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# 8 x 8 Rich Color General Purpose Dot Matrix Displays 47.8 mm (1.88 inch) Package

## Technical Data

**HDSP-R881**  
**HDSP-R883**

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### Features

- **8 x 8 Dot Matrix**  
Dot Diameter 3.75 mm  
Dot Pitch 6.0 mm
- **Rich Color Capability**  
Mix Colors Red, Blue, and  
Green for Rich Colors  
including White
- **Viewable up to 30 Meters**
- **X-Y Stackable**
- **Industry Standard Pin-out**  
36.0 mm (1.4 in.) DIP Leads on  
2.54 mm (0.1 in.) Centers
- **Black Face Paint**

### Description

This display comprises 8 rows by 8 columns of 3.75 mm diameter dots on a pitch of 6.0 mm. The device is available in common row cathode and common row anode configurations. The displays come in black face paint and black side-walls. Each dot has red, green, and blue (RGB) colors that may be mixed to produce the intended rich color. Water clear dots provide for higher intensities for the display.



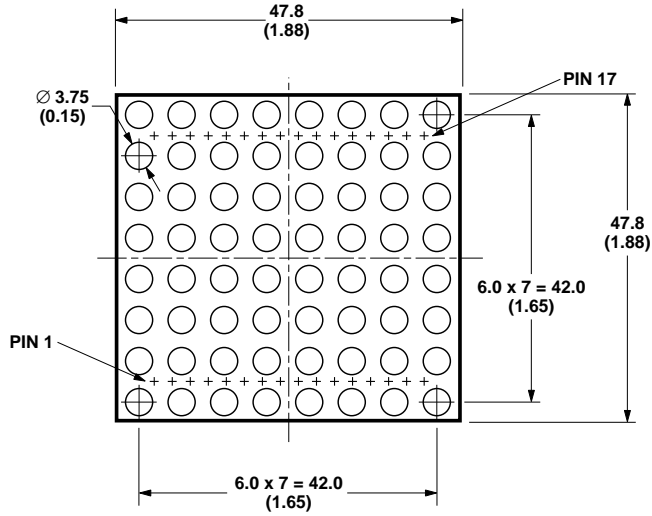
### Devices

	<b>Description</b>
HDSP-R881	Common Row Anode
HDSP-R883	Common Row Cathode

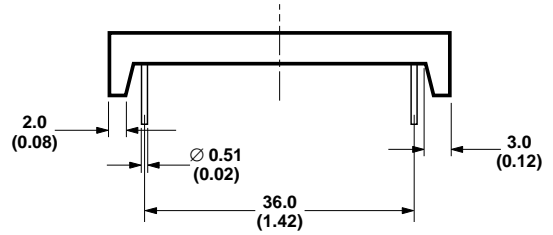
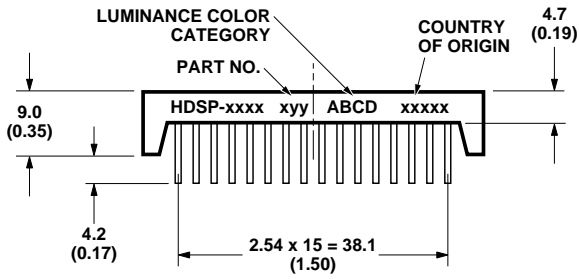
#### Note:

1. For details, please contact your local Agilent components sales office or an authorized distributor.

# Package Dimensions

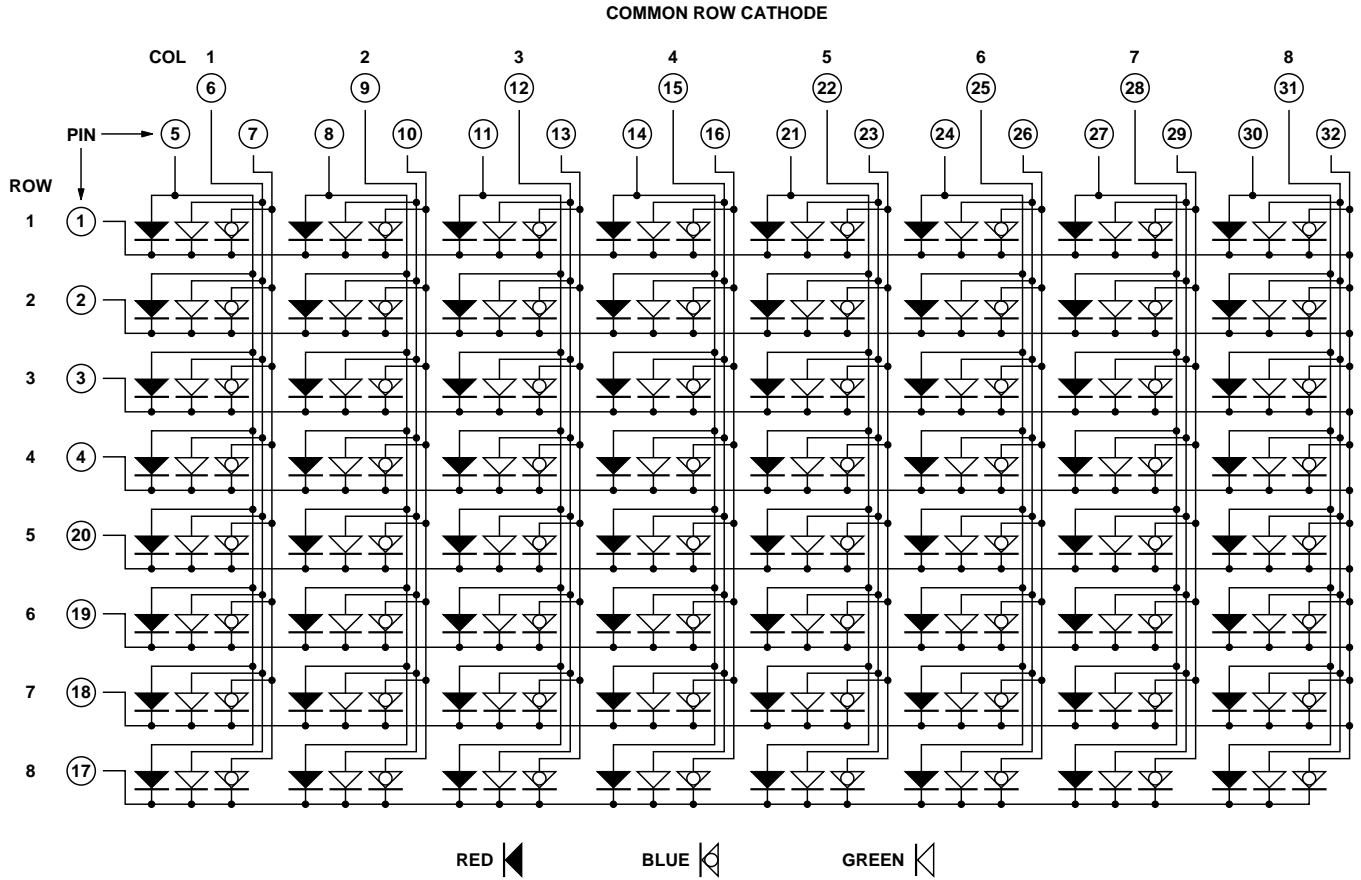


ROW	COL 1	2	3	4	5	6	7	8
1	○	○	○	○	○	○	○	○
2	○	○	○	○	○	○	○	○
3	○	○	○	○	○	○	○	○
4	○	○	○	○	○	○	○	○
5	○	○	○	○	○	○	○	○
6	○	○	○	○	○	○	○	○
7	○	○	○	○	○	○	○	○
8	○	○	○	○	○	○	○	○



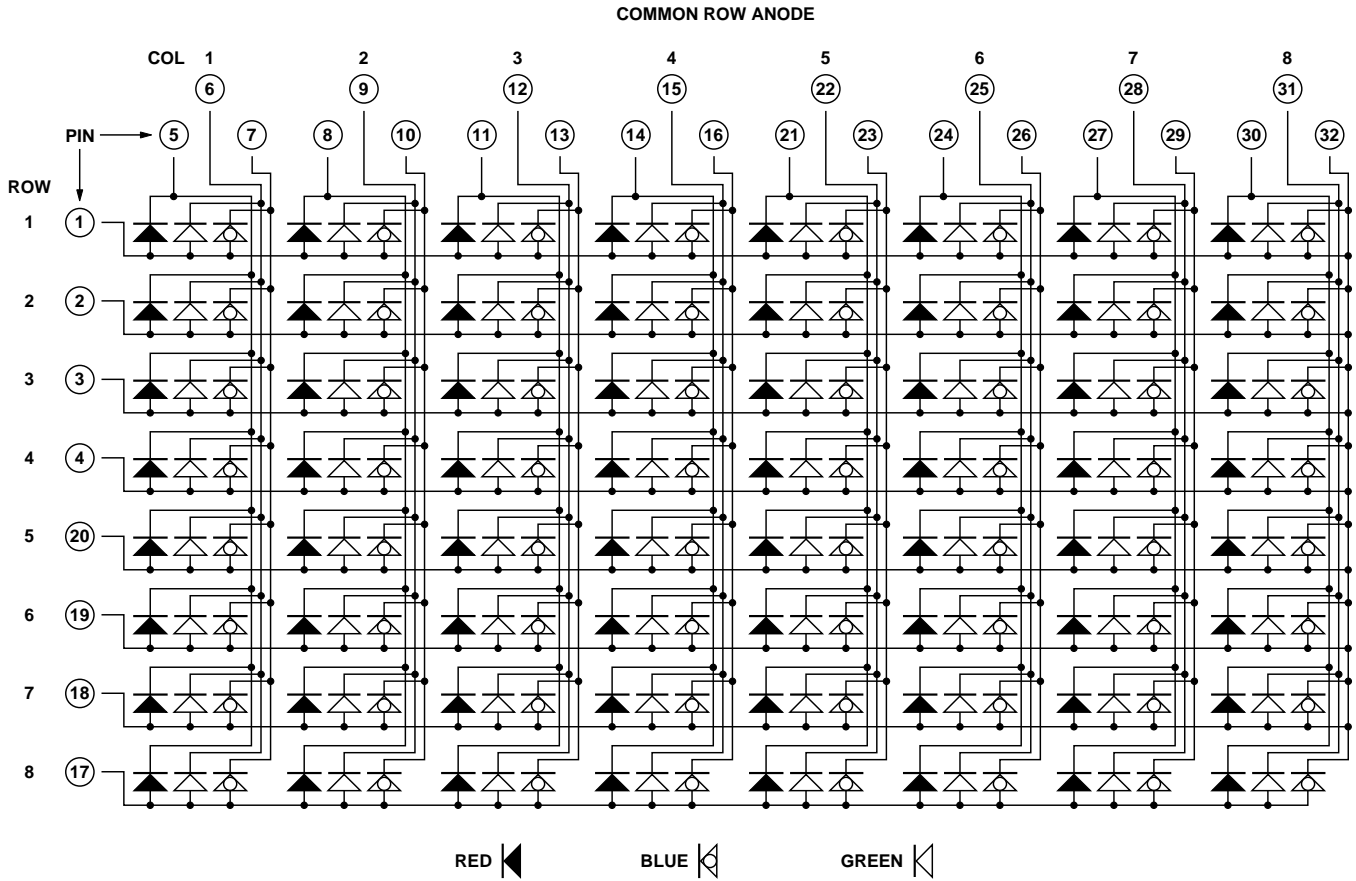
- NOTES:  
 1. UNLESS OTHERWISE STATED, TOLERANCE IS  $\pm 0.25$  mm.  
 2. DIMENSIONS IN MILLIMETERS (INCHES).

## Internal Circuit Diagram



PIN	FUNCTION	PIN	FUNCTION
1	ROW 1 CATHODE	17	ROW 8 CATHODE
2	ROW 2 CATHODE	18	ROW 7 CATHODE
3	ROW 3 CATHODE	19	ROW 6 CATHODE
4	ROW 4 CATHODE	20	ROW 5 CATHODE
5	COLUMN 1 RED ANODE	21	COLUMN 5 RED ANODE
6	COLUMN 1 GREEN ANODE	22	COLUMN 5 GREEN ANODE
7	COLUMN 1 BLUE ANODE	23	COLUMN 5 BLUE ANODE
8	COLUMN 2 RED ANODE	24	COLUMN 6 RED ANODE
9	COLUMN 2 GREEN ANODE	25	COLUMN 6 GREEN ANODE
10	COLUMN 2 BLUE ANODE	26	COLUMN 6 BLUE ANODE
11	COLUMN 3 RED ANODE	27	COLUMN 7 RED ANODE
12	COLUMN 3 GREEN ANODE	28	COLUMN 7 GREEN ANODE
13	COLUMN 3 BLUE ANODE	29	COLUMN 7 BLUE ANODE
14	COLUMN 4 RED ANODE	30	COLUMN 8 RED ANODE
15	COLUMN 4 GREEN ANODE	31	COLUMN 8 GREEN ANODE
16	COLUMN 4 BLUE ANODE	32	COLUMN 8 BLUE ANODE

## Internal Circuit Diagram



PIN	FUNCTION	PIN	FUNCTION
1	ROW 1 ANODE	17	ROW 8 ANODE
2	ROW 2 ANODE	18	ROW 7 ANODE
3	ROW 3 ANODE	19	ROW 6 ANODE
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6	COLUMN 1 GREEN CATHODE	22	COLUMN 5 GREEN CATHODE
7	COLUMN 1 BLUE CATHODE	23	COLUMN 5 BLUE CATHODE
8	COLUMN 2 RED CATHODE	24	COLUMN 6 RED CATHODE
9	COLUMN 2 GREEN CATHODE	25	COLUMN 6 GREEN CATHODE
10	COLUMN 2 BLUE CATHODE	26	COLUMN 6 BLUE CATHODE
11	COLUMN 3 RED CATHODE	27	COLUMN 7 RED CATHODE
12	COLUMN 3 GREEN CATHODE	28	COLUMN 7 GREEN CATHODE
13	COLUMN 3 BLUE CATHODE	29	COLUMN 7 BLUE CATHODE
14	COLUMN 4 RED CATHODE	30	COLUMN 8 RED CATHODE
15	COLUMN 4 GREEN CATHODE	31	COLUMN 8 GREEN CATHODE
16	COLUMN 4 BLUE CATHODE	32	COLUMN 8 BLUE CATHODE

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

Parameter	Symbol	Red	Green	Blue	Units
Power Dissipation per Dot	$P_D$	30	39	90	mW
Peak Forward Current per Dot <sup>[1,2]</sup>	$I_{PEAK}$	60	100	50	mA
Average Forward Current per Dot	$I_F \text{ AVG}$	15 <sup>[3]</sup>	15 <sup>[4]</sup>	20 <sup>[5]</sup>	mA
Reverse Voltage per Dot	$V_R$	5	5	5	V
Operating Temperature	$T_O$	-35 to 80			$^\circ\text{C}$
Storage Temperature	$T_S$	-40 to 80			$^\circ\text{C}$
Soldering Conditions (2 mm [0.079 in.] Below Seating Plane)	Temperature	260			$^\circ\text{C}$
	Time	3			s

**Notes:**

- Do not exceed maximum average current per dot.
- Maximum peak forward current stated at 1/8 duty factor, 10 kHz.
- Derate above  $25^\circ\text{C}$  at 0.20 mA/ $^\circ\text{C}$  for red color.
- Derate above  $25^\circ\text{C}$  at 0.17 mA/ $^\circ\text{C}$  for green color.
- Derate above  $25^\circ\text{C}$  at 0.33 mA/ $^\circ\text{C}$  for blue color.

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

Parameter	Symbol	Color	Min.	Typ.	Max.	Units	Test Conditions
Peak Wavelength	$\lambda_{PEAK}$	Red		660		nm	$I_F = 20 \text{ mA}$
		Green		568			
		Blue		430			
Dominant Wavelength	$\lambda_d$	Red		643		nm	$I_F = 20 \text{ mA}$
		Green		573			
		Blue		466			
Spectral Line Half Width	$\lambda_d$	Red		20		nm	$I_F = 20 \text{ mA}$
		Green		30			
		Blue		65			
Forward Voltage	$V_F$	Red		1.8	2.0	V	$I_F = 20 \text{ mA}$
		Green		2.2	2.6		
		Blue		3.8	4.5		
Reverse Current <sup>[1]</sup>	$I_R$	Red			100	$\mu\text{A}$	$V_R = 5 \text{ V}$
		Green			100		
		Blue			100		

**Note:**

- Typical specification for reference only. Do not exceed absolute maximum ratings.

## Luminance and Color at $T_A=25^\circ\text{C}$

Color	Color Combination	Luminance $\text{cd/m}^2$ (nits)			Color Coordinates <sup>[2]</sup>	
		Min.	Typ.	Max.	X	Y
Red	Red	175	226		0.728	0.271
Green	Green	280	366		0.488	0.546
Blue	Blue	30	49		0.146	0.055
Orange	Red, Green	455	592		0.594	0.403
Purple	Red, Blue	205	275		0.412	0.152
White	Green, Blue	310	415		0.285	0.270
Pink	Red, Green, Blue	485	641		0.420	0.280

Test Conditions<sup>[3]</sup>: At 1/8 Duty, Red  $I_{FP} = 40 \text{ mA}$ , Green  $I_{FP} = 80 \text{ mA}$ , Blue  $I_{FP} = 40 \text{ mA}$

### Notes:

- The devices are categorized for luminous intensity. The intensity category is designated by a letter on the side of the package.
- Color coordinates are based on the CIE 1931 Chromaticity Coordinates. See Figure 10.
- Test current for each color is applied to individual colors per color combination.

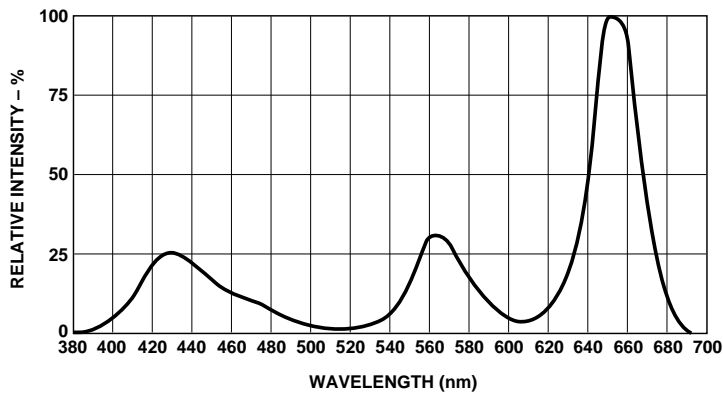


Figure 1. Relative Intensity vs. Wavelength.

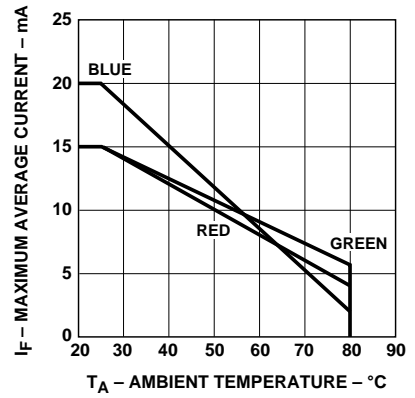


Figure 2. Maximum Allowable Average Current per Dot vs. Ambient Temperature.

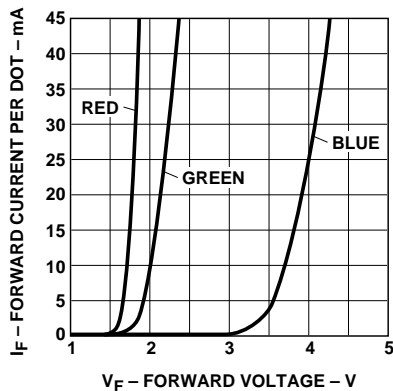


Figure 3. Forward Current vs. Forward Voltage.

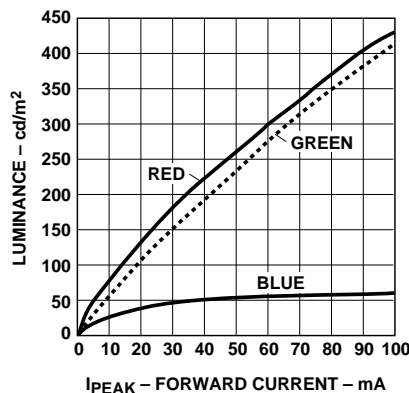


Figure 4. Relative Luminance vs. Peak Forward Current.

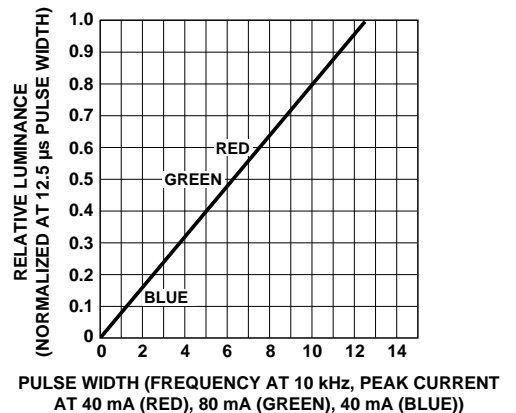


Figure 5. Relative Luminance vs. Duty Factor.

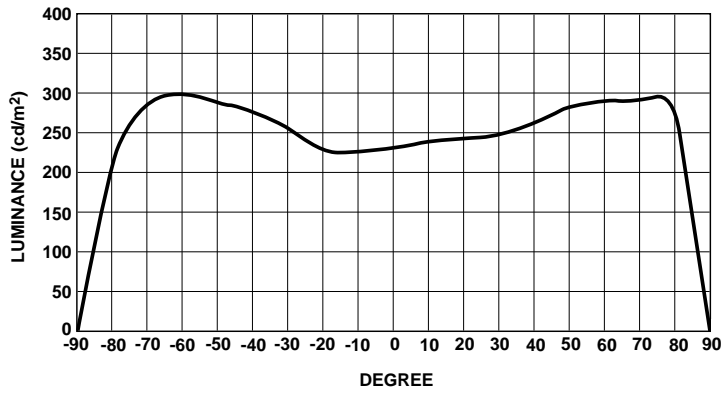


Figure 6. Typical Luminance vs. Angular Displacement (Red).

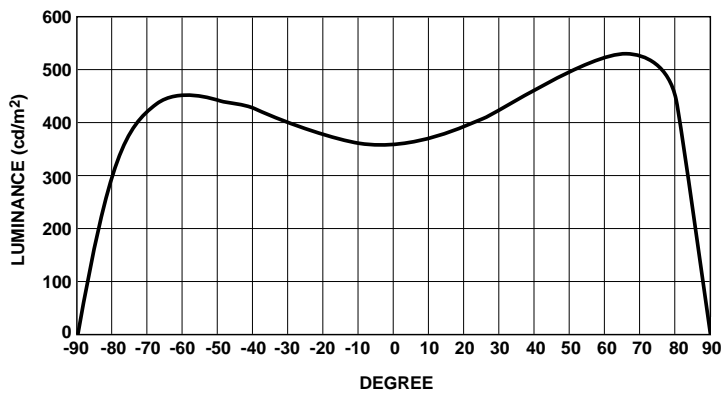


Figure 7. Typical Luminance vs. Angular Displacement (Green).

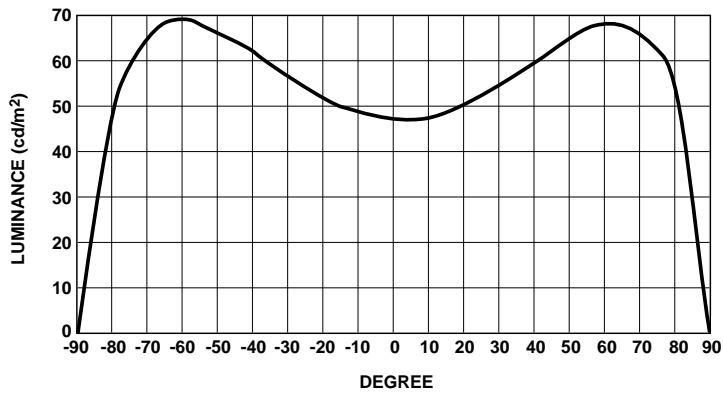


Figure 8. Typical Luminance vs. Angular Displacement (Blue).

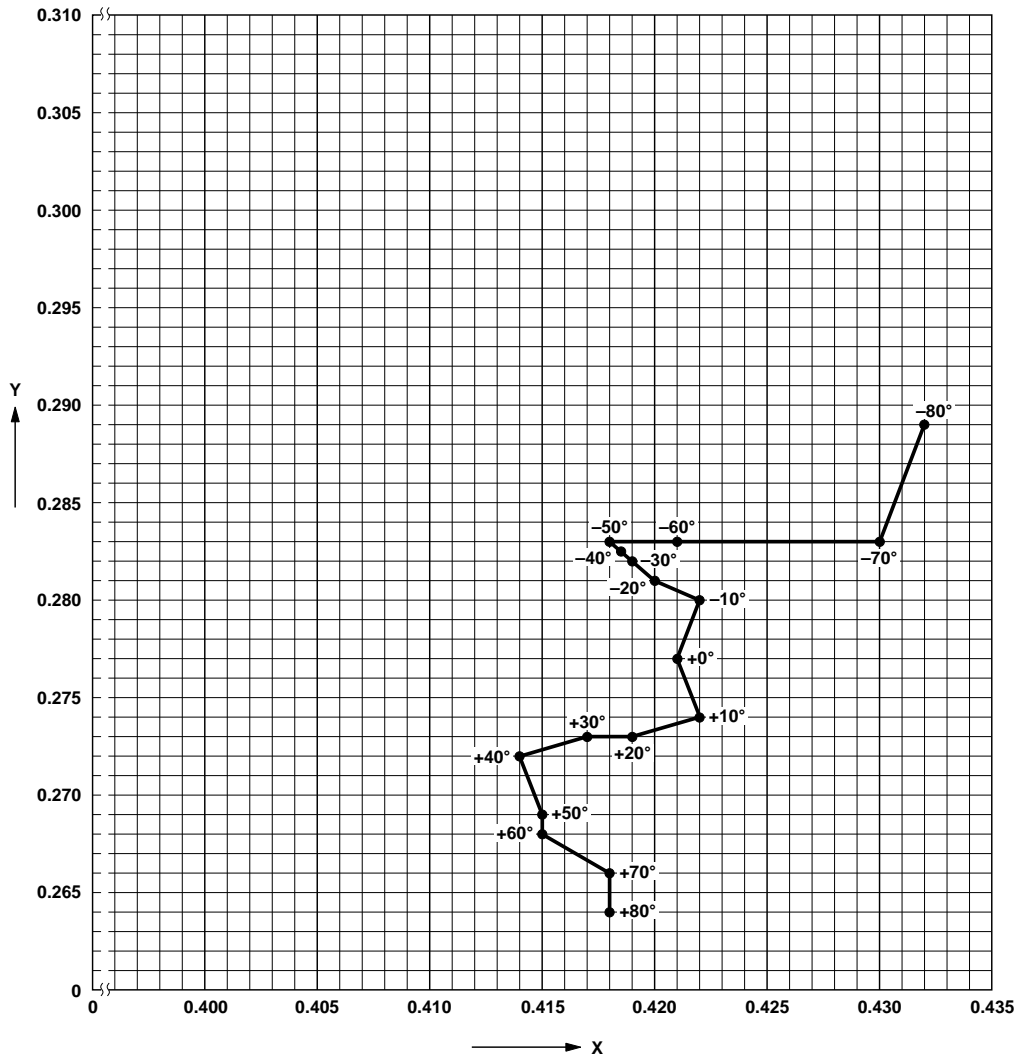


Figure 9. CIE Color Coordinates vs. Angular Displacement (Pink).



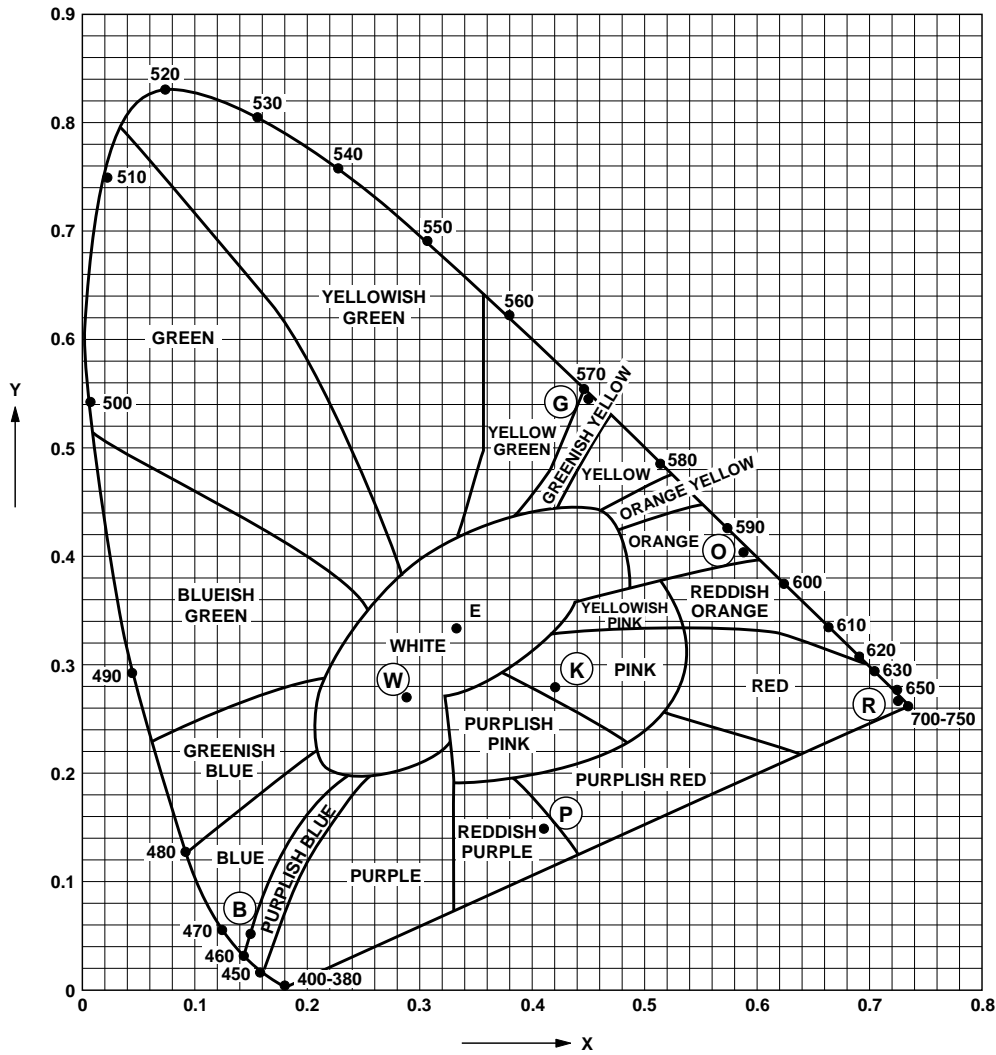


Figure 10. CIE 1931 Chromaticity Diagram.

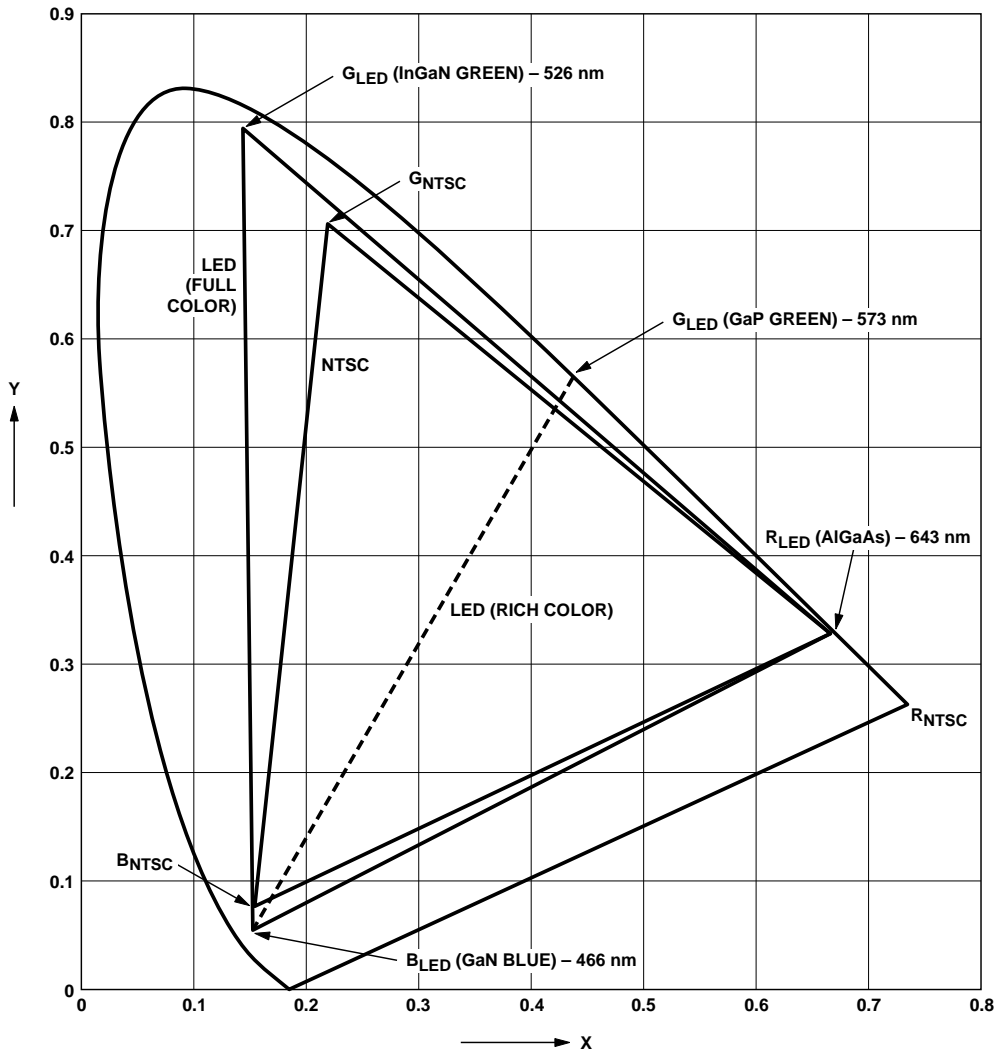


Figure 11. Color Coordinate (NTSC vs. LED).

### Contrast Enhancement

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

### Soldering/Cleaning

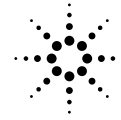
Cleaning agents from the ketone family (acetone, methyl ethyl ketone, etc.) and from the chlorinated hydrocarbon family (methylene chloride, trichloroethylene, carbon tetrachloride, etc.) are not recommended for cleaning LED parts. All of these

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 8 x 8 Rich Color General Purpose Dot Matrix Displays.



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