

# NB7L1008MNGEVB

## NB7L1008MNG Evaluation Board User's Manual



ON Semiconductor®

<http://onsemi.com>

### EVAL BOARD USER'S MANUAL

#### Introduction

The NB7L1008 is a high performance differential 1:8 Clock/Data fanout buffer that operates up to 12 Gbps/7 GHz with a 2.5 V or 3.3 V power supply. ON Semiconductor has developed a “universal” QFN-32 evaluation board and configured it for the NB7L1008. This evaluation board was designed to provide a flexible and convenient platform to quickly evaluate, characterize and verify the operation of the NB7L1008.

This evaluation board manual contains:

- Information on the NB7L1008 Evaluation Board
- Test and Measurement Setup Procedures

This manual should be used in conjunction with the device datasheet, which contains full technical details on the device specifications and operation.

#### Board Layout

The NB7L1008 Evaluation Board provides a high bandwidth, 50-Ω controlled impedance environment and is implemented in one layer.

#### Layer Stack

L1 (Rogers)

High-performance SMA connectors are provided for all high-speed input & output signal access.

#### Evaluation Board Assembly Instructions

The QFN-32 evaluation board is designed for characterizing devices in a 50-Ω laboratory environment using high bandwidth equipment.

#### Output Loading/Termination

*LVPECL Outputs*

**Table 1. DIFFERENTIAL INPUTS DRIVEN SINGLE – ENDED** (Notes 1 & 2)

| Symbol    | Characteristic                                     | Min             | Typ | Max            | Unit |
|-----------|--|-----------------|-----|----------------|------|
| $V_{IH}$  | Single – Ended Input High Voltage                  | $V_{th} + 75$   | –   | $V_{CC}$       | mV   |
| $V_{IL}$  | Single – Ended Input Low Voltage                   | $V_{EE}$        | –   | $V_{th} - 100$ | mV   |
| $V_{th}$  | Input Threshold Reference Voltage Range            | $V_{EE} + 1100$ | –   | $V_{CC} - 100$ | mV   |
| $V_{ISE}$ | Single – Ended Input Voltage ( $V_{IH} - V_{IL}$ ) | 200             | –   | 1200           | mV   |

1.  $V_{th}$ ,  $V_{IH}$ ,  $V_{IL}$  and  $V_{ISE}$  parameters must be complied with simultaneously.
2.  $V_{th}$  is applied to the complementary input when operating in single-ended mode.

**Table 2. DIFFERENTIAL INPUTS DRIVEN DIFFERENTIALLY (IN, INB)** (Note 3)

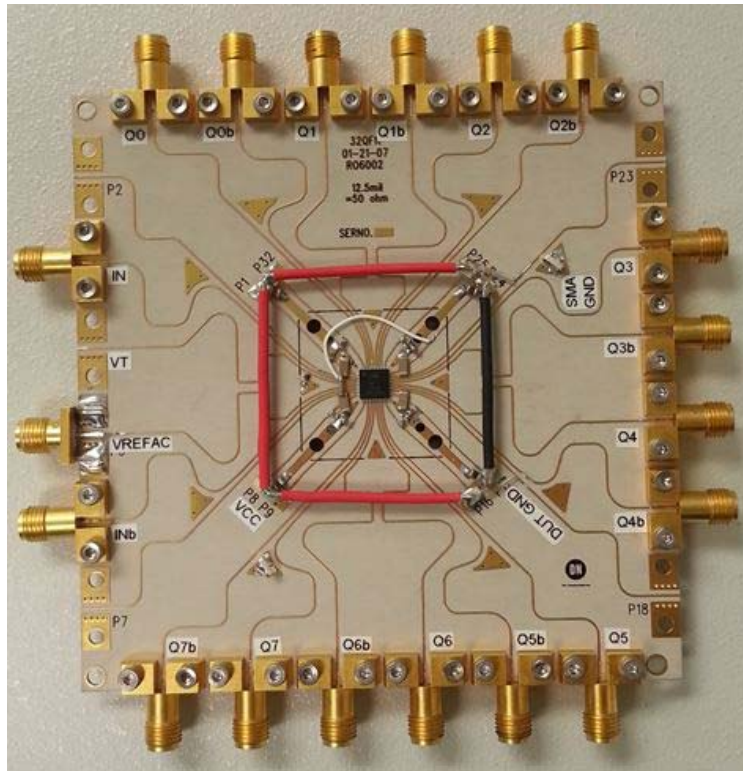
| Symbol    | Characteristic                                     | Min             | Typ | Max             | Unit |
|-----------|--|-----------------|-----|-----------------|------|
| $V_{IHD}$ | Differential Input High Voltage                    | $V_{EE} + 1100$ | –   | $V_{CC}$        | mV   |
| $V_{ILD}$ | Differential Input Low Voltage                     | $V_{EE}$        | –   | $V_{IHD} - 100$ | mV   |
| $V_{ID}$  | Differential Input Voltage ( $V_{IHD} - V_{ILD}$ ) | 100             | –   | 1200            | mV   |
| $I_{IH}$  | Input High Current                                 | –150            | 40  | +150            | μA   |
| $I_{IL}$  | Input Low Current                                  | –150            | 5   | +150            | μA   |

3.  $V_{IHD}$ ,  $V_{ILD}$ ,  $V_{ID}$  and  $V_{CMR}$  parameters must be complied with simultaneously.

If the input signals to the NB7L1008 require termination, internal 50-Ω resistors are provided via the VT pin and grounded using a SMA grounding plug then and should be stimulated with the appropriate voltage levels.

**NOTE:** For this evaluation board, VT is connected to ground, thus it can only be used for LVPECL inputs.

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**Figure 1. Test Board**

1. Connect the appropriate power supplies to  $V_{CC}$ , DUTGND.
2. Connect a signal generator to the input SMA connectors. Setup input signal levels according to the device data sheet.

3. Connect a test measurement device to the device's output SMA connectors.

**NOTE:** The test measurement device must contain 50- $\Omega$  termination.

**Table 3. NB7L1008, LVPECL INPUTS AND LVPECL OUTPUTS**

| Device Pin Power Supply Connector | Power Supply  |
|-----------------------------------|---|
| $V_{CC}$                          | $V_{CC} = 2\text{ V}$   |
| 50 $\Omega$ Input                 | $VT = 0\text{ V}$   |
| DUTGND                            | $DUTGND = V_{EE} = -0.5\text{ V}$ (for 2.5 V) and $-1.3\text{ V}$ (for 3.3 V) |

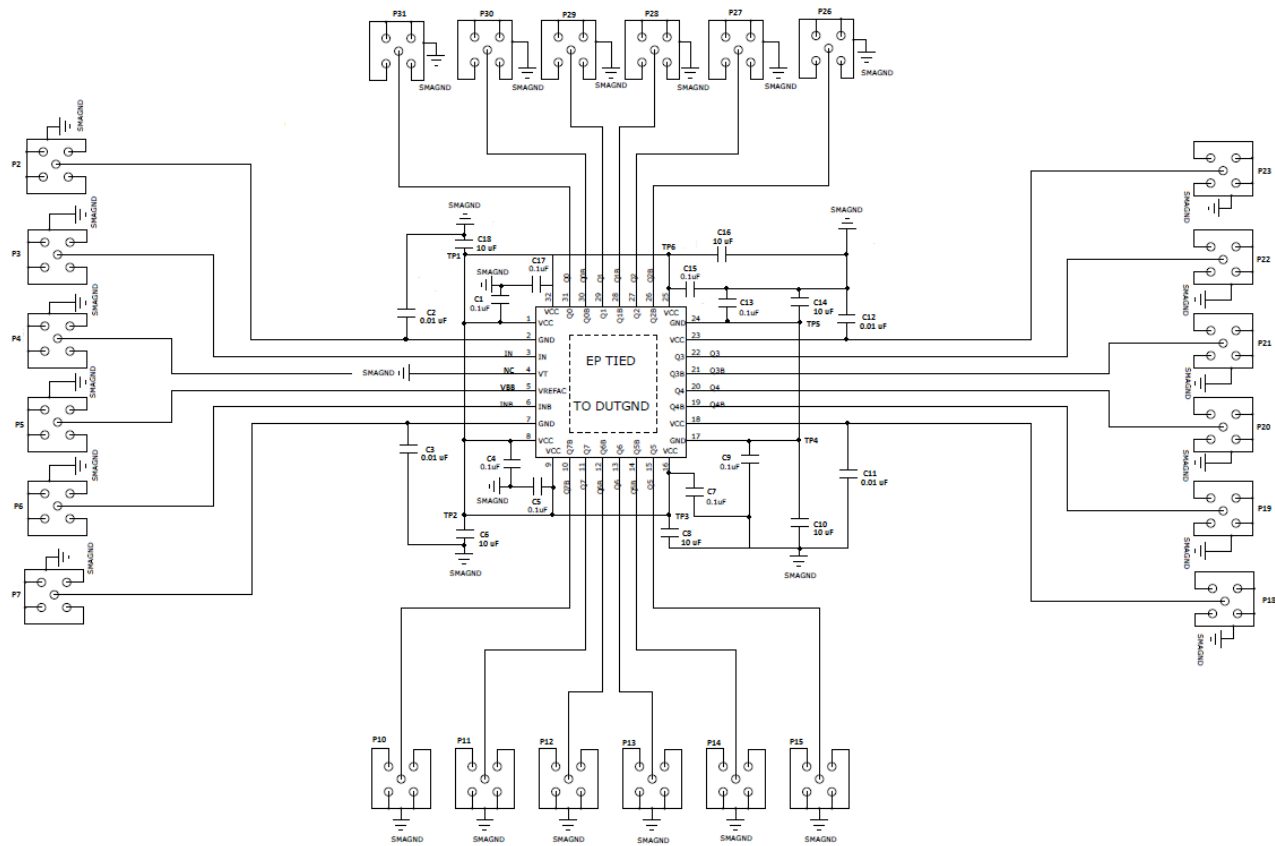
**Table 4. NB7L1008, CML INPUTS AND LVPECL OUTPUTS**

| Device Pin Power Supply Connector | Power Supply  |
|-----------------------------------|---|
| $V_{CC}$                          | $V_{CC} = 2\text{ V}$   |
| 50 $\Omega$ Input                 | $VT = V_{CC}$   |
| DUTGND                            | $DUTGND = V_{EE} = -0.5\text{ V}$ (for 2.5 V) and $-1.3\text{ V}$ (for 3.3 V) |

**Table 5. NB7L1008, LVDS INPUTS AND LVPECL OUTPUTS**

| Device Pin Power Supply Connector | Power Supply  |
|-----------------------------------|---|
| $V_{CC}$                          | $V_{CC} = 2\text{ V}$   |
| 50 $\Omega$ Input                 | $VT = \text{Open}$  |
| DUTGND                            | $DUTGND = V_{EE} = -0.5\text{ V}$ (for 2.5 V) and $-1.3\text{ V}$ (for 3.3 V) |

## NB7L1008MNGEVB




**Figure 2. Schematic Drawing**

**Table 6. BILL OF MATERIALS**

| Components                | Manufacturer     | Description  | Manufacturer Part Number | Web Site   |
|---------------------------|------------------|--|--------------------------|--|
| SMA Connector             | Rosenberger      | High Performance SMA Connector, Side Launch, Gold Plated | 32K243-40ME3             | <a href="http://www.rosenberger.de">http://www.rosenberger.de</a><br><a href="http://www.rosenbergerna.com">http://www.rosenbergerna.com</a> |
| SMA Connector             | Johnson-Emerson  | SMA Connector, Side Launch, Gold Plated                  | 142-0701-801             | <a href="http://www.digikey.com">http://www.digikey.com</a>  |
| Surface Mount Test Points | Keystone*        | SMT Compact Test Point                                   | 5016                     | <a href="http://www.keylco.com">http://www.keylco.com</a>  |
| Chip Capacitor            | AVC Corporation* | 0603 0.1 $\mu$ F $\pm$ 10%                               | 0603C104KAT2A            | <a href="http://www.avxcorp.com">http://www.avxcorp.com</a>  |
| Chip Capacitor            | Kemet            | 1206 0.01 $\mu$ F $\pm$ 10%                              | C1206C103K5RACTU         | <a href="http://www.newark.com">http://www.newark.com</a>  |
| Chip Capacitor            | TDK              | 0603 0.1 $\mu$ F $\pm$ 10%                               | C3216X5R1H106K160AB      | <a href="http://www.newark.com">http://www.newark.com</a>  |
| Evaluation Board          | ON Semiconductor | QFN 32 Evaluation Board                                  | NB7VQ1006MMNGEVB         | <a href="http://www.onsemi.com">http://www.onsemi.com</a>  |
| Device Samples            | ON Semiconductor | NB7L1008   | Various                  | <a href="http://www.onsemi.com">http://www.onsemi.com</a>  |

\*Components are available through most distributors, i.e. [www.newark.com](http://www.newark.com), [www.digikey.com](http://www.digikey.com)

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