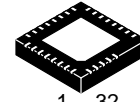


# 1.8 V Differential 2:1 M Input to 1.2 V/1.8 V 1:6 CML Clock/Data Fanout Buffer / Translator

Multi-Level Inputs w/ Internal Termination

## NB7V586M

Description

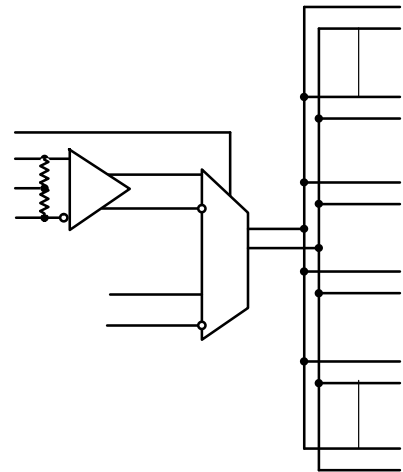


QFN32  
 MN SUFFIX  
 CASE 488AM

MARKING DIAGRAM\*

\*For additional marking information, refer to Application Note [AND8002/D](#).

### SIMPLIFIED LOGIC DIAGRAM



### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 7 of this data sheet.

Features

# NB7V586M

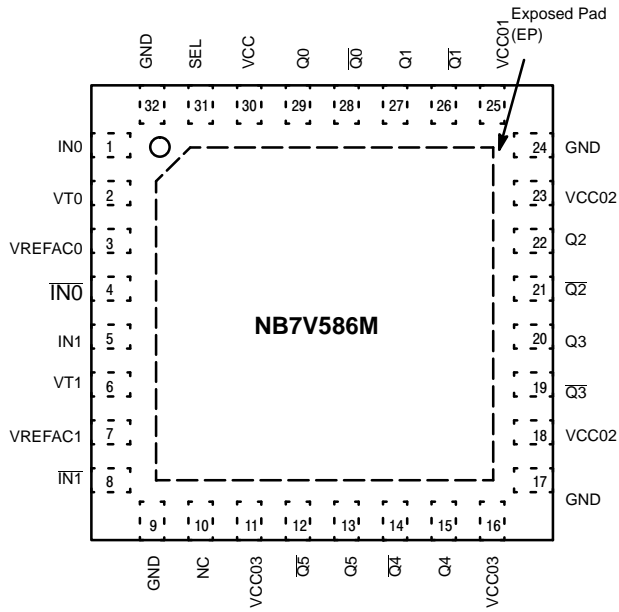


Figure 1. 32-Lead QFN Pinout (Top View)

Table 1. INPUT SELECT FUNCTION TABLE

| SEL* | CLK Input Selected |
|------|--------------------|
| 0    | IN0                |
| 1    | IN1                |

# NB7V586M

**Table 3. ATTRIBUTES**

| Characteristics  | Value                |
|--|----------------------|
| ESD Protection<br>Human Body Model<br>Machine Model    | > 2 kV<br>> 200 V    |
| Input Pullup Resistor (R <sub>PU</sub> )               | 75 kΩ                |
| Moisture Sensitivity (Note 3)                          | Level 1              |
| Flammability Rating<br>Oxygen Index: 28 to 34          | UL 94 V-0 @ 0.125 in |
| Transistor Count                                       | 308                  |
| Meets or exceeds JEDEC Spec EIA/JESD78 IC Latchup Test |                      |

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

**Table 4. MAXIMUM RATINGS**

| Symbol              | Parameter   | Condition 1         | Condition 2                                    | Rating                        | Unit       |
|---------------------|---|---------------------|--|-------------------------------|------------|
| V <sub>CC</sub>     | Positive Power Supply   | GND = 0 V           |  | 3.0                           | V          |
| V <sub>CCOx</sub>   | Positive Power Supply   | GND = 0 V           |  | 3.0                           | V          |
| V <sub>IO</sub>     | Input/Output Voltage  | GND = 0 V           | -0.5 ≤ V <sub>IO</sub> ≤ V <sub>CC</sub> + 0.5 | -0.5 to V <sub>CC</sub> + 0.5 | V          |
| V <sub>INPP</sub>   | Differential Input Voltage  I <sub>Nx</sub> - I <sub>Nx</sub> |                     |  | 1.89                          | V          |
| I <sub>IN</sub>     | Input Current Through R <sub>T</sub> (50 Ω Resistor)          |                     |  | ± 40                          | mA         |
| I <sub>OUT</sub>    | Output Current  | Continuous<br>Surge |  | 34<br>40                      | mA         |
| I <sub>VREFAC</sub> | V <sub>REFAC</sub> Sink/Source Current                        |                     |  | ± 1.5                         | mA         |
| T <sub>A</sub>      | Operating Temperature Range                                   |                     |  | -40 to +85                    | C          |
| T <sub>stg</sub>    | Storage Temperature Range                                     |                     |  | -65 to +150                   | C          |
| θ <sub>JA</sub>     | Thermal Resistance (Junction-to-Ambient)<br>(Note 4)          | 0 lfpm<br>500 lfpm  | QFN-32<br>QFN-32                               | 31<br>27                      | C/W<br>C/W |
| θ <sub>JC</sub>     | Thermal Resistance (Junction-to-Case)<br>(Note 4)             | Standard Board      | QFN-32   | 12                            | C/W        |
| T <sub>sol</sub>    | Wave Solder<br>Pb-Free  |                     |  | 265                           | C          |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these

## NB7V586M

**Table 5. DC CHARACTERISTICS – CML OUTPUT**  $V_{CC} = 1.8\text{ V} \pm 5\%$ ,  $V_{CCO1} = 1.2\text{ V} \pm 5\%$  or  $1.8\text{ V} \pm 5\%$ ,  $V_{CCO2} = 1.2\text{ V} \pm 5\%$  or  $1.8\text{ V} \pm 5\%$ ,  $V_{CCO3} = 1.2\text{ V} \pm 5\%$  or  $1.8\text{ V} \pm 5\%$ ,  $GND = 0\text{ V}$ ,  $T_A = -40\text{ C}$  to  $85\text{ C}$  (Note 5)

| Symbol | Characteristic | Min | Typ | Max | Unit |
|--------|----------------|-----|-----|-----|------|
|--------|----------------|-----|-----|-----|------|

**POWER SUPPLY CURRENT** (Inputs and Outputs open)

|           |  |  |    |     |    |
|-----------|--|--|----|-----|----|
| $I_{CC}$  | Power Supply Current for $V_{CC}$<br>(Inputs and Outputs Open)   |  | 75 | 125 | mA |
| $I_{CCO}$ | Power Supply Current for $V_{CCOx}$<br>(Inputs and Outputs Open) |  | 95 | 105 |    |

**CML OUTPUTS** (Note 6)

|          |                     |   |                         |                         |                    |    |
|----------|---------------------|---|-------------------------|-------------------------|--------------------|----|
| $V_{OH}$ | Output HIGH Voltage |   |                         |                         |                    | mV |
|          |                     | $V_{CC} = 1.8\text{ V}$ , $V_{CCOx} = 1.8\text{ V}$ | $V_{CCOx} - 40$<br>1760 | $V_{CCOx} - 20$<br>1780 | $V_{CCOx}$<br>1800 |    |
|          |                     | $V_{CC} = 1.8\text{ V}$ , $V_{CCOx} = 1.2\text{ V}$ | 1160                    | 1180                    | 1200               |    |

## NB7V586M

**Table 6. AC CHARACTERISTICS**  $V_{CC} = 1.8\text{ V} \pm 5\%$ ,  $V_{CCO1} = 1.2\text{ V} \pm 5\%$  or  $1.8\text{ V} \pm 5\%$ ,  $V_{CCO2} = 1.2\text{ V} \pm 5\%$  or  $1.8\text{ V} \pm 5\%$ ,  $V_{CCO3} = 1.2\text{ V} \pm 5\%$  or  $1.8\text{ V} \pm 5\%$ ,  $GND = 0\text{ V}$ ,  $T_A = -40\text{ C}$  to  $85\text{ C}$  (Note 11)

| Symbol                | Characteristic   | Min | Typ | Max | Unit |
|-----------------------|--|-----|-----|-----|------|
| $f_{MAX}$             | Maximum Input Clock Frequency, $V_{OUTPP} \geq 200\text{ mV}$                  | 4.0 | 6.0 |     | GHz  |
| $f_{DATAMAX}$         | Maximum Operating Input Data Rate (PRBS23)                                     | 10  |     |     | Gbps |
| $V_{OUTPP}$           | Output Voltage Amplitude (See Figures 4, Note 15) $f_{in} \leq 4.0\text{ GHz}$ | 200 | 330 |     | mV   |
| $t_{PLH}$ , $t_{PHL}$ | Propagation Delay to Output Differential @ 1 GHz, $I_{Nx}/I_{NmV}$             |     |     |     |      |

# NB7V586M

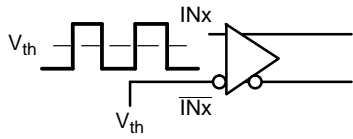


Figure 6. Differential Input Driven Single-Ended

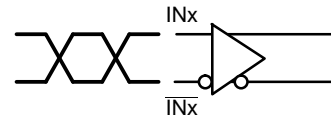


Figure 7. Differential Inputs Driven Differentially

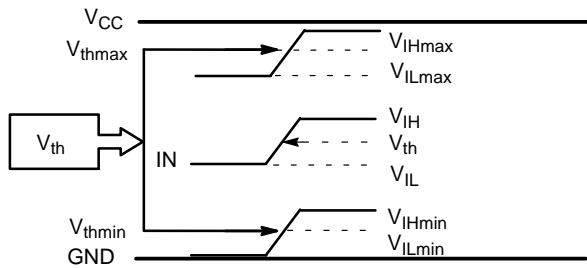


Figure 8.  $V_{th}$  Diagram

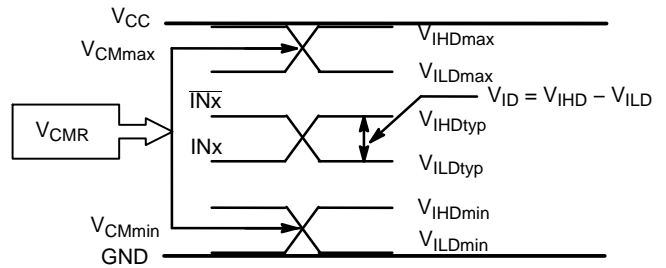
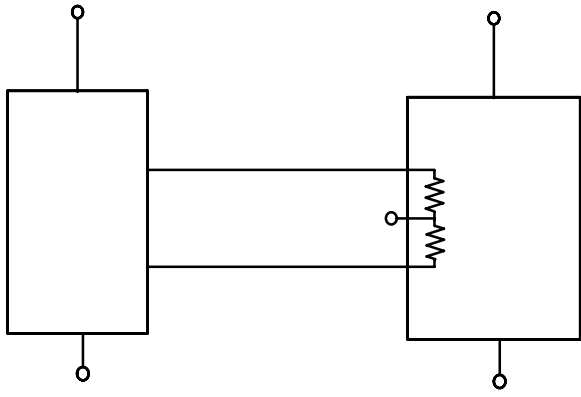
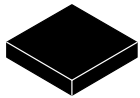


Figure 9.  $V_{CMR}$  Diagram

NB7V586M

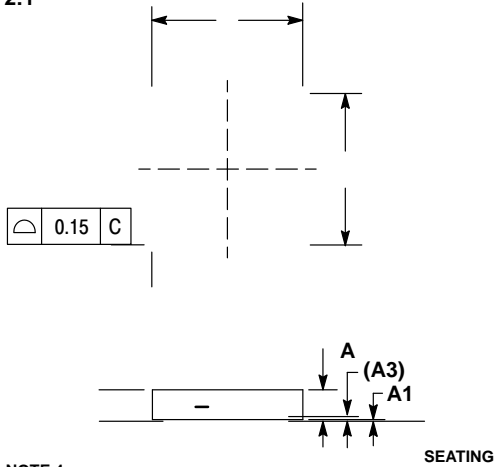




**QFN32 5x5, 0.5P**  
CASE 488AM  
ISSUE A

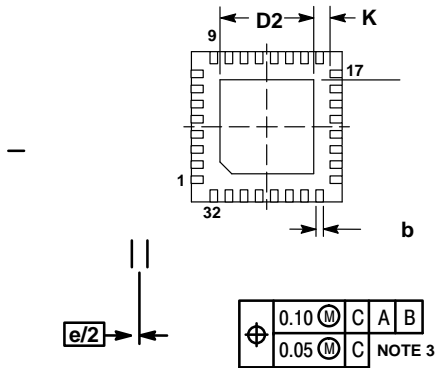
DATE 23 OCT 2013

SCALE 2:1



NOTE 4

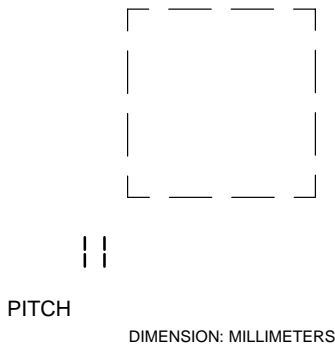
|    | MAX           |
|----|---------------|
| A1 | 0.80 1.00     |
| A3 | 0.20 REF 0.05 |
| b  | 0.18 0.30     |
| D  | 5.00 BSC      |
| D2 | 2.95 3.25     |
| E  | 5.00 BSC      |
| E2 | 2.95 3.25     |
| e  | 0.50 BSC      |
| K  | 0.20          |
| L  | 0.30 0.50     |
| L1 | 0.15          |



XXXXXXXXXX  
XXXXXXXXXX  
AWLYYYWW■

■Free indicator, "G" or

**RECOMMENDED**



PITCH

DIMENSION: MILLIMETERS

|                         |                    |  |
|-------------------------|--------------------|--|
| <b>DOCUMENT NUMBER:</b> | <b>98AON20032D</b> |  |
|                         |                    |  |



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