

## EHP-C06/CM01A-P01/TR

**Features**

- Feature of the device: small package with high efficiency
- Typical color temperature: 3500 K.
- Typical view angle: 160°.
- Typical optical efficiency: 50 lm/W.
- ESD protection.
- Soldering methods: SMT.
- Grouping parameter: total luminous flux, color temperature.
- Thermal resistance (junction to slug): 10 K/W.
- The product itself will remain within RoHS compliant version

**Applications**

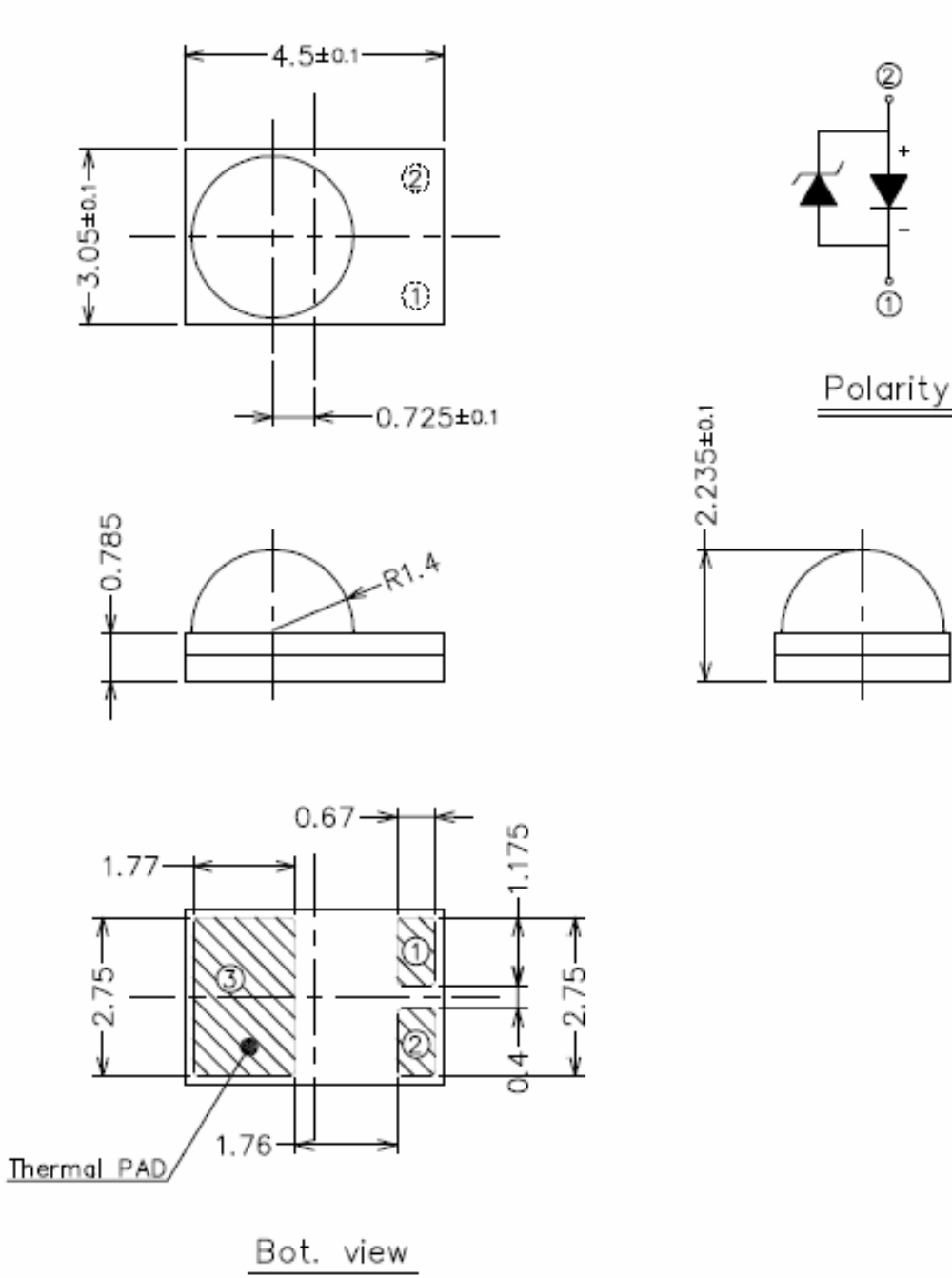
- TFT LCD display backlight
- Decorative and entertainment illumination
- Signal and symbol luminaries for orientation marker lights (e.g. steps, exit ways, etc.)
- Exterior and interior automotive illumination

**Materials**

Items	Description
Substrate	Ceramic material
Encapsulating Resin	Silicone resin with phosphor
Electrodes	Ag plating
Die attach	Silver paste
Chip	InGaN

**EHP-C06/CM01A-P01/TR**

**Dimensions**



- Notes :**
- 1. Dimensions are in millimeters**
  - 2. Tolerances unless dimensions  $\pm 0.1$ mm**

**EHP-C06/CM01A-P01/TR**
**Maximum Ratings ( $T_{Ambient}=25^{\circ}C$ )**

Parameter	Symbol	Rating	Unit
ESD Sensitivity (JEDEC 3b)	ESD	8000	V
Operating Temperature	$T_{opr}$	-40 ~ +100	$^{\circ}C$
Storage Temperature	$T_{stg}$	-40 ~ +110	$^{\circ}C$
Junction temperature	$T_j$	120	$^{\circ}C$
DC Operating Current	$I_F$	350	mA
Pulse Forward Current	$I_F$	500	mA
Power Dissipation	$P_d$	2.0	W
Junction to heat-sink thermal resistance	$R_{th}$	10	K/W

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

Parameter	Bin	Symbol	Min	Typ.	Max	Unit	Condition
Luminous Flux	J3	$\phi_v$	33	----	39	lm	$I_F=350mA$
	J4		39	----	45		
	J5		45	----	52		
Forward Voltage <sup>(2)</sup>	V1	$V_F$	2.95	----	3.25	V	
	V2		3.25	----	3.55		
	V3		3.55	----	3.85		
Viewing Angle <sup>(3)</sup>	----	$2\theta_{1/2}$	----	160	----	deg	
Color Temperature	----	$CCT$	2850	3500	4500	K	

Note. 1. Luminous Flux measurement tolerance:  $\pm 10\%$

2. Forward Voltage measurement tolerance:  $\pm 0.1V$

3.  $2\theta_{1/2}$  is the off axis angle from lamp centerline where the luminous intensity is 1/2 of the peak value.

**EHP-C06/CM01A-P01/TR**

**Color Binning**

Rank T5				
x	0.364	0.381	0.378	0.362
y	0.383	0.394	0.382	0.372
Reference CCT: 4100K-4500K				

Rank T6				
x	0.362	0.378	0.374	0.359
y	0.372	0.382	0.366	0.356
Reference CCT: 4100K-4500K				

Rank S5				
x	0.381	0.396	0.392	0.378
y	0.394	0.404	0.391	0.382
Reference CCT: 3800K-4100K				

Rank S6				
x	0.378	0.392	0.387	0.374
y	0.382	0.391	0.374	0.366
Reference CCT: 3800K-4100K				

Rank R5				
x	0.396	0.415	0.409	0.392
y	0.404	0.416	0.400	0.391
Reference CCT: 3500K-3800K				

Rank R6				
x	0.392	0.409	0.402	0.387
y	0.391	0.400	0.382	0.374
Reference CCT: 3500K-3800K				

**Note. 1. Color coordinates measurement allowance:  $\pm 0.01$**

**2. Color bins are defined at  $I_f=350$  mA**

**EHP-C06/CM01A-P01/TR**

**Color Binning**

Rank Q5				
x	0.415	0.431	0.424	0.409
y	0.416	0.423	0.406	0.400
Reference CCT: 3250K-3500K				

Rank Q6				
x	0.409	0.424	0.416	0.402
y	0.400	0.406	0.389	0.382
Reference CCT: 3250K-3500K				

Rank P5				
x	0.431	0.446	0.438	0.424
y	0.423	0.429	0.412	0.406
Reference CCT: 3050K-3250K				

Rank P6				
x	0.424	0.438	0.429	0.416
y	0.406	0.412	0.394	0.389
Reference CCT: 3050K-3250K				

Rank N5				
x	0.454	0.461	0.453	0.438
y	0.446	0.433	0.416	0.412
Reference CCT: 2850K-3050K				

Rank N6				
x	0.438	0.453	0.444	0.429
y	0.412	0.416	0.399	0.394
Reference CCT: 2850K-3050K				

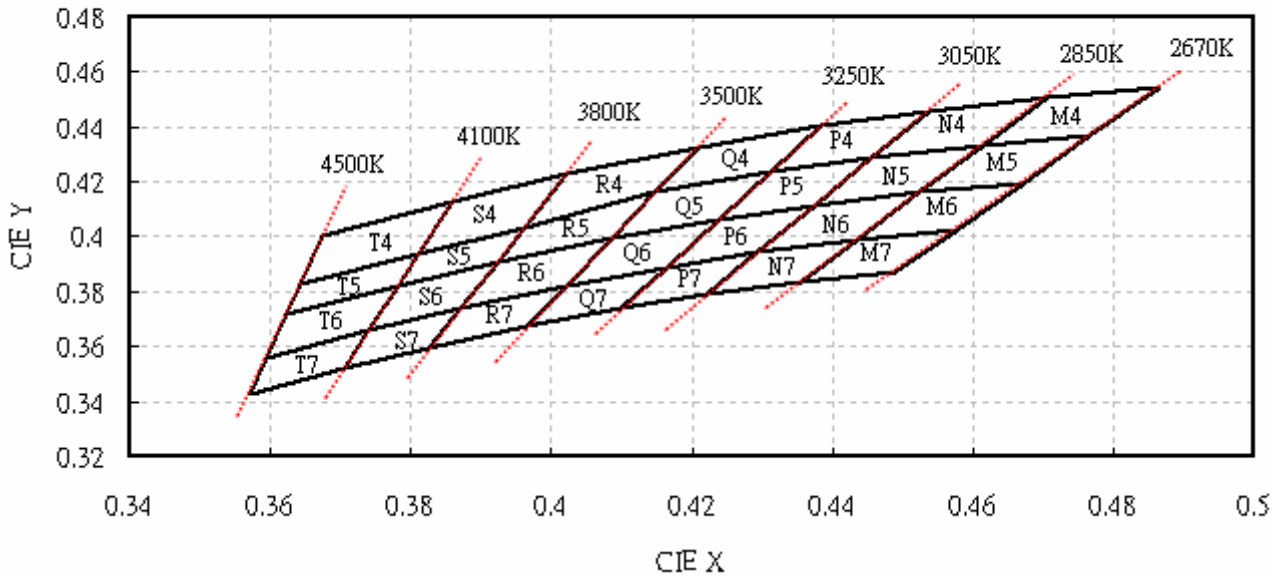
Note. 1. Color coordinates measurement allowance:  $\pm 0.01$

2. Color bins are defined at  $I_f=350$  mA

**EHP-C06/CM01A-P01/TR**

**Color Binning Structure Graphic Representation**

White Warm Bining

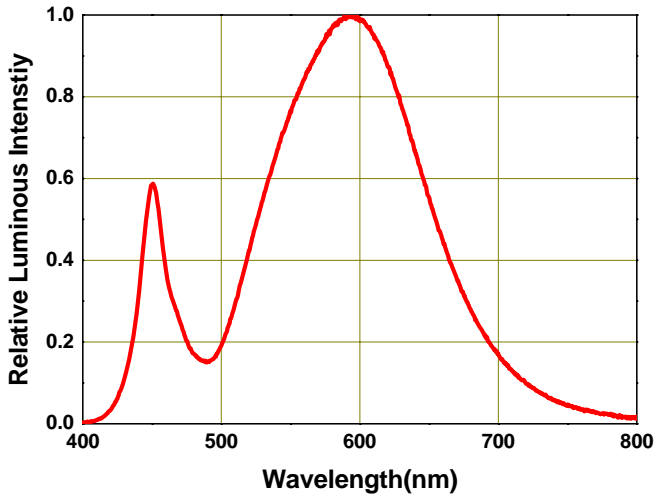


**Standard Specification**

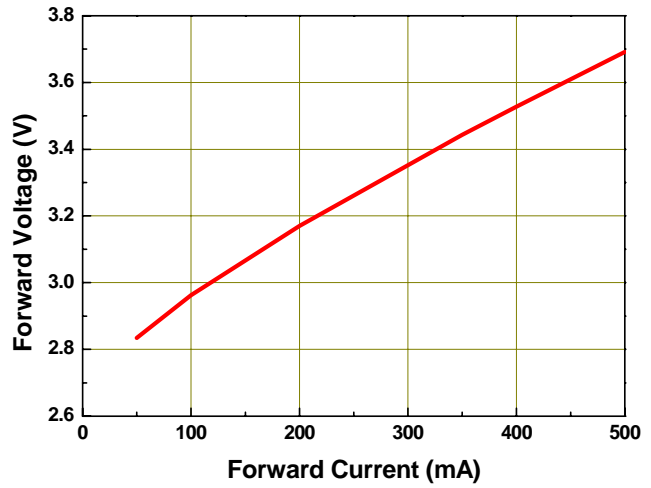
part number	CCT range(K)	Color bins	Brightness range(lm)
EHP-C06/LM01A-P01/2832/Y/J3J5	2850-3250	N5、N6、P5、P6	33-52
EHP-C06/LM01A-P01/3238/Y/J3J5	3250-3800	R5、R6、Q5、Q6	33-52
EHP-C06/LM01A-P01/3845/Y/J3J5	3800-4500	S5、S6、T5、T6	33-52

Typical Electro-Optical Characteristics Curves

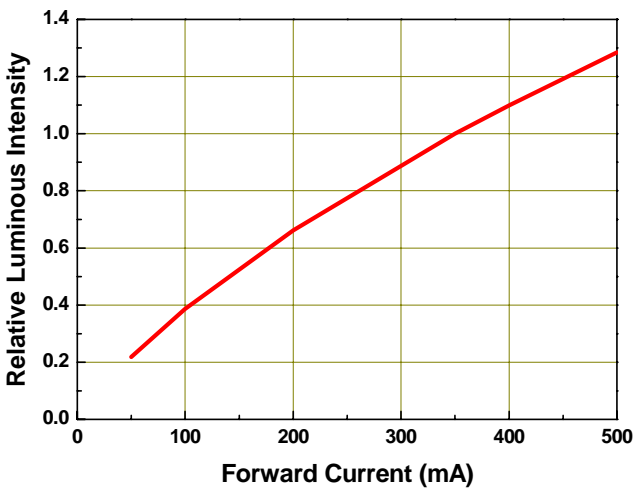
Relative Spectral Distribution,  
 $I_F=350\text{mA}$ ,  $T_{\text{Ambient}}=25^\circ\text{C}$



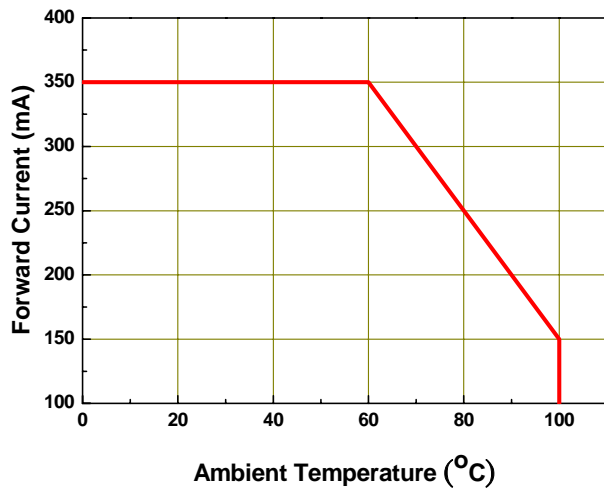
Forward Voltage vs Forward Current,  
 $T_{\text{Ambient}}=25^\circ\text{C}$



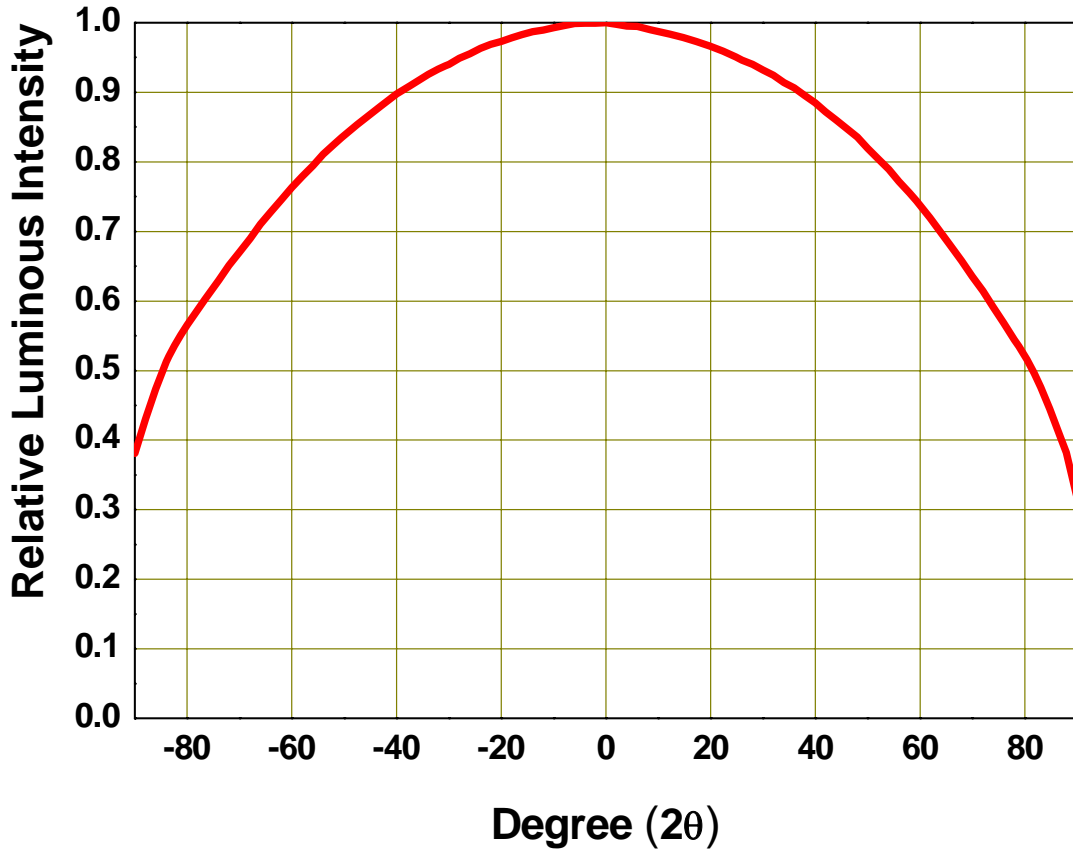
Relative Luminous Intensity vs Forward Current,  $T_{\text{Ambient}}=25^\circ\text{C}$



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



Typical Representative Spatial Radiation Pattern





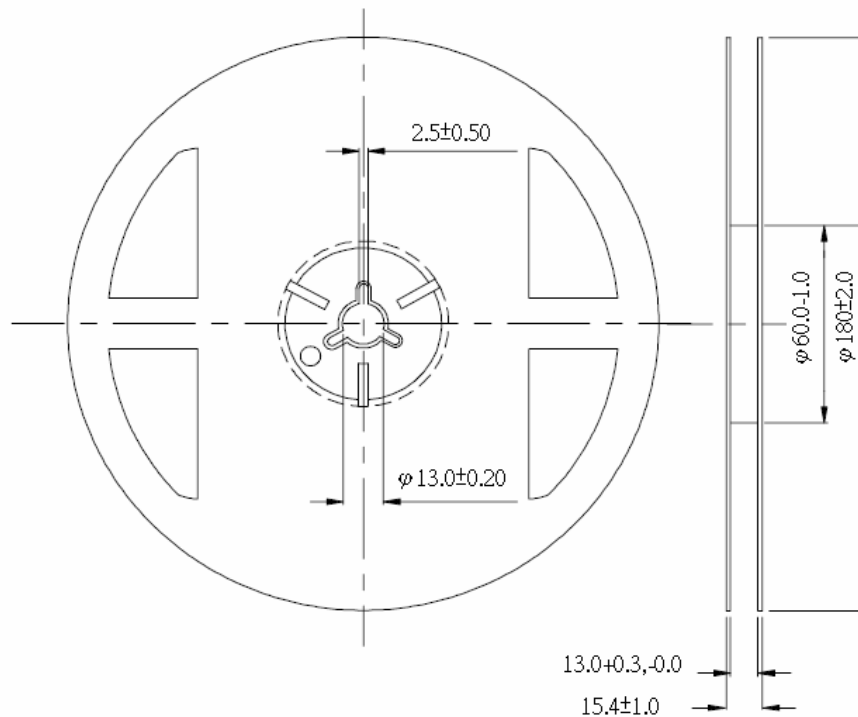
**EHP-C06/CM01A-P01/TR**

**Label Explanation**

- CPN: Customer's Production Number**
- P/N : Production Number**
- QTY: Packing Quantity**
- CAT: Luminous Flux**
- HUE: Chromaticity Coordinates**
- REF: Forward Voltage**
- LOT No: Lot Number**
- MADE IN TAIWAN: Production Place**



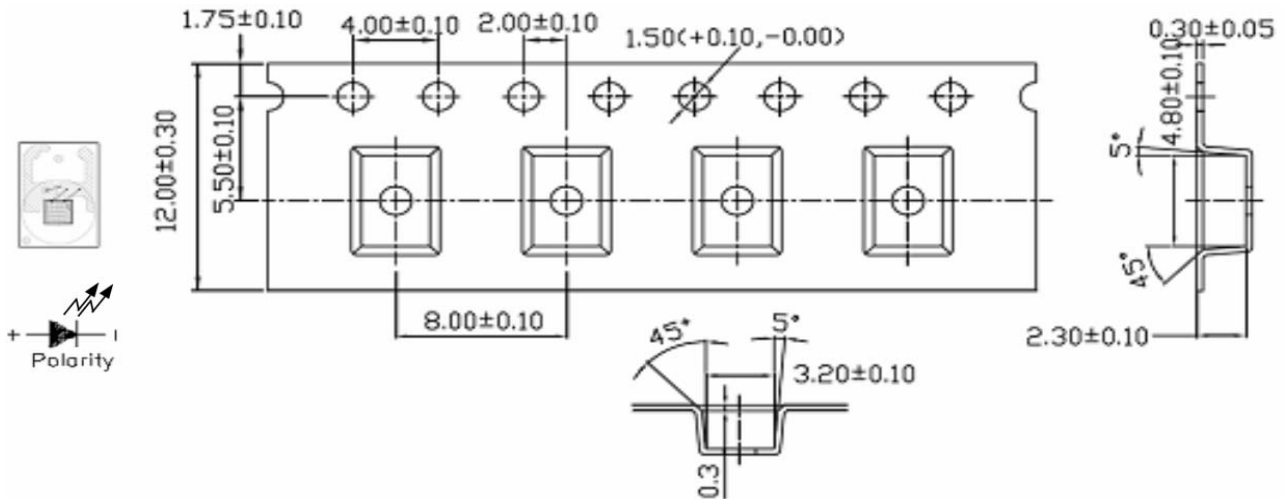
**Reel Dimensions**



- Note: 1. Dimensions are in millimeters.**
- 2. The tolerances unless mentioned is  $\pm 0.1$ mm.**

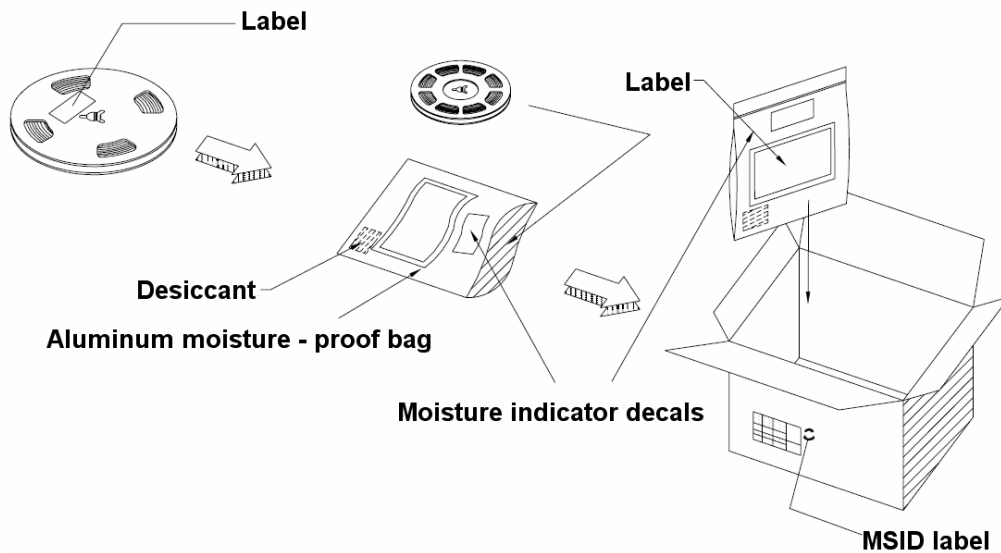
**EHP-C06/CM01A-P01/TR**

Carrier Tape Dimensions: Loaded quantity 400 PCS per reel



- Note: 1. Dimensions are in millimeters.  
 2. The tolerances unless mentioned is  $\pm 0.1$ mm.

**Moisture Resistant Packaging**



**Reliability Test Items**

Stress Test	Stress Condition	Stress Duration
Reflow	$T_{sol}=260^{\circ}\text{C}$ , 10sec, 6min	3 times
DC Operating Life	$T_a=25^{\circ}\text{C}$ , $I_F=350\text{mA}$	1000 hours
Thermal Shock	H : $+110^{\circ}\text{C}$ 20min. ↓ 10sec. L : $-40^{\circ}\text{C}$ 20min.	300 Cycles
Temperature Cycle	H : $+100^{\circ}\text{C}$ 30min. ↓ 5min. L : $-40^{\circ}\text{C}$ 30min.	1000 Cycles
High Temperature/Humidity	$T_a=85^{\circ}\text{C}$ , RH=85%	1000 hours
High Temperature Storage	$T_a=85^{\circ}\text{C}$	1000 hours
Low Temperature Storage	$T_a=-40^{\circ}\text{C}$	1000 hours
Pulse Test	$T_a=25^{\circ}\text{C}$ , $I_F=1000\text{mA}$ 30ms on/ 2500ms off	30000 times
High Temperature /Humidity Operation Life	$T_a=85^{\circ}\text{C}$ , RH=60%,	1000 hours
ESD Human Body Model	8000V, Interval:0.5sec	3 times

\* $I_m$ : Brightness attenuate difference(1000hrs) < 50%

\* $V_F$ : Forward voltage difference < 20%

Notes: All reliability items are tested under superior thermal management with 1" x 1" MCPCB.

**Precautions For Use****1. Over-current-proof**

Though EHP-C06 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.

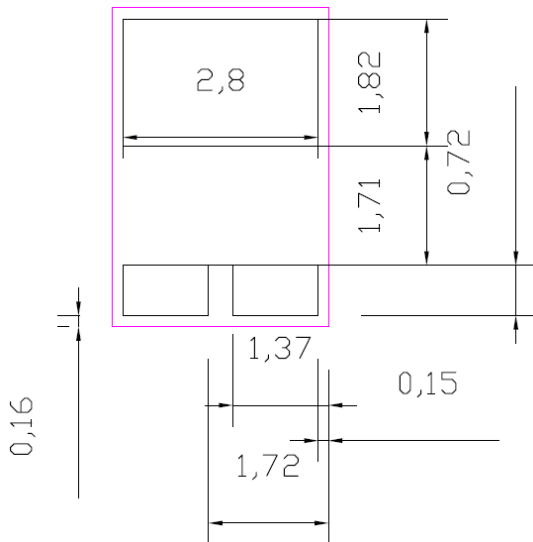
**3. Thermal Management**

- i. For maintaining the high flux output and achieving reliability, EHP-C06 series LEDs should be mounted on a metal core printed circuit board (MCPCB), with proper thermal connection to dissipate approximately 1W of thermal energy under normal operation.
- ii. Sufficient thermal management must be conducted, or the die junction temperature will be over the limit under large electronic driving and LEDs lifetime will decrease critically.
- iii. It was suggested that the temperature of Heat sink connected to EHP-C06 LED should not exceed 70°C

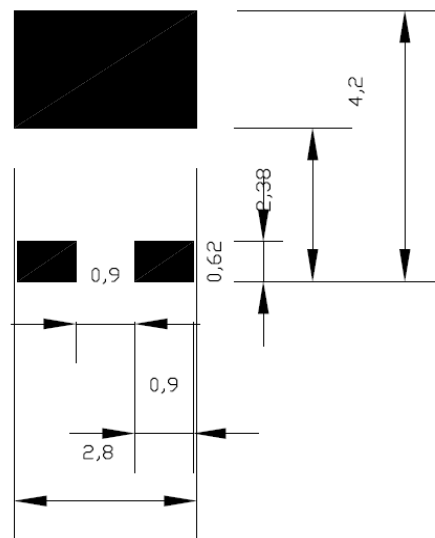
EHP-C06/CM01A-P01/TR

4. Soldering Condition

4-1. RECOMMENDED PCB SOLDER PAD



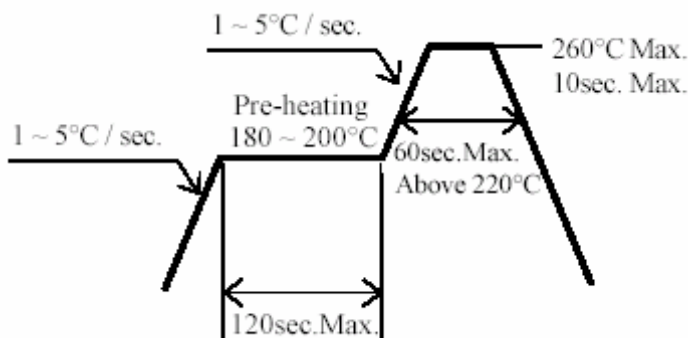
RECOMMENDED STENCIL PATTERN  
(HATCHED AREA IS OPENING)



- Notes : 1. Dimensions are in millimeters
- 2. Tolerances unless dimensions  $\pm 0.1\text{mm}$

4-2.

- 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