

# HDSP-331x/332E/333x/334x Series

7.62 mm (0.3 inch) General Purpose

Seven-Segment Display



## Data Sheet

### Description

This 7.62 mm (0.3 inch) LED seven-segment display uses industry standard size package and pinout. The device is available in either common anode or common cathode. The choice of colors includes High Efficiency Red (HER), Green, AlGaAs Red, and Yellow. The gray face displays are suitable for indoor use.

### Applications

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

Note:

1. For additional details, please contact your local Avago sales office or an authorized distributor.

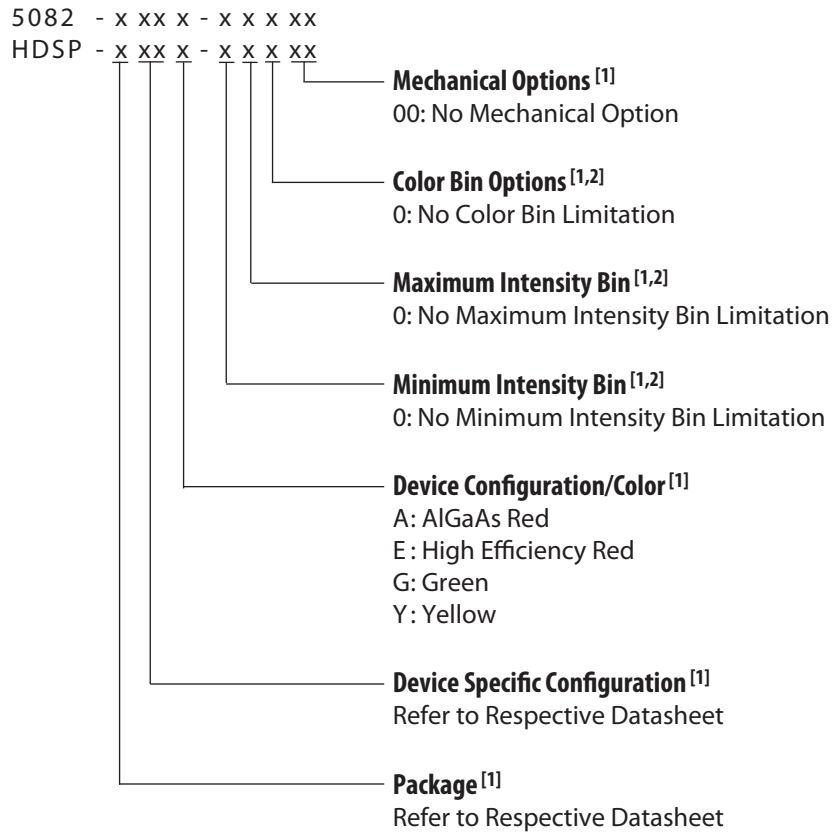
### Features

- Industry standard size
- Industry standard pinout
  - 7.62 mm (0.4 inch) character height
  - DIP lead on 2.54 mm
- Choice of colors
  - High Efficiency Red (HER), Green, AlGaAs Red, and Yellow
- Excellent appearance
  - Evenly lighted segments gray package gives optimum contrast
  - ± 50° viewing angle
- Design flexibility
  - Common anode or common cathode
  - Single digit
  - Left and right hand decimal point
- Categorized for luminous intensity
  - Green and yellow categorized for color

### Devices

HER	Green	AlGaAs Red	Yellow	Description	Package Drawing
HDSP-331E	HDSP-313G	HDSP-331A	HDSP-331Y	Common Anode, Right Hand and Left Hand Decimal	A
HDSP-332E				Common Anode, Right Hand and Left Hand Decimal without Pin 4, 5 and 12	A
HDSP-333E	HDSP-333G	HDSP-333A	HDSP-333Y	Common Cathode, Right Hand Decimal	B
HDSP-334E	HDSP-334G	HDSP-334A	HDSP-334Y	Common Cathode, Right Hand Decimal	C

## Part Numbering System

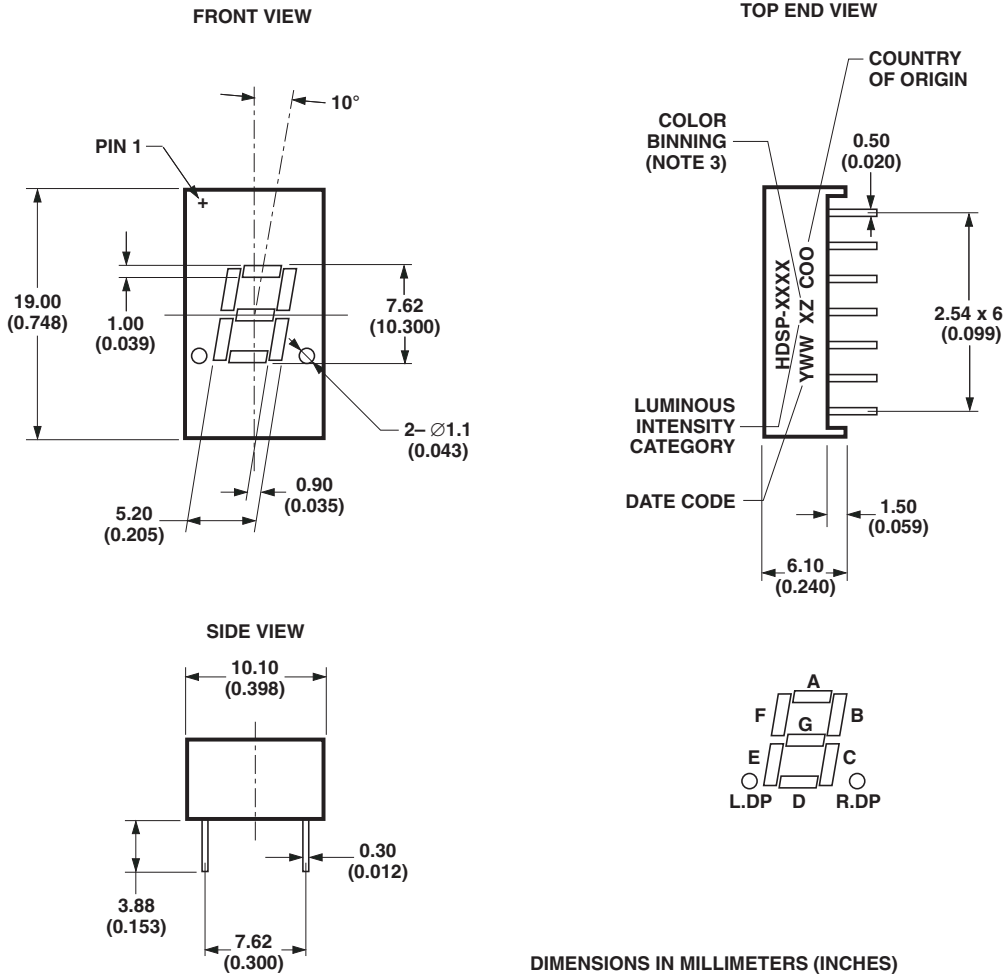


Notes:

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

## Package Drawing A

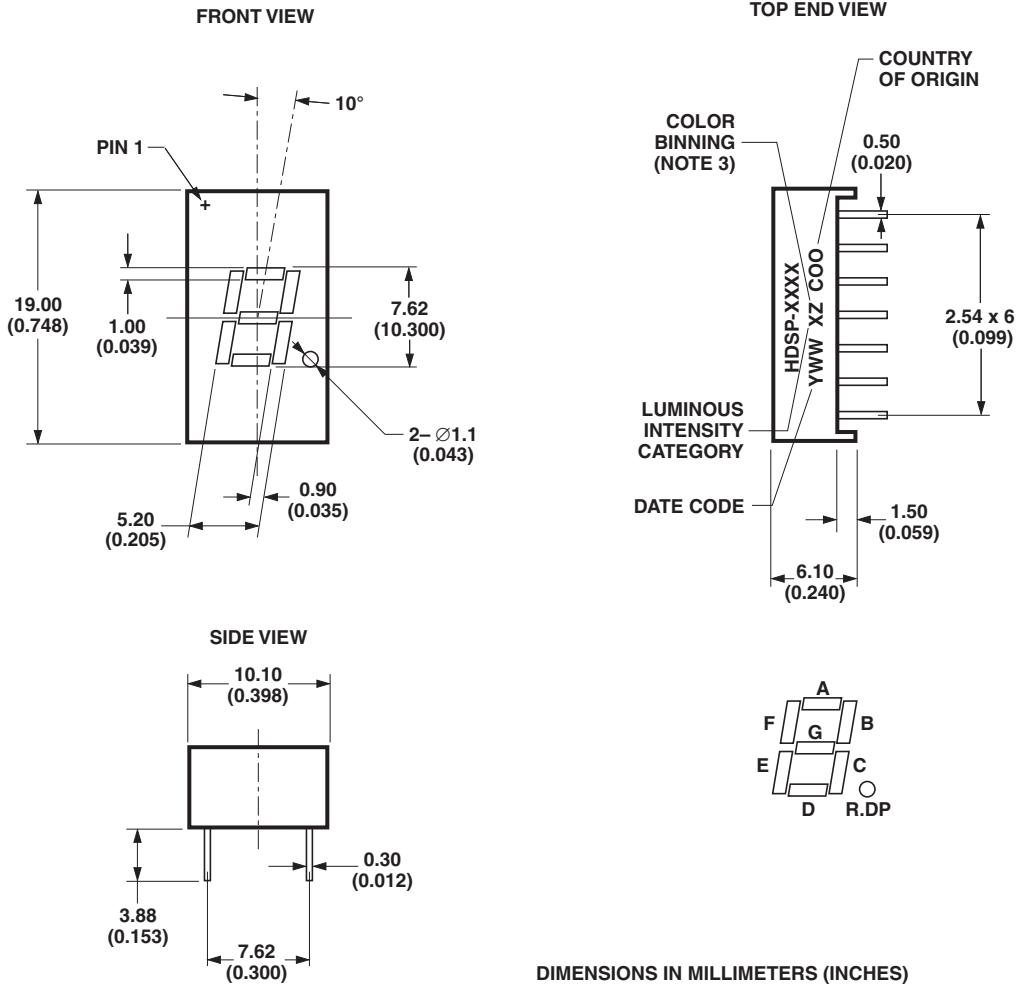


NOTE: HDSP-332E DOES NOT HAVE PIN 4, 5 AND 12.

DIMENSIONS IN MILLIMETERS (INCHES)

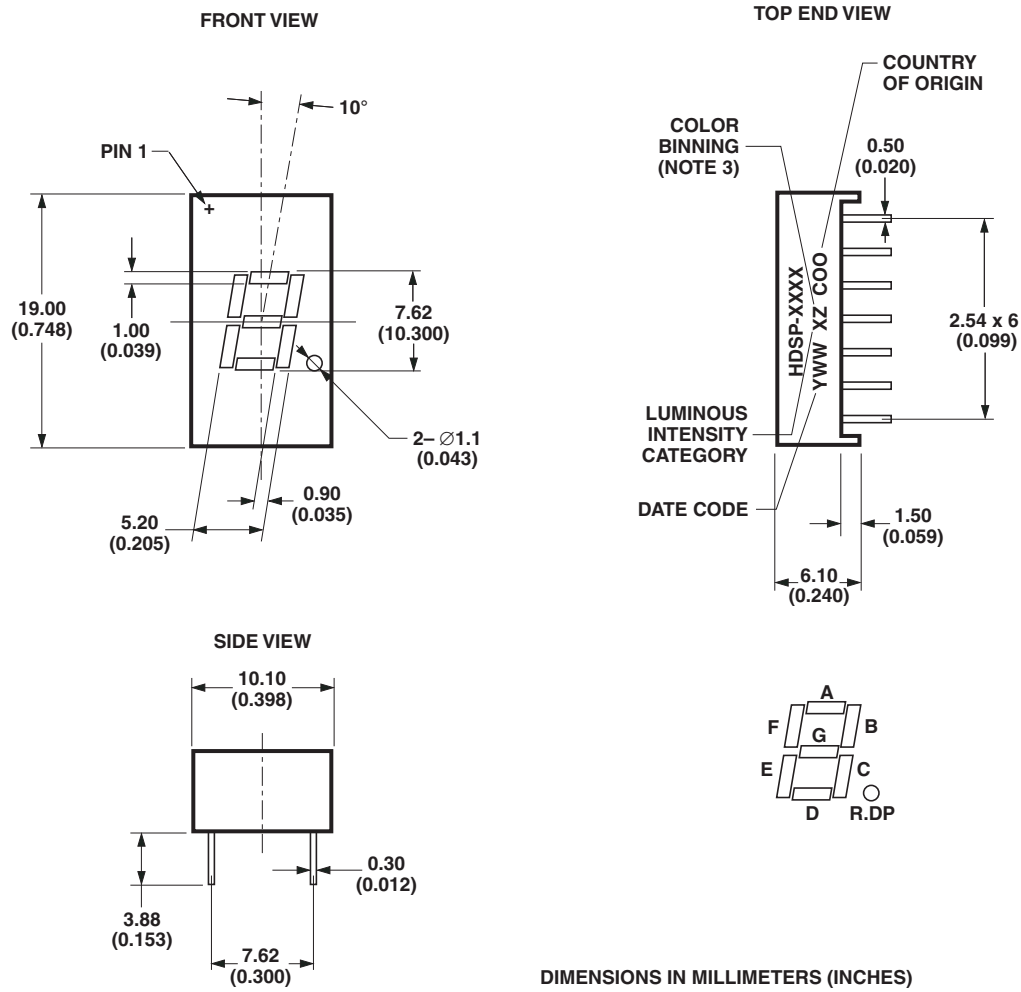
# Package Dimensions

## Package Drawing B



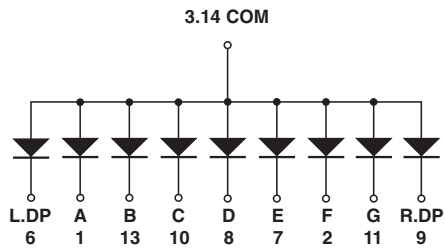
# Package Dimensions

## Package Drawing C



## Internal Circuit Diagram

### Common Anode

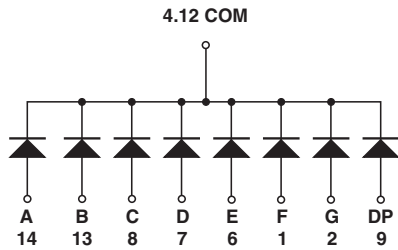


HDSP-331E/331G/331Y/331A/332E

PIN NO.	CONNECTION
1	CATHODE A
2	CATHODE F
3	COMMON ANODE
6	CATHODE L.DP
7	CATHODE E
8	CATHODE D
9	CATHODE R.DP
10	CATHODE C
11	CATHODE G
13	CATHODE B
14	COMMON ANODE

PINS 4, 5, 12: NO CONNECTION FOR HDSP-331E/331G/331Y/331A AND NO PIN FOR HDSP-332E

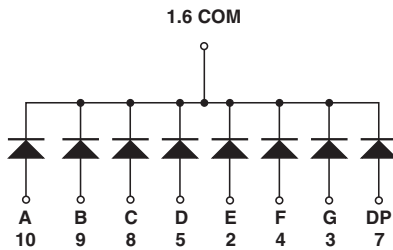
### Common Cathode



HDSP-333E/333G/333Y/333A

PIN NO.	CONNECTION
1	ANODE F
2	ANODE G
4	COMMON CATHODE
6	ANODE E
7	ANODE D
8	ANODE C
9	ANODE DP
12	COMMON CATHODE
13	ANODE B
14	ANODE A

PINS 3, 5, 10, 11: NC



HDSP-334E/334G/334Y/334A

PIN NO.	CONNECTION
1	COMMON CATHODE
2	ANODE E
3	ANODE G
4	ANODE F
5	ANODE D
6	COMMON CATHODE
7	ANODE DP
8	ANODE C
9	ANODE B
10	ANODE A

PINS 11, 12, 13, 14: NC

## Absolute Maximum Ratings at $T_A = 25^\circ\text{C}$

Description	HER HDSP-33xE	Green HDSP-33xG	AlGaAs Red HDSP-33xA	Yellow HDSP-33xY	Units
Power Dissipation Segment	65	65	30	52	mW
Forward Current Segment	25 [1]	25 [2]	15 [3]	20 [4]	mA
Peak Forward Current per Segment (1/10 Duty Factor at 10 kHz)	100	100	80	80	mA
Operating Temperature Range	-35 to +85	-35 to +85	-35 to +85	-35 to +85	$^\circ\text{C}$
Storage Temperature Range	-35 to +85	-35 to +85	-35 to +85	-35 to +85	$^\circ\text{C}$
Reverse Voltage per Segment or DP	5	5	5	5	V
Wavesoldering Temperature for 3 Seconds (at 2 mm Distance from the Body)	250	250	250	250	$^\circ\text{C}$

Note:

1. Derate above  $25^\circ\text{C}$  at  $0.33\text{ mA}/^\circ\text{C}$ .
2. Derate above  $25^\circ\text{C}$  at  $0.33\text{ mA}/^\circ\text{C}$ .
3. Derate above  $25^\circ\text{C}$  at  $0.2\text{ mA}/^\circ\text{C}$ .
4. Derate above  $25^\circ\text{C}$  at  $0.27\text{ mA}/^\circ\text{C}$ .

## Electrical/Optical Characteristics at $T_A = 25^\circ\text{C}$

### High Efficiency Red (HER)

Device HDSP-	Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions	
331E	Luminous Intensity/Segment	$I_V$		1.15		mcd	$I_F = 5\text{ mA}$	
333E			0.8	1.80			$I_F = 10\text{ mA}$	
333E	Forward Voltage	$V_F$		2.05	2.40	V	$I_F = 20\text{ mA}$	
334E			Peak Wavelength	$\lambda_{\text{PEAK}}$	635			nm
			Dominant Wavelength	$\lambda_d$	620			nm
			Reverse Voltage	$V_R$	5			

### Green

Device HDSP-	Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
331G	Luminous Intensity/Segment	$I_V$	0.8	2.00		mcd	$I_F = 10\text{ mA}$
333G				2.07			V
334G	Forward Voltage	$V_F$	1.80	2.25	2.60	V	$I_F = 20\text{ mA}$
			Peak Wavelength	$\lambda_{\text{PEAK}}$	568		nm
			Dominant Wavelength	$\lambda_d$	573		nm
			Reverse Voltage	$V_R$	5		

## AlGaAs Red

Device HDSP-	Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
331A 333A 334A	Luminous Intensity/Segment	$I_V$		3.93		mcd	$I_F = 5 \text{ mA}$
			2.001	4.20			$I_F = 10 \text{ mA}$
	Forward Voltage	$V_F$		1.85	2.00	V	$I_F = 20 \text{ mA}$
	Peak Wavelength	$\lambda_{PEAK}$		660		nm	
	Dominant Wavelength	$\lambda_d$		643		nm	
	Reverse Voltage	$V_R$	5			V	$I_R = 100 \mu\text{A}$

## Yellow

Device HDSP-	Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
331Y 333Y 334Y	Luminous Intensity/Segment	$I_V$		0.71		mcd	$I_F = 5 \text{ mA}$
			0.80	1.50			$I_F = 10 \text{ mA}$
	Forward Voltage	$V_F$		2.15	2.60	V	$I_F = 20 \text{ mA}$
	Peak Wavelength	$\lambda_{PEAK}$		595		nm	
	Dominant Wavelength	$\lambda_d$		590		nm	
	Reverse Voltage	$V_R$	5			V	$I_R = 100 \mu\text{A}$

## Intensity Bin Limits (mcd at 10 mA)

Bin Name	HER/Green/Yellow		AlGaAs Red	
	Min. <sup>[1]</sup>	Max. <sup>[1]</sup>	Min. <sup>[1]</sup>	Max. <sup>[1]</sup>
G	0.801	1.250	NA	NA
H	1.251	2.000	NA	NA
I	2.001	3.200	2.001	3.200
J	NA	NA	3.201	5.050
K	NA	NA	5.051	8.000

Note:

1. Tolerance for each bin limit is  $\pm 10\%$ .

## Color Bin Limits (nm at 10 mA)

Color	Bin	Dominant Wavelength (nm)	
		Min.	Max.
Green	3	569.1	571.1
	4	571.1	573.1
	5	573.1	585.5
Yellow	1	585.5	588.5
	2	588.5	591.5
	3	591.5	594.5

Note:

1. Tolerance for each bin limit is 1 nm.



## High Efficiency Red (HER)

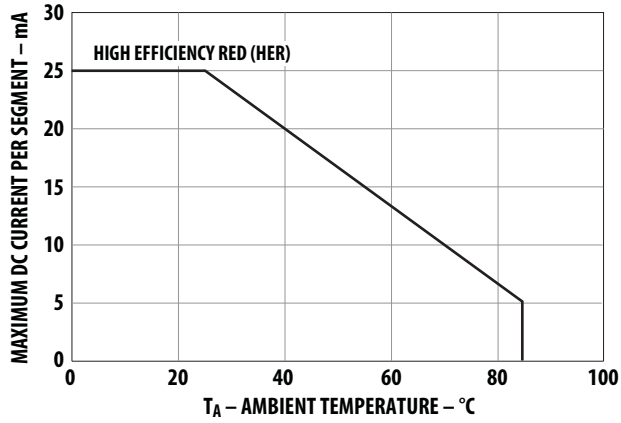


Figure 1. Maximum allowable average or DC current vs. ambient temperature.

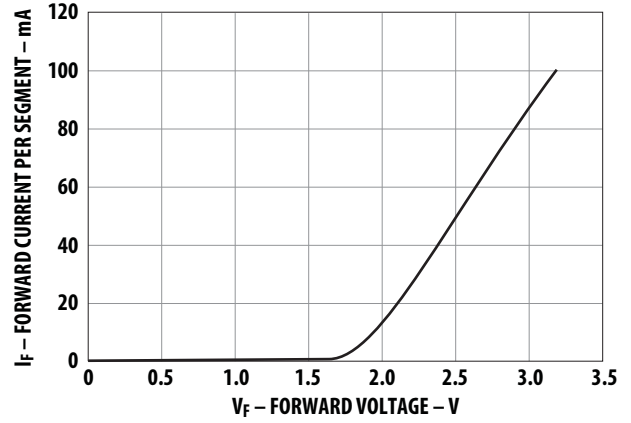


Figure 2. Forward current vs. forward voltage.

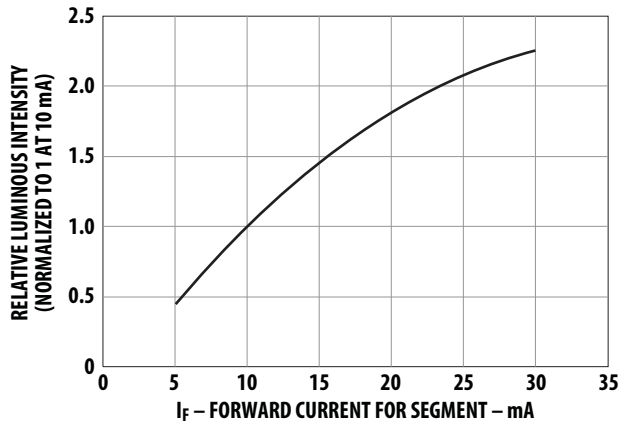


Figure 3. Relative luminous intensity vs. DC forward current.

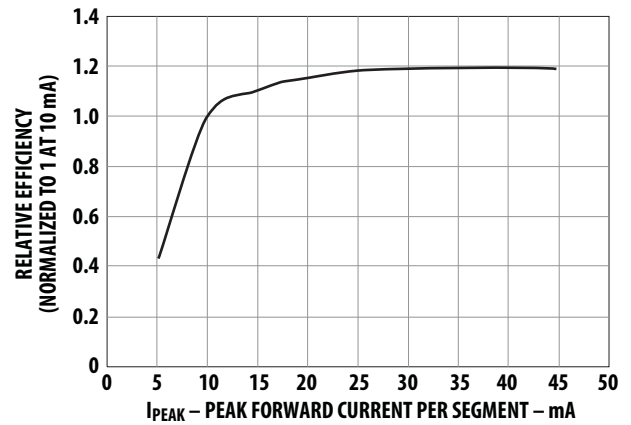


Figure 4. Relative efficiency (luminous intensity per unit current) vs. peak current.

## Green

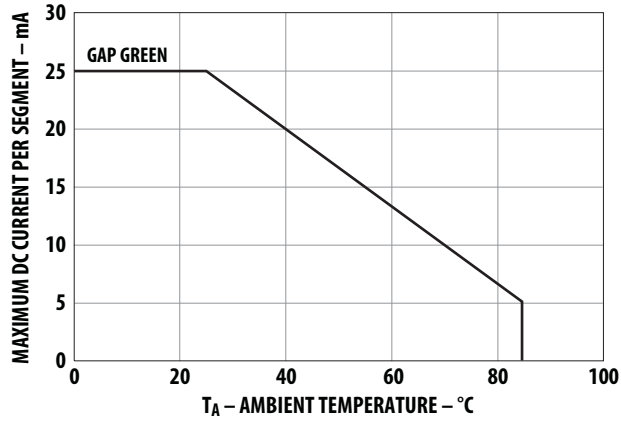


Figure 5. Maximum allowable average or DC current vs. ambient temperature.

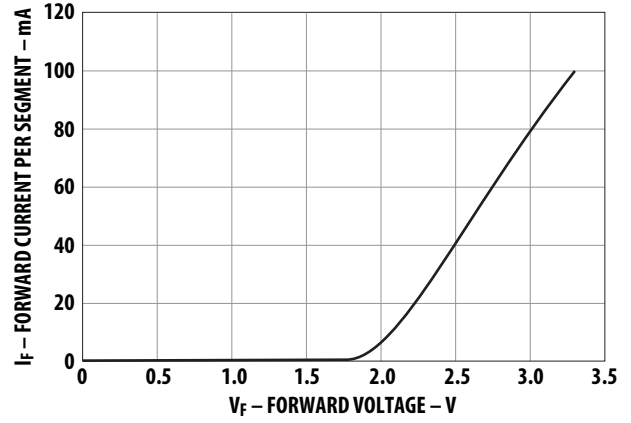


Figure 6. Forward current vs. forward voltage.

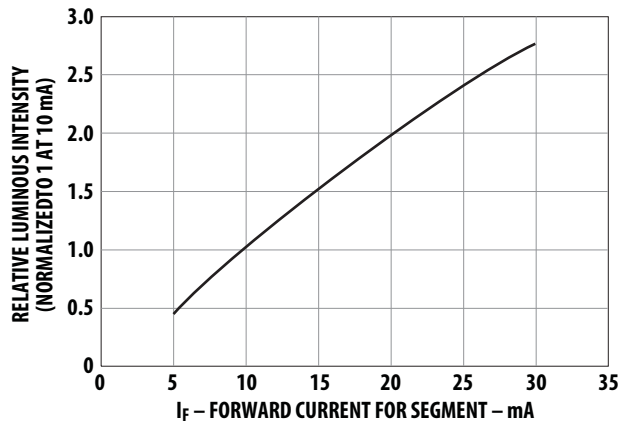


Figure 7. Relative luminous intensity vs. DC forward current.

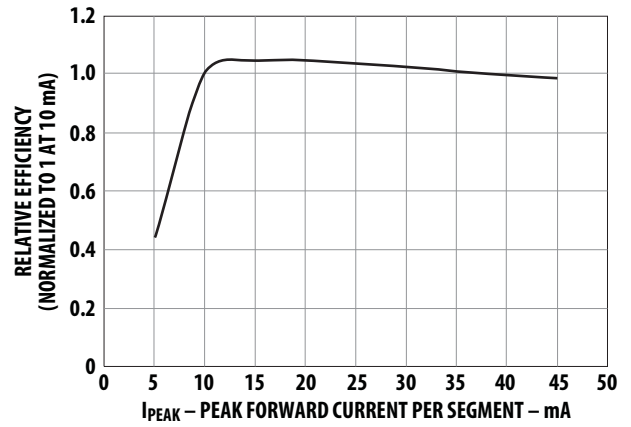


Figure 8. Relative efficiency (luminous intensity per unit current) vs. peak current.

## AlGaAs Red

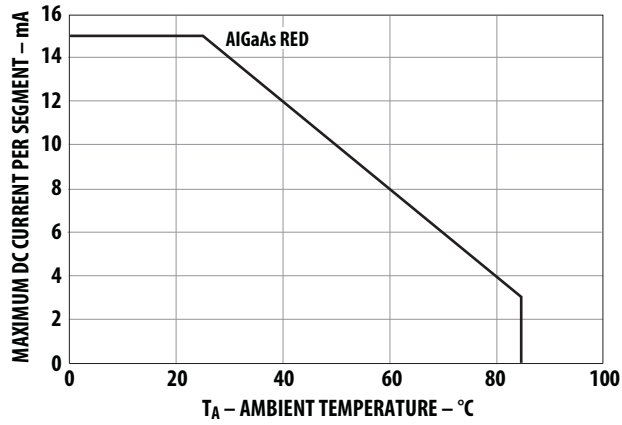


Figure 9. Maximum allowable average or DC current vs. ambient temperature.

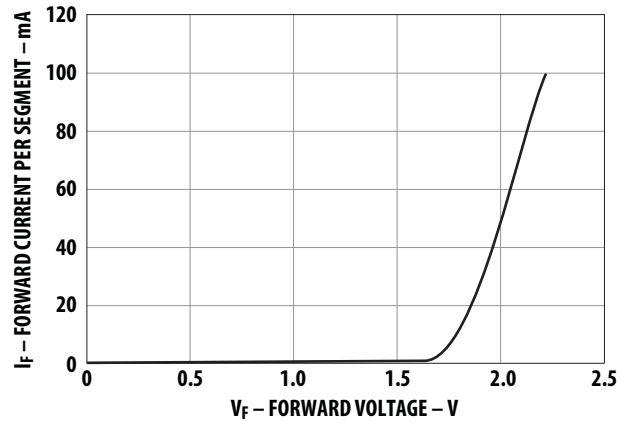


Figure 10. Forward current vs. forward voltage.

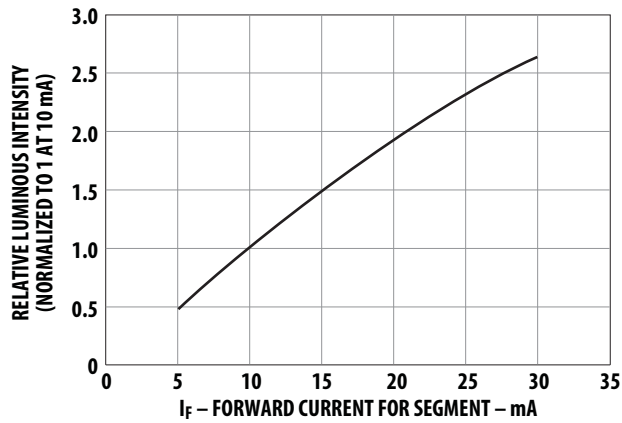


Figure 11. Relative luminous intensity vs. DC forward current.

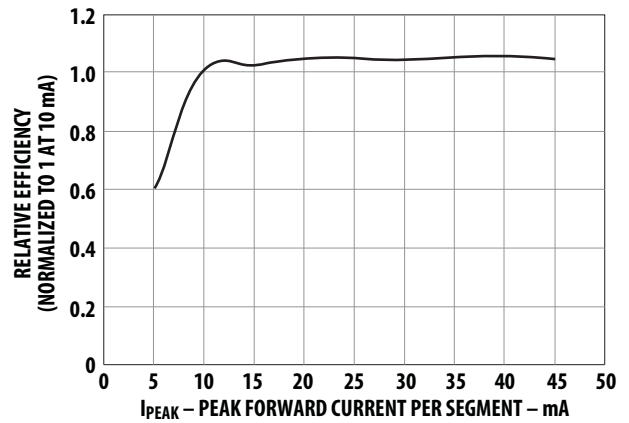


Figure 12. Relative efficiency (luminous intensity per unit current) vs. peak current.

## Yellow

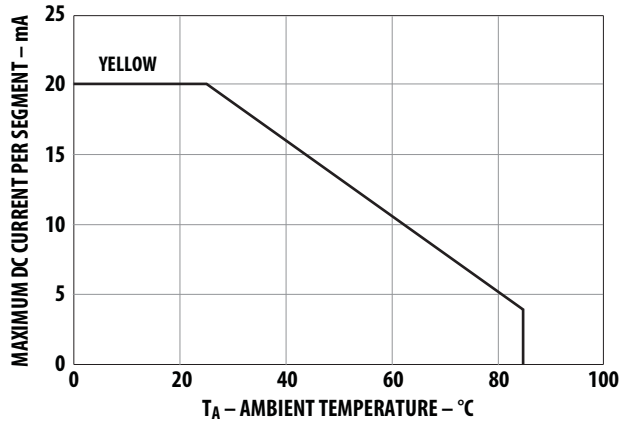


Figure 13. Maximum allowable average or DC current vs. ambient temperature.

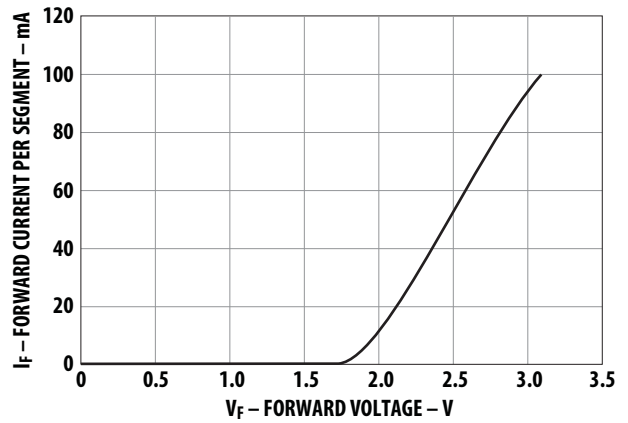


Figure 14. Forward current vs. forward voltage.

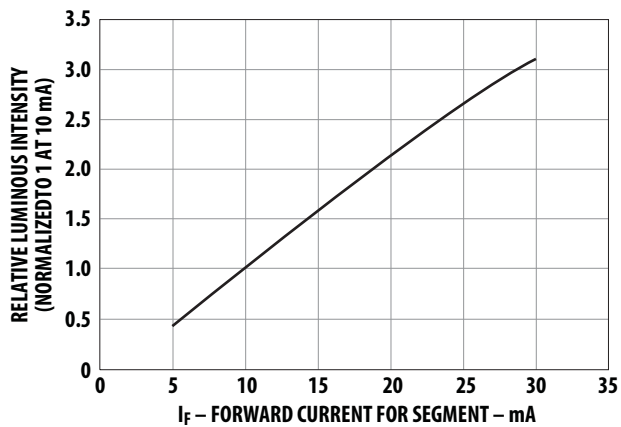


Figure 15. Relative luminous intensity vs. DC forward current.

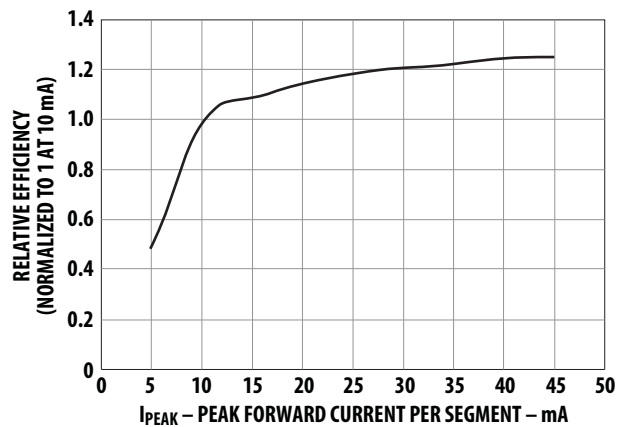


Figure 16. Relative efficiency (luminous intensity per unit current) vs. peak current.

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

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