

NLAS325

Dual SPST Analog Switch, Low Voltage, Single Supply

The NLAS325 is a dual SPST (Single Pole, Single Throw) switch, similar to 1/2 a standard 4066. The device permits the independent selection of 2 analog/digital signals. Available in the Ultra-Small 8 package.

The use of advanced 0.6 μ CMOS process, improves the R_{ON} resistance considerably compared to older higher voltage technologies.

Features

- On Resistance is 20 Ω Typical at 5.0 V
- Matching is < 1.0 Ω Between Sections
- 2.0–6.0 V Operating Range
- Ultra Low < 5.0 pC Charge Injection
- Ultra Low Leakage < 1.0 nA at 5.0 V, 25°C
- Wide Bandwidth > 200 MHz, –3.0 dB
- 2000 V ESD (HBM)
- R_{ON} Flatness $\pm 6.0 \Omega$ at 5.0 V
- US8 Package
- Independent Enables; One Positive, One Negative
- Pb-Free Package is Available

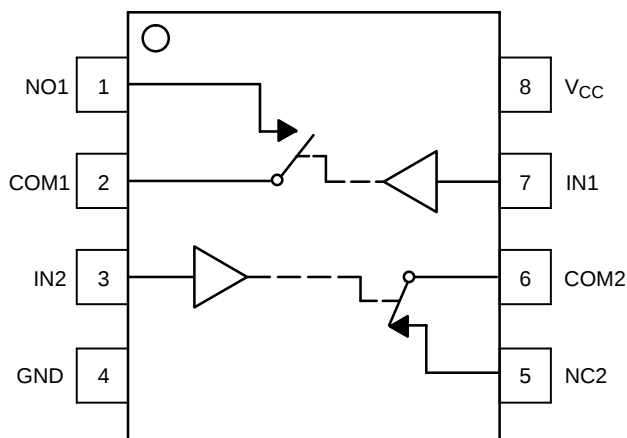


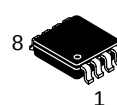
Figure 1. Pinout



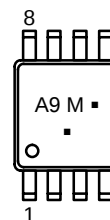
ON Semiconductor®

<http://onsemi.com>

MARKING DIAGRAM



US8
US SUFFIX
CASE 493



A9 = Device Code
M = Date Code*
▪ = Pb-Free Package

(Note: Microdot may be in either location)

*Date Code orientation may vary depending upon manufacturing location.

PIN ASSIGNMENT

1	NO1
2	COM1
3	IN2
4	GND
5	NC2
6	COM2
7	IN1
8	V _{CC}

FUNCTION TABLE

On/Off Enable Input	Analog Switch 1	Analog Switch 2
L	Off	On
H	On	Off

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 9 of this data sheet.

MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{CC}	DC Supply Voltage	− 0.5 to + 7.0	V
V _I	DC Input Voltage	− 0.5 to + 7.0	V
V _O	DC Output Voltage	− 0.5 to + 7.0	V
I _{IK}	DC Input Diode Current V _I < GND	− 50	mA
I _{OK}	DC Output Diode Current V _O < GND	− 50	mA
I _O	DC Output 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
T _L	Lead Temperature, 1.0 mm from Case for 10 Seconds	260	°C
T _J	Junction Temperature under Bias	+ 150	°C
θ _{JA}	Thermal Resistance (Note 1)	250	°C/W
P _D	Power Dissipation in Still Air at 85°C	250	mW
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) Charged Device Model (Note 4)	> 2000 > 200 N/A	V

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.

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 JESD22-C101-A.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Max	Unit
V _{CC}	DC Supply Voltage	2.0	5.5	V
V _{IN}	Digital Select Input Voltage	GND	5.5	V
V _{IS}	Analog Input Voltage (NC, NO, COM)	GND	V _{CC}	V
T _A	Operating Temperature Range	− 55	+ 125	°C
t _r , t _f	Input Rise or Fall Time, SELECT V _{CC} = 3.3 V ± 0.3 V V _{CC} = 5.0 V ± 0.5 V	0 0	100 20	ns/V

DEVICE JUNCTION TEMPERATURE VERSUS TIME TO 0.1% BOND FAILURES

Junction Temperature °C	Time, Hours	Time, Years
80	1,032,200	117.8
90	419,300	47.9
100	178,700	20.4
110	79,600	9.4
120	37,000	4.2
130	17,800	2.0
140	8,900	1.0

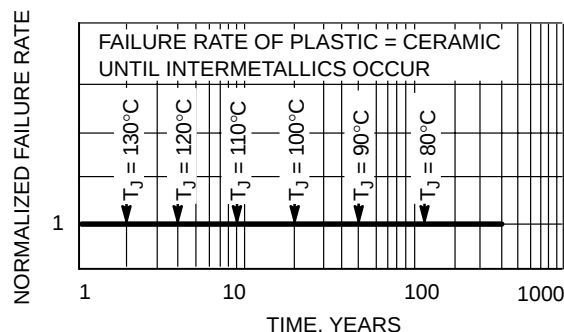


Figure 2. Failure Rate vs. Time Junction Temperature

NLAS325

DC CHARACTERISTICS – Digital Section (Voltages Referenced to GND)

Symbol	Parameter	Condition	V _{CC}	Guaranteed Limit			Unit
				–55°C to 25°C	<85°C	<125°C	
V _{IH}	Minimum High-Level Input Voltage, Select Inputs		2.0	1.5	1.5	1.5	V
			2.5	1.9	1.9	1.9	
			3.0	2.1	2.1	2.1	
			4.5	3.15	3.15	3.15	
			5.5	3.85	3.85	3.85	
V _{IL}	Maximum Low-Level Input Voltage, Select Inputs		2.0	0.5	0.5	0.5	V
			2.5	0.6	0.6	0.6	
			3.0	0.9	0.9	0.9	
			4.5	1.35	1.35	1.35	
			5.5	1.65	1.65	1.65	
I _{IN}	Maximum Input Leakage Current, Select Inputs	V _{IN} = 5.5 V or GND	0 V to 5.5 V	±0.2	±2.0	±2.0	μA
I _{CC}	Maximum Quiescent Supply Current	Select and V _{IS} = V _{CC} or GND	5.5	4.0	4.0	8.0	μA

DC ELECTRICAL CHARACTERISTICS – Analog Section

Symbol	Parameter	Condition	V _{CC}	Guaranteed Limit			Unit
				–55°C to 25°C	<85°C	<125°C	
R _{ON}	Maximum “ON” Resistance (Figures 16 – 22)	V _{IN} = V _{IL} or V _{IH} V _{IS} = GND to V _{CC} I _{IN} ≤ 10 mA	2.5	85	95	105	Ω
			3.0	45	50	55	
			4.5	30	35	40	
			5.5	25	30	35	
R _{FLAT(ON)}	ON Resistance Flatness (Figures 16 – 22)	V _{IN} = V _{IL} or V _{IH} I _{IN} ≤ 10 mA V _{IS} = 1.0 V, 2.0 V, 3.5 V	4.5	4.0	4.0	5.0	Ω
I _{NC(OFF)} I _{NO(OFF)}	NO or NC Off Leakage Current (Figure 8)	V _{IN} = V _{IL} or V _{IH} V _{NO} or V _{NC} = 1.0 V _{COM} 4.5 V	5.5	1.0	10	100	nA
I _{COM(ON)}	COM ON Leakage Current (Figure 8)	V _{IN} = V _{IL} or V _{IH} V _{NO} 1.0 V or 4.5 V with V _{NC} floating or V _{NO} 1.0 V or 4.5 V with V _{NO} floating V _{COM} = 1.0 V or 4.5 V	5.5	1.0	10	100	nA

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

Symbol	Parameter	Test Conditions	V _{CC} (V)	V _{IS} (V)	Guaranteed Maximum Limit							Unit
					–55°C to 25°C			<85°C		<125°C		
					Min	Typ*	Max	Min	Max	Min	Max	
t _{ON}	Turn-On Time (Figures 11 and 12)	R _L = 300 Ω, C _L = 35 pF (Figures 4 and 5)	2.5	2.0	5.0	23	35	5.0	38	5.0	41	ns
			3.0	2.0	5.0	16	24	5.0	27	5.0	30	
			4.5	3.0	2.0	11	16	2.0	19	2.0	22	
			5.5	3.0	2.0	9.0	14	2.0	17	2.0	20	
t _{OFF}	Turn-Off Time (Figures 11 and 12)	R _L = 300 Ω, C _L = 35 pF (Figures 4 and 5)	2.5	2.0	1.0	7.0	12	1.0	15	1.0	18	ns
			3.0	2.0	1.0	5.0	10	1.0	13	1.0	16	
			4.5	3.0	1.0	4.0	6.0	1.0	9.0	1.0	12	
			5.5	3.0	1.0	3.0	5.0	1.0	8.0	1.0	11	
t _{BBM}	Minimum Break-Before-Make Time	V _{IS} = 3.0 V (Figure 3) R _L = 300 Ω, C _L = 35 pF	2.5	2.0	1.0	12		1.0		1.0		ns
			3.0	2.0	1.0	11		1.0		1.0		
			4.5	3.0	1.0	6.0		1.0		1.0		
			5.5	3.0	1.0	5.0		1.0		1.0		

*Typical Characteristics are at 25°C.

		Typical @ 25, V _{CC} = 5.0 V	pF
C _{IN}	Maximum Input Capacitance, Select Input	8.0	
C _{NO} or C _{NC}	Analog I/O (switch off)	10	
C _{COM}	Common I/O (switch off)	10	
C _(ON)	Feedthrough (switch on)	20	

ADDITIONAL APPLICATION CHARACTERISTICS (Voltages Referenced to GND Unless Noted)

Symbol	Parameter	Condition	V_{CC} (V)	Typical	Unit
				25°C	
BW	Maximum On-Channel –3.0 dB Bandwidth or Minimum Frequency Response (Figure 10)	$V_{IN} = 0$ dBm V_{IN} centered between V_{CC} and GND (Figure 6)	3.0	145	MHz
			4.5	170	
			5.5	175	
V_{ONL}	Maximum Feedthrough On Loss	$V_{IN} = 0$ dBm @ 100 kHz to 50 MHz V_{IN} centered between V_{CC} and GND (Figure 6)	3.0	–2.0	dB
			4.5	–2.0	
			5.5	–2.0	
V_{ISO}	Off-Channel Isolation (Figure 9)	$f = 100$ kHz; $V_{IS} = 1.0$ V RMS V_{IN} centered between V_{CC} and GND (Figure 6)	3.0	–93	dB
			4.5	–93	
			5.5	–93	
Q	Charge Injection Select Input to Common I/O (Figure 14)	$V_{IN} = V_{CC}$ to GND, $F_{IS} = 20$ kHz $t_r = t_f = 3.0$ ns $R_{IS} = 0 \Omega$, $C_L = 1000$ pF $Q = C_L \cdot \Delta V_{OUT}$ (Figure 7)	3.0	1.5	pC
			5.5	3.0	
THD	Total Harmonic Distortion THD + Noise (Figure 13)	$F_{IS} = 20$ Hz to 100 kHz, $R_L = R_{gen} = 600 \Omega$, $C_L = 50$ pF $V_{IS} = 5.0$ V _{PP} sine wave	5.5	0.1	%
VCT	Channel-to-Channel Crosstalk	$f = 100$ kHz; $V_{IS} = 1.0$ V RMS V_{IN} centered between V_{CC} and GND (Figure 6)	5.5	–90	dB
			3.0	–90	

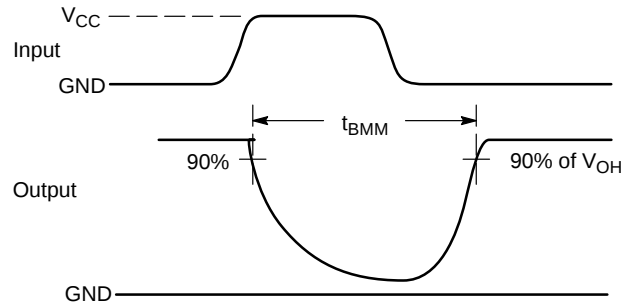
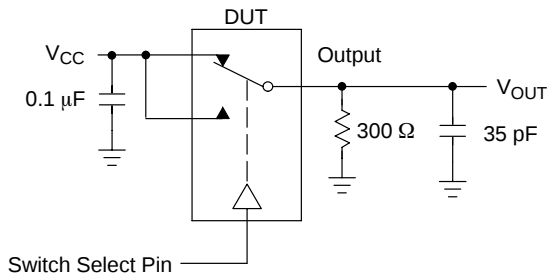


Figure 3. t_{BMM} (Time Break-Before-Make)

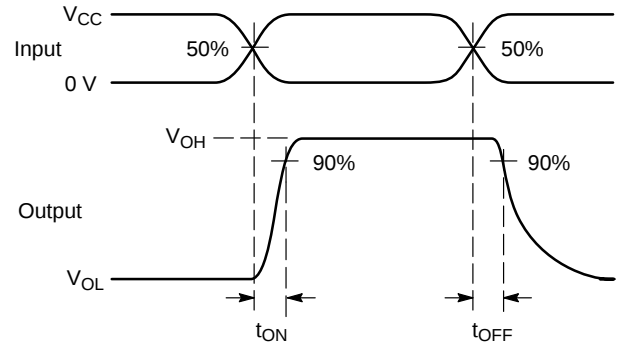
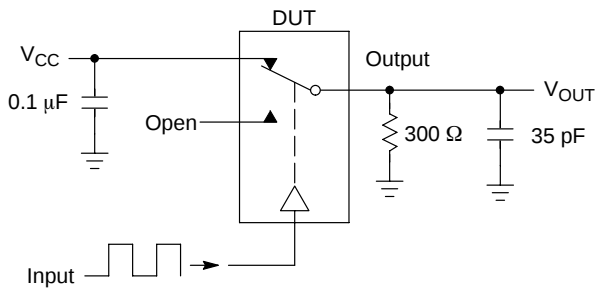


Figure 4. t_{ON}/t_{OFF}

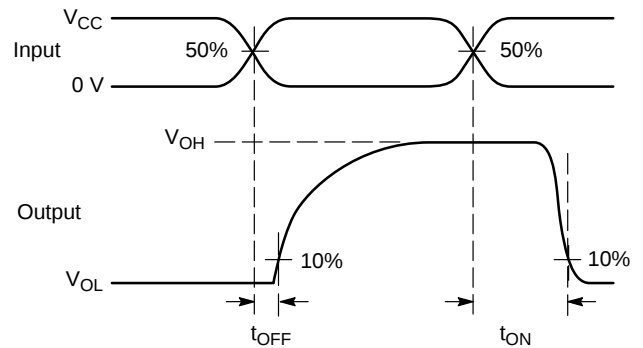
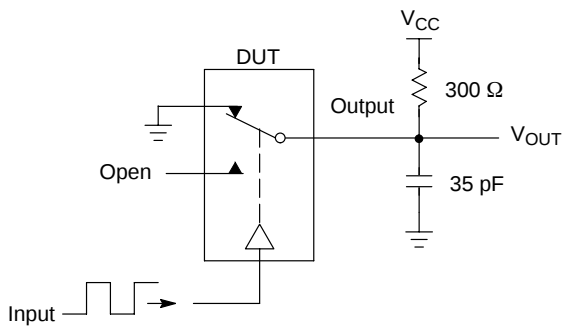
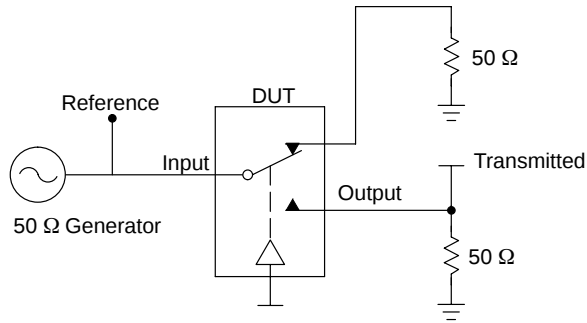


Figure 5. t_{ON}/t_{OFF}



Channel switch control/s test socket is normalized. Off isolation is measured across an off channel. On loss is the bandwidth of an On switch. V_{ISO} , Bandwidth and V_{ONL} are independent of the input signal direction.

$$V_{ISO} = \text{Off Channel Isolation} = 20 \text{ Log } \left(\frac{V_{OUT}}{V_{IN}} \right) \text{ or } V_{IN} \text{ at } 100 \text{ kHz}$$

$$V_{ONL} = \text{On Channel Loss} = 20 \text{ Log } \left(\frac{V_{OUT}}{V_{IN}} \right) \text{ for } V_{IN} \text{ at } 100 \text{ kHz to } 50 \text{ MHz}$$

Bandwidth (BW) = the frequency 3.0 dB below V_{ONL}

V_{CT} = Use V_{ISO} setup and test to all other switch analog input/outputs terminated with 50 Ω

Figure 6. Off Channel Isolation/On Channel Loss (BW)/Crosstalk (On Channel to Off Channel)/ V_{ONL}

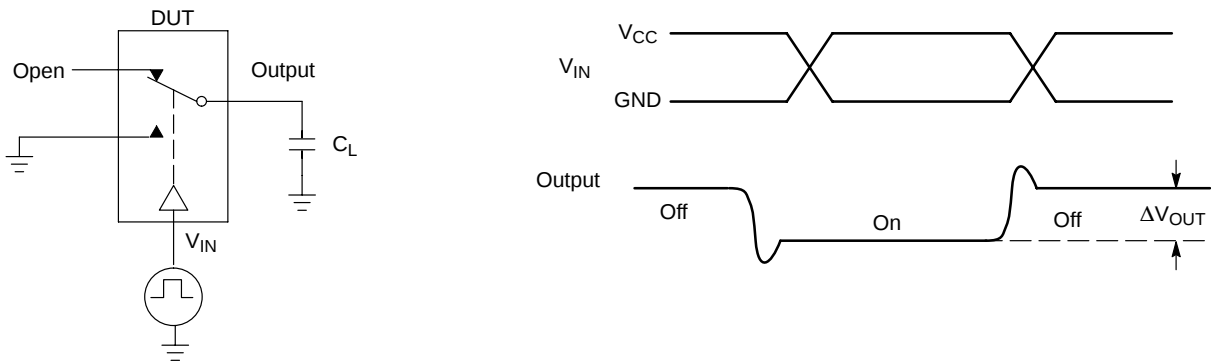


Figure 7. Charge Injection: (Q)

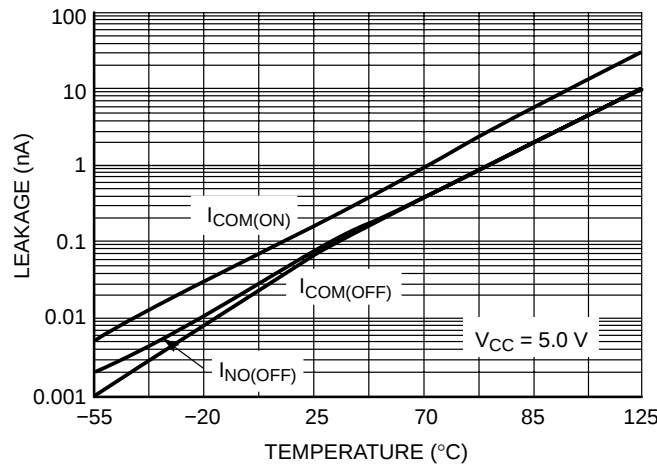


Figure 8. Switch Leakage vs. Temperature

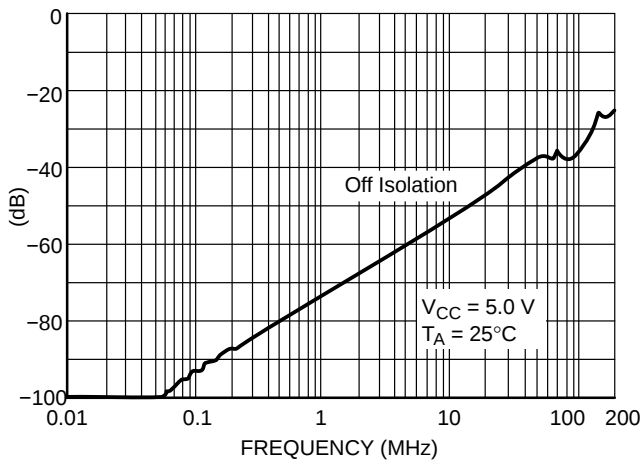


Figure 9. Off-Channel Isolation

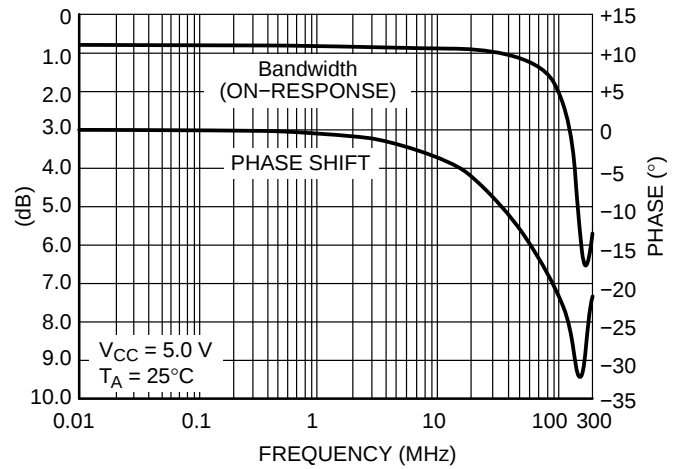


Figure 10. Typical Bandwidth and Phase Shift

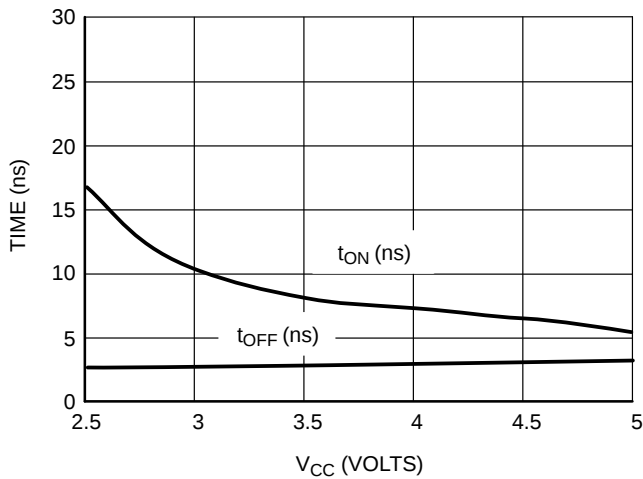


Figure 11. t_{ON} and t_{OFF} vs. V_{CC} at 25°C

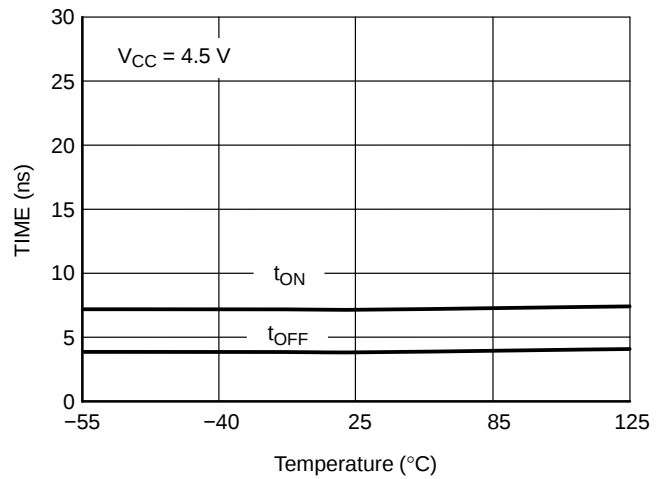


Figure 12. t_{ON} and t_{OFF} vs. Temp

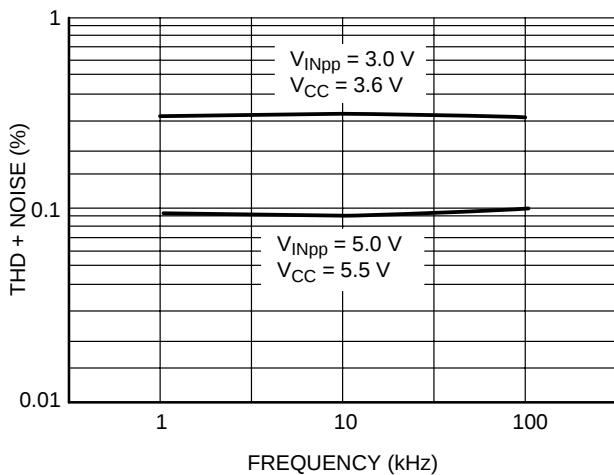


Figure 13. Total Harmonic Distortion Plus Noise vs. Frequency

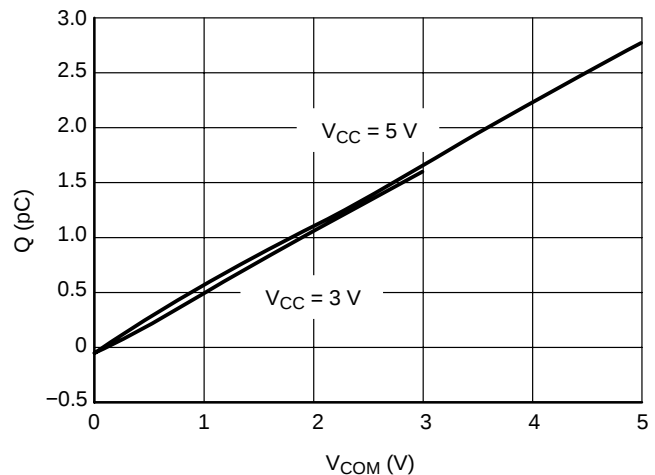


Figure 14. Charge Injection vs. COM Voltage

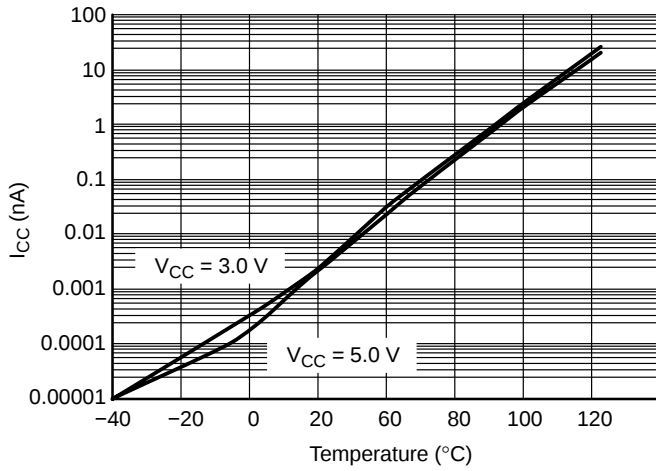


Figure 15. I_{CC} vs. Temp, $V_{CC} = 3.0$ V and 5.0 V

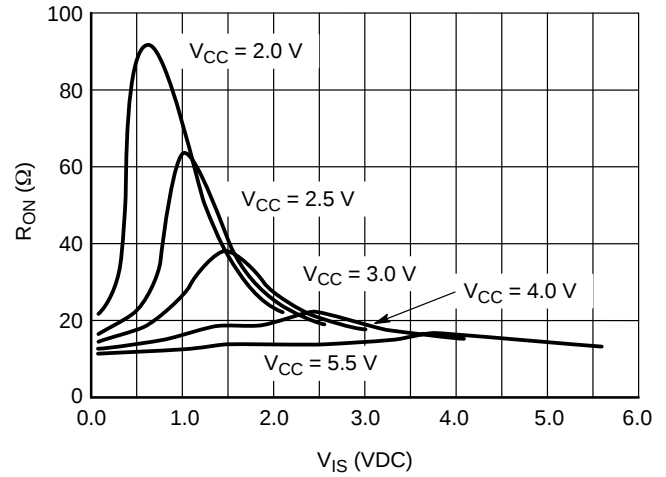


Figure 16. R_{ON} vs. V_{CC} , Temp = 25°C

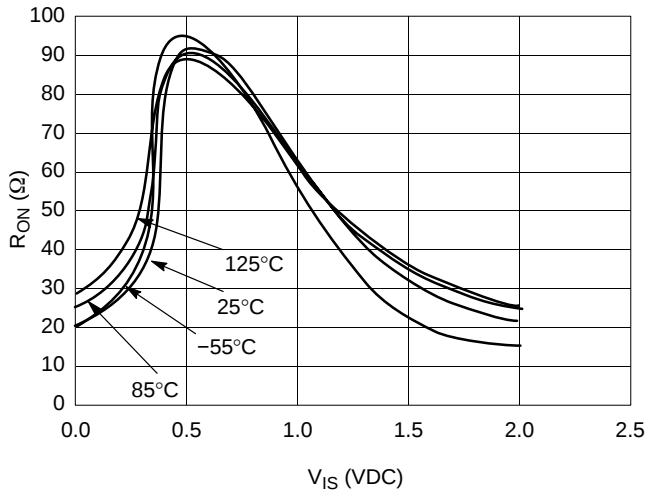


Figure 17. R_{ON} vs Temp, $V_{CC} = 2.0$ V

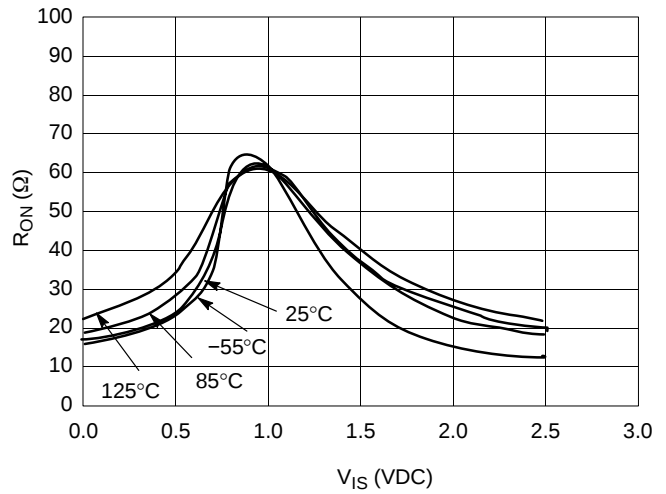


Figure 18. R_{ON} vs. Temp, $V_{CC} = 2.5$ V

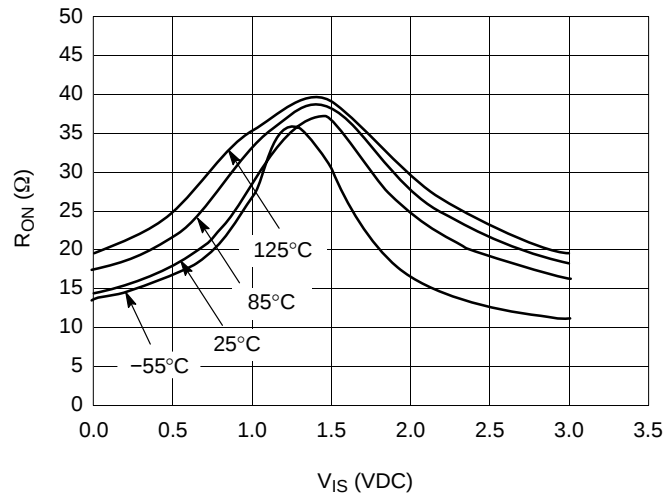


Figure 19. R_{ON} vs. Temp, $V_{CC} = 3.0$ V

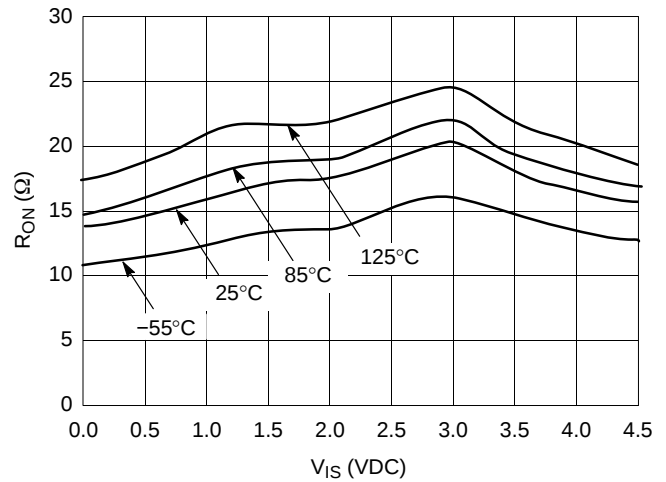


Figure 20. R_{ON} vs. Temp, $V_{CC} = 4.5$ V

NLAS325

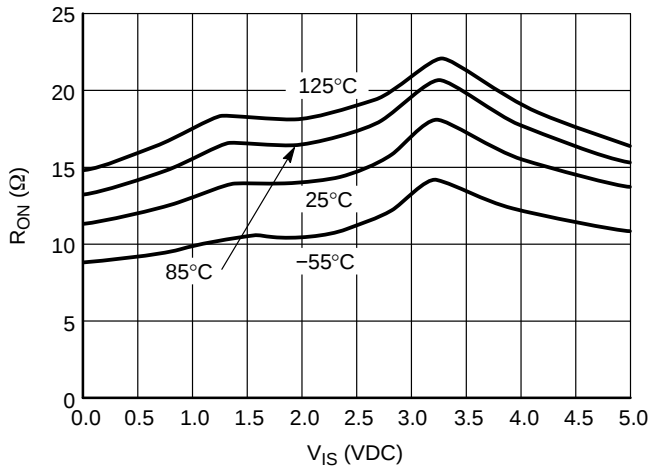


Figure 21. R_{ON} vs. Temp, V_{CC} = 5.0 V

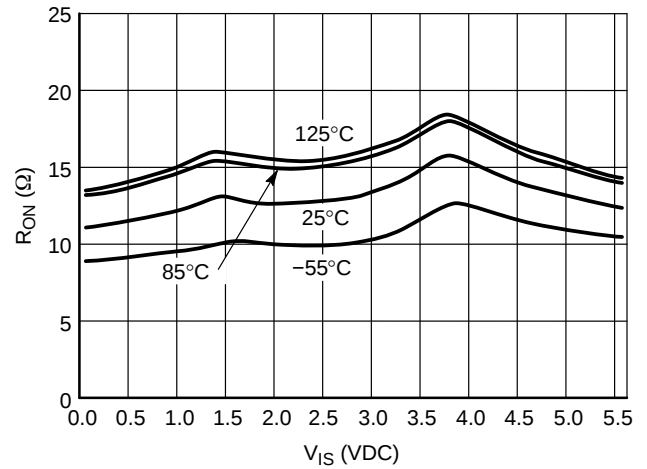


Figure 22. R_{ON} vs. Temp, V_{CC} = 5.5 V

ORDERING INFORMATION

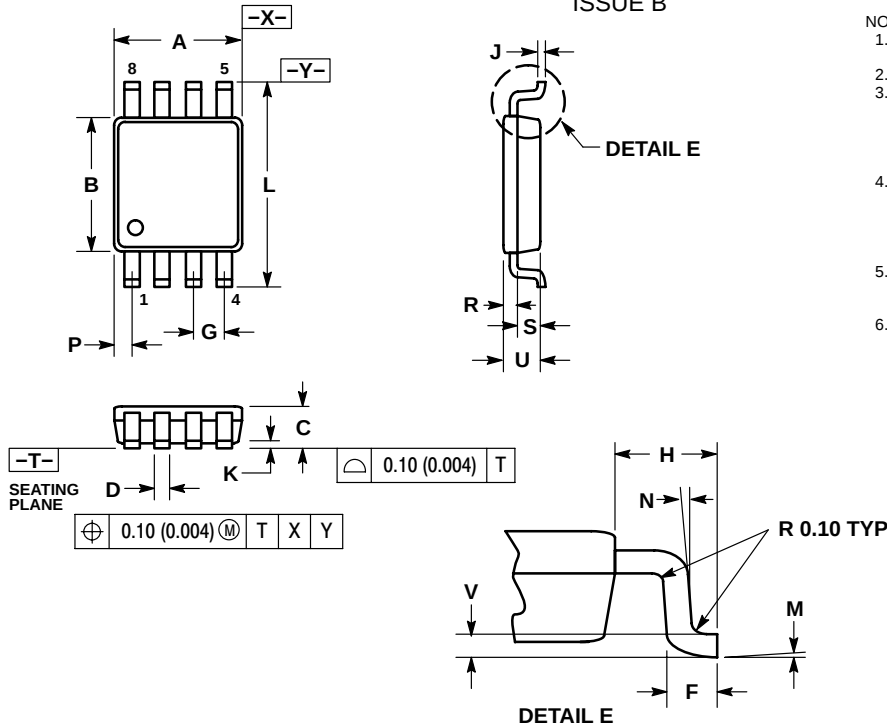
Device Order Number	Device Nomenclature				Package Type	Tape and Reel Size†
	Circuit Indicator	Technology	Device Function	Package Suffix		
NLAS325US	NL	AS	325	US	US8	178 mm (7") 3000 Unit
NLAS325USG	NL	AS	325	USG	US8 (Pb-Free)	178 mm (7") 3000 Unit

†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.

NLAS325

PACKAGE DIMENSIONS

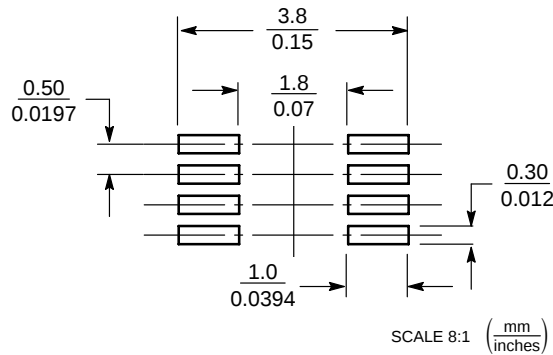
US8
US SUFFIX
CASE 493-02
ISSUE B



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION "A" DOES NOT INCLUDE MOLD FLASH, PROTRUSION OR GATE BURR. MOLD FLASH, PROTRUSION AND GATE BURR SHALL NOT EXCEED 0.140 MM (0.0055") PER SIDE.
4. DIMENSION "B" DOES NOT INCLUDE INTER-LEAD FLASH OR PROTRUSION. INTER-LEAD FLASH AND PROTRUSION SHALL NOT EXCEED 0.140 (0.0055") PER SIDE.
5. LEAD FINISH IS SOLDER PLATING WITH THICKNESS OF 0.0076-0.0203 MM. (300-800 °).
6. ALL TOLERANCE UNLESS OTHERWISE SPECIFIED ±0.0508 (0.0002 ").

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.

ON Semiconductor and are 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 limitation 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 "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor 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, even if such claim alleges 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.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 61312, Phoenix, Arizona 85062-1312 USA
Phone: 480-829-7710 or 800-344-3860 Toll Free USA/Canada
Fax: 480-829-7709 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free
USA/Canada

Japan: ON Semiconductor, Japan Customer Focus Center
2-9-1 Kamimeguro, Meguro-ku, Tokyo, Japan 153-0051
Phone: 81-3-5773-3850

ON Semiconductor Website: <http://onsemi.com>

Order Literature: <http://www.onsemi.com/litorder>

For additional information, please contact your local Sales Representative.

Данный компонент на территории Российской Федерации

Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru

moschip.ru_4

moschip.ru_6

moschip.ru_9