

## HDSP-301x/303x Series

## HDSP-561x/563x Series

10 mm and 13 mm Slim Font Seven Segment Displays



## Data Sheet



### Description

These slim font seven segment displays incorporate a new slim font character design. This slim font features narrow width, specially mitered segments to give a fuller appearance to the illuminated character. Faces of these displays are painted a neutral gray for enhanced on/off contrast.

All devices are available in either common anode or common cathode configuration with right hand decimal point.

### Features

- Excellent appearance
- Slim font design
- Mitered corners, evenly illuminated segments
- Gray face for optimum on/off contrast
- Choice of colors: HER, green, yellow, and AlGaAs
- Choice of character size: 10 mm and 13 mm
- Characterized for luminous intensity

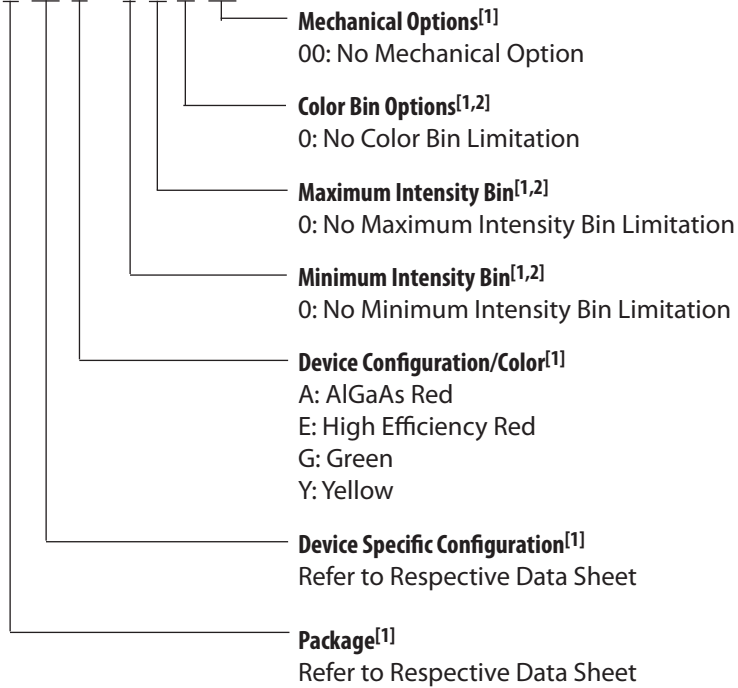
### Devices

| HER<br>HDSP- | Green<br>HDSP- | Yellow<br>HDSP- | AlGaAs<br>HDSP- | Description                   |
|--------------|----------------|-----------------|-----------------|-------------------------------|
| 301E         | 301G           | 301Y            | 301A            | Common Anode, 10 mm Display   |
| 303E         | 303G           | 303Y            | 303A            | Common Cathode, 10 mm Display |
| 561E         | 561G           | 561Y            | 561A            | Common Anode, 13 mm Display   |
| 563E         | 563G           | 563Y            | 563A            | Common Cathode, 13 mm Display |

## Part Numbering System

5082 - x xx x - x x x xx

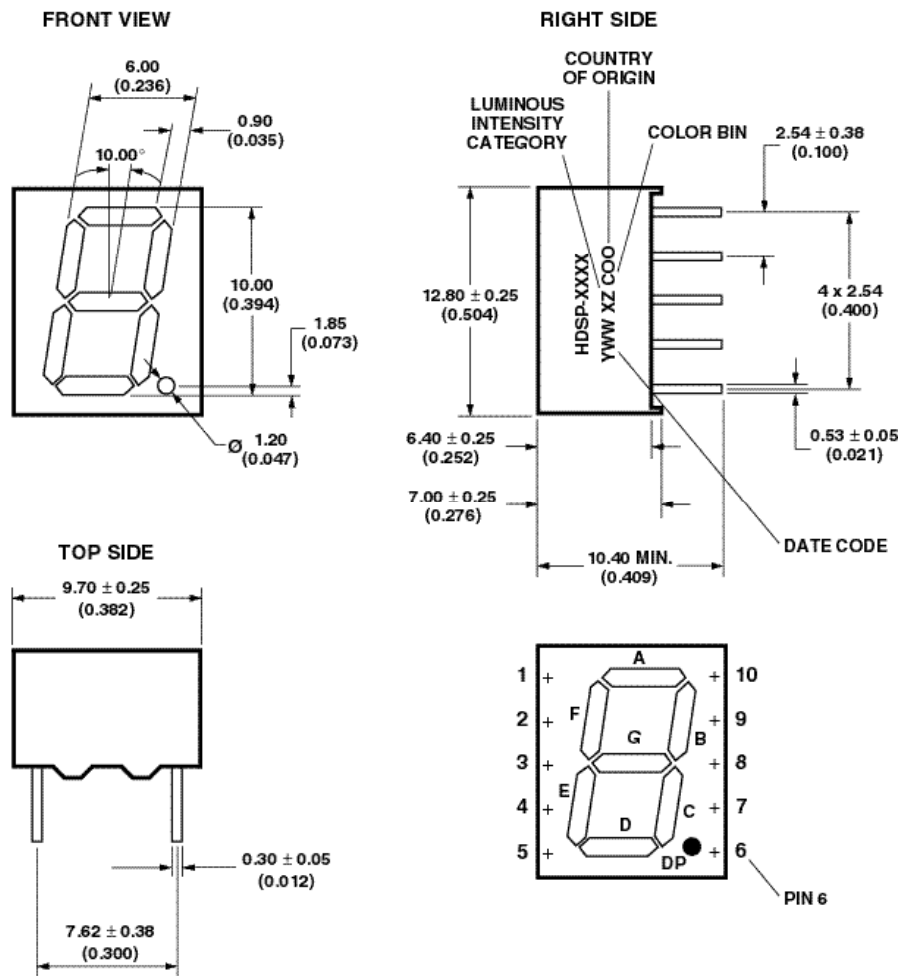
HDSP - x xx x - x x x xx



### Notes:

1. For codes not listed in the figure above, please refer to the respective data sheet or contact your nearest Avago representative for details.
2. Bin options refer to shippable bins for a part-number. Color and Intensity Bins are typically restricted to 1 bin per tube (exceptions may apply). Please refer to respective data sheet for specific bin limit information.

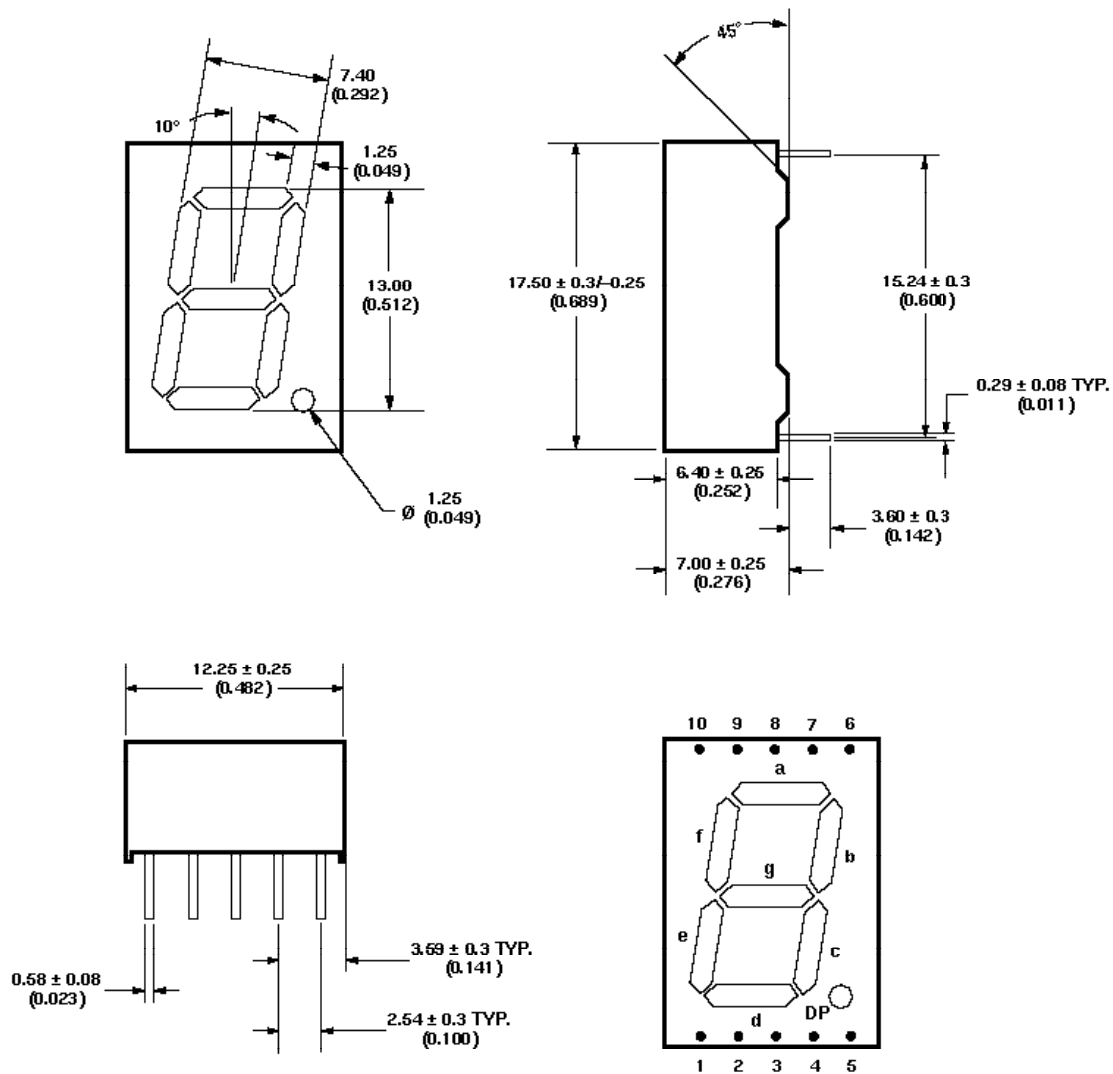
## HDSP-301x/303x Series



NOTE: QDSP-399G DOES NOT HAVE PIN 6.

| Pin | Function   |
|-----|------------|
| 1   | G          |
| 2   | F          |
| 3   | Common A/C |
| 4   | E          |
| 5   | D          |
| 6   | DP         |
| 7   | C          |
| 8   | Common A/C |
| 9   | B          |
| 10  | A          |

## HDSP-561x/563x Series



**NOTES:**

1. ALL DIMENSIONS ARE IN MILLIMETERS (INCHES).  
2. UNLESS OTHERWISE STATED, TOLERANCES ARE  $\pm 0.25$  mm.

| Pin | Function   |
|-----|------------|
| 1   | E          |
| 2   | D          |
| 3   | Common A/C |
| 4   | C          |
| 5   | DP         |
| 6   | B          |
| 7   | A          |
| 8   | Common A/C |
| 9   | F          |
| 10  | G          |

**Absolute Maximum Ratings**

| Description                                                   | HER        | Green      | Yellow     | AlGaAs     | Units |
|---------------------------------------------------------------|------------|------------|------------|------------|-------|
| Average Power per Segment or DP                               | 105        | 105        | 105        | 37         | mW    |
| Peak Forward Current per Segment or DP                        | 90         | 90         | 90         | 45         | mA    |
| DC Forward Current per Segment or DP                          | 30         | 30         | 30         | 15         | mA    |
| Operating Temperature Range                                   | −40 to +80 | −40 to +80 | −40 to +80 | −20 to +80 | °C    |
| Storage Temperature Range                                     | −40 to +80 | −40 to +80 | −40 to +80 | −40 to +80 | °C    |
| Reverse Voltage per Segment or DP                             | 5          | 5          | 5          | 5          | V     |
| Wavesoldering Temperature for 3 Seconds<br>1.59 mm below body | 250        | 250        | 250        | 250        | °C    |

**Notes:**

1. Derate above 33°C at 0.34 mA/°C for HER.
2. Derate above 27°C at 0.32 mA/°C for Green.
3. Derate above 30°C at 0.33 mA/°C for Yellow.
4. Derate above 60°C at 0.25 mA/°C for AlGaAs.

**Electrical/Optical Characteristics at T<sub>A</sub> = 25°C****HER****Device  
Series**

| HDSP-    | Parameter                                     | Symbol              | Min.  | Typ.  | Max. | Units     | Test Conditions        |
|----------|-----------------------------------------------|---------------------|-------|-------|------|-----------|------------------------|
| 301/303E | Luminous Intensity/Segment<br>(Digit Average) | I <sub>V</sub>      | 1.100 | 1.800 |      | mcd       | I <sub>F</sub> = 10 mA |
|          | Forward Voltage/Segment<br>or DP              | V <sub>F</sub>      |       | 1.90  | 2.50 | V         | I <sub>F</sub> = 20 mA |
|          | Peak Wavelength                               | λ <sub>PEAK</sub>   |       | 635   |      | nm        | I <sub>F</sub> = 20 mA |
|          | Dominant Wavelength                           | λ <sub>d</sub>      |       | 625   |      | nm        | I <sub>F</sub> = 20 mA |
|          | Reverse Current                               | I <sub>R</sub>      |       |       | 100  | μA        | V <sub>R</sub> = 5 V   |
|          | Thermal Resistance LED<br>Junction-to-Pin     | RO <sub>J-PIN</sub> |       | 351.5 |      | °C/W/Seg. |                        |

**HER****Device  
Series**

| HDSP-    | Parameter                                     | Symbol              | Min.  | Typ.  | Max. | Units     | Test Conditions        |
|----------|-----------------------------------------------|---------------------|-------|-------|------|-----------|------------------------|
| 561/563E | Luminous Intensity/Segment<br>(Digit Average) | I <sub>V</sub>      | 1.100 | 1.800 |      | mcd       | I <sub>F</sub> = 10 mA |
|          | Forward Voltage/Segment<br>or DP              | V <sub>F</sub>      |       | 1.90  | 2.50 | V         | I <sub>F</sub> = 20 mA |
|          | Peak Wavelength                               | λ <sub>PEAK</sub>   |       | 635   |      | nm        | I <sub>F</sub> = 20 mA |
|          | Dominant Wavelength                           | λ <sub>d</sub>      |       | 625   |      | nm        | I <sub>F</sub> = 20 mA |
|          | Reverse Current                               | I <sub>R</sub>      |       |       | 100  | μA        | V <sub>R</sub> = 5 V   |
|          | Thermal Resistance LED<br>Junction-to-Pin     | RO <sub>J-PIN</sub> |       | 351.5 |      | °C/W/Seg. |                        |

**Green**

| <b>Device Series</b> | <b>Parameter</b>                           | <b>Symbol</b>           | <b>Min.</b> | <b>Typ.</b> | <b>Max.</b> | <b>Units</b>              | <b>Test Conditions</b> |
|----------------------|--------------------------------------------|-------------------------|-------------|-------------|-------------|---------------------------|------------------------|
| 301/303G             | Luminous Intensity/Segment (digit average) | $I_V$                   | 1.800       | 2.800       |             | mcd                       | $I_F = 10 \text{ mA}$  |
|                      | Forward Voltage/Segment or DP              | $V_F$                   |             | 2.25        | 2.50        | V                         | $I_F = 20 \text{ mA}$  |
|                      | Peak Wavelength                            | $\lambda_{\text{PEAK}}$ |             | 568         |             | nm                        | $I_F = 20 \text{ mA}$  |
|                      | Dominant Wavelength                        | $\lambda_d$             |             | 573         |             | nm                        | $I_F = 20 \text{ mA}$  |
|                      | Reverse Current                            | $I_R$                   |             |             | 100         | $\mu\text{A}$             | $V_R = 5 \text{ V}$    |
|                      | Thermal Resistance LED Junction-to-Pin     | $RO_{J-PIN}$            |             | 351.5       |             | $^{\circ}\text{C/W/Seg.}$ |                        |

**Green**

| <b>Device Series</b> | <b>Parameter</b>                           | <b>Symbol</b>           | <b>Min.</b> | <b>Typ.</b> | <b>Max.</b> | <b>Units</b>              | <b>Test Conditions</b> |
|----------------------|--------------------------------------------|-------------------------|-------------|-------------|-------------|---------------------------|------------------------|
| 561/563G             | Luminous Intensity/Segment (Digit Average) | $I_V$                   | 1.800       | 2.800       |             | mcd                       | $I_F = 10 \text{ mA}$  |
|                      | Forward Voltage/Segment or DP              | $V_F$                   |             | 2.25        | 2.50        | V                         | $I_F = 20 \text{ mA}$  |
|                      | Peak Wavelength                            | $\lambda_{\text{PEAK}}$ |             | 568         |             | nm                        | $I_F = 20 \text{ mA}$  |
|                      | Dominant Wavelength                        | $\lambda_d$             |             | 573         |             | nm                        | $I_F = 20 \text{ mA}$  |
|                      | Reverse Current                            | $I_R$                   |             |             | 100         | $\mu\text{A}$             | $V_R = 5 \text{ V}$    |
|                      | Thermal Resistance LED Junction-to-Pin     | $RO_{J-PIN}$            |             | 351.5       |             | $^{\circ}\text{C/W/Seg.}$ |                        |

**Yellow**

| <b>Device Series</b> | <b>Parameter</b>                           | <b>Symbol</b>           | <b>Min.</b> | <b>Typ.</b> | <b>Max.</b> | <b>Units</b>              | <b>Test Conditions</b> |
|----------------------|--------------------------------------------|-------------------------|-------------|-------------|-------------|---------------------------|------------------------|
| 301/303Y             | Luminous Intensity/Segment (Digit Average) | $I_V$                   | 1.100       | 1.800       |             | mcd                       | $I_F = 10 \text{ mA}$  |
|                      | Forward Voltage/Segment or DP              | $V_F$                   |             | 2.15        | 2.50        | V                         | $I_F = 20 \text{ mA}$  |
|                      | Peak Wavelength                            | $\lambda_{\text{PEAK}}$ |             | 589         |             | nm                        | $I_F = 20 \text{ mA}$  |
|                      | Dominant Wavelength                        | $\lambda_d$             |             | 590         |             | nm                        | $I_F = 20 \text{ mA}$  |
|                      | Reverse Current                            | $I_R$                   |             |             | 100         | $\mu\text{A}$             | $V_R = 5 \text{ V}$    |
|                      | Thermal Resistance LED Junction-to-Pin     | $RO_{J-PIN}$            |             | 351.5       |             | $^{\circ}\text{C/W/Seg.}$ |                        |

**Yellow**

| Device Series | Parameter                                  | Symbol                  | Min.  | Typ.  | Max. | Units                     | Test Conditions       |
|---------------|--------------------------------------------|-------------------------|-------|-------|------|---------------------------|-----------------------|
| HDSP-561/563Y | Luminous Intensity/Segment (Digit Average) | $I_V$                   | 1.800 | 2.800 |      | mcd                       | $I_F = 10 \text{ mA}$ |
|               | Forward Voltage/Segment or DP              | $V_F$                   |       | 2.15  | 2.50 | V                         | $I_F = 20 \text{ mA}$ |
|               | Peak Wavelength                            | $\lambda_{\text{PEAK}}$ |       | 589   |      | nm                        | $I_F = 20 \text{ mA}$ |
|               | Dominant Wavelength                        | $\lambda_d$             |       | 590   |      | nm                        | $I_F = 20 \text{ mA}$ |
|               | Reverse Current                            | $I_R$                   |       |       | 100  | $\mu\text{A}$             | $V_R = 5 \text{ V}$   |
|               | Thermal Resistance LED Junction-to-Pin     | $RO_{J-PIN}$            |       | 351.5 |      | $^{\circ}\text{C/W/Seg.}$ |                       |

**Notes:**

1. Typical specification for reference only. Do not exceed absolute maximum ratings.
2. The dominant wavelength,  $\lambda$ , is derived from the CIE chromaticity diagram and is that single wavelength which defines the color of the device.

**AlGaAs**

| Device Series | Parameter                                  | Symbol                  | Min.  | Typ.  | Max. | Units                     | Test Conditions       |
|---------------|--------------------------------------------|-------------------------|-------|-------|------|---------------------------|-----------------------|
| HDSP-301/303A | Luminous Intensity/Segment (Digit Average) | $I_V$                   | 0.280 | 0.450 |      | mcd                       | $I_F = 1 \text{ mA}$  |
|               | Forward Voltage/Segment or DP              | $V_F$                   |       | 1.80  | 2.20 | V                         | $I_F = 20 \text{ mA}$ |
|               | Peak Wavelength                            | $\lambda_{\text{PEAK}}$ |       | 660   |      | nm                        | $I_F = 20 \text{ mA}$ |
|               | Dominant Wavelength                        | $\lambda_d$             |       | 643   |      | nm                        | $I_F = 20 \text{ mA}$ |
|               | Reverse Current                            | $I_R$                   |       |       | 100  | $\mu\text{A}$             | $V_R = 5 \text{ V}$   |
|               | Thermal Resistance LED Junction-to-Pin     | $RO_{J-PIN}$            |       | 351.5 |      | $^{\circ}\text{C/W/Seg.}$ |                       |

**AlGaAs**

| Device Series | Parameter                                  | Symbol                  | Min.  | Typ.  | Max. | Units                     | Test Conditions       |
|---------------|--------------------------------------------|-------------------------|-------|-------|------|---------------------------|-----------------------|
| HDSP-561/563A | Luminous Intensity/Segment (Digit Average) | $I_V$                   | 0.280 | 0.450 |      | mcd                       | $I_F = 1 \text{ mA}$  |
|               | Forward Voltage/Segment or DP              | $V_F$                   |       | 1.80  | 2.20 | V                         | $I_F = 20 \text{ mA}$ |
|               | Peak Wavelength                            | $\lambda_{\text{PEAK}}$ |       | 660   |      | nm                        | $I_F = 20 \text{ mA}$ |
|               | Dominant Wavelength                        | $\lambda_d$             |       | 643   |      | nm                        | $I_F = 20 \text{ mA}$ |
|               | Reverse Current                            | $I_R$                   |       |       | 100  | $\mu\text{A}$             | $V_R = 5 \text{ V}$   |
|               | Thermal Resistance LED Junction-to-Pin     | $RO_{J-PIN}$            |       | 351.5 |      | $^{\circ}\text{C/W/Seg.}$ |                       |

**Notes:**

1. Typical specification for reference only. Do not exceed absolute maximum ratings.
2. The dominant wavelength,  $\lambda$ , is derived from the CIE chromaticity diagram and is that single wavelength which defines the color of the device.

## Intensity Bin Limits (mcd)

### Green

| HDSP-301G/303G/561G/563G |       |       |
|--------------------------|-------|-------|
| IV Bin Category          | Min.  | Max.  |
| K                        | 1.800 | 3.600 |
| L                        | 2.800 | 5.600 |

### Yellow

| HDSP-301Y/303Y  |       |       |
|-----------------|-------|-------|
| IV Bin Category | Min.  | Max.  |
| I               | 1.100 | 2.200 |
| K               | 1.800 | 3.600 |

### Yellow

| HDSP-561Y/563Y  |       |       |
|-----------------|-------|-------|
| IV Bin Category | Min.  | Max.  |
| K               | 1.800 | 3.600 |
| L               | 2.800 | 5.600 |

### HER

| HDSP-301E/303E  |       |       |
|-----------------|-------|-------|
| IV Bin Category | Min.  | Max.  |
| I               | 1.100 | 2.200 |
| K               | 1.800 | 3.600 |

### AlGaAs Red

| HDSP-301A/303A/561A/563A |       |       |
|--------------------------|-------|-------|
| IV Bin Category          | Min.  | Max.  |
| F                        | 0.280 | 0.560 |
| G                        | 0.450 | 0.900 |

### HER

| HDSP-561E/563E  |       |      |
|-----------------|-------|------|
| IV Bin Category | Min.  | Max. |
| K               | 2.001 | 3.2  |
| L               | 3.201 | 5.05 |

Note: Tolerance is  $\pm 10\%$

## Color Categories

| Color  | Bin | Dominant Wavelength (nm) |        |
|--------|-----|--------------------------|--------|
|        |     | Min.                     | Max.   |
| Green  | 3   | 570.00                   | 574.50 |
|        | 4   | 567.00                   | 571.50 |
| Yellow | 2   | 586.50                   | 590.00 |
|        | 3   | 584.00                   | 587.50 |

### Note:

1. All categories are established for classification of products. Products may not be available in all categories. Please contact your Avago representatives for further clarification/information.

## HDSP-301x/303x Series

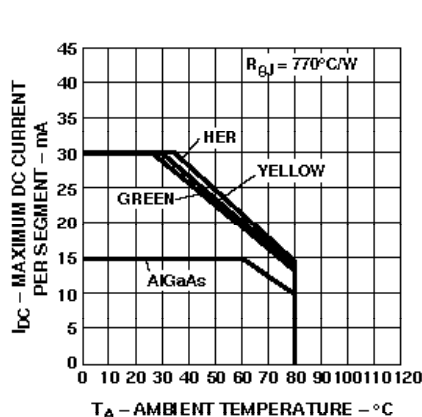


Figure 1. Maximum allowable DC current vs. ambient temperature.

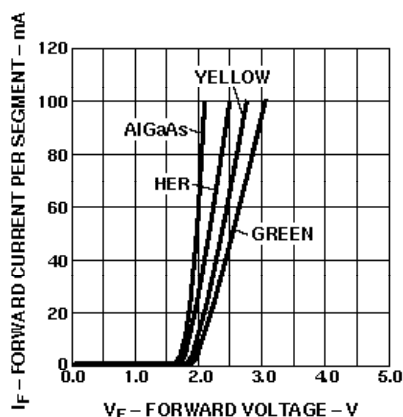


Figure 2. Forward current vs. forward voltage.

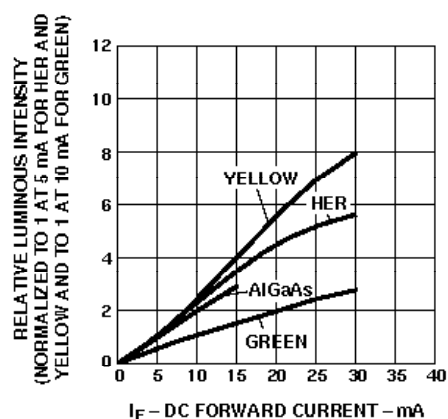


Figure 3. Relative luminous intensity vs. DC forward current.

## HDSP-561x/563x Series

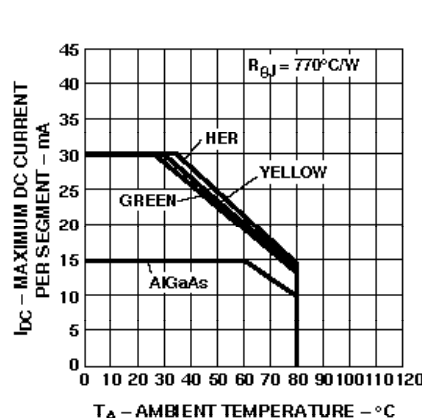


Figure 4. Maximum allowable DC current vs. ambient temperature.

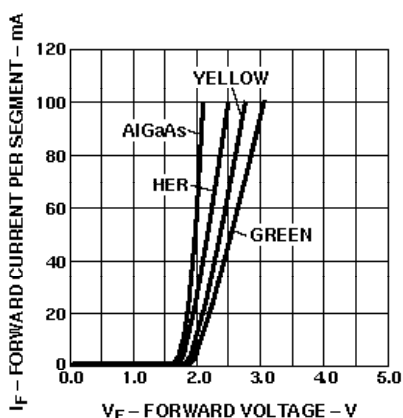


Figure 5. Forward current vs. forward voltage.

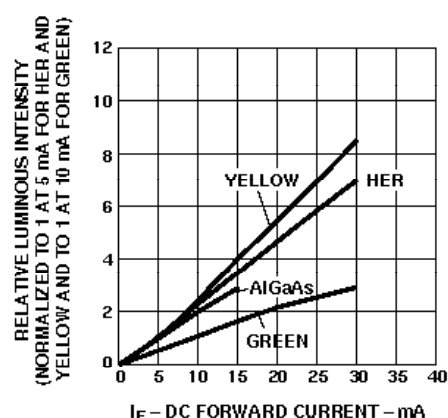


Figure 6. Relative luminous intensity vs. DC forward current.

## Contrast Enhancement

For information on contrast enhancement, please see Application Note 1015.

## Soldering/Cleaning

Cleaning agents from the ketone family (acetone, methyl ethyl ketone, etc.) and from the chlorinated hydrocarbon family (methylene chloride, trichloroethylene, carbon tetrachloride, etc.) are not recommended for cleaning LED parts. All of these various solvents attack or dissolve the encapsulating epoxies used to form the package of plastic LED parts.

For information on soldering LEDs, please refer to Application Note 1027.

For product information and a complete list of distributors, please go to our website: [www.avagotech.com](http://www.avagotech.com)

Avago, Avago Technologies, and the A logo are trademarks of Avago Technologies Limited in the United States and other countries. Data subject to change. Copyright © 2006 Avago Technologies Limited. All rights reserved. Obsoletes 5989-2834EN AV02-0625EN - July 26, 2007

**Avago**  
TECHNOLOGIES

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «JONHON», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «FORSTAR».



## JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели,  
кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: [ocean@oceanchips.ru](mailto:ocean@oceanchips.ru)

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А