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## 74AC86

### Quad 2-Input Exclusive-OR Gate

#### General Description

The AC86 contains four, 2-input exclusive-OR gates.

#### Features

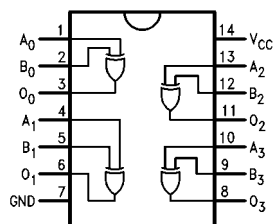
- $I_{CC}$  reduced by 50%
- Outputs source/sink 24 mA

#### Ordering Code:

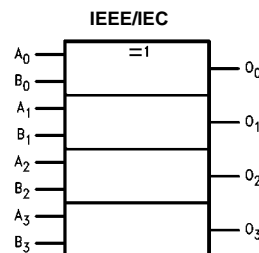
Order Number	Package Number	Package Description
74AC86SC	M14A	14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
74AC86SJ	M14D	Pb-Free 14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
74AC86MTC	MTC14	14-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide
74AC86PC	N14A	14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide

Device also available in Tape and Reel. Specify by appending suffix letter "X" to the ordering code.  
Pb-Free package per JEDEC J-STD-020B.

#### Connection Diagram



#### Logic Symbol



#### Pin Descriptions

Pin Names	Description
A <sub>0</sub> -A <sub>3</sub>	Inputs
B <sub>0</sub> -B <sub>3</sub>	Inputs
O <sub>0</sub> -O <sub>3</sub>	Outputs

**Absolute Maximum Ratings**(Note 1)

Supply Voltage ( $V_{CC}$ )	-0.5V to +7.0V
DC Input Diode Current ( $I_{IK}$ )	
$V_I = 0.5V$	-20 mA
$V_I = V_{CC} + 0.5V$	+20 mA
DC Input Voltage ( $V_I$ )	-0.5V to $V_{CC} + 0.5V$
DC Output Diode Current ( $I_{OK}$ )	
$V_O = -0.5V$	-20 mA
$V_O = V_{CC} + 0.5V$	+20 mA
DC Output Voltage ( $V_O$ )	-0.5V to $V_{CC} + 0.5V$
DC Output Source or Sink Current ( $I_O$ )	$\pm 50$ mA
DC $V_{CC}$ or Ground Current	
Per Output Pin ( $I_{CC}$ or $I_{GND}$ )	$\pm 50$ mA
Storage Temperature ( $T_{STG}$ )	-65°C to +150°C
Junction Temperature ( $T_J$ )	
PDIP	140°C

**Recommended Operating Conditions**

Supply Voltage ( $V_{CC}$ )	2.0V to 6.0V
Input Voltage ( $V_I$ )	0V to $V_{CC}$
Output Voltage ( $V_O$ )	0V to $V_{CC}$
Operating Temperature ( $T_A$ )	-40°C to +85°C
Minimum Input Edge Rate ( $\Delta V/\Delta t$ )	125 mV/ns
$V_{IN}$ from 30% to 70% of $V_{CC}$	
$V_{CC}$ @ 3.3V, 4.5V, 5.5V	

**Note 1:** Absolute maximum ratings are those values beyond which damage to the device may occur. The databook specifications should be met, without exception, to ensure that the system design is reliable over its power supply, temperature, and output/input loading variables. Fairchild does not recommend operation of FACT™ circuits outside databook specifications.

**DC Electrical Characteristics**

Symbol	Parameter	V <sub>CC</sub> (V)	T <sub>A</sub> = 25°C		T <sub>A</sub> = -40°C to +85°C	Units	Conditions				
			Typ	Guaranteed Limits							
V <sub>IH</sub>	Minimum HIGH Level Input Voltage	3.0	1.5	2.1	2.1	V	V <sub>OUT</sub> = 0.1V or V <sub>CC</sub> - 0.1V				
		4.5	2.25	3.15	3.15						
		5.5	2.75	3.85	3.85						
V <sub>IL</sub>	Maximum LOW Level Input Voltage	3.0	1.5	0.9	0.9	V	V <sub>OUT</sub> = 0.1V or V <sub>CC</sub> - 0.1V				
		4.5	2.25	1.35	1.35						
		5.5	2.75	1.65	1.65						
V <sub>OH</sub>	Minimum HIGH Level Output Voltage	3.0	2.99	2.9	2.9	V	I <sub>OUT</sub> = -50 μA				
		4.5	4.49	4.4	4.4						
		5.5	5.49	5.4	5.4						
		3.0		2.56	2.46	V	V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> I <sub>OH</sub> = -12 mA I <sub>OH</sub> = -24 mA I <sub>OH</sub> = -24 mA (Note 2)				
		4.5		3.86	3.76						
		5.5		4.86	4.76						
		V <sub>OL</sub>	Maximum LOW Level Output Voltage	3.0	0.002			0.1	0.1	V	I <sub>OUT</sub> = 50 μA
				4.5	0.001			0.1	0.1		
				5.5	0.001			0.1	0.1		
	3.0			0.36	0.44	V	V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> I <sub>OL</sub> = 12 mA I <sub>OL</sub> = 24 mA I <sub>OL</sub> = 24 mA (Note 2)				
	4.5		0.36	0.44							
	5.5		0.36	0.44							
	I <sub>IN</sub> (Note 4)	Maximum Input Leakage Current	5.5		±0.1			±1.0	μA	V <sub>I</sub> = V <sub>CC</sub> , GND	
I <sub>OLD</sub>	Minimum Dynamic	5.5			75	mA	V <sub>OLD</sub> = 1.65V Max				
I <sub>OHD</sub>	Output Current (Note 3)	5.5			-75	mA	V <sub>OHD</sub> = 3.85V Min				
I <sub>CC</sub> (Note 4)	Maximum Quiescent Supply Current	5.5		2.0	20.0	μA	V <sub>IN</sub> = V <sub>CC</sub> or GND				

**Note 2:** All outputs loaded; thresholds on input associated with output under test.

**Note 3:** Maximum test duration 20 ms, one output loaded at a time.

**Note 4:**  $I_{IN}$  and  $I_{CC}$  @ 3.0V are guaranteed to be less than or equal to the respective limit @ 5.5V  $V_{CC}$ .

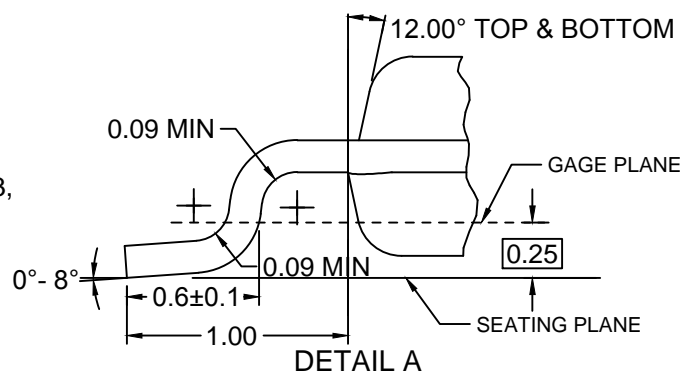
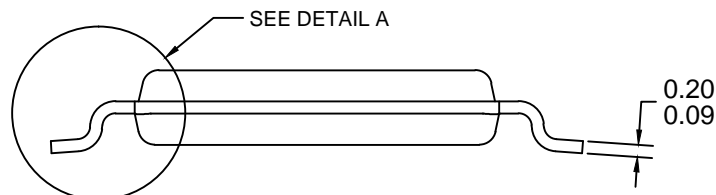
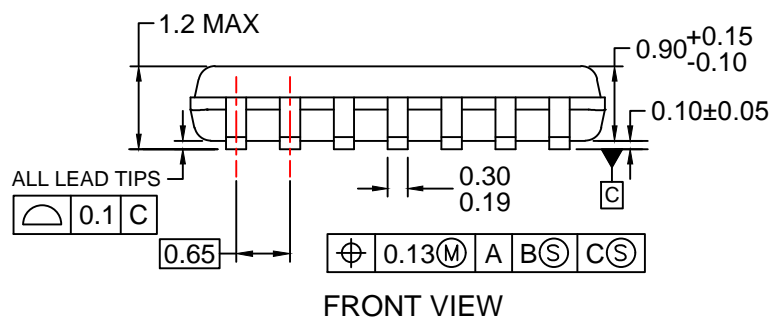
**AC Electrical Characteristics**

Symbol	Parameter	V <sub>CC</sub> (V) (Note 5)	T <sub>A</sub> = +25°C C <sub>L</sub> = 50 pF			T <sub>A</sub> = -40°C to +85°C C <sub>L</sub> 40 pF		Units
			Min	Typ	Max	Min	Max	
t <sub>PHL</sub>	Propagation Delay	3.3	2.0	6.0	11.5	1.5	12.5	ns
	Inputs to Outputs	5.0	1.5	4.5	8.5	1.0	9.5	
t <sub>PLH</sub>	Propagation Delay	3.3	2.0	6.5	11.5	1.5	12.5	ns
	Inputs to Outputs	5.0	1.5	4.5	8.5	1.0	9.0	

**Note 5:** Voltage Range 3.3V is 3.3V ± 0.3V  
Voltage Range 5.0V is 5.0V ± 0.5V

**Capacitance**

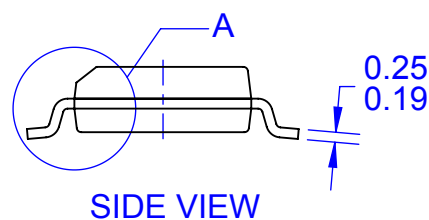
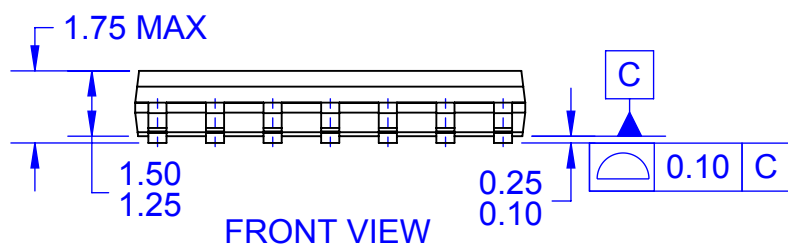
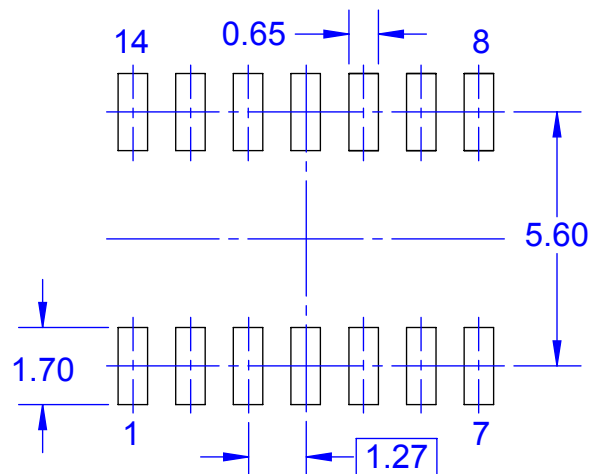
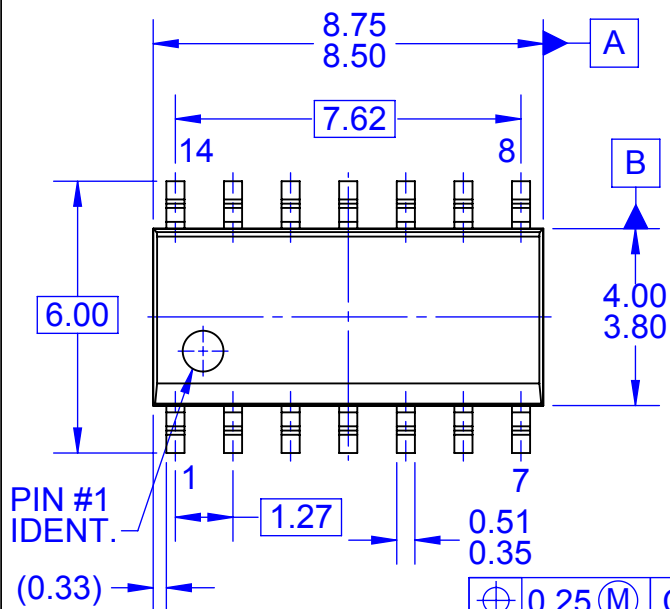
Symbol	Parameter	Typ	Units	Conditions
C <sub>IN</sub>	Input Capacitance	4.5	pF	V <sub>CC</sub> = OPEN
C <sub>PD</sub>	Power Dissipation Capacitance	35	pF	V <sub>CC</sub> = 5.0V



#### NOTES:

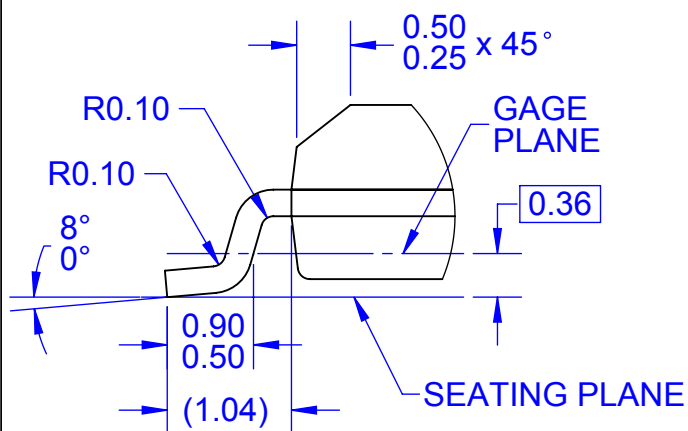
- CONFORMS TO JEDEC REGISTRATION MO-153, VARIATION AB, REF NOTE 6
- DIMENSIONS ARE IN MILLIMETERS.
- DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS
- DIMENSIONING AND TOLERANCES PER ANSI Y14.5M, 2009.
- LANDPATTERN STANDARD: SOP65P640X110-14M.
- DRAWING FILE NAME: MKT-MTC14rev7.





#### NOTES:

- A. CONFORMS TO JEDEC MS-012, VARIATION AB, ISSUE C
- B. ALL DIMENSIONS ARE IN MILLIMETERS
- C. DIMENSIONS DO NOT INCLUDE MOLD FLASH OR BURRS
- D. LAND PATTERN STANDARD: SOIC127P600X145-14M
- E. CONFORMS TO ASME Y14.5M, 2009
- D. DRAWING FILENAME: MKT-M14Arev14



DETAIL A  
SCALE 16 : 1



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