



Is Now Part of



ON Semiconductor®

To learn more about ON Semiconductor, please visit our website at
www.onsemi.com

ON Semiconductor and the ON Semiconductor logo 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.

NC7WB3125

2-Bit Low Power Bus Switch

General Description

The NC7WB3125 is a 2-bit ultra high-speed CMOS FET bus switch with TTL-compatible active LOW control inputs. The low On Resistance of the switch allows inputs to be connected to outputs with minimal propagation delay and without generating additional ground bounce noise. The device is organized as a 2-bit switch with independent bus enable (\overline{OE}) controls. When \overline{OE} is LOW, the switch is ON and Port A is connected to Port B. When \overline{OE} is HIGH, the switch is OPEN and a high-impedance state exists between the two ports. Control inputs tolerate voltages up to 5.5V independent of V_{CC} .

Features

- Space saving US8 surface mount package
- MicroPak™ Pb-Free leadless package
- Typical 3Ω switch resistance at 5.0V V_{CC}
- Minimal propagation delay through the switch
- Power down high impedance input/output
- Zero bounce in flow through mode
- TTL compatible active LOW control inputs
- Control inputs are overvoltage tolerant
- Bus switch replacement for Logic x125 part

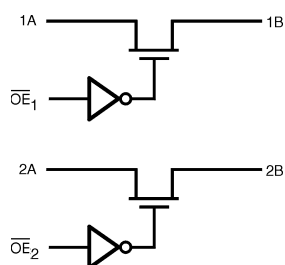
Ordering Code:

Order Number	Package Number	Product Code Top Mark	Package Description	Supplied As
NC7WB3125K8X	MAB08A	WB25	8-Lead US8, JEDEC MO-187, Variation CA 3.1mm Wide	3k Units on Tape and Reel
NC7WB3125L8X (Preliminary)	MAC08A	T4	Pb-Free 8-Lead MicroPak, 1.6 mm Wide	5k Units on Tape and Reel

Pb-Free package per JEDEC J-STD-020B.

MircoPak™ is a trademark of Fairchild Semiconductor Corporation.

Logic Diagram



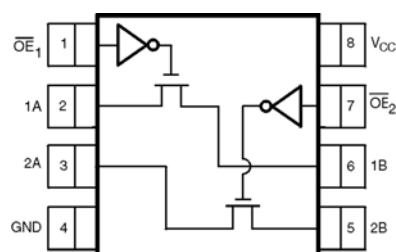
Pin Descriptions

Pin Name	Description
A	Bus A
B	Bus B
OE	Bus Enable Input

Function Table

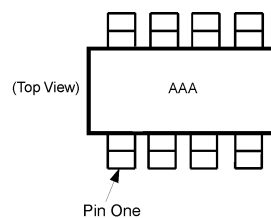
Bus Enable Input OE	Function
L	B Connected to A
H	Disconnected

Connection Diagrams



(Top View)

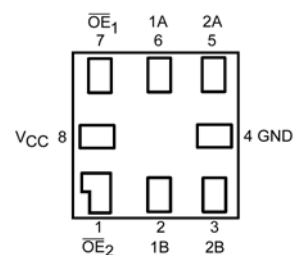
Pin One Orientation Diagram



AAA represents Product Code Top Mark - see ordering code

Note: Orientation of Top Mark determines Pin One location. Read the top product code mark left to right, Pin One is the lower left pin (see diagram).

Pad Assignments for MicroPak



(Top Through View)

Absolute Maximum Ratings(Note 1)

Supply Voltage (V_{CC})	-0.5V to +7.0V
DC Switch Voltage (V_S)	-0.5V to +7.0V
DC Output Voltage (V_{IN}) (Note 2)	-0.5V to +7.0V
DC Input Diode Current	
(I_{IK}) $V_{IN} < 0V$	-50 mA
DC Output (I_{OUT}) Current	128 mA
DC V_{CC} or Ground Current	
(I_{CC}/I_{GND})	± 100 mA
Storage Temperature Range (T_{STG})	-65°C to +150°C
Junction Temperature under Bias (T_J)	+150°C
Junction Lead Temperature (T_L)	
(Soldering, 10 Seconds)	+260°C
Power Dissipation (P_D) @ +85°C	250 mW

Recommended Operating Conditions (Note 3)

Supply Operating (V_{CC})	4.0V to 5.5V
Control Input Voltage (V_{IN})	0V to 5.5V
Switch Input Voltage (V_{IN})	0V to 5.5V
Output Voltage (V_{OUT})	0V to 5.5V
Operating Temperature (T_A)	-40°C to +85°C
Input Rise and Fall Time (t_r, t_f)	
Switch Control Input	0 ns/V to 5 ns
Switch I/O	0 ns/V to DC
Thermal Resistance (θ_{JA})	250°C/W

Note 1: The "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the Electrical Characteristics tables are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

Note 2: The input and output negative voltage ratings may be exceeded if the input and output diode current ratings are observed.

Note 3: Unused logic inputs must be held HIGH or LOW. They may not float.

DC Electrical Characteristics

Symbol	Parameter	V_{CC} (V)	$T_A = -40^\circ\text{C to } +85^\circ\text{C}$			Units	Conditions
			Min	Typ	Max		
V_{IK}	Clamp Diode Voltage	4.5			-1.2	V	$I_{IN} = -18$ mA
V_{IH}	HIGH Level Input Voltage	4.0 to 5.5	2.0			V	
V_{IL}	LOW Level Input Voltage	4.0 to 5.5			0.8	V	
V_{OH}	HIGH Level Output Voltage	4.0 to 5.5	See Figure 3			V	$V_{IN} = V_{CC}$
I_{IN}	Input Leakage Current	5.5			± 1.0	μA	$0 \leq V_{IN} \leq 5.5V$
I_{OFF}	Switch OFF Leakage Current	5.5			± 1.0	μA	$0 \leq A, B \leq V_{CC}$
R_{ON}	Switch On Resistance (Note 4)	4.5		3.0	7.0	Ω	$V_{IN} = 0V, I_{IN} = 64$ mA
		4.5		3.0	7.0		$V_{IN} = 0V, I_{IN} = 30$ mA
		4.5		6.0	15.0		$V_{IN} = 2.4V, I_{IN} = 15$ mA
		4.0		10.0	20.0		$V_{IN} = 2.4V, I_{IN} = 15$ mA
I_{CC}	Quiescent Supply Current	5.5		3.0		μA	$V_{IN} = V_{CC}$ or GND $I_{OUT} = 0$
ΔI_{CC}	Increase in I_{CC} per Input (Note 5)	5.5		1.0	2.5	mA	$V_{IN} = 3.4V$, One \overline{OE} Input only, Other $\overline{OE} = V_{CC}$

Note 4: Measured by the voltage drop between A and B pins at the indicated current through the switch. On Resistance is determined by the lower of the voltages on the two (A or B) pins.

Note 5: Per TTL driven input ($V_{IN} = 3.4V$, control input only). A and B pins do not contribute to I_{CC} .

AC Electrical Characteristics

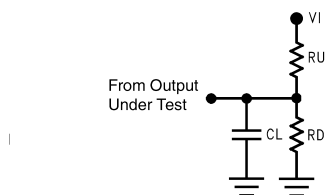
Symbol	Parameter	V _{CC} (V)	T _A = -40°C to +85°C, C _L = 50 pF, R _U = R _D = 500Ω			Units	Conditions	Figure Number
			Min	Typ	Max			
t _{PHL} , t _{PLH}	Propagation Delay Bus-to-Bus (Note 6)	4.0 to 5.5			0.25	ns	V _I = OPEN	Figures 1, 2
t _{PZL} , t _{PZH}	Output Enable Time	4.5 to 5.5 4.0	0.8 0.8	2.5 3.0	4.2 4.6	ns	V _I = 7V for t _{PZL} V _I = 0V for t _{PZH}	Figures 1, 2
t _{PLZ} , t _{PHZ}	Output Disable Time	4.5 to 5.5 4.0	0.8 0.8	3.1 2.9	4.8 4.4	ns	V _I = 7V for t _{PLZ} V _I = 0V for t _{PHZ}	Figures 1, 2

Note 6: This parameter is guaranteed by design. The bus switch contributes no propagation delay other than the RC delay of the typical On Resistance of the switch and the 50 pF load capacitance, when driven by an ideal voltage source (zero output impedance). The specified limit is calculated on this basis.

Capacitance

Symbol	Parameter	Typ	Max	Units	Conditions
C _{IN}	Control Pin Input Capacitance	2.5		pF	V _{CC} = 0V
C _{I/O} (OFF)	Port Off Capacitance	6.0		pF	V _{CC} = 5.0V = \overline{OE}
C _{I/O} (ON)	Switch ON Capacitance	12.0		pF	V _{CC} = 5.0V, \overline{OE} = 0V

AC Loading and Waveforms



Input driven by 50Ω source terminated in 50Ω

C_L includes load and stray capacitance

Input PRR = 1.0 MHz; t_W = 500 ns

FIGURE 1. AC Test Circuit

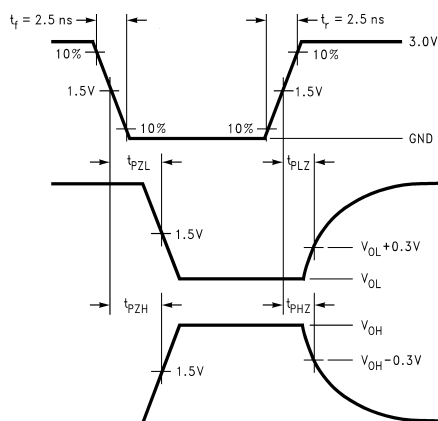
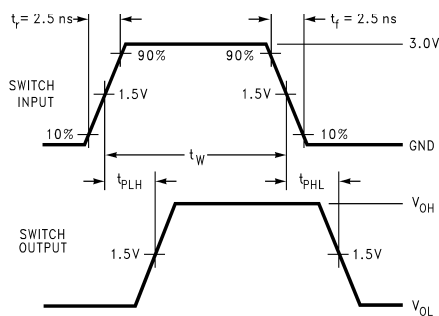


FIGURE 2. AC Waveforms

DC Characteristics

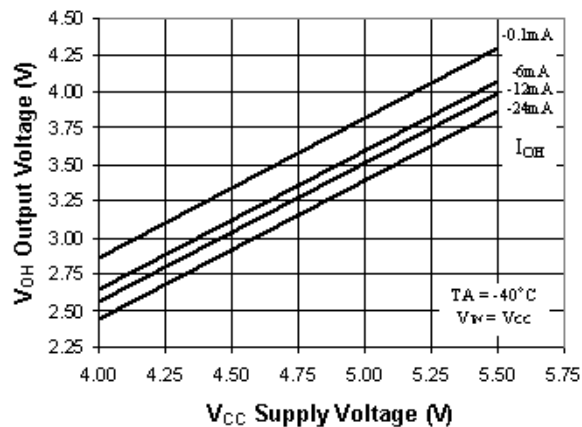
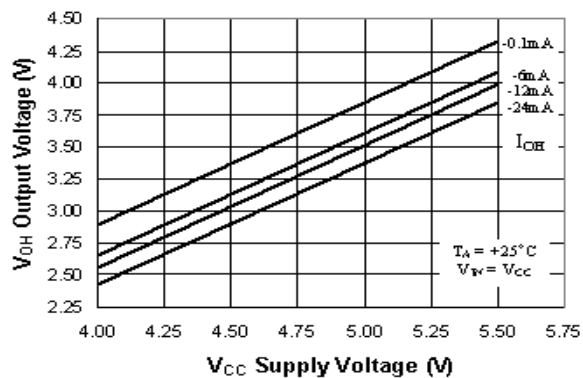
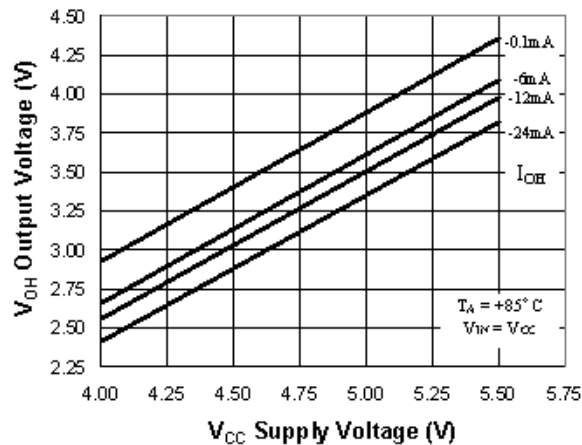
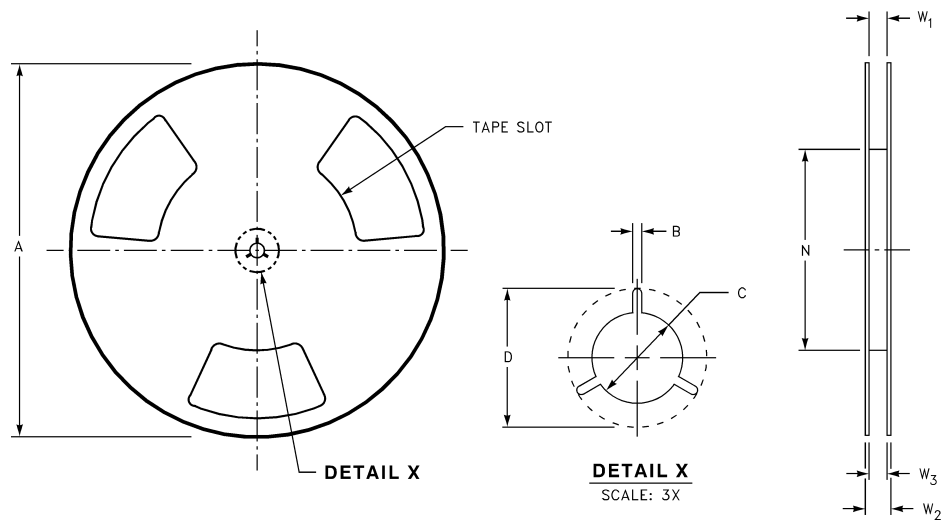


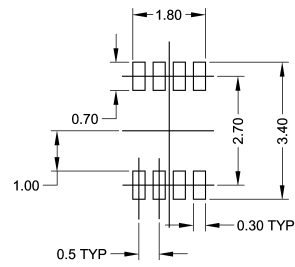
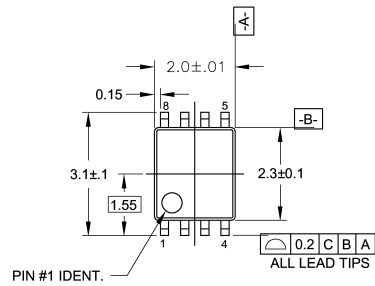
FIGURE 3. Typical High Level Output Voltage vs. Supply Voltage

REEL DIMENSIONS inches (millimeters)

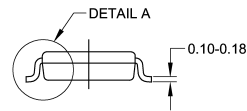
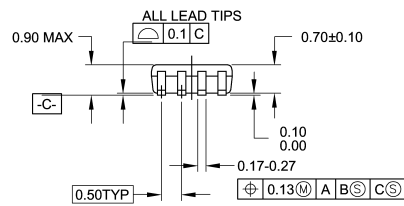


Tape Size	A	B	C	D	N	W1	W2	W3
8 mm	7.0 (177.8)	0.059 (1.50)	0.512 (13.00)	0.795 (20.20)	2.165 (55.00)	0.331 + 0.059/-0.000 (8.40 + 1.50/-0.00)	0.567 (14.40)	W1 + 0.078/-0.039 (W1 + 2.00/-1.00)

Physical Dimensions inches (millimeters) unless otherwise noted

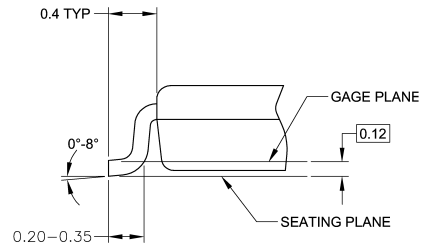


LAND PATTERN RECOMMENDATION



NOTES:

- A. CONFORMS TO JEDEC REGISTRATION MO-187
- B. DIMENSIONS ARE IN MILLIMETERS.
- C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.
- D. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M, 1982.

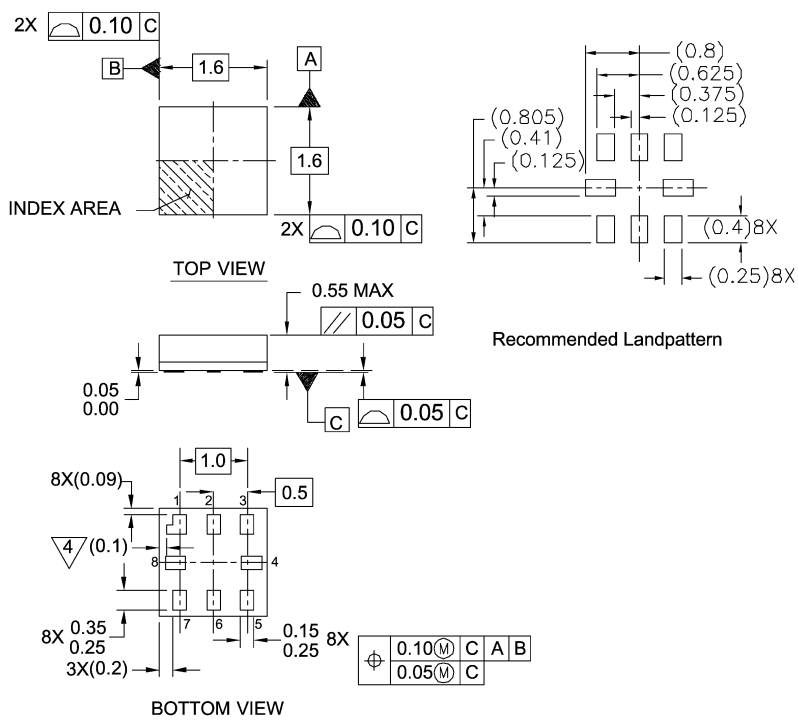


DETAIL A

MAB08AREVC

**8-Lead US8, JEDEC MO-187, Variation CA 3.1mm Wide
Package Number MAB08A**

Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



Notes:

1. PACKAGE CONFORMS TO JEDEC MO-255 VARIATION UAAD
2. DIMENSIONS ARE IN MILLIMETERS
3. DRAWING CONFORMS TO ASME Y.14M-1994
4. PIN 1 FLAG, END OF PACKAGE OFFSET.

MAC08AREVC

Pb-Free 8-Lead MicroPak, 1.6 mm Wide
Package Number MAC08A

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION

As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use


provided in the labeling, can be reasonably expected to result in significant injury to the user.

2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

PRODUCT STATUS DEFINITIONS

Definition of terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	This datasheet contains preliminary data, and supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild Semiconductor. The datasheet is printed for reference information only.

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 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

Japan Customer Focus Center
Phone: 81-3-5817-1050

ON Semiconductor Website: www.onsemi.com

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

For additional information, please contact your local
Sales Representative