

NB4L339MNGEVB

NB4L339MNGEVB Evaluation Board User's Manual



ON Semiconductor®

<http://onsemi.com>

EVAL BOARD USER'S MANUAL

INTRODUCTION AND BOARD DESCRIPTION

ON Semiconductor has developed an evaluation board for the NB4L339 Clock Generator as a convenience for customers interested in performing their own device engineering assessment. The board offers a flexible and convenient platform to quickly evaluate, characterize and verify the performance and operation of the NB4L339.

This evaluation board manual contains:

- Information on the NB4L339 Evaluation Board
- Appropriate Lab Setup
- Detailed Board Features
- Bill of Materials

This manual should be used in conjunction with the device datasheet

(www.onsemi.com/pub/Collateral/NB4L339.PDF), which contains full technical details on the device specification and operation.

The NB4L339 Evaluation Board was designed to accommodate a custom QFN-32 socket. Therefore, some external components were installed on the bottom side of the board. SMA connectors are provided for all input & output signal access.

Board Layout

The evaluation board is constructed with FR4 material, provides a high bandwidth 50 Ω controlled trace impedance environment and is designed to minimize noise and minimize crosstalk.

Layer Stack

- L1 Signal
- L2 SMA Ground
- L3 V_{CC} (positive power supply) and V_{EE} (Device negative power supply)
- L4 Signal

Board Features

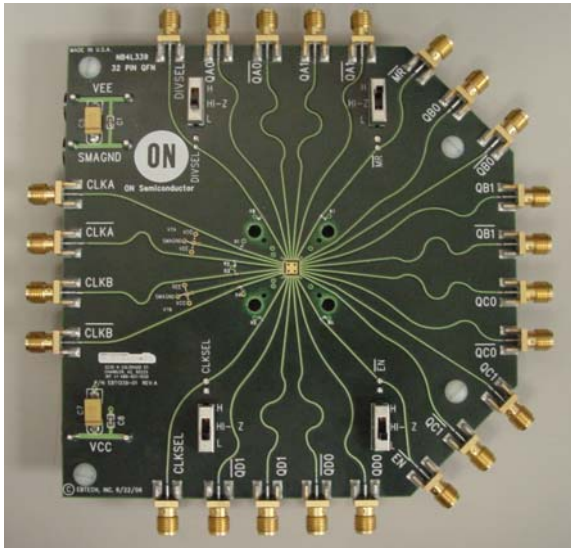
- Incorporates on-board slide switches to manually control CLKSEL, DIVSEL, \overline{EN} and \overline{MR} logic pins, minimizing cabling
- 2.5 V or 3.3 V single or split-power supply operation
- LVPECL differential output signals are accessed via SMA connectors
- Convenient and compact board layout

What Measurements Can You Expect to Make?

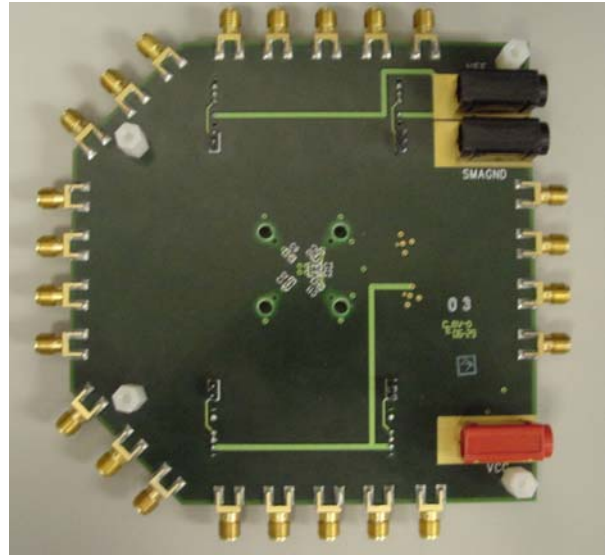
With this evaluation board, the following measurements could be performed in single ended or differential modes of operation.

- Jitter
- Output Skew
- Eye Pattern Generation
- Frequency Performance
- Output Rise and Fall Time
- Phase Noise

NB4L339MNGEVB



Top View



Bottom View

Figure 1. NB4L339MNGEVB Evaluation Board

Lab Setup for Time Domain Measurements

Table 1. Basic Lab Equipment

Description	Example Equipment	Qty
Power Supply with 4 outputs	HP6624A	1
Oscilloscope and/or Frequency counter	TDS8000 with 80E01 Sampling Head	1
Differential Signal Generator	Agilent 8133A, Advantest D3186	1
Matched High Speed Cables with SMA Connectors	Storm, Semflex	6 Pair
Digital Voltmeter, Power supply cables		

Lab Setup

A typical lab setup for taking time domain measurements in differential mode operation is shown in Figure 2. The following steps should be followed for proper equipment setup:

Step 1: Connect Power

Three power levels must be provided to the board, V_{CC} , V_{EE} , and SMAGND via the banana jack connectors on the bottom of the board. Bypass capacitors are installed from V_{CC} to SMAGND and V_{EE} to SMAGND at the banana jacks and the device pins. Using the split power supply mode, $GND = V_{TT} = V_{CC} - 2.0\text{ V}$. The exposed pad of the QFN-32 package is connected to V_{EE} .

Table 2. NB4L339 Power Supply Connections

3.3 V Setup	2.5 V Setup
$V_{CC} = 2.0\text{ V}$	$V_{CC} = 2.0\text{ V}$
$V_{TT} = \text{SMAGND} = 0\text{ V}$	$V_{TT} = \text{SMAGND} = 0\text{ V}$
$V_{EE} = -1.3\text{ V}$	$V_{EE} = -0.5\text{ V}$

- SMAGND (V_{TT}) is the termination supply for the LVPECL outputs only, not to be confused with the device ground pin (V_{EE}).

Step 2: Connect Inputs

For Differential Mode:

Connect the differential output of the signal generator to the differential input of the device (CLKx and $\overline{\text{CLKx}}$). The differential clock inputs of the NB4L339 incorporate internal $50\ \Omega$ termination resistors.

For Single-Ended Mode:

Connect the single-ended output of the generator to the CLKx input of the device. V_{th} must be applied to the complementary input ($\overline{\text{CLKx}}$) when operating in single-ended mode. Refer to the device datasheet for details on single-ended operation.

The VTA and VTB termination pins each have a trace from package pin to a node where it can be connected to either V_{CC} , V_{EE} or SMAGND, depending on the user's need.

NOTE: Inputs CLKA/B and $\overline{\text{CLKA/CLKB}}$ must be signal driven or auto oscillation may result.

NB4L339MNGEVB

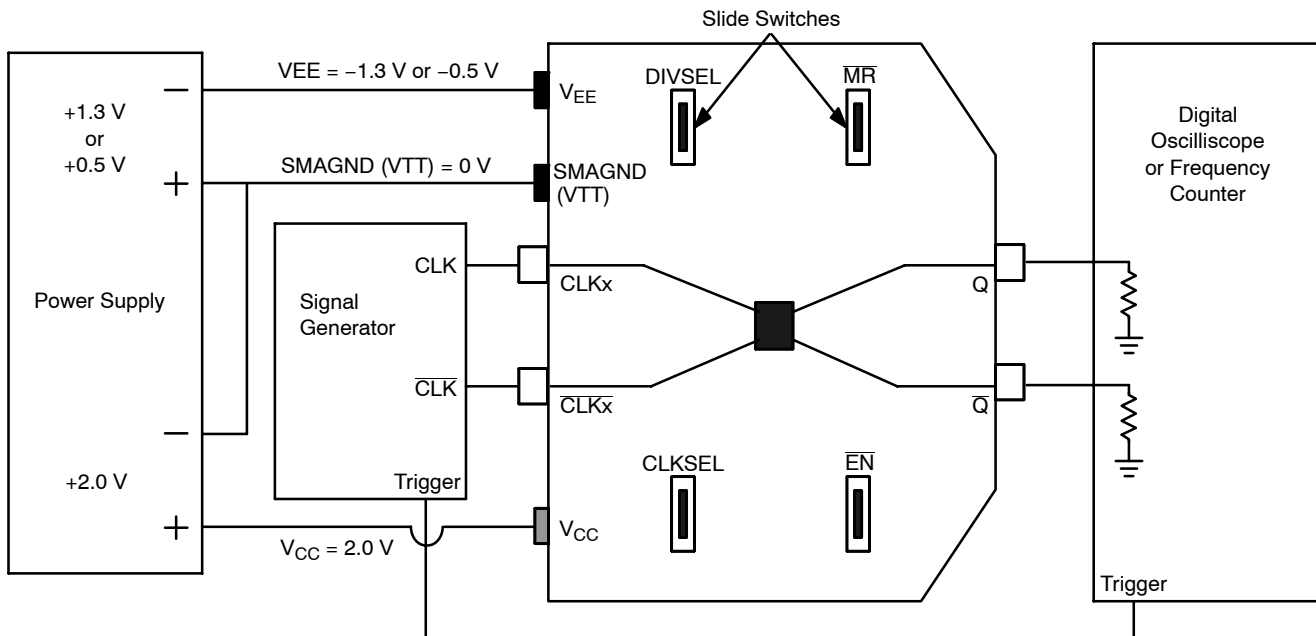


Figure 2. NB4L339 Board Setup Time Domain (Differential Mode)

NOTE: All differential cable pairs **must be** matched.

For single-ended operation, $\overline{\text{CLKx}}$ needs to be tied to V_{TT} through the internal $50\ \Omega$ resistor.

Step 3: Setup Input Signals

Set the signal generator output amplitude to 500 mV.

Set the generator output for a square wave clock signal with a 50% duty cycle.

Step 4: Connect Output Signals

The LVPECL Q_{xn} and $\overline{Q_{\text{xn}}}$ outputs have standard, open emitter outputs and must be externally DC loaded and AC terminated. A split power supply technique takes advantage of terminating the LVPECL outputs into $50\ \Omega$ of an oscilloscope or a frequency counter. Since $V_{\text{TT}} = V_{\text{CC}} - 2\ \text{V}$, offsetting V_{CC} to +2.0 V yields $V_{\text{TT}} = 0\ \text{V}$ or Ground (SMAGND). The V_{TT} terminal connects to the isolated SMAGND connector ground plane, and is not to be confused with the device ground pin (V_{EE}).

Connect the Q and \overline{Q} outputs of the device to the oscilloscope with matched cables. The oscilloscope

sampling head must have internal $50\ \Omega$ termination to ground.

NOTE: When single-ended output is being used, the unconnected output for the pair **must be** terminated to V_{TT} through a $50\ \Omega$ resistor for best operation. Unused outputs pairs may be left unconnected. Since $V_{\text{TT}} = 0\ \text{V}$, a standard $50\ \Omega$ SMA termination is recommended.

Step 5: Set CLKSEL, DIVSEL, $\overline{\text{EN}}$ and $\overline{\text{MR}}$

The CLKSEL, DIVSEL, $\overline{\text{EN}}$ and $\overline{\text{MR}}$ control pins can be controlled from an external source via the appropriate SMA connector, or using the slide switches located on the board, as indicated in Figure 2. In order to use the slide switches, the jumpers/shunts on the bottom side of the board must be installed. When using an external source, remove the jumper for that pin. Refer to the NB4L339 datasheet for details on the proper settings for these pins.

NB4L339MNGEVB

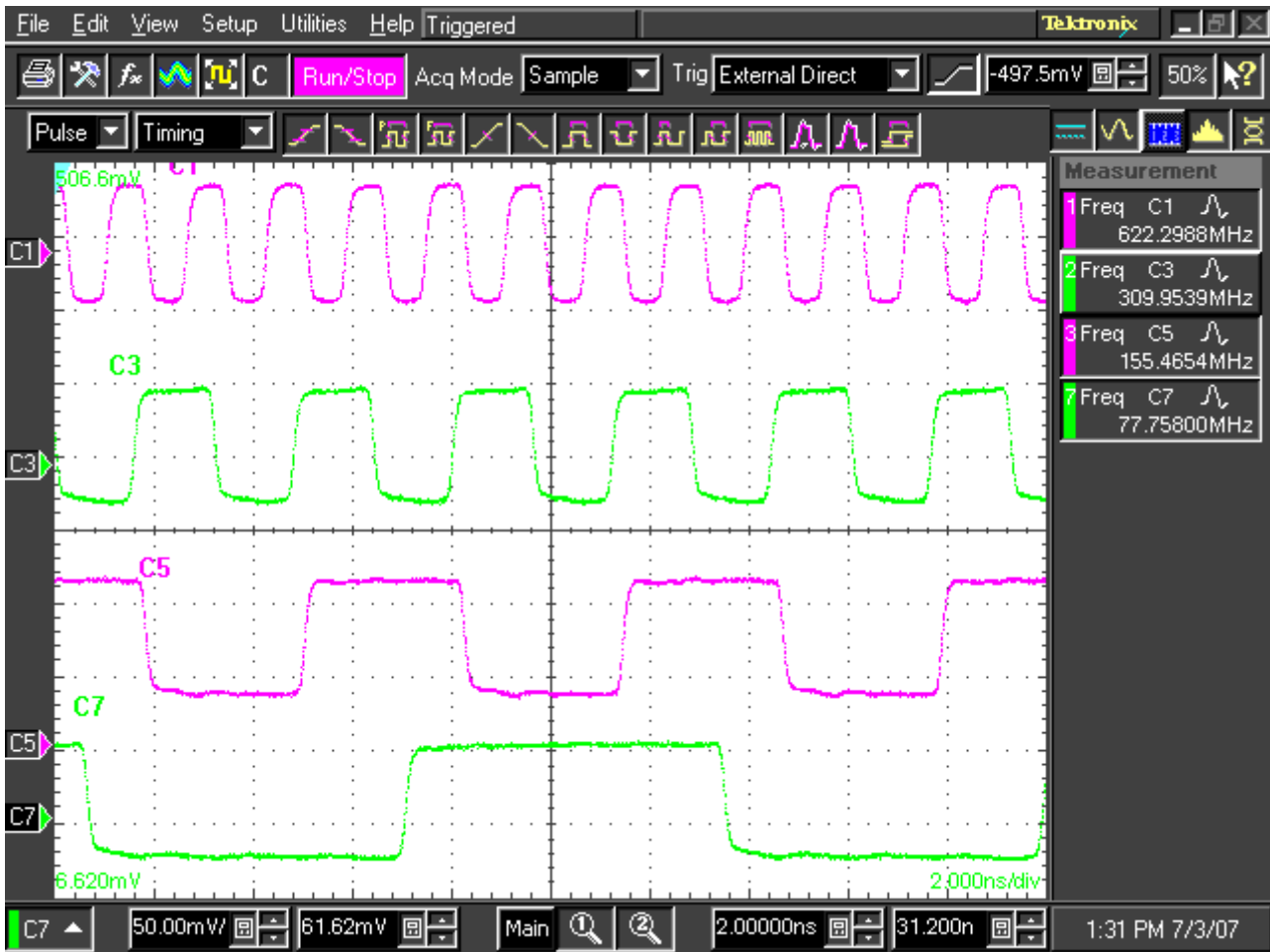


Figure 3. Frequency Division with the NB4L339

NB4L339MNGEVB

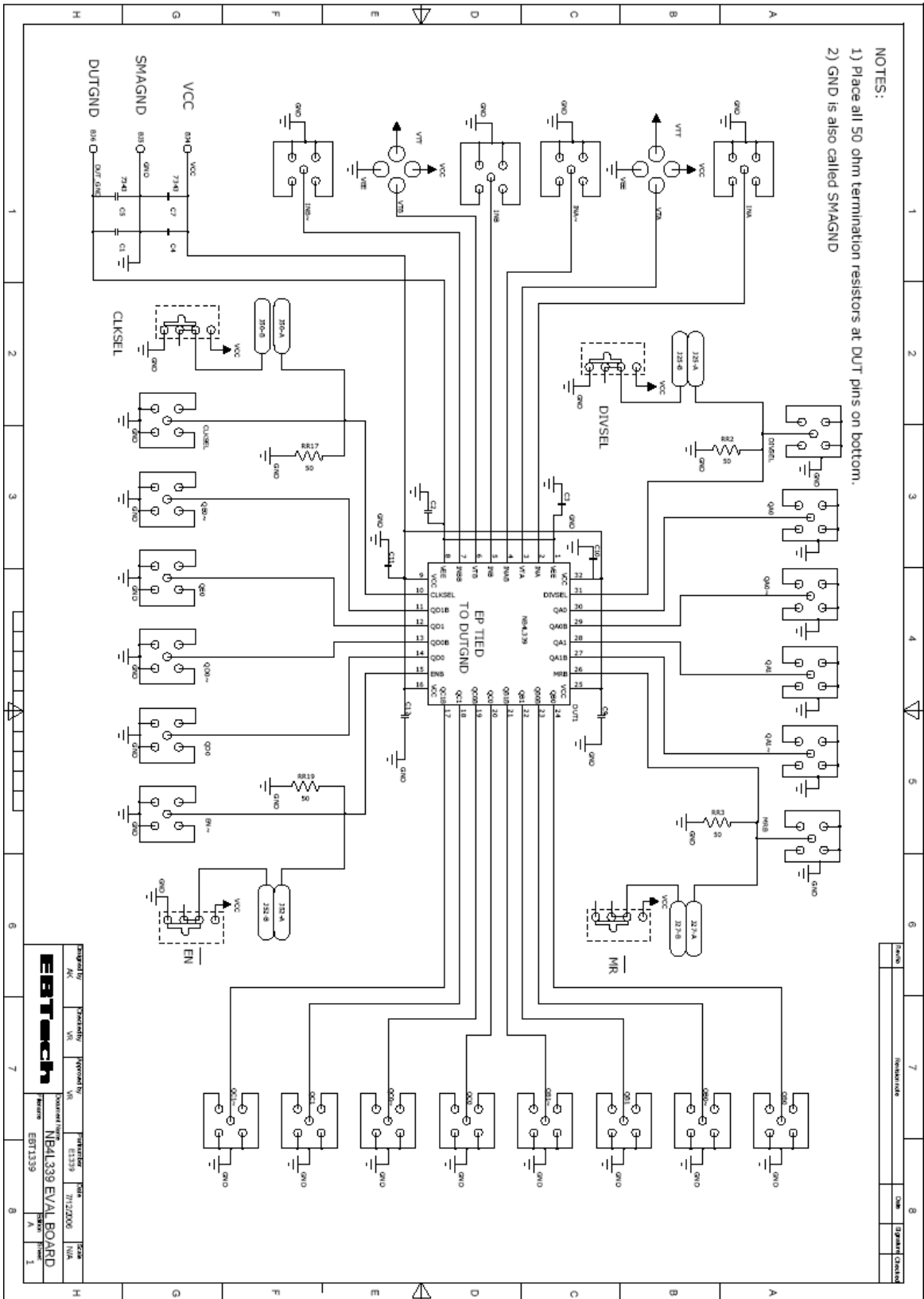


Figure 4. Evaluation Board Schematic

NB4L339MNGEVB

Table 3. Detailed board features by device pin.


Pin	Name	Feature
11, 12, 13, 14, 17, 18, 19, 20, 27, 28, 29, 30	Q_{xn} , $\overline{Q_{xn}}$	All of the Q_{xn} & $\overline{Q_{xn}}$ LVPECL outputs have equal length 50 Ω impedance board traces with SMA connectors. Matched cables can connect to an oscilloscope or frequency counter.
9, 16, 25, 32	V_{CC}	The V_{CC} pins are all connected directly to the V_{CC} power plane. Bypass capacitors are installed at each pin.
2, 4, 5, 7	CLK_x , $\overline{CLK_x}$	<p>The CLK_x & $\overline{CLK_x}$ Clock input pins have equal length board traces with SMA connectors. Matched cables can connect to a signal generator.</p> <p>Resistors R1–R4 are intended to terminate a signal generator with 50 Ω to ground, if needed. They have been (should be) removed since the NB4L339 already provides internal 50 Ω termination resistors for a signal generator when VT_x is connected to SMAGND in a split-power supply configuration.</p>
3, 6	VTA, VTB	The VTA and VTB pins each have a trace from package pin to a node where it can be connected to either V_{CC} , V_{EE} or SMAGND, depending on the user's need.
10, 31, 15, 26	CLKSEL, DIVSEL, \overline{EN} , \overline{MR}	<p>Slide Switch Control</p> <p>The board incorporates slide switches to manually control the logic levels for the CLKSEL, DIVSEL, \overline{EN} and \overline{MR} control pins, thus, minimizing cabling. In order to use the slide switches, the jumpers/shunts on the bottom side of the board must be installed.</p> <p>External Control</p> <p>The CLKSEL, DIVSEL, \overline{EN} and \overline{MR} control pins can be controlled from an external source via the appropriate SMA connector. A 50 Ω resistor is installed from the trace to SMAGND to terminate a signal generator, if needed. When using an external source, remove the switch jumper/shunt from the bottom of the board.</p>
--	EP	The exposed pad of the QFN–32 package is connected to V_{EE} .

2. NOTE. x = A, B, C, or D; n = 0 or 1

NB4L339MNGEVB

Table 4. Bill of Materials

Comp	Manufact	Description	Part Number	Qty	Web Site
SMA Connector	Johnson	SMA Connector, Side Launch, Gold Plated	142-0711-821	24	www.johnsoncomponents.com
Banana Jack	Deltron	Red Connector Single PCB Socket	571-0500	1	www.deltron-emcon.com
Banana Jack	Deltron	Black Connector Single PCB Socket	571-0100	2	www.deltron-emcon.com
Capacitor	AVX Corporation	Cap Cerm .1uF 10% 16V X7R 0603	0603YC104KAT2A	8	www.avxcorp.com
Capacitor	Kemet	Cap Tant 22uF 16V 10% SMD	T491D2236K016AT	2	www.kemet.com
Sliding Switch	ITT/Cannon	SP3T	OS103011MS8QP1	4	www.ittcannon.com
Jumper	Sullins Electronics	HDR jumper shun .1CTR	STC02SYAN	4	www.sullinselectronics.com
Jumper	Sullins Electronics	2-pin jumper	PEC36ACN	4	www.sullinselectronics.com
Resistor	Yageo America	Resistor 49.9 Ohm 1/16W 1% 0402 SMD	9C04021A49R9FLMF3	8	www.yageoamerica.com
Evaluation Board	ON Semiconductor	NB4L339 Evaluation Board	NB4L339MNGEVB	1	www.onsemi.com
Device Samples	ON Semiconductor	NB4L339 Clock Generator	NB4L339MNG	1	www.onsemi.com
Nylon Screw				4	
Standoff		Stand off (Height of Banana Jack)		4	

ON Semiconductor and  are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). 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

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
Order Literature: <http://www.onsemi.com/orderlit>
 For additional information, please contact your local Sales Representative

Данный компонент на территории Российской Федерации

Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru

moschip.ru_4

moschip.ru_6

moschip.ru_9