

AZ10EL16VO

AZ100EL16VO

ECL/PECL Oscillator Gain Stage and Buffer with Enable

FEATURES

- Green and RoHS Compliant Available
- 250ps Propagation Delay on \bar{Q} Output
- High Voltage Gain vs. Standard EL16
- For Oscillator Applications
- Available in 2x2 or 3x3mm MLP Package
- 75k Ω Enable Pull-Down Resistor
- S-Parameter (.s2p) and IBIS Model
- Files Available on Arizona Microtek Website

DESCRIPTION

The AZ10/100EL16VO is an oscillator gain stage with a high gain output buffer including an enable. The Q_{HG}/\bar{Q}_{HG} outputs have a voltage gain several times greater than the Q/\bar{Q} outputs. An enable input (\bar{EN}) allows continuous oscillator operation. When \bar{EN} is LOW or floating (NC), input data is passed to both sets of outputs. When \bar{EN} is HIGH, the Q_{HG}/\bar{Q}_{HG} outputs will be forced LOW/HIGH respectively, while input data will continue to be passed to the Q/\bar{Q} outputs. The \bar{EN} input can be driven with an ECL/PECL signal or a CMOS logic signal.

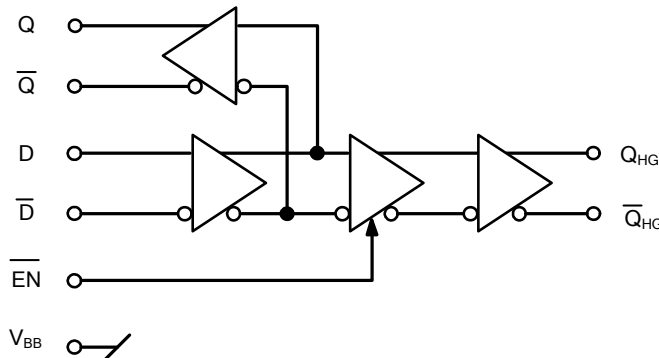
The input impedance of the D/\bar{D} inputs remain constant for all operating modes since forcing the outputs via the \bar{EN} pin does not power-down the chip but only disables the high gain Q_{HG}/\bar{Q}_{HG} outputs.

Input protection diodes are included on the D/\bar{D} inputs for enhanced ESD protection.

The EL16VO also provides a V_{BB} output that supports 1.5mA sink/source current. When used, the V_{BB} pin should be bypassed to ground or V_{CC} via a 0.01 μ F capacitor.

Any used output must have an external pull down resistor. For 3.3V operation, an 180 Ω resistor to V_{EE} is recommended if an AC coupled load is present. At 5.0V, a 330 Ω resistor is recommended for the AC load case. Alternately, a 50 Ω load terminated to $V_{CC} - 2V$ or the Thevenin equivalent may be driven directly. Unused outputs may be left floating (NC).

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



PIN/PAD DESCRIPTION

| PIN | FUNCTION |
|-----------------------|--------------------------|
| D/\bar{D} | Data Inputs |
| Q/\bar{Q} | Data Outputs |
| Q_{HG}/\bar{Q}_{HG} | Data Outputs w/High Gain |
| V_{BB} | Reference Voltage Output |
| \bar{EN} | Enable Input |
| V_{CC} | Positive Supply |
| V_{EE} | Negative Supply |

AZ10EL16VO
AZ100EL16VO

PACKAGE AVAILABILITY

| PACKAGE | PART NUMBER | MARKING | NOTES |
|--|--------------------|----------------------------|--------------|
| MLP 8 (2x2) Green / RoHS Compliant / Lead (Pb) Free | AZ100EL16VONG | P0G <Date Code> | 1,2 |
| MLP 8 (2x2) | AZ100EL16VONB | P4 <Date Code> | 1,2,3 |
| MLP 8 (2x2) RoHS Compliant / Lead (Pb) Free | AZ100EL16VONB+ | P4+ <Date Code> | 1,2 |
| MLP 8 (2x2x0.75) Green / RoHS Compliant / Lead (Pb) Free | AZ100EL16VONBG | P4G <Date Code> | 1,2 |
| MLP 16 (3x3) | AZ10/100EL16VOL | AZM 16J <Date Code> | 1,2 |
| MLP 16 (3x3) Green / RoHS Compliant / Lead (Pb) Free | AZ10/100EL16VOLG | AZMG 16J <Date Code> | 1,2 |
| SOIC 8 | AZ10EL16VOD | AZM10 EL16VO | 1,2,4 |
| SOIC 8 | AZ100EL16VOD | AZM100 EL16VO | 1,2,4 |
| TSSOP 8 | AZ10EL16VOT | AZT 16VO | 1,2,4 |
| TSSOP 8 RoHS Compliant / Lead (Pb) Free | AZ10EL16VOT+ | AZT+ 16VO | 1,2,4 |
| TSSOP 8 | AZ100EL16VOT | AZH 16VO | 1,2,4 |
| TSSOP 8 RoHS Compliant / Lead (Pb) Free | AZ100EL16VOT+ | AZH+ 16VO | 1,2,4 |
| TSSOP 10 RoHS Compliant / Lead (Pb) Free | AZ10EL16VOU+ | AZT+ 16VOU | 1,2,4 |
| TSSOP 10 RoHS Compliant / Lead (Pb) Free | AZ100EL16VOU+ | AZH+ 16VOU | 1,2,4 |
| DIE | AZ10/100EL16VOXP | N/A | 5 |
| DIE | AZ10/100EL16VOXR | N/A | 6 |

- 1 Add R1 at end of part number for 7 inch (1K parts), R2 for 13 inch (2.5K parts) Tape & Reel.
- 2 Date code format: "Y" or "YY" for year followed by "WW" for week.
- 3 Parts marked JNB for date codes prior to 4WW (prior to 2004).
- 4 Date code "YWW" or "YYWW" on underside of part.
- 5 Waffle Pack. Die thickness 180 µm.
- 6 Die on 7 inch Tape & Reel, 3k parts per reel. Die thickness 180 µm.

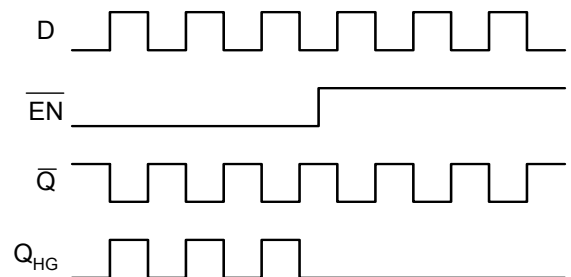
AZ10EL16VO
AZ100EL16VO

TRUTH TABLE

| EN | Q/Q | Q _{HG} | Q _{HG} |
|-----------|------|-----------------|-----------------|
| LOW or NC | Data | Data | Data |
| HIGH | Data | LOW | HIGH |

NC = No Connect

TIMING DIAGRAM



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 +6.0 | Vdc |
| V _I | PECL Input Voltage (V _{EE} = 0V) | 0 to +6.0 | Vdc |
| V _{EE} | ECL Power Supply (V _{CC} = 0V) | -6.0 to 0 | Vdc |
| V _I | ECL Input Voltage (V _{CC} = 0V) | -6.0 to 0 | Vdc |
| V _{I DIFF} | Differential Input Voltage D/ \bar{D} | 0 to ± 1.6 | Vpp ¹ |
| 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 |

1. V_{I DIFF} is the voltage difference between D and \bar{D}

AZ10EL16VO
AZ100EL16VO

10K ECL DC Characteristics ($V_{EE} = -3.0V$ to $-5.5V$, $V_{CC} = GND$)

| 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 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 | D/ \bar{D} | -1230 | | -430 | -1170 | | -380 | -1130 | | -360 | -1060 | | -310 | mV |
| | | EN | -1230 | | V_{CC} | -1170 | | V_{CC} | -1130 | | V_{CC} | -1060 | | V_{CC} | |
| V_{IL} | Input LOW Voltage | D/ \bar{D} | -2300 | | -1500 | -2260 | | -1480 | -2240 | | -1480 | -2190 | | -1445 | mV |
| | | EN | V_{EE} | | -1500 | V_{EE} | | -1480 | V_{EE} | | -1480 | V_{EE} | | -1445 | |
| V_{BB} | Reference Voltage | -1430 | | -1300 | -1380 | | -1260 | -1360 | | -1240 | -1310 | | -1190 | mV | |
| I_{IH} | Input HIGH Current | D/ \bar{D} | | | 60 | | | 60 | | | 60 | | | 60 | μA |
| | | EN | | | 150 | | | 150 | | | 150 | | | 150 | |
| I_{IL} | Input LOW Current | 0.5 | | | 0.5 | | | 0.5 | | | 0.5 | | | μA | |
| I_{EE} | Power Supply Current | | | 40 | | | 40 | | | 40 | | | 40 | mA | |

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

10K LVPECL DC Characteristics ($V_{EE} = GND$, $V_{CC} = +3.3V$)

| 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} | 2220 | | 2410 | 2280 | | 2460 | 2320 | | 2490 | 2390 | | 2580 | mV | |
| V_{OL} | Output LOW Voltage ^{1,2} | 1350 | | 1650 | 1350 | | 1670 | 1350 | | 1670 | 1350 | | 1705 | mV | |
| V_{IH} | Input HIGH Voltage | D/ \bar{D} ¹ | 2070 | | 2870 | 2130 | | 2920 | 2170 | | 2940 | 2240 | | 2990 | mV |
| | | EN | 2070 ¹ | | V_{CC} | 2130 ¹ | | V_{CC} | 2170 ¹ | | V_{CC} | 2240 ¹ | | V_{CC} | |
| V_{IL} | Input LOW Voltage | D/ \bar{D} ¹ | 1000 | | 1800 | 1040 | | 1820 | 1060 | | 1820 | 1110 | | 1855 | mV |
| | | EN | V_{EE} | | 1800 ¹ | V_{EE} | | 1820 ¹ | V_{EE} | | 1820 ¹ | V_{EE} | | 1855 ¹ | |
| V_{BB} | Reference Voltage ¹ | 1870 | | 2000 | 1920 | | 2040 | 1940 | | 2060 | 1990 | | 2110 | mV | |
| I_{IH} | Input HIGH Current | D/ \bar{D} | | | 60 | | | 60 | | | 60 | | | 60 | μA |
| | | EN | | | 150 | | | 150 | | | 150 | | | 150 | |
| I_{IL} | Input LOW Current | 0.5 | | | 0.5 | | | 0.5 | | | 0.5 | | | μA | |
| I_{EE} | Power Supply Current | -300 | | 40 | -300 | | 40 | -300 | | 40 | -300 | | 40 | mA | |

1. For supply voltages other than 3.3V, use the ECL table values and ADD supply voltage value.

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

3. Specified with EN forced to V_{EE} .

AZ10EL16VO
AZ100EL16VO

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 ^{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 | D/ \bar{D} ¹ | | 4570 | 3830 | | 4620 | 3870 | | 4640 | 3940 | | 4690 | mV |
| | | \bar{EN} | 3770 | | V_{CC} | 3830 ¹ | | V_{CC} | 3870 ¹ | | V_{CC} | 3940 ¹ | | |
| V_{IL} | Input LOW Voltage | D/ \bar{D} ¹ | | 3500 | 2740 | | 3520 | 2760 | | 3520 | 2810 | | 3555 | mV |
| | | \bar{EN} | 2700 | | 3500 ¹ | V_{EE} | | 3520 ¹ | V_{EE} | | 3520 ¹ | V_{EE} | | |
| V_{BB} | Reference Voltage ¹ | 3570 | | 3700 | 3620 | | 3740 | 3640 | | 3760 | 3690 | | 3810 | mV |
| I_{IH} | Input HIGH Current | D/ \bar{D} | | 60 | | | 60 | | | 60 | | | 60 | μA |
| | | \bar{EN} | | 150 | | | 150 | | | 150 | | | 150 | |
| I_{IL} | Input LOW Current | D/ \bar{D} | 0.5 | | 0.5 | | 0.5 | | 0.5 | | 0.5 | | 0.5 | μA |
| | | \bar{EN} ³ | -1400 | | -1400 | | -1400 | | -1400 | | -1400 | | -1400 | |
| I_{EE} | Power Supply Current | | | 40 | | | 40 | | | 40 | | | 40 | mA |

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

100K ECL DC Characteristics ($V_{EE} = -3.0\text{V}$ to -5.5V , $V_{CC} = \text{GND}$)

| 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 | | -880 | -1025 | | -880 | -1025 | | -880 | -1025 | | -880 | mV |
| V_{OL} | Output LOW Voltage ¹ | -1900 | | -1555 | -1900 | | -1620 | -1900 | | -1620 | -1900 | | -1620 | mV |
| V_{IH} | Input HIGH Voltage | D/ \bar{D} | | -390 | -1165 | | -390 | -1165 | | -390 | -1165 | | -390 | mV |
| | | \bar{EN} | -1165 | | V_{CC} | -1165 | | V_{CC} | -1165 | | V_{CC} | -1165 | | |
| V_{IL} | Input LOW Voltage | D/ \bar{D} | | -1475 | -2250 | | -1475 | -2250 | | -1475 | -2250 | | -1475 | mV |
| | | \bar{EN} | -2250 | | -1475 | V_{EE} | | -1475 | V_{EE} | | -1475 | V_{EE} | | |
| V_{BB} | Reference Voltage | -1390 | | -1250 | -1390 | | -1250 | -1390 | | -1250 | -1390 | | -1250 | mV |
| I_{IH} | Input HIGH Current | D/ \bar{D} | | 60 | | | 60 | | | 60 | | | 60 | μA |
| | | \bar{EN} | | 150 | | | 150 | | | 150 | | | 150 | |
| I_{IL} | Input LOW Current | 0.5 | | | 0.5 | | | 0.5 | | | 0.5 | | | μA |
| I_{EE} | Power Supply Current | | | 40 | | | 40 | | | 40 | | | 46 | mA |

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

AZ10EL16VO
AZ100EL16VO

100K LVPECL DC Characteristics ($V_{EE} = \text{GND}$, $V_{CC} = +3.3\text{V}$)

| 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} | 2215 | | 2420 | 2275 | | 2420 | 2275 | | 2420 | 2275 | | 2420 | mV |
| V_{OL} | Output LOW Voltage ^{1,2} | 1400 | | 1745 | 1400 | | 1680 | 1400 | | 1680 | 1400 | | 1680 | mV |
| V_{IH} | Input HIGH Voltage | D/ \bar{D} ¹ | 2135 | 2910 | 2135 | | 2910 | 2135 | | 2910 | 2135 | | 2910 | mV |
| | | $\bar{E}N$ | 2135 ¹ | V_{CC} | 2135 ¹ | | V_{CC} | 2135 ¹ | | V_{CC} | 2135 ¹ | | V_{CC} | |
| V_{IL} | Input LOW Voltage | D/ \bar{D} ¹ | 1050 | 1825 | 1050 | | 1825 | 1050 | | 1825 | 1050 | | 1825 | mV |
| | | $\bar{E}N$ | V_{EE} | 1825 ¹ | V_{EE} | | 1825 ¹ | V_{EE} | | 1825 ¹ | V_{EE} | | 1825 ¹ | |
| V_{BB} | Reference Voltage ¹ | 1910 | | 2050 | 1910 | | 2050 | 1910 | | 2050 | 1910 | | 2050 | mV |
| I_{IH} | Input HIGH Current | D/ \bar{D} | | 60 | | | 60 | | | 60 | | | 60 | μA |
| | | $\bar{E}N$ | | 150 | | | 150 | | | 150 | | | 150 | |
| I_{IL} | Input LOW Current | D/ \bar{D} | 0.5 | | 0.5 | | | 0.5 | | | 0.5 | | | μA |
| | | $\bar{E}N$ ³ | -300 | | -300 | | | -300 | | | -300 | | | |
| I_{EE} | Power Supply Current | | | 40 | | | 40 | | | 40 | | | 46 | mA |

1. For supply voltages other than 3.3V, use the ECL table values and ADD supply voltage value.
2. Each output is terminated through a 50Ω resistor to $V_{CC} - 2\text{V}$.
3. Specified with $\bar{E}N$ forced to V_{EE} .

100K 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 ^{1,2} | 3915 | | 4120 | 3975 | | 4120 | 3975 | | 4120 | 3975 | | 4120 | mV |
| V_{OL} | Output LOW Voltage ^{1,2} | 3100 | | 3445 | 3100 | | 3380 | 3100 | | 3380 | 3100 | | 3380 | mV |
| V_{IH} | Input HIGH Voltage | D/ \bar{D} ¹ | 3835 | 4610 | 3835 | | 4610 | 3835 | | 4610 | 3835 | | 4610 | mV |
| | | $\bar{E}N$ | 3835 ¹ | V_{CC} | 3835 ¹ | | V_{CC} | 3835 ¹ | | V_{CC} | 3835 ¹ | | V_{CC} | |
| V_{IL} | Input LOW Voltage | D/ \bar{D} ¹ | 2750 | 3525 | 2750 | | 3525 | 2750 | | 3525 | 2750 | | 3525 | mV |
| | | $\bar{E}N$ | V_{EE} | 3525 ¹ | V_{EE} | | 3525 ¹ | V_{EE} | | 3525 ¹ | V_{EE} | | 3525 ¹ | |
| V_{BB} | Reference Voltage ¹ | 3610 | | 3750 | 3610 | | 3750 | 3610 | | 3750 | 3610 | | 3750 | mV |
| I_{IH} | Input HIGH Current | D/ \bar{D} | | 60 | | | 60 | | | 60 | | | 60 | μA |
| | | $\bar{E}N$ | | 150 | | | 150 | | | 150 | | | 150 | |
| I_{IL} | Input LOW Current | D/ \bar{D} | 0.5 | | 0.5 | | | 0.5 | | | 0.5 | | | μA |
| | | $\bar{E}N$ ³ | -1400 | | -1400 | | | -1400 | | | -1400 | | | |
| I_{EE} | Power Supply Current | | | 40 | | | 40 | | | 40 | | | 46 | mA |

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

AZ10EL16VO

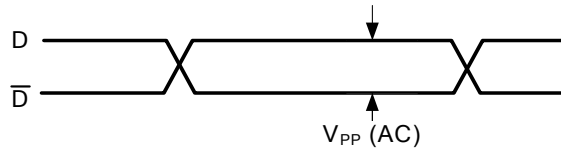
AZ100EL16VO

AC Characteristics ($V_{EE} = -3.0V$ to $-5.5V$; $V_{CC} = GND$ or $V_{EE} = GND$, $V_{CC} = +3.0V$ to $+5.5V$)

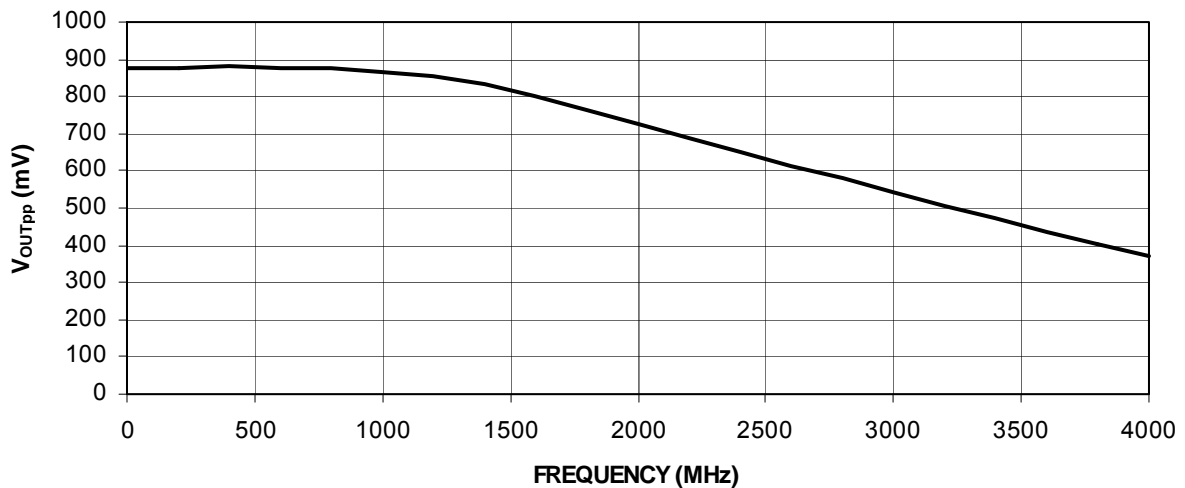
| Symbol | Characteristic | -40°C | | | 0°C | | | 25°C | | | 85°C | | | Unit |
|-------------------|---|-------|-----|------|-----|-----|------|------|-----|------|------|-----|------|------|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| t_{PLH}/t_{PHL} | Propagation Delay D to Q/ \bar{Q} Outputs (SE) | 100 | | 300 | 100 | | 300 | 100 | 200 | 300 | 100 | | 300 | ps |
| | D to Q_{HG}/\bar{Q}_{HG} Outputs (SE) | 150 | | 450 | 150 | | 450 | 150 | 290 | 450 | 150 | | 450 | |
| t_{SKEW} | Duty Cycle Skew ¹ (SE) | | 5 | 20 | | 5 | 20 | | 5 | 20 | | 5 | 20 | ps |
| $V_{PP} (AC)$ | Input Swing ² | 80 | | 1000 | 80 | | 1000 | 80 | | 1000 | 80 | | 1000 | mV |
| t_r/t_f | Output Rise/Fall Times (20% – 80%) | 80 | | 240 | 80 | | 240 | 80 | 135 | 240 | 80 | | 240 | ps |

1. Duty cycle skew is the difference between a t_{PLH} and t_{PHL} propagation delay through a device.
2. V_{PP} is the peak-to-peak differential input swing for which AC parameters are guaranteed. The device has a voltage gain of ≈ 20 to Q/ \bar{Q} outputs and a voltage gain of ≈ 100 to Q_{HG}/\bar{Q}_{HG} outputs.

AC PP INPUT



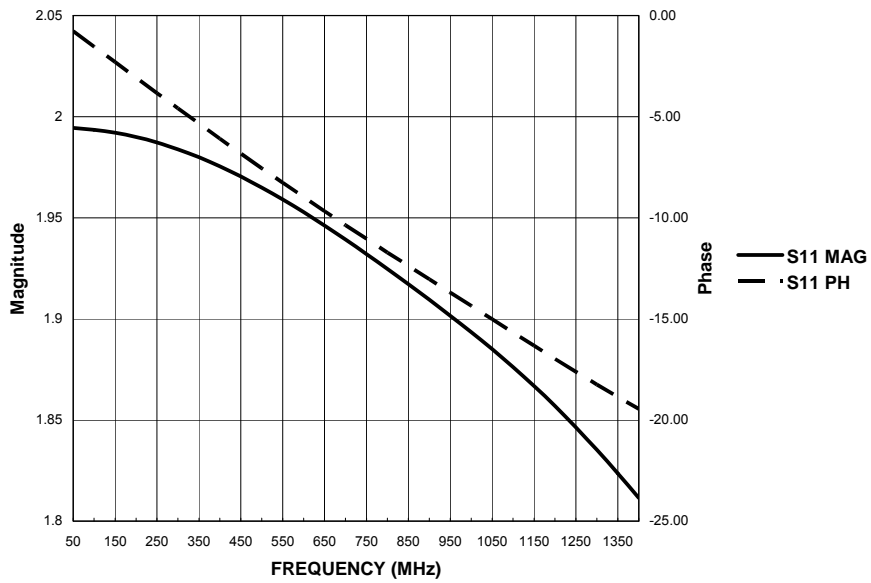
Typical Large Signal Outputs, Q_{HG}/\bar{Q}_{HG}



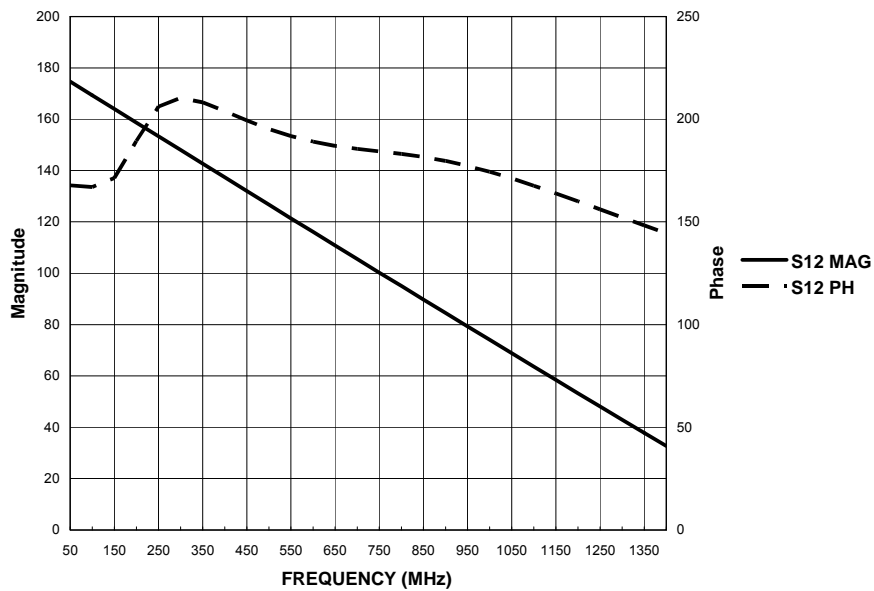
Measured with 750mv differential input, V_{EEP} NC, Q_{HG}/\bar{Q}_{HG} each terminated to $V_{CC}-2V$ via 50 Ω resistors.



**AZ10EL16VO
AZ100EL16VO**

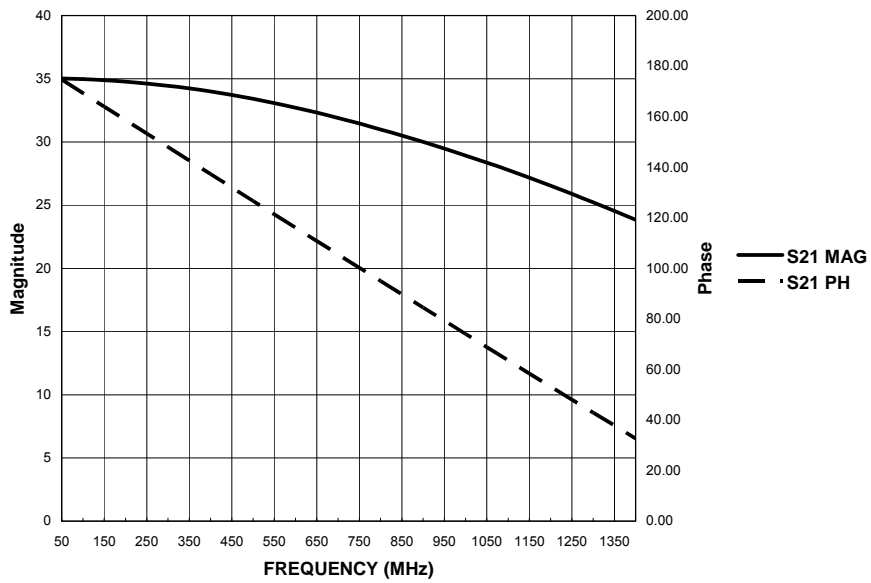


S11, D to Q, 50 Ω load to $V_{CC} - 2V$

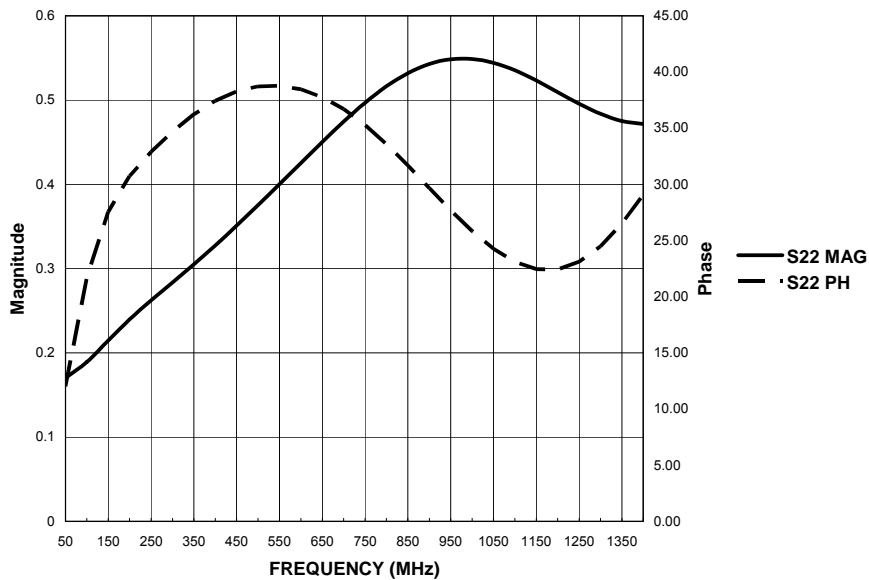


S12, D to Q, 50 Ω load to $V_{CC} - 2V$

**AZ10EL16VO
AZ100EL16VO**

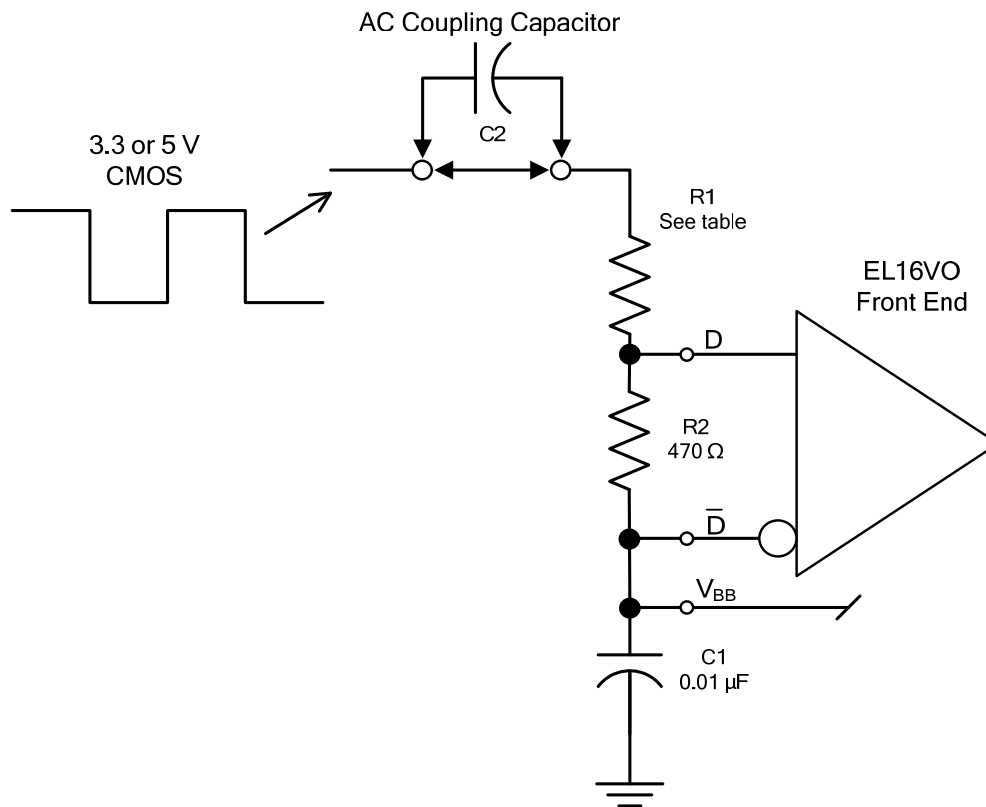


S21, D to Q, 50 Ω load to $V_{CC} - 2V$



S22, D to Q, 50 Ω load to $V_{CC} - 2V$

AZ10EL16VO
AZ100EL16VO



Application Circuit for CMOS Inputs

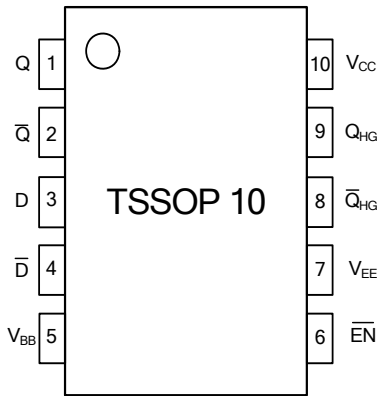
| Input Type | R1 ¹ | |
|------------|----------------------------|-------------------------|
| | AC Coupled (C2 in circuit) | DC Coupled (C2 shorted) |
| 3.3 V CMOS | 430 Ω | 750 Ω |
| 5 V CMOS | 910 Ω | 1.8K Ω |

¹ R1 should be chosen so that the input swing on the D input with respect to \bar{D} is in the range of ± 80 to ± 1000 mV, per the AC Characteristics table.

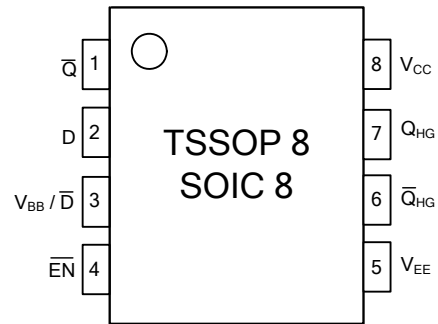
Recommended Component Values for CMOS Single Ended Inputs

AZ10EL16VO
AZ100EL16VO

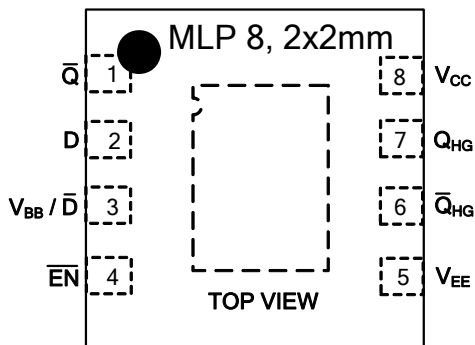
AZ10EL16VOU
AZ100EL16VOU



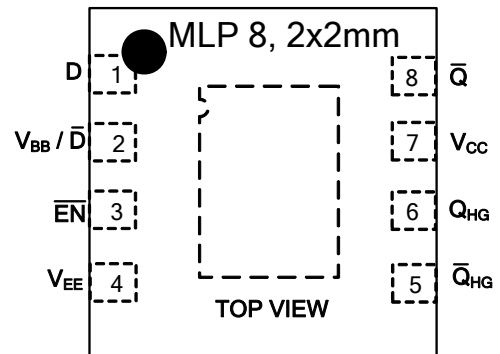
AZ10EL16VOD
AZ100EL16VOD
AZ10EL16VOT
AZ100EL16VOT



AZ100EL16VON

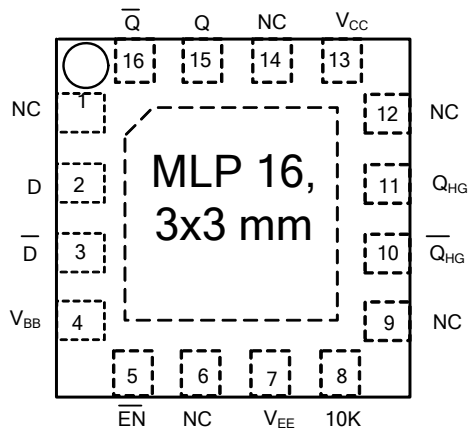


AZ100EL16VONB



MLP 8: Bottom Center Pad may be left open or tied to V_{EE} . Pin 4 is the V_{EE} return.

AZ10/100EL16VOL



MLP 16 (L) Package and DIE:
10K/100K Selection

Connect pin/pad 10K to V_{EE} to select 10K operation. Float (NC) pin/pad 10K to select 100K operation. V_{EE} connection must be less than 1Ω .

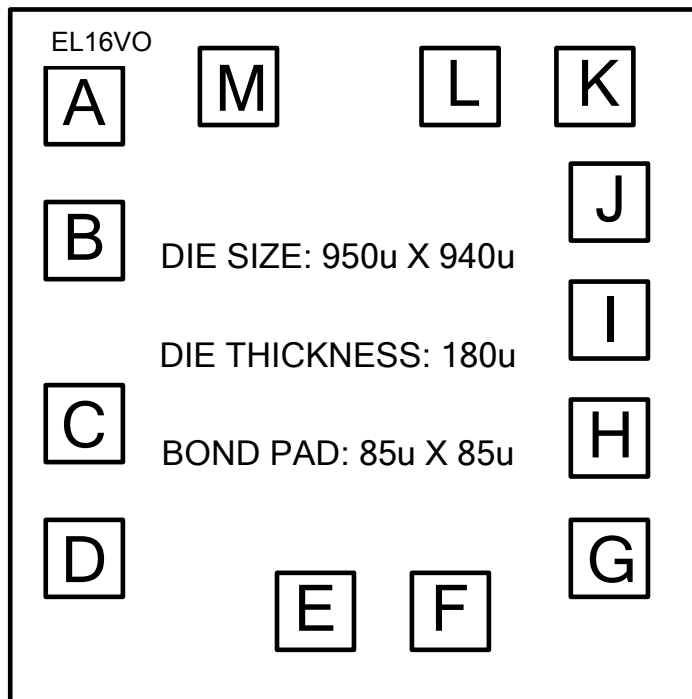
Pin 6 of the MLP 16 package may be connected to pin 7 (V_{EE}) with no effect on the circuit.

MPL 16: Bottom Center Pad may be left open or tied to V_{EE} . Pin 7 is the V_{EE} return.

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DIE PAD COORDINATES

AZ10/100EL16VO DIE:



Note: Other die thicknesses available. Contact factory for further information.

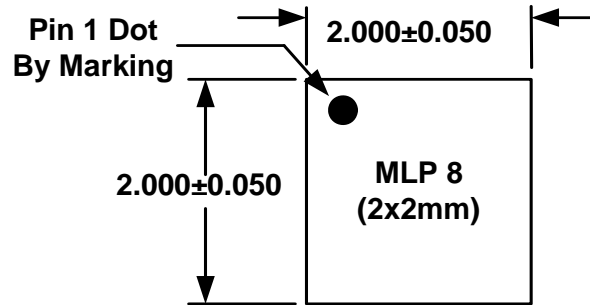
PAD CENTER COORDINATES

| NAME | PAD DESIGNATION | X(Microns) | Y(Microns) |
|------|-----------------|------------|------------|
| A | D | -342.5 | 312.5 |
| B | \bar{D} | -342.5 | 144.5 |
| C | V_{BB} | -342.5 | -87.0 |
| D | \bar{EN} | -342.5 | -255.0 |
| E | V_{EE} | -33.5 | -312.5 |
| F | 10K | 126.5 | -312.5 |
| G | \bar{Q}_{HG} | 312.5 | -248.5 |
| H | Q_{HG} | 312.5 | -98.5 |
| I | NC | 312.5 | 51.5 |
| J | V_{CC} | 312.5 | 201.5 |
| K | V_{CC} | 302.5 | 342.5 |
| L | Q | 142.5 | 342.5 |
| M | \bar{Q} | -140.5 | 342.5 |

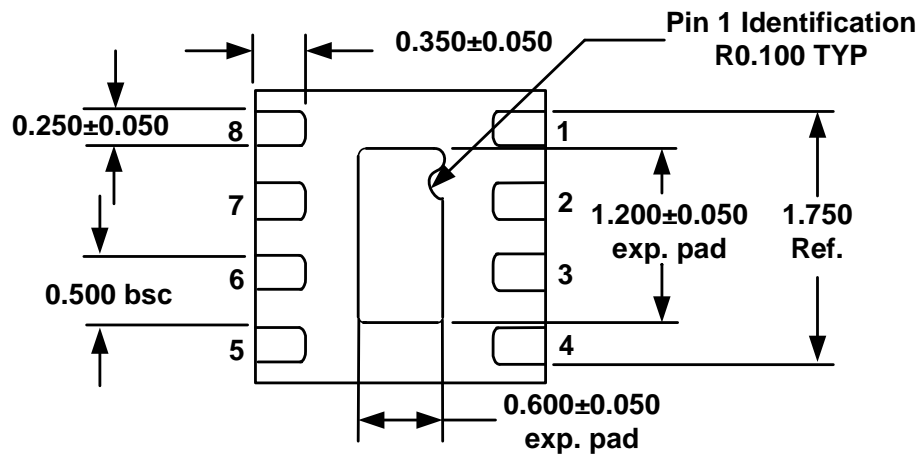
NC = No connect, leave open.

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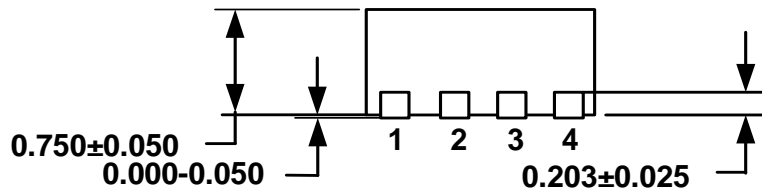
PACKAGE DIAGRAM
MLP 8 2x2mm



TOP VIEW



BOTTOM VIEW

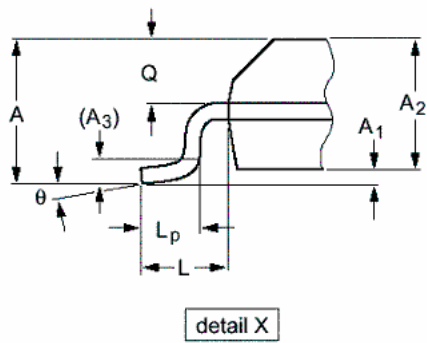
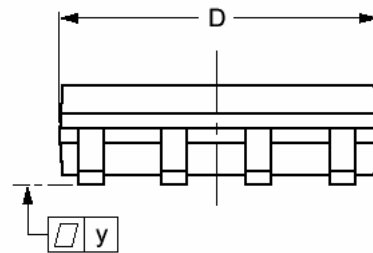
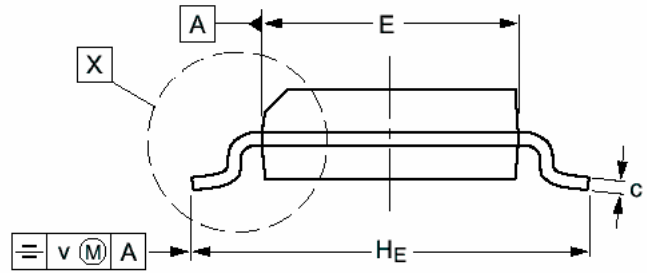
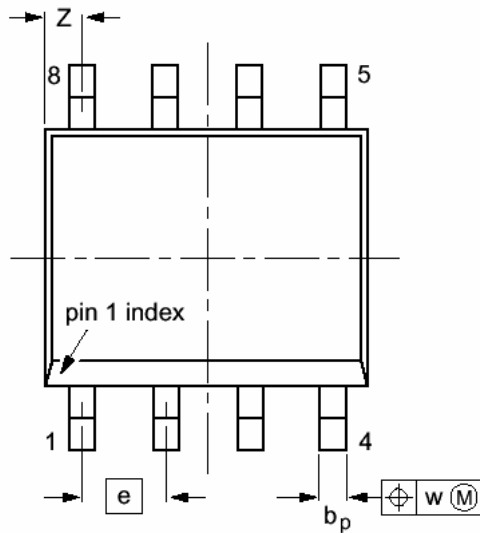


SIDE VIEW

Note: All dimensions are in mm

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PACKAGE DIAGRAM
SOIC 8



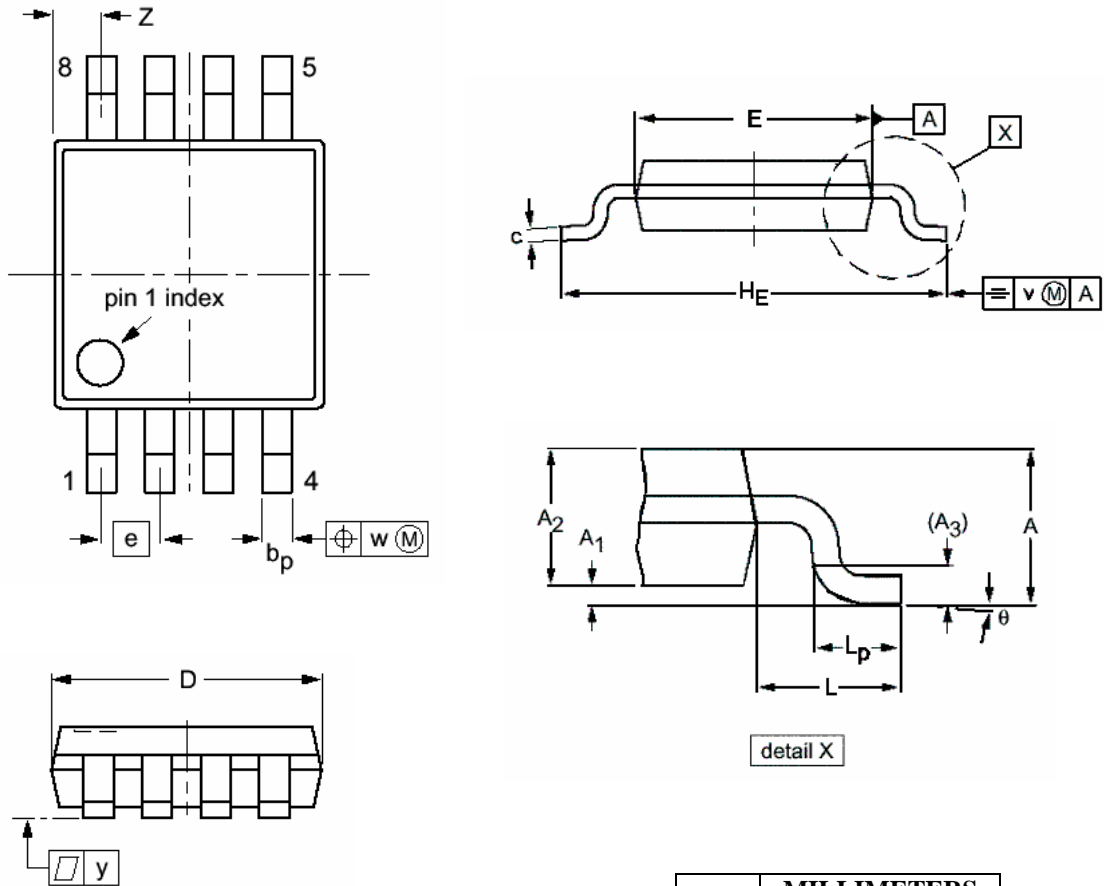
| DIM | MILLIMETERS | | INCHES | |
|----------------|-------------|------|--------|--------|
| | MIN | MAX | MIN | MAX |
| A | | 0.75 | | 0.069 |
| A ₁ | 0.10 | 0.25 | 0.004 | 0.010 |
| A ₂ | 1.25 | 1.45 | 0.049 | 0.057 |
| A ₃ | 0.25 | | 0.01 | |
| b _p | 0.36 | 0.49 | 0.014 | 0.019 |
| c | 0.19 | 0.25 | 0.0075 | 0.0100 |
| D | 4.8 | 5.0 | 0.19 | 0.20 |
| E | 3.8 | 4.0 | 0.15 | 0.16 |
| e | 1.27 | | 0.050 | |
| H _E | 5.80 | 6.20 | 0.228 | 0.244 |
| L | 1.05 | | 0.041 | |
| L _p | 0.40 | 1.00 | 0.016 | 0.039 |
| Q | 0.60 | 0.70 | 0.024 | 0.028 |
| v | 0.25 | | 0.01 | |
| w | 0.25 | | 0.01 | |
| y | 0.10 | | 0.004 | |
| Z | 0.30 | 0.70 | 0.012 | 0.028 |
| θ | 0° | 8° | 0° | 8° |

NOTES:

1. DIMENSIONS D AND E DO NOT INCLUDE MOLD PROTRUSION.
2. MAXIMUM MOLD PROTRUSION FOR D IS 0.15mm.
3. MAXIMUM MOLD PROTRUSION FOR E IS 0.25mm.

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**PACKAGE DIAGRAM
TSSOP 8**



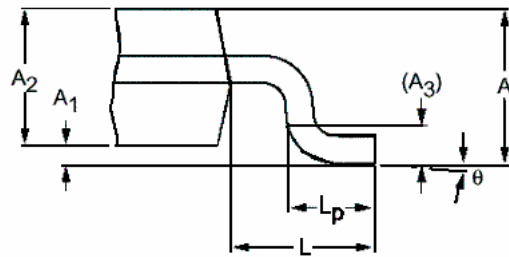
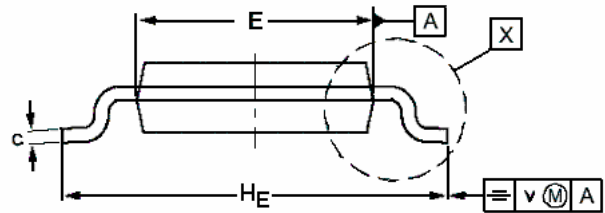
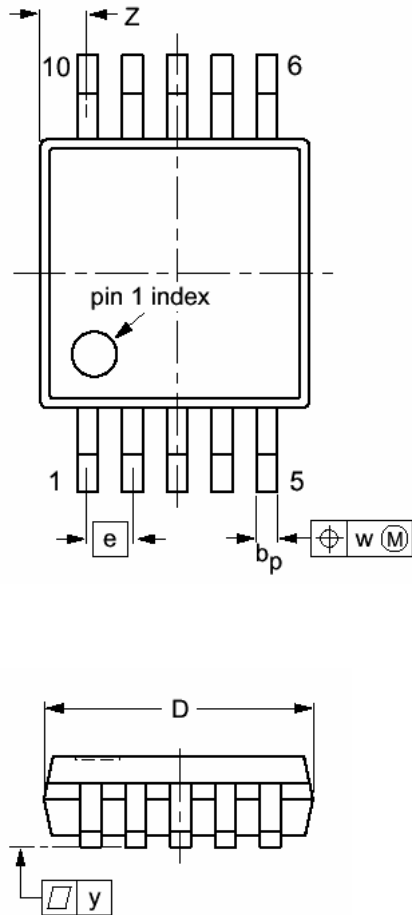
NOTES:

1. DIMENSIONS D AND E DO NOT INCLUDE MOLD PROTRUSION.
2. MAXIMUM MOLD PROTRUSION FOR D IS 0.15mm.
3. MAXIMUM MOLD PROTRUSION FOR E IS 0.25mm.

| DIM | MILLIMETERS | |
|----------------|-------------|------|
| | MIN | MAX |
| A | | 1.10 |
| A ₁ | 0.05 | 0.15 |
| A ₂ | 0.80 | 0.95 |
| A ₃ | 0.25 | |
| b _p | 0.25 | 0.45 |
| c | 0.15 | 0.28 |
| D | 2.90 | 3.10 |
| E | 2.90 | 3.10 |
| e | 0.65 | |
| H _E | 4.70 | 5.10 |
| L | 0.94 | |
| L _p | 0.40 | 0.70 |
| v | 0.10 | |
| w | 0.10 | |
| y | 0.10 | |
| Z | 0.35 | 0.70 |
| θ | 0° | 6° |

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**PACKAGE DIAGRAM
TSSOP 10**



detail X

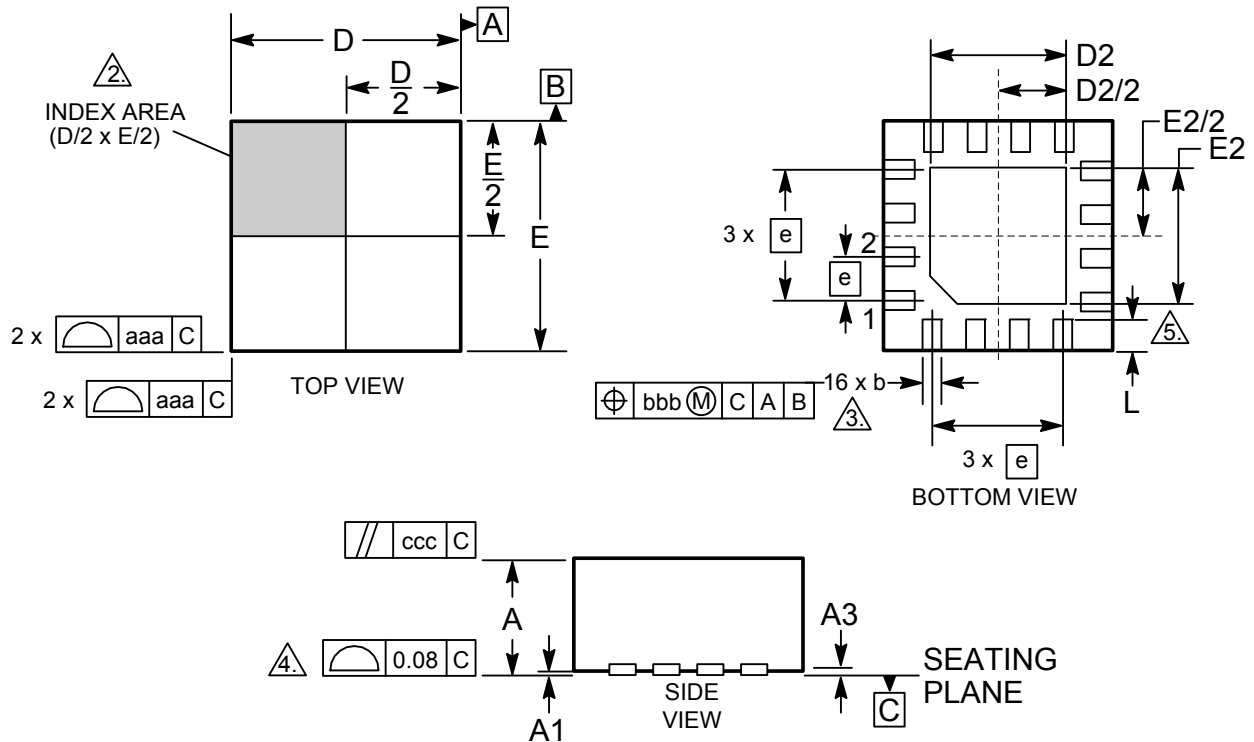
| | MILLIMETERS | |
|----------------|-------------|------|
| | MIN | MAX |
| A | | 1.10 |
| A ₁ | 0.05 | 0.15 |
| A ₂ | 0.80 | 0.95 |
| A ₃ | 0.25 | |
| b _p | 0.15 | 0.30 |
| c | 0.15 | 0.23 |
| D ¹ | 2.90 | 3.10 |
| E ² | 2.90 | 3.10 |
| e | 0.50 | |
| H _E | 4.80 | 5.00 |
| L | 0.95 | |
| L _p | 0.40 | 0.70 |
| v | 0.10 | |
| w | 0.10 | |
| y | 0.10 | |
| Z | 0.34 | 0.67 |
| θ | 0° | 6° |

NOTES:

1. DIMENSIONS D AND E DO NOT INCLUDE MOLD PROTRUSION.
2. MAXIMUM MOLD PROTRUSION FOR D IS 0.15mm.
3. MAXIMUM MOLD PROTRUSION FOR E IS 0.25mm.

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**PACKAGE DIAGRAM
MLP 16 3x3mm**



NOTES:

1. DIMENSIONING AND TOLERANCING CONFORM TO ASME T14-1994.
2. THE TERMINAL #1 AND PAD NUMBERING CONVENTION SHALL CONFORM TO JESD 95-1 SPP-012.
3. DIMENSION b APPLIES TO METALLIZED PAD AND IS MEASURED BETWEEN 0.25 AND 0.30 mm FROM PAD TIP.
4. COPLANARITY APPLIES TO THE EXPOSED PADS AS WELL AS THE TERMINALS.
5. INSIDE CORNERS OF METALLIZED PAD MAY BE SQUARE OR ROUNDED

| DIM | MILLIMETERS | |
|-----|-------------|------|
| | MIN | MAX |
| A | 0.80 | 1.00 |
| A1 | 0.00 | 0.05 |
| A3 | 0.25 REF | |
| b | 0.18 | 0.30 |
| D | 2.90 | 3.10 |
| D2 | 0.25 | 1.95 |
| E | 2.90 | 3.10 |
| E2 | 0.25 | 1.95 |
| e | 0.50 BSC | |
| L | 0.30 | 0.50 |
| aaa | 0.25 | |
| bbb | 0.10 | |
| ccc | 0.10 | |

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