# NB3N3011DTEVB

# NB3N3011DTEVB Evaluation Board User's Manual

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## EVAL BOARD USER'S MANUAL

### Board Description

The NB3N3011 Evaluation Board provides a flexible and convenient platform to quickly evaluate, characterize and verify the performance and operation of the NB3N3011 Clock Generator. This user's manual provides detailed information on board contents, layout and its use. It should be used in conjunction with a device datasheet: NB3N3011. (www.onsemi.com)

A single TSSOP−8 (wide) device can be mounted on the board.

### Board Features

- Accommodates the Electrical Characterization of the NB3N3011
- Supports Use of a 25 MHz and 26.5625 MHz Through−hole or Surface Mount Crystal
- Incorporates on Board Power Supply Filter
- Convenient and Compact Board Layout
- 3.3 V Single or Split−power Supply Operation
- LVPECL Differential Output Signals are Accessed via SMA Connectors

### Board Layout

The evaluation board is constructed with FR4 material and is designed to minimize noise, and crosstalk and achieve high bandwidth. SMA connectors are provided for output signal access.

### Layer Stack

L1 Signal and SMAGND
L2 SMA Ground
L3 $V_{CC}$ (Positive Power Supply) and $V_{EE}$ (Device Negative Power Supply)
L4 Signal

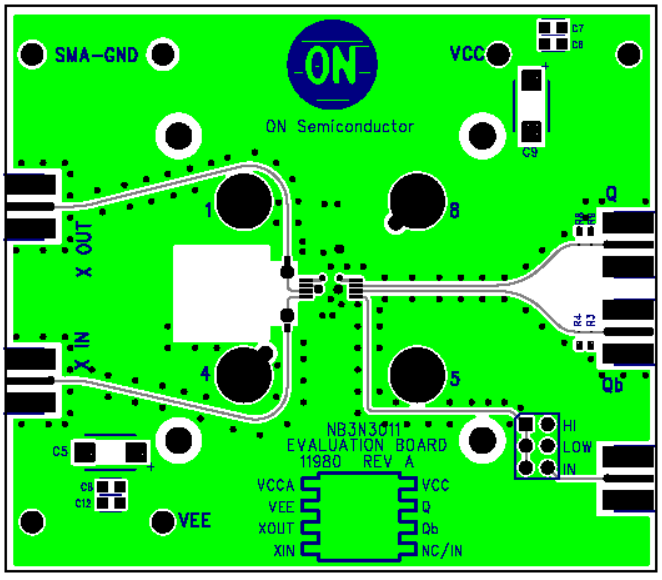



**Figure 1. Evaluation Board**

## LAB SETUP PROCEDURE

### Power Supply Connections and Output Termination

The NB3N3011 has a positive supply pin, $V_{CC}$, and a negative supply pin, $V_{EE}$. SMAGND ($V_{TT}$) is the termination supply for the LVPECL outputs, only.

Power supply banana plug connectors for $V_{CC}$, $V_{EE}$ and SMAGND are provided in the corners of the board. The LVPECL Q and $\overline{Q}$ outputs have standard, open emitter outputs and must be externally DC loaded and terminated. Thevenin equivalent load and termination resistors pads are provided at the Q/$\overline{Q}$ output's SMA connectors, but are not installed. A "split" or dual power supply technique can be used to take advantage of terminating the LVPECL outputs into 50 Ω of an oscilloscope or a frequency counter. Since $V_{TT} = V_{CC} - 2.0$ V, offsetting $V_{CC}$ to +2.0 V yields $V_{TT}$ = 0 V or Ground. The $V_{TT}$ terminal connects to the isolated SMAGND connector ground plane, and is not to be confused with the device ground pin or $V_{EE}$.

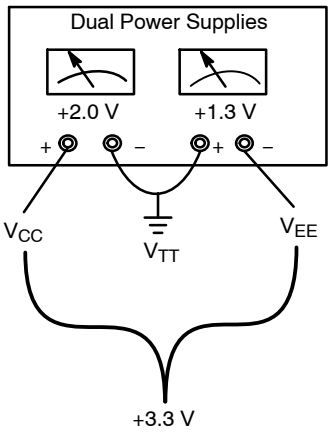



**Figure 2. "Split" or Dual Power Supply Connections**

**Table 1. "SPLIT" POWER SUPPLY CONFIGURATION**

| Device Pin | Power Supply | "Spilt" Power Supply |
|---|---|---|
| $V_{CC}$ | RED | $V_{CC}$ = +2.0 V |
| SMAGND | BLACK | $V_{TT} = V_{CC} - 2.0$ V = 0 V |
| $V_{EE}$ | BLACK | $V_{EE}$ = −1.3 V |

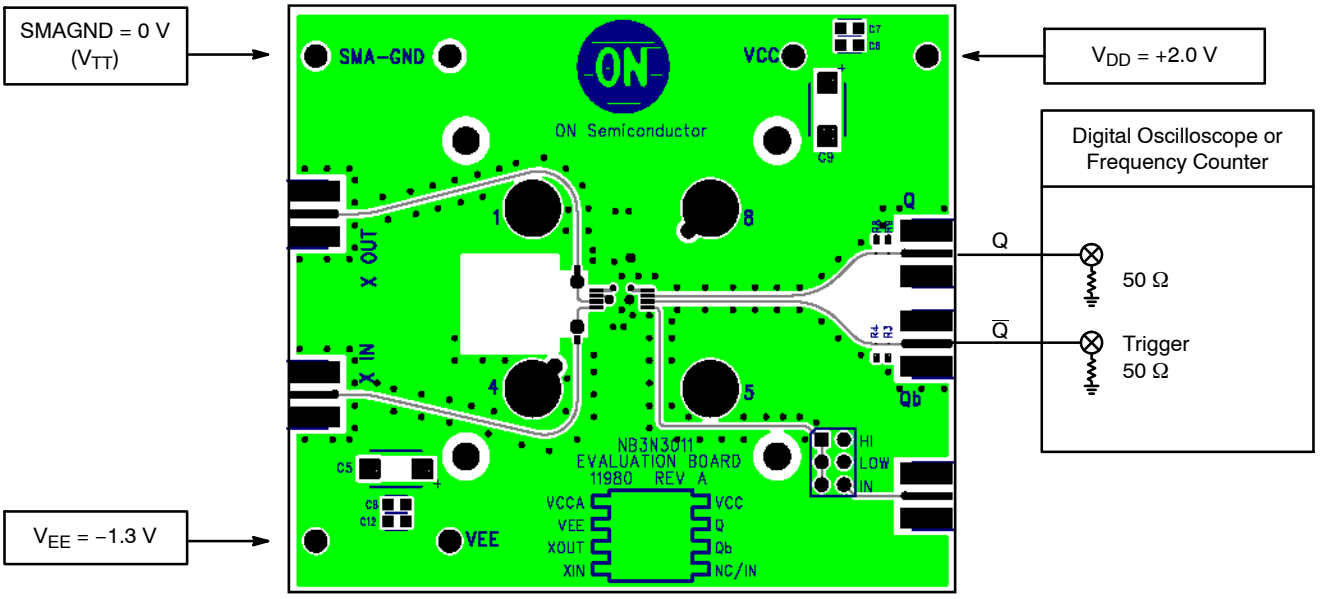



**Figure 3. "Split" Power Supply Connections**

## LAB SETUP AND MEASUREMENT PROCEDURE

### Equipment Used

- Tektronix TDS8000 Oscilloscope or Frequency Counter
- Agilent #6624A DC Power Supply
- Digital Voltmeter
- Matched high−speed cables with SMA connectors

In order to get started and demonstrate the NB3N3011, perform the following test set−up sequence:

To monitor the Q and $\overline{Q}$ outputs on an oscilloscope or frequency counter (with internal 50 Ω termination impedance), the power supply needs to be DC offset:

1. Connect a “split” power supply to the evaluation board. (see Figure 2)
   Connect $V_{CC}$ banana jack to +2.0 V
   Connect SMAGND banana jack to ground = 0 V
   Connect $V_{EE}$ banana jack to −1.3 V for 3.3 V operation
2. Ensure the oscilloscope is triggered properly and has 50 Ω internal termination to ground. The board does not provide 50 Ω source termination resistors. Two oscilloscope trigger methods are1) from Q (using a “T” connector) or 2) directly from $\overline{Q}$.
3. Connect the LVPECL Q and $\overline{Q}$ outputs to the oscilloscope with good quality matched cables. The outputs are terminated with 50 Ω to $V_{TT}$ = SMAGND ($V_{CC}$ – 2.0 V) = 0 V = Ground internal to the oscilloscope.

### NB3N3011 Evaluation Board Pin Descriptions and Features by Pin

The NB3N3011 Evaluation Board was designed to accommodate the test and evaluation of the NB3N3011 LVPECL Clock Generator. Detailed board features by device pin are described below:

#### Crystal (XTAL_IN and XTAL_OUT)

A through−hole or surface mount parallel resonant crystal can be used.

Disregard the metal traces and connectors from $X_{IN}$ and $X_{OUT}$. They are open and NOT connected to the crystal package pins and have no impedance affect on the crystal.

#### Q and $\overline{Q}$

The Q and $\overline{Q}$ LVPECL outputs have equal length 50 Ω board traces with SMA connectors. Matched cables can connect to an oscilloscope or frequency counter.

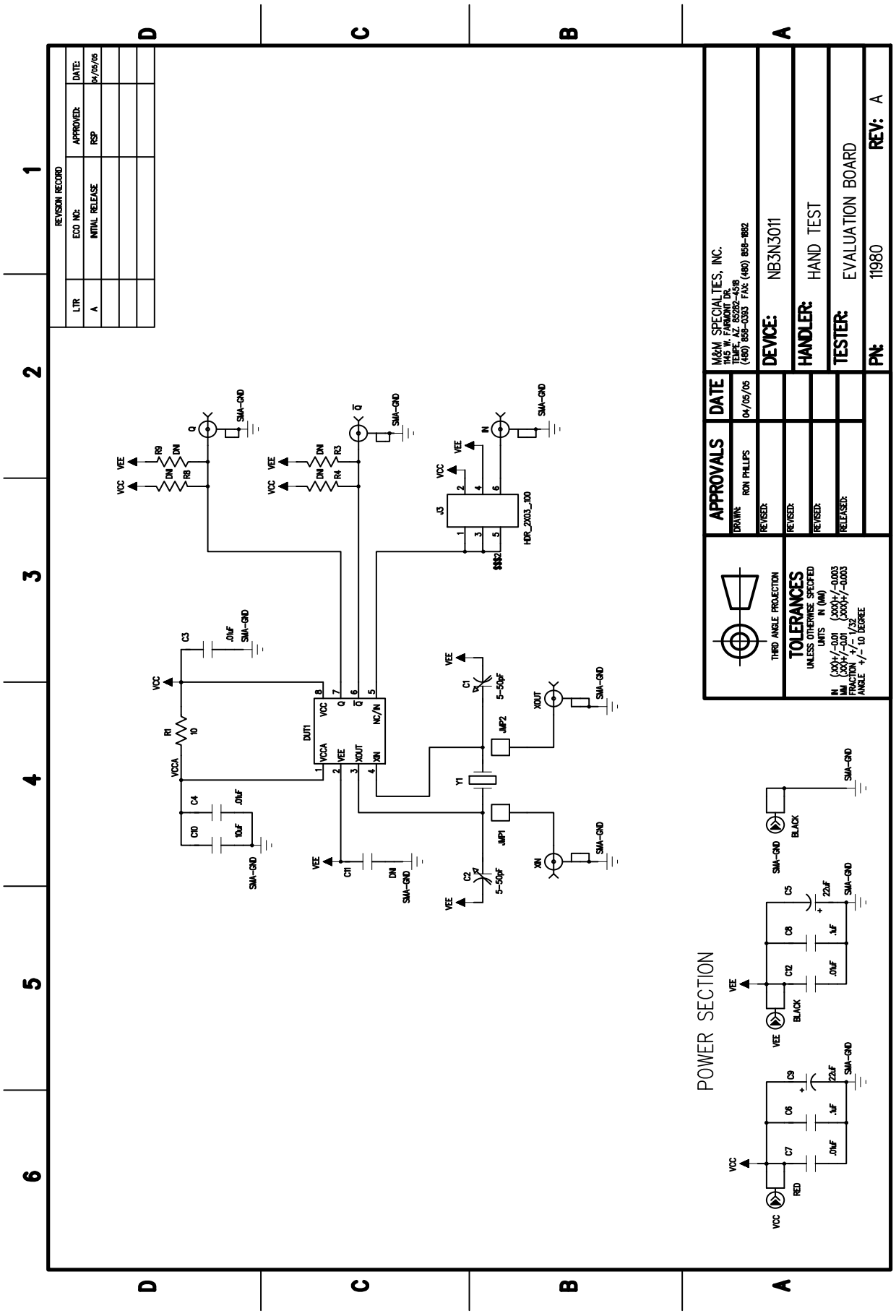
#### $V_{CC}$ and $V_{CCA}$

The $V_{CC}$ pin is connected directly to the $V_{CC}$ power plane. By−pass capacitors are installed.

The $V_{CCA}$ pin has the power supply filter components installed per the datasheet.

**Table 2. NB3N3011 BILL OF MATERIALS**

| Component | Description | Qty | Designator |
|---|---|---|---|
| Connector | Johnson Comp Inc SMA #142−0711−821 | 2 | Q, $\overline{Q}$ |
| Capacitor, P/S Bypass | 22 μF | 2 | C5, C9 |
| Capacitor, P/S Bypass; VCCA Filter | 0.01 μF | 4 | C7, C12 |
| Capacitor, P/S Bypass | 0.1 μF | 2 | C8, C8 |
| Capacitor, VCCA Filter | 10 μF | 1 | C10 |
| Capacitor, Cyrstal Load | 33 μF | 1 | C14 |
| Capacitor, Cyrstal Load | 22 μF | 1 | C13 |
| Crystal | 25 MHz, Ecliptek #ECX6106−25.00M − Surface Mount<br>#ECX6150−25.000M − Through−hole<br>26.5625 MHz, Ecliptek #ECX6110−26.5625M − Surface Mount<br>#ECX6151−26.5625M − Through−hole | 1 | Y1 |
| Jumper Header | | 0 | |
| Jumper | | 0 | |
| Resistor, VCCA Filter | 10 Ω | 1 | R1 |
| Banana Jack | Deltron #EF681 150−039 Red | 1 | VCC |
| Banana Jack | Deltron #EF681 150−040 Black | 2 | VEE, SMAGND |
| Stand−offs | | 4 | |
| NB3N3011 | TSSOP−8 (Wide) device mounted on board | 1 | |
| TSSOP−8 (Wide) Socket | M&M Specialties #50−000−00659 (Optional)<br>(480)−858−0393 | Optional | |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TEMPE, AZ. 85282-4518
(480) 858-0393 FAX: (480) 858-8882
DEVICE: NB3N3011
HANDLER: HAND TEST
TESTER: EVALUATION BOARD
PN: 11980
REV: A
THIRD ANGLE PROJECTION
TOLERANCES
UNLESS OTHERWISE SPECIFIED
UNITS IN (MM)
IN (XX)+/-0.01 (XXX)+/-0.003
MM (XX)+/-0.01 (XXX)+/-0.003
FRACTION +/- 1/32
ANGLE +/- 1.0 DEGREE
POWER SECTION
DUT1
VCCA
VCC
VEE
Q
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XOUT
XIN
SMA-GND
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BLACK
RED

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