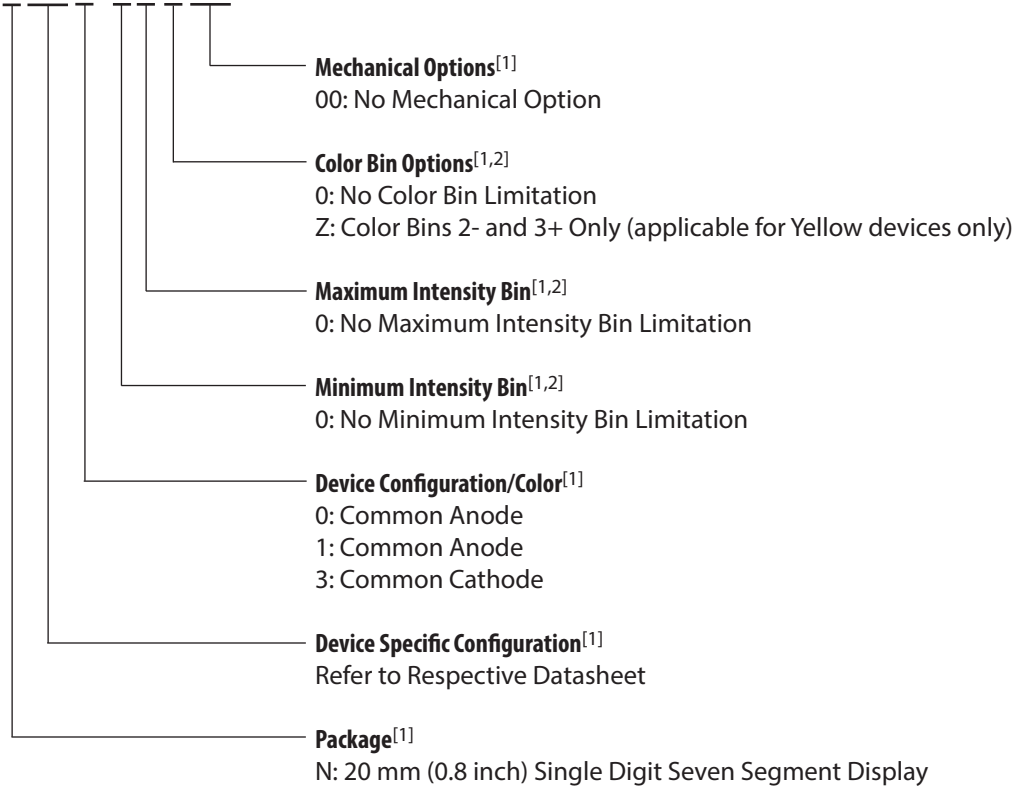


Part Numbering System

5082 - X X X X - X X X X X

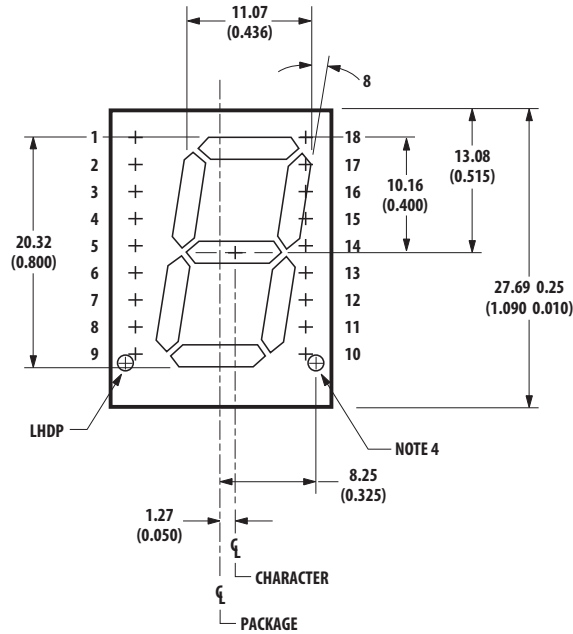
HDSP- X X X X - X X X X X



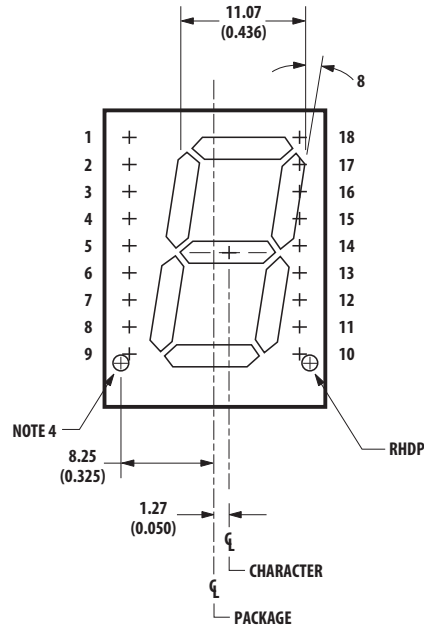
Notes:

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.

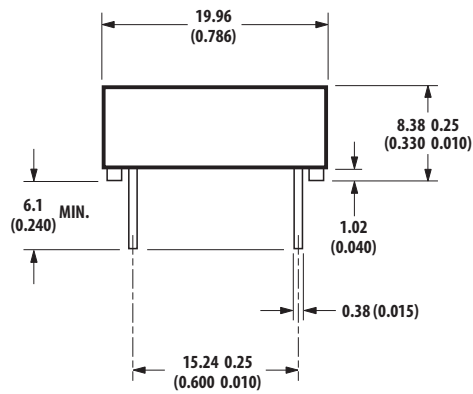
Package Dimensions



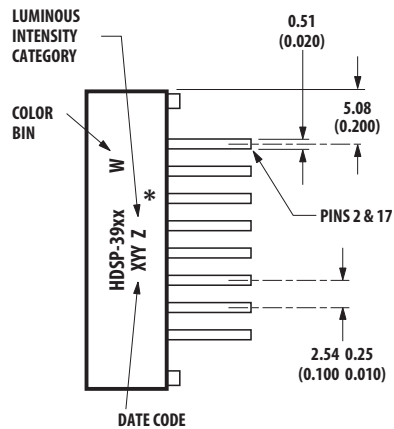
FRONT VIEW A, D



FRONT VIEW B, C



END VIEW



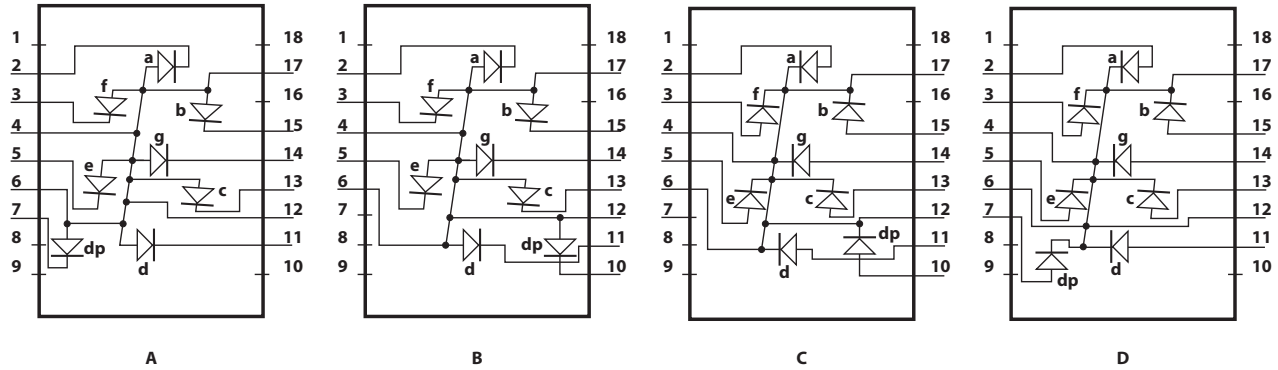
SIDE VIEW

* THE SIDE VIEW OF PACKAGE INDICATES COUNTRY OF ORIGIN.

FUNCTION				
PIN	A	B	C	D
1	NO PIN	NO PIN	NO PIN	NO PIN
2	CATHODE a	CATHODE a	ANODE a	ANODE a
3	CATHODE f	CATHODE f	ANODE f	ANODE f
4	ANODE ^[3]	ANODE ^[3]	CATHODE ^[6]	CATHODE ^[6]
5	CATHODE e	CATHODE e	ANODE e	ANODE e
6	ANODE ^[3]	ANODE ^[3]	CATHODE ^[6]	CATHODE ^[6]
7	CATHODE dp	NO CONNEC.	NO CONNEC.	ANODE dp
8	NO PIN	NO PIN	NO PIN	NO PIN
9	NO PIN	NO PIN	NO PIN	NO PIN
10	NO PIN	CATHODE dp	ANODE dp	NO PIN
11	CATHODE d	CATHODE d	ANODE d	ANODE d
12	ANODE ^[3]	ANODE ^[3]	CATHODE ^[6]	CATHODE ^[6]
13	CATHODE c	CATHODE c	ANODE c	ANODE c
14	CATHODE g	CATHODE g	ANODE g	ANODE g
15	CATHODE b	CATHODE b	ANODE b	ANODE b
16	NO PIN	NO PIN	NO PIN	NO PIN
17	ANODE ^[3]	ANODE ^[3]	CATHODE ^[6]	CATHODE ^[6]
18	NO PIN	NO PIN	NO PIN	NO PIN

- NOTES:
1. DIMENSIONS IN MILLIMETERS AND (INCHES).
 2. ALL UNTOLERANCED DIMENSIONS ARE FOR REFERENCE ONLY.
 3. REDUNDANT ANODES.
 4. UNUSED dp POSITION.
 5. SEE INTERNAL CIRCUIT DIAGRAM.
 6. REDUNDANT CATHODES.
 7. FOR HDSP-420x/-860x SERIES PRODUCT ONLY.

Internal Circuit Diagram



Absolute Maximum Ratings

Description	AlGaAs Red HDSP-N150 Series	HER HDSP-3900 Series	Yellow HDSP-420x Series	Green HDSP-860x Series	Units
Average Power per Segment or DP	96	105	105	105	mW
Peak Forward Current per Segment or DP	160 ^[1]	135 ^[3]	135 ^[3]	90 ^[5]	mA
DC Forward Current per Segment or DP	40 ^[2]	40 ^[4]	40 ^[4]	30 ^[6]	mA
Operating Temperature Range	-20 to +100 ^[7]	-40 to +100		-40 to +100	°C
Storage Temperature Range		-55 to +100			°C
Reverse Voltage* per Segment or DP		3.0			V
Wave Soldering Temperature for 3 Seconds (1.60 mm [0.063 in.]		250			°C

* reverse voltage is for LED testing purposes and is not recommended to be used as an application condition.

Notes:

- See Figure 2 to establish pulsed conditions.
- Derate above 55°C at 0.8 mA/°C.
- See Figure 7 to establish pulsed conditions.
- Derate above 50°C at 0.73 mA/°C.
- See Figure 8 to establish pulsed conditions.
- Derate above 50°C at 0.54 mA/°C.
- For operation below -20°C, contact your local Avago components sales office or an authorized distributor.

Electrical/Optical Characteristics at T_A = 25°C

AlGaAs Red

Device Series - HDSP-N15x

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Luminous Intensity/Segment ^[1,2,5] (Digit Average)	I _V	6.0	14.0		mcd	I _F = 20 mA
Forward Voltage/Segment or DP	V _F		1.8		V	I _F = 20 mA
			2.0	3.0	V	I _F = 100 mA
Peak Wavelength	λ _{PEAK}		645		nm	
Dominant Wavelength ^[3]	λ _d		637		nm	
Reverse Voltage/Segment or DP ^[4]	V _R	3.0	15		V	I _R = 100 μA
Temperature Coefficient of V _F /Segment or DP	ΔV _F /°C		-2		mV/°C	
Thermal Resistance LED Junction-to-Pin	Rθ _{J-PIN}		430		°C/W/Seg	

High Efficiency Red

Device Series - HDSP-390x

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Luminous Intensity/Segment ^[1,2] (Digit Average)	I_V	3350	7000		μcd	$I_F = 100 \text{ mA}$ Peak: 1 of 5 df
			4800		μcd	$I_F = 20 \text{ mA}$
Forward Voltage/Segment or DP	V_F		2.6	3.5	V	$I_F = 100 \text{ mA}$
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	$I_R = 100 \mu\text{A}$
Temperature Coefficient of V_F /Segment or DP	$\Delta V_F/^\circ\text{C}$		-2		mV/ $^\circ\text{C}$	
Thermal Resistance LED Junction-to-Pin	$R\theta_{J-PIN}$		375		$^\circ\text{C/W/Seg}$	

Yellow

Device Series - HDSP-420x

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Luminous Intensity/Segment ^[1,2] (Digit Average)	I_V		2200	7000	μcd	$I_F = 100 \text{ mA}$ Peak: 1 of 5 df
			3400		μcd	$I_F = 20 \text{ mA}$
Forward Voltage/Segment or DP	V_F		2.6	3.5	V	$I_F = 100 \text{ mA}$
Peak Wavelength	λ_{PEAK}		583		nm	
Dominant Wavelength ^[3,6]	λ_d	581.5	586	592.5	nm	
Reverse Voltage/Segment or DP ^[4]	V_R	3.0	25.0		V	$I_R = 100 \mu\text{A}$
Temperature Coefficient of V_F /Segment or DP	$\Delta V_F/^\circ\text{C}$		-2		mV/ $^\circ\text{C}$	
Thermal Resistance LED Junction-to-Pin	$R\theta_{J-PIN}$		375		$^\circ\text{C/W/Seg}$	

Green

Device Series - HDSP-860x

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Luminous Intensity/Segment ^[1,2] (Digit Average)	I_V	680	1500		μcd	$I_F = 10 \text{ mA}$
			1960		μcd	$I_F = 50 \text{ mA}$ Peak: 1 of 5 df
Forward Voltage/Segment or DP	V_F		2.1	2.5	V	$I_F = 10 \text{ mA}$
Peak Wavelength	λ_{PEAK}		566		nm	
Dominant Wavelength ^[3,6]	λ_d		571	577	nm	
Reverse Voltage/Segment or DP ^[4]	V_R	3.0	50.0		V	$I_R = 100 \mu\text{A}$
Temperature Coefficient of V_F /Segment or DP	$\Delta V_F/^\circ\text{C}$		-2		mV/ $^\circ\text{C}$	
Thermal Resistance LED Junction-to-Pin	$R\theta_{J-PIN}$		375		$^\circ\text{C/W/Seg}$	

Notes:

1. Case temperature of the device immediately prior to the intensity measurement is 25°C.
2. The digits are categorized for luminous intensity. The intensity category is designated by a letter on the side of the package.
3. The dominant wavelength, λ_d , is derived from the CIE chromaticity diagram and is that single wavelength which defines the color of the device.
4. Typical specification for reference only. Do not exceed absolute maximum ratings.
5. For low current operation, the AlGaAs Red HDSP-N100 series displays are recommended. They are tested at 1 mA dc/segment and are pin for pin compatible with the HDSP-N150 series.
6. The Yellow (HDSP-420x) and Green (HDSP-860x) displays are categorized for dominant wavelength. The category is designated by a number adjacent to the luminous intensity category letter.

AlGaAs Red

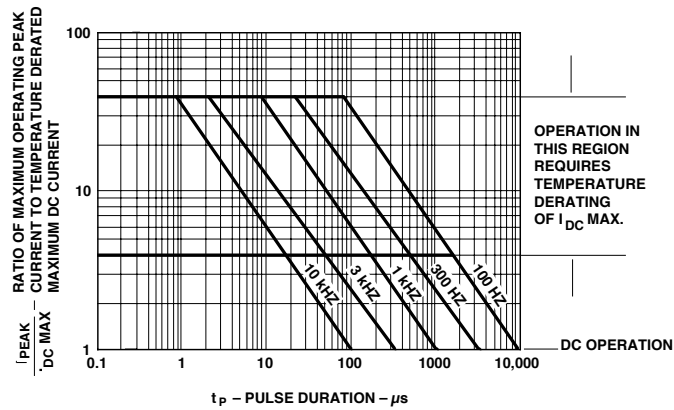


Figure 1. Maximum allowed peak current vs. pulse duration – AlGaAs Red.

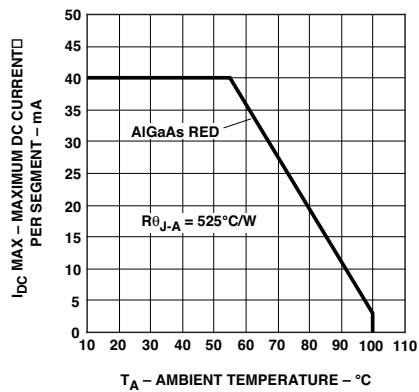


Figure 2. Maximum allowable DC current vs. ambient temperature.

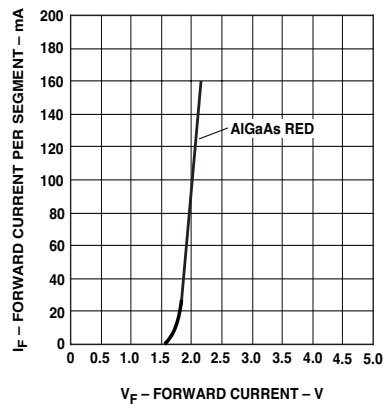


Figure 3. Forward current vs. forward voltage.

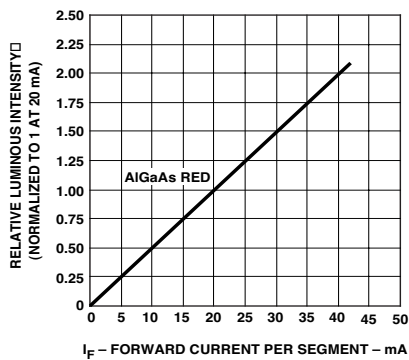


Figure 5.

Figure 4. Relative luminous intensity vs. DC forward current.

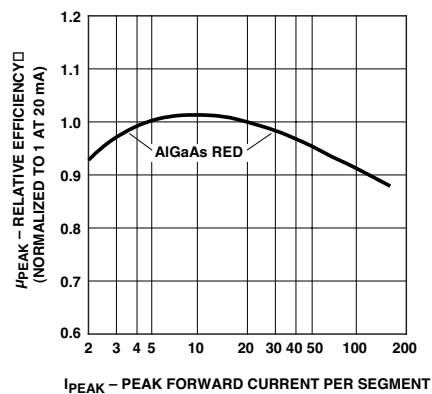


Figure 5. Relative efficiency (luminous intensity per unit current) vs. peak current.

HER, Yellow, Green

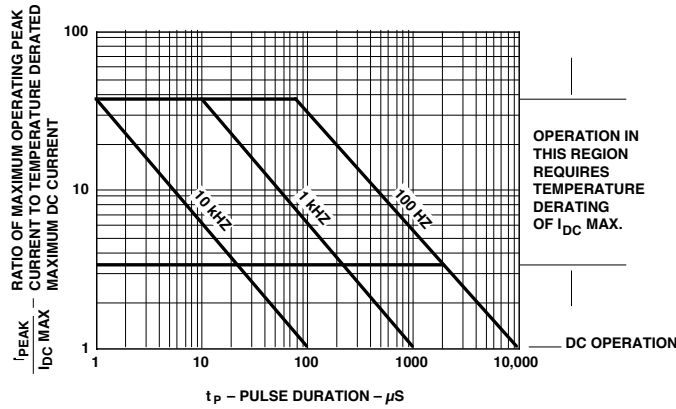


Figure 6. Maximum allowed peak current vs. pulse duration – HER, Yellow.

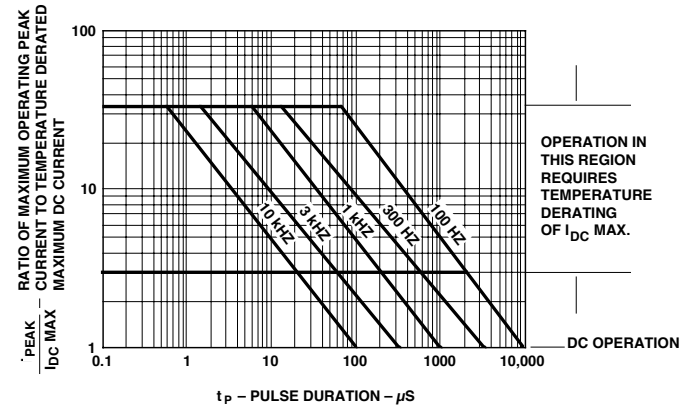


Figure 7. Maximum allowed peak current vs. pulse duration – Green.

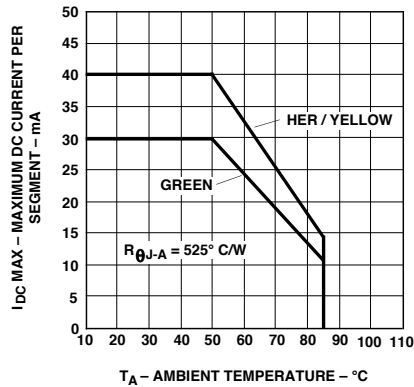


Figure 8. Maximum allowable DC current vs. ambient temperature.

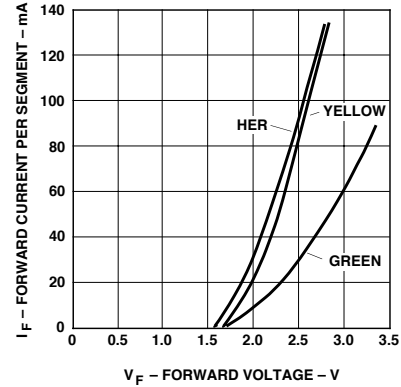


Figure 9. Forward current vs. forward voltage.

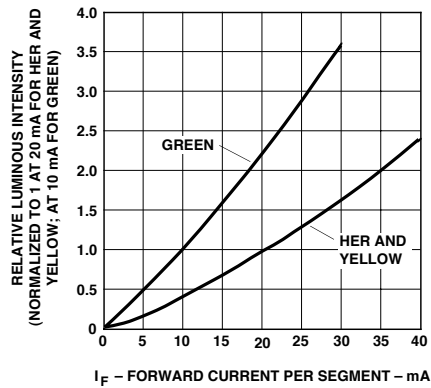


Figure 10. Relative luminous intensity vs. DC forward current.

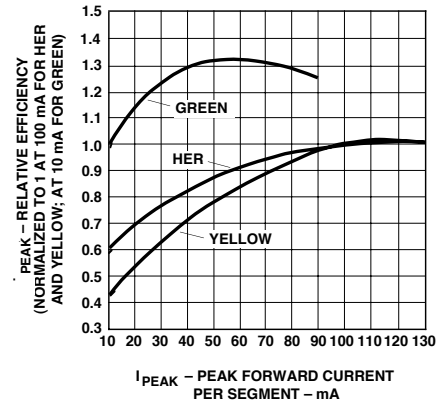


Figure 11. Relative efficiency (luminous intensity per unit current) vs. peak current.

Intensity Bin Limits (mcd)

AlGaAs Red - HDSP-N15x

IV Bin Category	Min.	Max.
J	6.14	11.20
K	9.20	16.90
L	13.80	25.30
M	20.70	38.00
N	31.10	56.90
O	46.60	85.40

Yellow - HDSP-420x

IV Bin Category	Min.	Max.
C	2.23	4.09
D	3.35	6.14
E	5.02	9.21
F	7.53	13.82
G	11.30	20.72
H	16.95	31.08
I	25.43	46.62

Green - HDSP-860x

IV Bin Category	Min.	Max.
D	1.03	1.88
E	1.54	2.82
F	2.31	4.25
G	3.47	6.37
H	5.21	9.55

HER - HDSP-390x

IV Bin Category	Min.	Max.
D	3.35	6.14
E	5.02	9.21
F	7.53	13.82
G	11.30	20.72
H	16.95	31.08
I	25.43	46.62

Color Categories

Color	Bin	Dominant Wavelength (nm)	
		Min.	Max.
Yellow	1	581.50	585.00
	3	584.00	587.50
	2	586.50	590.00
	4	589.00	592.50
Green	2	573.00	577.00
	3	570.00	574.00
	4	567.00	571.00
	5	564.00	568.00

Note:

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.

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, trichloro- ethylene, 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

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