

**3.3 V 3.2 Gb/s D**  
**D C /D 2 2**  
**C S**  
**CML O I**  
**T**

## NB4N840M

### Description

The NB4N840M is a high-bandwidth fully differential dual 2 x 2 crosspoint switch with CML inputs/outputs that is suitable for applications such as SDH/SONET, DWDM, Gigabit Ethernet and high speed switching. Fully differential design techniques are used to minimize jitter accumulation, crosstalk, and signal skew, which make this device ideal for loop-through and protection channel switching applications.

Internally terminated differential CML inputs accept AC-coupled LVPECL (Positive ECL) or direct coupled CML signals. By providing internal 50 Ω input and output termination resistor, the need for external components is eliminated and interface reflections are minimized. Differential 16 mA CML outputs provide matching internal 50 Ω terminations, and 400 mV output swings when externally terminated, 50 Ω to V<sub>CC</sub>.

Single-ended LVCMOS/LVTTL SEL inputs control the routing of the signals through the crosspoint switch which makes this device configurable as 1:2 fan-out, repeater or 2 x 2 crosspoint switch. The device is housed in a low profile 5 x 5 mm 32-pin QFN package.

### Features

- Plug-in compatible to the MAX3840 and SY55859L
- Maximum Input Clock Frequency 2.7 GHz
- Maximum Input Data Frequency 3.2 Gb/s
- 225 ps Typical Propagation Delay
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Table 1. TRUTH TABLE

SELA0/SELB0	SELA1/SELB1	ENA0/ENA1	ENB0/ENB1	QA0/QB0	QA1/QB1	Function
L	L	H	H	DA0/DB0	DA0/DB0	1:2 Fanout
L	H	H	H	DA0/DB0	DA1/DB1	Quad Repeater
H	L	H	H	DA1/DB1	DA0/DB0	Crosspoint Switch
H	H	H	H	DA1/DB1	DA1/DB1	1:2 Fanout
X	X	L	L	Disable/Power Down	Disable/Power Down	No output (@ V <sub>CC</sub> )

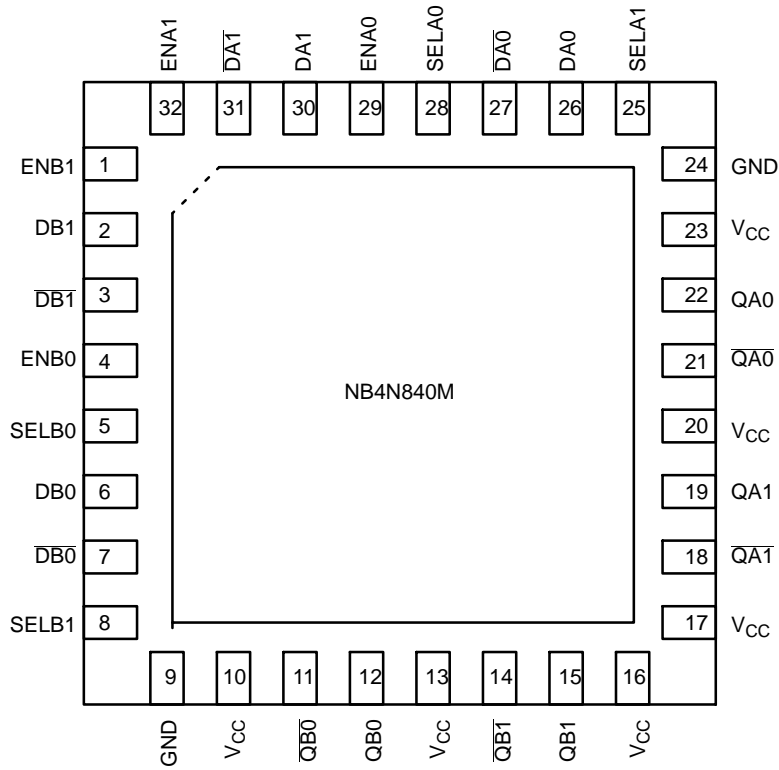


Figure 2. Pin Configuration (Top View)

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**Table 2. PIN DESCRIPTION**

Pin	Name	I/O	Description
1	ENB1	LVTTL	

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**Table 3. ATTRIBUTES**

Characteristics		Value
ESD Protection	Human Body Model	> 2000 V
	Machine Model	> 110 V
Moisture Sensitivity (Note 1)	QFN-32	Level 1
Flammability Rating	Oxygen Index: 28 to 34	UL 94 V-0 @ 0.125 in
Transistor Count		380
Meets or exceeds JEDEC Spec EIA/JESD78 IC Latchup Test		

1. For additional information, refer to Application Note AND8003/D.

**Table 4. MAXIMUM RATINGS**

Symbol	Parameter	Condition 1	Condition 2	Rating	Unit
V <sub>CC</sub>	Positive Power Supply	GND = 0 V			

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**Table 5. DC CHARACTERISTICS, CLOCK INPUTS, CML OUTPUTS**  $V_{CC} = 3.0\text{ V to }3.6\text{ V}$ ,  $T_A = -40^\circ\text{C to }+85^\circ\text{C}$

Symbol	Characteristic	Min	Typ	Max	Unit
$I_{CC}$	Power Supply Current (All outputs enabled)		130	170	mA
$V_{out_{diff}}$	CML Differential Output Swing (Note 4, Figures 5 and 12)	640	800	1000	mV
$V_{CMR}$ (Note 6)	CML Output Common Mode Voltage (Loaded $50\ \Omega$ to $V_{CC}$ )		$V_{CC} - 200$		mV
	CML Single-Ended Input Voltage Range	$V_{CC} - 800$		$V_{CC} + 400$	mV
$V_{ID}$	Differential Input Voltage ( $V_{IHD} - V_{ILD}$ )	300		1600	mV

## LVTTTL CONTROL INPUT PINS

$V_{IH}$	Input HIGH Voltage (LVTTTL Inputs)	2000			
$V_{IL}$	Input LOW Voltage (LVTTTL Inputs)			800	mV

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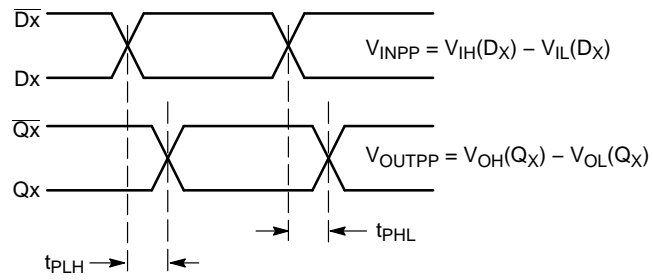


Figure 9. AC Reference Measurement

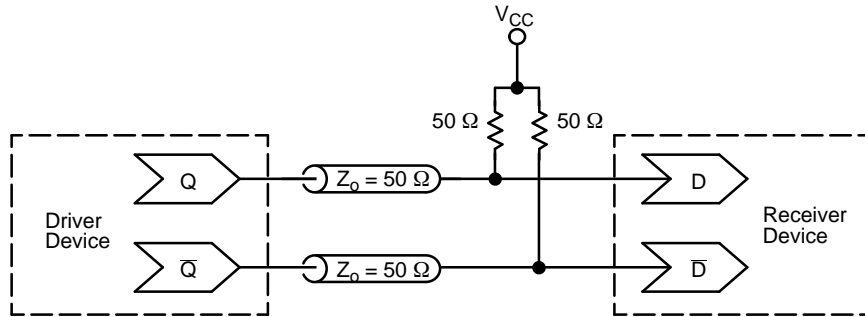


Figure 10. Typical Termination for Output Driver and Device Evaluation  
(See Application Note AND8173/D)

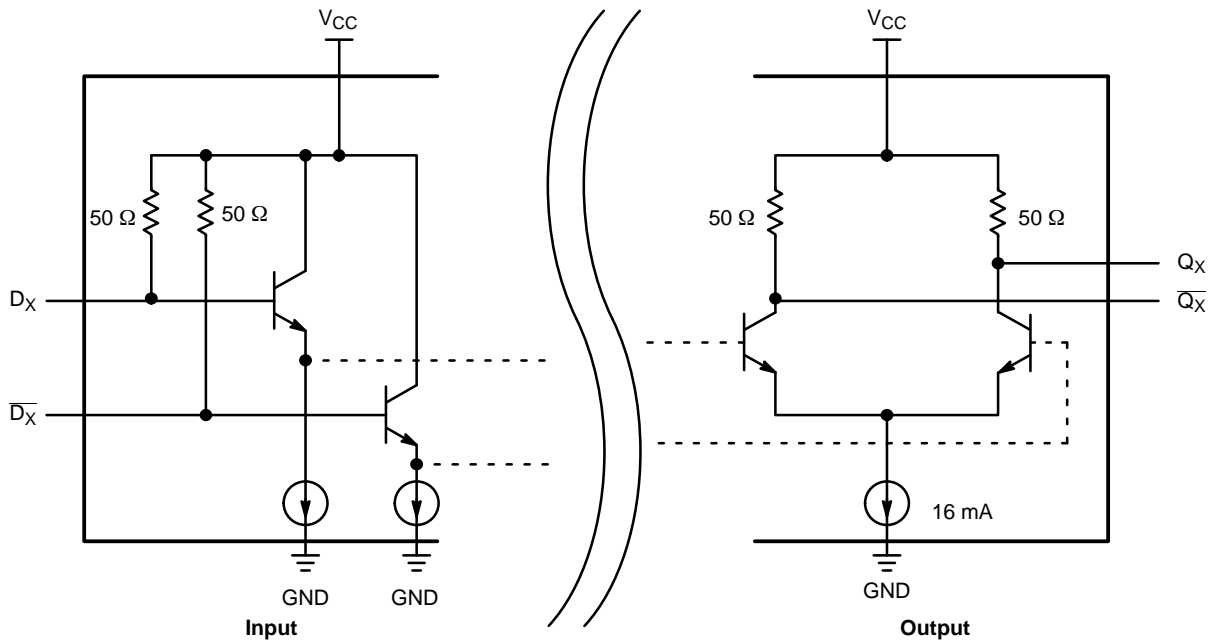


Figure 11. CML Input and Output Structure

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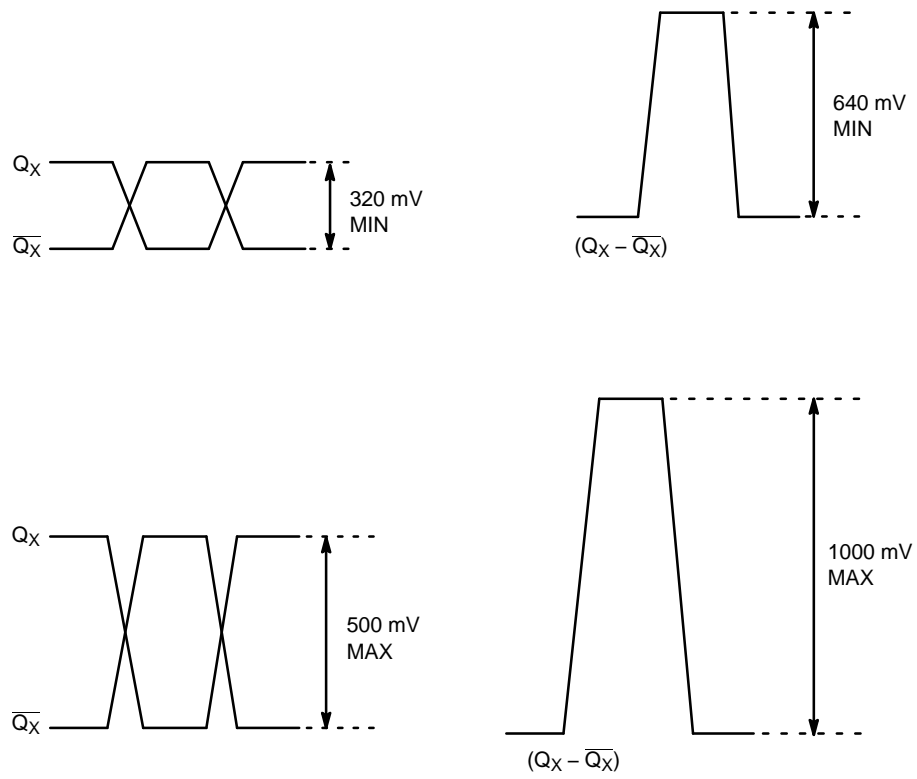


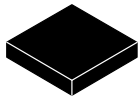
Figure 12. CML Output Levels

## ORDERING INFORMATION

Device	Package	Shipping
NB4N840MMNG	QFN32 (Pb-Free)	74 Units / Rail
NB4N840MMNR4G	QFN32 (Pb-Free)	1000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

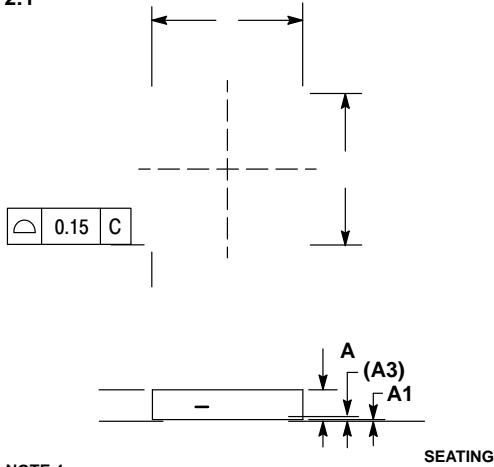




**QFN32 5x5, 0.5P**  
CASE 488AM  
ISSUE A

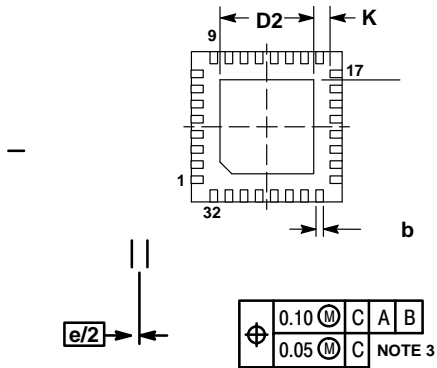
DATE 23 OCT 2013

SCALE 2:1



NOTE 4

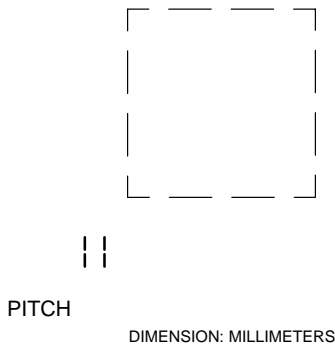
	MAX
A1	0.80 1.00
A3	0.20 REF 0.05
b	0.18 0.30
D	5.00 BSC
D2	2.95 3.25
E	5.00 BSC
E2	2.95 3.25
e	0.50 BSC
K	0.20
L	0.30 0.50
L1	0.15



XXXXXXXXXX  
XXXXXXXXXX  
AWLYYYWW■

■Free indicator, "G" or

**RECOMMENDED**



PITCH

DIMENSION: MILLIMETERS

<b>DOCUMENT NUMBER:</b>	<b>98AON20032D</b>	

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