

# ON Semiconductor

## Is Now

# onsemi™

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# NLAS5113

## 1 $\Omega$ $R_{ON}$ SPST Switch

The NLAS5113 is an SPST switch designed for very low  $R_{ON}$  applications within portable devices. The NLAS5113 operates over a wide  $V_{CC}$  range, 1.65 V to 4.5 V, and maintain a very low  $R_{ON}$ : 1.3  $\Omega$  Max @  $V_{CC} = 4.2$  V. It is available in a choice of two packages: SC88 and UDFN6.

### Features

- $R_{ON}$ : 1.3  $\Omega$  Max @  $V_{CC} = 4.2$  V
- $V_{CC}$  Range: 1.65 V to 4.5 V
- UDFN6 or SC88 Packages Available
- These are Pb-Free Devices

### Typical Applications

- Mobile Phones
- Portable Devices



**ON Semiconductor**<sup>®</sup>

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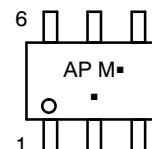
### MARKING DIAGRAMS



UDFN6  
CASE 517AA



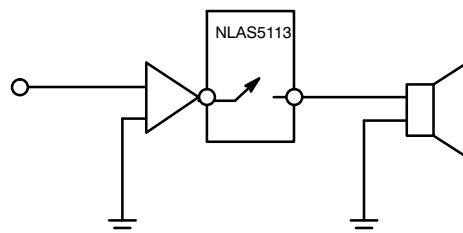
SC-88  
CASE 419B



XX = Device Code  
M = Date Code  
▪ = Pb-Free Package

(Note: Microdot may be in either location)

### APPLICATION DIAGRAM

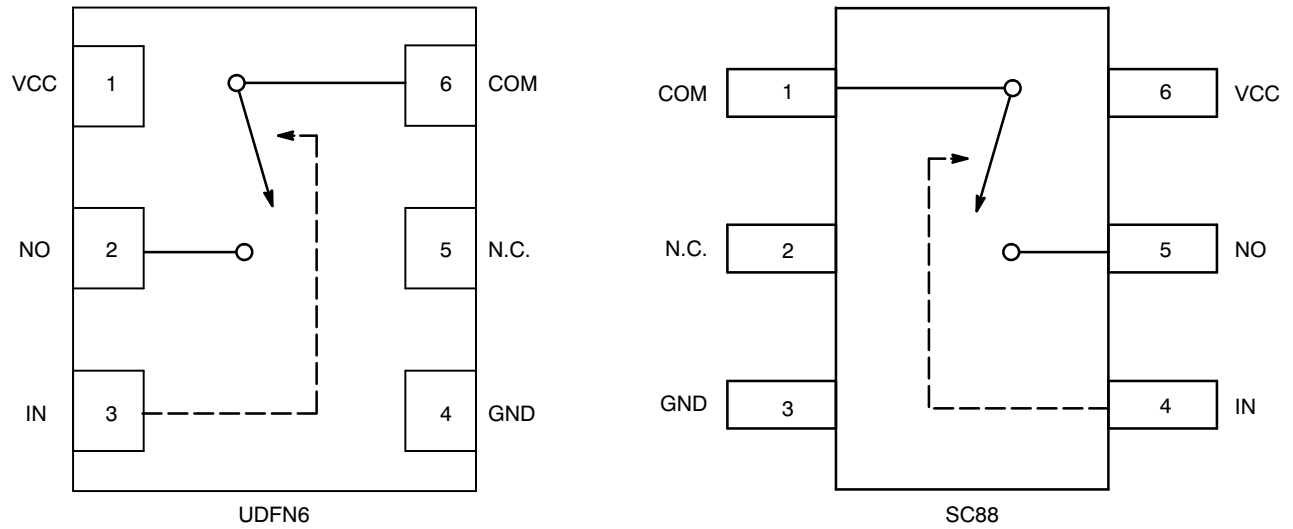


### ORDERING INFORMATION

Device	Package	Shipping <sup>†</sup>
NLAS5113MUTBG	UDFN6 (Pb-Free)	3000/Tape & Reel
NLAS5113DFT2G	SC-88 (Pb-Free)	3000/Tape & Reel

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

# NLAS5113



**Figure 1. Functional Block Diagram Pinouts**

Pin #	Name	Direction	Description
1	V <sub>CC</sub>	Input	Analog Supply Voltage
2	NO	I/O	Normally Open Signal Line
3	IN	Input	Control Input for Switch #
4	GND	Input	Ground
5	N.C.	N/A	No Connect
6	COM	I/O	Common Signal Line

**FUNCTION TABLE**

IN	NO
0	OFF
1	ON

# NLAS5113

## OPERATING CONDITIONS

### MAXIMUM RATINGS

Symbol	Pins	Parameter	Value	Condition	Unit
V <sub>CC</sub>	V <sub>CC</sub>	Positive DC Supply Voltage	-0.5 to 5.5		V
V <sub>IS</sub>	NOx, NCx, COMx	Analog Signal Voltage	-0.5 to V <sub>CC</sub> + 0.5		V
V <sub>IN</sub>	IN1, IN2	Control Input Voltage	-0.5 to 6.0		V
I <sub>CC</sub>	V <sub>CC</sub>	Positive DC Supply Current	50		mA
I <sub>IS_CON</sub>	NOx, NCx, COMx	Analog Signal Continuous Current	±300	Closed Switch	mA
I <sub>IS_PK</sub>	NOx, NCx, COMx	Analog Signal Peak Current	±500	10% Duty Cycle	mA
I <sub>IN</sub>	IN	Control Input Current			mA
T <sub>STG</sub>		Storage Temperature Range	-65 to 150		°C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

### RECOMMENDED OPERATING CONDITIONS

Symbol	Pins	Parameter	Value	Condition	Unit
V <sub>CC</sub>	V <sub>CC</sub>	Positive DC Supply Voltage	1.65 to 4.5		V
V <sub>IS</sub>	NOx, NCx, COMx	Analog Signal Voltage	0 to V <sub>CC</sub>		V
V <sub>IN</sub>	IN1, IN2	Control Input Voltage	0 to V <sub>CC</sub>		V
T <sub>A</sub>		Operating Temperature Range	-40 to 85		°C

NOTE: Minimum and maximum values are guaranteed through test or design across the **Recommended Operating Conditions**, where applicable. Typical values are listed for guidance only and are based on the particular conditions listed for each section, where applicable. These conditions are valid for all values found in the characteristics tables unless otherwise specified in the test conditions.

# NLAS5113

## DC ELECTRICAL CHARACTERISTICS Typical: T = 25°C; V<sub>CC</sub> = 3.3 V, R<sub>L</sub> = 50 Ω

Symbol	Pins	Parameter	Test Conditions	Min	Typ	Max	Unit
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### VOLTAGE I<sub>OUT</sub> < 20μA

V <sub>IH</sub>	INx	Control Input High	2.7 V < V <sub>CC</sub>	2.0			V
V <sub>IL</sub>	INx	Control Input Low				0.8	V

### CURRENT

I <sub>IN</sub>	INx	Control Input Leakage	0 V < V <sub>IN</sub> < V <sub>CC</sub>		±0.1	±1.0	μA
I <sub>NO/NC (OFF)</sub>	NCx, NOx	OFF State Leakage	0 V < V <sub>COM</sub> , V <sub>NO</sub> < V <sub>CC</sub>		±0.1	±1.0	μA
I <sub>COM (ON)</sub>	COMx	ON State Leakage	0 V < V <sub>COM</sub> , V <sub>NO</sub> < V <sub>CC</sub>		±0.5	±2.0	μA
I <sub>CC</sub>	V <sub>CC</sub>	Quiescent Supply	All Channels ON or OFF; V <sub>IN</sub> = V <sub>CC</sub> or GND, I <sub>OUT</sub> = 0;		1.0	2.0	μA

### ON RESISTANCE I<sub>ON</sub> = -100 mA, V<sub>IS</sub> = 0 to V<sub>CC</sub>

Symbol	Pins	Parameter	Test Conditions	V <sub>CC</sub> (V)	Min	Typ	Max	Unit
R <sub>ON</sub>		ON Resistance		2.7 4.2		1.7 1.1	2.0 1.3	Ω
R <sub>FLAT</sub>		R <sub>ON</sub> Flatness		2.7 4.2		0.4 0.4		Ω

### ESD PROTECTION

Pins	Description	Minimum Voltage
All Pins to Ground	Human Body Model	3 kV

## AC ELECTRICAL CHARACTERISTICS Typical: T = 25°C; V<sub>CC</sub> = 3.3 V, R<sub>L</sub> = 50 Ω, C<sub>L</sub> = 5 pF, f = 1 MHz

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
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### FREQUENCY

BW	-3dB Bandwidth			457		MHz
THD	Total Harmonic Distortion	f = 20 Hz to 20 kHz, 1.0 V <sub>PP</sub>		0.08		%

### TRANSITION TIMES

t <sub>ON</sub>	Turn On Time: COM to NO			7.0		ns
t <sub>OFF</sub>	Turn Off Time: COM to NO			4.5		ns

### OFF ISOLATION V<sub>NO</sub> or V<sub>NC</sub> (pk-pk) = 1.0 V

O <sub>IRR</sub>	Off Isolation			-57		dB
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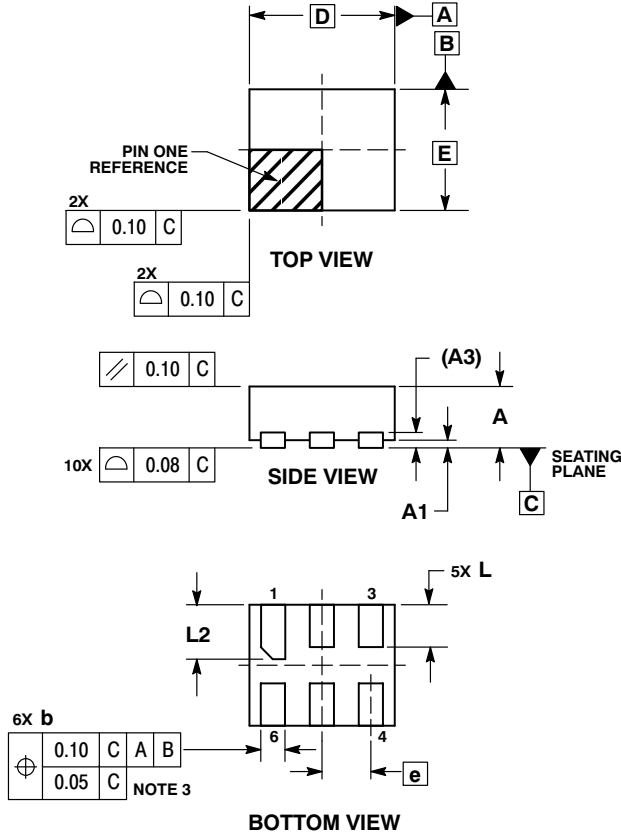
### CAPACITANCE

Symbol	Pins	Parameter	Test Conditions	Min	Typ	Max	Unit
C <sub>IN</sub>	INx	Control Input	V <sub>CC</sub> = 0 V		2.8		pF
C <sub>ON</sub>	NO to COM	Through Switch	V <sub>CC</sub> = V <sub>IN</sub> = 3.3 V		20		pF
C <sub>OFF</sub>	NO1, NO	Individual Port	V <sub>CC</sub> = 3.3 V, V <sub>IN</sub> = 0 V		14		pF

# NLAS5113

## PACKAGE DIMENSIONS

UDFN6, 1.2x1.0, 0.4P  
CASE 517AA-01  
ISSUE B

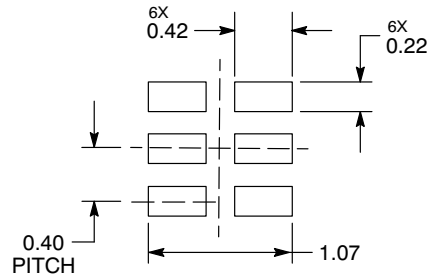


### NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.25 AND 0.30 mm FROM TERMINAL.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

MILLIMETERS		
DIM	MIN	MAX
A	0.45	0.55
A1	0.00	0.05
A3	0.127 REF	
b	0.15	0.25
D	1.20 BSC	
E	1.00 BSC	
e	0.40 BSC	
L	0.30	0.40
L2	0.40	0.50

### MOUNTING FOOTPRINT\*



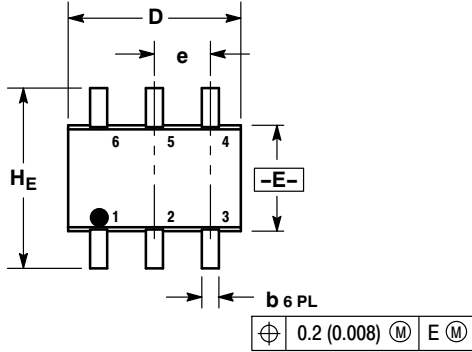
DIMENSIONS: MILLIMETERS

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

# NLAS5113

## PACKAGE DIMENSIONS

SC-88/SC70-6/SOT-363  
CASE 419B-02  
ISSUE W

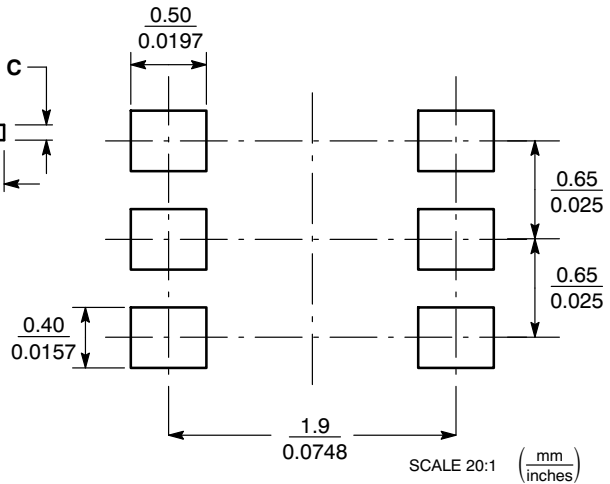


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 419B-01 OBSOLETE, NEW STANDARD 419B-02.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.80	0.95	1.10	0.031	0.037	0.043
A1	0.00	0.05	0.10	0.000	0.002	0.004
A3	0.20 REF			0.008 REF		
b	0.10	0.21	0.30	0.004	0.008	0.012
C	0.10	0.14	0.25	0.004	0.005	0.010
D	1.80	2.00	2.20	0.070	0.078	0.086
E	1.15	1.25	1.35	0.045	0.049	0.053
e	0.65 BSC			0.026 BSC		
L	0.10	0.20	0.30	0.004	0.008	0.012
H <sub>E</sub>	2.00	2.10	2.20	0.078	0.082	0.086

### SOLDERING FOOTPRINT\*



### SC-88/SC70-6/SOT-363

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