}C$)

Parameter		Symbol	Rating	Unit
Operating Temperature		T_{opr}	-40 ~ +85	°C
Storage Temperature		T_{stg}	-40 ~ +100	°C
Junction temperature		T_j	125	°C
Pulse Forward Current	Red	I_F	550	mA
	Blue		500	
	Green		500	
Power Dissipation (Under Pulse)		P_d	5.0	W

Electro-Optical Characteristics ($T_{Ambient}=25^{\circ}C$)

Parameter	Symbol	Color	Min.	Typ.	Max.	Unit	Condition
Luminous Flux	Φ_V	R	23	-----	33	lm	$I_F=350mA$
		B	6	-----	13		
		G	33	-----	45		
Viewing Angle	$2\theta_{1/2}$		-----	130	-----	deg	
Wavelength	λ_D	R	620	-----	630	nm	
		B7	460	-----	465		
		G2	525	-----	530		
Forward Voltage	V_F	R	2.05	-----	2.65	V	
		B	3.25	-----	3.85		
		G	3.25	-----	3.85		

Note. 1. $2\theta_{1/2}$ is the off axis angle from lamp centerline where the luminous intensity is 1/2 of the peak value.

2. Luminous flux measurement tolerance : $\pm 10\%$
3. Forward Voltage measurement tolerance : $\pm 0.1V$
4. Wavelength measurement tolerance : $\pm 1nm$



EHP-B02/GRB03-P03

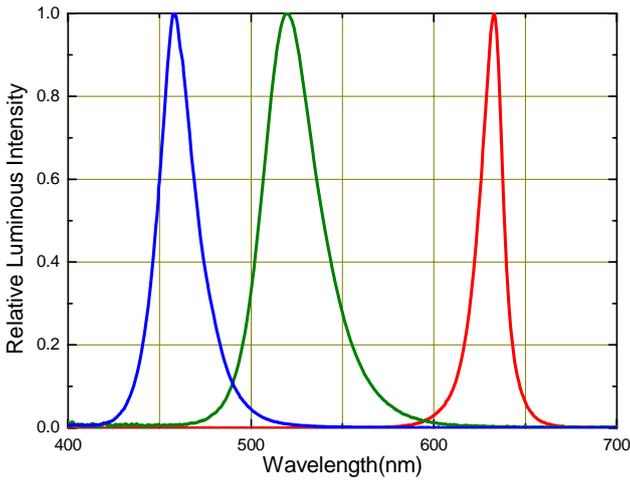
Standard Specification

part number	Color bins	Brightness range(lm)
EHP-B02/GRB03-P03/G3RB7/TR	G3、R5、R6、B7	G : 33-45 ; R : 23-33 ; B : 6-13

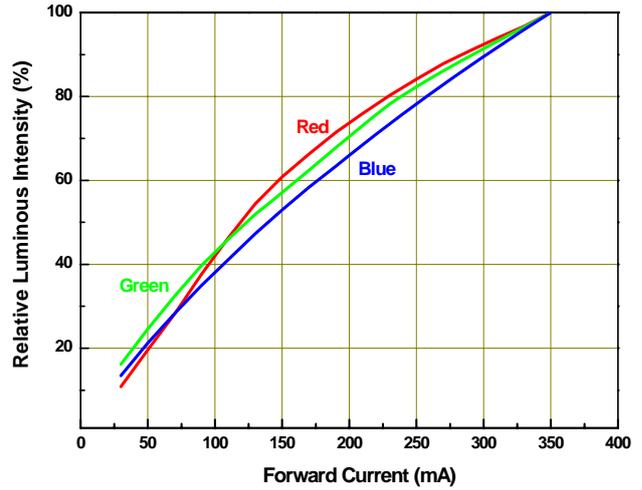
EHP-B02/GRB03-P03

Typical Electro-Optical Characteristics Curves

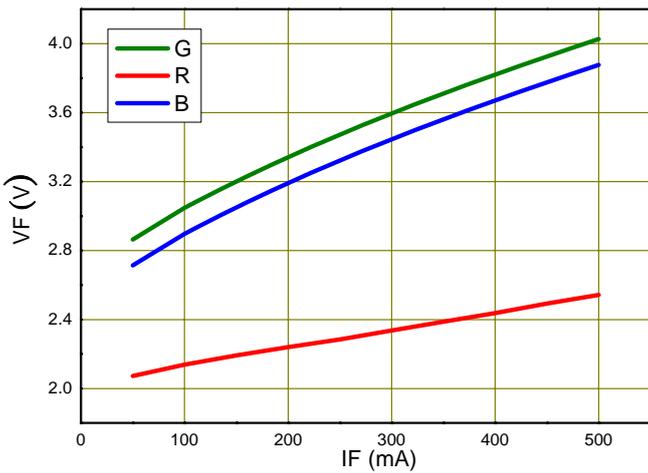
Relative Spectral Distribution,
 $I_F=350\text{mA}$, $T_{\text{Ambient}}=25^\circ\text{C}$



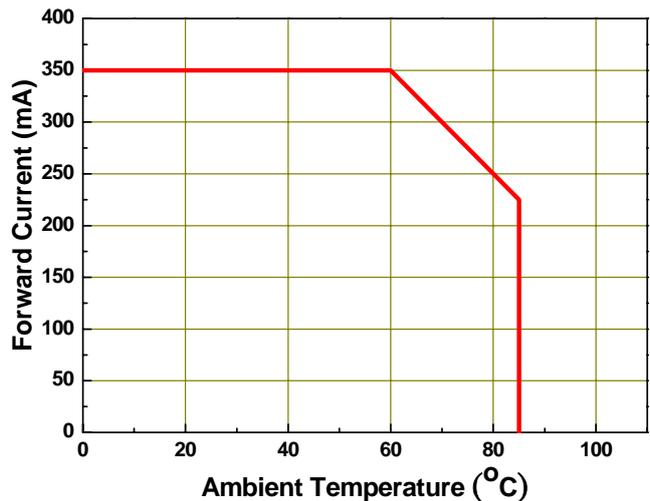
Forward Voltage vs Forward Current,
 $T_{\text{Ambient}}=25^\circ\text{C}$



Relative Luminous Intensity vs Forward Current, $T_{\text{Ambient}}=25^\circ\text{C}$

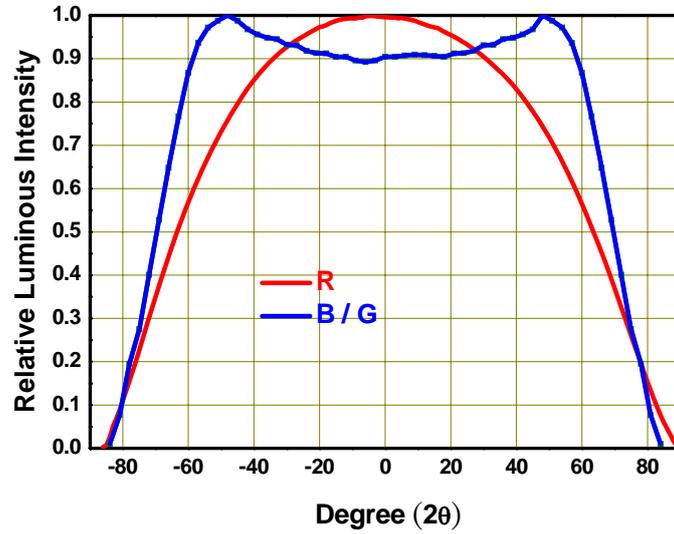


Forward Current Derating Curve,
 Derating based on $T_{\text{MAX}}=125^\circ\text{C}$



EHP-B02/GRB03-P03

Typical Representative Spatial Radiation Pattern



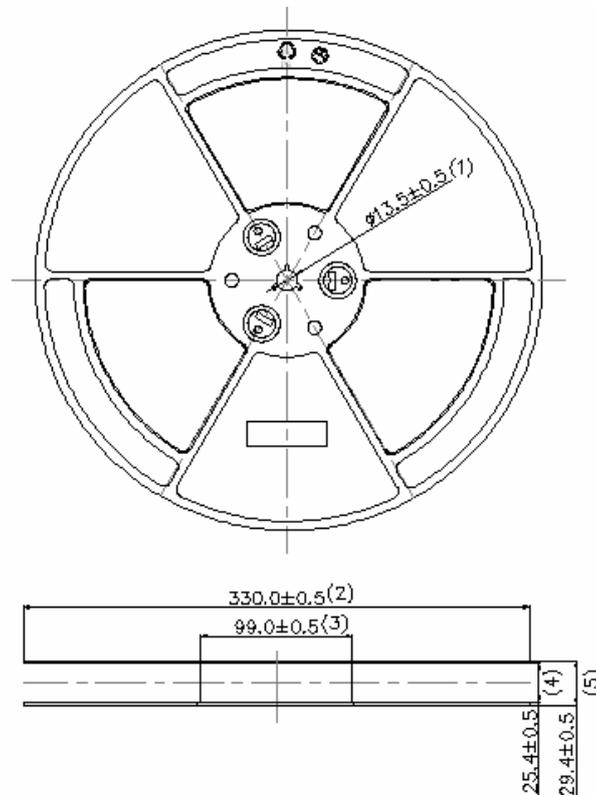
EHP-B02/GRB03-P03

Label explanation

- CPN: Customer's Production Number
- P/N : Production Number
- QTY: Packing Quantity
- CAT: Luminous Ranks
- HUE: Dominant Wavelength
- REF: Reference
- LOT No: Lot Number
- MADE IN TAIWAN: Production Place



Reel Dimensions

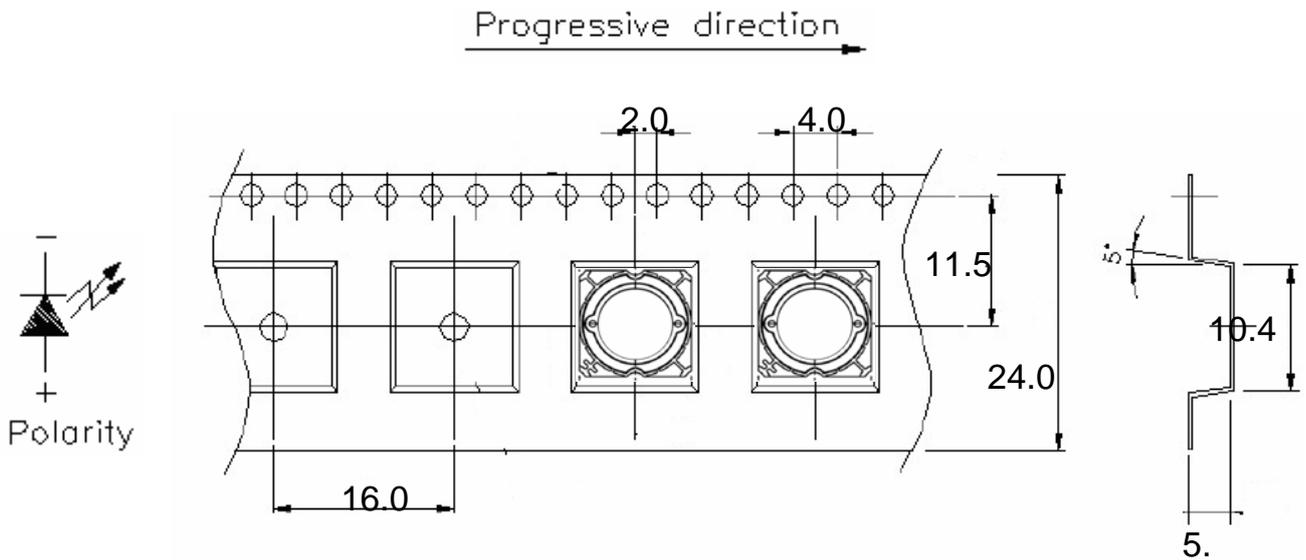


Note: 1. Dimensions are in millimeters

2. The tolerances unless mentioned is $\pm 0.1\text{mm}$

EHP-B02/GRB03-P03

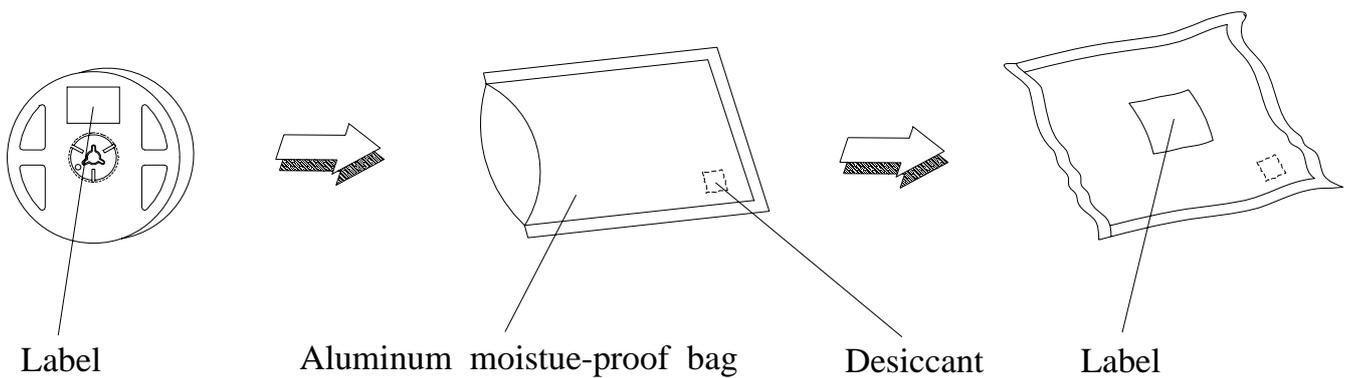
Carrier Tape Dimensions: Loaded quantity 300 PCS per reel.



Note: 1. Dimensions are in millimeters

2. The tolerances unless mentioned is $\pm 0.1\text{mm}$

Moisture Resistant Packaging



Reliability Test Items and Results

Stress Test	Stress Condition	Stress Duration
Solderability	Tsol=230°C, 5sec	1 times
Reflow	Tsol=260°C, 10sec, 6min	3 times
Thermal Shock	H : +110°C 20min. 'j 20sec. 'L : -40°C 20min.	500 Cycles
Temperature Cycle	H : +100°C 30min. 'j 5min. 'L : - 40°C 30min.	1000 Cycles
High Temperature/Humidity Reverse Bias	Ta=85°C , RH=85%	1000hours
High Temperature Operation Life #1	Ta=25°C, IF=350mA	1000hours
High Temperature Operation Life #2	Ta=55°C, IF=350mA	1000hours
High Temperature Operation Life #3	Ta=85°C, IF=225mA	1000hours
High Temperature Storage	Ta= 110°C	1000hours
Low Temperature Storage	Ta= -40°C	1000hours
Low Temperature Operation Life	Ta= -40°C, IF=350mA	1000hours
ESD Human Body Model	2000V, Interval:0.5sec	3 times
ESD Machine Model	200V, Interval:0.5sec	3 times

*Im: BRIGHTNESS ATTENUATE DIFFERENCE(1000hrs) < 20%

*VF: FORWARD VOLTAGE DIFFERENCE < 20%

Precautions For Use

1. Over-current-proof

Though EHP-B02 has conducted ESD protection mechanism, customer must not use the device in reverse and should apply resistors for extra protection. Otherwise slight voltage shift may cause enormous current change and burn out failure would happen.

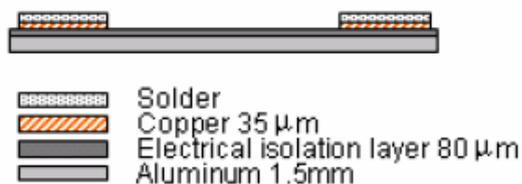
2. Storage

- i. Do not open moisture proof bag before the products are ready to use.
- ii. Before opening the package, the LEDs should be kept at 30°C or less and 90%RH or less.
- iii. The LEDs should be used within a year.
- iv. After opening the package, the LEDs should be kept at 30°C or less and 70%RH or less.
- v. The LEDs should be used within 168 hours (7 days) after opening the package.
- vi. If the moisture absorbent material (silicone gel) has faded away or the LEDs have exceeded the storage time, baking treatment should be performed using the following conditions.
- vii. Pre-curing treatment : 60±5°C for 24 hours.

3. Thermal Management

- i. For maintaining the high flux output and achieving reliability, EHP-B02 series LED package should be mounted on a metal core printed circuit board (MCPCB) with proper thermal connection to dissipate approximately 3W of thermal energy under 350mA(per die) operation.

MCPCB structure



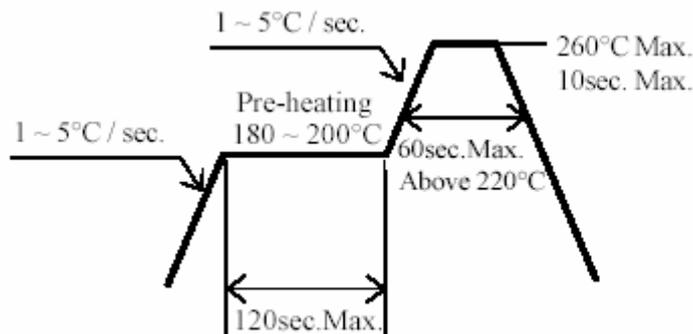
Recommend:

$$\text{Max } T_{\text{Slug}} = 70^{\circ}\text{C}$$

- ii. Special thermal designs are also recommended to take in outer heat sink design, such as FR4 PCB on Aluminum with thermal vias or FPC on Aluminum with thermal conductive adhesive, etc.
- iii. Sufficient thermal management must be conducted, or the die junction temperature will be over the limit under large electronic driving and LED lifetime will decrease critically.

4. Soldering Condition

- i. Lead reflow soldering temperature profile



- ii. Reflow soldering should not be done more than two times.
- iii. While soldering, do not put stress on the LEDs during heating.
- iv. After soldering, do not warp the circuit board

5. Soldering Iron

- i. For prototype builds or small series production runs it is possible to place and solder the LED by hand.
- ii. Dispensing thermal conductive glue or grease on the substrates and follow its curing spec. Press LED housing to closely connect LED and substrate.
- iii. It is recommended to hand solder the leads with a solder tip temperature of 280°C for less than 3 seconds within once in less than the soldering iron capacity 25W. Leave two seconds and more intervals, and do soldering of each terminal.
- iv. Be careful because the damage of the product is often started at the time of the hand solder.