# 4-B F Adder

The MC14008B 4-bit full adder is constructed with MOS P-Channel and N-Channel enhancement mode devices in a single monolithic structure. This device consists of four full adders with fast internal look-ahead carry output. It is useful in binary addition and other arithmetic applications. The fast parallel carry output bit allows high-speed operation when used with other adders in a system.

## Features

- Look-Ahead Carry Output
- Diode Protection on All Inputs
- All Outputs Buffered
- Supply Voltage Range = 3.0 Vdc to 18 Vdc
- Capable of Driving Two Low–Power TTL Loads or One Low–Power Schottky TTL Load Over the Rated Temperature Range
- Pin-for-Pin Replacement for CD4008B
- This Device is Pb-Free and is RoHS Compliant

## MAXIMUM RATINGS (Voltages Referenced to VSS)

Symbol	Parameter	Value	Unit
V <sub>DD</sub>	DC Supply Voltage Range	-0.5 to +18.0	V
V <sub>in</sub> , V <sub>out</sub>	Input or Output Voltage Range (DC or Transient)	–0.5 to V <sub>DD</sub> + 0.5	V
I <sub>in</sub> , I <sub>out</sub>	Input or Output Current (DC or Transient) per Pin	±10	mA
PD	Power Dissipation, per Package (Note 1)	500	mW
T <sub>A</sub>	Ambient Temperature Range	-55 to +125	°C
T <sub>stg</sub>	Storage Temperature Range	-65 to +150	°C
TL	Lead Temperature (8–Second Soldering)	260	°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.

1. Temperature Derating: "D/DW" Package: -7.0 mW/°C From 65°C To 125°C

This device contains protection circuitry to guard against damage due to high static voltages or electric fields. However, precautions must be taken to avoid applications of any voltage higher than maximum rated voltages to this high–impedance circuit. For proper operation,  $V_{in}$  and  $V_{out}$  should be constrained to the range  $V_{SS} \leq (V_{in} \text{ or } V_{out}) \leq V_{DD}.$ 

Unused inputs must always be tied to an appropriate logic voltage level (e.g., either  $V_{SS}$  or  $V_{DD}$ ). Unused outputs must be left open.

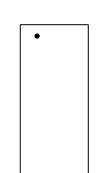


A STAR SEC DAMAGE

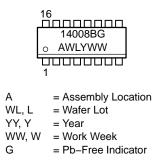
### http://onsemi.com



CASE 751B



#### MARKING DIAGRAM



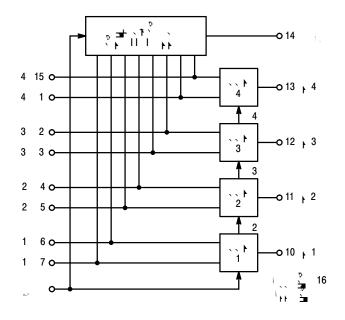
#### **ORDERING INFORMATION**

See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

# MC14008B

## TRUTH TABLE





# MC14008B

ELECTRICAL CHARACTERISTICS	<b>3</b> (Voltages Referenced to V <sub>SS</sub> )
----------------------------	--

				–55°C		25°C			125°C		
Characteristic		Symbol	V <sub>DD</sub> Vdc	Min	Max	Min	Typ (Note 2)	Max	Min	Max	Unit
Output Voltage $V_{in} = V_{DD} \text{ or } 0$	"0" Level	V <sub>OL</sub>	5.0 10 15	- - -	0.05 0.05 0.05	- - -	0 0 0	0.05 0.05 0.05	- - -	0.05 0.05 0.05	Vdc
$V_{in} = 0 \text{ or } V_{DD}$	"1" Level	V <sub>OH</sub>	5.0 10 15	4.95 9.95 14.95	- - -	4.95 9.95 14.95	5.0 10 15		4.95 9.95 14.95	_ _ _	Vdc
	"0" Level	V <sub>IL</sub>	5.0 10 15	_ _ _	1.5 3.0 4.0	_ _ _	2.25 4.50 6.75	1.5 3.0 4.0	_ _ _	1.5 3.0 4.0	Vdc
$(V_O = 0.5 \text{ or } 4.5 \text{ Vdc})$ $(V_O = 1.0 \text{ or } 9.0 \text{ Vdc})$ $(V_O = 1.5 \text{ or } 13.5 \text{ Vdc})$	"1" Level	V <sub>IH</sub>	5.0 10 15	3.5 7.0 11	- - -	3.5 7.0 11	2.75 5.50 8.25	- -	3.5 7.0 11	- - -	Vdc
$\begin{array}{l} \text{Output Drive Current} \\ (\text{V}_{\text{OH}} = 2.5 \ \text{Vdc}) \\ (\text{V}_{\text{OH}} = 4.6 \ \text{Vdc}) \\ (\text{V}_{\text{OH}} = 9.5 \ \text{Vdc}) \\ (\text{V}_{\text{OH}} = 13.5 \ \text{Vdc}) \end{array}$	Source	I <sub>OH</sub>	5.0 5.0 10 15	-3.0 -0.64 -1.6 -4.2	- - -	-2.4 -0.51 -1.3 -3.4	-4.2 -0.88 -2.25 -8.8	- - -	-1.7 -0.36 -0.9 -2.4	- - - -	mAdc
(V <sub>OL</sub> = 0.4 Vdc) (V <sub>OL</sub> = 0.5 Vdc) (V <sub>OL</sub> = 1.5 Vdc)	Sink	I <sub>OL</sub>	5.0 10 15	0.64 1.6 4.2	- - -	0.51 1.3 3.4	0.88 2.25 8.8		0.36 0.9 2.4	_ _ _	mAdc
Input Current		l <sub>in</sub>	15	-	±0.1	-	±0.00001	±0.1	-	±1.0	μAdc
Input Capacitance (V <sub>in</sub> = 0)		C <sub>in</sub>	_	-	_	-	5.0	7.5	-	-	pF
Quiescent Current (Per Package)		I <sub>DD</sub>	5.0 10 15	- - -	5.0 10 20	- - -	0.005 0.010 0.015	5.0 10 20	_ _ _	150 300 600	μAdc
Total Supply Current (Note (Dynamic plus Quiesce Per Package) (C <sub>L</sub> = 50 pF on all outp buffers switching)	Γ	5.0 10 15			I <sub>T</sub> = (3	1.7 μΑ/kHz) f 3.4 μΑ/kHz) f 5.0 μΑ/kHz) f	+ I <sub>DD</sub> + I <sub>DD</sub>			μAdc	

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.

Data labelled "Typ" is not to be used for design purposes but is intended as an indication of the IC's potential performance.
The formulas given are for the typical characteristics only at 25°C.
To calculate total supply current at loads other than 50 pF:

 $I_T(C_L) = I_T(50 \text{ pF}) + (C_L - 50) \text{ Vfk}$ 

where: I<sub>T</sub> is in  $\mu$ A (per package), C<sub>L</sub> in pF, V = (V<sub>DD</sub> - V<sub>SS</sub>) in volts, f in kHz is input frequency, and k = 0.005.

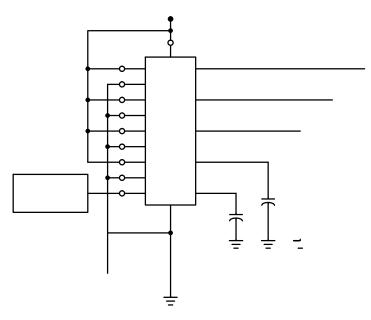


Figure 3. Dynamic Power Dissipation Test Circuit and Waveform

# MC14008B

\_

0

Figure 5. Logic Diagram

SOIC-16 9.90x3.90x1.50 1.27P CASE 751B ISSUE L

#### SOIC-16 9.90x3.90x1.50 1.27P CASE 751B ISSUE L

## GENERIC MARKING DIAGRAM\*

16	H	H	A	H.	H.	-A	A	E
		XXX	XX)	XX)	XX)	XX)	XX	G
		XX	XX	XX	XX	XX	XX)	хI
	0		A	WĽ	YW	/W		
1	Έ	H	Н	Н	Н	Н	H	Ъ

XXXXX = Specific Device Code

A = Assembly Location

- WL = Wafer Lot
- Y = Year
- WW = Work Week
- G = Pb–Free Package

\*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.

S,	1: 2. BAS 3. 4. C C 5. 6. BAS 7. C C 9. BAS 10. 11. C C 13. BAS 14. C C 15. 16. C C	S 2: 1. CA 2. A 3. C 4. CA 5. CA 6. C 7. A 8. CA 9. CA 10. A 11. C 12. CA 13. CA 13. CA 14. C 15. A 16. CA	s C C C	3: $S$ 1. C C , #1 2. BAS, #1 3. , #1 4. C C , #1 5. C C , #2 6. BAS, #2 7. , #2 8. C C , #2 9. C C , #3 10. BAS, #3 11. , #3 12. C C , #4 14. BAS, #4 15. , 44 15. , 44	4: 1. C C , #1 2. C C , #2 4. C C , #2 5. C C , #3 6. C C , #3 7. C C , #4 8. C C , #4 9. BAS , #4 10. , #4 11. BAS , #3 12. , #3 13. BAS , #2 14. , #2 15. BAS , #1 16. , #1
S	5: A, #1 2. A, #1 3. A, #2 4. A, #2 5. A, #3 6. A, #3 6. A, #4 9. A, #4 9. A, #4 10. S, C, #4 11. A, #3 12. S, C, #3 13. A, #1 14. S, C, #2 15. A, #1 16. S, C, #1 16. S, C, #1	S 6: 1. CA 2. CA 3. CA 4. CA 5. CA 6. CA 7. CA 8. CA 9. A 10. A 11. A 12. A 13. A 14. A 15. A 16. A	S.	7:	

DOCUMENT NUMBER:	98ASB42566B Electronic versions are uncontrolled except when accessed directly from the Document Repositor Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.				
DESCRIPTION:	SOIC-16 9.90X3.90X1.50 1.27P		PAGE 2 OF 2		

onsemi and ONSEMI are trademarks of Semiconductor Components Industries, LLC dba onsemi or its subsidiaries in the United States and/or other countries. onsemi reserves the right to make changes without further notice to any products herein. onsemi makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does onsemi assume any liability arising out of the application or use of any product, consequential or incidental damages. onsemi does not convey any license under its patent rights nor the rights of others.

onsemi, , and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "onsemi" or its affiliates and/or subsidiaries in the United States and/or other countries. onsemi owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of onsemi's product/patent coverage may be accessed at <a href="http://www.onsemi.com/site/pdf/Patent-Marking.pdf">www.onsemi.com/site/pdf/Patent-Marking.pdf</a>. Onsemi reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and onsemi makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does onsemi assume any liability arising out of the application or use of any product or incruit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using onsemi