

## Rochester Electronics Manufactured Components

Rochester branded components are manufactured using either die/wafers purchased from the original suppliers or Rochester wafers recreated from the original IP. All recreations are done with the approval of the OCM.

Parts are tested using original factory test programs or Rochester developed test solutions to guarantee product meets or exceed the OCM data sheet.

## Quality Overview

- ISO-9001
- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-35835
  - Class Q Military
  - Class V Space Level
- Qualified Suppliers List of Distributors (QSLD)
  - Rochester is a critical supplier to DLA and meets all industry and DLA standards.

Rochester Electronics, LLC is committed to supplying products that satisfy customer expectations for quality and are equal to those originally supplied by industry manufacturers.

The original manufacturer's datasheet accompanying this document reflects the performance and specifications of the Rochester manufactured version of this device. Rochester Electronics guarantees the performance of its semiconductor products to the original OEM specifications. 'Typical' values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.

# 74AC08, 74ACT08 Quad 2-Input AND Gate

## Features

- $I_{CC}$  reduced by 50% on 74AC only
- Outputs source/sink 24mA

## General Description

The AC08/ACT08 contains four, 2-input AND gates.

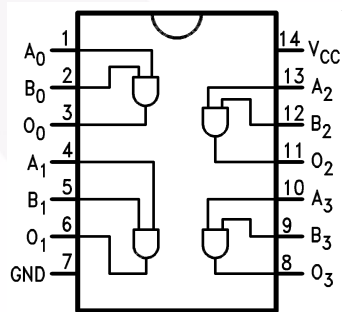
## Ordering Information

| Order Number | Package Number | Package Description  |
|--------------|----------------|--|
| 74AC08SC     | M14A           | 14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow |
| 74AC08SJ     | M14D           | 14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide                |
| 74AC08MTC    | MTC14          | 14-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide  |
| 74AC08PC     | N14A           | 14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide       |
| 74ACT08SC    | M14A           | 14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow |
| 74ACT08MTC   | MTC14          | 14-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide  |
| 74ACT08PC    | N14A           | 14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide       |

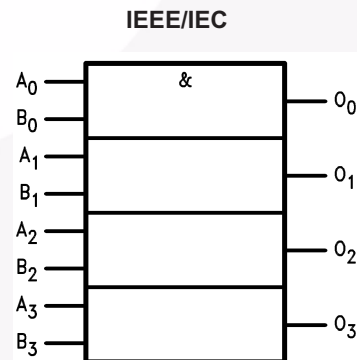
Device also available in Tape and Reel. Specify by appending suffix letter "X" to the ordering number.

 All packages are lead free per JEDEC: J-STD-020B standard.

## Connection Diagram



## Logic Symbol



## Pin Description

| Pin Names  | Description |
|------------|-------------|
| $A_n, B_n$ | Inputs      |
| $O_n$      | Outputs     |

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

## 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  | Rating         |
|-----------------------|--|----------------|
| $V_{CC}$              | Supply Voltage<br>AC   | 2.0V to 6.0V   |
|                       | ACT  | 4.5V to 5.5V   |
| $V_I$                 | Input Voltage  | 0V to $V_{CC}$ |
| $V_O$                 | Output Voltage   | 0V to $V_{CC}$ |
| $T_A$                 | Operating Temperature  | -40°C to +85°C |
| $\Delta V / \Delta t$ | Minimum Input Edge Rate, AC Devices:<br>$V_{IN}$ from 30% to 70% of $V_{CC}$ , $V_{CC}$ @ 3.3V, 4.5V, 5.5V | 125mV/ns       |
| $\Delta V / \Delta t$ | Minimum Input Edge Rate, ACT Devices:<br>$V_{IN}$ from 0.8V to 2.0V, $V_{CC}$ @ 4.5V, 5.5V                 | 125mV/ns       |

## DC Electrical Characteristics for AC

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

**Notes:**

- All outputs loaded; thresholds on input associated with output under test.
- Maximum test duration 2.0ms, one output loaded at a time.
- I<sub>IN</sub> and I<sub>CC</sub> @ 3.0V are guaranteed to be less than or equal to the respective limit @ 5.5V V<sub>CC</sub>.

## DC Electrical Characteristics for ACT

| Symbol           | Parameter                                     | V <sub>CC</sub><br>(V) | Conditions   | T <sub>A</sub> = +25°C  |                   | T <sub>A</sub> = -40°C to +85°C |      | Units |
|------------------|---|------------------------|--|---|-------------------|---------------------------------|------|-------|
|                  |   |                        |  | Typ.  | Guaranteed Limits |                                 |      |       |
| V <sub>IH</sub>  | Minimum HIGH Level Input Voltage              | 4.5                    | V <sub>OUT</sub> = 0.1V or V <sub>CC</sub> - 0.1V                              | 1.5   | 2.0               | 2.0                             |      | V     |
|                  |   | 5.5                    |  | 1.5   | 2.0               | 2.0                             |      |       |
| V <sub>IL</sub>  | Maximum LOW Level Input Voltage               | 4.5                    | V <sub>OUT</sub> = 0.1V or V <sub>CC</sub> - 0.1V                              | 1.5   | 0.8               | 0.8                             |      | V     |
|                  |   | 5.5                    |  | 1.5   | 0.8               | 0.8                             |      |       |
| V <sub>OH</sub>  | Minimum HIGH Level Output Voltage             | 4.5                    | I <sub>OUT</sub> = -50μA   | 4.49  | 4.4               | 4.4                             |      | V     |
|                  |   | 5.5                    |  | 5.49  | 5.4               | 5.4                             |      |       |
|                  |   | 4.5                    | V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> , I <sub>OH</sub> = -24mA |   | 3.86              | 3.76                            |      |       |
|                  |   | 5.5                    |  | V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> , I <sub>OH</sub> = -24mA <sup>(4)</sup> |                   | 4.86                            | 4.76 |       |
| V <sub>OL</sub>  | Maximum LOW Level Output Voltage              | 4.5                    | I <sub>OUT</sub> = 50μA  | 0.001   | 0.1               | 0.1                             |      | V     |
|                  |   | 5.5                    |  | 0.001   | 0.1               | 0.1                             |      |       |
|                  |   | 4.5                    | V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> , I <sub>OL</sub> = 24mA  |   | 0.36              | 0.44                            |      |       |
|                  |   | 5.5                    |  | V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> , I <sub>OL</sub> = 24mA <sup>(4)</sup>  |                   | 0.36                            | 0.44 |       |
| I <sub>IN</sub>  | Maximum Input Leakage Current                 | 5.5                    | V <sub>I</sub> = V <sub>CC</sub> , GND   |   | ±0.1              | ±1.0                            |      | μA    |
| I <sub>CCT</sub> | Maximum I <sub>CC</sub> /Input                | 5.5                    | V <sub>I</sub> = V <sub>CC</sub> - 2.1V  | 0.6   |                   | 1.5                             |      | mA    |
| I <sub>OLD</sub> | Minimum Dynamic Output Current <sup>(5)</sup> | 5.5                    | V <sub>OLD</sub> = 1.65V Max.  |   |                   | 75                              |      | mA    |
| I <sub>OHD</sub> |   | 5.5                    | V <sub>OHD</sub> = 3.85V Min.  |   |                   | -75                             |      | mA    |
| I <sub>CC</sub>  | Maximum Quiescent Supply Current              | 5.5                    | V <sub>IN</sub> = V <sub>CC</sub> or GND                                       |   | 4.0               | 40.0                            |      | μA    |

**Notes:**

- All outputs loaded; thresholds on input associated with output under test.
- Maximum test duration 2.0ms, one output loaded at a time.

**AC Electrical Characteristics for AC**

| Symbol    | Parameter         | $V_{CC}$ (V) <sup>(6)</sup> | $T_A = +25^\circ\text{C}$ ,<br>$C_L = 50\text{pF}$ |      |      | $T_A = -40^\circ\text{C to } +85^\circ\text{C}$ ,<br>$C_L = 50\text{pF}$ |      | Units |
|-----------|-------------------|-----------------------------|--|------|------|--|------|-------|
|           |                   |                             | Min.   | Typ. | Max. | Min.   | Max. |       |
| $t_{PLH}$ | Propagation Delay | 3.3                         | 1.5  | 7.5  | 9.5  | 1.0  | 10.0 | ns    |
|           |                   | 5.0                         | 1.5  | 5.5  | 7.5  | 1.0  | 8.5  |       |
| $t_{PHL}$ | Propagation Delay | 3.3                         | 1.5  | 7.0  | 8.5  | 1.0  | 9.0  | ns    |
|           |                   | 5.0                         | 1.5  | 5.5  | 7.0  | 1.0  | 7.5  |       |

**Note:**

6. Voltage range 3.3 is  $3.3\text{V} \pm 0.3\text{V}$ . Voltage range 5.0 is  $5.0\text{V} \pm 0.5\text{V}$ .

**AC Electrical Characteristics for ACT**

| Symbol    | Parameter         | $V_{CC}$ (V) <sup>(7)</sup> | $T_A = +25^\circ\text{C}$ ,<br>$C_L = 50\text{pF}$ |      |      | $T_A = -40^\circ\text{C to } +85^\circ\text{C}$ ,<br>$C_L = 50\text{pF}$ |      | Units |
|-----------|-------------------|-----------------------------|--|------|------|--|------|-------|
|           |                   |                             | Min.   | Typ. | Max. | Min.   | Max. |       |
| $t_{PLH}$ | Propagation Delay | 5.0                         | 1.0  | 6.5  | 9.0  | 1.0  | 10.0 | ns    |
| $t_{PHL}$ | Propagation Delay | 5.0                         | 1.0  | 6.5  | 9.0  | 1.0  | 10.0 | ns    |

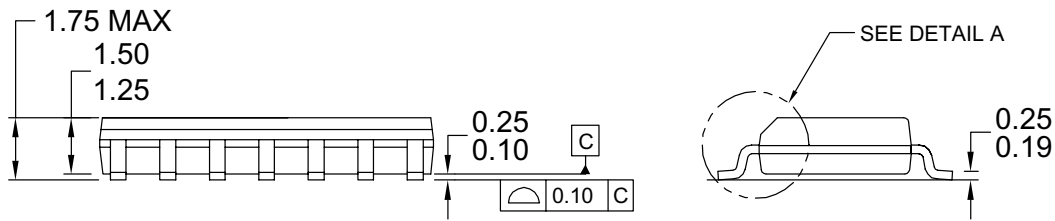
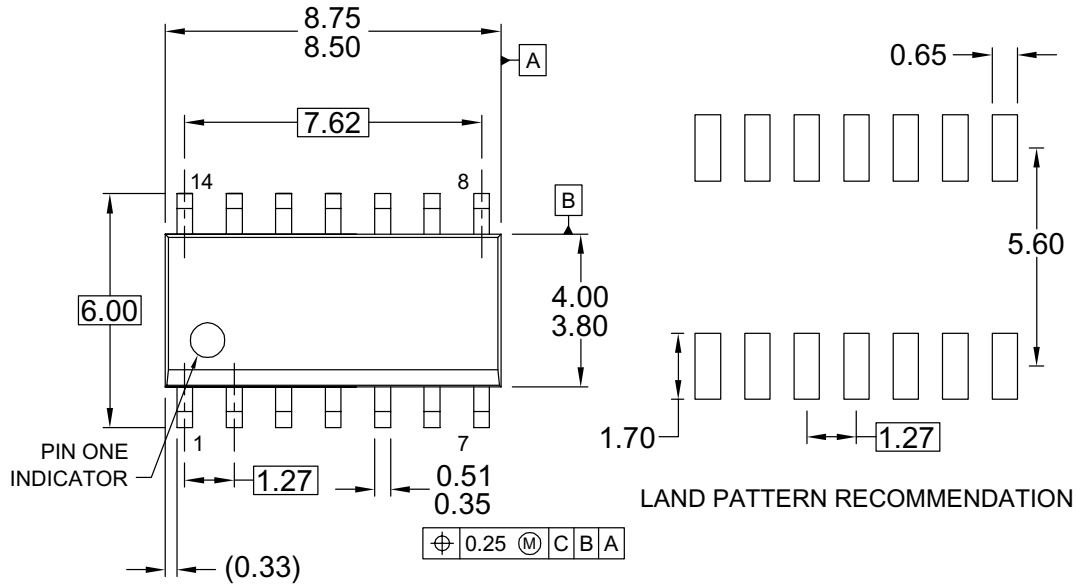
**Note:**

7. Voltage range 5.0 is  $5.0\text{V} \pm 0.5\text{V}$ .

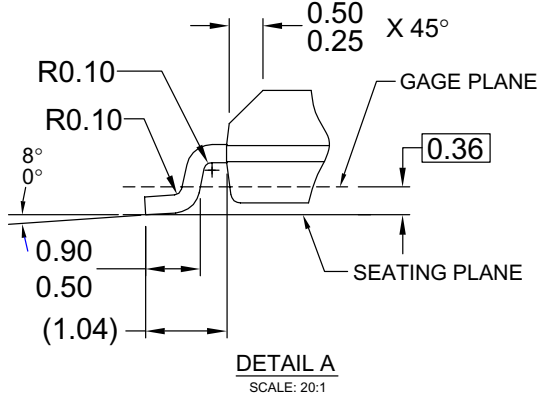
**Capacitance**

| Symbol   | Parameter                     | Conditions             | Typ. | Units |
|----------|-------------------------------|------------------------|------|-------|
| $C_{IN}$ | Input Capacitance             | $V_{CC} = \text{OPEN}$ | 4.5  | pF    |
| $C_{PD}$ | Power Dissipation Capacitance | $V_{CC} = 5.0\text{V}$ | 20.0 | pF    |

Physical Dimensions



NOTES: UNLESS OTHERWISE SPECIFIED



- A) THIS PACKAGE 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) LANDPATTERN STANDARD: SOIC127P600X145-14M
- E) DRAWING CONFORMS TO ASME Y14.5M-1994
- F) DRAWING FILE NAME: M14AREV13

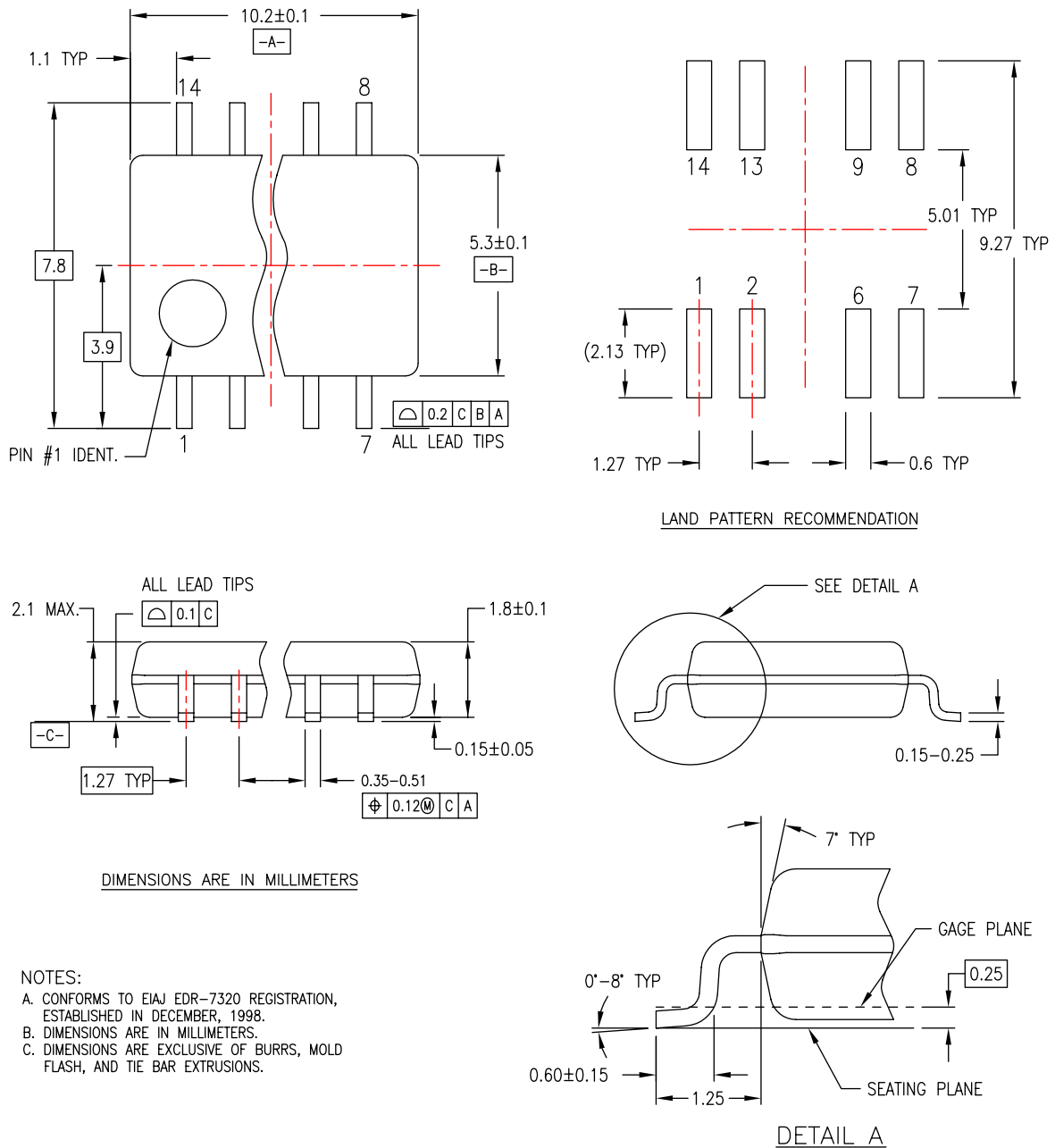
Figure 1. 14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow

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Physical Dimensions (Continued)



M14DREVC

Figure 2. 14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide

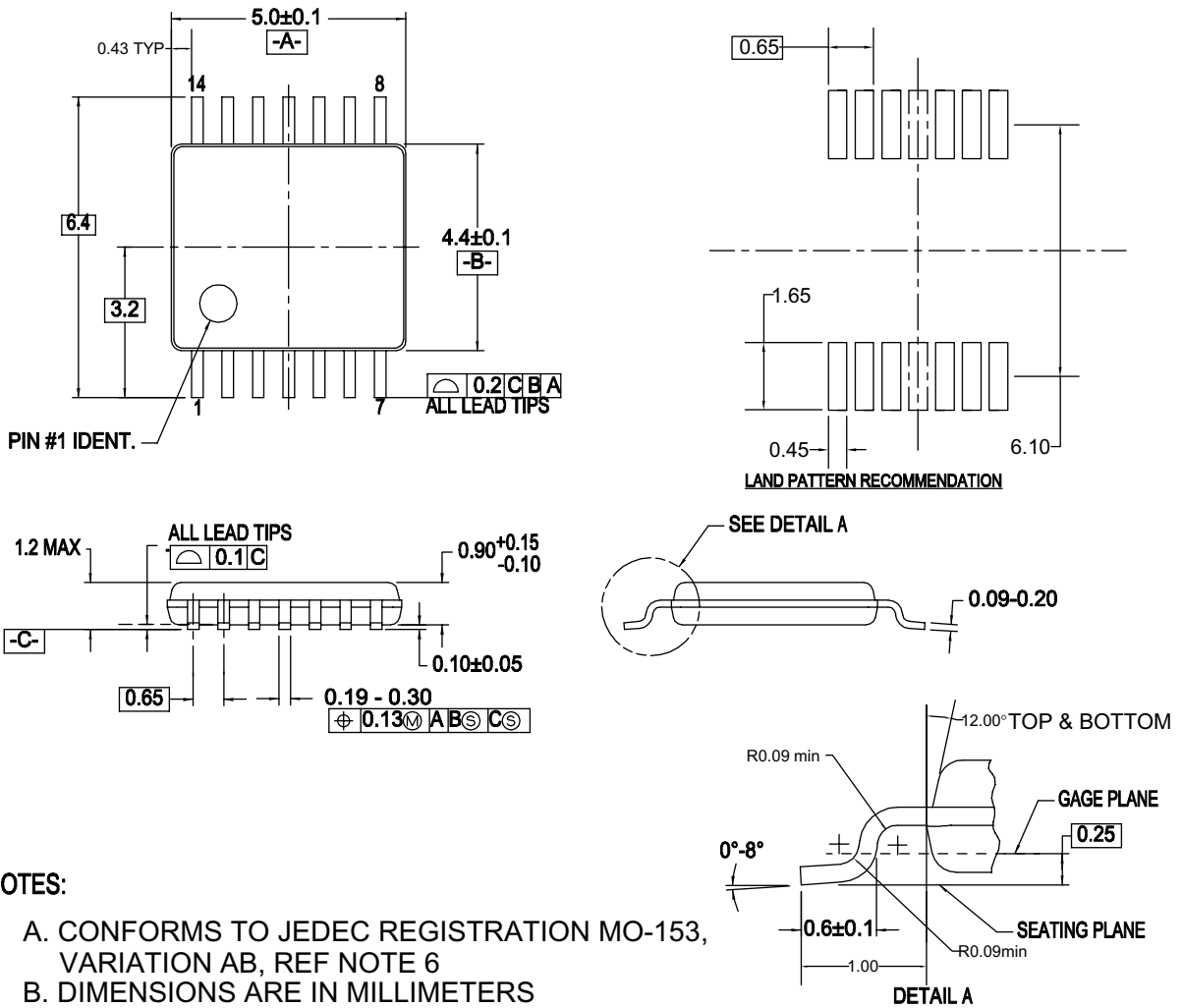
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Physical Dimensions (Continued)



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
- D. DIMENSIONING AND TOLERANCES PER ANSI Y14.5M, 1982
- E. LANDPATTERN STANDARD: SOP65P640X110-14M
- F. DRAWING FILE NAME: MTC14REV6

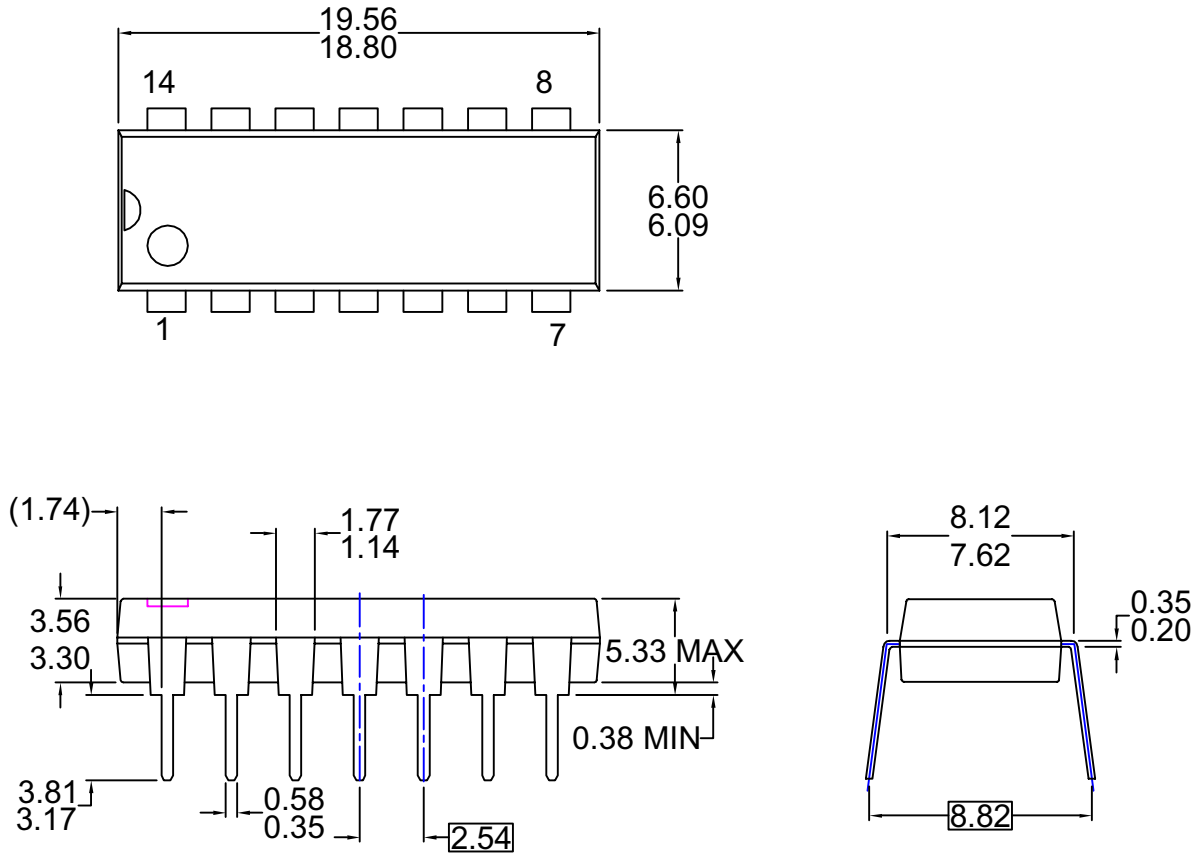
Figure 3. 14-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide

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**Physical Dimensions** (Continued)



- NOTES: UNLESS OTHERWISE SPECIFIED**  
**THIS PACKAGE CONFORMS TO**  
 A) JEDEC MS-001 VARIATION BA  
 B) ALL DIMENSIONS ARE IN MILLIMETERS.  
 C) DIMENSIONS ARE EXCLUSIVE OF BURRS,  
 MOLD FLASH, AND TIE BAR EXTRUSIONS.  
 D) DIMENSIONS AND TOLERANCES PER  
 ASME Y14.5-1994  
 E) DRAWING FILE NAME: MKT-N14AREV7

**Figure 4. 14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide**

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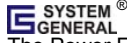


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| Build it Now <sup>™</sup>  | FRFET <sup>®</sup>                           | Power220 <sup>®</sup>                  |  SYSTEM GENERAL <sup>®</sup> |
| CorePLUS <sup>™</sup>  | Global Power Resource <sup>SM</sup>          | Power247 <sup>®</sup>                  | The Power Franchise <sup>®</sup>  |
| CROSSVOLT <sup>™</sup>   | Green FPS <sup>™</sup>                       | POWEREDGE <sup>®</sup>                 | the <b>power</b> <sup>™</sup>   |
| CTL <sup>™</sup>   | Green FPS <sup>™</sup> e-Series <sup>™</sup> | Power-SPM <sup>™</sup>                 | franchise   |
| Current Transfer Logic <sup>™</sup>  | GTO <sup>™</sup>                             | PowerTrench <sup>®</sup>               | TinyBoost <sup>™</sup>  |
| EcoSPARK <sup>®</sup>  | <i>i-Lo</i> <sup>™</sup>                     | Programmable Active Droop <sup>™</sup> | TinyBuck <sup>™</sup>   |
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|  <sup>™</sup> | ISOPLANAR <sup>™</sup>                       | QS <sup>™</sup>                        | TINYOPTO <sup>™</sup>   |
|  <sup>®</sup> | MegaBuck <sup>™</sup>                        | QT Optoelectronics <sup>™</sup>        | TinyPower <sup>™</sup>  |
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| FACT <sup>®</sup>  | MillerDrive <sup>™</sup>                     | SPM <sup>®</sup>                       | UHC <sup>®</sup>  |
| FAST <sup>®</sup>  | Motion-SPM <sup>™</sup>                      | STEALTH <sup>™</sup>                   | Ultra FRFET <sup>™</sup>  |
| FastvCore <sup>™</sup>   | OPTOLOGIC <sup>®</sup>                       | SuperFET <sup>™</sup>                  | UniFET <sup>™</sup>   |
| FlashWriter <sup>®</sup> *   | OPTOPLANAR <sup>®</sup>                      | SuperSOT <sup>™</sup> -3               | VCX <sup>™</sup>  |
|  |  | SuperSOT <sup>™</sup> -6               |   |
|  |  | SuperSOT <sup>™</sup> -8               |   |

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2. A critical component in 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 the design.   |
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