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# DI-8884A High Voltage Cathode Decoder/Driver

Direct Replacement for National DM-8884A

### General Description:

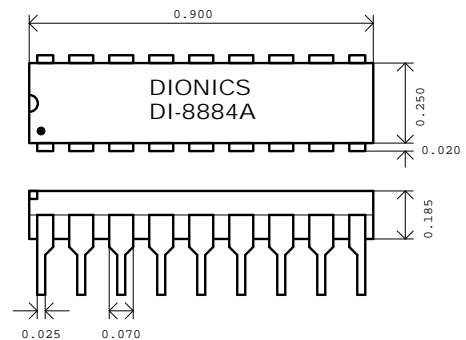
The DI-8884A is designed to decode four lines of BCD input and drive seven segment digits of gas-filled readout displays. Two separate inputs are provided for driving the decimal point and comma cathodes.

All outputs consist of switchable and programmable current sinks, which provide constant current to the tube cathodes, even with high tube anode supply tolerance. Output currents may be varied over the 0.2 to 1.2 mA range for multiplex operation. The output current is adjusted by connecting an external program resistor ( $R_p$ ) from  $V_{cc}$  to the program input.

### Features:

- ✓ Reliable Dielectric Isolation Process
- ✓ Current Sink Outputs
- ✓ High Output Breakdown Voltage
- ✓ Low Input Load Current
- ✓ Intended For Multiplex Operation
- ✓ Replacement For National DM-8884A
- ✓ Standard 18-pin DIP Package

### Package Layout:



### ❖ *Truth Table*

| Function       | Decimal Point | Comma | D | C | B | A | a | b | c | d | e | f | g | Display |
|----------------|---------------|-------|---|---|---|---|---|---|---|---|---|---|---|---------|
| 0              | 1             | 1     | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0       |
| 1              | 1             | 1     | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1       |
| 2              | 1             | 1     | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2       |
| 3              | 1             | 1     | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 3       |
| 4              | 1             | 1     | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 4       |
| 5              | 1             | 1     | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 5       |
| 6              | 1             | 1     | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 6       |
| 7              | 1             | 1     | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 7       |
| 8              | 1             | 1     | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8       |
| 9              | 1             | 1     | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 9       |
| 10             | 1             | 1     | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0       |
| 11             | 1             | 1     | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0       |
| 12             | 1             | 1     | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0       |
| 13             | 1             | 1     | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0       |
| 14             | 1             | 1     | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | -       |
| 15             | 1             | 1     | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |         |
| *Decimal Point | 0             | 1     | X | X | X | X | X | X | X | X | X | X | X | .       |
| *Comma         | 0             | 0     | X | X | X | X | X | X | X | X | X | X | X | ,       |

*\*Decimal point and Comma can be displayed with or without any numeral.*

## DI-8884A High Voltage Cathode Decoder/Driver

| ❖ Absolute Maximum Ratings       |                  |
|----------------------------------|------------------|
| Input Voltage (V <sub>cc</sub> ) | 7V               |
| Segment Output Voltage           | 110V             |
| Power Dissipation                | 600mW            |
| Transient Segment Output Current | 50mA             |
| Operation Temperature Range      | 0 °C to 70 °C    |
| Storage Temperature Range        | -65 °C to 150 °C |

### ❖ Electrical Characteristics ( 0 °C < T<sub>a</sub> < 70 °C - Unless otherwise noted; V<sub>cc</sub> = 5V ± 5% )

| <i>Parameter</i>                                 | <i>Conditions</i>   | <i>Min.</i> | <i>Max.</i> | <i>Unit</i> |
|--|---|-------------|-------------|-------------|
| Logic "1" Input Voltage                          | V <sub>cc</sub> = 4.75V   | 2.0         | –           | V           |
| Logic "0" Input Voltage                          | V <sub>cc</sub> = 4.75V   | –           | 1.0         | V           |
| Logic "1" Input Current                          | V <sub>cc</sub> = 5.25V; V <sub>in</sub> = 2.4V   | –           | 15.0        | μA          |
| Logic "0" Input Current                          | V <sub>cc</sub> = 5.25V; V <sub>in</sub> = 0.4V   | –           | -250        | μA          |
| Positive Input Clamp Voltage                     | V <sub>cc</sub> = 4.75V; I <sub>in</sub> = 1.0mA  | 5.0         | –           | V           |
| Negative Input Clamp Voltage                     | V <sub>cc</sub> = 5.0 V; I <sub>in</sub> = -12.0 mA; @T <sub>a</sub> = 25 °C                      | –           | -1.5        | V           |
| Power Supply Current                             | V <sub>cc</sub> = 5.25V; R <sub>p</sub> = 2.8K; All V <sub>in</sub> = 5V                          | –           | 40.0        | mA          |
| Segment Outputs<br>All Outputs On Current Ratio  | All V <sub>out</sub> = 50V<br>Output b Current = Ref.   | 0.9         | 1.1         | –           |
| Output b On Current                              | V <sub>cc</sub> = 5V; V <sub>out</sub> @ b=50V; @T <sub>a</sub> = 25 °C<br>R <sub>p</sub> = 18.1K | 0.18        | 0.22        | mA          |
|  | R <sub>p</sub> = 7.03K  | 0.45        | 0.55        | mA          |
|  | R <sub>p</sub> = 3.40 K   | 0.90        | 1.10        | mA          |
|  | R <sub>p</sub> = 2.80K  | 1.03        | 2.00        | mA          |
| Output Leakage Current                           | V <sub>out</sub> = 75V  | –           | 5.0         | μA          |
| Output Breakdown Voltage                         | I <sub>out</sub> = 10μA   | 110         | –           | V           |
| Propagation Delay<br>Any Input to Segment Output | V <sub>cc</sub> = 5V; @T <sub>a</sub> = 25 °C   | –           | 10.0        | μs          |

### ❖ Pin Designation

