

MC10EP11



SO-8, D SUFFIX
8-LEAD PLASTIC SOIC PACKAGE
CASE 751

ORDERING INFORMATION
MC10EP11D SOIC

ECLPS Plus™

Product Preview

1:2 Differential Fanout Buffer

- 180ps Typical Propagation Delay
- Maximum Frequency > 2.7GHz
- PECL mode: 3.0V to 5.5V V_{CC} with $V_{EE} = 0V$
- ECL mode: 0V V_{CC} with $V_{EE} = -3.0V$ to $-5.5V$
- Internal Input Resistors: Pulldown on D, Pulldown and Pullup on \bar{D}
- Q Outputs will default LOW with inputs open or at V_{EE}
- ESD Protection: >4KV HBM, >200V MM
- New Differential Input Common Mode Range
- Moisture Sensitivity Level 1, Indefinite Time Out of Drypack
- Flammability Rating: UL-94 code V-0 @ 1/8", Oxygen Index 28 to 34
- Transistor Count = 73 devices

The MC10EP11 is a differential 1:2 fanout buffer. The device is pin and functionally equivalent to the LVEL11 device. With AC performance much faster than the LVEL11 device, the EP11 is ideal for applications requiring the fastest AC performance available.

PIN DESCRIPTION

| PIN | FUNCTION |
|---|-------------------------------------|
| D, \bar{D} Q0, $\bar{Q0}$, Q1, $\bar{Q1}$ | ECL Data Inputs ECL Data Outputs |



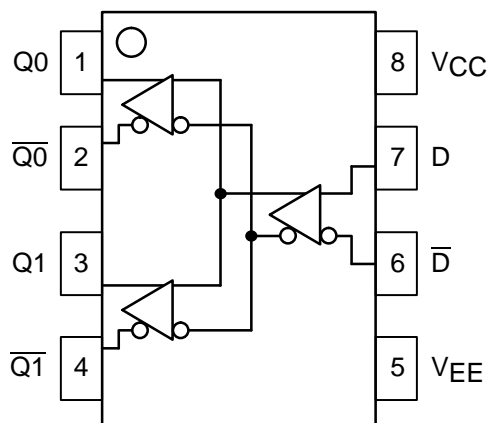


Figure 1. 8-Lead Pinout (Top View) and Logic Diagram

MAXIMUM RATINGS*

| Symbol | Parameter | Value | Unit |
|---------------|---|-------------------|------|
| V_{EE} | Power Supply ($V_{CC} = 0V$) | -6.0 to 0 | VDC |
| V_{CC} | Power Supply ($V_{EE} = 0V$) | 6.0 to 0 | VDC |
| V_I | Input Voltage ($V_{CC} = 0V$, V_I not more negative than V_{EE}) | -6.0 to 0 | VDC |
| V_I | Input Voltage ($V_{EE} = 0V$, V_I not more positive than V_{CC}) | 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 | -65 to +150 | °C |
| θ_{JA} | Thermal Resistance (Junction-to-Ambient) Still Air 500lfpm | 190 130 | °C/W |
| θ_{JC} | Thermal Resistance (Junction-to-Case) | 41 to 44 \pm 5% | °C/W |
| T_{sol} | Solder Temperature (<2 to 3 Seconds: 245°C desired) | 265 | °C |

* Maximum Ratings are those values beyond which damage to the device may occur.

DC CHARACTERISTICS, ECL/LVECL ($V_{CC} = 0V$; $V_{EE} = -5.5V$ to $-3.0V$) (Note 4.)

| Symbol | Characteristic | -40°C | | | 25°C | | | 85°C | | | Unit |
|-----------------|---|------------------------|-------|-------|--------------|-------|-------|--------------|-------|-------|------|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| IEE | Power Supply Current (Note 1.) | 20 | 29 | 37 | 20 | 30 | 39 | 22 | 31 | 40 | mA |
| VOH | Output HIGH Voltage (Note 2.) | -1135 | -1060 | -885 | -1070 | -945 | -820 | -1010 | -885 | -760 | mV |
| VOL | Output LOW Voltage (Note 2.) | -1935 | -1810 | -1685 | -1870 | -1745 | -1620 | -1810 | -1685 | -1560 | mV |
| VIH | Input HIGH Voltage Single Ended | -1210 | | -885 | -1145 | | -820 | -1085 | | -760 | mV |
| VIL | Input LOW Voltage Single Ended | -1935 | | -1610 | -1870 | | -1545 | -1810 | | -1485 | mV |
| VIHCMR | Input HIGH Voltage Common Mode Range (Note 3.) | $V_{EE}+2.0$ | | 0.0 | $V_{EE}+2.0$ | | 0.0 | $V_{EE}+2.0$ | | 0.0 | V |
| I _{IH} | Input HIGH Current | | | 150 | | | 150 | | | 150 | μA |
| I _{IL} | Input LOW Current | D 0.5 D̄ -150 | | | 0.5 -150 | | | 0.5 -150 | | | μA |

NOTE: 10EP circuits are designed to meet the DC specifications shown in the above table after thermal equilibrium has been established.
The circuit is in a test socket or mounted on a printed circuit board and transverse airflow greater than 500lfpm is maintained.

1. $V_{CC} = 0V$, $V_{EE} = V_{EEmin}$ to V_{EEmax} , all other pins floating.
2. All loading with 50 ohms to $V_{CC}-2.0$ volts.
3. V_{IHCMR} min varies 1:1 with V_{EE} , max varies 1:1 with V_{CC} .
4. Input and output parameters vary 1:1 with V_{CC} .

DC CHARACTERISTICS, LVPECL ($V_{CC} = 3.3V \pm 0.3V$, $V_{EE} = 0V$) (Note 8.)

| Symbol | Characteristic | -40°C | | | 25°C | | | 85°C | | | Unit |
|-----------------|---|------------------------|------|------|-------------|------|------|-------------|------|------|------|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| IEE | Power Supply Current (Note 5.) | 20 | 29 | 37 | 20 | 30 | 39 | 22 | 31 | 40 | mA |
| VOH | Output HIGH Voltage (Note 6.) | 2165 | 2240 | 2415 | 2230 | 2355 | 2480 | 2290 | 2415 | 2540 | mV |
| VOL | Output LOW Voltage (Note 6.) | 1365 | 1490 | 1615 | 1430 | 1555 | 1680 | 1490 | 1615 | 1740 | mV |
| VIH | Input HIGH Voltage Single Ended | 2090 | | 2415 | 2155 | | 2480 | 2215 | | 2540 | mV |
| VIL | Input LOW Voltage Single Ended | 1365 | | 1690 | 1430 | | 1755 | 1490 | | 1815 | mV |
| VIHCMR | Input HIGH Voltage Common Mode Range (Note 7.) | 2.0 | | 3.3 | 2.0 | | 3.3 | 2.0 | | 3.3 | V |
| I _{IH} | Input HIGH Current | | | 150 | | | 150 | | | 150 | μA |
| I _{IL} | Input LOW Current | D 0.5 D̄ -150 | | | 0.5 -150 | | | 0.5 -150 | | | μA |

NOTE: 10EP circuits are designed to meet the DC specifications shown in the above table after thermal equilibrium has been established.
The circuit is in a test socket or mounted on a printed circuit board and transverse airflow greater than 500lfpm is maintained.

5. $V_{CC} = 3.3V$, $V_{EE} = 0V$, all other pins floating.
6. All loading with 50 ohms to $V_{CC}-2.0$ volts.
7. V_{IHCMR} min varies 1:1 with V_{EE} , max varies 1:1 with V_{CC} .
8. Input and output parameters vary 1:1 with V_{CC} .

DC CHARACTERISTICS, PECL ($V_{CC} = 5.0V \pm 0.5V$, $V_{EE} = 0V$) (Note 12.)

| Symbol | Characteristic | -40°C | | | 25°C | | | 85°C | | | Unit |
|--------|--|------------------------|------|------|-------------|------|------|-------------|------|------|------|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| IEE | Power Supply Current (Note 9.) | 20 | 29 | 37 | 20 | 30 | 39 | 22 | 31 | 40 | mA |
| VOH | Output HIGH Voltage (Note 10.) | 3865 | 3940 | 4115 | 3930 | 4055 | 4180 | 3990 | 4115 | 4240 | mV |
| VOL | Output LOW Voltage (Note 10.) | 3065 | 3190 | 3315 | 3130 | 3255 | 3380 | 3190 | 3315 | 3440 | mV |
| VIH | Input HIGH Voltage Single Ended | 3790 | | 4115 | 3855 | | 4180 | 3915 | | 4240 | mV |
| VIL | Input LOW Voltage Single Ended | 3065 | | 3390 | 3130 | | 3455 | 3190 | | 3515 | mV |
| VIHCMR | Input HIGH Voltage Common Mode Range (Note 11.) | 2.0 | | 5.0 | 2.0 | | 5.0 | 2.0 | | 5.0 | V |
| IIH | Input HIGH Current | | | 150 | | | 150 | | | 150 | μA |
| IIL | Input LOW Current | D 0.5 D̄ -150 | | | 0.5 -150 | | | 0.5 -150 | | | μA |

NOTE: 10EP circuits are designed to meet the DC specifications shown in the above table after thermal equilibrium has been established.

The circuit is in a test socket or mounted on a printed circuit board and transverse airflow greater than 500lfpm is maintained.

9. $V_{CC} = 5.0V$, $V_{EE} = 0V$, all other pins floating.

10. All loading with 50 ohms to V_{CC} -2.0 volts.

11. V_{IHCMR} min varies 1:1 with V_{EE} , max varies 1:1 with V_{CC} .

12. Input and output parameters vary 1:1 with V_{CC} .

AC CHARACTERISTICS ($V_{CC} = 0V$; $V_{EE} = -3.0V$ to $-5.5V$) or ($V_{CC} = 3.0V$ to $5.5V$; $V_{EE} = 0V$)

| Symbol | Characteristic | -40°C | | | 25°C | | | 85°C | | | Unit |
|--|---|-------|------------|------|------|------------|------|------|------------|------|------|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| f _{max} | Maximum Toggle Frequency (Note 13.) | 2.7 | | | 2.7 | | | 2.7 | | | GHz |
| t _{PLH} , t _{PHL} | Propagation Delay CLK→Q, Q̄ | 140 | 200 | 270 | 160 | 220 | 300 | 180 | 240 | 320 | ps |
| t _{SKew} | Device Skew Part-to-Part (Note 14.) Q, Q̄ | | TBD TBD | | | TBD TBD | | | TBD TBD | | ps |
| t _{JITTER} | Cycle-to-Cycle Jitter | | TBD | | | TBD | | | TBD | | ps |
| V _{PP} | Input Voltage Swing (Diff.) | 150 | 800 | 1200 | 150 | 800 | 1200 | 150 | 800 | 1200 | mV |
| t _r t _f | Output Rise/Fall Times (20% – 80%) Q, Q̄ | 50 | 110 | 180 | 60 | 120 | 200 | 70 | 140 | 220 | ps |

13. F_{max} guaranteed for functionality only. See Figure 2 for typical output swing. V_{OL} and V_{OH} levels are guaranteed at DC only.

14. Skew is measured between outputs under identical transitions.

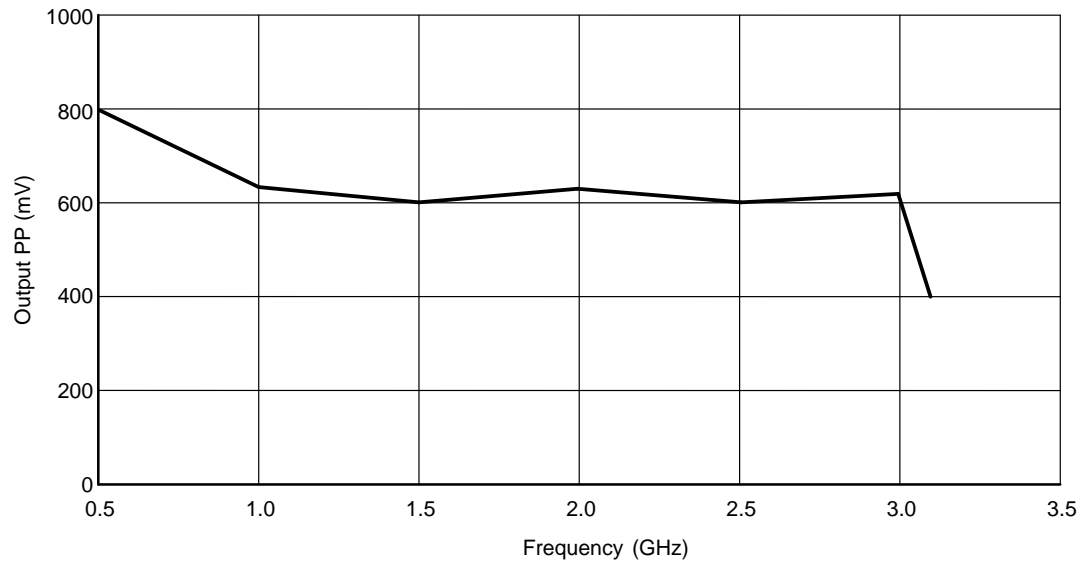
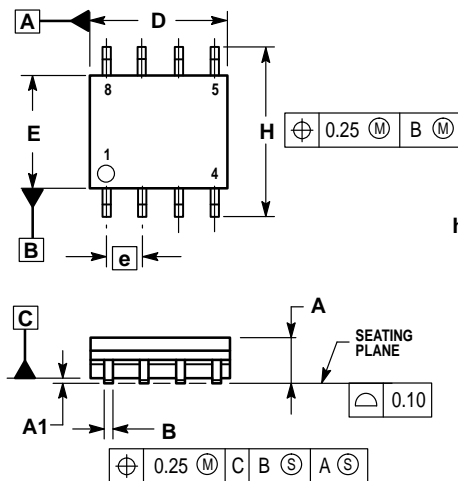


Figure 2. Typical Output V_{pp} vs. Frequency

OUTLINE DIMENSIONS

SO-8, D SUFFIX
PLASTIC SOIC PACKAGE
CASE 751-06
ISSUE T



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. DIMENSIONS ARE IN MILLIMETER.
3. DIMENSION D AND E DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
5. DIMENSION B DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 TOTAL IN EXCESS OF THE B DIMENSION AT MAXIMUM MATERIAL CONDITION.

| DIM | MILLIMETERS | |
|-----|-------------|------|
| | MIN | MAX |
| A | 1.35 | 1.75 |
| A1 | 0.10 | 0.25 |
| B | 0.35 | 0.49 |
| C | 0.19 | 0.25 |
| D | 4.80 | 5.00 |
| E | 3.80 | 4.00 |
| e | 1.27 BSC | |
| H | 5.80 | 6.20 |
| h | 0.25 | 0.50 |
| L | 0.40 | 1.25 |
| θ | 0° | 7° |

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