

# 74AC11

## Triple 3-Input AND Gate

### General Description

The AC11 contains three 3-input AND gates.

### Features

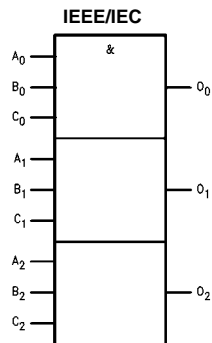
- $I_{CC}$  reduced by 50%
- Outputs source/sink 24 mA

### Ordering Code:

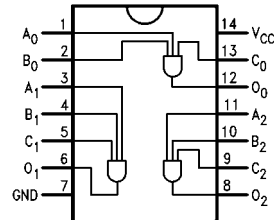
| Order Number | Package Number | Package Description   |
|--------------|----------------|---|
| 74AC11SC     | M14A           | 14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-120, 0.150 Narrow |
| 74AC11SJ     | M14D           | 14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide               |
| 74AC11MTC    | MTC14          | 14-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide |
| 74AC11PC     | 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.

### Logic Symbol



### Connection Diagram



### Pin Descriptions

| Pin Names       | Description |
|-----------------|-------------|
| $A_n, B_n, C_n$ | Inputs      |
| $O_n$           | 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<br>or Sink Current ( $I_O$ )                             | $\pm 50$ mA              |
| DC $V_{CC}$ or Ground Current<br>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                            | $V_{CC}$<br>(V) | $T_A = +25^\circ\text{C}$ |                   | $T_A = -40^\circ\text{C to } +85^\circ\text{C}$ |         | Units                                  | Conditions  |
|----------------------|--------------------------------------|-----------------|---------------------------|-------------------|---|---------|--|---|
|                      |                                      |                 | Typ                       | Guaranteed Limits |   |         |  |   |
| $V_{IH}$             | Minimum HIGH Level<br>Input Voltage  | 3.0             | 1.5                       | 2.1               | 2.1   | V       | $V_{OUT} = 0.1V$<br>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<br>Input Voltage   | 3.0             | 1.5                       | 0.9               | 0.9   | V       | $V_{OUT} = 0.1V$<br>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<br>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 $V_{IH}$<br>$I_{OH} = -12$ mA<br>$I_{OH} = -24$ mA<br>$I_{OH} = -24$ mA (Note 2) |
|                      |                                      |                 | 4.5                       |                   | 3.86  | 3.76    |  |   |
|                      |                                      |                 | 5.5                       |                   | 4.86  | 4.76    |  |   |
| $V_{OL}$             | Maximum LOW Level<br>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 $V_{IH}$<br>$I_{OL} = 12$ mA<br>$I_{OL} = 24$ mA<br>$I_{OL} = 24$ mA (Note 2)    |
|                      |                                      |                 | 4.5                       |                   | 0.36  | 0.44    |  |   |
|                      |                                      |                 | 5.5                       |                   | 0.36  | 0.44    |  |   |
| $I_{IN}$<br>(Note 4) | Maximum Input<br>Leakage Current     | 5.5             |                           | $\pm 0.1$         | $\pm 1.0$                                       | $\mu A$ | $V_I = V_{CC}$ ,<br>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                  |   |
| $I_{CC}$<br>(Note 4) | Maximum Quiescent<br>Supply Current  | 5.5             |                           | 2.0               | 20.0  | $\mu A$ | $V_{IN} = V_{CC}$<br>or GND            |   |

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

**Note 3:** Maximum test duration 2.0 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

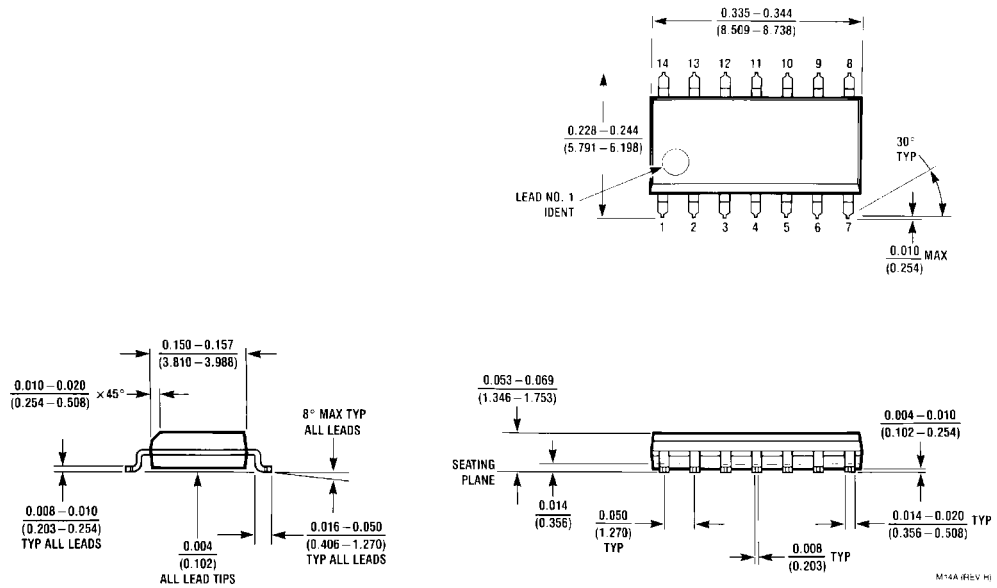
| Symbol           | Parameter         | V <sub>CC</sub><br>(V)<br>(Note 5) | T <sub>A</sub> = +25°C<br>C <sub>L</sub> = 50 pF |     |     | T <sub>A</sub> = -40°C to +85°C<br>C <sub>L</sub> = 50 pF |      | Units |
|------------------|-------------------|------------------------------------|--|-----|-----|---|------|-------|
|                  |                   |                                    | Min  | Typ | Max | Min   | Max  |       |
| t <sub>PLH</sub> | Propagation Delay | 3.3                                | 1.5  | 5.5 | 9.5 | 1.0   | 10.0 | ns    |
|                  |                   | 5.0                                | 1.5  | 4.0 | 8.0 | 1.0   | 8.5  |       |
| t <sub>PHL</sub> | Propagation Delay | 3.3                                | 1.5  | 5.5 | 8.5 | 1.0   | 9.5  | ns    |
|                  |                   | 5.0                                | 1.5  | 4.0 | 7.0 | 1.0   | 7.5  |       |

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

## Capacitance

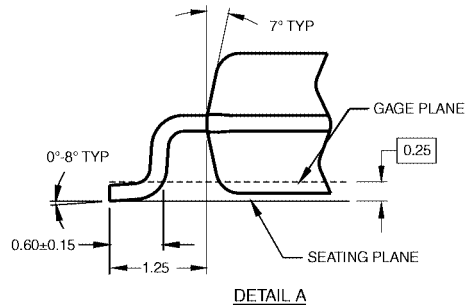
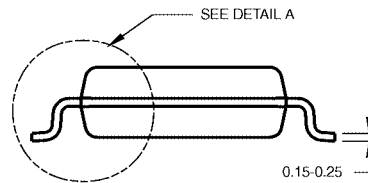
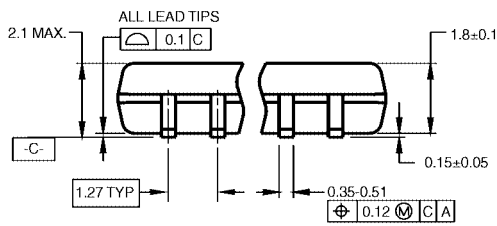
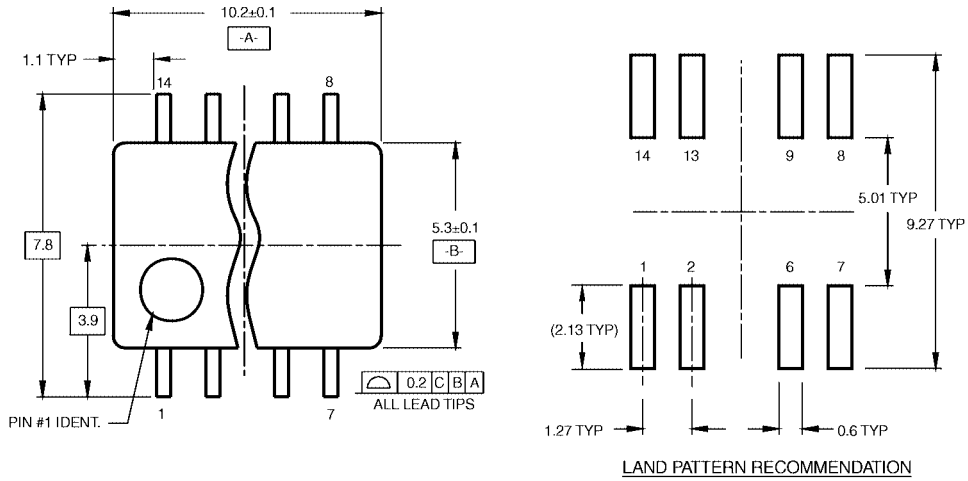
| Symbol          | Parameter                     | Typ  | Units | Conditions             |
|-----------------|-------------------------------|------|-------|------------------------|
| C <sub>IN</sub> | Input Capacitance             | 4.5  | pF    | V <sub>CC</sub> = OPEN |
| C <sub>PD</sub> | Power Dissipation Capacitance | 20.0 | pF    | V <sub>CC</sub> = 5.0V |

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



**14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-120, 0.150 Narrow  
Package Number M14A**

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

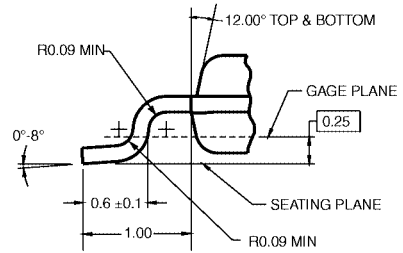
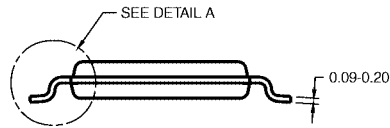
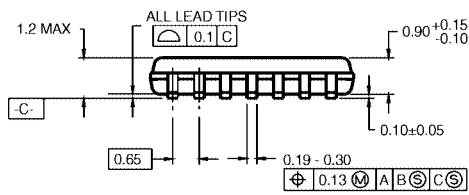


- NOTES:
- A. CONFORMS TO EIAJ EDR-7320 REGISTRATION, ESTABLISHED IN DECEMBER, 1998.
  - B. DIMENSIONS ARE IN MILLIMETERS.
  - C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.

M14DRevB1

**14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide  
Package Number M14D**

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



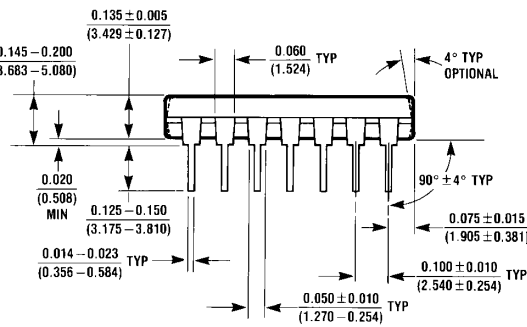
- NOTES:  
 A. CONFORMS TO JEDEC REGISTRATION MO-153, VARIATION AB, REF NOTE 6, DATE 7/93.  
 B. DIMENSIONS ARE IN MILLIMETERS.  
 C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.  
 D. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M, 1982.

MTC14RevC3

DETAIL A

**14-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide Package Number MTC14**

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



N14A (REV F)

**14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide Package Number N14A**

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