

# DM74AS10

## Triple 3-Input NAND Gate

### Features

- Switching specifications at 50pF
- Switching specifications guaranteed over full temperature and  $V_{CC}$  range
- Advanced oxide-isolated, ion-implanted Schottky TTL process
- Functionally and pin for pin compatible with Schottky, low power Schottky, and advanced low power Schottky TTL counterpart
- Improved AC performance over Schottky, low power Schottky, and advanced low power Schottky counterparts

### General Description

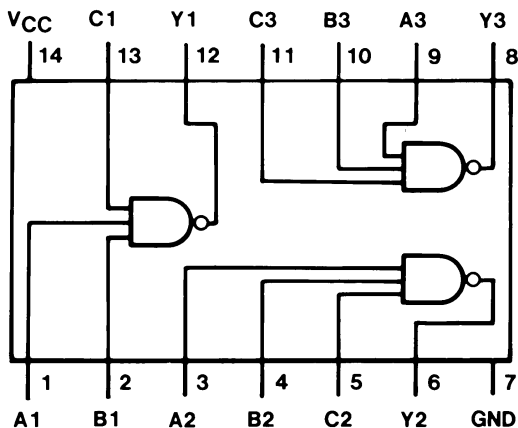
This device contains three independent gates, each of which performs the logic NAND function.

### Ordering Information

| Order Number | Package Number | Package Description  |
|--------------|----------------|--|
| DM74AS10M    | M14A           | 14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow |

Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering number.

### Connection Diagram



### Function Table

$$Y = \overline{ABC}$$

| Inputs |   |   | Output |
|--------|---|---|--------|
| A      | B | C | Y      |
| X      | X | L | H      |
| X      | L | X | H      |
| L      | X | X | H      |
| H      | H | H | L      |

H = HIGH Logic Level

L = LOW Logic Level

X = Either LOW or HIGH Logic Level

## Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

| Symbol        | Parameter                            | Rating          |
|---------------|--------------------------------------|-----------------|
| $V_{CC}$      | Supply Voltage                       | 7V              |
| $V_I$         | Input Voltage                        | 7V              |
| $T_A$         | Operating Free Air Temperature Range | 0°C to +70°C    |
| $T_{STG}$     | Storage Temperature Range            | -65°C to +150°C |
| $\theta_{JA}$ | Typical Thermal Resistance           | 114.0°C/W       |

## Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications. Fairchild does not recommend exceeding them or designing to absolute maximum ratings.

| Symbol   | Parameter                      | Min. | Nom. | Max. | Units |
|----------|--------------------------------|------|------|------|-------|
| $V_{CC}$ | Supply Voltage                 | 4.5  | 5    | 5.5  | V     |
| $V_{IH}$ | HIGH Level Input Voltage       | 2    |      |      | V     |
| $V_{IL}$ | LOW Level Input Voltage        |      |      | 0.8  | V     |
| $I_{OH}$ | HIGH Level Output Current      |      |      | -2   | mA    |
| $I_{OL}$ | LOW Level Output Current       |      |      | 20   | mA    |
| $T_A$    | Free Air Operating Temperature | 0    |      | 70   | °C    |

## Electrical Characteristics

Over recommended operating free air temperature range. All typical values are measured at  $V_{CC} = 5V$ ,  $T_A = 25^\circ C$ .

| Symbol   | Parameter                         | Conditions                                  | Min.         | Typ. | Max. | Units   |
|----------|-----------------------------------|---|--------------|------|------|---------|
| $V_{IK}$ | Input Clamp Voltage               | $V_{CC} = 4.5V$ , $I_I = -18mA$             |              |      | -1.2 | V       |
| $V_{OH}$ | HIGH Level Output Voltage         | $I_{OH} = -2mA$ , $V_{CC} = 4.5V$ to $5.5V$ | $V_{CC} - 2$ |      |      | V       |
| $V_{OL}$ | LOW Level Output Voltage          | $V_{CC} = 4.5V$ , $I_{OL} = 20mA$           |              | 0.35 | 0.5  | V       |
| $I_I$    | Input Current @ Max Input Voltage | $V_{CC} = 5.5V$ , $V_{IH} = 7V$             |              |      | 0.1  | mA      |
| $I_{IH}$ | HIGH Level Input Current          | $V_{CC} = 5.5V$ , $V_{IH} = 2.7V$           |              |      | 20   | $\mu A$ |
| $I_{IL}$ | LOW Level Input Current           | $V_{CC} = 5.5V$ , $V_{IL} = 0.4V$           |              |      | -0.5 | mA      |
| $I_O$    | Output Drive Current              | $V_{CC} = 5.5V$ , $V_O = 2.25V$             | -30          |      | -112 | mA      |
| $I_{CC}$ | Supply Current                    | $V_{CC} = 5.5V$ Outputs HIGH                |              | 1.5  | 2.4  | mA      |
|          |                                   | Outputs LOW                                 |              | 8.1  | 13   |         |

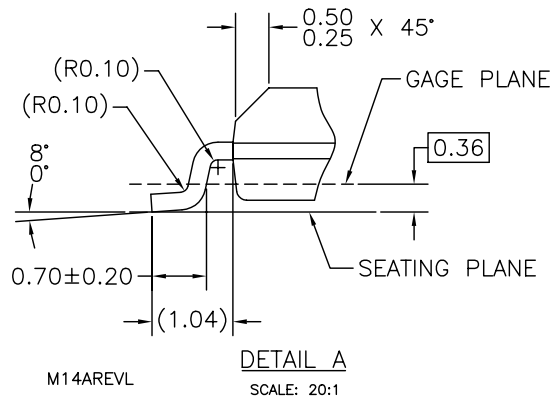
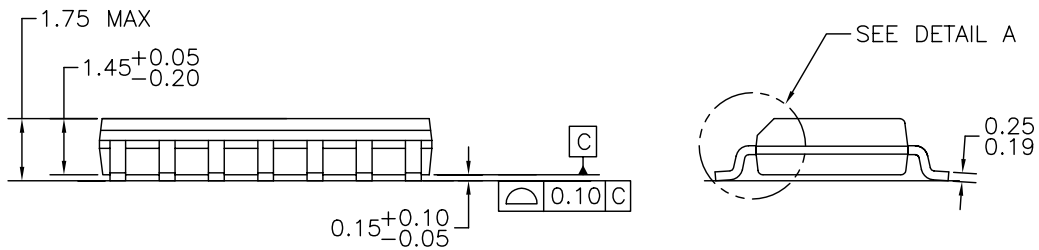
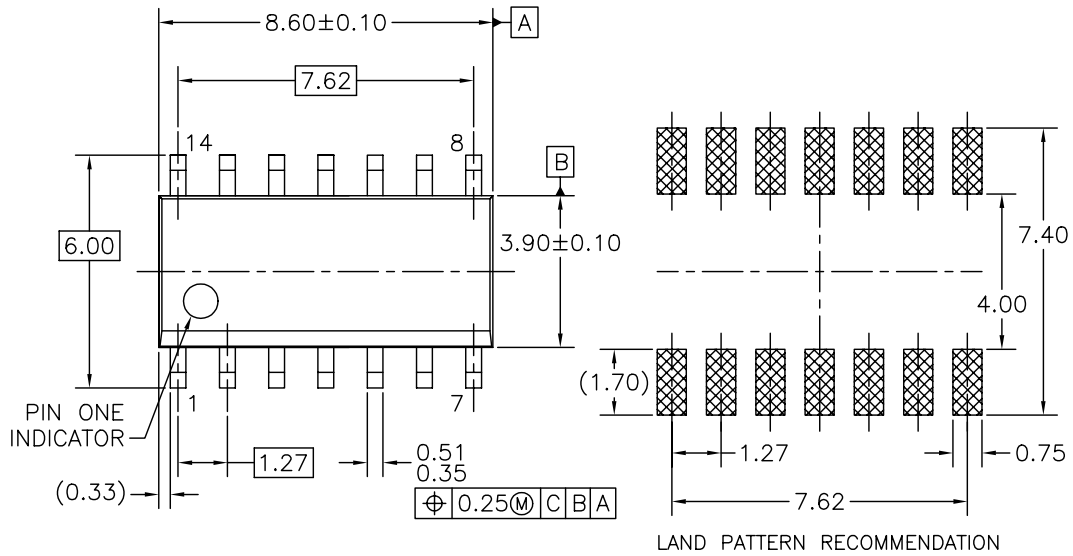
## Switching Characteristics

Over recommended operating free air temperature range.

| Symbol    | Parameter  | Conditions  | Min | Max | Units |
|-----------|--|---|-----|-----|-------|
| $t_{PLH}$ | Propagation Delay Time, LOW-to-HIGH Level Output | $V_{CC} = 4.5V$ to $5.5V$<br>$R_L = 500\Omega$ , $C_L = 50pF$ | 1   | 4.5 | ns    |
| $t_{PHL}$ | Propagation Delay Time, HIGH-to-LOW Level Output |   | 1   | 4.5 | ns    |

### Physical Dimensions

Dimensions are in millimeters unless otherwise noted.



NOTES: UNLESS OTHERWISE SPECIFIED


- A) THIS PACKAGE CONFORMS TO JEDEC MS-012, VARIATION AB, ISSUE C, DATED MAY 1990.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DIMENSIONS DO NOT INCLUDE MOLD FLASH OR BURRS.

**Figure 1. 14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow Package Number M14A**



## TRADEMARKS

The following are registered and unregistered trademarks and service marks Fairchild Semiconductor owns or is authorized to use and is not intended to be an exhaustive list of all such trademarks

|                         |                      |                            |   |
|-------------------------|----------------------|----------------------------|---|
| ACEx®                   | Green FPS™ e-Series™ | Power-SPM™                 | SyncFET™  |
| Build it Now™           | GTO™                 | PowerTrench®               | The Power Franchise®  |
| CorePLUS™               | <i>i-Lo</i> ™        | Programmable Active Droop™ |  ™ |
| CROSSVOLT™              | IntelliMAX™          | QFET®                      | TinyBoost™  |
| CTL™                    | ISOPLANAR™           | QS™                        | TinyBuck™   |
| Current Transfer Logic™ | MegaBuck™            | QT Optoelectronics™        | TinyLogic®  |
| EcoSPARK®               | MICROCOUPLER™        | Quiet Series™              | TINYOPTO™   |
| FACT Quiet Series™      | MicroPak™            | RapidConfigure™            | TinyPower™  |
| FACT®                   | Motion-SPM™          | SMART START™               | TinyPWM™  |
| FAST®                   | OPTOLOGIC®           | SPM®                       | TinyWire™   |
| FastvCore™              | OPTOPLANAR®          | STEALTH™                   | μSerDes™  |
| FPS™                    | PDP-SPM™             | SuperFET™                  | UHC®  |
| FRFET®                  | Power220®            | SuperSOT™-3                | UniFET™   |
| Global Power ResourceSM | Power247®            | SuperSOT™-6                | VCX™  |
| Green FPS™              | POWEREDGE®           | SuperSOT™-8                |   |

## DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION, OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS. THESE SPECIFICATIONS DO NOT EXPAND THE TERMS OF FAIRCHILD'S WORLDWIDE TERMS AND CONDITIONS, SPECIFICALLY THE WARRANTY THEREIN, WHICH COVERS THESE PRODUCTS.

## LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION.

As used herein:

- Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.
- A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

## PRODUCT STATUS DEFINITIONS

### Definition of Terms

| Datasheet Identification | Product Status         | Definition   |
|--------------------------|------------------------|--|
| Advance Information      | Formative or In Design | This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.   |
| Preliminary              | First Production       | This datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design. |
| No Identification Needed | Full Production        | This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.   |
| Obsolete                 | Not In Production      | This datasheet contains specifications on a product that has been discontinued by Fairchild semiconductor. The datasheet is printed for reference information only.                                      |

Rev. I28