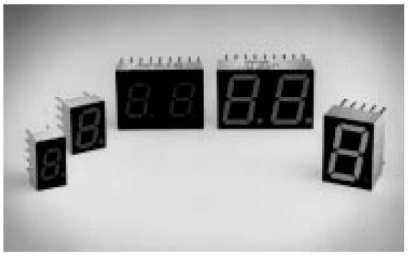
Black Surface Seven Segment Displays

Technical Data

HDSP-AX11/-AX13 Series
HDSP-FX11/-FX13 Series
HDSP-GX11/-GX13 Series
HDSP-HX11/-HX13 Series
HDSP-KX11/-KX13 Series



Features

- **Black Surface and Color Tinted Epoxy**
- **Industry Standard Size**
- **Industry Standard Pinout**
- **Choice of Character Size**
  7.6 mm (0.30 in.), 10 mm (0.40 in.), 14.2 mm (0.56 in.)
- **Choice of Colors**
  Red, AlGaAs Red, High Efficiency Red (HER), Green
- **Excellent Appearance**
  Evenly Lighted Segments – 50Viewing Angle
- **Design Flexibility**
  Common Anode or Common Cathode
  Single and Two Digit
- **Categorized for Luminous Intensity**
  Categorized for Color: Green Use of Like Categories Yields a Uniform Display
- **Excellent for Long Digit String Multiplexing**

Description

These devices use industry standard size package and pinout. Available with black surface finish. All devices are available as either common anode or common cathode.

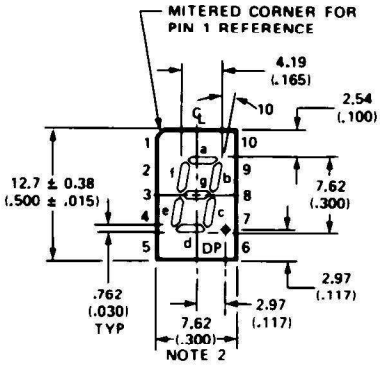
Typical applications include appliances, channel indicators of TV, CATV converters, game machines, and point of sale terminals.

Devices

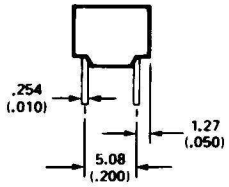
Red HDSP-	AlGaAs Red HDSP-	HER HDSP-	Green HDSP-	Description	Package Drawing
A011	A111	A211	A511	7.6 mm Common Anode Right Hand Decimal	A
A013	A113	A213	A513	7.6 mm Common Cathode Right Hand Decimal	B
F011	F111	F211	F511	10 mm Common Anode Right Hand Decimal	C
F013	F113	F213	F513	10 mm Common Cathode Right Hand Decimal	D
G011	G111	G211	G511	10 mm Two Digit Common Anode Right Hand Decimal	E
G013	G113	G213	G513	10 mm Two Digit Common Cathode Right Hand Decimal	F
H011	H111	H211	H511	14.2 mm Common Anode Right Hand Decimal	G
H013	H113	H213	H513	14.2 mm Common Cathode Right Hand Decimal	H
K011	K111	K211	K511	14.2 mm Two Digit Common Anode Right Hand Decimal	I
K013	K113	K213	K513	14.2 mm Two Digit Common Cathode Right Hand Decimal	J

5964-6372E

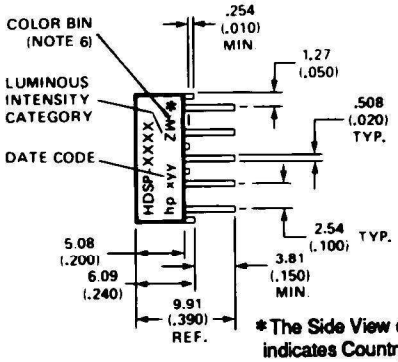
Package Dimensions (7.6 mm Series)



A, B

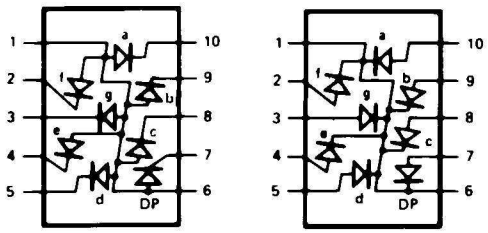


A, B



*The Side View of package indicates Country of Origin.

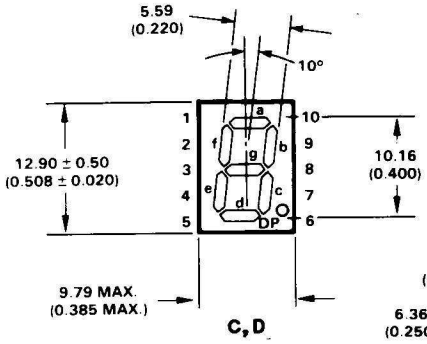
Internal Circuit Diagram



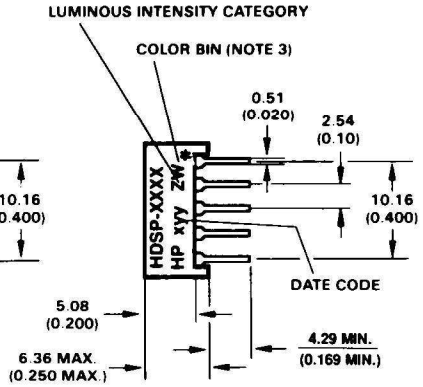
PIN	FUNCTION A	FUNCTION B
1	ANODE[4]	CATHODE[5]
2	CATHODE f	ANODE f
3	CATHODE g	ANODE g
4	CATHODE e	ANODE e
5	CATHODE d	ANODE d
6	ANODE[4]	CATHODE[5]
7	CATHODE DP	ANODE DP
8	CATHODE c	ANODE c
9	CATHODE b	ANODE b
10	CATHODE a	ANODE a

NOTES:
1. ALL DIMENSIONS IN MILLIMETERS (INCHES).
2. MAXIMUM.
3. ALL UNTOLERANCED DIMENSIONS ARE FOR REFERENCE ONLY.
4. REDUNDANT ANODES.
5. REDUNDANT CATHODES.
6. FOR HDSP-A511/-A513 ONLY.

Package Dimensions (10 mm Series: Single)

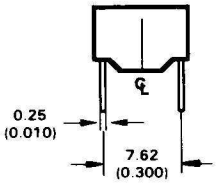


C, D



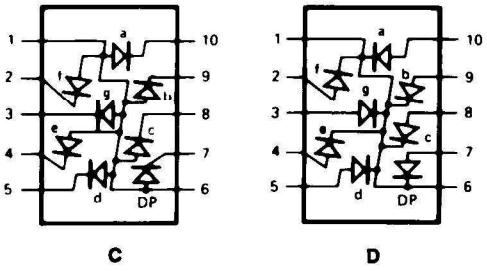
C, D

*The Side View of package indicates Country of Origin.



C, D

Internal Circuit Diagram



PIN	FUNCTION C	FUNCTION D
1	ANODE[4]	CATHODE[5]
2	CATHODE f	ANODE f
3	CATHODE g	ANODE g
4	CATHODE e	ANODE e
5	CATHODE d	ANODE d
6	ANODE[4]	CATHODE[5]
7	CATHODE DP	ANODE DP
8	CATHODE c	ANODE c
9	CATHODE b	ANODE b
10	CATHODE a	ANODE a

NOTES:
1. ALL DIMENSIONS IN MILLIMETERS (INCHES).
2. ALL UNTOLERANCED DIMENSIONS ARE FOR REFERENCE ONLY.
3. FOR HDSP-F511/-F513 ONLY.
4. REDUNDANT ANODES.
5. REDUNDANT CATHODES.

Absolute Maximum Ratings

Description	Red HDSP-X01X Series	AlGaAs Red HDSP-X11X Series	HER HDSP-X21X Series	Green HDSP-X51X Series	Units
Average Power per Segment or DP	82	37	105	105	mW
Peak Forward Current per Segment or DP	150[1]	45	90[3]	90[5]	mA
DC Forward Current per Segment or DP	25[2]	15[7]	30[4]	30[6]	mA
Operating Temperature Range	-40 to +100	-20 to +100	-40 to +100		°C
Storage Temperature Range	-55 to +100				°C
Reverse Voltage per Segment or DP	3.0				V
Lead Solder Temperature for 3 Seconds (1.60 mm [0.063 in.] below seating plane)	260				°C

Notes:
1. See Figure 1 to establish pulsed conditions.
2. Derate above 80°C at 0.63 mA/°C (see Figure 2).
3. See Figure 10 to establish pulsed conditions.
4. Derate above 53°C at 0.45 mA/°C (see Figure 12).
5. See Figure 11 to establish pulsed conditions.
6. Derate above 39°C at 0.37 mA/°C (see Figure 12).
7. Derate above 91°C at 0.53 mA/°C (see Figure 6).

Electrical/Optical Characteristics at T_A = 25°C

Red

Device Series HDSP-	Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
A01X	Luminous Intensity/Segment[1,2] (Digit Average)	I_V	600	1100		µcd	I_F = 20 mA
				500			I_F = 10 mA
F01X, G01X			650	1200			I_F = 20 mA
H01X, K01X			600	1300			I_F = 20 mA
				1400			I_F = 100 mA Peak: 1/5 Duty Factor
All Devices	Forward Voltage/Segment or DP	V_F		1.6	2.0	V	I_F = 20 mA
	Peak Wavelength	λ_{PEAK}		655		nm	
	Dominant Wavelength[3]	λ_d		640		nm	
	Reverse Voltage/Segment or DP[4]	V_R	3.0	12		V	I_R = 100 µA
	Temperature Coefficient of V_F/Segment or DP	ΔV_F/°C		-2		mV/°C	
A01X	Thermal Resistance LED Junction-to-Pin	$R\theta_{J\text{-}PIN}$		200		°C/W/ Seg.	
F01X, G01X				320			
H01X, K01X				345			

AlGaAs Red

Device Series HDSP-	Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
A11X	Luminous Intensity/Segment[1,2] (Digit Average)	I_V	315	600		µcd	I_F = 1 mA
				3600			I_F = 5 mA
F11X, G11X			330	650			I_F = 1 mA
				3900			I_F = 5 mA
H11X, K11X			400	700			I_F = 1 mA
				4200			I_F = 5 mA
All Devices	Forward Voltage/Segment or DP	V_F		1.6	2.0	V	I_F = 1 mA
				1.7			I_F = 5 mA
				1.8	22		I_F = 20 mA Peak
	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	
A11X	Thermal Resistance LED Junction-to-Pin	$R\theta_{J\text{-}PIN}$		255		°C/W/ Seg.	
F11X, G11X				320			
H11X, K12X				400			