

AZ10E142 AZ100E142

ECL/PECL 9-bit Shift Register

FEATURES

- 700 MHz Minimum Shift Frequency
- 9-Bit for Byte-Parity Application
- Asynchronous Master Reset
- Dual Clocks
- Operating Range of 4.2V to 5.46V
- 75k Ω Internal Input Pulldown Resistors
- Direct Replacement for ON Semiconductor MC10E142 & MC100E142

PACKAGE AVAILABILITY

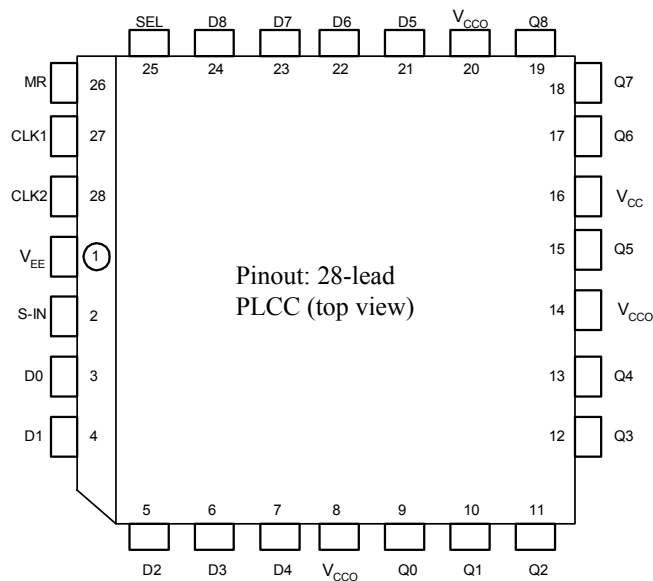
| PACKAGE | PART NO. | MARKING |
|-------------|---------------|------------|
| PLCC 28 | AZ10E142FN | AZM10E142 |
| PLCC 28 T&R | AZ10E142FNR2 | AZM10E142 |
| PLCC 28 | AZ100E142FN | AZM100E142 |
| PLCC 28 T&R | AZ100E142FNR2 | AZM100E142 |

DESCRIPTION

The AZ10/100E142 is a 9-bit shift register, designed with byte-parity applications in mind. The E142 performs serial/parallel in and serial/parallel out, shifting in one direction. The nine inputs D0-D8 accept parallel input data, while S-IN accepts serial input data. The Qn outputs do not need to be terminated for the shift operation to function. To minimize noise and power, any Q output not used should be left unterminated.

The SEL (Select) input pin is used to switch between the two modes of operation – SHIFT and LOAD. The shift direction is from bit 0 to bit 8. Input data is accepted by the registers a set-up time before the positive going edge of CLK1 or CLK2; shifting is also accomplished on the positive clock edge. A HIGH on the Master Reset pin (MR) asynchronously resets all the registers to zero.

NOTE: Specifications in ECL/PECL tables are valid when thermal equilibrium is established.



AZ10E142
AZ100E142

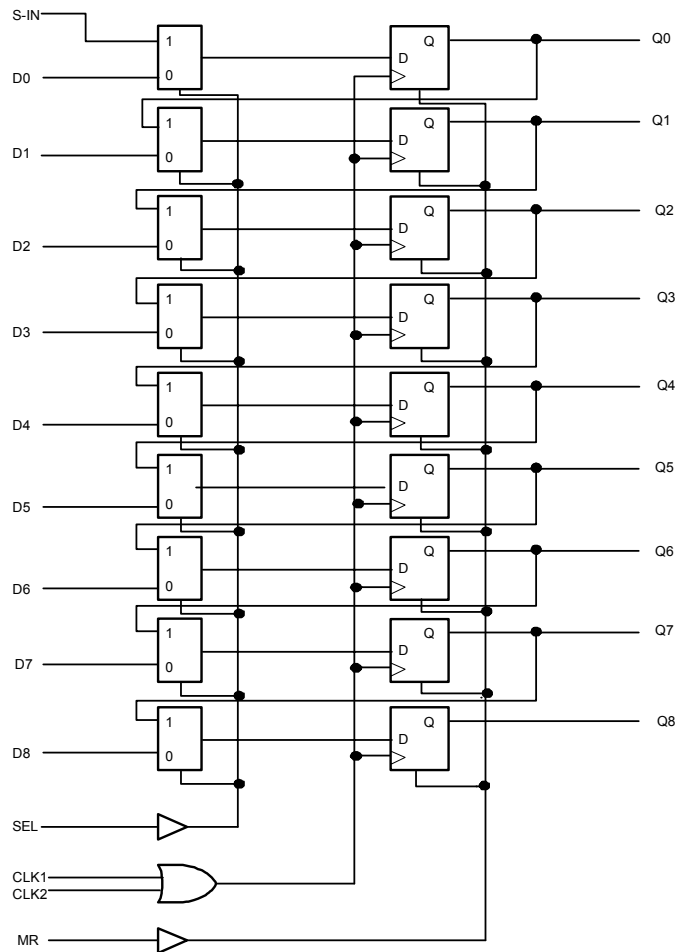
LOGIC SYMBOL

FUNCTION TABLE

| SEL | MODE |
|-----|-------|
| L | Load |
| H | Shift |

PIN DESCRIPTION

| PIN | FUNCTION |
|------------------------------------|----------------------|
| D0 – D8 | Parallel Data Inputs |
| S – IN | Serial Data Input |
| SEL | Mode Select Input |
| CLK1, CLK2 | Clock Inputs |
| MR | Master Reset |
| Q0 – Q8 | Data Outputs |
| V _{CC} , V _{CC0} | Positive Supply |
| V _{EE} | Negative Supply |



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

| Symbol | Characteristic | Rating | Unit |
|------------------|---|-------------|------|
| V _{CC} | PECL Power Supply (V _{EE} = 0V) | 0 to +8.0 | Vdc |
| V _I | PECL Input Voltage (V _{EE} = 0V) | 0 to +6.0 | Vdc |
| V _{EE} | ECL Power Supply (V _{CC} = 0V) | -8.0 to 0 | Vdc |
| V _I | ECL Input Voltage (V _{CC} = 0V) | -6.0 to 0 | Vdc |
| I _{OUT} | Output Current --- Continuous --- Surge | 50 100 | mA |
| T _A | Operating Temperature Range | -40 to +85 | °C |
| T _{STG} | Storage Temperature Range | -65 to +150 | °C |

10K ECL DC Characteristics (V_{EE} = -4.94V to -5.46V, V_{CC} = V_{CC0} = 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 ¹ | -1080 | | -890 | -1020 | | -840 | -980 | | -810 | -910 | | -720 | mV |
| V _{OL} | Output LOW Voltage ¹ | -1950 | | -1650 | -1950 | | -1630 | -1950 | | -1630 | -1950 | | -1595 | 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 _{IH} | Input HIGH Current | | | 150 | | | 150 | | | 150 | | | 150 | μA |
| I _{IL} | Input LOW Current | 0.5 | | | 0.5 | | | | | | | | 0.5 | μA |
| I _{EE} | Power Supply Current | | 120 | 145 | | 120 | 145 | | 120 | 145 | | 120 | 145 | mA |

1. Each output is terminated through a 50Ω resistor to V_{CC} - 2V.

AZ10E142

AZ100E142

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

| 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 ^{1,2} | 3920 | | 4110 | 3980 | | 4160 | 4020 | | 4190 | 4090 | | 4280 | mV |
| V_{OL} | Output LOW Voltage ^{1,2} | 3050 | | 3350 | 3050 | | 3370 | 3050 | | 3370 | 3050 | | 3405 | mV |
| V_{IH} | Input HIGH Voltage ¹ | 3770 | | 4110 | 3830 | | 4160 | 3870 | | 4190 | 3940 | | 4280 | mV |
| V_{IL} | Input LOW Voltage ¹ | 3050 | | 3500 | 3050 | | 3520 | 3050 | | 3520 | 3050 | | 3555 | mV |
| I_{IH} | Input HIGH Current | | | 150 | | | 150 | | | 150 | | | 150 | μA |
| I_{IL} | Input LOW Current | 0.5 | | | 0.5 | | | 0.5 | | | 0.5 | | | μA |
| I_{EE} | Power Supply Current | | 120 | 145 | | 120 | 145 | | 120 | 145 | | 120 | 145 | mA |

- For supply voltages other than 5.0V, use the ECL table values and ADD supply voltage value.
- Each output is terminated through a 50Ω resistor to $V_{CC} - 2\text{V}$.

100K ECL DC Characteristics ($V_{EE} = -4.2\text{V}$ to -5.46V , $V_{CC} = V_{CCO} = \text{GND}$)

| 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 ¹ | -1085 | -1005 | -880 | -1025 | -955 | -880 | -1025 | -955 | -880 | -1025 | -955 | -880 | mV |
| V_{OL} | Output LOW Voltage ¹ | -1830 | -1695 | -1555 | -1810 | -1705 | -1620 | -1810 | -1705 | -1620 | -1810 | -1705 | -1620 | mV |
| V_{IH} | Input HIGH Voltage | -1165 | | -880 | -1165 | | -880 | -1165 | | -880 | -1165 | | -880 | mV |
| V_{IL} | Input LOW Voltage | -1810 | | -1475 | -1810 | | -1475 | -1810 | | -1475 | -1810 | | -1475 | mV |
| I_{IH} | Input HIGH Current | | | 150 | | | 150 | | | 150 | | | 150 | μA |
| I_{IL} | Input LOW Current | 0.5 | | | 0.5 | | | 0.5 | | | 0.5 | | | μA |
| I_{EE} | Power Supply Current | | 120 | 145 | | 120 | 145 | | 120 | 145 | | 138 | 165 | mA |

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

100K PECL DC Characteristics ($V_{EE} = \text{GND}$, $V_{CC} = V_{CCO} = +5.0\text{V}$)

| 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 ^{1,2} | 3915 | 3995 | 4120 | 3975 | 4045 | 4120 | 3975 | 4045 | 4120 | 3975 | 4045 | 4120 | mV |
| V_{OL} | Output LOW Voltage ^{1,2} | 3170 | 3305 | 3445 | 3190 | 3295 | 3380 | 3190 | 3295 | 3380 | 3190 | 3295 | 3380 | mV |
| V_{IH} | Input HIGH Voltage ¹ | 3835 | | 4120 | 3835 | | 4120 | 3835 | | 4120 | 3835 | | 4120 | mV |
| V_{IL} | Input LOW Voltage ¹ | 3190 | | 3525 | 3190 | | 3525 | 3190 | | 3525 | 3190 | | 3525 | mV |
| I_{IH} | Input HIGH Current | | | 150 | | | 150 | | | 150 | | | 150 | μA |
| I_{IL} | Input LOW Current | 0.5 | | | 0.5 | | | 0.5 | | | 0.5 | | | μA |
| I_{EE} | Power Supply Current | | 120 | 145 | | 120 | 145 | | 120 | 145 | | 138 | 165 | mA |

- For supply voltages other than 5.0V, use the ECL table values and ADD supply voltage value.
- Each output is terminated through a 50Ω resistor to $V_{CC} - 2\text{V}$.

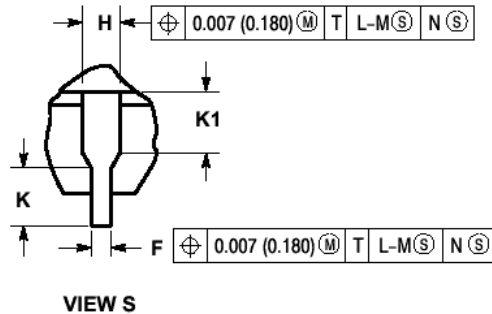
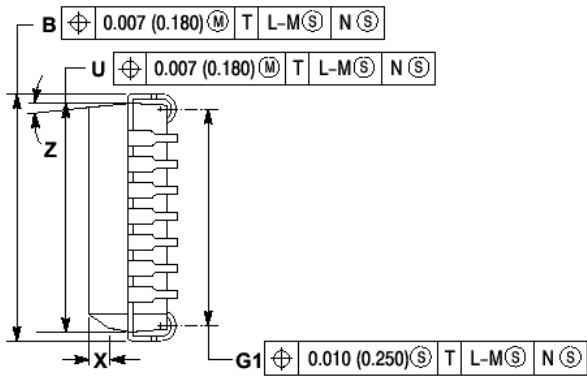
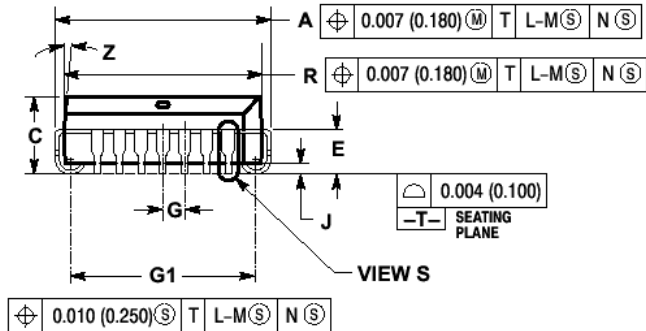
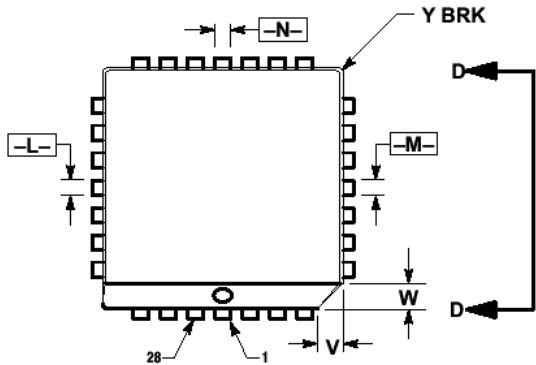
AC Characteristics ($V_{EE} = 10\text{E}(-4.94\text{V}$ to $-5.46\text{V})$, $100\text{E}(-4.2\text{V}$ to $-5.46\text{V})$; $V_{CC} = V_{CCO} = \text{GND}$ or $V_{EE} = \text{GND}$, $V_{CC} = V_{CCO} = 10\text{E}(+4.94\text{V}$ to $+5.46\text{V})$, $100\text{E}(+4.2\text{V}$ to $+5.46\text{V})$)

| Symbol | Characteristic | -40°C | | | 0°C | | | 25°C | | | 85°C | | | Unit |
|-----------------------------------|---|------------|-------------|--------------|------------|-------------|--------------|------------|-------------|--------------|------------|-------------|--------------|------|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| f_{SHIFT} | Max. Shift Frequency | 700 | 900 | | 700 | 900 | | 700 | 900 | | 700 | 900 | | MHz |
| $t_{\text{PLH}} / t_{\text{PHL}}$ | Propagation Delay to Output CLK1, CLK2 MR | 600 600 | 800 800 | 1000 1000 | 600 600 | 800 800 | 1000 1000 | 600 600 | 800 800 | 1000 1000 | 600 600 | 800 800 | 1000 1000 | ps |
| t_s | Setup Time D SEL | 50 300 | -100 150 | | 50 300 | -100 150 | | 50 300 | -100 150 | | 50 300 | -100 150 | | ps |
| t_h | Hold Time D SEL | 300 75 | 100 -150 | | 300 75 | 100 -150 | | 300 75 | 100 -150 | | 300 75 | 100 -150 | | ps |
| t_{RR} | Reset Recovery Time | 900 | 700 | | 900 | 700 | | 900 | 700 | | 900 | 700 | | ps |
| t_{PW} | Minimum Pulse Width CLK1, CLK2, MR | 400 | | | 400 | | | 400 | | | 400 | | | ps |
| t_{SKEW} | Within-Device Skew ¹ | | 75 | | | 75 | | | 75 | | | 75 | | ps |
| t_r / t_f | Rise/Fall Times 20% - 80% | 300 | | 800 | 300 | | 800 | 300 | | 800 | 300 | | 800 | ps |

- Within-device skew is defined as identical transitions on similar paths through a device.

AZ10E142
AZ100E142

**PACKAGE DIAGRAM
PLCC 28**



VIEW D-D

VIEW S

| DIM | MILLIMETERS | | INCHES | |
|-----|-------------|-------|-----------|-------|
| | MIN | MAX | MIN | MAX |
| A | 12.32 | 12.57 | 0.485 | 0.495 |
| B | 12.32 | 12.57 | 0.485 | 0.495 |
| C | 4.20 | 4.57 | 0.165 | 0.180 |
| E | 2.29 | 2.79 | 0.090 | 0.110 |
| F | 0.33 | 0.48 | 0.013 | 0.019 |
| G | 1.27 BSC | | 0.050 BSC | |
| H | 0.66 | 0.81 | 0.026 | 0.032 |
| J | 0.51 | | 0.020 | |
| K | 0.64 | | 0.025 | |
| R | 11.43 | 11.58 | 0.450 | 0.456 |
| U | 11.43 | 11.58 | 0.450 | 0.456 |
| V | 1.07 | 1.21 | 0.042 | 0.048 |
| W | 1.07 | 1.21 | 0.042 | 0.048 |
| X | 1.07 | 1.42 | 0.042 | 0.056 |
| T | | 0.50 | | 0.020 |
| Z | 2° | 10° | 2° | 10° |
| G1 | 10.42 | 10.92 | 0.410 | 0.430 |
| K1 | 1.02 | | 0.040 | |

NOTES:

- DATUMS -L-, -M-, AND -N- DETERMINED WHERE TOP OF LEAD SHOULDER EXITS PLASTIC BODY AT MOLD PARTING LINE.
- DIMENSION G1, TRUE POSITION TO BE MEASURED AT DATUM -T-, SEATING PLANE.
- DIMENSIONS R AND U DO NOT INCLUDE MOLD FLASH. ALLOWABLE MOLD FLASH IS 0.010mm (0.250in.) PER SIDE.
- DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
- CONTROLLING DIMENSION: INCH.
- THE PACKAGE TOP MAY BE SMALLER THAN THE PACKAGE BOTTOM BY UP TO 0.012mm (0.300in.). DIMENSIONS R AND U ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY EXCLUSIVE OF MOLD FLASH, THE BAR BURRS, GATE BURRS AND INTERLEAD FLASH, BUT INCLUDING ANY MISMATCH BETWEEN THE TOP AND BOTTOM OF THE PLASTIC BODY.
- DIMENSION H DOES NOT INCLUDE DAMBAR PROTRUSION OR INTRUSION. THE DAMBAR PROTRUSION(S) SHALL NOT CAUSE THE H DIMENSION TO BE SMALLER THAN 0.025mm (0.635in.).

AZ10E142
AZ100E142

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