

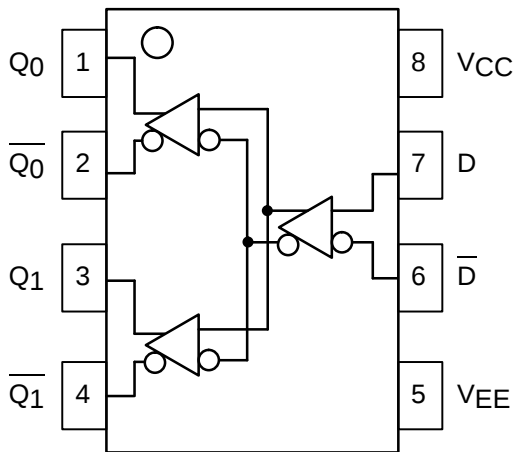
# Low Voltage 1:2 Differential Fanout Buffer

The MC100LVEL11 is a differential 1:2 fanout buffer. The device is functionally similar to the E111 device but with higher performance capabilities. Having within-device skews and output transition times significantly improved over the E111, the LVEL11 is ideally suited for those applications which require the ultimate in AC performance.

The differential inputs of the LVEL11 employ clamping circuitry to maintain stability under open input conditions. If the inputs are left open (pulled to  $V_{EE}$ ) the Q outputs will go LOW.

- 330ps Propagation Delay
- 5ps Skew Between Outputs
- High Bandwidth Output Transitions
- 75k $\Omega$  Internal Input Pulldown Resistors
- >2000V ESD Protection

## LOGIC DIAGRAM AND PINOUT ASSIGNMENT



# MC100LVEL11



**D SUFFIX**  
PLASTIC SOIC PACKAGE  
CASE 751-05

## PIN DESCRIPTION

| PIN         | FUNCTION                    |
|-------------|-----------------------------|
| D<br>Q0, Q1 | Data Inputs<br>Data Outputs |

## DC CHARACTERISTICS ( $V_{EE} = V_{EE}(\text{min})$ to $V_{EE}(\text{max})$ ; $V_{CC} = \text{GND}$ )

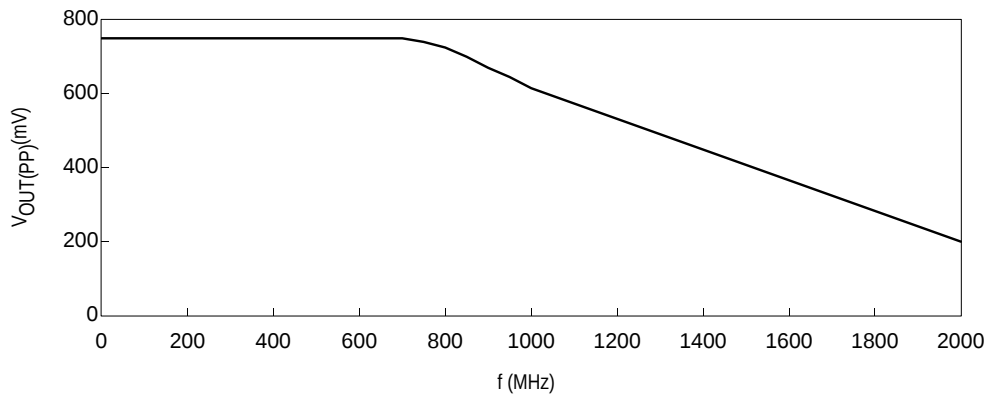
| Symbol   | Characteristic                                             | -40°C       |      |      | 0°C         |      |      | 25°C        |      |      | 85°C        |      |      | Unit          |
|----------|------------------------------------------------------------|-------------|------|------|-------------|------|------|-------------|------|------|-------------|------|------|---------------|
|          |                                                            | Min         | Typ  | Max  | Min         | Typ  | Max  | Min         | Typ  | Max  | Min         | Typ  | Max  |               |
| $I_{EE}$ | Power Supply Current                                       |             | 24   | 28   |             | 24   | 28   |             | 24   | 28   |             | 25   | 30   | mA            |
| $V_{EE}$ | Power Supply Voltage                                       | -3.0        | -3.3 | -3.8 | -3.0        | -3.3 | -3.8 | -3.0        | -3.3 | -3.8 | -3.0        | -3.3 | -3.8 | V             |
| $I_{IH}$ | Input HIGH Current                                         |             |      | 150  |             |      | 150  |             |      | 150  |             |      | 150  | $\mu\text{A}$ |
| $I_{IL}$ | Input LOW Current $\begin{matrix} D_n \\ D_n \end{matrix}$ | 0.5<br>-600 |      |      | 0.5<br>-600 |      |      | 0.5<br>-600 |      |      | 0.5<br>-600 |      |      | $\mu\text{A}$ |



**AC CHARACTERISTICS** ( $V_{EE} = V_{EE}(\text{min})$  to  $V_{EE}(\text{max})$ ;  $V_{CC} = \text{GND}$ )

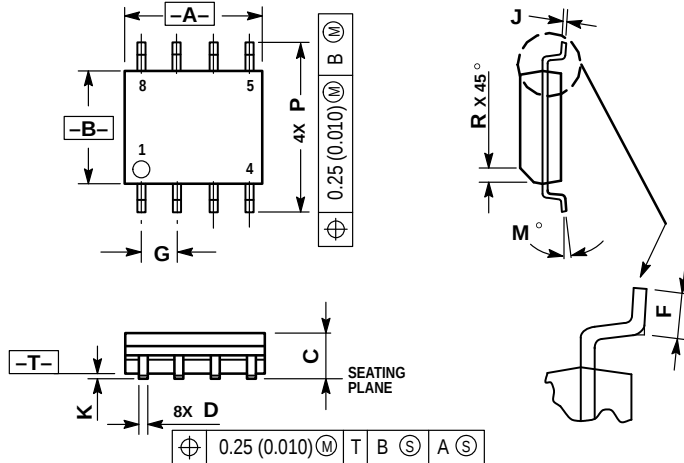
| Symbol                 | Characteristic                                                                          | -40°C        |        |              | 0°C          |        |              | 25°C         |        |              | 85°C         |        |              | Unit |
|------------------------|-----------------------------------------------------------------------------------------|--------------|--------|--------------|--------------|--------|--------------|--------------|--------|--------------|--------------|--------|--------------|------|
|                        |                                                                                         | Min          | Typ    | Max          | Min          | Typ    | Max          | Min          | Typ    | Max          | Min          | Typ    | Max          |      |
| $t_{PLH}$<br>$t_{PHL}$ | Propagation Delay to Output                                                             | 235          |        | 385          | 245          |        | 395          | 255          | 330    | 405          | 285          |        | 435          | ps   |
| $t_{SKEW}$             | Within-Device Skew <sup>1</sup><br>Duty Cycle Skew <sup>2</sup>                         |              | 5<br>5 | 20<br>20     |              | 5<br>5 | 20<br>20     |              | 5<br>5 | 20<br>20     |              | 5<br>5 | 20<br>20     | ps   |
| $V_{PP}$               | Minimum Input Swing <sup>3</sup>                                                        | 200          |        |              | 200          |        |              | 200          |        |              | 200          |        |              | mV   |
| $V_{CMR}$              | Common Mode Range <sup>4</sup><br>$V_{PP} < 500\text{mV}$<br>$V_{PP} \geq 500\text{mV}$ | -2.1<br>-1.9 |        | -0.2<br>-0.2 | -2.2<br>-2.0 |        | -0.2<br>-0.2 | -2.2<br>-2.0 |        | -0.2<br>-0.2 | -2.2<br>-2.0 |        | -0.2<br>-0.2 | V    |
| $t_r$<br>$t_f$         | Output Rise/Fall Times Q<br>(20% – 80%)                                                 | 120          |        | 320          | 120          |        | 320          | 120          | 220    | 320          | 120          |        | 320          | ps   |

1. Within-device skew defined as identical transitions on similar paths through a device.
2. Duty cycle skew is the difference between a TPLH and TPHL propagation delay through a device.
3. Minimum input swing for which AC parameters guaranteed. The device will function properly with input swings below 200mV, however, AC delays may move outside of the specified range. The device has a DC gain of  $\approx 40$ .
4. 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 number in the spec table assumes a nominal  $V_{EE} = -3.3\text{V}$ . Note for PECL operation, the  $V_{CMR}(\text{min})$  will be fixed at  $3.3\text{V} - |V_{CMR}(\text{min})|$ .

**Figure 1. Output Swing versus Frequency**

## OUTLINE DIMENSIONS

**D SUFFIX**  
**PLASTIC SOIC PACKAGE**  
**CASE 751-05**  
**ISSUE P**



## NOTES:

1. DIMENSIONS A AND B ARE DATUMS AND T IS A DATUM SURFACE.
2. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
3. DIMENSIONS ARE IN MILLIMETER.
4. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
5. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
6. DIMENSION D DOES NOT INCLUDE MOLD PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.

| DIM | MILLIMETERS |      |
|-----|-------------|------|
|     | MIN         | MAX  |
| A   | 4.80        | 5.00 |
| B   | 3.80        | 4.00 |
| C   | 1.35        | 1.75 |
| D   | 0.35        | 0.49 |
| F   | 0.40        | 1.25 |
| G   | 1.27 BSC    |      |
| J   | 0.18        | 0.25 |
| K   | 0.10        | 0.25 |
| M   | 0°          | 7°   |
| P   | 5.80        | 6.20 |
| R   | 0.25        | 0.50 |

Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola 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 consequential or incidental damages. "Typical" parameters which may be provided in Motorola 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. Motorola does not convey any license under its patent rights nor the rights of others. Motorola products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola 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 Motorola was negligent regarding the design or manufacture of the part. Motorola and  are registered trademarks of Motorola, Inc. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

**How to reach us:**

**USA/EUROPE/Locations Not Listed:** Motorola Literature Distribution;  
P.O. Box 20912; Phoenix, Arizona 85036. 1-800-441-2447 or 602-303-5454

**MFAX:** RMFAX0@email.sps.mot.com – TOUCHTONE 602-244-6609  
**INTERNET:** <http://Design-NET.com>

**JAPAN:** Nippon Motorola Ltd.; Tatsumi-SPD-JLDC, 6F Seibu-Butsuryu-Center,  
3-14-2 Tatsumi Koto-Ku, Tokyo 135, Japan. 03-81-3521-8315

**ASIA/PACIFIC:** Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,  
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298

