NLU1GT126

Non-Inverting 3-State Buffer, TTL Level

LSTTL−Compatible Inputs

The NLU1GT126 MiniGate™ is an advanced CMOS high−speed non−inverting buffer in ultra−small footprint.

The NLU1GT126 requires the 3−state control input (OE) to be set Low to place the output in the high impedance state.

The device input is compatible with TTL−type input thresholds and the output has a full 5.0 V CMOS level output swing.

The NLU1GT126 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} = 3.8 ns (Typ) @ V_{CC} = 5.0 V
- Low Power Dissipation: I_{CC} = 2 μA (Max) at T_A = 25°C
- TTL−Compatible Input: V_{IL} = 0.8 V; V_{IH} = 2.0 V
- CMOS−Compatible Output:
  V_{OH} > 0.8 V_{CC}; V_{OL} < 0.1 V_{CC} @ Load
- Power Down Protection Provided on inputs
- Balanced Propagation Delays
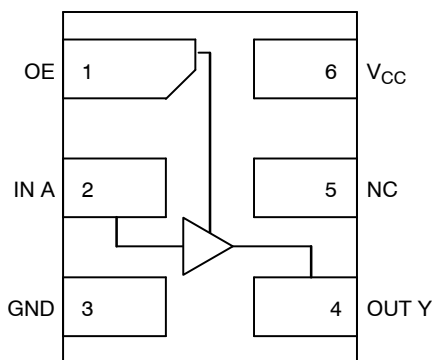- Ultra−Small Packages
- These are Pb−Free Devices
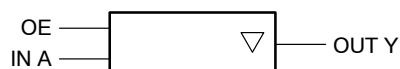

Figure 1. Pinout (Top View)

Figure 2. Logic Symbol

FUNCTION TABLE

Input		Output
A	**OE**	**Y**
L	H	L
H	H	H
X	L	Z

PIN ASSIGNMENT

1	OE
2	IN A
3	GND
4	OUT Y
5	NC
6	V_{CC}
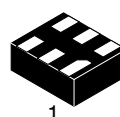
NLU1GT126
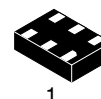
MAXIMUM RATINGS

Symbol	Parameter		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	−20	mA
I_{OK}	DC Output Diode Current	V_{OUT} < GND	±20	mA
I_O	DC Output Source/Sink Current		±12.5	mA
I_{CC}	DC Supply Current Per Supply Pin		±25	mA
I_{GND}	DC Ground Current per Ground Pin		±25	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	
$I_{LATCHUP}$	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		Min	Max	Unit
V_{CC}	Positive DC Supply Voltage		1.65	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
$\Delta t/\Delta V$	Input Transition Rise or Fall Rate	V_{CC} = 3.3 V ± 0.3 V V_{CC} = 5.0 V ± 0.5 V	0 0	100 20	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

Symbol	Parameter	Conditions	V$_{CC}$ (V)	T$_A$ = 25 °C			T$_A$ = +85°C		T$_A$ = −55°C to +125°C		Unit
				Min	Typ	Max	Min	Max	Min	Max	
V$_{IH}$	Low−Level Input Voltage		3.0 4.5 to 5.5	1.4 2.0			1.4 2.0		1.4 2.0		V
V$_{IL}$	Low−Level Input Voltage		3.0 4.5 to 5.5			0.53 0.8		0.53 0.8		0.53 0.8	V
V$_{OH}$	High−Level Output Voltage	V$_{IN}$ = V$_{IH}$ or V$_{IL}$ I$_{OH}$ = −50 μA	3.0 4.5	2.9 4.4	3.0 4.5		2.9 4.4		2.9 4.4		V
		V$_{IN}$ = V$_{IH}$ or V$_{IL}$ I$_{OH}$ = −4 mA I$_{OH}$ = −8 mA	3.0 4.5	2.58 3.94			2.48 3.80		2.34 3.66		
V$_{OL}$	Low−Level Output Voltage	V$_{IN}$ = V$_{IH}$ or V$_{IL}$ I$_{OL}$ = 50 μA	3.0 4.5	0 0	0.1 0.1		0.1 0.1		0.1 0.1		V
		V$_{IN}$ = V$_{IH}$ or V$_{IL}$ I$_{OL}$ = 4 mA I$_{OL}$ = 8 mA	3.0 4.5			0.36 0.36		0.44 0.44		0.52 0.52	
I$_{IN}$	Input Leakage Current	0 ≤ V$_{IN}$ ≤ 5.5 V	0 to 5.5			±0.1		±1.0		±1.0	μA
I$_{CC}$	Quiescent Supply Current	0 ≤ V$_{IN}$ ≤ V$_{CC}$	5.5			1.0		20		40	μA
I$_{CCT}$	Quiescent Supply Current	V$_{IN}$ = 3.4 V Other Input: V$_{CC}$ or GND	5.5			1.35		1.50		1.65	mA
I$_{OPD}$	Output Leakage Current	V$_{OUT}$ = 5.5 V	0			0.5		5.0		10	μA
I$_{OZ}$	3−State Leakage Current	V$_{IN}$ = V$_{IH}$ or V$_{IL}$ V$_{OUT}$ = V$_{CC}$ or GND	0			±0.25		±2.5		±2.5	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.

AC ELECTRICAL CHARACTERISTICS (Input t$_r$ = t$_f$ = 3.0 ns)

Symbol	Parameter	V$_{CC}$ (V)	Test Condition	T$_A$ = 25 °C			T$_A$ = +85°C		T$_A$ = −55°C to +125°C		Unit
				Min	Typ	Max	Min	Max	Min	Max	
t$_{PLH}$, t$_{PHL}$	Propagation Delay, A to **Y** (Figures 3 and 5)	3.0 to 3.6	C$_L$ = 15 pF C$_L$ = 50 pF		5.6 8.1	8.0 11.5	1.0 1.0	9.5 13		12 16	ns
		4.5 to 5.5	C$_L$ = 15 pF C$_L$ = 50 pF		3.8 5.3	5.5 7.5	1.0 1.0	6.5 8.5		8.5 10.5	
t$_{PZL}$, t$_{PZH}$	Output Enable Time, OE to Y (Figures 4 and 6)	3.0 to 3.6	C$_L$ = 15 pF C$_L$ = 50 pF		5.4 7.9	8.0 11.5	1.0 1.0	9.5 13		11.5 15	ns
		4.5 to 5.5	C$_L$ = 15 pF C$_L$ = 50 pF		3.6 5.1	5.1 7.1	1.0 1.0	6.0 8.0		7.5 9.5	
t$_{PLZ}$, t$_{PHZ}$	Output Disable Time, OE to Y (Figures 4 and 6)	3.0 to 3.6	C$_L$ = 15 pF C$_L$ = 50 pF		6.5 8.0	9.7 13.2	1.0 1.0	11.5 15		14.5 18.5	ns
		4.5 to 5.5	C$_L$ = 15 pF C$_L$ = 50 pF		4.8 7.0	6.8 8.8	1.0 1.0	8.0 10		10 12	
C$_{IN}$	Input Capacitance				4	10		10		10	pF
C$_{OUT}$	3−State Output Capacitance (Output in High Impedance State)				6						pF
C$_{PD}$	Power Dissipation Capacitance (Note 3)	5.0			14						pF

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$_{PD}$ • V$_{CC}$ • f$_{in}$ + I$_{CC}$. C$_{PD}$ is used to determine the no−load dynamic power consumption: P$_D$ = C$_{PD}$ • V$_{CC}^2$ • f$_{in}$ + I$_{CC}$ • V$_{CC}$.
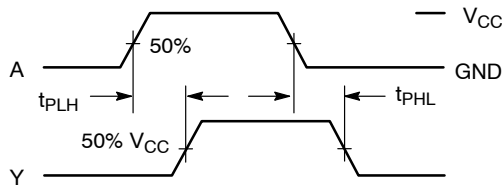
NLU1GT126

SWITCHING WAVEFORMS

Figure 3. Switching Waveforms

Figure 4.

*Includes all probe and jig capacitance

Figure 5. Test Circuit

*Includes all probe and jig capacitance
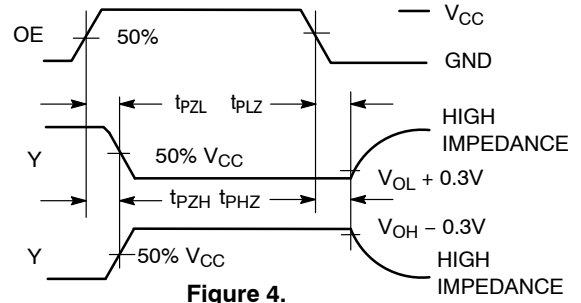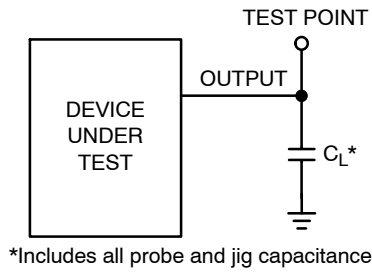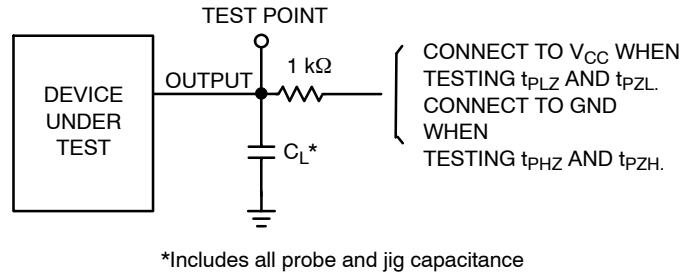
Figure 6. Test Circuit
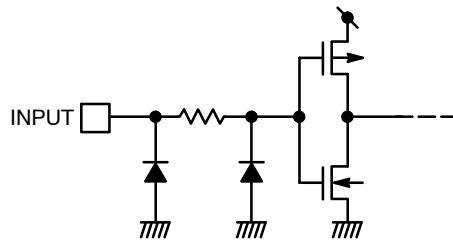
Figure 7. Input Equivalent Circuit

ORDERING INFORMATION

| Device	Package	Shipping†
NLU1GT126MUTCG	UDFN6, 1.2 x 1.0, 0.4P (Pb−Free)	3000 / Tape & Reel
NLU1GT126AMUTCG	UDFN6, 1.45 x 1.0, 0.5P (Pb−Free)	3000 / Tape & Reel
NLU1GT126CMUTCG	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.
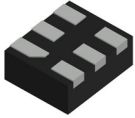
UDFN6, 1.20x1.00x0.50, 0.40P
CASE 517AA
ISSUE E

DATE 09 MAY 2025
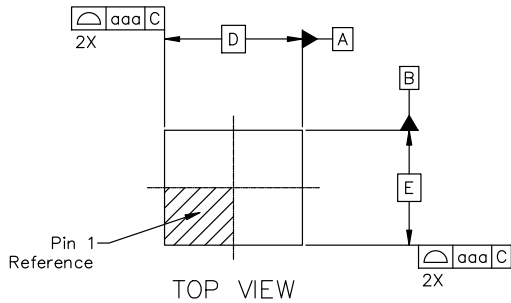
NOTES:
1. DIMENSIONING AND TOLERANCING AS PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.25 AND 0.30mm FROM TERMINAL.
4. COPLANARITY APPLIES TO TH EXPOSED PAD AS WELL AS THE TERMINALS.

TOP VIEW

Pin 1 Reference

DETAIL "B"
Scale 2:1
Side View
(Optional)

SIDE VIEW

SEATING PLANE

DETAIL "A"
Scale 2:1
Bottom View
(Optional)

BOTTOM VIEW

PIN 1
Chamfer Dimension
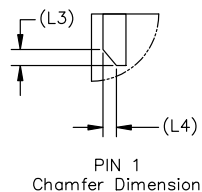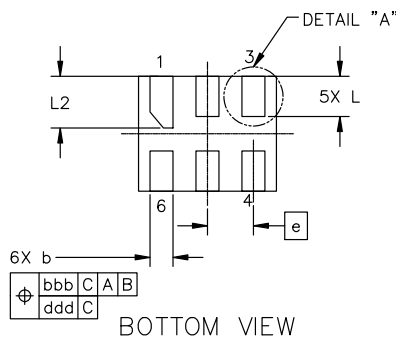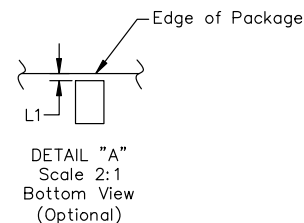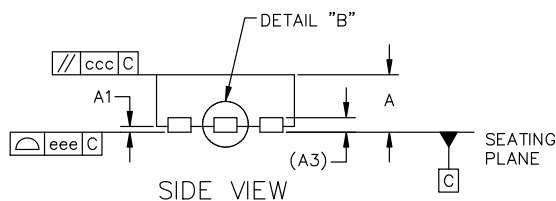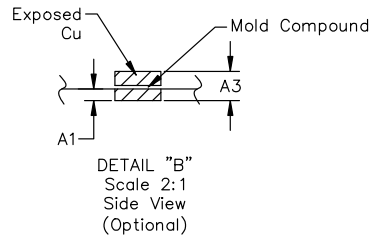
DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.45	0.50	0.55
A1	0.00	–––	0.05
A3	0.127 REF		
b	0.15	0.20	0.25
D	1.20 BSC		
E	1.00 BSC		
e	0.40 BSC		
L	0.30	0.35	0.40
L1	0.00	–––	0.15
L2	0.40	0.45	0.50
L3	0.14 REF		
L4	0.116 REF		
TOLERANCE FORM & POSITION			
aaa	0.10		
bbb	0.10		
ccc	0.10		
ddd	0.05		
eee	0.08		
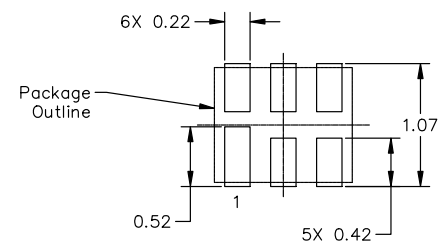
RECOMMENDED MOUNTING FOOTPRINT

6X 0.22
Package Outline
1.07
0.52
1
5X 0.42

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

**GENERIC
MARKING DIAGRAM***

XXM
•

XX = 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:	**98AON22068D**	
DESCRIPTION:	**UDFN6, 1.20x1.00x0.50, 0.40P**	**PAGE 1 OF 1**

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

SCALE 4:1

DATE 15 MAY 2008

TOP VIEW

PIN ONE
REFERENCE

| ⌒ | 0.10 | C |

| ⌒ | 0.10 | C |
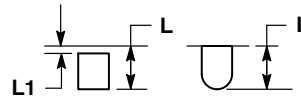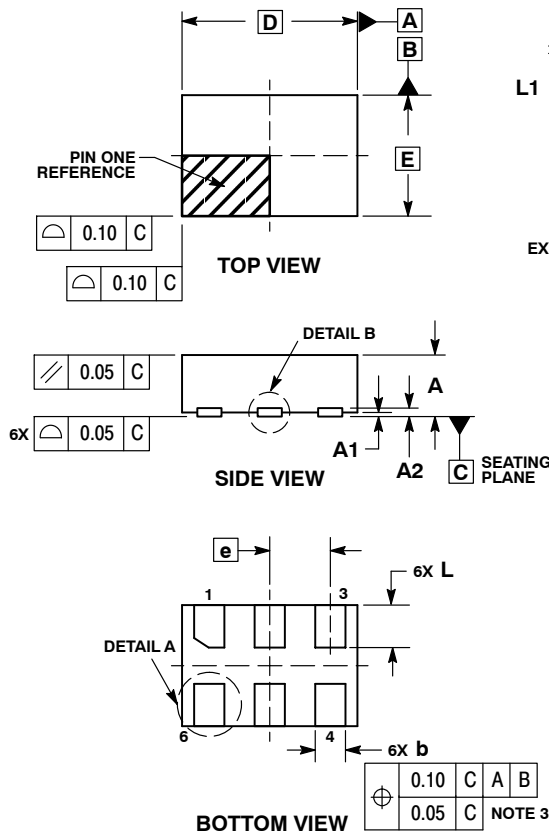
DETAIL A
OPTIONAL
CONSTRUCTIONS
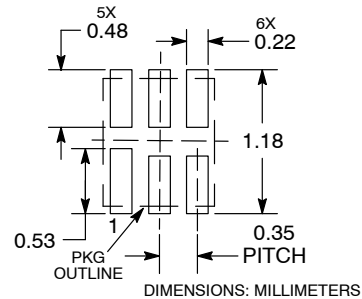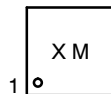
NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.

| | ⫽ | 0.05 | C |
| 6X | ⌒ | 0.05 | C |

SIDE VIEW

DETAIL B

SEATING
PLANE

EXPOSED Cu   MOLD CMPD
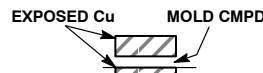
DETAIL B
OPTIONAL
CONSTRUCTIONS

| 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

BOTTOM VIEW

DETAIL A

| ⊕ | 0.10 | C | A | B |
| | 0.05 | C | NOTE 3 |

MOUNTING FOOTPRINT

PACKAGE
OUTLINE

6X
0.30

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 **onsemi** 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	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, 1.45x1.0, 0.5P		PAGE 1 OF 1

UDFN6, 1x1, 0.35P
CASE 517BX
ISSUE O
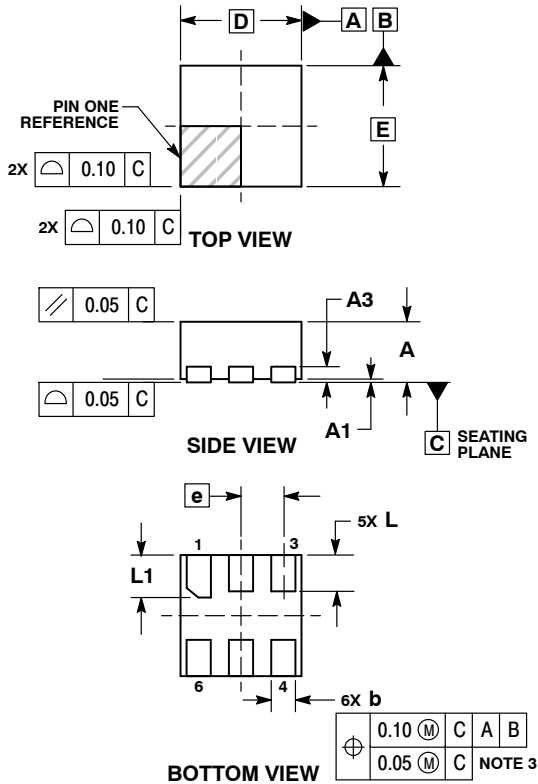
SCALE 4:1

DATE 18 MAY 2011

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 Ⓜ C A B
  0.05 Ⓜ C   NOTE 3

BOTTOM VIEW

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

**RECOMMENDED
SOLDERING FOOTPRINT***

5X
0.48

6X
0.22

1.18

0.53

1

0.35
PITCH

PKG
OUTLINE

DIMENSIONS: MILLIMETERS

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

**GENERIC
MARKING DIAGRAM***

X M

1

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		
DESCRIPTION:	UDFN6, 1x1, 0.35P		PAGE 1 OF 1

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:
Technical Library: www.onsemi.com/design/resources/technical−documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support
For additional information, please contact your local Sales Representative at
www.onsemi.com/support/sales

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