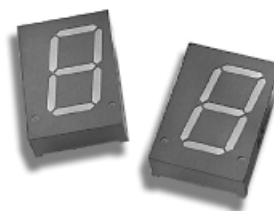


HDSP-815E/816E/815G/816G

20 mm (0.8 inch) General Purpose Seven Segment Displays



Data Sheet



Description

These 20 mm (0.8 inch) displays use industry standard size and pin-out. The devices are available as either common anode or common cathode. Available in either red or green colors, these gray-faced displays are suitable for indoor use.

No color binning is offered for these parts.

These parts are subjected to Outgoing Quality Assurance (OQA) inspection with AQL of 0.065% for functional and visual/cosmetic rejects.

Devices

| HER HDSP- | Green HDSP- | Description |
|-----------|-------------|--------------------------------------|
| 815E | 815G | Common Anode Right Hand Decimal |
| 816E | 816G | Common Cathode Right Hand Decimal |

Features

- Industry standard size
- Industry standard pin-out
15.24 mm (0.6 in.) DIP leads on 2.54 mm (0.1 in.) centers
- Choice of colors
Red, Green
- Mitered font
Mitered corners on segments
- Gray face paint
Gray package gives optimum contrast
- $\pm 50^\circ$ Viewing angle
- Design flexibility
Common anode or common cathode
- Categorized for luminous intensity

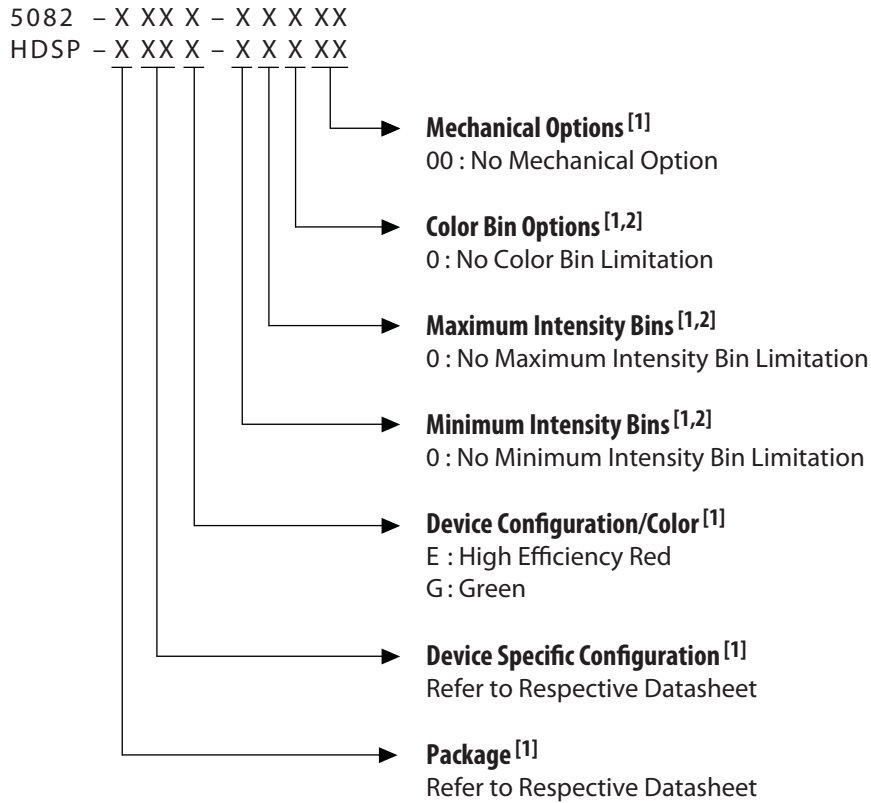
Applications

- Suitable for indoor use
- Not recommended for industrial applications, i.e., operating temperature requirements exceeding 85°C or below -25°C [1]
- Extreme temperature cycling not recommended [2]

Notes:

1. For industrial applications, it is recommended to use HDSP-3901/3903/8601/8603.
2. For details, please contact your local Avago Technologies sales office or an authorized distributor.

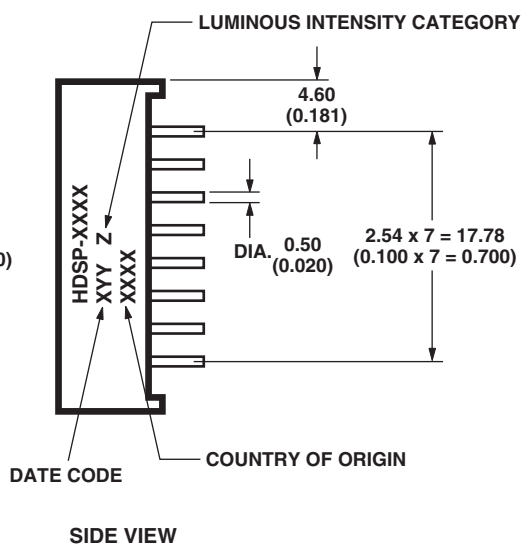
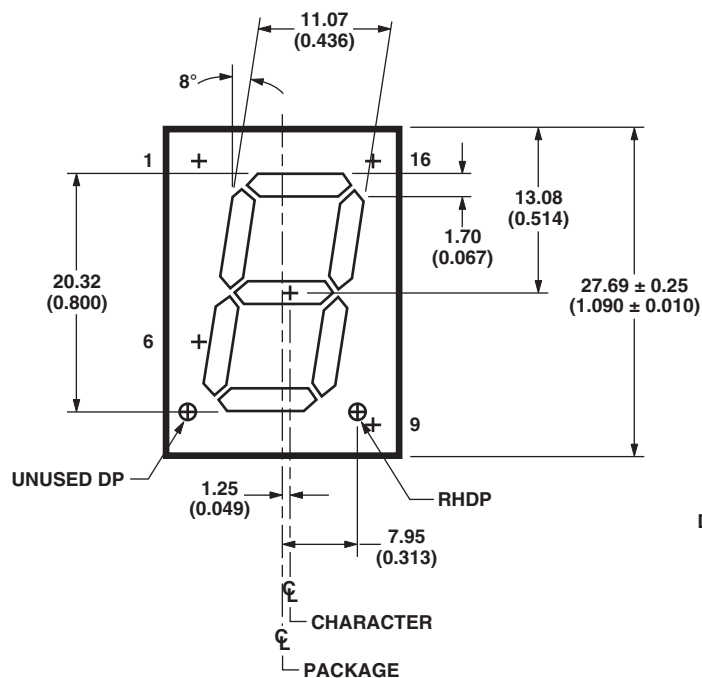
Part Numbering System



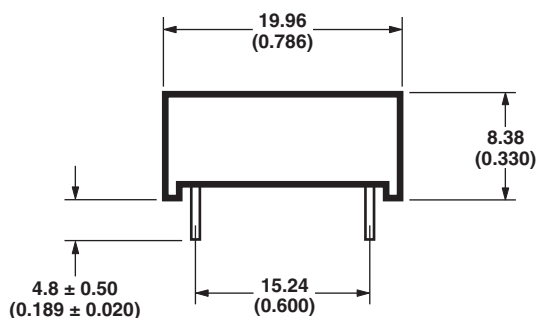
Notes:

1. For codes not listed in the figure above, please refer to the respective datasheet 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 datasheet for specific bin limit information.

Package Dimensions



FRONT VIEW

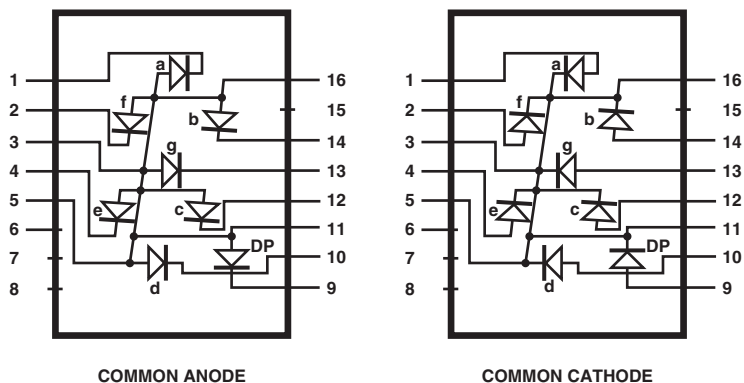


END VIEW

NOTES:

1. DIMENSIONS IN MILLIMETERS AND (INCHES).
2. TOLERANCE IS 0.25 mm (0.010 INCH) UNLESS OTHERWISE STATED.

Internal Circuit Diagram



| COMMON ANODE | | COMMON CATHODE | |
|--------------|---------------|----------------|----------------|
| PIN | FUNCTION | PIN | FUNCTION |
| 1 | CATHODE A | 1 | ANODE A |
| 2 | CATHODE F | 2 | ANODE F |
| 3 | COMMON ANODE | 3 | COMMON CATHODE |
| 4 | CATHODE E | 4 | ANODE E |
| 5 | COMMON ANODE | 5 | COMMON CATHODE |
| 6 | NO CONNECTION | 6 | NO CONNECTION |
| 7 | NO PIN | 7 | NO PIN |
| 8 | NO PIN | 8 | NO PIN |
| 9 | CATHODE RHDP | 9 | ANODE RHDP |
| 10 | CATHODE D | 10 | ANODE D |
| 11 | COMMON ANODE | 11 | COMMON CATHODE |
| 12 | CATHODE C | 12 | ANODE C |
| 13 | CATHODE G | 13 | ANODE G |
| 14 | CATHODE B | 14 | ANODE B |
| 15 | NO PIN | 15 | NO PIN |
| 16 | COMMON ANODE | 16 | COMMON CATHODE |

Absolute Maximum Ratings at T_A = 25° C

| Parameter | High Efficiency Red HDSP-815E HDSP-816E | Green HDSP-815G HDSP-816G | Units |
|--|---|---------------------------------|-------|
| Average Power per Segment or DP | 62.5 | 65 | mW |
| Peak Forward Current per Segment or DP (1/10 Duty Cycle, 0.1 ms Pulse Width) | 100 | 90 | mA |
| DC Forward Current per Segment or DP ^[1] | 25 | 25 | mA |
| Reverse Voltage per Segment or DP | 3 | 3 | V |
| Operating Temperature | -25 to +85 | -25 to +85 | °C |
| Storage Temperature | -25 to +85 | -25 to +85 | °C |
| Wave Soldering Temperature for 3 Seconds ^[2] (1.6 mm [0.063 in.] below Body) | 250 | 250 | °C |

Notes:

- Derate above 25° C at 0.33 mA/°C.
- Not recommended to be soldered more than 2 times. Minimum interval between solderings is 15 minutes. Total soldering time not to exceed 5 seconds.

Optical/Electrical Characteristics at T_A = 25° C

High Efficiency Red

| Devices HDSP- | Parameter | Symbol | Min. | Typ. | Max. | Units | Test Conditions |
|------------------|--|---------------------|------|------|------|-------|-------------------------|
| 815E 816E | Luminous Intensity/Segment (Segment Average) ^[1,2] | I _v | 2.3 | 4.8 | | mcd | I _F = 20 mA |
| | Forward Voltage/Segment or DP | V _F | | 2.1 | 3.0 | V | I _F = 20 mA |
| | Peak Wavelength | λ _{PEAK} | | 635 | | nm | |
| | Dominant Wavelength ^[3] | λ _d | | 626 | | nm | |
| | Reverse Voltage/Segment or DP ^[4] | V _R | 3.0 | 25 | | V | I _R = 100 μA |
| | Temperature Coefficient of V _F /Segment or DP | ΔV _F /°C | | -2 | | mV/°C | |

Green

| Devices HDSP- | Parameter | Symbol | Min. | Typ. | Max. | Units | Test Conditions |
|------------------|--|---------------------|------|------|------|-------|-------------------------|
| 815G 816G | Luminous Intensity/Segment (Segment Average) ^[1,2] | I _v | 1.5 | 3.3 | | mcd | I _F = 20 mA |
| | Forward Voltage/Segment or DP | V _F | | 2.1 | 2.6 | V | I _F = 20 mA |
| | Peak Wavelength | λ _{PEAK} | | 566 | | nm | |
| | Dominant Wavelength ^[3] | λ _d | | 571 | | nm | |
| | Reverse Voltage/Segment or DP ^[4] | V _R | 3.0 | 50 | | V | I _R = 100 μA |
| | Temperature Coefficient of V _F /Segment or DP | ΔV _F /°C | | -2 | | mV/°C | |

Notes:

- Case temperature of the device immediately prior to the intensity measurement is 25° C.
- The digits are categorized for luminous intensity. The intensity category is designated by a letter on the side of the package.
- The dominant wavelength, λ_d, is derived from the CIE chromaticity diagram and represents the single wavelength which defines the color of the device.
- Typical specification for reference only. Do not exceed absolute maximum ratings.

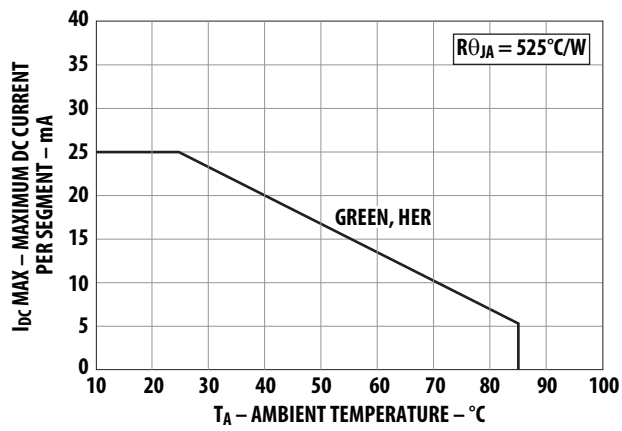


Figure 1. Maximum allowable DC current vs. ambient temperature.

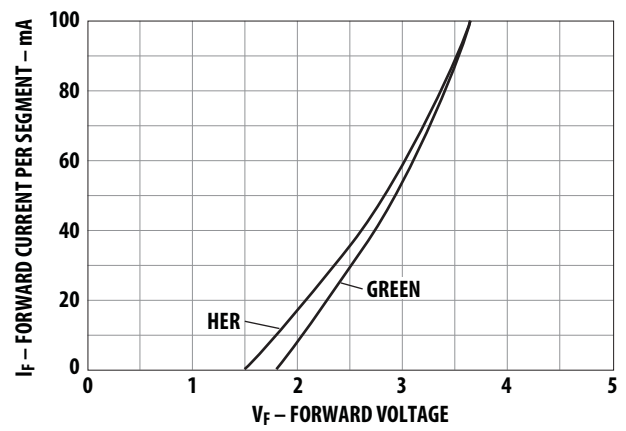


Figure 2. Forward current vs. forward voltage.

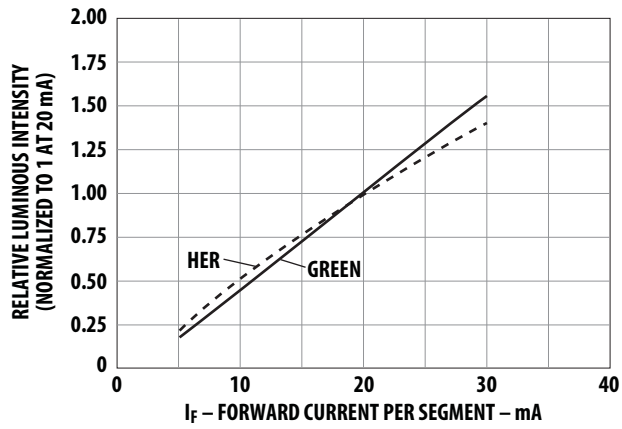


Figure 3. Relative luminous intensity vs. DC forward current.

Intensity Bin Limits (mcd at 20 mA)

HER/Green

| Bin Name | Green | | HER | |
|----------|---------------------|---------------------|---------------------|---------------------|
| | Min. ^[1] | Max. ^[1] | Min. ^[1] | Max. ^[1] |
| N | NA | NA | 5.31 | 7.57 |
| P | 7.57 | 10.78 | 7.57 | 10.78 |
| Q | 10.78 | 15.10 | 10.78 | 15.10 |
| R | 15.10 | 21.58 | NA | NA |

Note:

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

Color Categories

| Color | Bin | Dominant Wavelength (nm) | |
|-------|-----|--------------------------|--------|
| | | Min. | Max. |
| Green | 1 | 569.00 | 572.00 |
| | 2 | 572.00 | 575.00 |

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.

Device Reliability

For reliability information, please see the reliability data sheet 20 mm (0.8 inch) General Purpose Seven Segment Display.

For product information and a complete list of distributors, please go to our web site: www.avagotech.com

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