NLX2G04

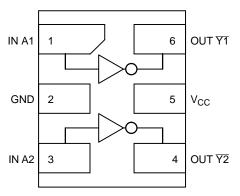
Dual Inverter

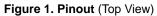
The NLX2G04 MiniGate[™] is an advanced high–speed CMOS dual inverter in ultra–small footprint.

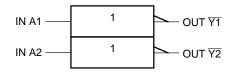
The NLX2G04 input and output structures provide protection when voltages up to 7.0 V are applied, regardless of the supply voltage.

Features

- High Speed: $t_{PD} = 1.8 \text{ ns} (Typ) @ V_{CC} = 5.0 \text{ V}$
- Low Power Dissipation: $I_{CC} = 1 \ \mu A$ (Max) at $T_A = 25^{\circ}C$
- Power Down Protection Provided on inputs
- Balanced Propagation Delays
- Overvoltage Tolerant (OVT) Input and Output Pins
- Ultra-Small Packages
- These are Pb–Free Devices









PIN ASSIGNMENT

1	IN A1
2	GND
3	IN A2
4	OUT Y2
5	V _{CC}
6	OUT Y1

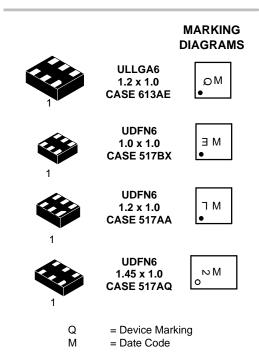
FUNCTION TABLE

А	Ŷ
L	H
H	L



ON Semiconductor®

www.onsemi.com



ORDERING INFORMATION

See detailed ordering and shipping information on page 5 of this data sheet.

MAXIMUM RATINGS

Symbol	Paramete	er	Value	Unit
V _{CC}	DC Supply Voltage		-0.5 to +7.0	V
V _{IN}	DC Input Voltage		-0.5 to +7.0	V
V _{OUT}	DC Output Voltage		-0.5 to +7.0	V
I _{IK}	DC Input Diode Current	V _{IN} < GND	-50	mA
I _{OK}	DC Output Diode Current	V _{OUT} < GND	-50	mA
Ι _Ο	DC Output Source/Sink Current		±50	mA
I _{CC}	DC Supply Current Per Supply Pin		±100	mA
I _{GND}	DC Ground Current per Ground Pin		±100	mA
T _{STG}	Storage Temperature Range		-65 to +150	°C
ΤL	Lead Temperature, 1 mm from Case for 10 Se	econds	260	°C
TJ	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	
ILATCHUP	Latchup Performance Above V _{CC} and Below (GND at 125°C (Note 2)	±500	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 no air flow.

2. Tested to EIA / JESD78.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter		Max	Unit
V _{CC}	Positive DC Supply Voltage		5.5	V
V _{IN}	Digital Input Voltage	0	5.5	V
V _{OUT}	Output Voltage	0	5.5	V
T _A	Operating Free–Air Temperature	-55	+125	°C
Δt/ΔV	Input Transition Rise or Fall Rate $\begin{array}{c} V_{CC}=2.5~V\pm0.2~V\\ V_{CC}=3.3~V\pm0.3~V\\ V_{CC}=5.0~V\pm0.5~V \end{array}$	0 0 0	20 10 5	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.

DC ELECTRICAL CHARACTERISTICS

			V _{cc}	٦	Γ _A = 25°(C	T _A = -	+85°C	T _A = −55°C to +125°C		
Symbol	Parameter	Conditions	(V)	Min	Тур	Max	Min	Max	Min	Max	Unit
V _{IH}	Low–Level Input Voltage		1.65–1.95	0.75 x V _{CC}			0.75 x V _{CC}		0.75 x V _{CC}		V
	vollage		2.3 to 5.5	0.70 x V _{CC}			0.70 x V _{CC}		0.70 x V _{CC}		
V _{IL}	Low–Level Input Voltage		1.65–1.95			0.25 x V _{CC}		0.25 x V _{CC}		0.25 x V _{CC}	V
	vollage		2.3 – 5.5			0.30 x V _{CC}		0.30 x V _{CC}		0.30 x V _{CC}	
V _{OH}	High– Level Output	$V_{IN} = V_{IH} \text{ or } V_{IL}$ $I_{OH} = -100 \ \mu A$	1.65 – 5.5	V _{CC} - 0.1	V _{CC}		V _{CC} - 0.1		V _{CC} - 0.1		V
	Voltage	$\begin{array}{c} V_{IN} = V_{IH} \text{ or } V_{IL} \\ I_{OH} = -4 \text{ mA} \\ I_{OH} = -8 \text{ mA} \\ I_{OH} = -12 \text{ mA} \\ I_{OH} = -16 \text{ mA} \\ I_{OH} = -24 \text{ mA} \\ I_{OH} = -32 \text{ mA} \end{array}$	1.65 2.3 2.7 3.0 3.0 4.5	1.29 1.9 2.2 2.4 2.3 3.8	1.52 2.1 2.4 2.7 2.5 4.0		1.29 1.9 2.2 2.4 2.3 3.8		1.29 1.9 2.2 2.4 2.3 3.8		
V _{OL}	Low–Level Output Voltage	$V_{IN} = V_{IH} \text{ or } V_{IL}$ $I_{OL} = 100 \ \mu\text{A}$	1.65 – 5.5			0.1		0.1		0.1	V
	voltage	$\begin{array}{c} V_{IN} = V_{IH} \text{ or } V_{IL} \\ I_{OH} = -4 \text{ mA} \\ I_{OH} = -8 \text{ mA} \\ I_{OH} = -12 \text{ mA} \\ I_{OH} = -16 \text{ mA} \\ I_{OH} = -24 \text{ mA} \\ I_{OH} = -32 \text{ mA} \end{array}$	1.65 2.3 2.7 3.0 3.0 4.5		0.08 0.2 0.22 0.28 0.38 0.42	0.24 0.3 0.4 0.4 0.55 0.55		0.24 0.3 0.4 0.4 0.55 0.55		0.24 0.3 0.4 0.4 0.55 0.55	
I _{IN}	Input Leakage Current	$0 \le V_{IN} \le 5.5 V$	0 to 5.5			±0.1		±1.0		±1.0	μΑ
I _{OFF}	Power–Off Output Leakage Current	V _{IN} or V _{OUT} = 5.5 V	0			1.0		10		10	μΑ
I _{CC}	Quiescent Supply Current	$0 \le V_{IN} \le V_{CC}$	5.5			1.0		10		10	μΑ

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.

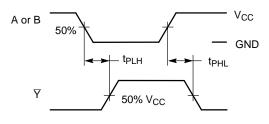
NLX2G04

			V _{cc}	Test	٦	T _A = 25°C		T _A = -55°C to +125°C		
Symbol	Parameter	(V)	Condition	Min	Тур	Мах	Min	Max	Unit	
t _{PLH} , t _{PHL}	Propagation Delay, Input A to Output \overline{Y}	1.65	$R_L = 1 M\Omega,$ $C_L = 15 pF$	1.8	2.3	9.2	1.8	11	ns	
		1.8	$\begin{array}{l} R_{L} = 1 \ M\Omega, \\ C_{L} = 15 \ pF \end{array}$	1.8	4.4	7.6	1.2	8.4		
		2.3–2.7	R _L = 1 MΩ, C _L = 15 pF	1.2	3.0	5.1	1.2	5.6		
		3.0–3.6	$R_L = 1 M\Omega$, $C_L = 15 pF$	0.8	2.2	3.4	0.8	3.8		
			$R_L = 500 \Omega,$ $C_L = 50 pF$	1.2	2.9	4.5	1.2	5.0		
		4.5–5.5	$\begin{array}{l} R_{L} = 1 \ M\Omega, \\ C_{L} = 15 \ pF \end{array}$	0.5	1.8	2.8	0.5	3.1		
			$R_L = 500 \Omega,$ $C_L = 50 pF$	0.8	2.3	3.6	0.8	4.0		
C _{IN}	Input Capacitance	5.5	$V_{IN} = 0 V \text{ or } V_{CC}$		2.5				pF	
C _{PD}	Power Dissipation Capacitance (Note 3)	3.3 5.5	$\begin{array}{c} 10 \text{ MHz} \\ \text{V}_{\text{IN}} = 0 \text{ V or } \text{V}_{\text{CC}} \end{array}$		9 11				pF	

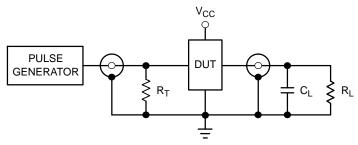
AC ELECTRICAL CHARACTERISTICS (Input $t_r = t_f = 3.0 \text{ nS}$)

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

NLX2G04







 $R_T = Z_{OUT}$ of pulse generator (typically 50 Ω)

Figure 4. Test Circuit

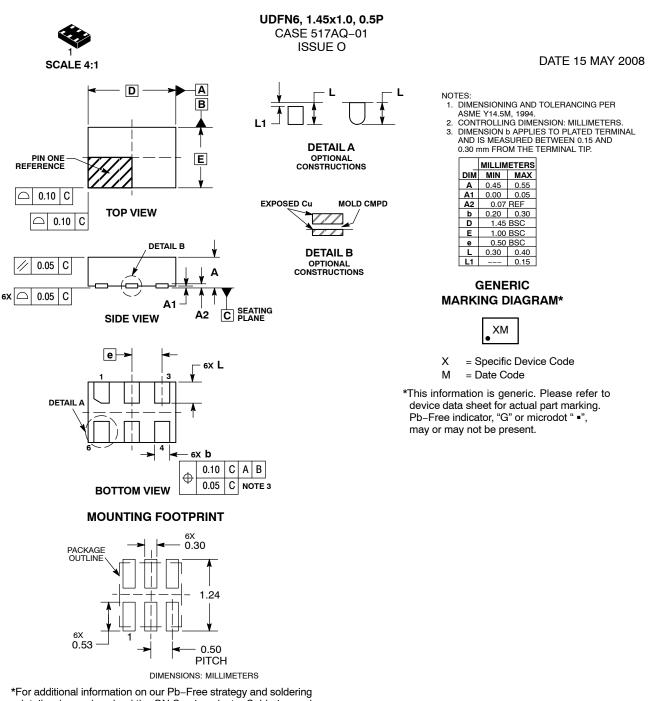
ORDERING INFORMATION

Device	Package	Shipping [†]
NLX2G04BMX1TCG	ULLGA6, 1.2 x 1.0, 0.4P (Pb–Free)	3000 / Tape & Reel
NLX2G04MUTCG	UDFN6, 1.2 x 1.0, 0.4P (Pb–Free)	3000 / Tape & Reel
NLX2G04AMUTCG	UDFN6, 1.45 x 1.0, 0.5P (Pb–Free)	3000 / Tape & Reel
NLX2G04CMUTCG	UDFN6, 1.0 x 1.0, 0.35P (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.

MiniGate is a trademark of Semiconductor Components Industries, LLC (SCILLC).





details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

DOCUMENT NUMBER:	98AON30313E	Electronic versions are uncontrolle		
STATUS:	ON SEMICONDUCTOR STANDARD	accessed directly from the Document Repository. Pri versions are uncontrolled except when stampe		
NEW STANDARD:		"CONTROLLED COPY" in red.		
DESCRIPTION:	UDFN6, 1.45X1.0, 0.5P		PAGE 1 OF 2	



ON Semiconductor®

DOCUMENT NUMBER: 98AON30313E

PAGE 2 OF 2

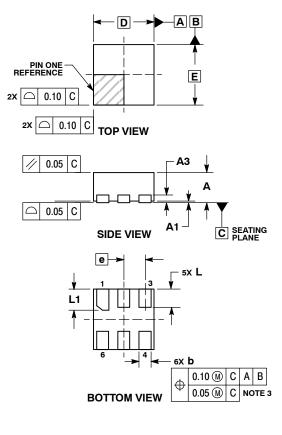
ISSUE	REVISION	DATE
0	RELEASED FOR PRODUCTION. REQ. BY K. VAN TYNE.	15 MAY 2008

ON Semiconductor and with a 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 function 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 "Typical" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights or 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 personal analleges 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.





SCALE 4:1



DATE 18 MAY 2011

NOTES:

UDFN6, 1x1, 0.35P CASE 517BX-01 ISSUE O

- 1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
- ASME Y14.5M, 1994. 2. CONTROLLING DIMENSION: MILLIMETERS. 3. DIMENSION & 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.

	MILLIN	MILLIMETERS		
DIM	MIN MAX			
Α	0.45	0.55		
A1	0.00	0.05		
A3	0.13 REF			
b	0.12	0.22		
D	1.00	BSC		
Е	1.00	BSC		
е	0.35	BSC		
L	0.25	0.35		
L1	0.30	0.40		

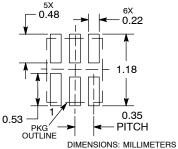




X = Specific Device Code M = Date Code

*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.

RECOMMENDED **SOLDERING FOOTPRINT***



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

DOCUMENT NUMBER:	98AON56787E	Electronic versions are uncontrolle	
STATUS:	ON SEMICONDUCTOR STANDARD	accessed directly from the Document versions are uncontrolled except	
NEW STANDARD:		"CONTROLLED COPY" in red.	-
DESCRIPTION:	UDFN6, 1X1, 0.35P		PAGE 1 OF 2



ON Semiconductor®

DOCUMENT NUMBER: 98AON56787E

PAGE 2 OF 2

ISSUE	REVISION	DATE
0	RELEASED FOR PRODUCTION. REQ. BY I. CAMBALIZA.	18 MAY 2011

ON Semiconductor and with a 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 function 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 "Typical" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights or 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 personal analleges 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.





ULLGA6, 1.2x1.0, 0.4P CASE 613AE-01 **ISSUE A** DATE 06 FEB 2008 SCALE 8:1 NOTES: D Α 1. DIMENSIONING AND TOLERANCING PER В ASME Y14.5M, 1994. CONTROLLING DIMENSION: MILLIMETERS. 2 CONTROLLING DIMENSION: MILLIMETERS. DIMENSION & APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP. A MAXIMUM OF 0.05 PULL BACK OF THE PLATED TERMINAL FROM THE EDGE OF THE DACKAGE IS ALL OWED. 3. 4 PIN ONE REFERENCE Ε PACKAGE IS ALLOWED. MILLIMETERS DIM MIN MAX □ 0.10 C
 A
 --- 0.40

 A1
 0.00
 0.05

 b
 0.15
 0.25
TOP VIEW □ 0.10 C D 1.20 BSC Εİ 1.00 BSC 0.40 BSC // 0.05 C el L 0.25 0.35 L1 0.35 0.45 Α SEATING PLANE 6X 🛆 0.05 C SIDE VIEW **MOUNTING FOOTPRINT** SOLDERMASK DEFINED* Ċ A1 5X 6X 0.49 0.26 е 5X L NOTE 4 N 1.24 L1 \mathbf{H} 0.53 0.40 6X b PITCH 0.10 C A B DIMENSIONS: MILLIMETERS Φ C NOTE 3 0.05 **BOTTOM VIEW**

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

DOCUMENT NUMBER:	98AON24012D Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.		
DESCRIPTION:	ULLGA6, 1.2X1.0, 0.4P PAGE 1 OF 1		
ON Semiconductor and us are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor 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. ON Semiconductor does not convey any license under its patent rights nor the rights of others.			

ON Semiconductor and are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at <u>www.onsemi.com/site/pdf/Patent-Marking.pdf</u>. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor 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. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor date 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. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use a a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor houteds for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

TECHNICAL SUPPORT

ON Semiconductor Website: www.onsemi.com

Email Requests to: orderlit@onsemi.com

North American Technical Support: Voice Mail: 1 800–282–9855 Toll Free USA/Canada Phone: 011 421 33 790 2910 Europe, Middle East and Africa Technical Support: Phone: 00421 33 790 2910 For additional information, please contact your local Sales Representative