

# MC10EP31, MC100EP31

## 3.3 V / 5 V ECL D Flip-Flop with Set and Reset

### Description

The MC10/100EP31 is a D flip-flop with set and reset. The device is pin and functionally equivalent to the EL31 and LVEL31 devices. With AC performance much faster than the EL31 and LVEL31 devices, the EP31 is ideal for applications requiring the fastest AC performance available. Both set and reset inputs are asynchronous, level triggered signals. Data enters the master portion of the flip-flop when CLK is low and is transferred to the slave, and thus the outputs, upon a positive transition of the CLK.

The 100 Series contains temperature compensation.

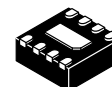
### Features

- 340 ps Typical Propagation Delay
- Maximum Frequency = > 3 GHz Typical
- PECL Mode Operating Range:  
 $V_{CC} = 3.0\text{ V}$  to  $5.5\text{ V}$  with  $V_{EE} = 0\text{ V}$
- NECL Mode Operating Range:  
 $V_{CC} = 0\text{ V}$  with  $V_{EE} = -3.0\text{ V}$  to  $-5.5\text{ V}$
- Open Input Default State
- Q Output Will Default LOW with Inputs Open or at  $V_{EE}$
- These Devices are Pb-Free, Halogen Free and are RoHS Compliant



**ON Semiconductor®**

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

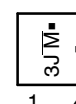
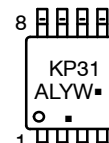
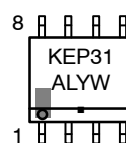
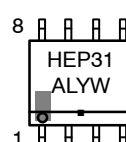


**SOIC-8 NB**  
**D SUFFIX**  
**CASE 751-07**

**TSSOP-8**  
**DT SUFFIX**  
**CASE 948R-02**

**DFN8**  
**MN SUFFIX**  
**CASE 506AA**

### MARKING DIAGRAMS\*



**SOIC-8 NB**

**TSSOP-8**

**DFN8**

|    |             |   |                     |
|----|-------------|---|---------------------|
| H  | = MC10      | A | = Assembly Location |
| K  | = MC100     | L | = Wafer Lot         |
| 5O | = MC10      | Y | = Year              |
| 3J | = MC100     | W | = Work Week         |
| M  | = Date Code | ■ | = Pb-Free Package   |

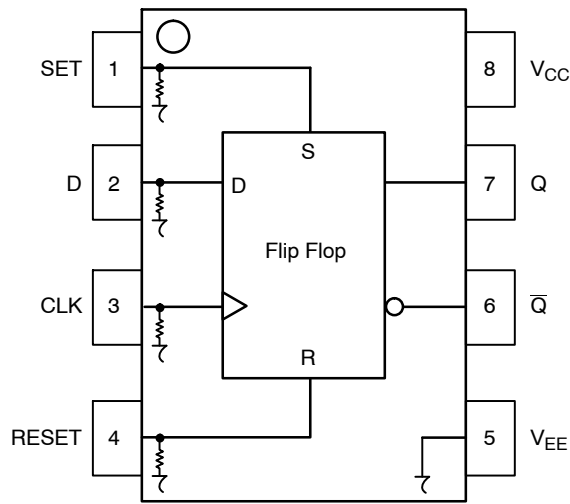
(Note: Microdot may be in either location)

\*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 8 of this data sheet.

# MC10EP31, MC100EP31



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

**Table 1. PIN DESCRIPTION**

| Pin             | Function                                                                                                                                                                       |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CLK*            | ECL Clock Inputs                                                                                                                                                               |
| Reset*          | ECL Asynchronous Reset                                                                                                                                                         |
| Set*            | ECL Asynchronous Set                                                                                                                                                           |
| D*              | ECL Data Input                                                                                                                                                                 |
| Q, $\bar{Q}$    | ECL Data Outputs                                                                                                                                                               |
| V <sub>CC</sub> | Positive Supply                                                                                                                                                                |
| V <sub>EE</sub> | Negative Supply                                                                                                                                                                |
| EP              | (DFN8 only) Thermal exposed pad must be connected to a sufficient thermal conduit. Electrically connect to the most negative supply (GND) or leave unconnected, floating open. |

\*Pins will default LOW when left open.

**Table 2. TRUTH TABLE**

| D | SET | RESET | 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

**Table 3. ATTRIBUTES**

| Characteristics                                                             | Value                         |
|-----------------------------------------------------------------------------|-------------------------------|
| Internal Input Pulldown Resistor                                            | 75 kΩ                         |
| Internal Input Pullup Resistor                                              | N/A                           |
| ESD Protection<br>Human Body Model<br>Machine Model<br>Charged Device Model | > 4 kV<br>> 200 V<br>> 2 kV   |
| Moisture Sensitivity, Indefinite Time Out of Drypack (Note 1)               | Pb-Free Pkg                   |
| SOIC-8 NB<br>TSSOP-8<br>DFN8                                                | Level 1<br>Level 3<br>Level 1 |
| Flammability Rating<br>Oxygen Index: 28 to 34                               | UL 94 V-0 @ 0.125 in          |
| Transistor Count                                                            | 75 Devices                    |
| Meets or exceeds JEDEC Spec EIA/JESD78 IC Latchup Test                      |                               |

1. For additional information, see Application Note [AND8003/D](#).

# MC10EP31, MC100EP31

**Table 4. MAXIMUM RATINGS**

| Symbol        | Parameter                                          | Condition 1                                    | Condition 2                            | Rating      | Unit |
|---------------|----------------------------------------------------|------------------------------------------------|----------------------------------------|-------------|------|
| $V_{CC}$      | PECL Mode Power Supply                             | $V_{EE} = 0\text{ V}$                          |                                        | 6           | V    |
| $V_{EE}$      | NECL Mode Power Supply                             | $V_{CC} = 0\text{ V}$                          |                                        | -6          | V    |
| $V_I$         | PECL Mode Input Voltage<br>NECL Mode Input Voltage | $V_{EE} = 0\text{ V}$<br>$V_{CC} = 0\text{ V}$ | $V_I \leq V_{CC}$<br>$V_I \geq V_{EE}$ | 6<br>-6     | V    |
| $I_{out}$     | Output Current                                     | Continuous<br>Surge                            |                                        | 50<br>100   | mA   |
| $T_A$         | Operating Temperature Range                        |                                                |                                        | -40 to +85  | °C   |
| $T_{stg}$     | Storage Temperature Range                          |                                                |                                        | -65 to +150 | °C   |
| $\theta_{JA}$ | Thermal Resistance (Junction-to-Ambient)           | 0 lfpm<br>500 lfpm                             | SOIC-8 NB<br>SOIC-8 NB                 | 190<br>130  | °C/W |
| $\theta_{JC}$ | Thermal Resistance (Junction-to-Case)              | Standard Board                                 | SOIC-8 NB                              | 41 to 44    | °C/W |
| $\theta_{JA}$ | Thermal Resistance (Junction-to-Ambient)           | 0 lfpm<br>500 lfpm                             | TSSOP-8<br>TSSOP-8                     | 185<br>140  | °C/W |
| $\theta_{JC}$ | Thermal Resistance (Junction-to-Case)              | Standard Board                                 | TSSOP-8                                | 41 to 44    | °C/W |
| $\theta_{JA}$ | Thermal Resistance (Junction-to-Ambient)           | 0 lfpm<br>500 lfpm                             | DFN8<br>DFN8                           | 129<br>84   | °C/W |
| $T_{sol}$     | Wave Solder (Pb-Free)                              | < 2 to 3 sec @ 260°C                           |                                        | 265         | °C   |
| $\theta_{JC}$ | Thermal Resistance (Junction-to-Case)              | (Note 2)                                       | DFN8                                   | 35 to 40    | °C/W |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

2. JEDEC standard multilayer board – 2S2P (2 signal, 2 power)

# MC10EP31, MC100EP31

**Table 5. 10EP DC CHARACTERISTICS, PECL** ( $V_{CC} = 3.3\text{ V}$ ,  $V_{EE} = 0\text{ V}$  (Note 1))

| Symbol   | Characteristic                    | -40°C |      |      | 25°C |      |      | 85°C |      |      | Unit |
|----------|-----------------------------------|-------|------|------|------|------|------|------|------|------|------|
|          |                                   | Min   | Typ  | Max  | Min  | Typ  | Max  | Min  | Typ  | Max  |      |
| $I_{EE}$ | Power Supply Current              | 26    | 34   | 44   | 26   | 35   | 45   | 28   | 37   | 47   | mA   |
| $V_{OH}$ | Output HIGH Voltage (Note 2)      | 2165  | 2290 | 2415 | 2230 | 2355 | 2480 | 2290 | 2415 | 2540 | mV   |
| $V_{OL}$ | Output LOW Voltage (Note 2)       | 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 | 1430 |      | 1755 | 1490 |      | 1815 | mV   |
| $I_{IH}$ | 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.

1. Input and output parameters vary 1:1 with  $V_{CC}$ .  $V_{EE}$  can vary +0.3 V to -2.2 V.
2. All loading with 50 Ω to  $V_{CC} - 2.0\text{ V}$ .

**Table 6. 10EP DC CHARACTERISTICS, PECL** ( $V_{CC} = 5.0\text{ V}$ ,  $V_{EE} = 0\text{ V}$  (Note 1))

| Symbol   | Characteristic                    | -40°C |      |      | 25°C |      |      | 85°C |      |      | Unit |
|----------|-----------------------------------|-------|------|------|------|------|------|------|------|------|------|
|          |                                   | Min   | Typ  | Max  | Min  | Typ  | Max  | Min  | Typ  | Max  |      |
| $I_{EE}$ | Power Supply Current              | 26    | 34   | 44   | 26   | 35   | 45   | 28   | 37   | 47   | mA   |
| $V_{OH}$ | Output HIGH Voltage (Note 2)      | 3865  | 3990 | 4115 | 3930 | 4055 | 4180 | 3990 | 4115 | 4240 | mV   |
| $V_{OL}$ | Output LOW Voltage (Note 2)       | 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   |
| $I_{IH}$ | 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.

1. Input and output parameters vary 1:1 with  $V_{CC}$ .  $V_{EE}$  can vary +2.0 V to -0.5 V.
2. All loading with 50 Ω to  $V_{CC} - 2.0\text{ V}$ .

**Table 7. 10EP DC CHARACTERISTICS, NECL** ( $V_{CC} = 0\text{ V}$ ;  $V_{EE} = -5.5\text{ V}$  to  $-3.0\text{ V}$  (Note 1))

| Symbol   | Characteristic                    | -40°C |       |       | 25°C  |       |       | 85°C  |       |       | Unit |
|----------|-----------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
|          |                                   | Min   | Typ   | Max   | Min   | Typ   | Max   | Min   | Typ   | Max   |      |
| $I_{EE}$ | Power Supply Current              | 26    | 34    | 44    | 26    | 35    | 45    | 28    | 37    | 47    | mA   |
| $V_{OH}$ | Output HIGH Voltage (Note 2)      | -1135 | -1010 | -885  | -1070 | -945  | -820  | -1010 | -885  | -760  | mV   |
| $V_{OL}$ | Output LOW Voltage (Note 2)       | -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   |
| $I_{IH}$ | 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.

1. Input and output parameters vary 1:1 with  $V_{CC}$ .
2. All loading with 50 Ω to  $V_{CC} - 2.0\text{ V}$ .

# MC10EP31, MC100EP31

**Table 8. 100EP DC CHARACTERISTICS, PECL** ( $V_{CC} = 3.3\text{ V}$ ,  $V_{EE} = 0\text{ V}$  (Note 1))

| Symbol   | Characteristic                    | -40°C |      |      | 25°C |      |      | 85°C |      |      | Unit |
|----------|-----------------------------------|-------|------|------|------|------|------|------|------|------|------|
|          |                                   | Min   | Typ  | Max  | Min  | Typ  | Max  | Min  | Typ  | Max  |      |
| $I_{EE}$ | Power Supply Current              | 26    | 34   | 44   | 26   | 35   | 45   | 28   | 37   | 47   | mA   |
| $V_{OH}$ | Output HIGH Voltage (Note 2)      | 2155  | 2280 | 2405 | 2155 | 2280 | 2405 | 2155 | 2280 | 2405 | mV   |
| $V_{OL}$ | Output LOW Voltage (Note 2)       | 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   |
| $I_{IH}$ | 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 lfpm. 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.

1. Input and output parameters vary 1:1 with  $V_{CC}$ .  $V_{EE}$  can vary +0.3 V to -2.2 V.
2. All loading with 50 Ω to  $V_{CC} - 2.0\text{ V}$ .

**Table 9. 100EP DC CHARACTERISTICS, PECL** ( $V_{CC} = 5.0\text{ V}$ ,  $V_{EE} = 0\text{ V}$  (Note 1))

| Symbol   | Characteristic                    | -40°C |      |      | 25°C |      |      | 85°C |      |      | Unit |
|----------|-----------------------------------|-------|------|------|------|------|------|------|------|------|------|
|          |                                   | Min   | Typ  | Max  | Min  | Typ  | Max  | Min  | Typ  | Max  |      |
| $I_{EE}$ | Power Supply Current              | 26    | 34   | 44   | 26   | 35   | 45   | 28   | 37   | 47   | mA   |
| $V_{OH}$ | Output HIGH Voltage (Note 2)      | 3855  | 3980 | 4105 | 3855 | 3980 | 4105 | 3855 | 3980 | 4105 | mV   |
| $V_{OL}$ | Output LOW Voltage (Note 2)       | 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   |
| $I_{IH}$ | 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 lfpm. 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.

1. Input and output parameters vary 1:1 with  $V_{CC}$ .  $V_{EE}$  can vary +2.0 V to -0.5 V.
2. All loading with 50 Ω to  $V_{CC} - 2.0\text{ V}$ .

**Table 10. 100EP DC CHARACTERISTICS, NECL** ( $V_{CC} = 0\text{ V}$ ;  $V_{EE} = -5.5\text{ V}$  to  $-3.0\text{ V}$  (Note 1))

| Symbol   | Characteristic                    | -40°C |       |       | 25°C  |       |       | 85°C  |       |       | Unit |
|----------|-----------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
|          |                                   | Min   | Typ   | Max   | Min   | Typ   | Max   | Min   | Typ   | Max   |      |
| $I_{EE}$ | Power Supply Current              | 26    | 34    | 44    | 26    | 35    | 45    | 28    | 37    | 47    | mA   |
| $V_{OH}$ | Output HIGH Voltage (Note 2)      | -1145 | -1020 | -895  | -1145 | -1020 | -895  | -1145 | -1020 | -895  | mV   |
| $V_{OL}$ | Output LOW Voltage (Note 2)       | -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   |
| $I_{IH}$ | 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 lfpm. 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.

1. Input and output parameters vary 1:1 with  $V_{CC}$ .
2. All loading with 50 Ω to  $V_{CC} - 2.0\text{ V}$ .

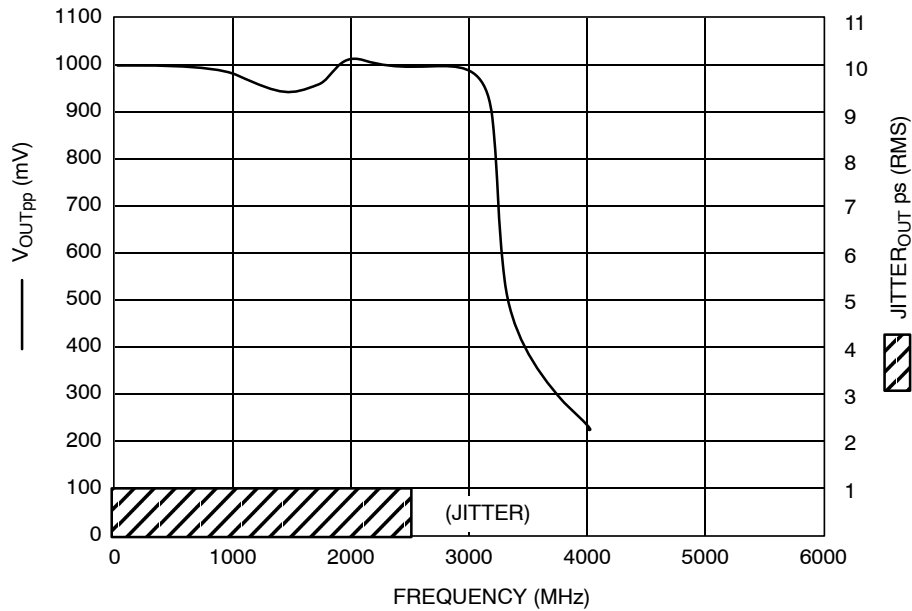
# MC10EP31, MC100EP31

**Table 11. AC CHARACTERISTICS** ( $V_{CC} = 0\text{ V}$ ;  $V_{EE} = -3.0\text{ V}$  to  $-5.5\text{ V}$  or  $V_{CC} = 3.0\text{ V}$  to  $5.5\text{ V}$ ;  $V_{EE} = 0\text{ V}$  (Note 1))

| Symbol                   | Characteristic                                                                             | -40°C      |            |            | 25°C       |            |            | 85°C       |            |            | Unit |
|--------------------------|--------------------------------------------------------------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------|
|                          |                                                                                            | Min        | Typ        | Max        | Min        | Typ        | Max        | Min        | Typ        | Max        |      |
| $f_{\max}$               | Maximum Frequency<br>(Figure 2)                                                            |            | > 3        |            |            | > 3        |            |            | > 3        |            | GHz  |
| $t_{PLH}$ ,<br>$t_{PHL}$ | Propagation Delay to<br>Output Differential<br>CLK to Q, $\bar{Q}$<br>S, R to Q, $\bar{Q}$ | 250<br>300 | 330<br>380 | 400<br>450 | 270<br>330 | 340<br>400 | 410<br>470 | 300<br>360 | 370<br>430 | 440<br>500 | ps   |
| $t_{RR}$                 | Set/Reset Recovery                                                                         | 225        |            |            | 225        |            |            | 225        |            |            | ps   |
| $t_S$<br>$t_H$           | Setup Time<br>Hold Time                                                                    | 100<br>150 |            |            | 100<br>150 |            |            | 100<br>150 |            |            | ps   |
| $t_{PW}$                 | Minimum Pulse width<br>SET, RESET                                                          | 550        | 450        |            | 550        | 450        |            | 550        | 450        |            | ps   |
| $t_{JITTER}$             | Cycle-to-Cycle Jitter<br>(Figure 2)                                                        |            | 0.2        | < 1        |            | 0.2        | < 1        |            | 0.2        | < 1        | ps   |
| $t_r$<br>$t_f$           | Output Rise/Fall Times<br>Q, $\bar{Q}$ (20% – 80%)                                         | 50         | 120        | 180        | 60         | 130        | 200        | 70         | 150        | 220        | ps   |

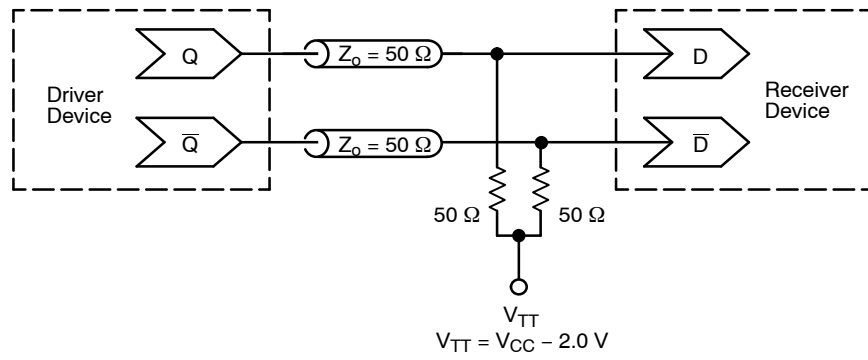
NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfm. Electrical parameters are guaranteed only over the declared operating temperature range. Functional 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.

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



**Figure 2.  $F_{\max}$ /Jitter**

## MC10EP31, MC100EP31



**Figure 3. Typical Termination for Output Driver and Device Evaluation**  
(See Application Note [AND8020/D](#) – Termination of ECL Logic Devices)

# MC10EP31, MC100EP31

## ORDERING INFORMATION

| Device         | Package                | Shipping <sup>†</sup> |
|----------------|------------------------|-----------------------|
| MC10EP31DG     | SOIC-8 NB<br>(Pb-Free) | 98 Units / Rail       |
| MC10EP31DR2G   | SOIC-8 NB<br>(Pb-Free) | 2500 / Tape & Reel    |
| MC10EP31DTG    | TSSOP-8<br>(Pb-Free)   | 100 Units / Rail      |
| MC10EP31DTR2G  | TSSOP-8<br>(Pb-Free)   | 2500 / Tape & Reel    |
| MC10EP31MNR4G  | DFN8<br>(Pb-Free)      | 1000 / Tape & Reel    |
| MC100EP31DG    | SOIC-8 NB<br>(Pb-Free) | 98 Units / Rail       |
| MC100EP31DR2G  | SOIC-8 NB<br>(Pb-Free) | 2500 / Tape & Reel    |
| MC100EP31DTG   | TSSOP-8<br>(Pb-Free)   | 100 Units / Rail      |
| MC100EP31DTR2G | TSSOP-8<br>(Pb-Free)   | 2500 / Tape & Reel    |
| MC100EP31MNR4G | DFN8<br>(Pb-Free)      | 1000 / Tape & Reel    |

<sup>†</sup>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](#).

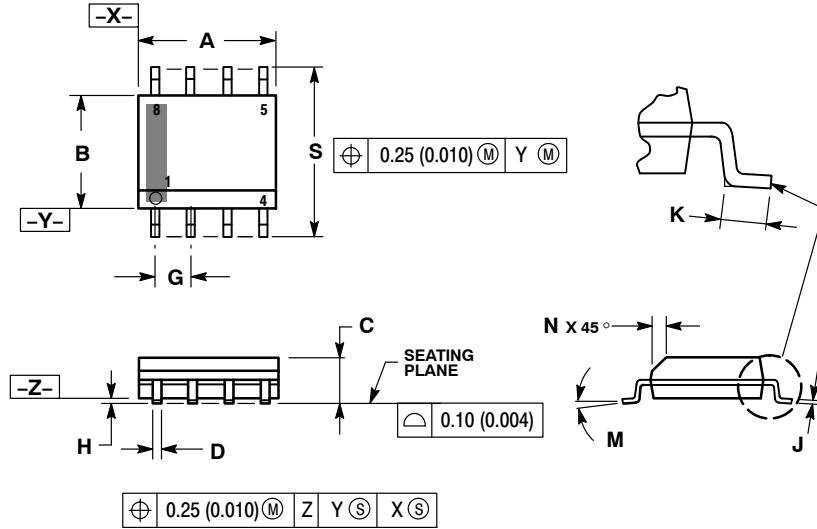
## Resource Reference of Application Notes

- 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

# MC10EP31, MC100EP31

## PACKAGE DIMENSIONS

SOIC-8 NB  
D SUFFIX  
CASE 751-07  
ISSUE AK

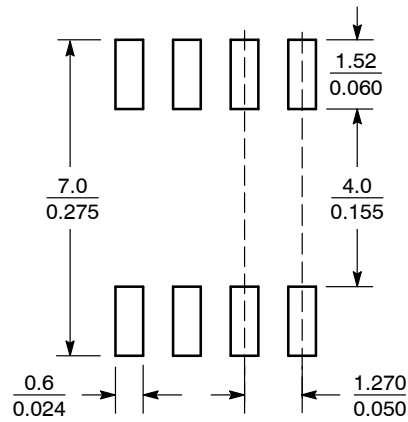


### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.
6. 751-01 THRU 751-06 ARE OBSOLETE. NEW STANDARD IS 751-07.

| DIM | MILLIMETERS |      | INCHES    |       |
|-----|-------------|------|-----------|-------|
|     | MIN         | MAX  | MIN       | MAX   |
| A   | 4.80        | 5.00 | 0.189     | 0.197 |
| B   | 3.80        | 4.00 | 0.150     | 0.157 |
| C   | 1.35        | 1.75 | 0.053     | 0.069 |
| D   | 0.33        | 0.51 | 0.013     | 0.020 |
| G   | 1.27 BSC    |      | 0.050 BSC |       |
| H   | 0.10        | 0.25 | 0.004     | 0.010 |
| J   | 0.19        | 0.25 | 0.007     | 0.010 |
| K   | 0.40        | 1.27 | 0.016     | 0.050 |
| M   | 0°          | 8°   | 0°        | 8°    |
| N   | 0.25        | 0.50 | 0.010     | 0.020 |
| S   | 5.80        | 6.20 | 0.228     | 0.244 |

### SOLDERING FOOTPRINT\*



SCALE 6:1 (mm/inches)

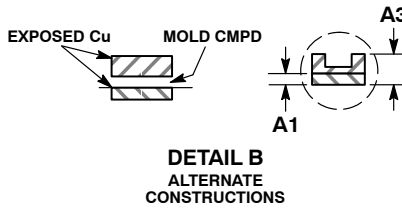
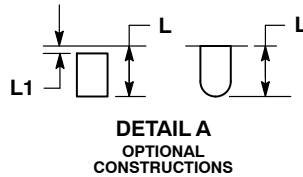
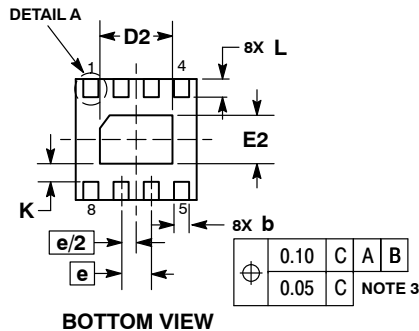
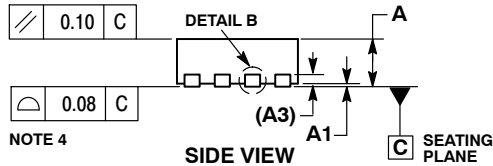
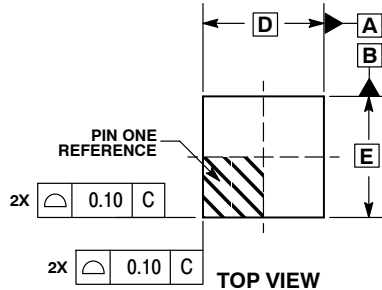
\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



# MC10EP31, MC100EP31

## PACKAGE DIMENSIONS

DFN8 2x2, 0.5 P  
MN SUFFIX  
CASE 506AA  
ISSUE F

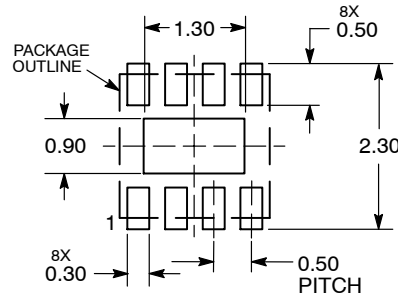


### NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.20 MM FROM TERMINAL TIP.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

| DIM | MILLIMETERS |      |
|-----|-------------|------|
|     | MIN         | MAX  |
| A   | 0.80        | 1.00 |
| A1  | 0.00        | 0.05 |
| A3  | 0.20 REF    |      |
| b   | 0.20        | 0.30 |
| D   | 2.00 BSC    |      |
| D2  | 1.10        | 1.30 |
| E   | 2.00 BSC    |      |
| E2  | 0.70        | 0.90 |
| e   | 0.50 BSC    |      |
| K   | 0.30 REF    |      |
| L   | 0.25        | 0.35 |
| L1  | ---         | 0.10 |

### RECOMMENDED 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.

ECLinPS is a trademark of Semiconductor Components Industries, LLC (SCILLC) or its subsidiaries in the United States and/or other countries.

ON Semiconductor and  are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marketing.pdf](http://www.onsemi.com/site/pdf/Patent-Marketing.pdf). ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor 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. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor 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 ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

### PUBLICATION ORDERING INFORMATION

#### LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor  
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA  
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada  
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada  
Email: [orderlit@onsemi.com](mailto:orderlit@onsemi.com)

**N. American Technical Support:** 800-282-9855 Toll Free  
USA/Canada  
**Europe, Middle East and Africa Technical Support:**  
Phone: 421 33 790 2910  
**Japan Customer Focus Center**  
Phone: 81-3-5817-1050

**ON Semiconductor Website:** [www.onsemi.com](http://www.onsemi.com)

**Order Literature:** <http://www.onsemi.com/orderlit>

For additional information, please contact your local Sales Representative