

NB7L1008MNGEVB

NB7L1008MNG Evaluation Board User's Manual



ON Semiconductor®

www.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

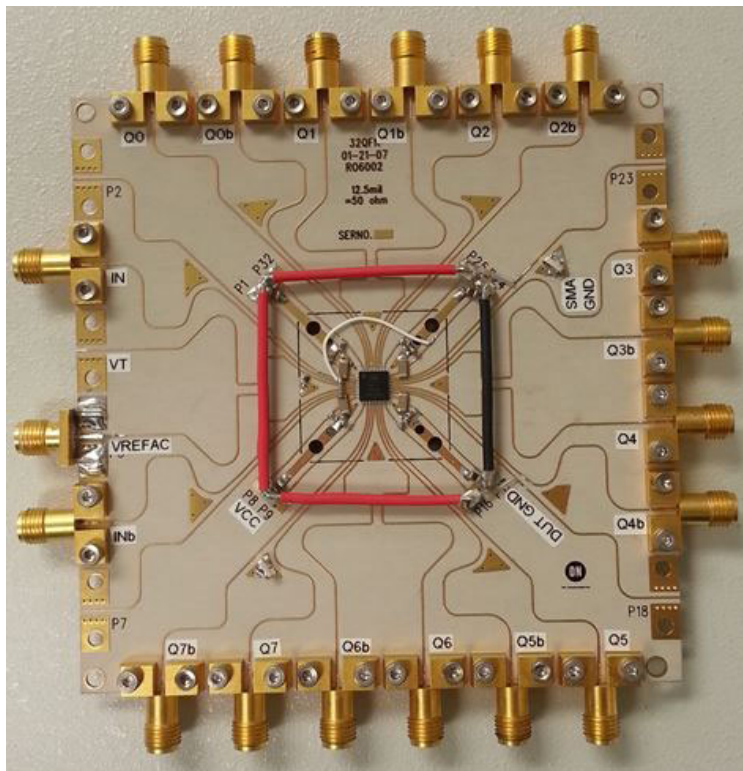


Figure 1. Test Board

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- Ω termination.

Table 3. NB7L1008, LVPECL INPUTS AND LVPECL OUTPUTS

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

NB7L1008MNGEVB

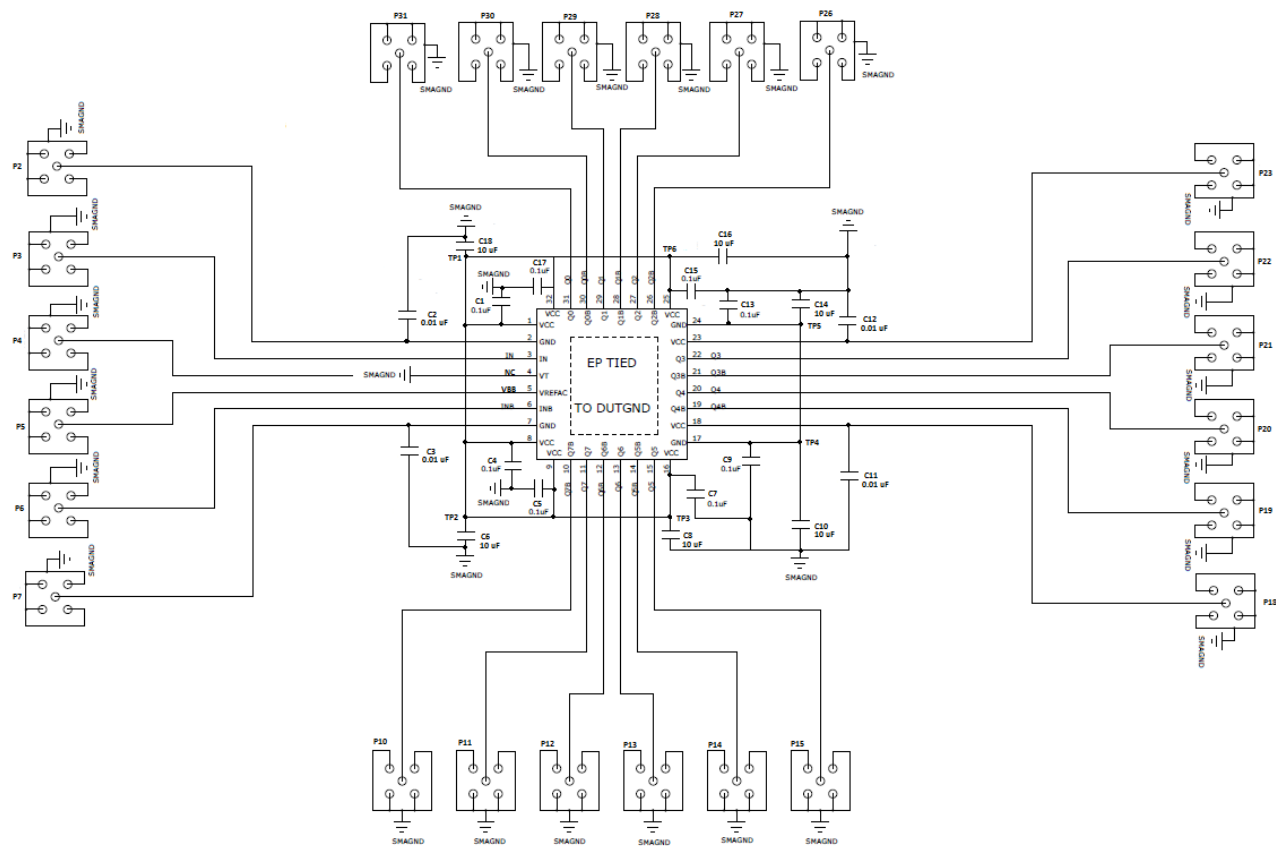


Figure 2. Schematic Drawing

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	http://www.rosenberger.de http://www.rosenbergerna.com
SMA Connector	Johnson-Emerson	SMA Connector, Side Launch, Gold Plated	142-0701-801	http://www.digikey.com
Surface Mount Test Points	Keystone*	SMT Compact Test Point	5016	http://www.keylco.com
Chip Capacitor	AVC Corporation*	0603 0.1 μ F \pm 10%	0603C104KAT2A	http://www.avxcorp.com
Chip Capacitor	Kemet	1206 0.01 μ F \pm 10%	C1206C103K5RACTU	http://www.newark.com
Chip Capacitor	TDK	0603 0.1 μ F \pm 10%	C3216X5R1H106K160AB	http://www.newark.com
Evaluation Board	ON Semiconductor	QFN 32 Evaluation Board – 2-Layer		http://www.onsemi.com
Device Samples	ON Semiconductor	NB7L1008MNG		http://www.onsemi.com

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

onsemi, **onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

The evaluation board/kit (research and development board/kit) (hereinafter the "board") is not a finished product and is not available for sale to consumers. The board is only intended for research, development, demonstration and evaluation purposes and will only be used in laboratory/development areas by persons with an engineering/technical training and familiar with the risks associated with handling electrical/mechanical components, systems and subsystems. This person assumes full responsibility/liability for proper and safe handling. Any other use, resale or redistribution for any other purpose is strictly prohibited.

THE BOARD IS PROVIDED BY ONSEMI TO YOU "AS IS" AND WITHOUT ANY REPRESENTATIONS OR WARRANTIES WHATSOEVER. WITHOUT LIMITING THE FOREGOING, ONSEMI (AND ITS LICENSORS/SUPPLIERS) HEREBY DISCLAIMS ANY AND ALL REPRESENTATIONS AND WARRANTIES IN RELATION TO THE BOARD, ANY MODIFICATIONS, OR THIS AGREEMENT, WHETHER EXPRESS, IMPLIED, STATUTORY OR OTHERWISE, INCLUDING WITHOUT LIMITATION ANY AND ALL REPRESENTATIONS AND WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE, NON-INFRINGEMENT, AND THOSE ARISING FROM A COURSE OF DEALING, TRADE USAGE, TRADE CUSTOM OR TRADE PRACTICE.

onsemi reserves the right to make changes without further notice to any board.

You are responsible for determining whether the board will be suitable for your intended use or application or will achieve your intended results. Prior to using or distributing any systems that have been evaluated, designed or tested using the board, you agree to test and validate your design to confirm the functionality for your application. Any technical, applications or design information or advice, quality characterization, reliability data or other services provided by **onsemi** shall not constitute any representation or warranty by **onsemi**, and no additional obligations or liabilities shall arise from **onsemi** having provided such information or services.

onsemi products including the boards are not designed, intended, or authorized for use in life support systems, or any FDA Class 3 medical devices or medical devices with a similar or equivalent classification in a foreign jurisdiction, or any devices intended for implantation in the human body. You agree to indemnify, defend and hold harmless **onsemi**, its directors, officers, employees, representatives, agents, subsidiaries, affiliates, distributors, and assigns, against any and all liabilities, losses, costs, damages, judgments, and expenses, arising out of any claim, demand, investigation, lawsuit, regulatory action or cause of action arising out of or associated with any unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of any products and/or the board.

This evaluation board/kit does not fall within the scope of the European Union directives regarding electromagnetic compatibility, restricted substances (RoHS), recycling (WEEE), FCC, CE or UL, and may not meet the technical requirements of these or other related directives.

FCC WARNING – This evaluation board/kit is intended for use for engineering development, demonstration, or evaluation purposes only and is not considered by **onsemi** to be a finished end product fit for general consumer use. It may generate, use, or radiate radio frequency energy and has not been tested for compliance with the limits of computing devices pursuant to part 15 of FCC rules, which are designed to provide reasonable protection against radio frequency interference. Operation of this equipment may cause interference with radio communications, in which case the user shall be responsible, at its expense, to take whatever measures may be required to correct this interference.

onsemi does not convey any license under its patent rights nor the rights of others.

LIMITATIONS OF LIABILITY: **onsemi** shall not be liable for any special, consequential, incidental, indirect or punitive damages, including, but not limited to the costs of requalification, delay, loss of profits or goodwill, arising out of or in connection with the board, even if **onsemi** is advised of the possibility of such damages. In no event shall **onsemi**'s aggregate liability from any obligation arising out of or in connection with the board, under any theory of liability, exceed the purchase price paid for the board, if any.

The board is provided to you subject to the license and other terms per **onsemi**'s standard terms and conditions of sale. For more information and documentation, please visit www.onsemi.com.

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:

Technical Library: www.onsemi.com/design/resources/technical-documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support

For additional information, please contact your local Sales Representative at www.onsemi.com/support/sales

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[onsemi:](#)

[NB7L1008MNGEVB](#)