Data Sheet

HDSP-A2xC

13.7 mm (0.54 in.) Dual-Digit Alphanumeric Display

Overview

The Broadcom® HDSP-A2xC dual-digit alphanumeric displays are space-efficient, feature a right-hand decimal point, and utilize AlInGaP LED chip technology. They are available as either common anode or common cathode.

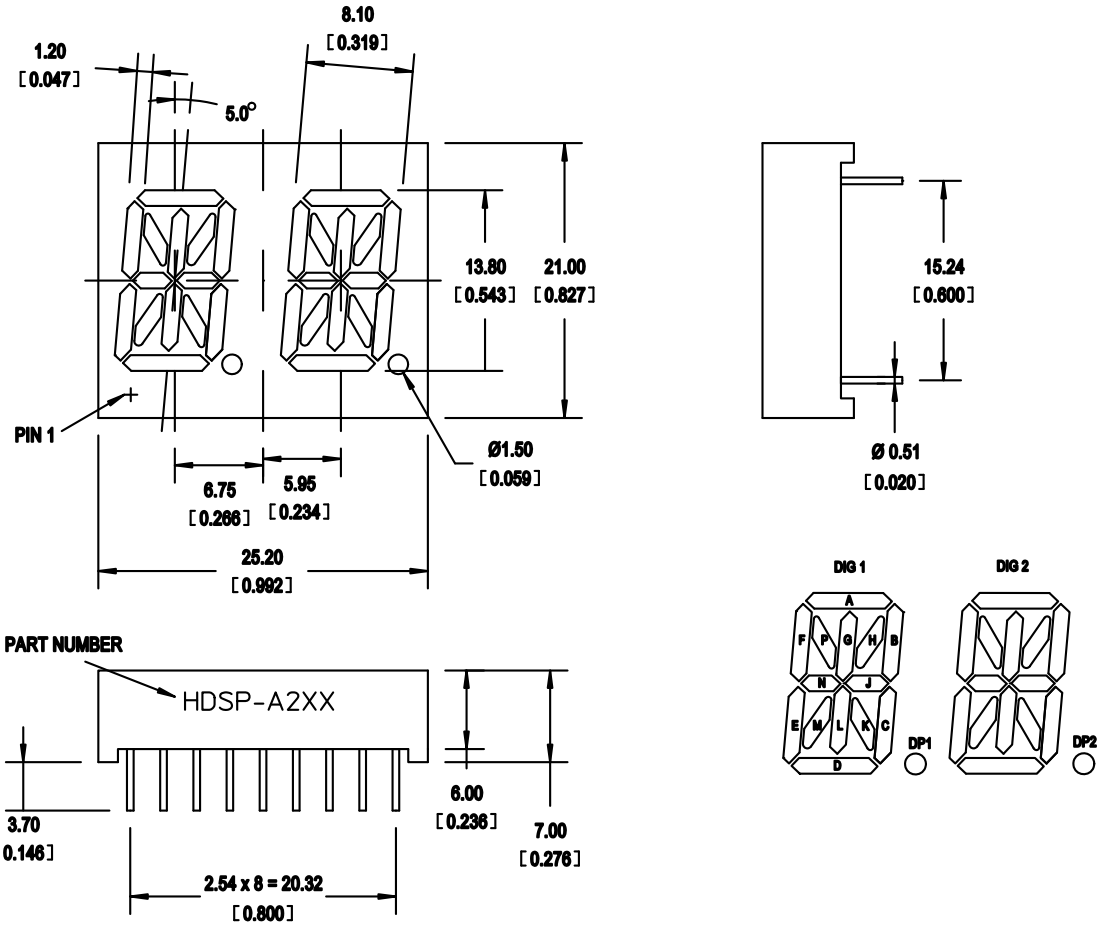
Features

- Available in red color
- Compact package
- Evenly lighted segments
- Grey surface for optimum contrast
- Right-hand decimal point

Applications

- Gaming machines
- Point-of-sale terminals
- Scanner
- Electronic displays
- Answering machines

Figure 1: Package Drawing

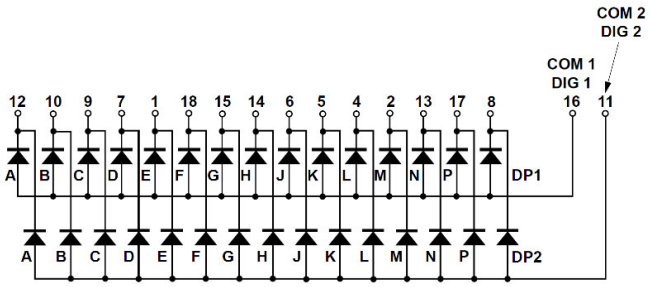


NOTE:

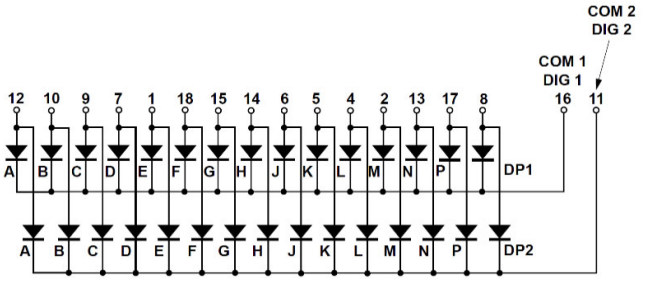
- All dimensions in millimeters (inches).
- Tolerance is ±0.25 mm unless otherwise specified.

Figure 2: Internal Circuit Diagram

Common Anode



Common Cathode



Pin Connection

Pin	Function	
	Common Anode	**Common Cathode**
1	1E/2E Cathode	1E/2E Anode
2	1M/2M Cathode	1M/2M Anode
3	No Connection	No Connection
4	1L/2L Cathode	1L/2L Anode
5	1K/2K Cathode	1K/2K Anode
6	1J/2J Cathode	1J/2J Anode
7	1D/2D Cathode	1D/2D Anode
8	DP1 Cathode	DP1 Anode
9	1C/2C Cathode	1C/2C Anode
10	1B/2B Cathode	1B/2B Anode
11	DIGIT No. 2 Common Anode	DIGIT No. 2 Common Cathode
12	1A/2A Cathode	1A/2A Anode
13	1N/2N Cathode	1N/2N Anode
14	1H/2H Cathode	1H/2H Anode
15	1G/2G Cathode	1G/2G Anode
16	DIGIT No. 1 Common Anode	DIGIT No. 1 Common Cathode
17	1P/2P Cathode	1P/2P Anode
18	1F/2F Cathode	1F/2F Anode

Device Selection Guide

Part Number	Color	Description
HDSP-A22C	Red	Common Anode, Grey Surface
HDSP-A27C	Red	Common Cathode, Grey Surface

Absolute Maximum Ratings

Parameters	HDSP-A2xC	Unit
DC Forward Current per segment or DP[a b]	50	mA
Peak Forward Current per segment or DP	100	mA
Average Forward Current	30	mA
Reverse Voltage per segment or DP (I_R = 100 µA)[c]	5	V
Operating Temperature	–40 to +105	°C
Storage Temperature	–40 to +120	°C
Wave Solder Condition 1.6 mm Below Body	250°C peak for 3 sec.	—

a. Derate linearly as shown in Figure 1.

b. For long term performance with minimal light output degradation, drive currents up to maximum 30 mA are recommended.

c. Indicates product final test condition. Long term reverse bias is not recommended.

Optical and Electrical Characteristics (T_J = 25°C)

Parameters	Min.	Typ.	Max.	Unit	Test Condition
Forward Voltage, V_F[a]	1.70	1.90	2.20	V	I_F = 20 mA
Reverse Voltage V_R[b]	5	20	—	V	I_F =100 µA
Peak Wavelength, λ_{peak}	—	635	—	nm	Peak Wavelength of Spectral Distribution at I_F = 20 mA
Dominant Wavelength, λ_d[c]	622.5	626	630	nm	I_F = 20 mA
Spectral Halfwidth, $\lambda_{1/2}$	—	17	—	nm	Wavelength Width at Spectral Distribution Half-Power Point at I_F = 20 mA
Speed of Response, τ_S	—	20	—	ns	Exponential Time Constant, $e^{-t\tau S}$
Capacitance, C	—	40	—	pF	V_F = 0, f = 1 MHz
Luminous Intensity, I_V[d] (Average per Segment)	18	25	—	mcd	I_F = 10 mA

a. Forward voltage tolerance is ±0.1V.

b. Indicates product final test condition. Long term reverse bias is not recommended.

c. The dominant wavelength, λ_d, is derived from the CIE Chromaticity Diagram and represents the perceived color of the device.

d. The luminous intensity, I_V, is measured at the mechanical axis of the package.

Bin Information

Intensity Bin Limits (CAT)

Bin ID[a]	Luminous Intensity, I_V (mcd)[b]	
	Min.	Max.
T	18.0	25.0
U	25.0	36.0

a. Bin categories are established for classification of products. Products may not be available in all bin categories.

b. Tolerance for each bin limit is ± 10%.

Figure 3: Maximum Forward Current vs. Ambient Temperature

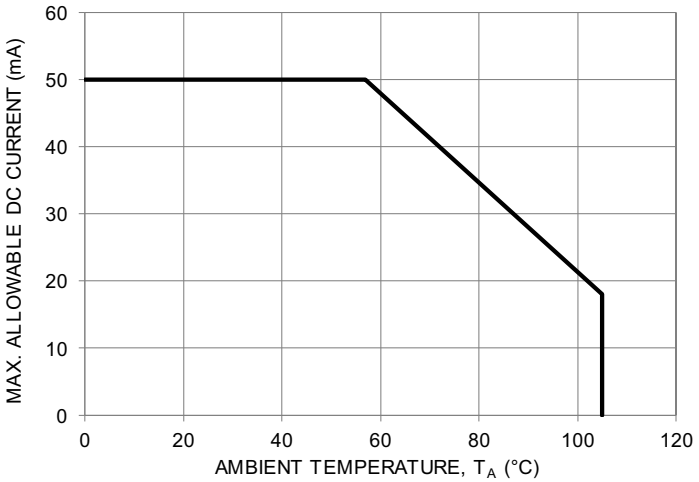
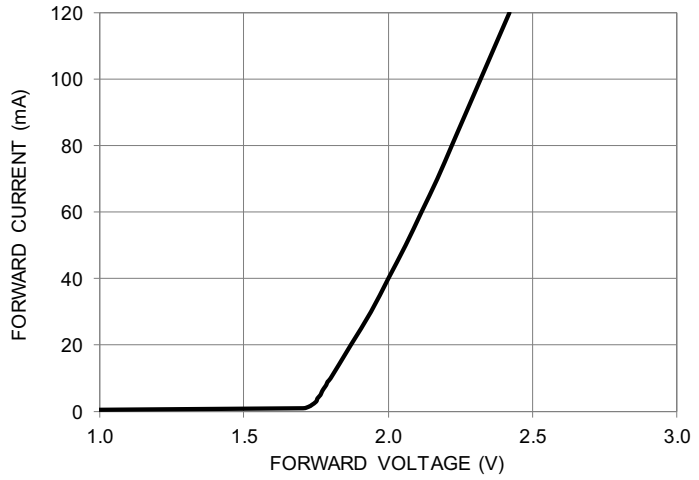


Figure 4: Forward Current vs. Forward Voltage

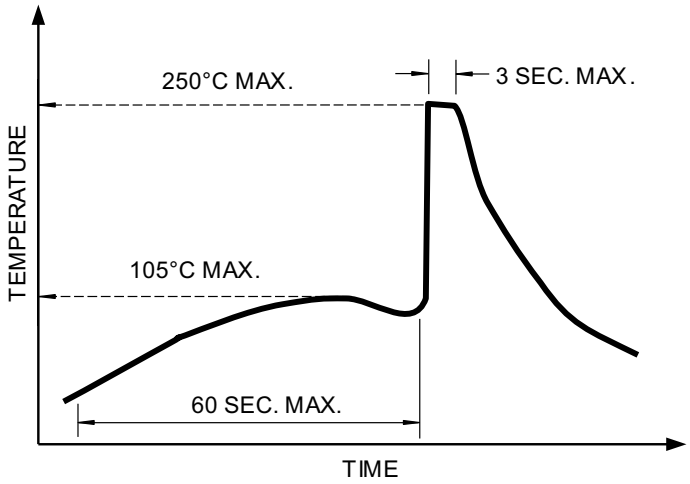


Precautionary Notes

Soldering and Handling Precautions

- Set and maintain the wave soldering parameters according to the recommended temperature and dwell time. Perform a daily check on the profile to ensure that it is always conforming to the recommended conditions. Exceeding these conditions will over-stress the LEDs and cause premature failures.
- Use only bottom preheaters to reduce thermal stress experienced by the LEDs.
- Recalibrate the soldering profile before loading a new type of PCB. PCB with a different size and design (component density) will have different heat capacity and might cause a change in temperature experienced by the PCB if the same wave soldering setting is used.
- Do not perform wave soldering more than once.
- Any alignment fixture used during wave soldering must be loosely fitted and must not apply stress on the LEDs. Use non-metal material as it will absorb less heat during the wave soldering process.
- At elevated temperature, the LEDs are more susceptible to mechanical stress. Allow the PCB to be sufficiently cooled to room temperature before handling. Do not apply stress to the LED when it is hot.
- Use wave soldering to solder the LED. Use hand soldering only for rework or touch-up if unavoidable, but it must be strictly controlled to the following conditions:
  - Soldering iron tip temperature = 315°C max.
  - Soldering duration = 2 sec. max.
  - Number of cycle = 1 only
  - Power of soldering iron = 50W max.
- For ESD sensitive devices, apply proper ESD precautions at the soldering station. Use only ESD-safe soldering iron.
- Do not touch the LED package body with the soldering iron except for the soldering terminals as it may cause damage to the LED.
- Confirm beforehand whether the functionality and performance of the LED is affected by soldering with hand soldering.
- Keep the heat source at least 1.6 mm away from the LED body during soldering.
- Design appropriate hole size to avoid problem during insertion.
- Cleaning agents from the ketone family (acetone, methyl ethylketone, and so on) and from the chlorinated hydrocarbon family (methylene chloride, trichloroethylene, carbon tetrachloride, and so on) are not recommended for cleaning the LED displays. All of these various solvents attack or dissolve the encapsulating epoxies used to form the package of plastic LED parts.

Figure 5: Recommended Wave Soldering Profile



NOTE: Refers to measurements with thermocouple mounted at the bottom of the PCB.

Application Precautions

- The drive current of the LED must not exceed the maximum allowable limit across temperature as stated in the data sheet.
- Circuit design must cater to the whole range of forward voltage (V_F) of the LEDs to ensure the intended drive current can always be achieved.
- The LED exhibits slightly different characteristics at different drive currents, which may result in a larger variation of performance (meaning: intensity, wavelength, and forward voltage). Set the application current as close as possible to the test current to minimize these variations.
- The LED is not intended for reverse bias. Use other appropriate components for such purposes. When driving the LED in matrix form, ensure that the reverse bias voltage does not exceed the allowable limit of the LED.
- Avoid rapid change in ambient temperature, especially in high-humidity environments, because they cause condensation on the LED.

Eye Safety Precautions

LEDs may pose optical hazards when in operation. Do not look directly at operating LEDs, as it may be harmful to the eyes. For safety reasons, use appropriate shielding or personal protective equipment.

CAUTION! Broadcom's products and software are not specifically designed, manufactured, or authorized for sale as parts, components, or assemblies for the planning, construction, maintenance, or direct operation of a nuclear facility or for use in medical devices or applications. The customer is solely responsible, and waives all rights to make claims against Broadcom or its suppliers, for all loss, damage, expense, or liability in connection with such use.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Broadcom Limited:

HDSP-A27C HDSP-A22C