

# AZ10EL89

## PECL/ECL Coaxial Cable Driver

[www.azmicrotek.com](http://www.azmicrotek.com)

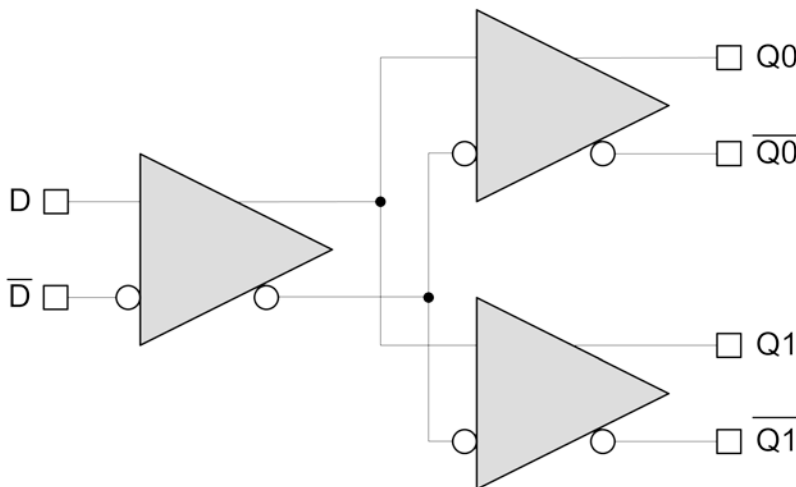
### DESCRIPTION

The [AZ10EL89](#) is a differential fan-out gate specifically designed to drive coaxial cables. The device is especially useful in digital video applications. In such applications, each output can be used as an independent driver since the system is polarity free.

The driver has a voltage gain of approximately 40 and produces an output swing twice as large as standard ECL output. The driver accepts a standard differential ECL input and can run off of the Digital Video Broadcast standard -5.0V supply.

The AZ10EL89 is a direct replacement for the ON Semi MC10EL89

### BLOCK DIAGRAM



### FEATURES

- Direct Replacement for ON Semi MC10EL89
- 1.6V output swing
- 375ps propagation delay
- Internal input pull-down resistors

### APPLICATIONS

- Digital Video Broadcasting

### PACKAGE AVAILABILITY

- SOIC8
- Green/RoHS Compliant/Pb-Free

| Order Number            | Package | Marking                 |
|-------------------------|---------|-------------------------|
| AZ10EL89DG <sup>1</sup> | SOIC8   | AZM10EL89G <sup>2</sup> |

<sup>1</sup> [Tape & Reel](#) - Add 'R1' at end of order number for 7in (1k parts), 'R2' (2.5k) for 13in

<sup>2</sup> See [www.azmicrotek.com](http://www.azmicrotek.com) for [date code format](#)

## PIN DESCRIPTION AND CONFIGURATION

Table 1 - Pin Description

| Pin | Name        | Type   | Function                           |
|-----|-------------|--------|------------------------------------|
| 1   | $Q_0$       | Output | Data Output ( 1.6V <sub>PP</sub> ) |
| 2   | $\bar{Q}_0$ | Output | Data Output ( 1.6V <sub>PP</sub> ) |
| 3   | $Q_1$       | Output | Data Output ( 1.6V <sub>PP</sub> ) |
| 4   | $\bar{Q}_1$ | Output | Data Output ( 1.6V <sub>PP</sub> ) |
| 5   | $V_{EE}$    | Power  | Negative Supply                    |
| 6   | $\bar{D}$   | Input  | Data Input                         |
| 7   | $D$         | Input  | Data Input                         |
| 8   | $V_{CC}$    | Power  | Positive Supply                    |

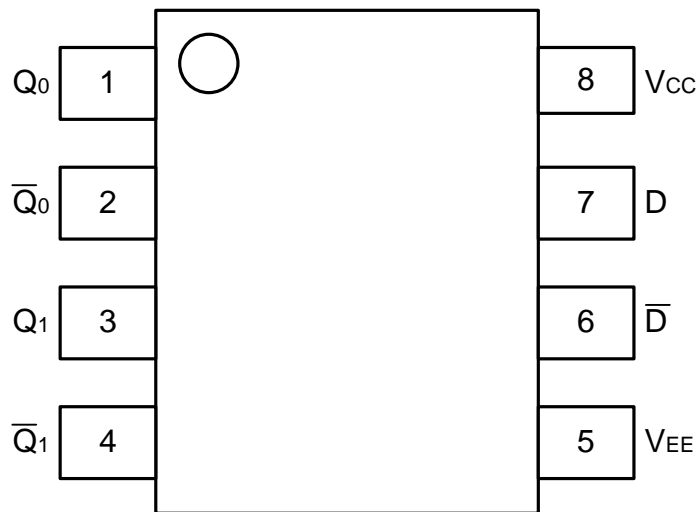


Figure 1 - Pin Configuration for SOIC8

## ENGINEERING NOTES

When driving a coaxial cable, proper termination is required at both ends of the line to minimize signal loss. The 1.6 V output swing allows for termination at both ends of the cable, while maintaining the required 800mV swing at the receiving end of the cable. Because of the larger output swings, the device cannot be terminated into the standard  $V_{CC} - 2.0V$ . All of the DC parameters are tested with a  $50\Omega$  to  $V_{CC} - 3.0V$  load. The driver accepts a standard differential ECL input and can run off of the Digital Video Broadcast standard  $-5.0V$  supply. Under open input conditions (pulled to  $V_{EE}$ ) internal input clamps will force the Q outputs LOW.

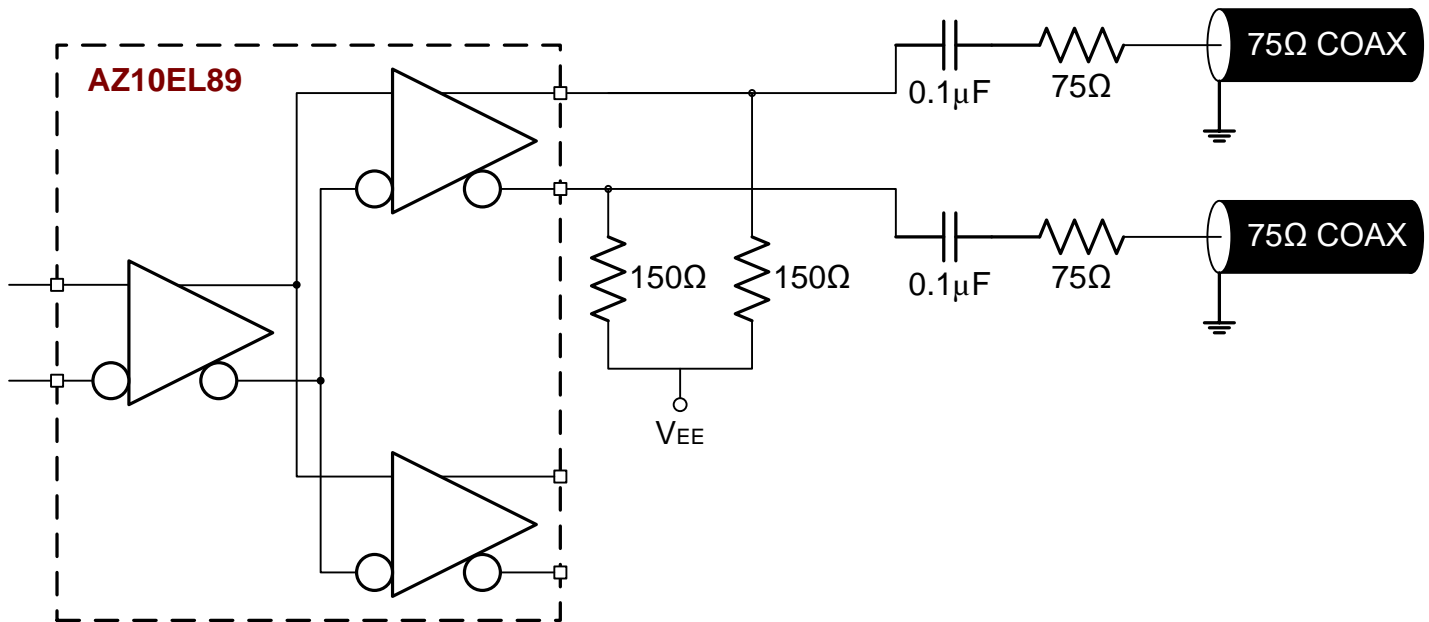


Figure 2 – Termination Configuration

## PERFORMANCE DATA

Table 2 – Absolute Maximum Ratings

Absolute Maximum Ratings are those values beyond which device life may be impaired.

| Symbol      | Characteristic              | Condition         | Rating      | Unit |
|-------------|-----------------------------|-------------------|-------------|------|
| $V_{CC}$    | PECL Power Supply           | ( $V_{EE} = 0V$ ) | 0 to +8.0   | V    |
| $V_I$       | PECL Input Voltage          | ( $V_{EE} = 0V$ ) | 0 to +6.0   | V    |
| $V_{EE}$    | ECL Power Supply            | ( $V_{CC} = 0V$ ) | -8.0 to 0   | V    |
| $V_I$       | ECL Input Voltage           | ( $V_{CC} = 0V$ ) | -6.0 to 0   | V    |
| $I_{OUT}$   | Output Current              | Continuous        | 50          | mA   |
|             |                             | Surge             | 100         |      |
| $T_A$       | Operating Temperature Range |                   | -40 to +85  | °C   |
| $T_{STG}$   | Storage Temperature Range   |                   | -65 to +150 | °C   |
| $ESD_{HBM}$ | Human Body Model            |                   | 2500        | V    |
| $ESD_{MM}$  | Machine Model               |                   | 200         | V    |
| $ESD_{CDM}$ | Charged Device Model        |                   | 2500        | V    |

Table 3 – 10K ECL DC Characteristics

10K ECL DC Characteristics ( $V_{EE} = -4.2V$  to  $-5.7V$ ,  $V_{CC} = GND$ )

| Symbol   | Characteristic                   | -40 °C |     |       | 0 °C  |     |       | 25 °C |     |       | 85 °C |     |       | Unit |
|----------|----------------------------------|--------|-----|-------|-------|-----|-------|-------|-----|-------|-------|-----|-------|------|
|          |                                  | Min    | Typ | Max   | Min   | Typ | Max   | Min   | Typ | Max   | Min   | Typ | Max   |      |
| $V_{OH}$ | Output HIGH Voltage <sup>1</sup> | -1230  |     | -980  | -1180 |     | -940  | -1130 |     | -900  | -1060 |     | -810  | mV   |
| $V_{OL}$ | Output LOW Voltage <sup>1</sup>  | -2900  |     | -2580 | -2950 |     | -2570 | -3000 |     | -2560 | -3050 |     | -2510 | mV   |
| $V_{IH}$ | Input HIGH Voltage               | -1230  |     | -890  | -1170 |     | -840  | -1130 |     | -810  | -1060 |     | -720  | mV   |
| $V_{IL}$ | Input LOW Voltage                | -1950  |     | -1500 | -1950 |     | -1480 | -1950 |     | -1480 | -1950 |     | -1445 | mV   |
| $I_{IL}$ | Input LOW Current                | 0.5    |     |       | 0.5   |     |       | 0.5   |     |       | 0.5   |     |       | μA   |
| $I_{IH}$ | Input HIGH Current               |        |     | 150   |       |     | 150   |       |     | 150   |       |     | 150   | μA   |
| $I_{EE}$ | Power Supply Current             |        | 23  | 28    |       | 23  | 28    |       | 23  | 28    |       | 23  | 28    | mA   |

<sup>1</sup> Each output is terminated through a 50Ω resistor to  $V_{CC} - 3V$ .

Table 4 – 10K PECL DC Characteristics

10K PECL DC Characteristics ( $V_{EE} = \text{GND}$ ,  $V_{CC} = +5.0\text{V}$ )

| Symbol   | Characteristic                     | -40 °C |     |      | 0 °C |     |      | 25 °C |     |      | 85 °C |     |      | Unit |
|----------|------------------------------------|--------|-----|------|------|-----|------|-------|-----|------|-------|-----|------|------|
|          |                                    | Min    | Typ | Max  | Min  | Typ | Max  | Min   | Typ | Max  | Min   | Typ | Max  |      |
| $V_{OH}$ | Output HIGH Voltage <sup>1,2</sup> | 3770   |     | 4020 | 3820 |     | 4060 | 3870  |     | 4100 | 3940  |     | 4190 | mV   |
| $V_{OL}$ | Output LOW Voltage <sup>1,2</sup>  | 2100   |     | 2420 | 2050 |     | 2430 | 2000  |     | 2440 | 1950  |     | 2490 | mV   |
| $V_{IH}$ | Input HIGH Voltage <sup>1</sup>    | 3770   |     | 4110 | 3830 |     | 4160 | 3870  |     | 4190 | 3940  |     | 4280 | mV   |
| $V_{IL}$ | Input LOW Voltage <sup>1</sup>     | 3050   |     | 3500 | 3050 |     | 3520 | 3050  |     | 3520 | 3050  |     | 3555 | mV   |
| $I_{IL}$ | Input LOW Current                  | 0.5    |     |      | 0.5  |     |      | 0.5   |     |      | 0.5   |     |      | μA   |
| $I_{IH}$ | Input HIGH Current                 |        |     | 150  |      |     | 150  |       |     | 150  |       |     | 150  | μA   |
| $I_{EE}$ | Power Supply Current               |        | 23  | 28   |      | 23  | 28   |       | 23  | 28   |       | 23  | 28   | mA   |

<sup>1</sup> For supply voltages other than 5.0V, use the ECL table values and ADD supply voltage value.

<sup>2</sup> Each output is terminated through a 50Ω resistor to  $V_{CC} - 3\text{V}$ .

Table 5 – AC Characteristics

AC Characteristics ( $V_{EE} = -4.2\text{V}$  to  $-5.7\text{V}$ ,  $V_{CC} = \text{GND}$  or  $V_{EE} = \text{GND}$ ,  $V_{CC} = +4.2\text{V}$  to  $+5.7\text{V}$ )

| Symbol                          | Characteristic  | -40 °C         |     |                | 0 °C           |     |                | 25 °C          |     |                | 85 °C          |     |                | Unit |
|---------------------------------|---|----------------|-----|----------------|----------------|-----|----------------|----------------|-----|----------------|----------------|-----|----------------|------|
|                                 |   | Min            | Typ | Max            | Min            | Typ | Max            | Min            | Typ | Max            | Min            | Typ | Max            |      |
| $t_{\text{max}}$                | Maximum Toggle Rate   |                |     |                |                |     |                |                | 1.5 |                |                |     |                | Gb/s |
| $t_{\text{PLH}}/t_{\text{PHL}}$ | Propagation Delay to Output                                     | 200            | 340 | 480            | 250            | 340 | 430            | 260            | 350 | 440            | 310            | 400 | 490            | ps   |
| $t_{\text{skew}}$               | Within-Device Skew <sup>1</sup><br>Duty Cycle Skew <sup>2</sup> |                | 5   | 20             |                | 5   | 20             |                | 5   | 20             |                | 5   | 20             | ps   |
| $V_{\text{PP}}$                 | Minimum Input Swing <sup>3</sup>                                | 150            |     |                | 150            |     |                | 150            |     |                | 150            |     |                | mV   |
| $V_{\text{CMR}}$                | Common Mode Range <sup>4</sup>                                  | $V_{EE} + 2.5$ |     | $V_{CC} - 0.4$ | $V_{EE} + 2.5$ |     | $V_{CC} - 0.4$ | $V_{EE} + 2.5$ |     | $V_{CC} - 0.4$ | $V_{EE} + 2.5$ |     | $V_{CC} - 0.4$ | V    |
| $t_r/t_f$                       | Output Rise/Fall Times Q (20%-80%)                              | 205            |     | 455            | 205            |     | 455            | 205            |     | 455            | 205            |     | 455            | ps   |

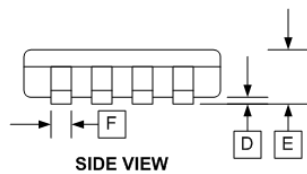
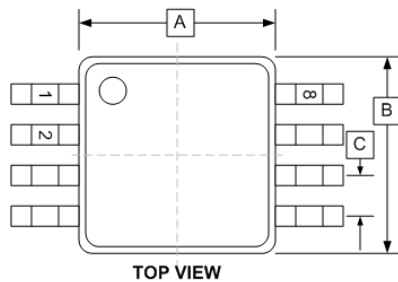
<sup>1</sup> Within-device skew defined as identical transitions on similar paths through a device.

<sup>2</sup> Duty cycle skew is the difference between a  $t_{\text{PLH}}$  and  $t_{\text{PHL}}$  propagation delay through a device.

<sup>3</sup>  $V_{\text{PP}}$  is the minimum peak-to-peak differential input swing for which AC parameters guaranteed. The device has a DC gain of ~ 40.

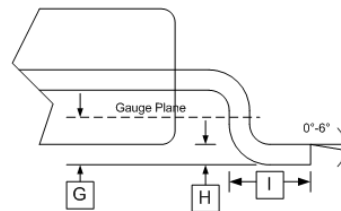
<sup>4</sup> The  $V_{\text{CMR}}$  range is referenced to the most positive side of the differential input signal. Normal operation is obtained if the HIGH level falls within the specified range and the peak-to-peak voltage lies between  $V_{\text{PP}}$  (min) and 1V.

**PACKAGE DIAGRAM**  
SOIC8  
Green/RoHS compliant/Pb-Free  
MSL=1

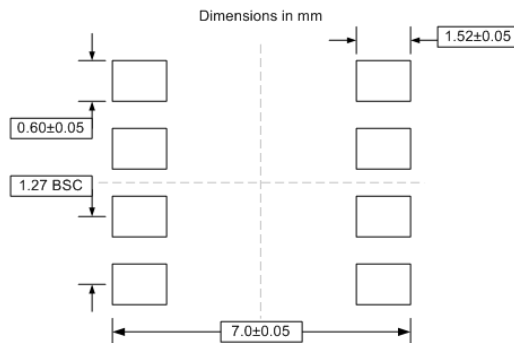


| DIM | INCHES    |        |
|-----|-----------|--------|
|     | MIN       | MAX    |
| A   | 0.189     | 0.196  |
| B   | 0.150     | 0.157  |
| C   | 0.050 BSC |        |
| D   | 0.004     | 0.01   |
| E   | 0.054     | 0.068  |
| F   | 0.014     | 0.019  |
| G   | 0.010     |        |
| H   | 0.0075    | 0.0098 |
| I   | 0.016     | 0.034  |

SOIC8 (D)



PCB LAND PATTERN/FOOTPRINT



Arizona Microtek, Inc. reserves the right to change circuitry and specifications at any time without prior notice. Arizona Microtek, Inc. makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Arizona Microtek, Inc. assume any liability arising out of the application or use of any product or circuit and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Arizona Microtek, Inc. does not convey any license rights nor the rights of others. Arizona Microtek, Inc. products are not designed, intended or authorized for use as components in systems intended to support or sustain life, or for any other application in which the failure of the Arizona Microtek, Inc. product could create a situation where personal injury or death may occur. Should Buyer purchase or use Arizona Microtek, Inc. products for any such unintended or unauthorized application, Buyer shall indemnify and hold Arizona Microtek, Inc. and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Arizona Microtek, Inc. was negligent regarding the design or manufacture of the part.