**Delux**

Product Introduction

The Delux Series SMCOD LED products with 7.0x7.0 mm size deliver high quality light with Delux lighting-class reliability. This high flux density light source is designed to support a wide range of high quality, directional luminaires and replacement lamps for commercial and residential applications. Available in 3-step color consistency, and featuring a 3.5-mm optical source. HRA0303 enables many kinds of application including retrofit and luminaire designs.

Features

- Compact high flux density light source
- Uniform high quality illumination
- Minimum 90, 95 CRI options
- Streamlined thermal path
- Energy Star/ANSI compliant color binning structure with 3SCDM
- More energy efficient than incandescent , halogen and fluorescent lamps
- Low voltage DC operation
- Instant light with unlimited dimming
- Only provide A and B visual color bin

Benefits

- Enhanced optical control
- Clean white light without pixilation
- High quality true color reproduction
- Significantly reduced thermal resistance and increased operating temperatures
- Uniform consistent white light
- Lower operating costs
- Easy to use whit daylight and motion detectors to enable increased energy saving
- Reduced maintenance costs
- Environmentally friendly, no disposal issue

Series Include

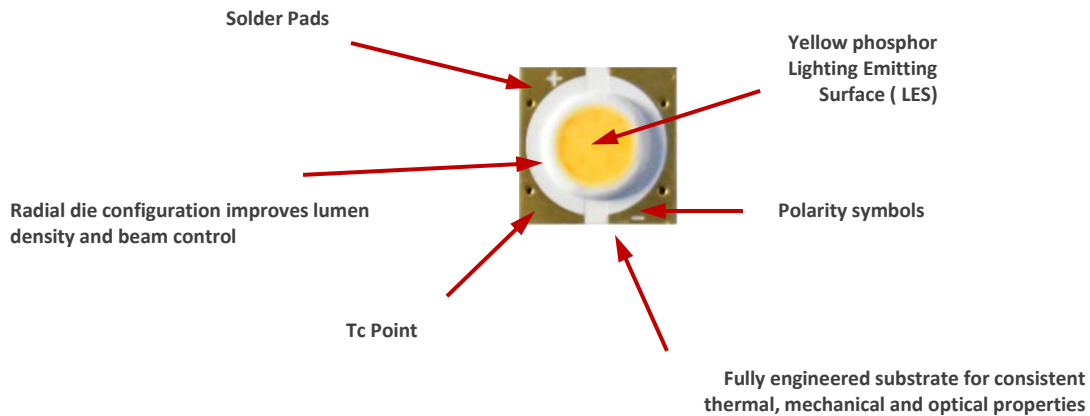
Standard Series

| Table of Contents | Page |
|--|-------------|
| Typical Product Features | 3 |
| Product bin and order code format | 3 |
| Lumen Maintenance Characteristics | 4 |
| Environmental Compliance | 4 |
| Minor Product Change Policy | 4 |
| Case Temperature Measurement Point | 4 |
| Cautionary statement | 5 |
| Product Selection Guide | 6 |
| Characteristics | 6 |
| Absolute Maximum Ratings | 7 |
| Drive Current versus Forward Voltage Characteristics | 8 |
| Typical Relative Luminous Flux vs. Drive Current | 8 |
| Typical Light Output Characteristics vs. Temperature | 9 |
| Typical Angular Radiation Pattern | 9 |
| RELATIVE SPECTRAL POWER DISTRIBUTION | 10 |
| Mechanical Dimensions | 10 |
| Equivalent Circuit | 11 |
| Chromaticity Coordinates | 11 |
| Reflow Soldering Characteristics | 12 |
| Packaging | 13 |

Typical Product Feature

Honourtek arrays are fully engineered devices that provide consistent thermal and optical performance on an engineered mechanical platform. The Delux Series arrays are the most compact chip-on-board devices across all of Honourtek' LED Array products. The arrays incorporate several features to simplify design integration and assembly.

Figure 1: Array Features



Product bin and order code format

HRS0303-30-92-36-X000-F1

| HRS | 03 | 03 | 30 | 92 | 36 | X000 | F1 |
|----------------|---------------------------------|----------|-------------------|-----|-------|-----------------------|----------|
| Product Family | Light Emitting Surface Diameter | Watt TYP | Color Temperature | CRI | VOLTs | Series/ Basic Package | Flux Bin |

Note : X000 nomenclature corresponds to the following:

- A000 = Standard Series
- B000 = Vigour Series
- W000 = Warmer Series
- J000 = Ocean Series
- M000 = Meat Series
- Y000 = Atmosphere Series

Lumen Maintenance Characteristics

Honourtek projects that its family of LED array products will deliver, on average, greater than 70% lumen maintenance after 50,000 hours of operation at two times the nominal drive current in Table 1. This performance assumes constant current operation at up to 2 times the nominal drive current with case temperature maintained at or below 85°C. For use beyond these operating conditions please consult your Honourtek sales representative for further assistance.

Honourtek conducts lumen maintenance tests per LM-80. Observation of design limits is required in order to achieve this projected lumen maintenance.

Environmental Compliance

Honourtek is committed to providing environmentally friendly products to the solid-state lighting market. Delux series LED Arrays comply with the European Union directives on the restriction of hazardous substances in electronic equipment, namely the RoHS directive. Honourtek does not intentionally add the following restricted materials to any LED array products: lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE).

Minor Product Change Policy

The rigorous qualification testing on products offered by Honourtek provides performance assurance. Slight cosmetic changes that do not affect form, fit, or function may occur as Honourtek continues product optimization.

Case Temperature Measurement Point

A case temperature measurement point location is included on the top surface of the Delux series LED arrays. The location of this measurement point is indicated in the mechanical dimensions section of this data sheet.

The purpose of this measurement point is to allow the user access to a measurement point which correlates to the true case temperature on the back surface of the LED array. Once the LED array is installed, it is challenging to measure the back surface of the array, or true case temperature.

Consistent and repeatable temperature measurements can be correlated to the data sheet performance specifications and to published LM-80 reliability data. The use of the case temperature measurements point is fully explained in AN30.

Cautionary Statements

CAUTION: CONTACT WITH LIGHT EMITTING SURFACE (LES)

Avoid any contact with the LES. Do not touch the LES of the Delux series LED array or apply stress to the LES (yellow phosphor resin area). Contact may cause damage to the LED array.

Optics and reflectors must not be mounted in contact with the LES (yellow phosphor resin area). Optical devices may be mounted on the top surface of the plastic housing of the Delux series LED array. Use the mechanical features of the LED array housing, edges and/or mounting holes to locate and secure optical devices as needed.

CAUTION: CHEMICAL EXPOSURE HAZARD

Exposure to some chemicals commonly used in luminaire manufacturing and assembly can cause damage to the LED array. Please consult Honourtek Application Note AN31 for additional information.

CAUTION: EYE SAFETY

Eye safety classification for the use of Honourtek Delux series LED arrays is in accordance with IEC specification EN62471:Photobiological Safety of Lamps and Lamp Systems. Delux series LED arrays are classified as Risk Group 1 (Low Risk) when operated at or below the maximum drive current. Please use appropriate precautions. It is important that employees working with LEDs are trained to use them safely.

CAUTION: RISK OF BURN

Do not touch the Delux series LED array or yellow resin area during operation. Allow the array to cool for a sufficient period of time before handling. The Delux series LED array may reach elevated temperatures such that could burn skin when touched.

CAUTION: CHEMICAL EXPOSURE HAZARD

Exposure to some chemicals commonly used in luminaire manufacturing and assembly can cause damage to the LED Array. Please consult Application Note AN41 for additional information.

Product Selection Guide

FLUX CHARACTERISTICS, ACCURATEWHITE ORDER CODES AND BINS(I_f=150mA,T_j=85°C)

Table 1: Selection Guide, Pulsed Measurement Data

| Part Number | Series | Nominal CCT (K) | CRI | | Typical Pulsed Flux T _j = 25°C (lm) | | | Typical Pulsed Flux T _j = 85°C (lm) | | | Typical Vf (V) | Typical Power(W) |
|--------------------------|--------|-----------------|------|------|--|------|------|--|------|------|----------------|------------------|
| | | | Min. | Typ. | Min. | Typ. | Max. | Min. | Typ. | Max. | | |
| HRS0303-30-90-36-A000-F1 | A | 2700 | 90 | 92 | 392 | 420 | 449 | 364 | 389 | 416 | 36.3 | 4.3 |
| HRS0303-30-90-36-A000-F1 | | 3000 | 90 | 92 | 405 | 433 | 463 | 375 | 401 | 429 | 36.3 | 4.3 |
| HRS0303-30-90-36-A000-F1 | | 3500 | 90 | 92 | 405 | 433 | 463 | 375 | 401 | 429 | 36.3 | 4.3 |
| HRS0303-30-90-36-A000-F1 | | 4000 | 90 | 92 | 417 | 446 | 477 | 386 | 413 | 442 | 36.3 | 4.3 |
| HRS0303-30-90-36-A000-F1 | | 2700 | 95 | 97 | 383 | 411 | 440 | 357 | 381 | 408 | 36.3 | 4.3 |
| HRS0303-30-90-36-A000-F1 | | 3000 | 95 | 97 | 398 | 425 | 454 | 368 | 393 | 420 | 36.3 | 4.3 |

Notes

1. Typical stabilized DC performance values are provided as reference only and are not a guarantee of performance.
2. Typical performance is estimated based on operation under DC (direct current) with the LED array mounted to a heat sink with thermal interface material and the case temperature maintained at 85°C. Based on Honourtek test setup, values may vary depending on the thermal design of the luminaire and/or the exposed environment to which the product is subjected.
3. Honourtek maintains a ± 7% tolerance on flux measurements.
4. Honourtek maintains a ± 2% tolerance on CRI measurements.
5. Nominal CCT as defined by ANSI C78.377-2017.

Characteristics

Table 2: Characteristics Data

| Characteristics | Unit | Minimum | Typical | Maximum |
|-------------------------------|--------|---------|---------|---------|
| Viewing angle | degree | | 120 | |
| ESD classification | | | Class 2 | |
| DC forward current | mA | | 150 | 200 |
| Power | | | 9.2 | |
| Reserve current | mA | | | 0.1 |
| Forward voltage(@150mA,85° C) | V | | 36.5 | |
| Forward voltage(@200mA,25° C) | V | | 36.9 | 40 |
| Thermal Resistance | ° C/W | | | |

Absolute Maximum Ratings

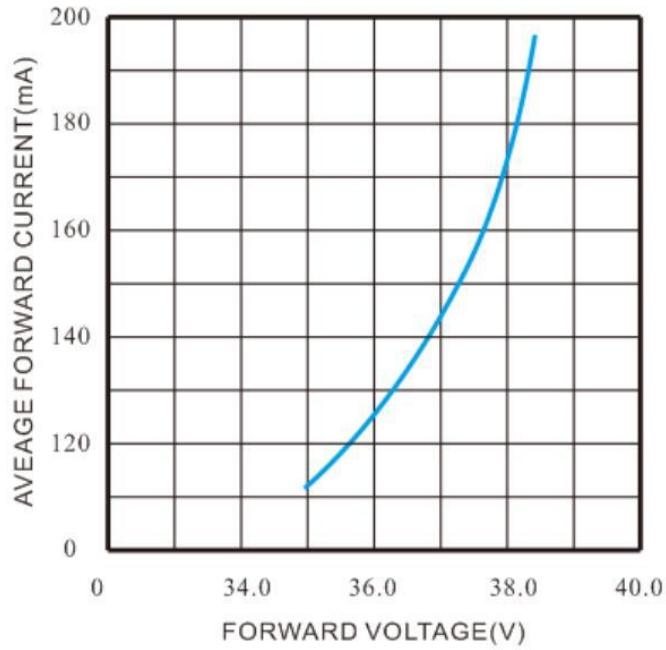
Table 3 : Maximum Ratings

| Parameter | Maximum Rating |
|--------------------------------------|-----------------------------------|
| LED Junction Temperature | 120°C |
| Storage Temperature | -40°C to +105°C |
| Operating Case Temperature | 105°C ^[2] |
| Soldering Temperature ^[1] | 350°C for a maximum of 10 seconds |

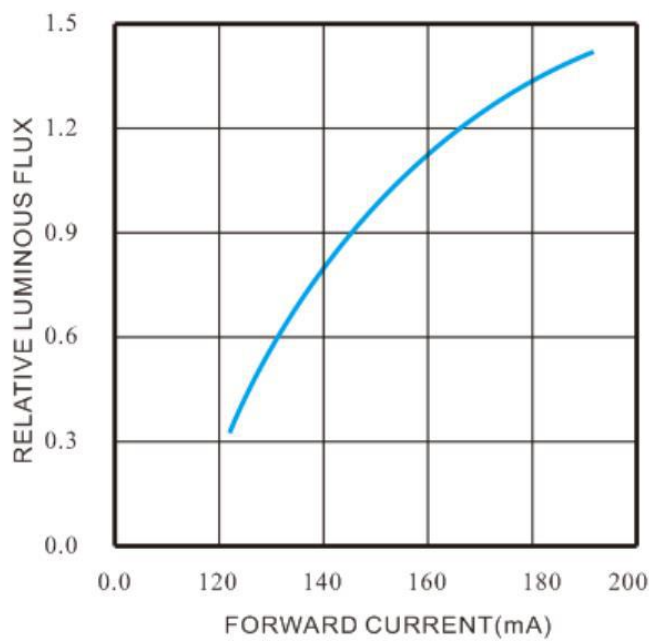
Notes :

1. See Honourtek Application Note AN31, Assembly Considerations for Delux series LED arrays, for more information.
2. For LM-80 requirement, please contact Honourtek Sales Support.

Drive Current versus Forward Voltage Characteristics



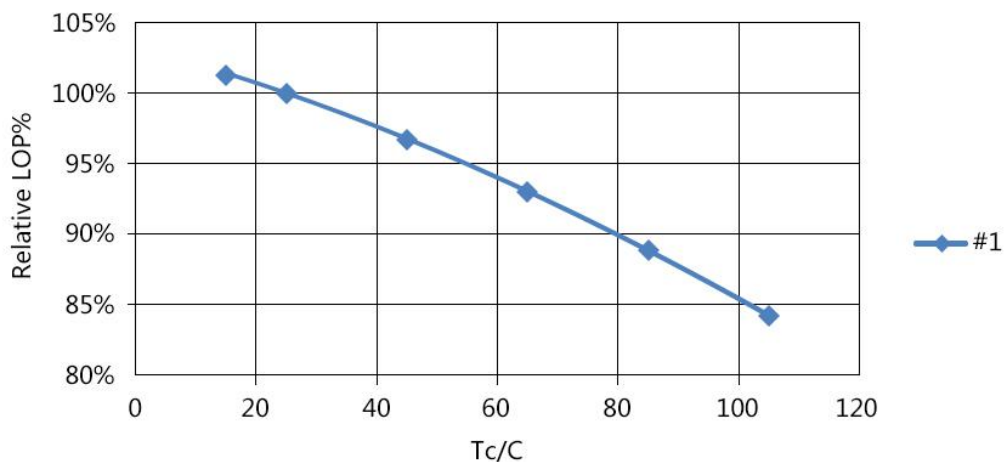
Typical Relative Luminous Flux vs. Drive Current, $T_j=85^\circ\text{C}$



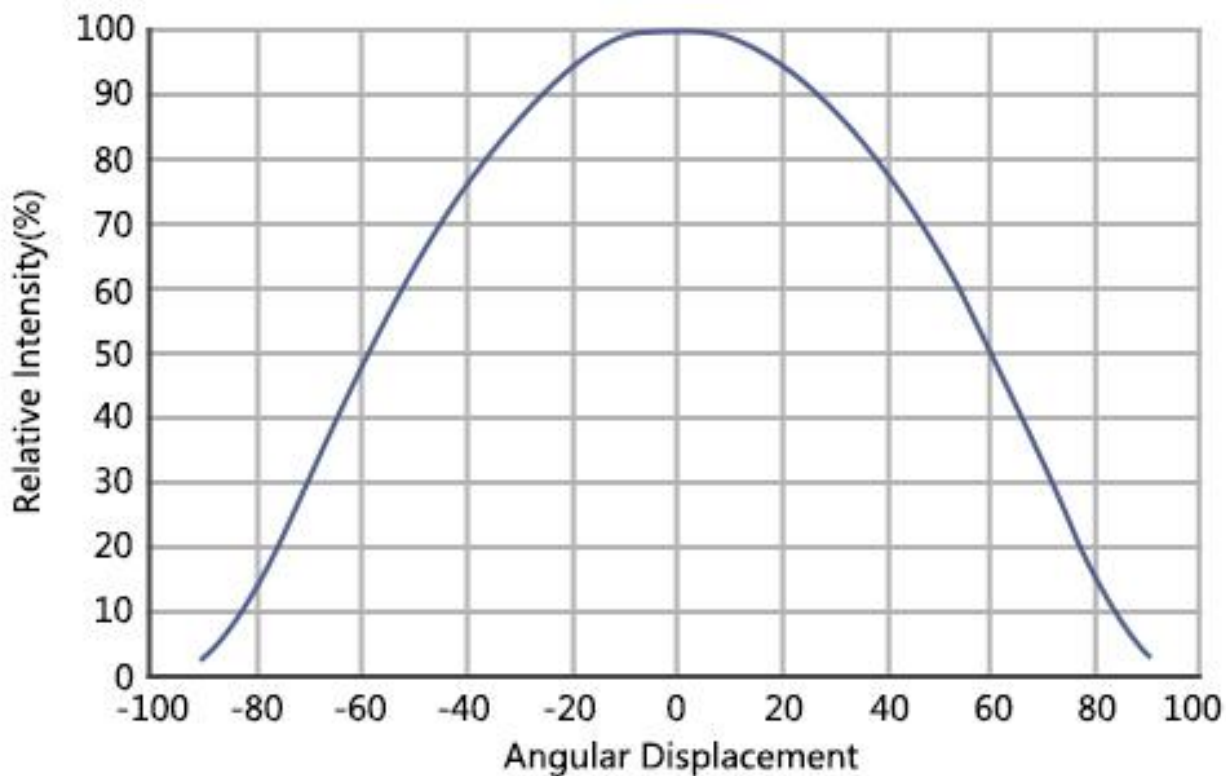
Typical Light Output Characteristics vs. Temperature

Typical Flux vs. Junction Temperature

Relative LOP vs. Case Temperature

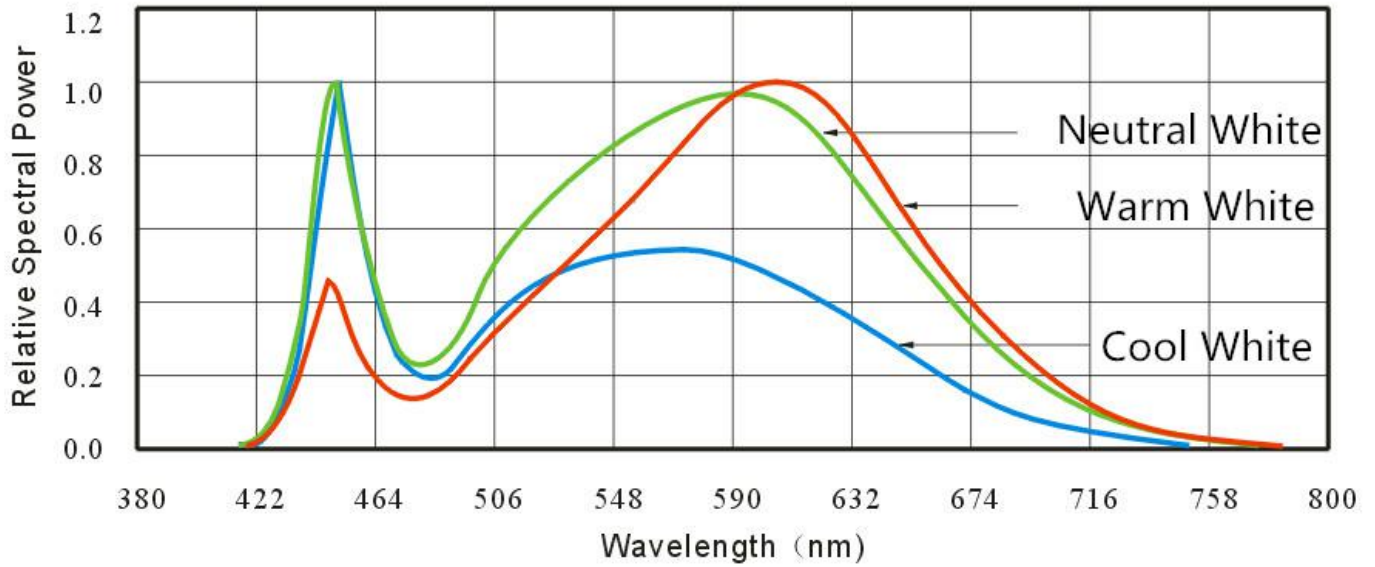


Typical Angular Radiation Pattern



RELATIVE SPECTRAL POWER DISTRIBUTION, T_j=85°C

The following graph is the result of a series of pulsed measurements at T_j=85° C.

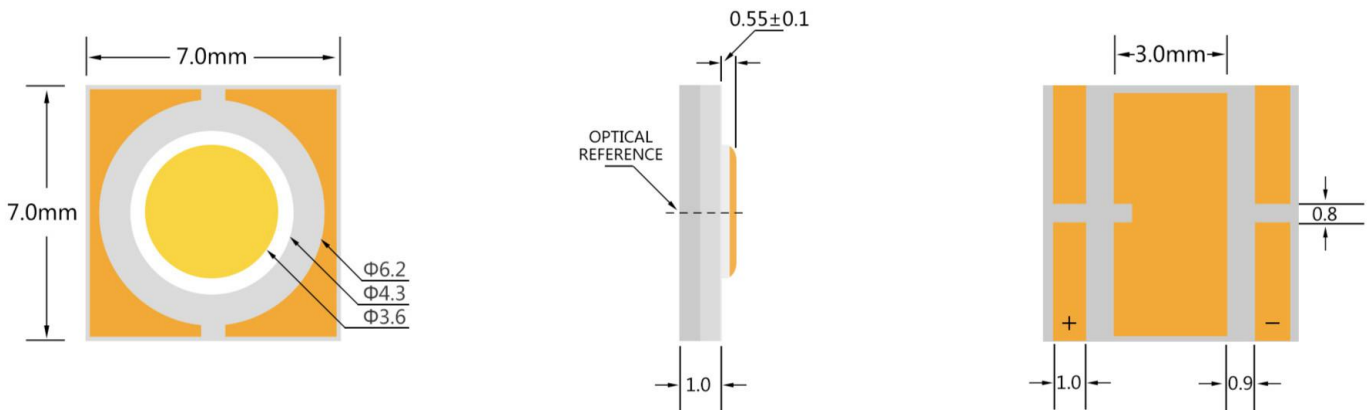


Mechanical Dimensions

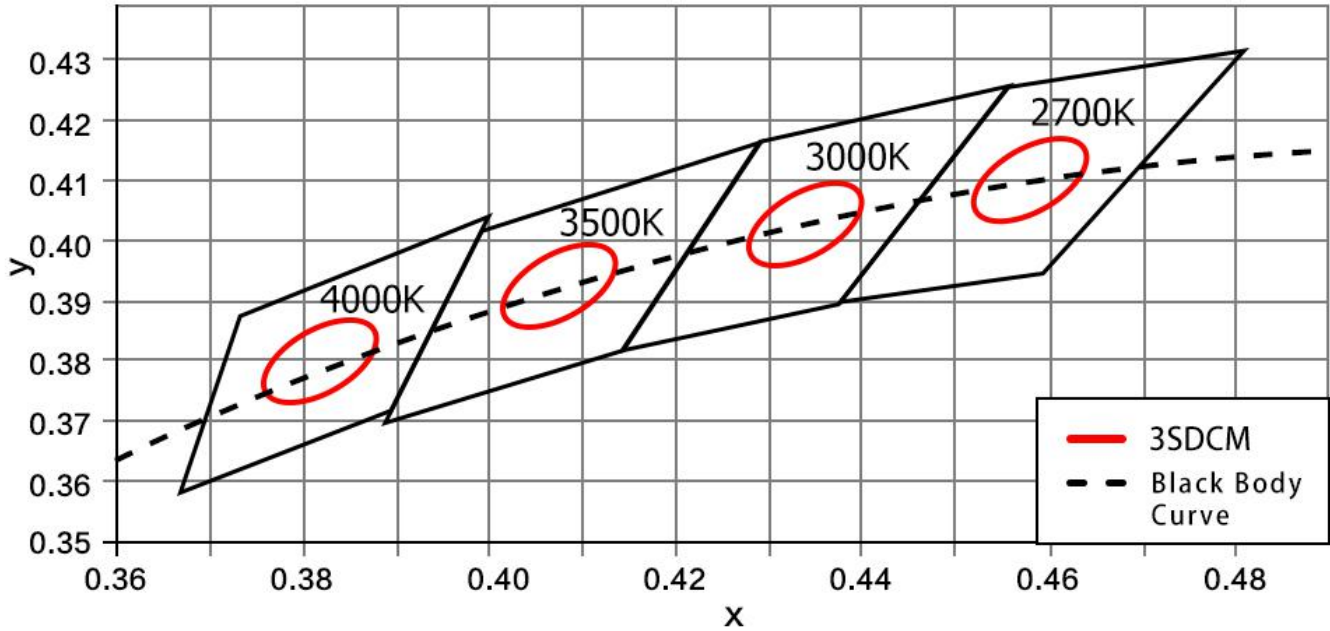
Drawing for Delux Arrays

LES = $\varnothing 3.6$

Dimensions are in mm.
Tolerances unless otherwise
Specified : $\pm 0.1\text{mm}$



Chromaticity Coordinates (Condition: IF=150 mA, Tj = 85° C)



HRS0303 White Chromaticity Bins

| CCT | 2700K | 3000K | 3500K | 4000K |
|-------------------|------------------------------|----------------------------|-----------------------------|-----------------------------|
| ANSI BIN 2011 | (2580K-2870K) 2725K ±145K | (2870K-3220K) 3045K±175 | (3220K-3710K) 3465 ±245K | (3710K-4260K) 3985 ±275K |
| ANSI BIN 2017 | 2725K ±83K | 3045K±100K | 3465 ±124K | 3985 ±154K |
| Delux BIN | 2725K ±75K | 3045K ±75K | 3465 ±80K | 3985 ±100K |
| Center Point(x,y) | 0.4578, 0.4101 | 0.4339, 0.4033 | 0.4078, 0.3930 | 0.3818, 0.3797 |

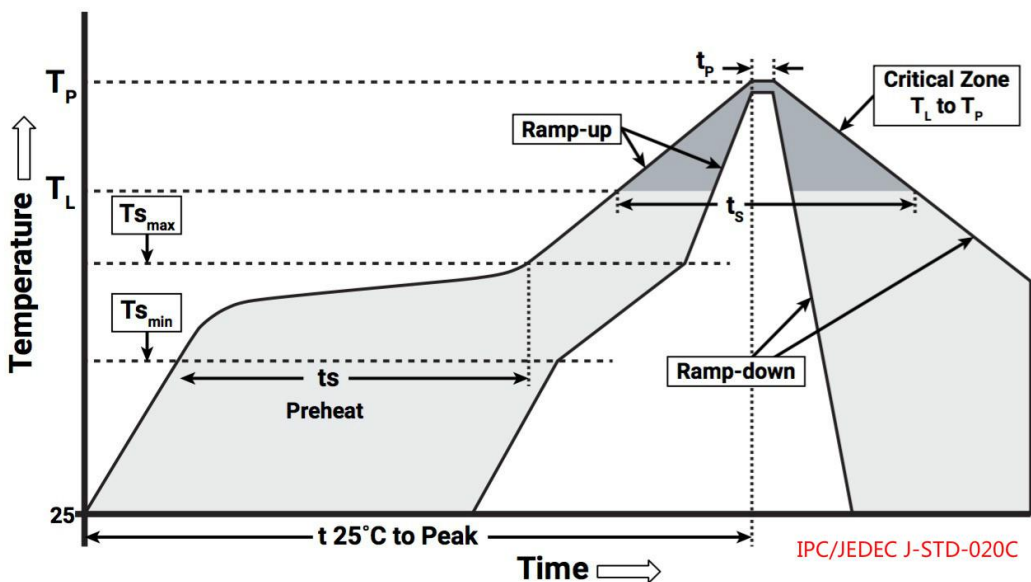
Note:

1. Color region stay within MacAdam 3-step ellipse from the chromaticity center.
2. The chromaticity center refers to ANSI C78.377.2017.
3. Honourtek maintains a +/- 0.005 tolerance on chromaticity (CIEx and CIEy) measurements.

REFLOW SOLDERING CHARACTERISTICS

In testing, HONOURTEK has found DELUX HRS0303 LEDs to be compatible with JEDEC J-STD-020C, using the parameters listed below. As a general guideline, HONOURTEK recommends that users follow the recommended soldering profile provided by the manufacturer of the solder paste used.

Note that this general guideline may not apply to all PCB designs and configurations of reflow soldering equipment.



| Profile Feature | Lead-Free solder |
|---|------------------|
| Average Ramp-Up Rate (Tsmax to Tp) | 1.2 ° C/second |
| Preheat: Temperature Min (Tsmin) | 120 ° C |
| Preheat: Temperature Max (Tsmax) | 170 ° C |
| Preheat: Time (tsmin to tsmax) | 65-150 seconds |
| Time Maintained Above: Temperature (TL) | 217 ° C |
| Time Maintained Above: Time (tL) | 45-90 seconds |
| Peak/Classification Temperature (Tp) | 235 - 245 ° C |
| Time Within 5 ° C of Actual Peak Temperature (tp) | 20-40 seconds |
| Ramp-Down Rate | 1 - 6 ° C/second |
| Time 25 ° C to Peak Temperature | 4 minutes max. |

Note: All temperatures refer to the topside of the package, measured on the package body surface.

Packaging

Packaging Reel and Labeling



Notes:

Honourtek HRS0303 LEDs are packaged in reel of 1000pcs.

About HONOURTEK

HONOURTEK is the global Specific Application Color and Customized LED Supplier. The company develops, manufactures and distributes groundbreaking LEDs that shatter the status quo and help customers gain and maintain a competitive edge.

With keeping create better light color. HONOURTEK is uniquely positioned to deliver lighting advancements well into the future by maintaining an unwavering focus on quality, innovation and reliability.

To learn more about our portfolio of LEDs, please visit Honourtek.com.

LED solutions with best color

A large version of the HONOURTEK logo, with "HONOURTEK" in red and "TEK" in grey.

©2019 HONOURTEK ,INC. All rights reserved. Delux is a registered trademark of the HONOURTEK, INC in the United States and other countries.

DELUX HRS0303 Product Datasheet REV122019

www.honourtek.com