

MC10EP131, MC100EP131

3.3V / 5V ECL Quad D Flip-Flop with Set, Reset, and Differential Clock

Description

The MC10/100EP131 is a Quad Master-slaved D flip-flop with common set and separate resets. The device is an expansion of the E131 with differential common clock and individual clock enables. With AC performance faster than the E131 device, the EP131 is ideal for applications requiring the fastest AC performance available.

Each flip-flop may be clocked separately by holding Common Clock (C_C) LOW and $\overline{C_C}$ HIGH, then using the differential Clock Enable inputs for clocking (C_{0-3} , $\overline{C_{0-3}}$).

Common clocking is achieved by holding the differential inputs C_{0-3} LOW and $\overline{C_{0-3}}$ HIGH while using the differential Common Clock (C_C) to clock all four flip-flops. When left floating open, any differential input will disable operation due to input pulldown resistors forcing an output default state.

Individual asynchronous resets (R_{0-3}) and an asynchronous set (SET) are provided.

Data enters the master when both C_C and C_{0-3} are LOW, and transfers to the slave when either C_C or C_{0-3} (or both) go HIGH.

The 100 Series contains temperature compensation.

Features

- 460 ps Typical Propagation Delay
- Maximum Frequency > 3 GHz Typical
- Differential Individual and Common Clocks
- Individual Asynchronous Resets
- Asynchronous Set
- PECL Mode Operating Range: $V_{CC} = 3.0\text{ V}$ to 5.5 V with $V_{EE} = 0\text{ V}$
- NECL Mode Operating Range: $V_{CC} = 0\text{ V}$ with $V_{EE} = -3.0\text{ V}$ to -5.5 V
- Open Input Default State
- Safety Clamp on Inputs
- Q Output Will Default LOW with Inputs Open or at V_{EE}
- Pb-Free Packages are Available



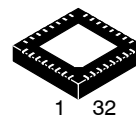
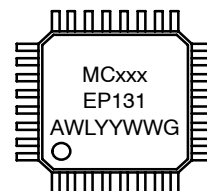
ON Semiconductor®

<http://onsemi.com>

MARKING DIAGRAM*



LQFP-32
FA SUFFIX
CASE 873A



QFN32
MN SUFFIX
CASE 488AM



xxx = 10 or 100
A = Assembly Location
WL, L = Wafer Lot
YY, Y = Year
WW, W = Work Week
G or ▪ = Pb-Free Package

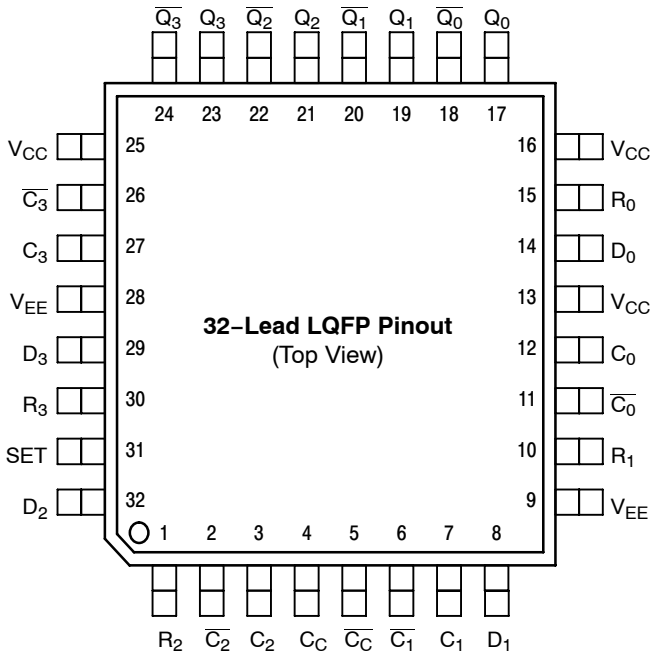
(Note: Microdot may be in either location)

*For additional marking information, refer to Application Note AND8002/D.

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 9 of this data sheet.

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Warning: All V_{CC} and V_{EE} pins must be externally connected to Power Supply to guarantee proper operation.

Figure 1. 32-Lead LQFP Pinout (Top View)

Table 1. PIN DESCRIPTION

| PIN | FUNCTION |
|---|---|
| D ₀₋₃ * | ECL Data Inputs |
| C ₀₋₃ *, C ₀₋₃ -* | ECL Separate Clock Inputs |
| C _C *, C _C -* | ECL Common Clock Inputs |
| R ₀₋₃ * | ECL Asynchronous Reset |
| SET* | ECL Asynchronous Set |
| Q ₀₋₃ , Q ₀₋₃ - | ECL Data Outputs |
| V _{CC} | Positive Supply |
| V _{EE} | Negative Supply |
| EP for QFN-32, only | The Exposed Pad (EP) on the QFN-32 package bottom is thermally connected to the die for improved heat transfer out of package. The exposed pad must be attached to a heat-sinking conduit. The pad is electrically connected to V _{EE} . |

* Pins will default LOW when left open.

Table 2. TRUTH TABLE

| D | S* | R* | CLK | Q |
|---|----|----|-----|-------|
| L | L | L | Z | L |
| H | L | L | Z | H |
| X | H | L | X | H |
| X | L | H | X | L |
| X | H | H | X | Undef |

Z = LOW to HIGH Transition

* Pins will default low when left open.

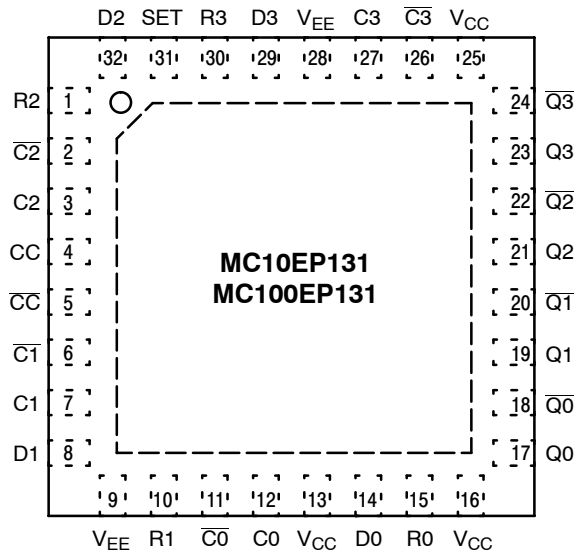


Figure 2. 32-Lead QFN Pinout (Top View)

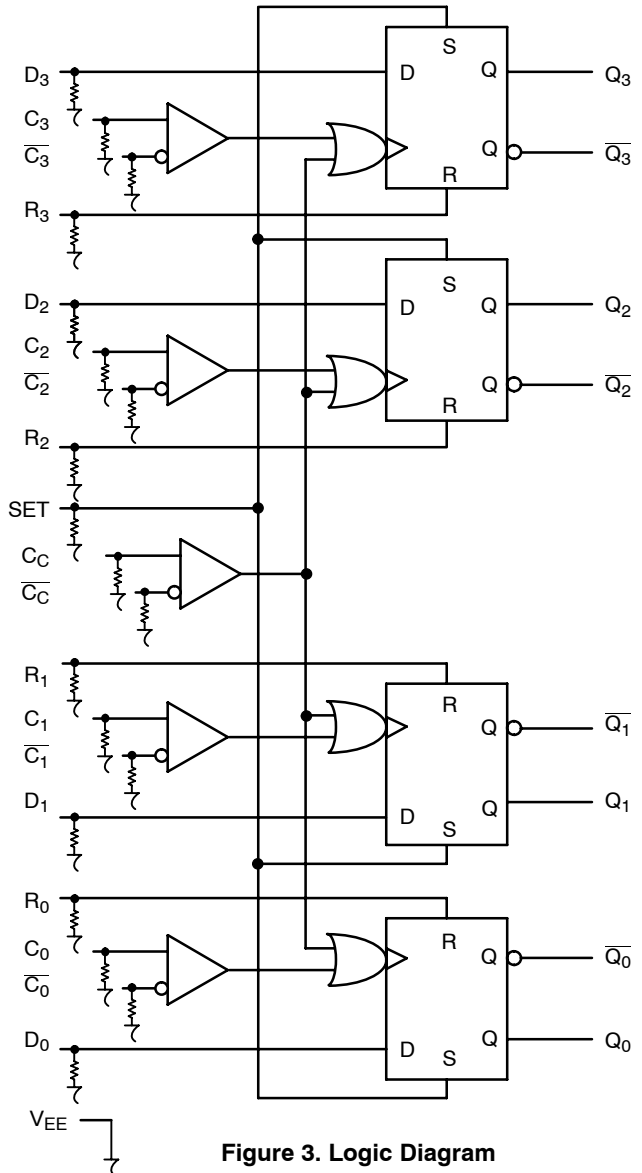


Figure 3. Logic Diagram

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Table 3. ATTRIBUTES

| Characteristics | Value | |
|---|---|-------------------------------|
| Internal Input Pulldown Resistor | 75 kΩ | |
| Internal Input Pullup Resistor | N/A | |
| ESD Protection | Human Body Model Machine Model Charged Device Model | > 2 kV > 100 V > 2 kV |
| Moisture Sensitivity, Indefinite Time Out of Drypack (Note 1) | Pb Pkg | Pb-Free Pkg |
| | LQFP-32 QFN-32 | Level 2 Level 2 Level 1 |
| Flammability Rating | Oxygen Index: 28 to 34 | UL 94 V-0 @ 0.125 in |
| Transistor Count | 935 Devices | |
| Meets or exceeds JEDEC Spec EIA/JESD78 IC Latchup Test | | |

1. For additional information, see Application Note AND8003/D.

Table 4. MAXIMUM RATINGS

| Symbol | Parameter | Condition 1 | Condition 2 | Rating | Unit |
|------------------|--|--|--|-------------|--------------|
| V _{CC} | PECL Mode Power Supply | V _{EE} = 0 V | | 6 | V |
| V _{EE} | NECL Mode Power Supply | V _{CC} = 0 V | | -6 | V |
| V _I | PECL Mode Input Voltage NECL Mode Input Voltage | V _{EE} = 0 V V _{CC} = 0 V | V _I ≤ V _{CC} V _I ≥ V _{EE} | 6 -6 | V V |
| I _{out} | Output Current | Continuous Surge | | 50 100 | mA mA |
| I _{BB} | V _{BB} Sink/Source | | | ± 0.5 | mA |
| T _A | Operating Temperature Range | | | -40 to +85 | °C |
| T _{stg} | Storage Temperature Range | | | -65 to +150 | °C |
| θ _{JA} | Thermal Resistance (Junction-to-Ambient) | 0 lfpm 500 lfpm | 32 LQFP 32 LQFP | 80 55 | °C/W °C/W |
| θ _{JC} | Thermal Resistance (Junction-to-Case) | Standard Board | 32 LQFP | 12 to 17 | °C/W |
| θ _{JA} | Thermal Resistance (Junction-to-Ambient) | 0 lfpm 500 lfpm | QFN-32 QFN-32 | 31 27 | °C/W °C/W |
| θ _{JC} | Thermal Resistance (Junction-to-Case) | 2S2P | QFN-32 | 12 | °C/W |
| T _{sol} | Wave Solder | Pb Pb-Free | | 265 265 | °C |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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Table 5. 10EP DC CHARACTERISTICS, PECL $V_{CC} = 3.3\text{ V}$, $V_{EE} = 0\text{ V}$ (Note 2)

| Symbol | Characteristic | -40°C | | | 25°C | | | 85°C | | | Unit |
|-------------|--|-------|------|------|------|------|------|------|------|------|---------------|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| I_{EE} | Power Supply Current | 70 | 95 | 120 | 70 | 95 | 120 | 70 | 95 | 120 | mA |
| V_{OH} | Output HIGH Voltage (Note 3) | 2165 | 2290 | 2415 | 2230 | 2355 | 2480 | 2290 | 2415 | 2540 | mV |
| V_{OL} | Output LOW Voltage (Note 3) | 1365 | 1490 | 1615 | 1430 | 1555 | 1680 | 1490 | 1615 | 1740 | mV |
| V_{IH} | Input HIGH Voltage (Single-Ended) | 2090 | | 2415 | 2155 | | 2480 | 2215 | | 2540 | mV |
| V_{IL} | Input LOW Voltage (Single-Ended) | 1365 | | 1690 | 1460 | | 1755 | 1490 | | 1815 | mV |
| V_{IHCMR} | Input HIGH Voltage Common Mode Range (Differential Configuration) (Note 4) | 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 | 0.5 | | | 0.5 | | | 0.5 | | | μA |

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfm. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

- Input and output parameters vary 1:1 with V_{CC} . V_{EE} can vary +0.3 V to -2.2 V.
- All loading with 50 Ω to $V_{CC} - 2.0\text{ V}$.
- V_{IHCMR} min varies 1:1 with V_{EE} . V_{IHCMR} max varies 1:1 with V_{CC} . The V_{IHCMR} range is referenced to the most positive side of the differential input signal.

Table 6. 10EP DC CHARACTERISTICS, PECL $V_{CC} = 5.0\text{ V}$, $V_{EE} = 0\text{ V}$ (Note 5)

| Symbol | Characteristic | -40°C | | | 25°C | | | 85°C | | | Unit |
|-------------|--|-------|------|------|------|------|------|------|------|------|---------------|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| I_{EE} | Power Supply Current | 70 | 95 | 120 | 70 | 95 | 120 | 70 | 95 | 120 | mA |
| V_{OH} | Output HIGH Voltage (Note 6) | 3865 | 3990 | 4115 | 3930 | 4055 | 4180 | 3990 | 4115 | 4240 | mV |
| V_{OL} | Output LOW Voltage (Note 6) | 3065 | 3190 | 3315 | 3130 | 3255 | 3380 | 3190 | 3315 | 3440 | mV |
| V_{IH} | Input HIGH Voltage (Single-Ended) | 3790 | | 4115 | 3855 | | 4180 | 3915 | | 4240 | mV |
| V_{IL} | Input LOW Voltage (Single-Ended) | 3065 | | 3390 | 3130 | | 3455 | 3190 | | 3515 | mV |
| V_{IHCMR} | Input HIGH Voltage Common Mode Range (Differential Configuration) (Note 7) | 2.0 | | 5.0 | 2.0 | | 5.0 | 2.0 | | 5.0 | V |
| I_{IH} | Input HIGH Current | | | 150 | | | 150 | | | 150 | μA |
| I_{IL} | Input LOW Current | 0.5 | | | 0.5 | | | 0.5 | | | μA |

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfm. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

- Input and output parameters vary 1:1 with V_{CC} . V_{EE} can vary +2.0 V to -0.5 V.
- All loading with 50 Ω to $V_{CC} - 2.0\text{ V}$.
- V_{IHCMR} min varies 1:1 with V_{EE} . V_{IHCMR} max varies 1:1 with V_{CC} . The V_{IHCMR} range is referenced to the most positive side of the differential input signal.

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Table 7. 10EP DC CHARACTERISTICS, NECL $V_{CC} = 0\text{ V}$, $V_{EE} = -5.5\text{ V}$ to -3.0 V (Note 8)

| Symbol | Characteristic | -40°C | | | 25°C | | | 85°C | | | Unit |
|-------------|---|--------------|-------|-------|--------------|-------|-------|--------------|-------|-------|---------------|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| I_{EE} | Power Supply Current | 70 | 95 | 120 | 70 | 95 | 120 | 70 | 95 | 120 | mA |
| V_{OH} | Output HIGH Voltage (Note 9) | -1135 | -1010 | -885 | -1070 | -945 | -820 | -1010 | -885 | -760 | mV |
| V_{OL} | Output LOW Voltage (Note 9) | -1935 | -1810 | -1685 | -1870 | -1745 | -1620 | -1810 | -1685 | -1560 | mV |
| V_{IH} | Input HIGH Voltage (Single-Ended) | -1210 | | -885 | -1145 | | -820 | -1085 | | -760 | mV |
| V_{IL} | Input LOW Voltage (Single-Ended) | -1935 | | -1610 | -1870 | | -1545 | -1810 | | -1485 | mV |
| V_{IHCMR} | Input HIGH Voltage Common Mode Range (Differential Configuration) (Note 10) | $V_{EE}+2.0$ | | 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 | 0.5 | | | 0.5 | | | 0.5 | | | μA |

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfm. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

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

9. All loading with $50\ \Omega$ to $V_{CC} - 2.0\text{ V}$.

10. V_{IHCMR} min varies 1:1 with V_{EE} . V_{IHCMR} max varies 1:1 with V_{CC} . The V_{IHCMR} range is referenced to the most positive side of the differential input signal.

Table 8. 100EP DC CHARACTERISTICS, PECL $V_{CC} = 3.3\text{ V}$, $V_{EE} = 0\text{ V}$ (Note 11)

| Symbol | Characteristic | -40°C | | | 25°C | | | 85°C | | | Unit |
|-------------|---|-------|------|------|------|------|------|------|------|------|---------------|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| I_{EE} | Power Supply Current | 70 | 95 | 120 | 75 | 97 | 120 | 80 | 105 | 130 | mA |
| V_{OH} | Output HIGH Voltage (Note 12) | 2155 | 2280 | 2405 | 2155 | 2280 | 2405 | 2155 | 2280 | 2405 | mV |
| V_{OL} | Output LOW Voltage (Note 12) | 1355 | 1480 | 1605 | 1355 | 1480 | 1605 | 1355 | 1480 | 1605 | mV |
| V_{IH} | Input HIGH Voltage (Single-Ended) | 2075 | | 2420 | 2075 | | 2420 | 2075 | | 2420 | mV |
| V_{IL} | Input LOW Voltage (Single-Ended) | 1355 | | 1675 | 1355 | | 1675 | 1355 | | 1675 | mV |
| V_{IHCMR} | Input HIGH Voltage Common Mode Range (Differential Configuration) (Note 13) | 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 | 0.5 | | | 0.5 | | | 0.5 | | | μA |

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfm. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

11. Input and output parameters vary 1:1 with V_{CC} . V_{EE} can vary $+0.3\text{ V}$ to -2.2 V .

12. All loading with $50\ \Omega$ to $V_{CC} - 2.0\text{ V}$.

13. V_{IHCMR} min varies 1:1 with V_{EE} . V_{IHCMR} max varies 1:1 with V_{CC} . The V_{IHCMR} range is referenced to the most positive side of the differential input signal.

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Table 9. 100EP DC CHARACTERISTICS, PECL $V_{CC} = 5.0\text{ V}$, $V_{EE} = 0\text{ V}$ (Note 14)

| Symbol | Characteristic | -40°C | | | 25°C | | | 85°C | | | Unit |
|-------------|---|-------|------|------|------|------|------|------|------|------|---------------|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| I_{EE} | Power Supply Current | 70 | 95 | 120 | 75 | 97 | 120 | 80 | 105 | 130 | mA |
| V_{OH} | Output HIGH Voltage (Note 15) | 3855 | 3980 | 4105 | 3855 | 3980 | 4105 | 3855 | 3980 | 4105 | mV |
| V_{OL} | Output LOW Voltage (Note 15) | 3055 | 3180 | 3305 | 3055 | 3180 | 3305 | 3055 | 3180 | 3305 | mV |
| V_{IH} | Input HIGH Voltage (Single-Ended) | 3775 | | 4120 | 3775 | | 4120 | 3775 | | 4120 | mV |
| V_{IL} | Input LOW Voltage (Single-Ended) | 3055 | | 3375 | 3055 | | 3375 | 3055 | | 3375 | mV |
| V_{IHCMR} | Input HIGH Voltage Common Mode Range (Differential Configuration) (Note 16) | 2.0 | | 5.0 | 2.0 | | 5.0 | 2.0 | | 5.0 | V |
| I_{IH} | Input HIGH Current | | | 150 | | | 150 | | | 150 | μA |
| I_{IL} | Input LOW Current | 0.5 | | | 0.5 | | | 0.5 | | | μA |

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfm. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

14. Input and output parameters vary 1:1 with V_{CC} . V_{EE} can vary +2.0 V to -0.5 V.

15. All loading with 50 Ω to $V_{CC} - 2.0\text{ V}$.

16. V_{IHCMR} min varies 1:1 with V_{EE} . V_{IHCMR} max varies 1:1 with V_{CC} . The V_{IHCMR} range is referenced to the most positive side of the differential input signal.

Table 10. 100EP DC CHARACTERISTICS, NECL $V_{CC} = 0\text{ V}$, $V_{EE} = -5.5\text{ V}$ to -3.0 V (Note 17)

| Symbol | Characteristic | -40°C | | | 25°C | | | 85°C | | | Unit |
|-------------|---|--------------|-------|-------|--------------|-------|-------|--------------|-------|-------|---------------|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| I_{EE} | Power Supply Current | 70 | 95 | 120 | 75 | 97 | 120 | 80 | 105 | 130 | mA |
| V_{OH} | Output HIGH Voltage (Note 18) | -1145 | -1020 | -895 | -1145 | -1020 | -895 | -1145 | -1020 | -895 | mV |
| V_{OL} | Output LOW Voltage (Note 18) | -1945 | -1820 | -1695 | -1945 | -1820 | -1695 | -1945 | -1820 | -1695 | mV |
| V_{IH} | Input HIGH Voltage (Single-Ended) | -1225 | | -880 | -1225 | | -880 | -1225 | | -880 | mV |
| V_{IL} | Input LOW Voltage (Single-Ended) | -1945 | | -1625 | -1945 | | -1625 | -1945 | | -1625 | mV |
| V_{IHCMR} | Input HIGH Voltage Common Mode Range (Differential Configuration) (Note 19) | $V_{EE}+2.0$ | | 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 | 0.5 | | | 0.5 | | | 0.5 | | | μA |

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfm. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

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

18. All loading with 50 Ω to $V_{CC} - 2.0\text{ V}$.

19. V_{IHCMR} min varies 1:1 with V_{EE} . V_{IHCMR} max varies 1:1 with V_{CC} . The V_{IHCMR} range is referenced to the most positive side of the differential input signal.

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Table 11. AC CHARACTERISTICS $V_{CC} = 0\text{ V}$; $V_{EE} = -3.0\text{ V}$ to -5.5 V or $V_{CC} = 3.0\text{ V}$ to 5.5 V ; $V_{EE} = 0\text{ V}$ (Note 20)

| Symbol | Characteristic | -40°C | | | 25°C | | | 85°C | | | Unit |
|--------------------------|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|------|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| f_{\max} | Maximum Frequency (See Figure 4. Frequency vs. V_{OUTpp} and JITTER) | | > 3 | | | > 3 | | | > 3 | | GHz |
| t_{PLH} , t_{PHL} | Propagation Delay to Output Differential C_C R_{0-3} SET | 320 320 320 300 | 450 450 430 430 | 520 520 520 550 | 380 400 380 380 | 460 500 480 460 | 580 600 580 580 | 450 450 450 400 | 560 560 560 530 | 650 650 700 650 | ps |
| t_{RR} | Set/ R_{0-3} Recovery | 290 | 210 | | 290 | 210 | | 350 | 280 | | ps |
| t_S t_H | Setup Time Hold Time | 120 | 80 | | 120 | 80 | | 120 | 80 | | ps |
| t_{PW} | Minimum Pulse Rate R_{0-3} | 550 | 400 | | 550 | 400 | | 550 | 400 | | |
| t_{JITTER} | Cycle-to-Cycle Jitter (See Figure 4. Frequency vs. V_{OUTpp} and JITTER) | | 0.2 | < 1 | | 0.2 | < 1 | | 0.2 | < 1 | ps |
| t_r t_f | Output Rise/Fall Times (20% – 80%) | 110 | 180 | 250 | 125 | 200 | 275 | 150 | 230 | 300 | ps |

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfm. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

20. Measured using a 750 mV source, 50% duty cycle clock source. All loading with $50\ \Omega$ to $V_{CC} - 2.0\text{ V}$.

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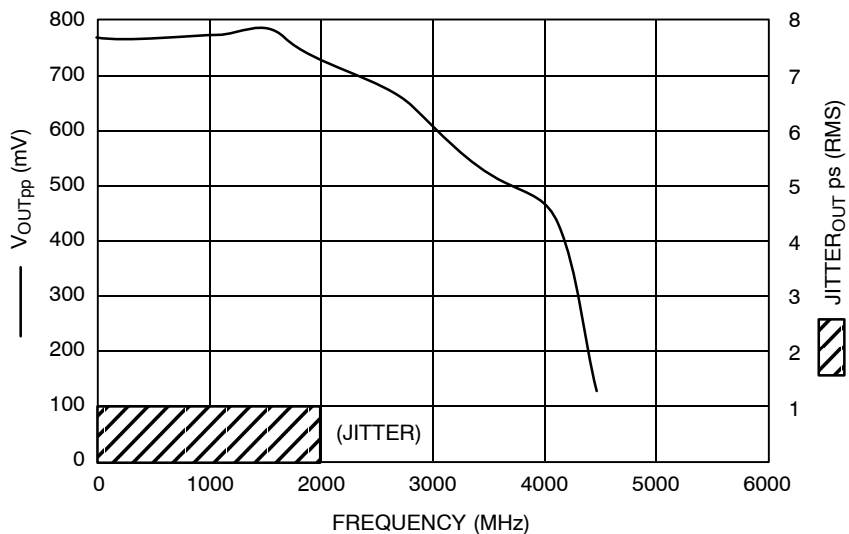


Figure 4. Frequency vs. V_{OUTpp} and JITTER

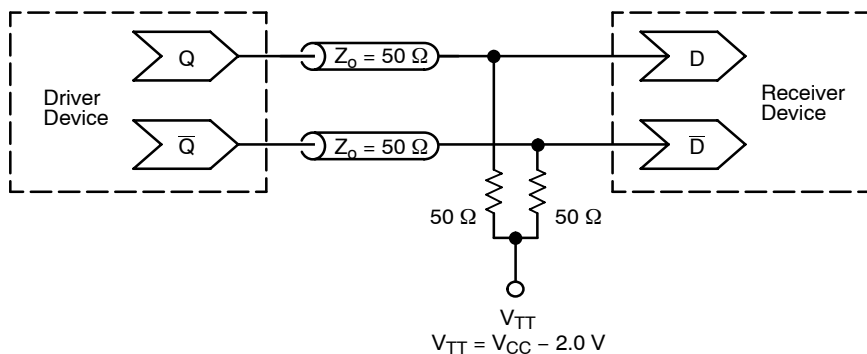


Figure 5. Typical Termination for Output Driver and Device Evaluation
(See Application Note AND8020/D – Termination of ECL Logic Devices.)

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ORDERING INFORMATION

| Device | Package | Shipping† |
|-----------------|----------------------|--------------------|
| MC10EP131FA | LQFP-32 | 250 Units / Tray |
| MC10EP131FAG | LQFP-32 (Pb-Free) | 250 Units / Tray |
| MC10EP131FAR2 | LQFP-32 | 2000 / Tape & Reel |
| MC10EP131FAR2G | LQFP-32 (Pb-Free) | 2000 / Tape & Reel |
| MC100EP131FA | LQFP-32 | 250 Units / Tray |
| MC100EP131FAG | LQFP-32 (Pb-Free) | 250 Units / Tray |
| MC100EP131FAR2 | LQFP-32 | 2000 / Tape & Reel |
| MC100EP131FAR2G | LQFP-32 (Pb-Free) | 2000 / Tape & Reel |
| MC10EP131MNG | QFN-32 (Pb-Free) | 74 Units / Tray |
| MC10EP131MNR4G | | 1000 / Tape & Reel |
| MC100EP131MNG | | 74 Units / Tray |
| MC100EP131MNR4G | | 1000 / Tape & Reel |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

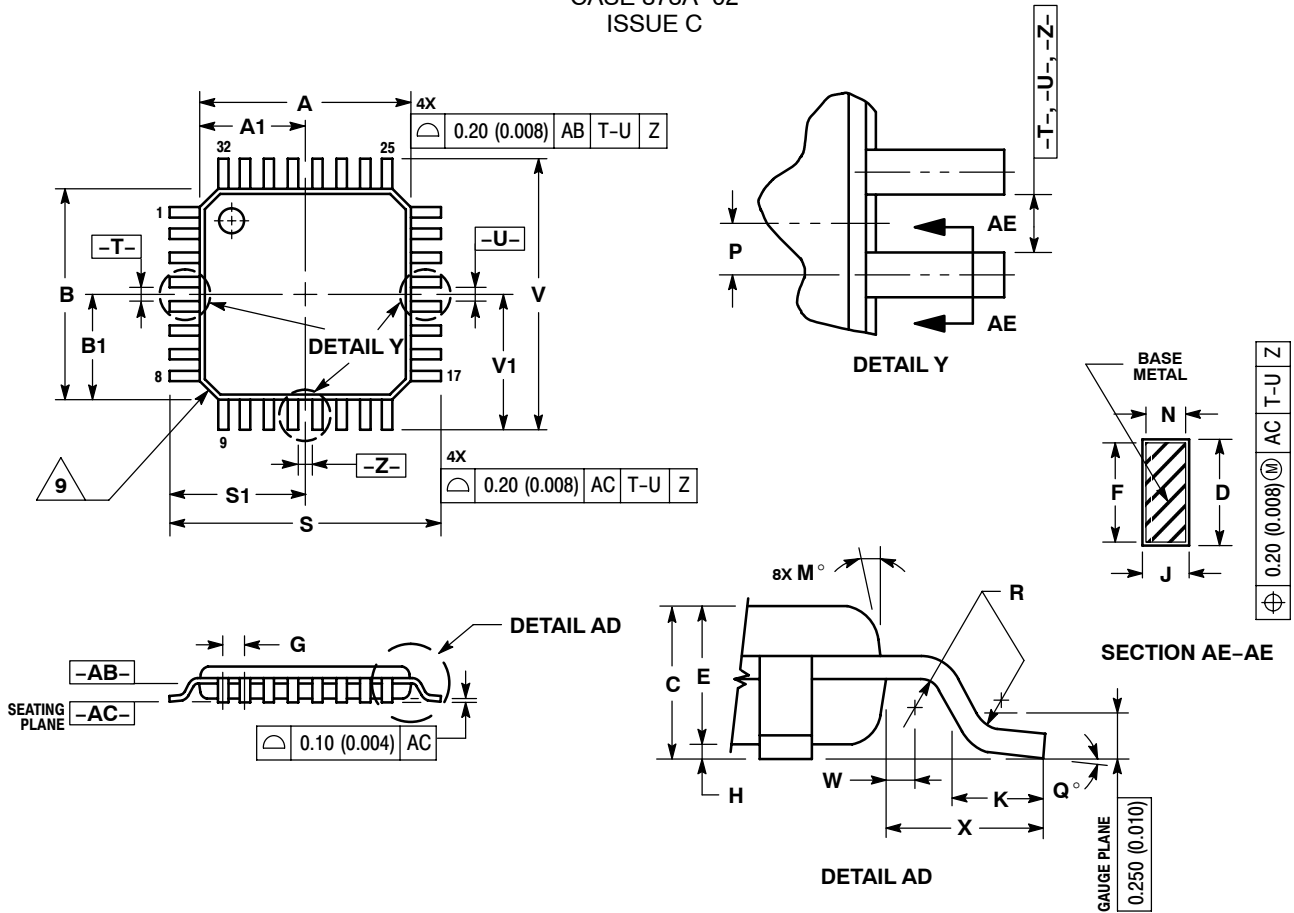
Resource Reference of Application Notes

- AN1405/D** – ECL Clock Distribution Techniques
- AN1406/D** – Designing with PECL (ECL at +5.0 V)
- AN1503/D** – ECLinPS™ I/O SPiCE Modeling Kit
- AN1504/D** – Metastability and the ECLinPS Family
- AN1568/D** – Interfacing Between LVDS and ECL
- AN1672/D** – The ECL Translator Guide
- AND8001/D** – Odd Number Counters Design
- AND8002/D** – Marking and Date Codes
- AND8020/D** – Termination of ECL Logic Devices
- AND8066/D** – Interfacing with ECLinPS
- AND8090/D** – AC Characteristics of ECL Devices

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PACKAGE DIMENSIONS

32 LEAD LQFP
CASE 873A-02
ISSUE C



NOTES:

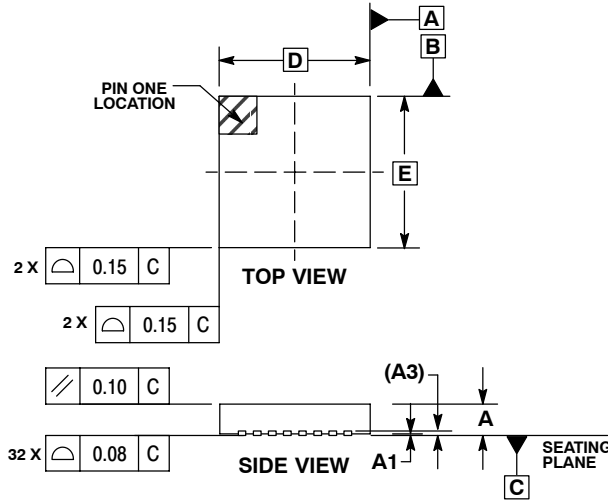
- DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
- CONTROLLING DIMENSION: MILLIMETER.
- DATUM PLANE -AB- IS LOCATED AT BOTTOM OF LEAD AND IS COINCIDENT WITH THE LEAD WHERE THE LEAD EXITS THE PLASTIC BODY AT THE BOTTOM OF THE PARTING LINE.
- DATUMS -T-, -U-, AND -Z- TO BE DETERMINED AT DATUM PLANE -AB-.
- DIMENSIONS S AND V TO BE DETERMINED AT SEATING PLANE -AC-.
- DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION. ALLOWABLE PROTRUSION IS 0.250 (0.010) PER SIDE. DIMENSIONS A AND B DO INCLUDE MOLD MISMATCH AND ARE DETERMINED AT DATUM PLANE -AB-.
- DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. DAMBAR PROTRUSION SHALL NOT CAUSE THE D DIMENSION TO EXCEED 0.520 (0.020).
- MINIMUM SOLDER PLATE THICKNESS SHALL BE 0.0076 (0.0003).
- EXACT SHAPE OF EACH CORNER MAY VARY FROM DEPICTION.

| DIM | MILLIMETERS | | INCHES | |
|-----|-------------|-------|--------|-------|
| | MIN | MAX | MIN | MAX |
| A | 7.000 | BSC | 0.276 | BSC |
| A1 | 3.500 | BSC | 0.138 | BSC |
| B | 7.000 | BSC | 0.276 | BSC |
| B1 | 3.500 | BSC | 0.138 | BSC |
| C | 1.400 | 1.600 | 0.055 | 0.063 |
| D | 0.300 | 0.450 | 0.012 | 0.018 |
| E | 1.350 | 1.450 | 0.053 | 0.057 |
| F | 0.300 | 0.400 | 0.012 | 0.016 |
| G | 0.800 | BSC | 0.031 | BSC |
| H | 0.050 | 0.150 | 0.002 | 0.006 |
| J | 0.090 | 0.200 | 0.004 | 0.008 |
| K | 0.450 | 0.750 | 0.018 | 0.030 |
| M | 12° | REF | 12° | REF |
| N | 0.090 | 0.160 | 0.004 | 0.006 |
| P | 0.400 | BSC | 0.016 | BSC |
| Q | 1° | 5° | 1° | 5° |
| R | 0.150 | 0.250 | 0.006 | 0.010 |
| S | 9.000 | BSC | 0.354 | BSC |
| S1 | 4.500 | BSC | 0.177 | BSC |
| V | 9.000 | BSC | 0.354 | BSC |
| V1 | 4.500 | BSC | 0.177 | BSC |
| W | 0.200 | REF | 0.008 | REF |
| X | 1.000 | REF | 0.039 | REF |

MC10EP131, MC100EP131

PACKAGE DIMENSIONS

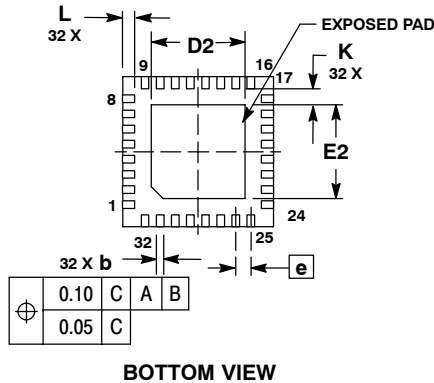
QFN32 5*5*1 0.5 P
CASE 488AM-01
ISSUE O



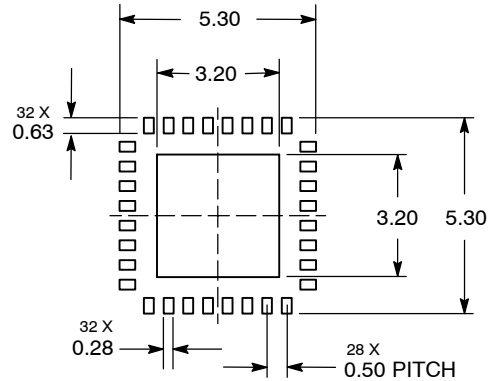
NOTES:

1. DIMENSIONS AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.25 AND 0.30 MM TERMINAL.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

| MILLIMETERS | | | |
|-------------|-----------|-------|-------|
| DIM | MIN | NOM | MAX |
| A | 0.800 | 0.900 | 1.000 |
| A1 | 0.000 | 0.025 | 0.050 |
| A3 | 0.200 REF | | |
| b | 0.180 | 0.250 | 0.300 |
| D | 5.00 BSC | | |
| D2 | 2.950 | 3.100 | 3.250 |
| E | 5.00 BSC | | |
| E2 | 2.950 | 3.100 | 3.250 |
| e | 0.500 BSC | | |
| K | 0.200 | --- | --- |
| L | 0.300 | 0.400 | 0.500 |



SOLDERING FOOTPRINT*



*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



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