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September 1988 Revised February 2005

74AC86

Quad 2-Input Exclusive-OR Gate

General Description

Features

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

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

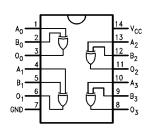
Ordering Code:

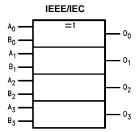
Order Nun	nber	Package Number	Package Description
74AC86S	С	M14A	14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
74AC86S	J	M14D	Pb-Free 14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
74AC86M	ITC	MTC14	14-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide
74AC86P	C	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 ₀ -A ₃	Inputs
B ₀ -B ₃	Inputs
O ₀ –O ₃	Outputs

FACT™ is a trademark of Fairchild Semiconductor Corporation.

Absolute Maximum Ratings(Note 1)

-0.5V to +7.0V Supply Voltage (V_{CC})

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})

 $V_0 = -0.5V$ -20 mA $V_O = V_{CC} + 0.5V$ +20 mA

DC Output Voltage (V_O) -0.5V to V_{CC} +0.5V \pm 50 mA

DC Output Source or Sink Current (I_O)

DC V_{CC} or Ground Current

Per Output Pin (I_{CC} or I_{GND}) ± 50 mA Storage Temperature (T_{STG}) -65°C to $+150^{\circ}\text{C}$

Junction Temperature (T_J)

PDIP 140°C

Recommended Operating Conditions

Supply Voltage (V_{CC}) 2.0V to 6.0V 0V to V_{CC} Input Voltage (V_I) 0V to $V_{\mbox{\footnotesize CC}}$ Output Voltage (V_O) Operating Temperature (T_A) -40°C to +85°C Minimum Input Edge Rate $(\Delta V/\Delta t)$ 125 mV/ns

 $V_{\mbox{\scriptsize IN}}$ from 30% to 70% of $V_{\mbox{\scriptsize CC}}$ 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 _{CC}	, , , , , , , , , , , , , , , , , , ,		$T_A = -40^{\circ}C \text{ to } +85^{\circ}C$	Units	Conditions
Syllibol	Farameter	(V)			Ullits	Conditions	
V _{IH}	Minimum HIGH Level	3.0	1.5	2.1	2.1		V _{OUT} = 0.1V
	Input Voltage	4.5	2.25	3.15	3.15	V	or V _{CC} = 0.1V
		5.5	2.75	3.85	3.85		
V _{IL}	Maximum LOW Level	3.0	1.5	0.9	0.9		V _{OUT} = 0.1V
	Input Voltage	4.5	2.25	1.35	1.35	V	or V _{CC} – 0.1V
		5.5	2.75	1.65	1.65		
V _{OH}	Minimum HIGH Level	3.0	2.99	2.9	2.9		
	Output Voltage	4.5	4.49	4.4	4.4	V	I _{OUT} = -50 μA
		5.5	5.49	5.4	5.4		
							V _{IN} = V _{IL} or V _{IH}
		3.0		2.56	2.46		I _{OH} = -12 mA
		4.5		3.86	3.76	V	I _{OH} = -24 mA
		5.5		4.86	4.76		I _{OH} = -24 mA (Note 2)
V _{OL}	Maximum LOW Level	3.0	0.002	0.1	0.1		
	Output Voltage	4.5	0.001	0.1	0.1	V	I _{OUT} = 50 μA
		5.5	0.001	0.1	0.1		
							$V_{IN} = V_{IL}$ or V_{IH}
		3.0		0.36	0.44		I _{OL} = 12 mA
		4.5		0.36	0.44	V	I _{OL} = 24 mA
		5.5		0.36	0.44		I _{OL} = 24 mA (Note 2)
I _{IN} (Note 4)	Maximum Input Leakage Current	5.5		±0.1	±1.0	μА	$V_I = V_{CC}$, GND
I _{OLD}	Minimum Dynamic	5.5			75	mA	V _{OLD} = 1.65V Max
I _{OHD}	Output Current (Note 3)	5.5			-75	mA	V _{OHD} = 3.85V Min
I _{CC} (Note 4)	Maximum Quiescent Supply Current	5.5		2.0	20.0	μА	V _{IN} = V _{CC} 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 $_{\rm IN}$ and I $_{\rm CC}$ @ 3.0V are guaranteed to be less than or equal to the respective limit @ 5.5V V $_{\rm CC}$.

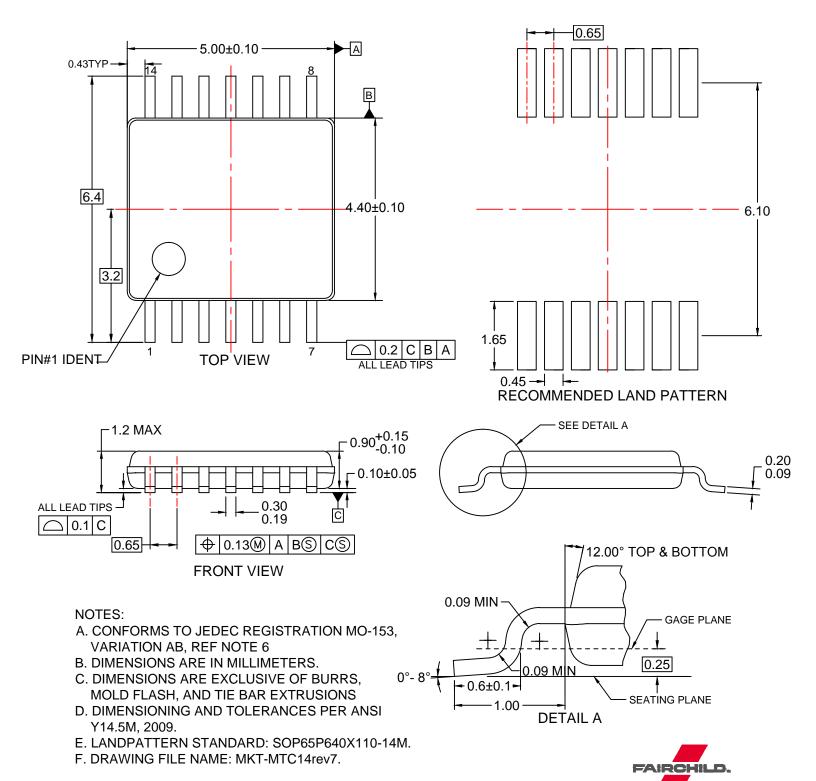
AC Electrical Characteristics

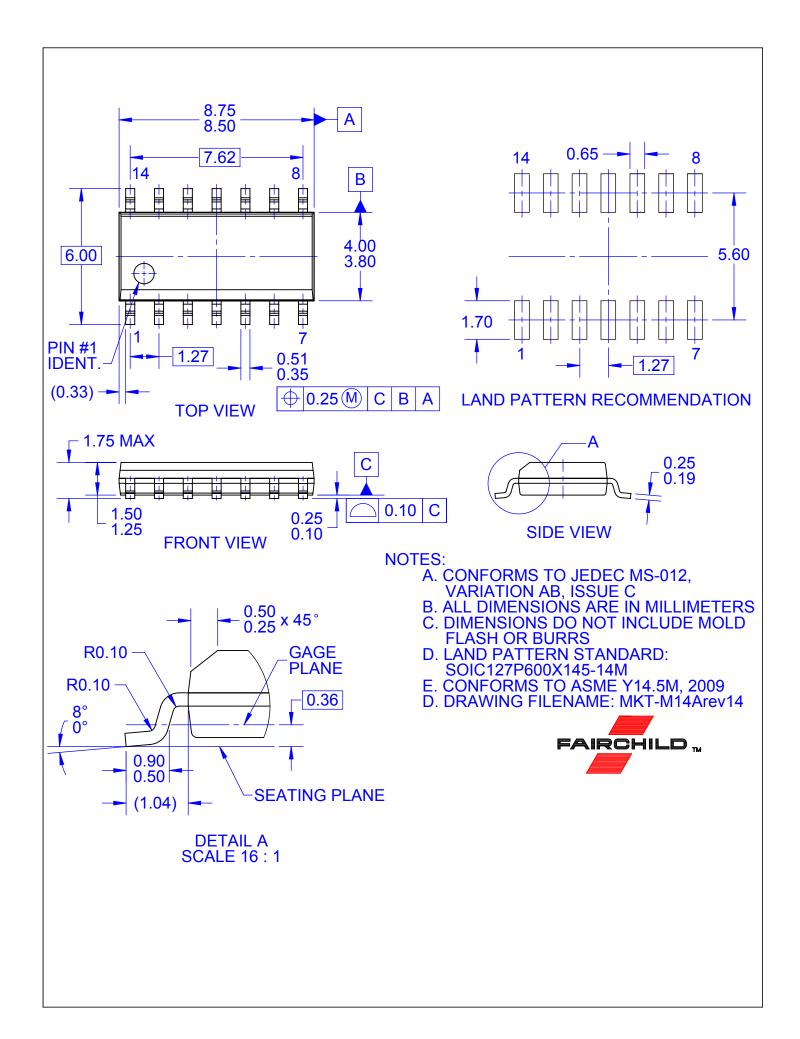
		V _{CC}	$T_A = +25^{\circ}C$			$T_A = -40^{\circ}C \text{ to } +85^{\circ}C$		
Symbol	Parameter	(V)	C _L = 50 pF			C _L 40 pF		Units
		(Note 5)	Min	Тур	Max	Min	Max	
t _{PHL}	Propagation Delay	3.3	2.0	6.0	11.5	1.5	12.5	ns
	Inputs to Outputs	5.0	1.5	4.5	8.5	1.0	9.5	115
t _{PLH}	Propagation Delay	3.3	2.0	6.5	11.5	1.5	12.5	ns
	Inputs to Outputs	5.0	1.5	4.5	8.5	1.0	9.0	115

Note 5: Voltage Range 3.3V is $3.3V \pm 0.3V$ Voltage Range 5.0V is $5.0V \pm 0.5V$

Capacitance

Symbol	Parameter	Тур	Units	Conditions
C _{IN}	Input Capacitance	4.5	pF	V _{CC} = OPEN
C _{PD}	Power Dissipation Capacitance	35	pF	V _{CC} = 5.0V





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