

# 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)

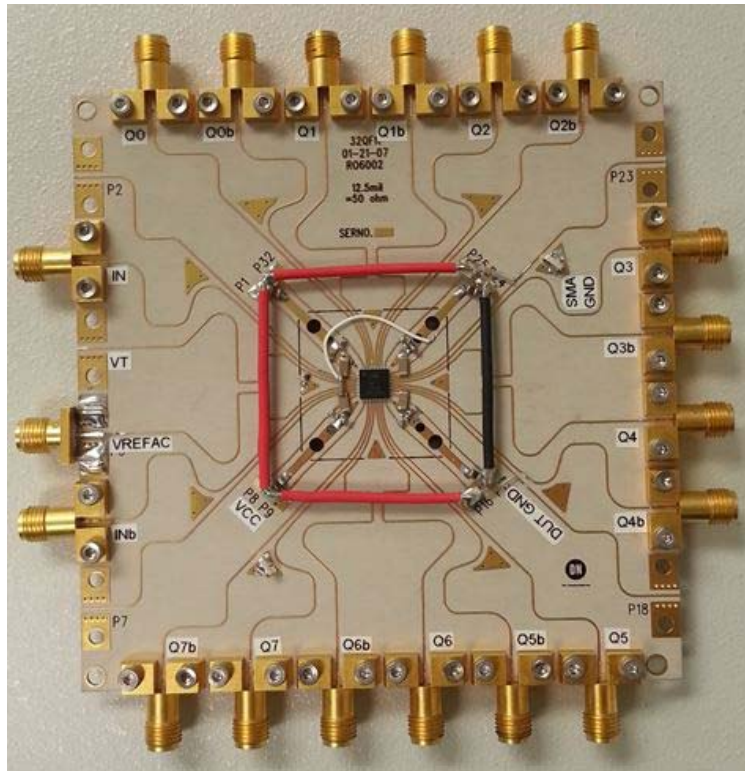
Symbol	Characteristic	Min	Typ	Max	Unit
$V_{IHD}$	Differential Input High Voltage	$V_{EE} + 1100$	–	$V_{CC}$	mV
$V_{ILD}$	Differential Input Low Voltage	$V_{EE}$	–	$V_{IHD} - 100$	mV
$V_{ID}$	Differential Input Voltage ( $V_{IHD} - V_{ILD}$ )	100	–	1200	mV
$I_{IH}$	Input High Current	–150	40	+150	μA
$I_{IL}$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

# NB7L1008MNGEVB



**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

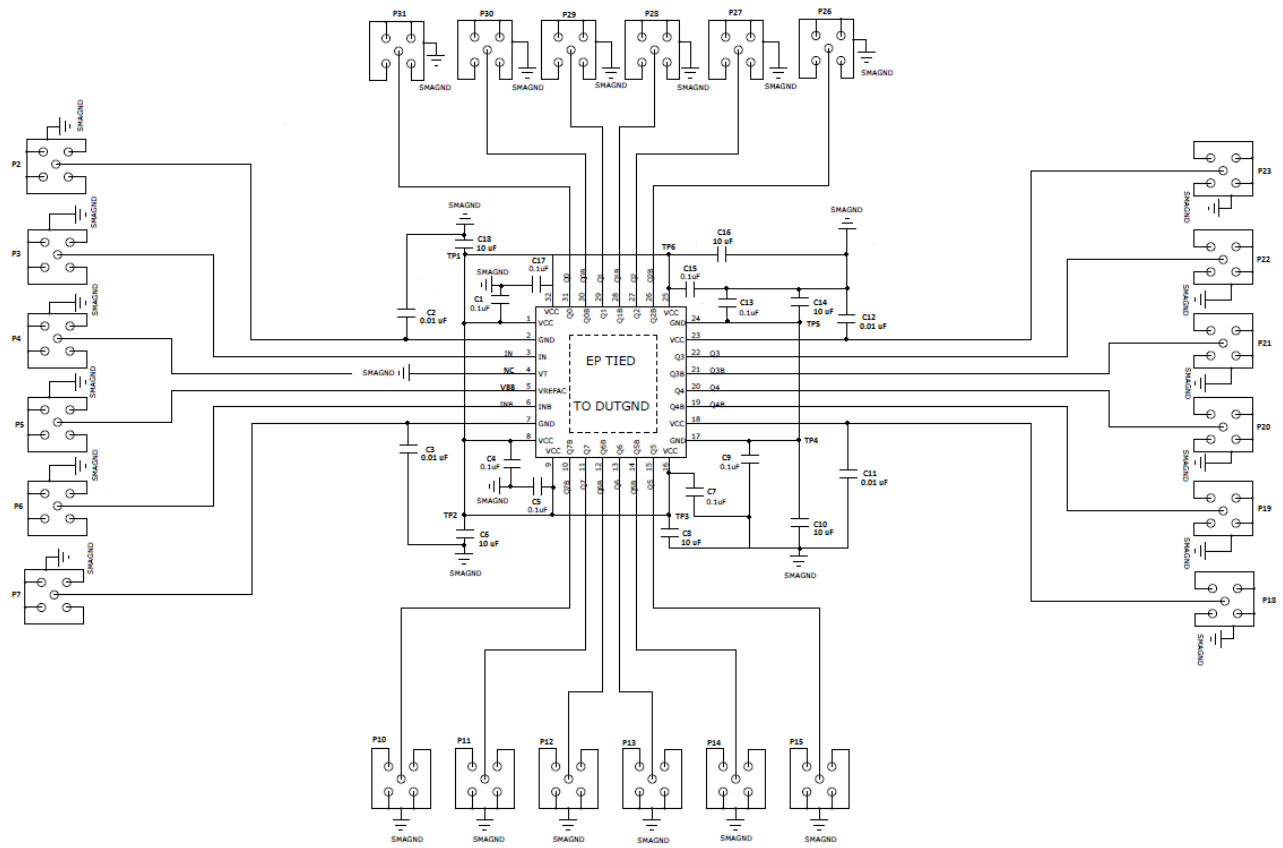



Figure 2. Schematic Drawing

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> <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)

# NB7L1008MNGEVB

ON Semiconductor and the  are registered trademarks of Semiconductor Components Industries, LLC (SCILLC) or its subsidiaries in the United States and/or other countries. SCILLC owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of SCILLC's product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC 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. "Typical" parameters which may be provided in SCILLC 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. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC 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 SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC 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 SCILLC was negligent regarding the design or manufacture of the part. SCILLC 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  
P.O. Box 5163, Denver, Colorado 80217 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