NL17SG32

Single 2-Input OR Gate

The NL17SG32 MiniGate™ is an advanced high−speed CMOS 2−input OR gate in ultra−small footprint.

The NL17SG32 input structures provides protection when voltages up to 4.6 V are applied.

ON Semiconductor®

Features

- Wide Operating V_{CC} Range: 0.9 V to 3.6 V
- High Speed: t_{PD} = 2.4 ns (Typ) at V_{CC} = 3.0 V, C_L = 15 pF
- Low Power Dissipation: I_{CC} = 0.5 µA (Max) at T_A = 25°C
- 4.6 V Overvoltage Tolerant (OVT) Input Pins
- Ultra−Small Packages
- These are Pb−Free and Halide−Free Devices

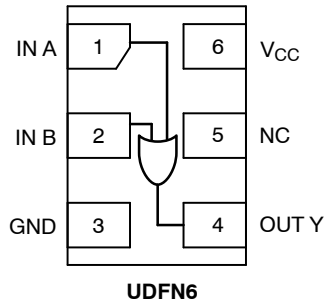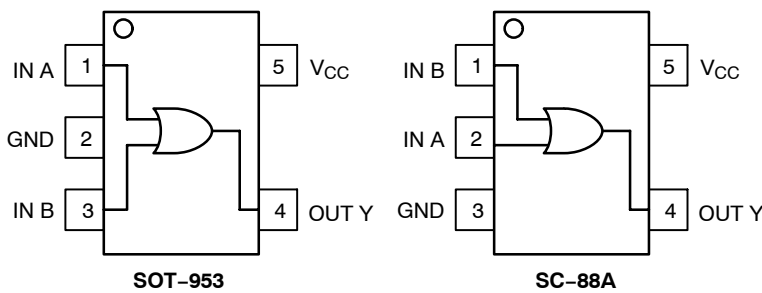**MARKING DIAGRAMS**

SOT−953 P5 SUFFIX CASE 527AE	3 M
UDFN6 1.0 x 1.0 CASE 517BX	◻ M
UDFN6 1.45 x 1.0 CASE 517AQ	9 M
SC−88A DF SUFFIX CASE 419A	≳ AU M

M = Date Code*
▪ = Pb−Free Package

(Note: Microdot may be in either location)

*Date Code orientation and/or position may vary depending upon manufacturing location.

Figure 1. Pinouts (Top View)

Figure 2. Logic Symbol

PIN ASSIGNMENT			
	SOT−953	SC−88A	UDFN6
1	IN A	IN B	IN A
2	GND	IN A	IN B
3	IN B	GND	GND
4	OUT Y	OUT Y	OUT Y
5	V_{CC}	V_{CC}	NC
6			V_{CC}

FUNCTION TABLE

A Input	B Input	Y Output
L	L	L
L	H	H
H	L	H
H	H	H

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

NL17SG32

MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V_{CC}	DC Supply Voltage		−0.5 to +5.5	V
V_{IN}	DC Input Voltage		−0.5 to +4.6	V
V_{OUT}	DC Output Voltage	Output at High or Low State Power−Down Mode (V_{CC} = 0 V)	−0.5 to V_{CC} +0.5 −0.5 to +4.6	V
I_{IK}	DC Input Diode Current	V_{IN} < GND	−20	mA
I_{OK}	DC Output Diode Current	V_{OUT} < GND	−20	mA
I_{OUT}	DC Output Source/Sink Current		±20	mA
I_{CC}	DC Supply Current per Supply Pin		±20	mA
I_{GND}	DC Ground Current per Ground Pin		±20	mA
T_{STG}	Storage Temperature Range		−65 to +150	°C
T_L	Lead Temperature, 1 mm from Case for 10 Seconds		260	°C
T_J	Junction Temperature Under Bias		+150	°C
MSL	Moisture Sensitivity		Level 1	
F_R	Flammability Rating	Oxygen Index: 28 to 34	UL 94 V−0 @ 0.125 in	
V_{ESD}	ESD Withstand Voltage	Human Body Model (Note 2) Machine Model (Note 3)	>2000 >200	V
$I_{LATCHUP}$	Latchup Performance	Above V_{CC} and Below GND at 125°C (Note 4)	±100	mA

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.
1. Measured with minimum pad spacing on an FR4 board, using 10 mm−by−1 inch, 2−ounce copper trace with no air flow.
2. Tested to EIA/JESD22−A114−A.
3. Tested to EIA/JESD22−A115−A.
4. Tested to EIA/JESD78.

RECOMMENDED OPERATING CONDITIONS

Symbol	Characteristics		Min	Max	Unit
V_{CC}	Positive DC Supply Voltage		0.9	3.6	V
V_{IN}	Digital Input Voltage		0.0	3.6	V
V_{OUT}	Output Voltage	Output at High or Low State Power−Down Mode (V_{CC} = 0 V)	0.0 0.0	V_{CC} 3.6	V
T_A	Operating Temperature Range		−55	+125	°C
$\Delta t / \Delta V$	Input Transition Rise or Fail Rate	V_{CC} = 3.3 V ± 0.3 V	0	10	ns/V

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

NL17SG32

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions		V_{CC} (V)	T_A = 25°C		T_A = -55°C to +125°C		Unit
					Min	Max	Min	Max	
V_{IH}	High-Level Input Voltage			0.9	V_{CC}		V_{CC}		V
				1.1 to 1.3	$0.7xV_{CC}$		$0.7xV_{CC}$		
				1.4 to 1.6	$0.65xV_{CC}$		$0.65xV_{CC}$		
				1.65 to 1.95	$0.65xV_{CC}$		$0.65xV_{CC}$		
				2.3 to 2.7	1.7		1.7		
				3.0 to 3.6	2.0		2.0		
V_{IL}	Low-Level Input Voltage			0.9		GND		GND	V
				1.1 to 1.3		$0.3xV_{CC}$		$0.3xV_{CC}$	
				1.4 to 1.6		$0.35xV_{CC}$		$0.35xV_{CC}$	
				1.65 to 1.95		$0.35xV_{CC}$		$0.35xV_{CC}$	
				2.3 to 2.7		0.7		0.7	
				3.0 to 3.6		0.8		0.8	
V_{OH}	High-Level Output Voltage	V_{IN} = V_{IH} or V_{IL}	I_{OH} = −20 μA	0.9	0.75		0.75		V
			I_{OH} = -0.3 mA	1.1 to 1.3	$0.75xV_{CC}$		$0.75xV_{CC}$		
			I_{OH} = -1.7 mA	1.4 to 1.6	$0.75xV_{CC}$		$0.75xV_{CC}$		
			I_{OH} = -3.0 mA	1.65 to 1.95	Vcc-0.45		Vcc-0.45		
			I_{OH} = -4.0 mA	2.3 to 2.7	2.0		2.0		
			I_{OH} = -8.0 mA	3.0 to 3.6	2.48		2.48		
V_{OL}	Low-Level Output Voltage	V_{IN} = V_{IH} or V_{IL}	I_{OL} = 20 μA	0.9 to 3.6		0.1		0.1	V
			I_{OL} = 1.1 mA	1.1 to 1.3		$0.25xV_{CC}$		$0.25xV_{CC}$	
			I_{OL} = 1.7 mA	1.4 to 1.6		$0.25xV_{CC}$		$0.25xV_{CC}$	
			I_{OL} = 3.0 mA	1.65 to 1.95		0.45		0.45	
			I_{OL} = 4.0 mA	2.3 to 2.7		0.4		0.4	
			I_{OL} = 8.0 mA	3.0 to 3.6		0.4		0.4	
I_{IN}	Input Leakage Current	$0 \leq V_{IN} \leq 3.6$ V		0 to 3.6		± 0.1		± 1.0	μA
I_{CC}	Quiescent Supply Current	V_{IN} = V_{CC} or GND		3.6		0.5		10.0	μA

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

NL17SG32

AC ELECTRICAL CHARACTERISTICS (Input $t_r = t_f = 3.0$ ns)

Symbol	Parameter	Test Condition	V_{CC} (V)	$T_A = 25°$ C			$T_A =$ -55°C to +125°C		Unit
				Min	Typ	Max	Min	Max	
t_{PLH}, t_{PHL}	Propagation Delay, A or B to Y	$C_L = 10$ pF, $R_L = 1$ MΩ	0.9	-	12.2	14.4	-	18.0	ns
			1.1 to 1.3	-	8.8	12.4	-	16.2	
			1.4 to 1.6	-	5.0	8.5	-	10.0	
			1.65 to 1.95	-	3.6	6.2	-	6.7	
			2.3 to 2.7	-	2.7	3.9	-	4.4	
			3.0 to 3.6	-	2.1	3.1	-	3.7	
		$C_L = 15$ pF, $R_L = 1$ MΩ	0.9	-	13.0	16.0	-	18.0	ns
			1.1 to 1.3	-	7.8	12.0	-	16.0	
			1.4 to 1.6	-	5.9	9.3	-	11.2	
			1.65 to 1.95	-	4.5	6.9	-	7.1	
			2.3 to 2.7	-	3.0	4.4	-	5.0	
			3.0 to 3.6	-	2.4	3.4	-	3.9	
		$C_L = 30$ pF, $R_L = 1$ MΩ	0.9	-	14.0	17.2	-	20.0	ns
			1.1 to 1.3	-	11.0	14.1	-	17.8	
			1.4 to 1.6	-	8.0	12.1	-	15.9	
			1.65 to 1.95	-	6.0	9.2	-	9.6	
			2.3 to 2.7	-	3.9	5.7	-	6.1	
			3.0 to 3.6	-	3.0	4.4	-	4.8	
C_{IN}	Input Capacitance		0 to 3.6		3	-	-	-	pF
C_{PD}	Power Dissipation Capacitance (Note 5)	f = 10 MHz	0.9 to 3.6	-	4	-	-	-	pF

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

5. C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load. Average operating current can be obtained by the equation: $I_{CC(OPR)} = C_{PD} \cdot V_{CC} \cdot f_{in} + I_{CC}$. C_{PD} is used to determine the no–load dynamic power consumption; $P_D = C_{PD} \cdot V_{CC}^2 \cdot f_{in} + I_{CC} \cdot V_{CC}$.

NL17SG32
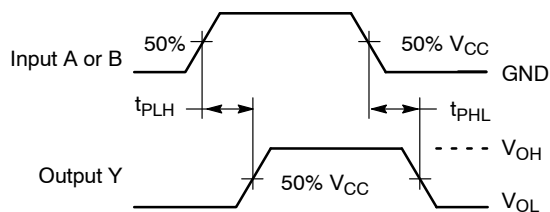
Figure 3. Switching Waveforms
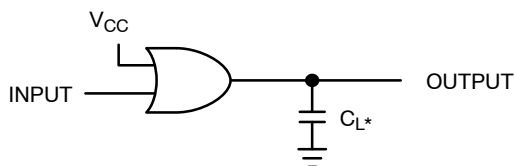
*Includes all probe and jig capacitance.
A 1−MHz square input wave is recommended
for propagation delay tests.

Figure 4. Test Circuit

ORDERING INFORMATION

Device	Package	Shipping[†]
NL17SG32P5T5G	SOT−953 (Pb−Free)	8000 / Tape & Reel
NL17SG32DFT2G	SC−88A (Pb−Free)	3000 / Tape & Reel
NL17SG32AMUTCG	UDFN6 1.45 x 1 mm (Pb−Free)	3000 / Tape & Reel
NL17SG32CMUTCG	UDFN6 1 x 1 mm (Pb−Free)	3000 / 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.

SC−88A (SC−70−5/SOT−353)
CASE 419A−02
ISSUE L

DATE 17 JAN 2013

SCALE 2:1

NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 419A−01 OBSOLETE. NEW STANDARD 419A−02.
4. DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

DIM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	0.071	0.087	1.80	2.20
B	0.045	0.053	1.15	1.35
C	0.031	0.043	0.80	1.10
D	0.004	0.012	0.10	0.30
G	0.026 BSC		0.65 BSC	
H	---	0.004	---	0.10
J	0.004	0.010	0.10	0.25
K	0.004	0.012	0.10	0.30
N	0.008 REF		0.20 REF	
S	0.079	0.087	2.00	2.20

D 5 PL ⊕ | 0.2 (0.008) Ⓜ | B Ⓜ

SOLDER FOOTPRINT

0.50 / 0.0197

0.65 / 0.025

0.65 / 0.025

0.40 / 0.0157

1.9 / 0.0748

SCALE 20:1   (mm / inches)

GENERIC MARKING DIAGRAM*

XXXM▪
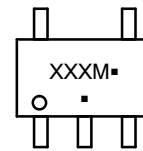
XXX = Specific Device Code
M   = Date Code
▪   = Pb−Free Package

(Note: Microdot may be in either location)

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

STYLE 1:
PIN 1. BASE
2. EMITTER
3. BASE
4. COLLECTOR
5. COLLECTOR

STYLE 2:
PIN 1. ANODE
2. EMITTER
3. BASE
4. COLLECTOR
5. CATHODE

STYLE 3:
PIN 1. ANODE 1
2. N/C
3. ANODE 2
4. CATHODE 2
5. CATHODE 1

STYLE 4:
PIN 1. SOURCE 1
2. DRAIN 1/2
3. SOURCE 1
4. GATE 1
5. GATE 2

STYLE 5:
PIN 1. CATHODE
2. COMMON ANODE
3. CATHODE 2
4. CATHODE 3
5. CATHODE 4

STYLE 6:
PIN 1. EMITTER 2
2. BASE 2
3. EMITTER 1
4. COLLECTOR
5. COLLECTOR 2/BASE 1

STYLE 7:
PIN 1. BASE
2. EMITTER
3. BASE
4. COLLECTOR
5. COLLECTOR

STYLE 8:
PIN 1. CATHODE
2. COLLECTOR
3. N/C
4. BASE
5. EMITTER

STYLE 9:
PIN 1. ANODE
2. CATHODE
3. ANODE
4. ANODE
5. ANODE

Note: Please refer to datasheet for style callout. If style type is not called out in the datasheet refer to the device datasheet pinout or pin assignment.

UDFN6, 1.45x1.0, 0.5P
CASE 517AQ
ISSUE O

SCALE 4:1

DATE 15 MAY 2008

PIN ONE REFERENCE

TOP VIEW

SIDE VIEW

BOTTOM VIEW
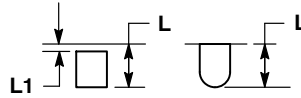
DETAIL A
OPTIONAL CONSTRUCTIONS

EXPOSED Cu   MOLD CMPD
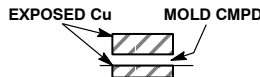
DETAIL B
OPTIONAL CONSTRUCTIONS
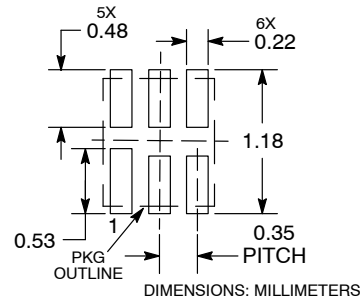
NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.

DIM	MILLIMETERS	
	MIN	MAX
A	0.45	0.55
A1	0.00	0.05
A2	0.07 REF	
b	0.20	0.30
D	1.45 BSC	
E	1.00 BSC	
e	0.50 BSC	
L	0.30	0.40
L1	---	0.15

MOUNTING FOOTPRINT

6X
0.30

PACKAGE OUTLINE

1.24

6X
0.53

1

0.50
PITCH

DIMENSIONS: MILLIMETERS

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

**GENERIC
MARKING DIAGRAM***

XM

X = Specific Device Code
M = Date Code

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, "G" or microdot " ▪", may or may not be present.

DOCUMENT NUMBER:	98AON30313E		
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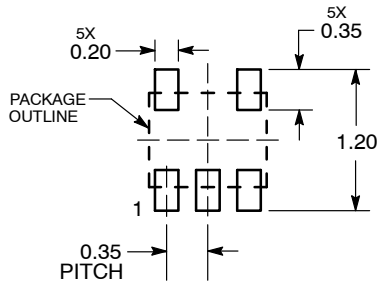CASE 517BX
ISSUE O
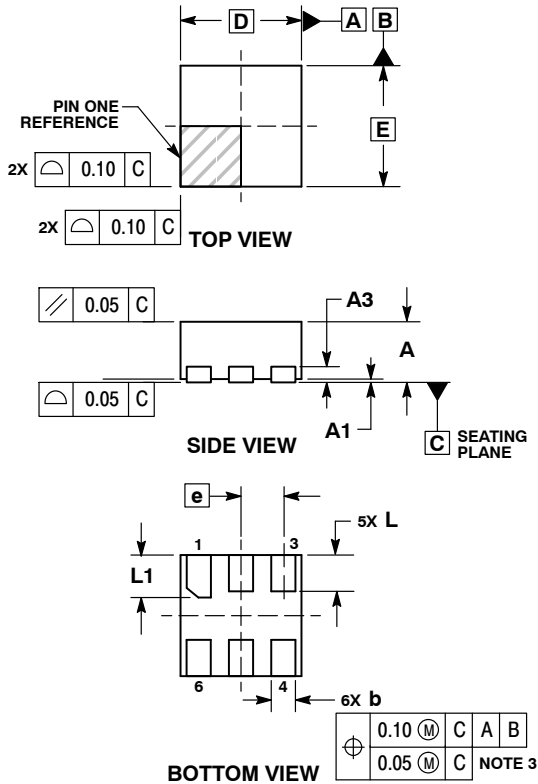
DATE 18 MAY 2011

SCALE 4:1

NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.20 MM FROM TERMINAL TIP.
4. PACKAGE DIMENSIONS EXCLUSIVE OF BURRS AND MOLD FLASH.

DIM	MILLIMETERS	
	MIN	MAX
A	0.45	0.55
A1	0.00	0.05
A3	0.13 REF	
b	0.12	0.22
D	1.00 BSC	
E	1.00 BSC	
e	0.35 BSC	
L	0.25	0.35
L1	0.30	0.40

PIN ONE REFERENCE

2X 0.10 C

2X 0.10 C   **TOP VIEW**

0.05 C

0.05 C   **SIDE VIEW**

A3
A
A1
C SEATING PLANE

e
5X L
L1
1   3
6   4
6X b

0.10 (M) C A B
0.05 (M) C   NOTE 3

BOTTOM VIEW

RECOMMENDED SOLDERING FOOTPRINT*

5X 0.48
6X 0.22
1.18
0.53
0.35
PKG OUTLINE
1
PITCH
DIMENSIONS: MILLIMETERS

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

GENERIC MARKING DIAGRAM*

X M
1 o

X = Specific Device Code
M = Date Code

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, "G" or microdot "■", may or may not be present. Some products may not follow the Generic Marking.

DOCUMENT NUMBER:	98AON56787E	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	UDFN6, 1x1, 0.35P	PAGE 1 OF 1

SOT−953
CASE 527AE
ISSUE E

DATE 02 AUG 2011
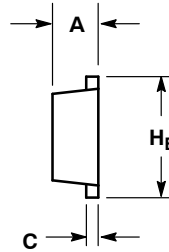
SCALE 4:1

TOP VIEW

SIDE VIEW

BOTTOM VIEW

$\oplus$ | 0.08 | X | Y

SOLDERING FOOTPRINT*

PACKAGE
OUTLINE

5X
0.20

5X
0.35

1.20

0.35
PITCH

DIMENSIONS: MILLIMETERS

*For additional information on our Pb−Free strategy and soldering
details, please download the ON Semiconductor Soldering and
Mounting Techniques Reference Manual, SOLDERRM/D.

NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME
   Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD
   FINISH. MINIMUM LEAD THICKNESS IS THE
   MINIMUM THICKNESS OF THE BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD
   FLASH, PROTRUSIONS, OR GATE BURRS.

DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.34	0.37	0.40
b	0.10	0.15	0.20
C	0.07	0.12	0.17
D	0.95	1.00	1.05
E	0.75	0.80	0.85
e	0.35 BSC		
H_E	0.95	1.00	1.05
L	0.175 REF		
L2	0.05	0.10	0.15
L3	---	---	0.15

**GENERIC
MARKING DIAGRAM***

XM
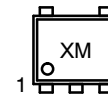
X   = Specific Device Code
M   = Month Code

*This information is generic. Please refer
to device data sheet for actual part
marking.
Pb−Free indicator, "G" or microdot " ▪",
may or may not be present.

DOCUMENT NUMBER:	98AON26457D		
DESCRIPTION:	SOT−953		PAGE 1 OF 1

PUBLICATION ORDERING INFORMATION

◊

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Click to view similar products for Logic Gates *category:*

Click to view products by ON Semiconductor *manufacturer:*

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74HC85N   NLU1G32AMUTCG   NLV7SZ58DFT2G   CD4068BE   NL17SG32P5T5G   NL17SG86DFT2G   NLV14001UBDR2G

NLX1G11AMUTCG   NLX1G97MUTCG   74LS38   74LVC32ADTR2G   MC74HCT20ADTR2G   NLV17SZ00DFT2G   NLV17SZ02DFT2G

NLV74HC02ADR2G   74HC32S14-13   74LS133   74LVC1G32Z-7   M38510/30402BDA   74LVC1G86Z-7   74LVC2G08RA3-7

NLV74HC08ADTR2G   NLV74HC14ADR2G   NLV74HC20ADR2G   NLX2G86MUTCG   5962-8973601DA   74LVC2G02HD4-7

NLU1G00AMUTCG   74LVC2G32RA3-7   74LVC2G00HD4-7   NL17SG02P5T5G   74LVC2G00HK3-7   74LVC2G86HK3-7

NLX1G99DMUTWG   NLVVHC1G00DFT2G   NLVHC1G08DFT2G   NLV7SZ57DFT2G   NLV74VHC04DTR2G   NLV27WZ86USG

NLV27WZ00USG   NLU1G86CMUTCG   NLU1G08CMUTCG   NL17SZ32P5T5G   NL17SZ00P5T5G   NL17SH02P5T5G   74AUP2G00RA3-7

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