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74AC86

Quad 2-Input Exclusive-OR Gate

General Description

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

Features

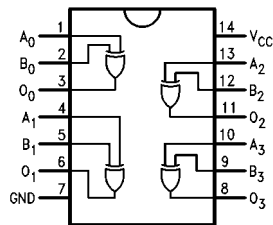
- I_{CC} reduced by 50%
- Outputs source/sink 24 mA

Ordering Code:

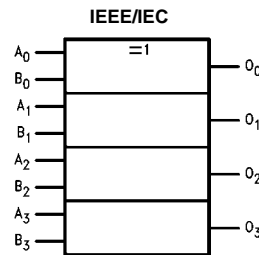
| Order Number | Package Number | Package Description |
|--------------|----------------|--|
| 74AC86SC | M14A | 14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow |
| 74AC86SJ | M14D | Pb-Free 14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide |
| 74AC86MTC | MTC14 | 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 ₀ -A ₃ | Inputs |
| B ₀ -B ₃ | Inputs |
| O ₀ -O ₃ | 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) | ± 50 mA |
| DC V_{CC} or Ground Current | |
| Per Output Pin (I_{CC} or I_{GND}) | ± 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_{CC} (V) | $T_A = 25^\circ C$ | | $T_A = -40^\circ C$ to $+85^\circ C$ | | Units | Conditions |
|----------------------|--------------------------------------|-----------------|--------------------|-------------------|--------------------------------------|---------|--|---|
| | | | Typ | Guaranteed Limits | | | | |
| V_{IH} | Minimum HIGH Level Input Voltage | 3.0 | 1.5 | 2.1 | 2.1 | V | $V_{OUT} = 0.1V$ or $V_{CC} - 0.1V$ | |
| | | 4.5 | 2.25 | 3.15 | 3.15 | | | |
| | | 5.5 | 2.75 | 3.85 | 3.85 | | | |
| V_{IL} | Maximum LOW Level Input Voltage | 3.0 | 1.5 | 0.9 | 0.9 | V | $V_{OUT} = 0.1V$ or $V_{CC} - 0.1V$ | |
| | | 4.5 | 2.25 | 1.35 | 1.35 | | | |
| | | 5.5 | 2.75 | 1.65 | 1.65 | | | |
| V_{OH} | Minimum HIGH Level Output Voltage | 3.0 | 2.99 | 2.9 | 2.9 | V | $I_{OUT} = -50 \mu A$ | |
| | | 4.5 | 4.49 | 4.4 | 4.4 | | | |
| | | 5.5 | 5.49 | 5.4 | 5.4 | | | |
| | | | 3.0 | | 2.56 | 2.46 | V | $V_{IN} = V_{IL}$ or V_{IH} $I_{OH} = -12$ mA $I_{OH} = -24$ mA $I_{OH} = -24$ mA (Note 2) |
| | | | 4.5 | | 3.86 | 3.76 | | |
| | | | 5.5 | | 4.86 | 4.76 | | |
| V_{OL} | Maximum LOW Level Output Voltage | 3.0 | 0.002 | 0.1 | 0.1 | V | $I_{OUT} = 50 \mu A$ | |
| | | 4.5 | 0.001 | 0.1 | 0.1 | | | |
| | | 5.5 | 0.001 | 0.1 | 0.1 | | | |
| | | | 3.0 | | 0.36 | 0.44 | V | $V_{IN} = V_{IL}$ or V_{IH} $I_{OL} = 12$ mA $I_{OL} = 24$ mA $I_{OL} = 24$ mA (Note 2) |
| | | | 4.5 | | 0.36 | 0.44 | | |
| | | | 5.5 | | 0.36 | 0.44 | | |
| I_{IN} (Note 4) | Maximum Input Leakage Current | 5.5 | | ± 0.1 | ± 1.0 | μA | $V_I = V_{CC}, GND$ | |
| 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 | μA | $V_{IN} = V_{CC}$ 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_{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 _{CC} (V) (Note 5) | T _A = +25°C C _L = 50 pF | | | T _A = -40°C to +85°C C _L 40 pF | | Units |
|------------------|-------------------|------------------------------------|--|-----|------|---|------|-------|
| | | | Min | Typ | 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 | |
| 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 | |

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

Capacitance

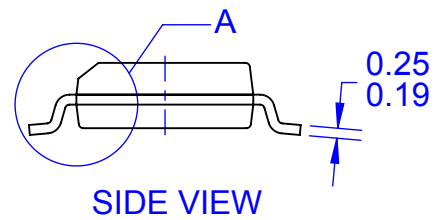
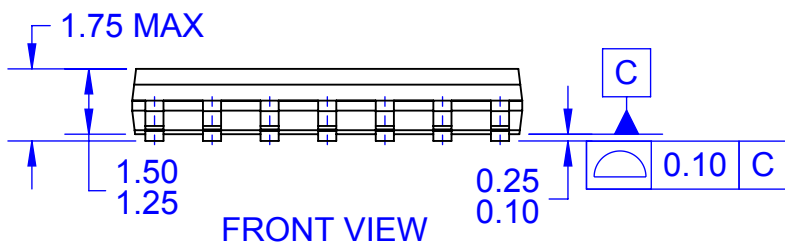
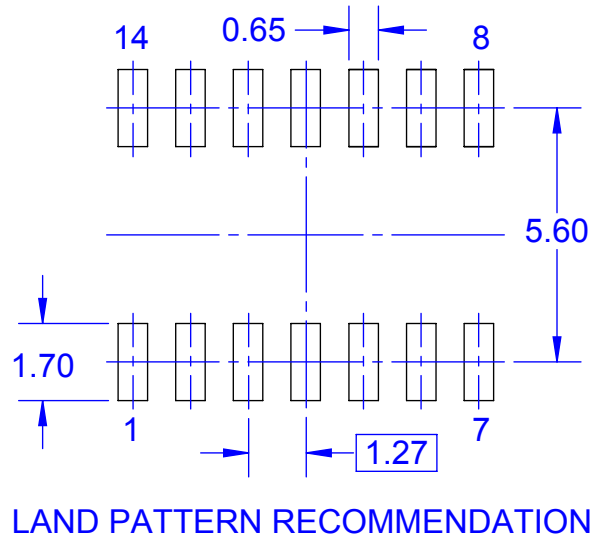
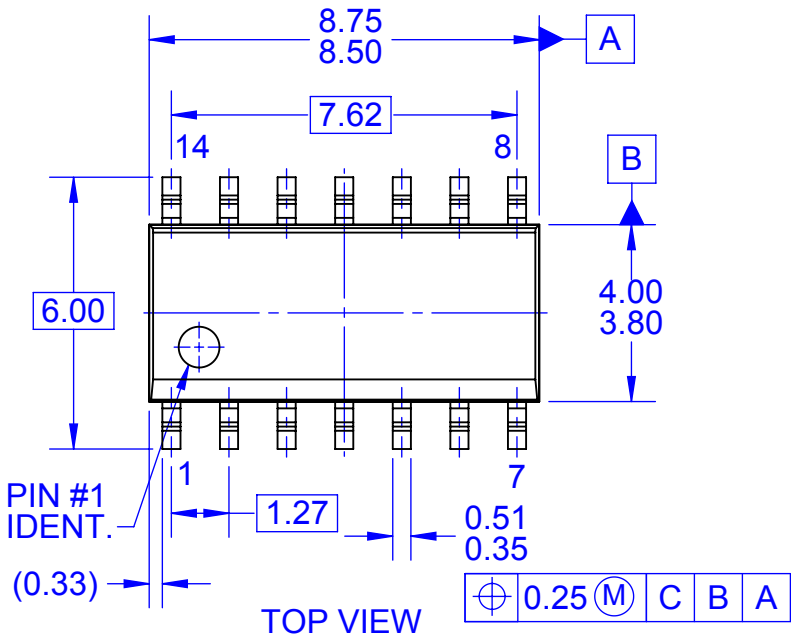
| Symbol | Parameter | Typ | Units | Conditions |
|-----------------|-------------------------------|-----|-------|------------------------|
| C _{IN} | Input Capacitance | 4.5 | pF | V _{CC} = OPEN |
| C _{PD} | Power Dissipation Capacitance | 35 | pF | V _{CC} = 5.0V |



NOTES:

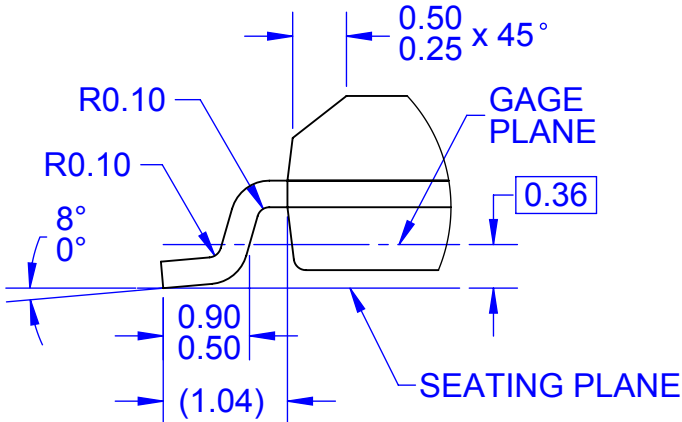
- A. CONFORMS TO JEDEC REGISTRATION MO-153, VARIATION AB, REF NOTE 6
- B. DIMENSIONS ARE IN MILLIMETERS.
- C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS
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- E. LANDPATTERN STANDARD: SOP65P640X110-14M.
- F. DRAWING FILE NAME: MKT-MTC14rev7.





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- 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



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