

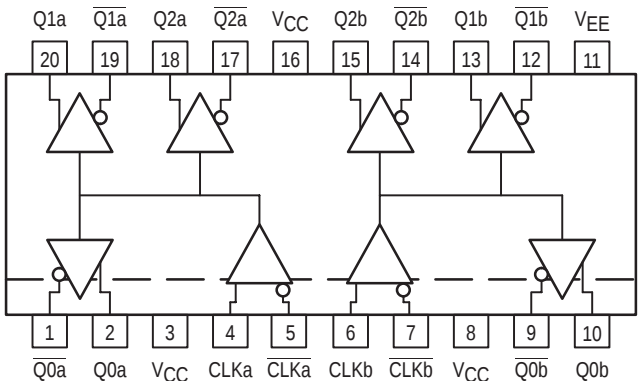
# Dual 1:3 Fanout Buffer

The MC100LVEL13 is a dual, fully differential 1:3 fanout buffer. The MC100EL13 is pin and functionally equivalent to the MC100LVEL13 but is specified for operation at the standard 100E ECL voltage supply. The Low Output–Output Skew of the device makes it ideal for distributing two different frequency synchronous signals.

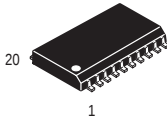
The differential inputs have special circuitry which ensures device stability under open input conditions. When both differential inputs are left open the D input will pull down to  $V_{EE}$ . The  $\overline{D}$  input will bias around  $V_{CC}/2$  and the Q output will go LOW.

- Differential Inputs and Outputs
- 20-Lead SOIC Packaging
- 500ps Typical Propagation Delays
- 50ps Output–Output Skews
- Supports Both Standard and Low Voltage 100K ECL
- >2000V ESD Protection

Logic Diagram and Pinout: 20-Lead SOIC (Top View)



## MC100LVEL13 MC100EL13



DW SUFFIX  
PLASTIC SOIC PACKAGE  
CASE 751D–04

### PIN NAMES

| Pins                                                                      | Function                                                                              |
|---------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Qna, $\overline{Qna}$<br>Qnb, $\overline{Qnb}$<br>CLKn, $\overline{CLKn}$ | Differential Clock Outputs<br>Differential Clock Outputs<br>Differential Clock Inputs |

### MC100LVEL13

DC CHARACTERISTICS ( $V_{EE} = -3.0V$  to  $-3.8V$ ;  $V_{CC} = GND$ )

| Symbol    | Characteristic       | –40°C                     |             |     | 0°C         |     |     | 25°C        |     |     | 85°C        |     |     | Unit    |
|-----------|----------------------|---------------------------|-------------|-----|-------------|-----|-----|-------------|-----|-----|-------------|-----|-----|---------|
|           |                      | Min                       | Typ         | Max | Min         | Typ | Max | Min         | Typ | Max | Min         | Typ | Max |         |
| $I_{EE}$  | Power Supply Current |                           | 30          | 38  |             | 30  | 38  |             | 30  | 38  |             | 32  | 40  | mA      |
| $I_{IH}$  | Input HIGH Current   |                           |             | 150 |             |     | 150 |             |     | 150 |             |     | 150 | $\mu A$ |
| $I_{INL}$ | Input LOW Current    | $D_n$<br>$\overline{D_n}$ | 0.5<br>–300 |     | 0.5<br>–300 |     |     | 0.5<br>–300 |     |     | 0.5<br>–300 |     |     | $\mu A$ |



## MC100LVEL13 MC100EL13

### MC100LVEL13

#### AC CHARACTERISTICS ( $V_{EE} = -3.0V$ to $-3.8V$ ; $V_{CC} = GND$ )

| Symbol                 | Characteristic                                                                 | -40°C        |     |              | 0°C          |     |              | 25°C         |     |              | 85°C         |     |              | Unit |
|------------------------|--------------------------------------------------------------------------------|--------------|-----|--------------|--------------|-----|--------------|--------------|-----|--------------|--------------|-----|--------------|------|
|                        |                                                                                | Min          | Typ | Max          | Min          | Typ | Max          | Min          | Typ | Max          | Min          | Typ | Max          |      |
| $t_{PLH}$<br>$t_{PHL}$ | Propagation Delay<br>CLK $Q/\overline{Q}$                                      | 410          |     | 600          | 420          |     | 610          | 430          |     | 620          | 450          |     | 640          | ps   |
| $t_{sk}(O)$            | Output–Output Skew<br>Any $Q_a$ $Q_a$ , Any $Q_b$ $Q_b$<br>Any $Q_a$ Any $Q_b$ |              |     | 50<br>75     |              |     | 50<br>75     |              |     | 50<br>75     |              |     | 50<br>75     | ps   |
| $t_{sk}(DC)$           | Duty Cycle Skew<br>$ t_{PLH} - t_{PHL} $                                       |              |     | 50           |              |     | 50           |              |     | 50           |              |     | 50           | ps   |
| $V_{PP}$               | Minimum Input Swing <sup>1</sup>                                               | 150          |     | 1000         | 150          |     | 1000         | 150          |     | 1000         | 150          |     | 1000         | mV   |
| $V_{CMR}$              | Common Mode Range <sup>2</sup><br>$V_{PP} < 500mV$<br>$V_{PP} \geq 500mV$      | -2.0<br>-1.8 |     | -0.4<br>-0.4 | -2.1<br>-1.9 |     | -0.4<br>-0.4 | -2.1<br>-1.9 |     | -0.4<br>-0.4 | -2.1<br>-1.9 |     | -0.4<br>-0.4 | V    |
| $t_r$<br>$t_f$         | Output Rise/Fall Times $Q$<br>(20% – 80%)                                      | 230          |     | 500          | 230          |     | 500          | 230          |     | 500          | 230          |     | 500          | ps   |

1. Minimum input swing for which AC parameters guaranteed. The device has a DC gain of  $\approx 40$ .

2. The CMR range is referenced to the most positive side of the differential input signal. Normal operation is obtained if the HIGH level falls within the specified range and the peak-to-peak voltage lies between  $V_{ppmin}$  and 1V. The lower end of the CMR range varies 1:1 with  $V_{EE}$ . The numbers in the spec table assume a nominal  $V_{EE} = -3.3V$ . Note for PECL operation, the  $V_{CMR}(min)$  will be fixed at  $3.3V - |V_{CMR}(min)|$ .

### MC100EL13

#### DC CHARACTERISTICS ( $V_{EE} = -4.2V$ 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 |         |
| $I_{EE}$  | Power Supply Current                        |             | 30  | 38  |             | 30  | 38  |             | 30  | 38  |             | 32  | 40  | mA      |
| $I_{IH}$  | Input HIGH Current                          |             |     | 150 |             |     | 150 |             |     | 150 |             |     | 150 | $\mu A$ |
| $I_{INL}$ | Input LOW Current $D_n$<br>$\overline{D_n}$ | 0.5<br>-300 |     |     | 0.5<br>-300 |     |     | 0.5<br>-300 |     |     | 0.5<br>-300 |     |     | $\mu A$ |

### MC100EL13

#### AC CHARACTERISTICS ( $V_{EE} = -4.2V$ to $-5.5V$ ; $V_{CC} = GND$ )

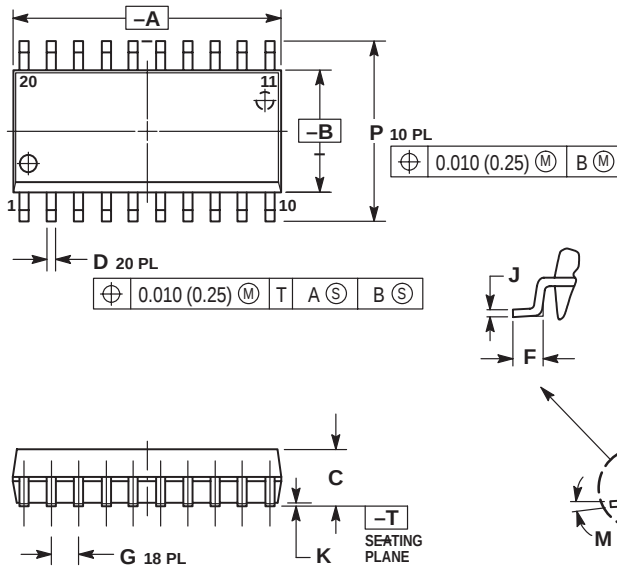
| Symbol                 | Characteristic                                                                 | -40°C        |     |              | 0°C          |     |              | 25°C         |     |              | 85°C         |     |              | Unit |
|------------------------|--------------------------------------------------------------------------------|--------------|-----|--------------|--------------|-----|--------------|--------------|-----|--------------|--------------|-----|--------------|------|
|                        |                                                                                | Min          | Typ | Max          | Min          | Typ | Max          | Min          | Typ | Max          | Min          | Typ | Max          |      |
| $t_{PLH}$<br>$t_{PHL}$ | Propagation Delay<br>CLK $Q/\overline{Q}$                                      | 410          |     | 600          | 420          |     | 610          | 430          |     | 620          | 450          |     | 640          | ps   |
| $t_{sk}(O)$            | Output–Output Skew<br>Any $Q_a$ $Q_a$ , Any $Q_b$ $Q_b$<br>Any $Q_a$ Any $Q_b$ |              |     | 50<br>75     |              |     | 50<br>75     |              |     | 50<br>75     |              |     | 50<br>75     | ps   |
| $t_{sk}(DC)$           | Duty Cycle Skew<br>$ t_{PLH} - t_{PHL} $                                       |              |     | 50           |              |     | 50           |              |     | 50           |              |     | 50           | ps   |
| $V_{PP}$               | Minimum Input Swing <sup>1</sup>                                               | 150          |     | 1000         | 150          |     | 1000         | 150          |     | 1000         | 150          |     | 1000         | mV   |
| $V_{CMR}$              | Common Mode Range <sup>2</sup><br>$V_{PP} < 500mV$<br>$V_{PP} \geq 500mV$      | -3.2<br>-3.0 |     | -0.4<br>-0.4 | -3.3<br>-3.1 |     | -0.4<br>-0.4 | -3.3<br>-3.1 |     | -0.4<br>-0.4 | -3.3<br>-3.1 |     | -0.4<br>-0.4 | V    |
| $t_r$<br>$t_f$         | Output Rise/Fall Times $Q$<br>(20% – 80%)                                      | 230          |     | 500          | 230          |     | 500          | 230          |     | 500          | 230          |     | 500          | ps   |

1. Minimum input swing for which AC parameters guaranteed. The device has a DC gain of  $\approx 40$ .

2. The CMR range is referenced to the most positive side of the differential input signal. Normal operation is obtained if the HIGH level falls within the specified range and the peak-to-peak voltage lies between  $V_{ppmin}$  and 1V. The lower end of the CMR range varies 1:1 with  $V_{EE}$ . The numbers in the spec table assume a nominal  $V_{EE} = -4.5V$ . Note for PECL operation, the  $V_{CMR}(min)$  will be fixed at  $5.0V - |V_{CMR}(min)|$ .

## OUTLINE DIMENSIONS

DW SUFFIX  
PLASTIC SOIC PACKAGE  
CASE 751D-04  
ISSUE E



## NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.150 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.13 (0.005) TOTAL IN EXCESS OF D DIMENSION AT MAXIMUM MATERIAL CONDITION.

| DIM | MILLIMETERS |       | INCHES    |       |
|-----|-------------|-------|-----------|-------|
|     | MIN         | MAX   | MIN       | MAX   |
| A   | 12.65       | 12.95 | 0.499     | 0.510 |
| B   | 7.40        | 7.60  | 0.292     | 0.299 |
| C   | 2.35        | 2.65  | 0.093     | 0.104 |
| D   | 0.35        | 0.49  | 0.014     | 0.019 |
| F   | 0.50        | 0.90  | 0.020     | 0.035 |
| G   | 1.27 BSC    |       | 0.050 BSC |       |
| J   | 0.25        | 0.32  | 0.010     | 0.012 |
| K   | 0.10        | 0.25  | 0.004     | 0.009 |
| M   | 0°          | 7°    | 0°        | 7°    |
| P   | 10.05       | 10.55 | 0.395     | 0.415 |
| R   | 0.25        | 0.75  | 0.010     | 0.029 |

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