

# D129

## 4-Channel MOSFET Switch Driver with Decode

### FEATURES

- TTL Compatible
- 4 Independent Drivers
- Output Sink Current to 10 mA
- DC Level Shifts to >19 V

### BENEFITS

- Reduces System Component Requirements
- Fast Level Shifting

### APPLICATIONS

- Interfacing Low Level Logic to MOSFETs or JFETs
- Designed to Interface with G118 and G119

### DESCRIPTION

The D129 is a four-channel driver designed to provide the DC level-shifting and amplification functions needed to interface low-level logic outputs (0.7 to 2.2 V) and field-effect transistor switch inputs (up to 50 V peak-to-peak). With an input logic supply of 5 V, the output transistor emitter, ( $V_-$ ), may be set at any voltage between -5 and -30 V. In the ON state, the output collector will sink up to 10 mA of current, and in the OFF state will hold off voltages up to 50 V above  $V_-$ . Each of the four drivers has a 3-input logic gate, and the driver will be ON when each of the inputs

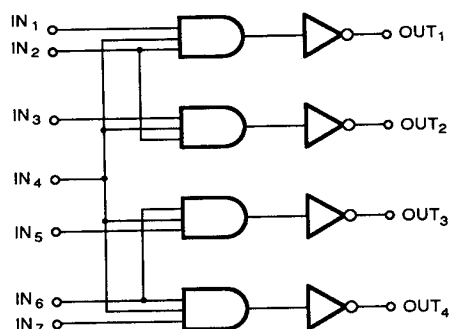
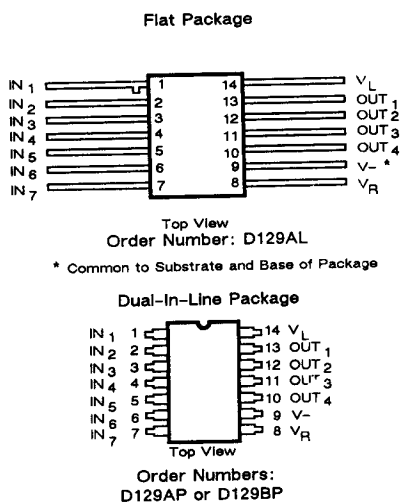
are either open or at positive logic "1".

With any of the inputs either grounded or at positive logic "0", the driver will be OFF. Some of the logic inputs to the four gates are internally connected to facilitate decoding from a binary counter, however, one input to each gate provides a means for independent operation of each driver, if desired.

Package options include the 14-pin side braze and flatpack packages. Performance grades include both the industrial, B suffix (-25 to 85°C) and military, A suffix (-55 to 125°C) temperature ranges.

### PIN CONFIGURATION

### FUNCTIONAL BLOCK DIAGRAM



**ABSOLUTE MAXIMUM RATINGS**

|                                                     |              |
|-----------------------------------------------------|--------------|
| $V_O$ to $V_-$ (A Suffix)                           | 50 V         |
| $V_O$ to $V_-$ (B Suffix)                           | 36 V         |
| $V_R$ to $V_-$ (A Suffix)                           | 33 V         |
| $V_R$ to $V_-$ (B Suffix)                           | 24 V         |
| $V_L$ to $V_R$                                      | 8 V          |
| $V_{IN}$ to $V_R$                                   | $\pm 6$ V    |
| $V_{IN}$ to $V_{IN}$ (Any Other $V_{IN}$ Terminals) | 6 V          |
| Current, (Any Terminal)                             | 30 mA        |
| Storage Temperature                                 | -65 to 150°C |

|                                  |              |
|----------------------------------|--------------|
| Operating Temperature (A Suffix) | -55 to 125°C |
| (B Suffix)                       | -25 to 85°C  |

**Power Dissipation\***

|               |        |
|---------------|--------|
| Flatpack**    | 750 mW |
| 14-Pin DIP*** | 825 mW |

\* All leads soldered or welded to PC board.

\*\* Derate 10 mW/°C above 75°C.

\*\*\* Derate 11 mW/°C above 75°C.

**ELECTRICAL CHARACTERISTICS <sup>a</sup>**

| PARAMETER                   | SYMBOL    | Test Conditions<br>Unless Otherwise Specified:<br>$V_L = 5\text{ V}$<br>$V_- = -20\text{ V}$<br>$V_R = 0\text{ V}$ | LIMITS                                           |                  |                             |                  |                            |                  | UNIT            |               |
|-----------------------------|-----------|--------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|------------------|-----------------------------|------------------|----------------------------|------------------|-----------------|---------------|
|                             |           |                                                                                                                    | 1=25°C<br>2=125,85°C<br>3=-55,-25°C              |                  | A<br>SUFFIX<br>-55 to 125°C |                  | B<br>SUFFIX<br>-25 TO 85°C |                  |                 |               |
|                             |           |                                                                                                                    | TEMP                                             | TYP <sup>c</sup> | MIN <sup>b</sup>            | MAX <sup>b</sup> | MIN <sup>b</sup>           | MAX <sup>b</sup> |                 |               |
|                             |           |                                                                                                                    | OUTPUT                                           |                  |                             |                  |                            |                  |                 |               |
| Output Voltage, LOW         | $V_{OL}$  | $V_{IN} = 2.2\text{ V}$<br>$V_L = 4.5\text{ V}$                                                                    | $I_{OUT} = 10\text{ mA}$                         | 1,3<br>2         | -19.8                       |                  | -19.3<br>-19.0             |                  | -19.25<br>-19.0 | V             |
|                             |           |                                                                                                                    | $I_{OUT} = 1\text{ mA}$                          | 1                | -19.75                      |                  | -19.8                      |                  |                 |               |
| Output Current, HIGH        | $I_{OH}$  | $V_O = 10\text{ V}$<br>$V_{IN} = 0.7\text{ V}$                                                                     | 1,3<br>2                                         | 0.005            |                             | 0.1<br>20        |                            | 0.2<br>10        | $\mu\text{A}$   |               |
| INPUT                       |           |                                                                                                                    |                                                  |                  |                             |                  |                            |                  |                 |               |
| Input Current, Voltage HIGH | $I_{INH}$ | $V_{IN} = 5\text{ V}$ , Input Under Test<br>$V_{IN} = 0\text{ V}$ , All Other Inputs                               | 1,3<br>2                                         |                  |                             | 0.25<br>5        |                            | 1<br>5           | $\mu\text{A}$   |               |
| Input Current, Voltage LOW  | $I_{INL}$ | $V_{IN} = 0\text{ V}$ , $V_L = 5.5\text{ V}$                                                                       | 1<br>2<br>3                                      | -0.2             | -200<br>-160<br>-250        |                  | -225<br>-200<br>-250       |                  |                 |               |
| DYNAMIC                     |           |                                                                                                                    |                                                  |                  |                             |                  |                            |                  |                 |               |
| Turn-ON Time                | $t_{ON}$  | See Switching Time<br>Test Circuit<br>( $C_L = 35\text{ pF}$ )                                                     | 1                                                | 0.22             |                             | 0.3              |                            | 0.3              | $\mu\text{s}$   |               |
| Turn-OFF Time               | $t_{OFF}$ |                                                                                                                    | 1                                                | 1.16             |                             | 1.5              |                            | 1.5              |                 |               |
| SUPPLY                      |           |                                                                                                                    |                                                  |                  |                             |                  |                            |                  |                 |               |
| Negative Supply Current     | $I_-$     | $V_- = -20\text{ V}$<br>$V_L = 5.5\text{ V}$                                                                       | One Channel<br>ON                                | 1                | -1.5                        | -2               |                            | -2.25            |                 | mA            |
| Logic Supply Current        | $I_L$     |                                                                                                                    |                                                  | 1                | 2.2                         |                  | 3                          |                  | 3.3             |               |
| Negative Supply Current     | $I_-$     |                                                                                                                    | All $V_{IN} = 0\text{ V}$<br>All Channels<br>OFF | 1                | -0.01                       | -10              |                            | -25              |                 | $\mu\text{A}$ |
| Logic Supply Current        | $I_L$     |                                                                                                                    |                                                  | 1                | 0.46                        |                  | 0.75                       |                  | 1               | mA            |

**NOTES:**

a. Refer to PROCESS OPTION FLOWCHART for additional information.

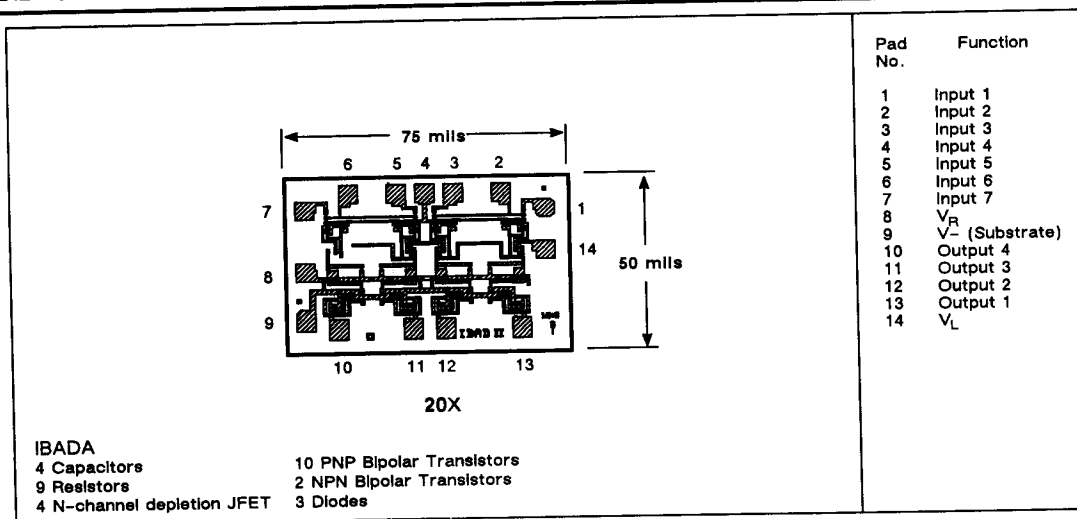
b. The algebraic convention whereby the most negative value is a minimum and the most positive a maximum, is used in this data sheet.

c. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.

# Not Recommended for New Designs

8-7

## DIE TOPOGRAPHY



## SWITCHING TIME AND TEST CIRCUIT

