NLAS3157, NLAS3257

Low Voltage SPDT Mux / Demux Analog Switch

The NLAS3157 Mux / Demux Analog Switch is an advanced high−speed single−pole double−throw (SPDT) CMOS switch. It can be used as an analog switch or as a low−delay bus switch. Break−before−make switching prevents both switches being enabled simultaneously. This eliminates signal disruption during switching. The control input, S, is independent of supply voltage line switch in an ultra−small footprint.

Features

- High Speed: t_{PD} = 0.25 ns (Max) @ V_{CC} = 4.5 V
- R_{ON}: 8.5 Ω Typ @ V_{CC} = 4.2 V
- C_{ON}: 7.5 pF Typ @ V_{CC} = 3.3 V
- V_{CC} Range: 1.65 V to 4.5 V
- Ultra−Small 1 x 1 mm Package
- This Device is Pb−Free, Halogen Free/BFR Free and RoHS Compliant

Typical Applications

- Mobile Phones, PDAs, Camera

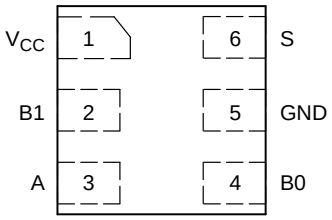


Figure 1. ULLGA6 (NLAS3157) (Top View)

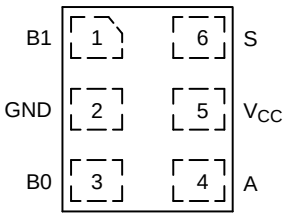


Figure 2. XLLGA6 (NLAS3257) (Top View)

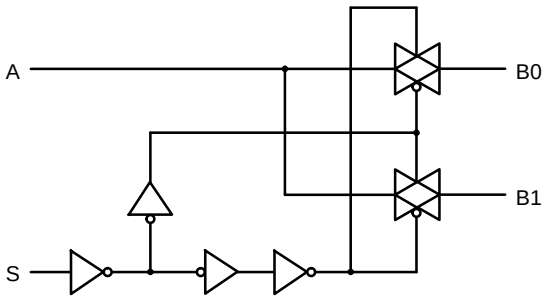


Figure 3. Logic Diagram

ON Semiconductor®

www.onsemi.com

MARKING DIAGRAMS

ULLGA6
1.0 x 1.0
CASE 613AD

Y = Specific Device Code
M = Date Code

XLLGA6
1.0 x 1.0
CASE 713AD

L = Specific Device Code
M = Date Code

FUNCTION TABLE

Input S	Function
L	A = B0
H	A = B1

ORDERING INFORMATION

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

© Semiconductor Components Industries, LLC, 2016

Table 1. MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V_{CC}	DC Supply Voltage		−0.5 to +5.5	V
V_{IN}	Control Input Voltage (S Pin)		−0.5 to +5.5	V
V_{IS}	Switch Input / Output Voltage (A, BO, B1 Pins)		−0.5 to V_{CC} + 0.5	V
I_{IK}	Control DC Input Diode Current (S Pin)	V_{IN} < GND	−50	mA
I_{OK}	Switch I/O Port DC Diode Current (A, BO, B1 Pins)	$V_{I/O}$ < GND or $V_{I/O}$ > V_{CC}	±50	mA
I_O	On−State Switch Current		±128	mA
	Continuous Current Through V_{CC} or GND		±150	mA
I_{CC}	DC Supply Current per Supply Pin		±150	mA
I_{GND}	DC Ground Current per Ground Pin		±150	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
θ_{JA}	Thermal Resistance (Note 1)		407	°C/W
P_D	Power Dissipation in Still Air at 85°C (Note 1)		1.5	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 Mode (Note 2) Machine Mode (Note 3) Charged Device Mode (Note 4)	>8000 >300 >2000	V
$I_{LATCHUP}$	Latchup Performance Above V_{CC} and Below GND at 85°C (Note 5)		±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 no air flow.
2. Tested to EIA/ JESD22−A114−A
3. Tested to EIA/ JESD22−A115−A
4. Tested to JESD22−C101−A
5. Tested to EIA / JESD78

Table 2. RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter		Min	Max	Unit
V_{CC}	Positive DC Supply Voltage		1.65	4.5	V
V_I	Control Input Voltage (S Pin)		0	4.5	V
V_{IS}	Switch Input / Output Voltage (A, BO, B1 Pins)		0	V_{CC}	V
T_A	Operating Free−Air Temperature		−40	+85	°C
$\Delta t / \Delta V$	Input Transition Rise or Fall Rate	Control Input Switch I/O	0 0	5 DC	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.

Table 3. DC ELECTRICAL CHARACTERISTICS (Typical: T = 25°C, V_{CC} = 3.3 V)

Symbol	Parameter	Test Conditions	V_{CC} (V)	−40°C to +85°C			Unit
				Min	Typ	Max	
V_{IH}	Control Input, HIGH Voltage		1.65 2.7 3.3 4.2	0.75 1.25 1.52 1.94			V
V_{IL}	Control Input, LOW Voltage		1.65 2.7 3.3 4.2			0.25 0.4 0.4 0.5	V
I_{IN}	Control Input, Leakage Current	$0 \le V_{IS} \le V_{CC}$	1.65 − 4.5			±1.0	μA
I_{CC}	Quiescent Supply Current	$V_{IS} = V_{CC}$ or GND; I_D = 0 A	1.65 − 4.5			1.0	μA
$I_{NC (OFF)}$ $I_{NO (OFF)}$	NC or NO Leakage Current	V_{IS} = 1.65 V to 4.5 V	4.5		±10	±100	nA
$I_{COM (ON)}$	COM ON Leakage Current	V_{IS} = 1.65 V to 4.5 V	4.5		±10	±100	nA
ON RESISTANCE (Typical: T = 25°C)							
R_{ON}	Peak On−Resistance	I_{ON} = 8 mA V_{IS} = 0 V to V_{CC}	1.65 2.7 3.3 4.2		15.4 10.8 9.5 8.5	23.2 12.4 11.0 9.9	Ω
R_{FLAT}	On−Resistance Flatness	I_{ON} = 8 mA V_{IS} = 0 V to V_{CC}	1.65 2.7 3.3 4.2		5.5 2.9 2.7 2.8	10.2 3.3 3.3 3.3	Ω
ΔR_{ON}	Delta On−Resistance	I_{ON} = 8 mA V_{IS} = 0 V to V_{CC}	1.65 2.7 3.3 4.2		0.3 0.3 0.3 0.3	0.35 0.35 0.35 0.35	Ω

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.

Table 4. AC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test Conditions	V_{CC} (V)	−40°C to +85°C			Unit
				Min	Typ	Max	
TIMING/FREQUENCY (Typical: T = 25°C, V_{CC} = 3.3 V, R_L = 50 Ω, C_L = 35 pF, f = 1 MHz)							
t_{PD}	Propagation Delay, A to Bn or Bn to A	(See Figures 4 and 5)	1.65 − 4.5			0.25	ns
t_{ON}	Turn−ON Time	(See Figures 7 and 8)	1.65 − 4.5	3.1	13.0	30.0	ns
t_{OFF}	Turn−OFF Time	(See Figures 7 and 8)	1.65 − 4.5	3.4	12.0	25.0	ns
T_{BBM}	Break−Before−Make Time	(See Figure 6)	1.65 − 4.5	2.0			ns
BW	−3 dB Bandwidth	C_L = 5 pF	1.65 − 4.5		1000		MHz
ISOLATION (Typical: T = 25°C, V_{CC} = 3.3 V, R_L = 50 Ω, C_L = 5 pF)							
O_{IRR}	OFF−Isolation	f = 240 MHz (See Figure 9)	1.65 − 4.5		-21		dB
X_{TALK}	Non−Adjacent Channel Crosstalk	f = 240 MHz	1.65 − 4.5		-21		dB

Table 4. AC ELECTRICAL CHARACTERISTICS

CAPACITANCE (Typical: T = 25°C)

C_{IN}	Control Pin Input Capacitance	V_{CC} = 0 V, f = 1 MHz		1.5		pF
		V_{CC} = 0 V, f = 10 MHz		1.0		
C_{ON}	ON Capacitance	V_{CC} = 3.3 V; OE = 0 V, S = 0 V or 3.3 V, f = 1 MHz		7.5		
		V_{CC} = 3.3 V; OE = 0 V, S = 0 V or 3.3 V, f = 10 MHz		6.5		
C_{OFF}	OFF Capacitance	V_{CC} = V_{IS} = 3.3 V; OE = 0 V, S = 3.3 V or 0 V, f = 1 MHz		3.8		
		V_{CC} = V_{IS} = 3.3 V; OE = 0 V, S = 3.3 V or 0 V, f = 10 MHz		2.0		

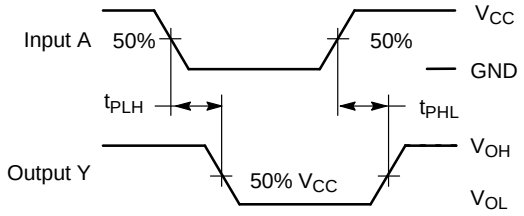
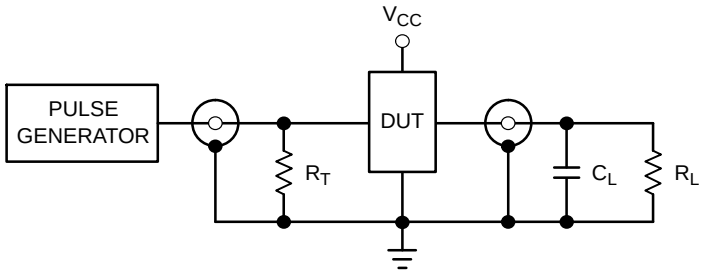


Figure 4. Propagation Delay Waveforms



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

Figure 5. Propagation Delay Test Circuit

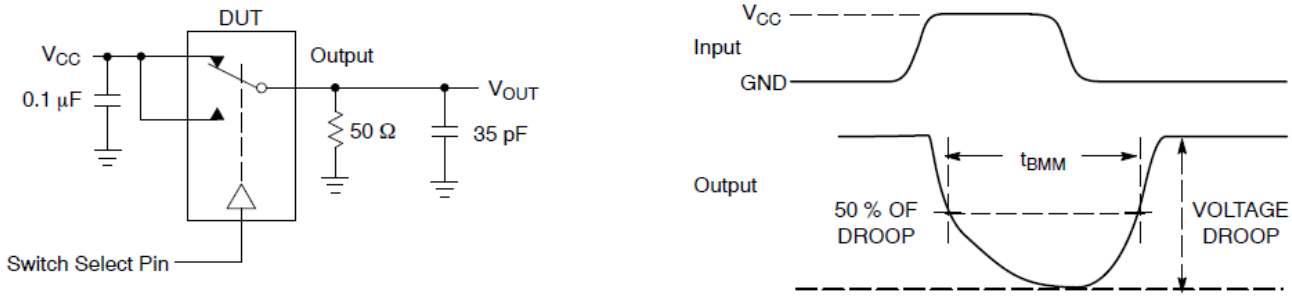


Figure 6. t_{BBM} (Time Break−Before−Make)

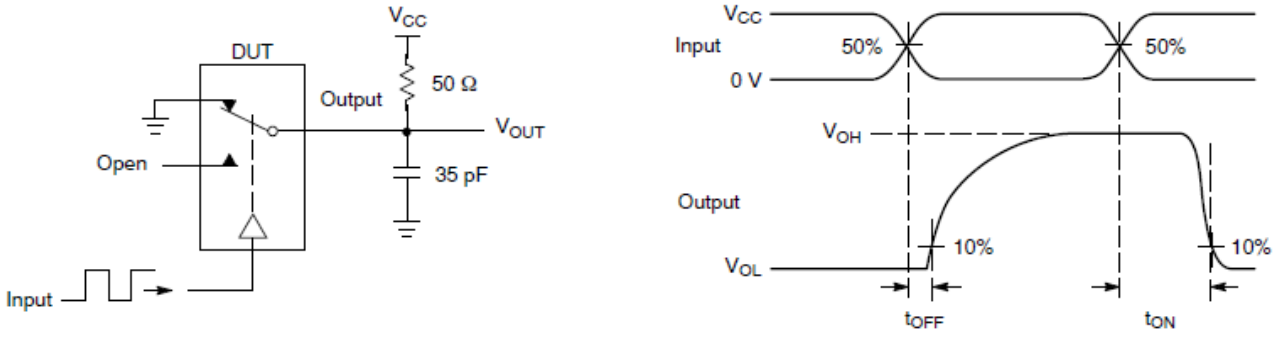


Figure 7. t_{ON} / t_{OFF}

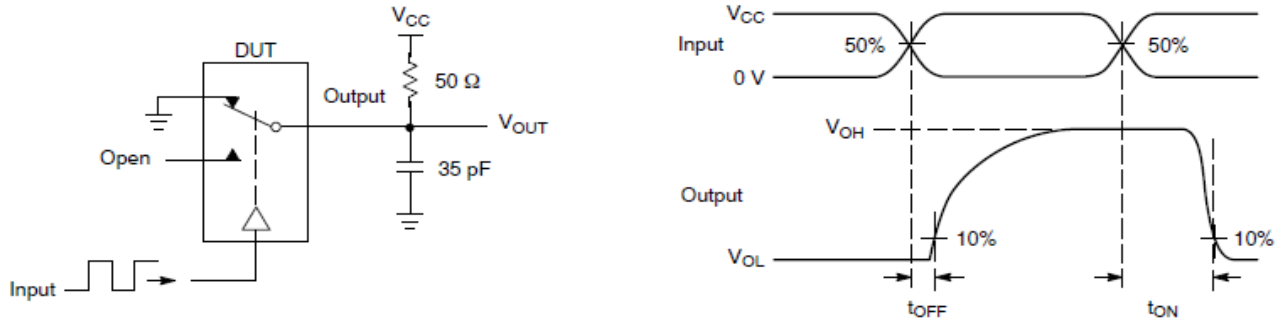
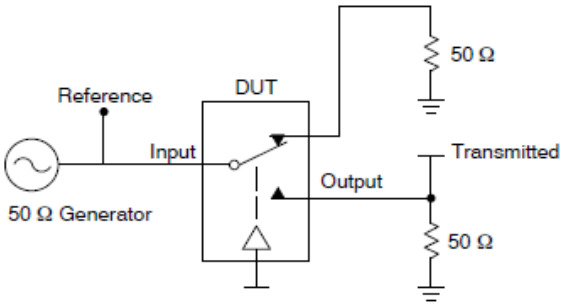


Figure 8. t_{ON} / t_{OFF}



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

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

Bandwidth (BW) = the frequency 3 dB below V_{ONL}

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

Figure 9. Off Channel Isolation / On Channel Loss (BW)/Crosstalk (On Channel to Off Channel) / V_{ONL}

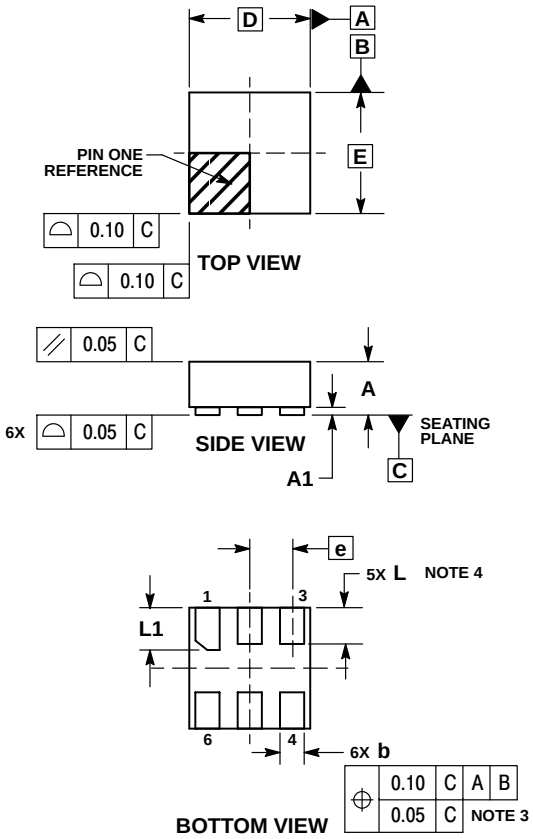
ORDERING INFORMATION

Device	Package	Shipping†
NLAS3157MX3TCG	ULLGA6 − 1.0 x 1.0, 0.35P (Pb−Free)	3000 / Tape & Reel
NLAS3257CMX2TCG	XLLGA6 − 1.0 x 1.0, 0.35P (Pb−Free)	3000 / Tape & Reel
NLAS3257CMX3TCG		

†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.

PACKAGE DIMENSIONS

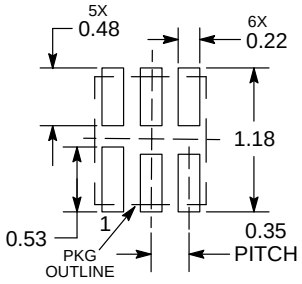
ULLGA6 1.0x1.0, 0.35P
CASE 613AD
ISSUE A



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.
4. A MAXIMUM OF 0.05 PULL BACK OF THE PLATED TERMINAL FROM THE EDGE OF THE PACKAGE IS ALLOWED.

	MILLIMETERS	
DIM	MIN	MAX
A	----	0.40
A1	0.00	0.05
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

MOUNTING FOOTPRINT SOLDERMASK DEFINED*

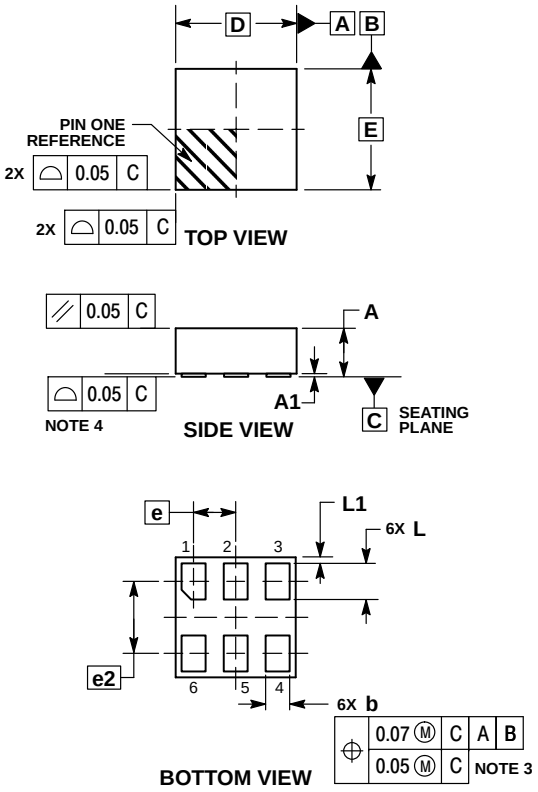


DIMENSIONS: MILLIMETERS

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

PACKAGE DIMENSIONS

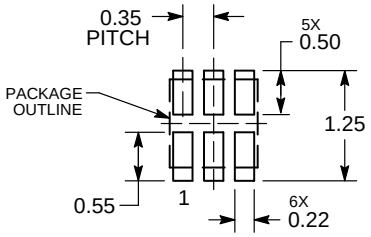
XLLGA6 1.0x1.0, 0.35P
CASE 713AD
ISSUE O



NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994 .
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO THE PLATED TERMINALS AND IS MEASURED BETWEEN 0.15 AND 0.25 MM FROM THE TERMINAL TIPS.
4. COPLANARITY APPLIES TO ALL OF THE TERMINALS.

	MILLIMETERS	
DIM	MIN	MAX
A	−−−	0.40
A1	0.00	0.05
b	0.17	0.23
D	1.00 BSC	
E	1.00 BSC	
e	0.35 BSC	
e2	0.60 BSC	
L	0.27	0.33
L1	0.05 REF	

RECOMMENDED SOLDERING 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.

ON Semiconductor and ON 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 www.onsemi.com/site/pdf/Patent−Marking.pdf. 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 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. 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 as 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 products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor 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 ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor 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
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA
Phone: 303−675−2175 or 800−344−3860 Toll Free USA/Canada
Fax: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800−282−9855 Toll Free USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910

ON Semiconductor Website: **www.onsemi.com**

Order Literature: http://www.onsemi.com/orderlit

For additional information, please contact your local Sales Representative

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Multiplexer Switch ICs ***category:***

Click to view products by ON Semiconductor ***manufacturer:***

Other Similar products are found below :

NLV74HC4066ADR2G HEF4051BP MC74HC4067ADTG DG508AAK/883B NLV14051BDG 016400E PI3V512QE 7705201EC PI2SSD3212NCE NLAS3257CMX2TCG PI5A3157BC6EX PI3DBS12412AZLEX PI3V512QEX PI3DBS16213ZLEX PI3DBS16415ZHEX PS509LEX MUX36S16IRSNR 74LVC1G3157GM-Q10X TC7W53FK,LF CD4053BM96 SN74LV4051APWR TC4066BP-NF HEF4053BT.653 PI3L720ZHEX ADG5408BRUZ-REEL7 ADG1404YRUZ-REEL7 ADG1208YRZ-REEL7 MAX4704EUB+T ADG1406BRUZ-REEL7 CD4053BPWRG4 ADG658TRUZ-EP 74HC4053D.653 74HCT4052PW.118 74LVC2G53DP.125 74HC4052DB.112 74HC4052PW.112 74HC4053DB.112 74HC4067DB.112 74HC4351DB.112 74HCT4052D.112 74HCT4052DB.112 74HCT4053DB.112 74HCT4351D.112 74LV4051PW.112 FSA1256L8X_F113 PI5V330QE PI5V331QE 5962-8771601EA 5962-87716022A ADG5249FBRUZ