

August 1997

## BCD to Seven Segment Decoder/Driver

### Features

- TTL Compatible Input Logic Levels
- 25mA (Typ) Constant Current Segment Outputs
- Eliminates Need for Output Current Limiting Resistors
- Pin Compatible with Other Industry Standard Decoders
- Low Standby Power Dissipation . . . . . 18mW (Typ)

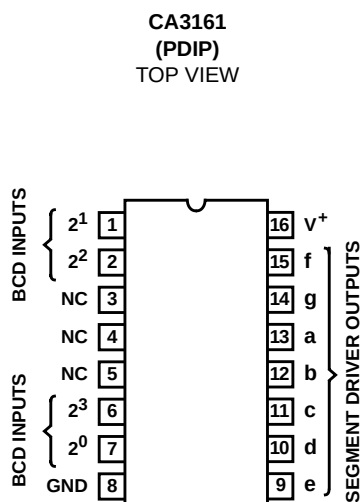
### Description

The CA3161E is a monolithic integrated circuit that performs the BCD to seven segment decoding function and features constant current segment drivers. When used with the CA3162E A/D Converter the CA3161E provides a complete digital readout system with a minimum number of external parts.

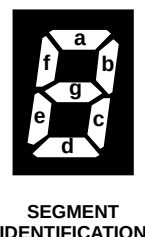
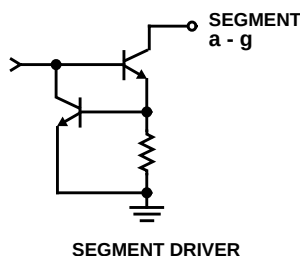
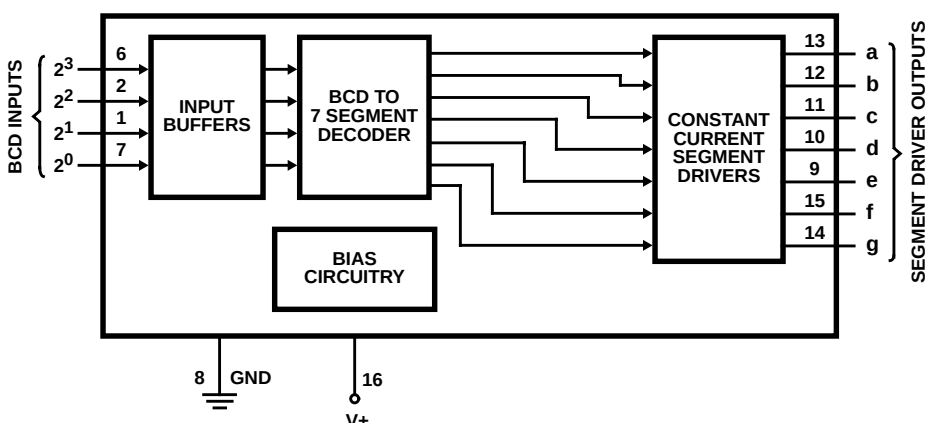
### Ordering Information

| PART NUMBER | TEMP. RANGE (°C) | PACKAGE    | PKG. NO. |
|-------------|------------------|------------|----------|
| CA3161E     | 0 to 70          | 16 Ld PDIP | E16.3    |

### Pinout



### Functional Block Diagram



**Absolute Maximum Ratings**

DC  $V_{SUPPLY}$  (Between Terminals 1 and 10) .....+7.0V  
 Input Voltage (Terminals 1, 2, 6, 7).....+5.5V  
 Output Voltage  
   Output "Off"..... +7V  
   Output "On" (Note 1)..... +10V

**Thermal Information**

Thermal Resistance (Typical, Note 2)  $\theta_{JA}$  ( $^{\circ}\text{C}/\text{W}$ )  
   PDIP Package ..... 100  
 Maximum Junction Temperature ..... 150 $^{\circ}\text{C}$   
 Maximum Storage Temperature Range ..... -65 $^{\circ}\text{C}$  to 150 $^{\circ}\text{C}$   
 Maximum Lead Temperature (Soldering 10s) ..... 300 $^{\circ}\text{C}$

**Operating Conditions**

Temperature Range ..... 0 $^{\circ}\text{C}$  to 75 $^{\circ}\text{C}$

*CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.*

**NOTES:**

1. This is the maximum output voltage for any single output. The output voltage must be consistent with the maximum dissipation and derating curve for worst case conditions. Example: All segments "ON", 100% duty cycle.
2.  $\theta_{JA}$  is measured with the component mounted on an evaluation PC board in free air.

**Electrical Specifications**  $T_A = 25^{\circ}\text{C}$ 

| PARAMETER                                   | TEST CONDITIONS | MIN | TYP | MAX | UNITS         |
|---------------------------------------------|-----------------|-----|-----|-----|---------------|
| $V_{SUPPLY}$ Operating Range, $V^+$         |                 | 4.5 | 5   | 5.5 | V             |
| Supply Current, $I^+$ (All Inputs High)     |                 | -   | 3.5 | 8   | mA            |
| Output Current Low ( $V_O = 2\text{V}$ )    |                 | 18  | 25  | 32  | mA            |
| Output Current High ( $V_O = 5.5\text{V}$ ) |                 | -   | -   | 250 | $\mu\text{A}$ |
| Input Voltage High (Logic "1" Level)        |                 | 2   | -   | -   | V             |
| Input Voltage Low (Logic "0" Level)         |                 | -   | -   | 0.8 | V             |
| Input Current High (Logic "1")              | 2V              | -30 | -   | -   | $\mu\text{A}$ |
| Input Current Low (Logic "0")               | 0V              | -40 | -   | -   | $\mu\text{A}$ |
| Propagation Delay Time,                     | $t_{PHL}$       | -   | 2.6 | -   | $\mu\text{s}$ |
|                                             | $t_{PLH}$       | -   | 1.4 | -   | $\mu\text{s}$ |

# CA3161

TRUTH TABLE

| BINARY<br>STATE | INPUTS         |                |                |                | OUTPUTS |   |   |   |   |   |   |   | DISPLAY |
|-----------------|----------------|----------------|----------------|----------------|---------|---|---|---|---|---|---|---|---------|
|                 | 2 <sup>3</sup> | 2 <sup>2</sup> | 2 <sup>1</sup> | 2 <sup>0</sup> | a       | b | c | d | e | f | g |   |         |
| 0               | L              | L              | L              | L              | L       | L | L | L | L | L | L | H | 0       |
| 1               | L              | L              | L              | H              | H       | L | L | H | H | H | H | H | 1       |
| 2               | L              | L              | H              | L              | L       | L | H | L | L | L | H | L | 2       |
| 3               | L              | L              | H              | H              | L       | L | L | L | L | H | H | L | 3       |
| 4               | L              | H              | L              | L              | H       | L | L | H | H | L | L | L | 4       |
| 5               | L              | H              | L              | H              | L       | H | L | L | L | H | L | L | 5       |
| 6               | L              | H              | H              | L              | L       | H | L | L | L | L | L | L | 6       |
| 7               | L              | H              | H              | H              | L       | L | L | H | H | H | H | H | 7       |
| 8               | H              | L              | L              | L              | L       | L | L | L | L | L | L | L | 8       |
| 9               | H              | L              | L              | H              | L       | L | L | L | L | H | L | L | 9       |
| 10              | H              | L              | H              | L              | H       | H | H | H | H | H | H | L | -       |
| 11              | H              | L              | H              | H              | L       | H | H | L | L | L | L | L | E       |
| 12              | H              | H              | L              | L              | H       | L | L | H | L | L | L | L | H       |
| 13              | H              | H              | L              | H              | H       | H | H | L | L | L | L | H | L       |
| 14              | H              | H              | H              | L              | L       | L | H | H | L | L | L | L | P       |
| 15              | H              | H              | H              | H              | H       | H | H | H | H | H | H | H | BLANK   |

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