

# 74VHC175 Quad D-Type Flip-Flop

## Features

- High Speed:  $f_{MAX} = 210\text{MHz}$  (Typ.) at  $V_{CC} = 5\text{V}$
- Low power dissipation:  $I_{CC} = 4\mu\text{A}$  (Max.) at  $T_A = 25^\circ\text{C}$
- High noise immunity:  $V_{NIH} = V_{NIL} = 28\% V_{CC}$  (Min.)
- Power down protection is provided on all inputs
- Low noise:  $V_{OLP} = 0.8\text{V}$  (Max.)
- Pin and function compatible with 74HC175

## General Description

The VHC175 is an advanced high-speed CMOS device fabricated with silicon gate CMOS technology. It achieves the high-speed operation similar to equivalent Bipolar Schottky TTL while maintaining the CMOS low power dissipation.

The VHC175 is a high-speed quad D-type flip-flop. The device is useful for general flip-flop requirements where clock and clear inputs are common. The information on the D inputs is stored during the LOW-to-HIGH clock transition. Both true and complemented outputs of each flip-flop are provided. A Master Reset input resets all flip-flops, independent of the Clock or D inputs, when LOW.

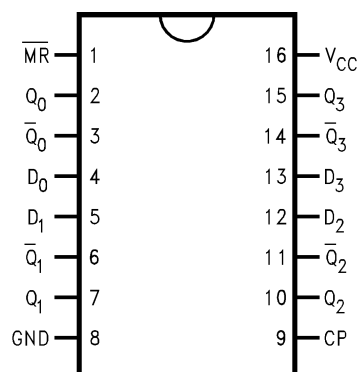
An input protection circuit insures that 0V to 7V can be applied to the input pins without regard to the supply voltage. This device can be used to interface 5V to 3V systems and two supply systems such as battery backup. This circuit prevents device destruction due to mismatched supply and input voltages.

## Ordering Information

| Order Number | Package Number | Package Description                                                          |
|--------------|----------------|------------------------------------------------------------------------------|
| 74VHC175M    | M16A           | 16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow |
| 74VHC175SJ   | M16D           | 16-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide                |
| 74VHC175MTC  | MTC16          | 16-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide  |

Surface mount packages are also available on Tape and Reel. Specify by appending the suffix letter "X" to the ordering number.

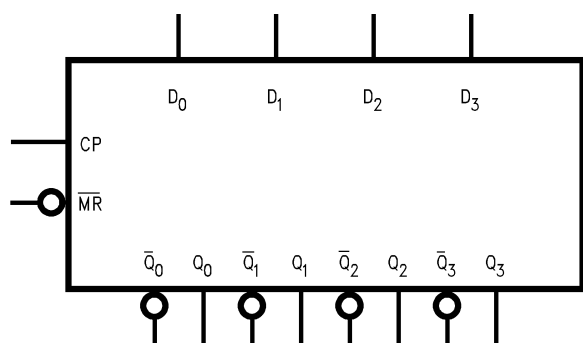
## Connection Diagram



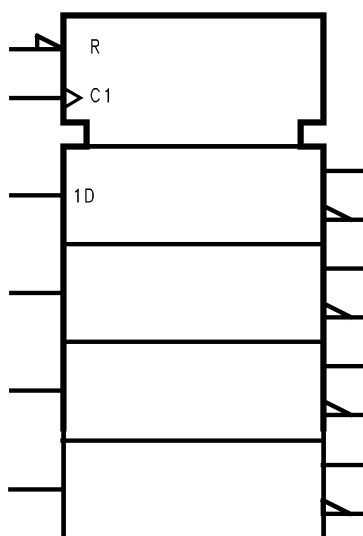
## Pin Description

| Pin Names             | Description        |
|-----------------------|--------------------|
| $D_0-D_3$             | Data Inputs        |
| CP                    | Clock Pulse Input  |
| MR                    | Master Reset Input |
| $Q_0-Q_3$             | True Outputs       |
| $\bar{Q}_0-\bar{Q}_3$ | Complement Outputs |

## Logic Symbol



IEEE/IEC



## Functional Description

The VHC175 consists of four edge-triggered D flip-flops with individual D inputs and Q and  $\bar{Q}$  outputs. The Clock and Master Reset are common. The four flip-flops will store the state of their individual D inputs on the LOW-to-HIGH clock (CP) transition, causing individual Q and  $\bar{Q}$  outputs to follow. A LOW input on the Master Reset ( $\overline{MR}$ ) will force all Q outputs LOW and  $\bar{Q}$  outputs HIGH independent of Clock or Data inputs. The VHC175 is useful for general logic applications where a common Master Reset and Clock are acceptable.

## Truth Table

| Inputs @ $t_n$ ,<br>$\overline{MR} = H$ |  | Outputs @ $t_{n+1}$ |             |
|-----------------------------------------|--|---------------------|-------------|
| $D_n$                                   |  | $Q_n$               | $\bar{Q}_n$ |
| L                                       |  | L                   | H           |
| H                                       |  | H                   | L           |

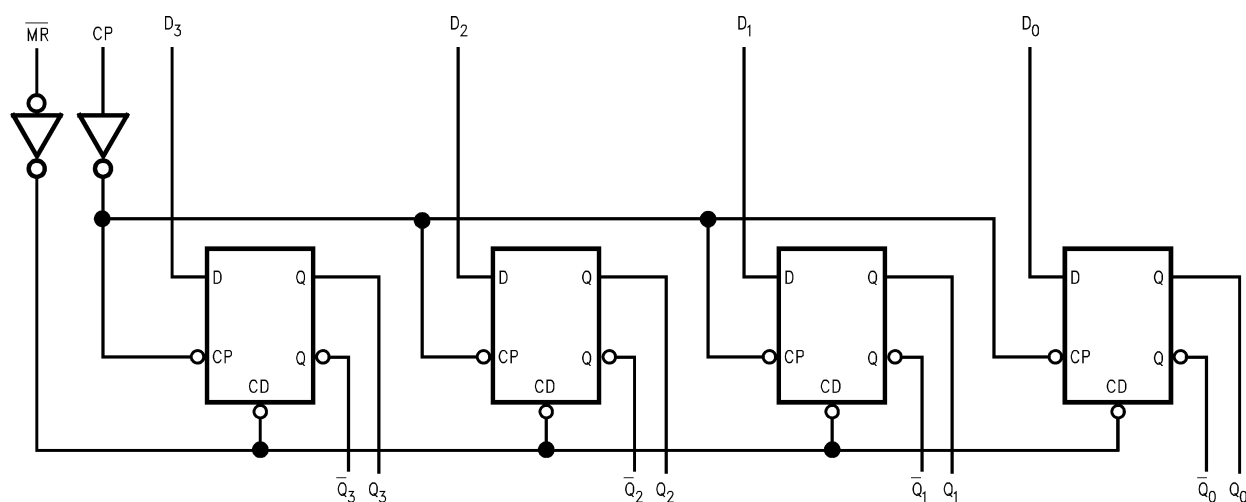
H = HIGH Voltage Level

L = LOW Voltage Level

$t_n$  = Bit Time before Clock Pulse

$t_{n+1}$  = Bit Time after Clock Pulse

## Logic Diagram



Please note that this diagram is provided only for the understanding of logic operations and should not be used to estimate propagation delays.

## 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           |
| $V_{IN}$  | DC Input Voltage                         | -0.5V to +7.0V           |
| $V_{OUT}$ | DC Output Voltage                        | -0.5V to $V_{CC} + 0.5V$ |
| $I_{IK}$  | Input Diode Current                      | -20mA                    |
| $I_{OK}$  | Output Diode Current                     | $\pm 20mA$               |
| $I_{OUT}$ | DC Output Current                        | $\pm 25mA$               |
| $I_{CC}$  | DC $V_{CC}$ / GND Current                | $\pm 50mA$               |
| $T_{STG}$ | Storage Temperature                      | -65°C to +150°C          |
| $T_L$     | Lead Temperature (Soldering, 10 seconds) | 260°C                    |

## Recommended Operating Conditions<sup>(1)</sup>

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                                                                    | 2.0V to +5.5V                     |
| $V_{IN}$   | Input Voltage                                                                     | 0V to +5.5V                       |
| $V_{OUT}$  | Output Voltage                                                                    | 0V to $V_{CC}$                    |
| $T_{OPR}$  | Operating Temperature                                                             | -40°C to +85°C                    |
| $t_r, t_f$ | Input Rise and Fall Time,<br>$V_{CC} = 3.3V \pm 0.3V$<br>$V_{CC} = 5.0V \pm 0.5V$ | 0ns/V ~ 100ns/V<br>0ns/V ~ 20ns/V |

### Note:

1. Unused inputs must be held HIGH or LOW. They may not float.

## DC Electrical Characteristics

| Symbol   | Parameter                 | $V_{CC}$ (V) | Conditions                       | $T_A = 25^\circ\text{C}$  |      |                     | $T_A = -40^\circ\text{C to } +85^\circ\text{C}$ |                     | Units         |
|----------|---------------------------|--------------|----------------------------------|---------------------------|------|---------------------|-------------------------------------------------|---------------------|---------------|
|          |                           |              |                                  | Min.                      | Typ. | Max.                | Min.                                            | Max.                |               |
| $V_{IH}$ | HIGH Level Input Voltage  | 2.0          |                                  | 1.50                      |      |                     | 1.50                                            |                     | V             |
|          |                           | 3.0–5.5      |                                  | $0.7 \times V_{CC}$       |      |                     | $0.7 \times V_{CC}$                             |                     |               |
| $V_{IL}$ | LOW Level Input Voltage   | 2.0          |                                  |                           |      | 0.50                |                                                 | 0.50                | V             |
|          |                           | 3.0–5.5      |                                  |                           |      | $0.3 \times V_{CC}$ |                                                 | $0.3 \times V_{CC}$ |               |
| $V_{OH}$ | HIGH Level Output Voltage | 2.0          | $V_{IN} = V_{IH}$<br>or $V_{IL}$ | $I_{OH} = -50\mu\text{A}$ | 1.9  | 2.0                 |                                                 | 1.9                 | V             |
|          |                           | 3.0          |                                  |                           | 2.9  | 3.0                 |                                                 | 2.9                 |               |
|          |                           | 4.5          |                                  |                           | 4.4  | 4.5                 |                                                 | 4.4                 |               |
|          |                           | 3.0          |                                  | $I_{OH} = -4\text{mA}$    | 2.58 |                     |                                                 | 2.48                |               |
|          |                           | 4.5          |                                  | $I_{OH} = -8\text{mA}$    | 3.94 |                     |                                                 | 3.80                |               |
|          |                           |              |                                  |                           |      |                     |                                                 |                     |               |
| $V_{OL}$ | LOW Level Output Voltage  | 2.0          | $V_{IN} = V_{IH}$<br>or $V_{IL}$ | $I_{OL} = 50\mu\text{A}$  |      | 0.0                 | 0.1                                             |                     | V             |
|          |                           | 3.0          |                                  |                           |      | 0.0                 | 0.1                                             |                     |               |
|          |                           | 4.5          |                                  |                           |      | 0.0                 | 0.1                                             |                     |               |
|          |                           | 3.0          |                                  | $I_{OL} = 4\text{mA}$     |      |                     | 0.36                                            | 0.44                |               |
|          |                           | 4.5          |                                  | $I_{OL} = 8\text{mA}$     |      |                     | 0.36                                            | 0.44                |               |
|          |                           |              |                                  |                           |      |                     |                                                 |                     |               |
| $I_{IN}$ | Input Leakage Current     | 0–5.5        | $V_{IN} = 5.5\text{V or GND}$    |                           |      | $\pm 0.1$           |                                                 | $\pm 1.0$           | $\mu\text{A}$ |
| $I_{CC}$ | Quiescent Supply Current  | 5.5          | $V_{IN} = V_{CC}$ or GND         |                           |      | 4.0                 |                                                 | 40.0                | $\mu\text{A}$ |

## Noise Characteristics

| Symbol          | Parameter                                | $V_{CC}$ (V) | $T_A = 25^\circ\text{C}$ |        | Units | Conditions          |
|-----------------|------------------------------------------|--------------|--------------------------|--------|-------|---------------------|
|                 |                                          |              | Typ.                     | Limits |       |                     |
| $V_{OLP}^{(2)}$ | Quiet Output Maximum Dynamic $V_{OL}$    | 5.0          | 0.4                      | 0.8    | V     | $C_L = 50\text{pF}$ |
| $V_{OLV}^{(2)}$ | Quiet Output Minimum Dynamic $V_{OL}$    | 5.0          | –0.4                     | –0.8   | V     | $C_L = 50\text{pF}$ |
| $V_{IHD}^{(2)}$ | Minimum HIGH Level Dynamic Input Voltage | 5.0          |                          | 3.5    | V     | $C_L = 50\text{pF}$ |
| $V_{ILD}^{(2)}$ | Maximum LOW Level Dynamic Input Voltage  | 5.0          |                          | 1.5    | V     | $C_L = 50\text{pF}$ |

## Note:

2. Parameter guaranteed by design.

## AC Electrical Characteristics

| Symbol                             | Parameter                                                  | $V_{CC}$ (V)  | Conditions                | $T_A = 25^\circ\text{C}$ |      |      | $T_A = -40^\circ\text{C}$<br>to $+85^\circ\text{C}$ |      | Units |
|------------------------------------|------------------------------------------------------------|---------------|---------------------------|--------------------------|------|------|-----------------------------------------------------|------|-------|
|                                    |                                                            |               |                           | Min.                     | Typ. | Max. | Min.                                                | Max. |       |
| $f_{\text{MAX}}$                   | Maximum Clock Frequency                                    | $3.3 \pm 0.3$ | $C_L = 15\text{pF}$       | 90                       | 140  |      | 75                                                  |      | MHz   |
|                                    |                                                            |               | $C_L = 50\text{pF}$       | 50                       | 75   |      | 45                                                  |      |       |
|                                    |                                                            | $5.0 \pm 0.5$ | $C_L = 15\text{pF}$       | 150                      | 210  |      | 125                                                 |      | MHz   |
|                                    |                                                            |               | $C_L = 50\text{pF}$       | 85                       | 115  |      | 75                                                  |      |       |
| $t_{\text{PLH}}, t_{\text{PHL}}$   | Propagation Delay Time, (CP to $Q_n$ or $\overline{Q}_n$ ) | $3.3 \pm 0.3$ | $C_L = 15\text{pF}$       |                          | 7.5  | 11.5 | 1.0                                                 | 13.5 | ns    |
|                                    |                                                            |               | $C_L = 50\text{pF}$       |                          | 10.0 | 15.0 | 1.0                                                 | 17.0 |       |
|                                    |                                                            | $5.0 \pm 0.5$ | $C_L = 15\text{pF}$       |                          | 4.8  | 7.3  | 1.0                                                 | 8.5  | ns    |
|                                    |                                                            |               | $C_L = 50\text{pF}$       |                          | 6.3  | 9.3  | 1.0                                                 | 10.5 |       |
| $t_{\text{PLH}}, t_{\text{PHL}}$   | Propagation Delay Time, (MR to $Q_n$ or $\overline{Q}_n$ ) | $3.3 \pm 0.3$ | $C_L = 15\text{pF}$       |                          | 6.3  | 10.1 | 1.0                                                 | 12.0 | ns    |
|                                    |                                                            |               | $C_L = 50\text{pF}$       |                          | 8.8  | 13.6 | 1.0                                                 | 15.5 |       |
|                                    |                                                            | $5.0 \pm 0.5$ | $C_L = 15\text{pF}$       |                          | 4.3  | 6.4  | 1.0                                                 | 7.5  | ns    |
|                                    |                                                            |               | $C_L = 50\text{pF}$       |                          | 5.8  | 8.4  | 1.0                                                 | 9.5  |       |
| $t_{\text{OSLH}}, t_{\text{OSHL}}$ | Output to Output Skew                                      | $3.3 \pm 0.3$ | $C_L = 50\text{pF}$       |                          |      | 1.5  |                                                     | 1.5  |       |
|                                    |                                                            | $5.0 \pm 0.5$ | $C_L = 50\text{pF}^{(3)}$ |                          |      | 1.0  |                                                     | 1.0  |       |
| $C_{\text{IN}}$                    | Input Capacitance                                          |               | $V_{CC} = \text{Open}$    |                          | 4    | 10   |                                                     | 10   | pF    |
| $C_{\text{PD}}$                    | Power Dissipation Capacitance                              |               | <sup>(4)</sup>            |                          | 44   |      |                                                     |      | pF    |

## Notes:

3. Parameter guaranteed by design.  $t_{\text{OSLH}} = |t_{\text{PLHmax}} - t_{\text{PLHmin}}|$ ;  $t_{\text{OSHL}} = |t_{\text{PHLmax}} - t_{\text{PHLmin}}|$ .

4.  $C_{\text{PD}}$  is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load. Average operating current can be obtained from the equation:

$I_{\text{CC}}(\text{opr.}) = C_{\text{PD}} \cdot V_{\text{CC}} \cdot f_{\text{IN}} + I_{\text{CC}}/4$  (per F/F), and the total  $C_{\text{PD}}$  when n pcs of the Flip-Flop operate can be calculated by the following equation:  $C_{\text{PD}}(\text{total}) = 30 + 14 \cdot n$

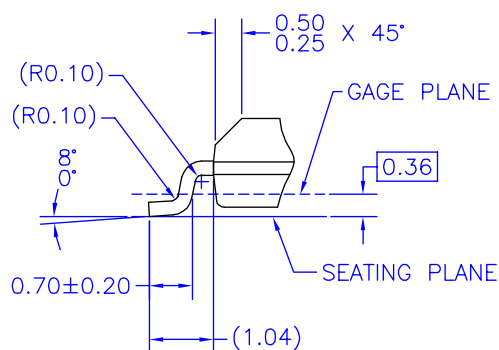
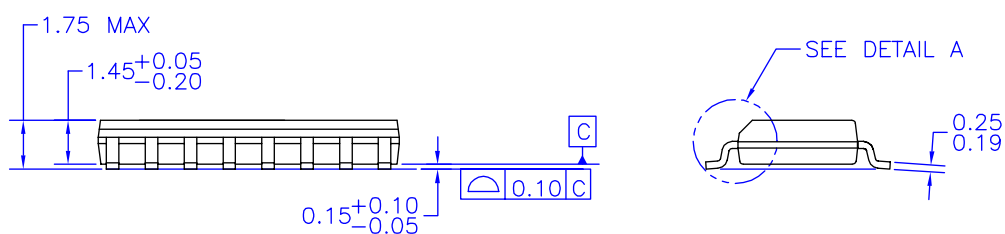
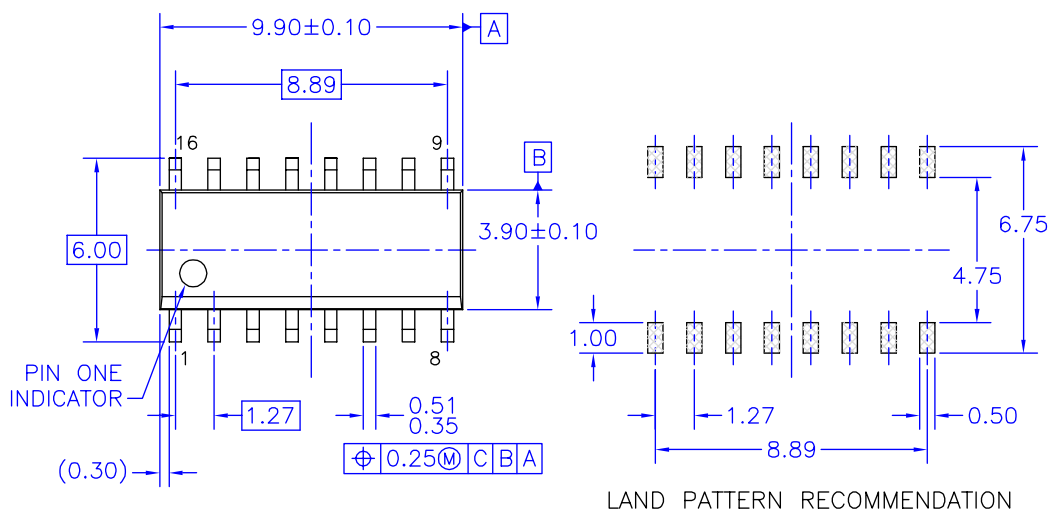
## AC Operating Requirements

| Symbol                                 | Parameter                                       | V <sub>CC</sub> (V) <sup>(5)</sup> | T <sub>A</sub> = 25°C |                    | T <sub>A</sub> = −40°C to +85°C | Units |
|----------------------------------------|-------------------------------------------------|------------------------------------|-----------------------|--------------------|---------------------------------|-------|
|                                        |                                                 |                                    | Typ.                  | Guaranteed Minimum |                                 |       |
| t <sub>W</sub> (L), t <sub>W</sub> (H) | Minimum Pulse Width (CP)                        | 3.3                                |                       | 5.0                | 5.0                             | ns    |
|                                        |                                                 | 5.0                                |                       | 5.0                | 5.0                             |       |
| t <sub>W</sub> (L)                     | Minimum Pulse Width ( $\overline{\text{MR}}$ )  | 3.3                                |                       | 5.0                | 5.0                             | ns    |
|                                        |                                                 | 5.0                                |                       | 5.0                | 5.0                             |       |
| t <sub>S</sub>                         | Minimum Setup Time (Dn to CP)                   | 3.3                                |                       | 5.0                | 5.0                             | ns    |
|                                        |                                                 | 5.0                                |                       | 4.0                | 4.0                             |       |
| t <sub>H</sub>                         | Minimum Hold Time (Dn to CP)                    | 3.3                                |                       | 1.0                | 1.0                             | ns    |
|                                        |                                                 | 5.0                                |                       | 1.0                | 1.0                             |       |
| t <sub>REC</sub>                       | Minimum Removal Time ( $\overline{\text{MR}}$ ) | 3.3                                |                       | 5.0                | 5.0                             | ns    |
|                                        |                                                 | 5.0                                |                       | 5.0                | 5.0                             |       |

## Note:

5.  $V_{CC}$  is  $3.3 \pm 0.3\text{V}$  or  $5.0 \pm 0.5\text{V}$

Dimensions are in millimeters unless otherwise noted.



DETAIL A  
SCALE: 2:1

- NOTES: UNLESS OTHERWISE SPECIFIED

- A) THIS PACKAGE CONFORMS TO JEDEC MS-012, VARIATION AC, ISSUE C, DATED MAY 1990.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DIMENSIONS DO NOT INCLUDE MOLD FLASH OR BURRS.
- D) STANDARD LEAD FINISH:  
200 MICROINCHES / 5.08 MICRONS MIN.  
LEAD/TIN (SOLDER) ON COPPER.

B) ALL DIMENSIONS ARE IN MILLIMETERS.

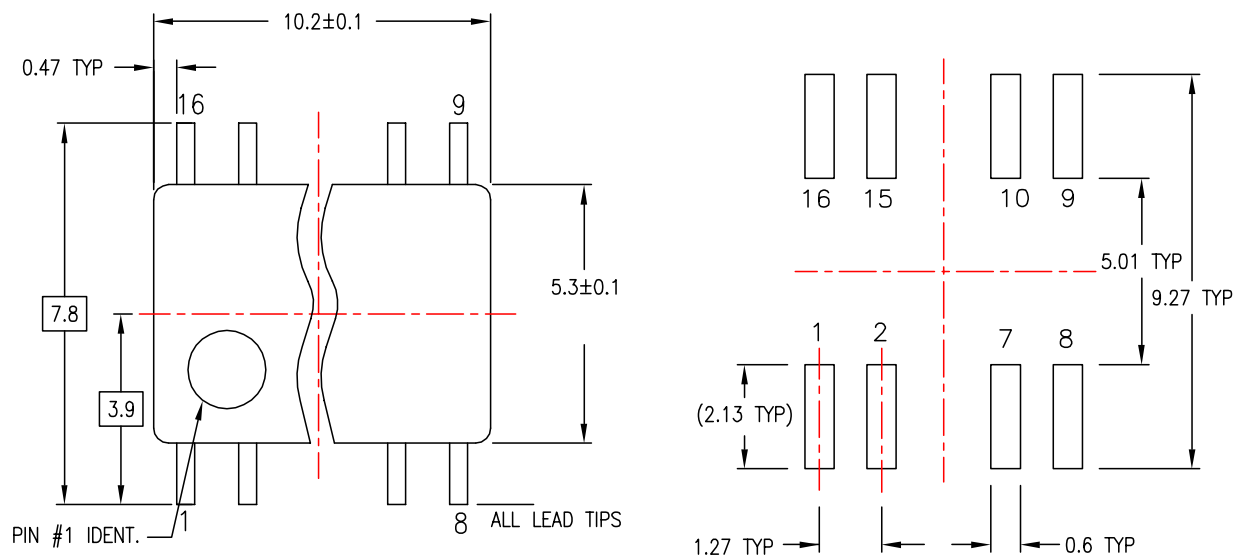
C) DIMENSIONS DO NOT INCLUDE MOLD FLASH OR BURRS.

D) STANDARD LEAD FINISH:  
200 MICROINCHES / 5.08 MICRONS MIN.  
LEAD/TIN (SOLDER) ON COPPER.

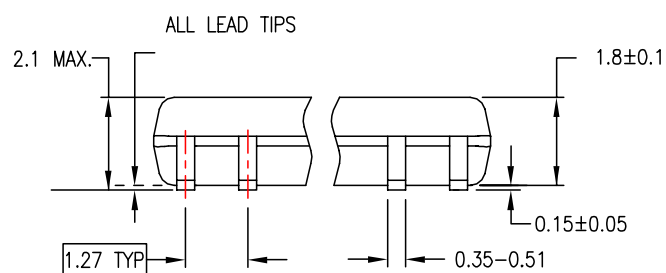
M16AREVK

**Figure 1. 16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow Package Number M16A**

Dimensions are in millimeters unless otherwise noted.



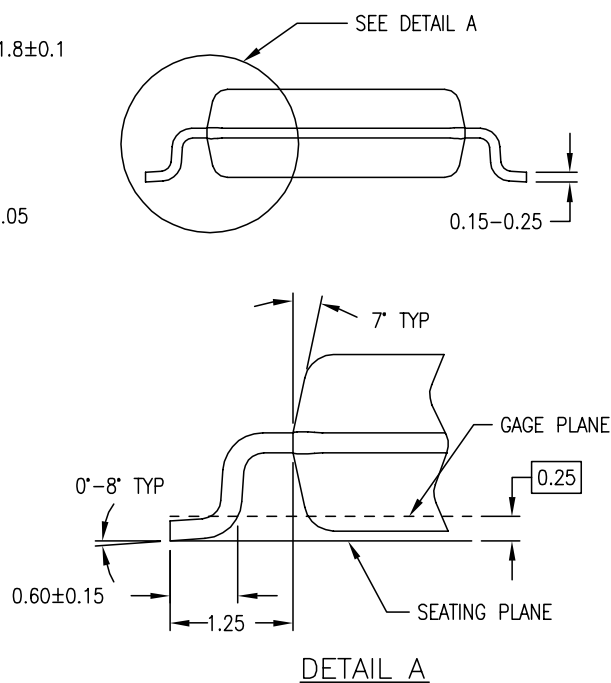
## LAND PATTERN RECOMMENDATION



DIMENSIONS ARE IN MILLIMETERS

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.



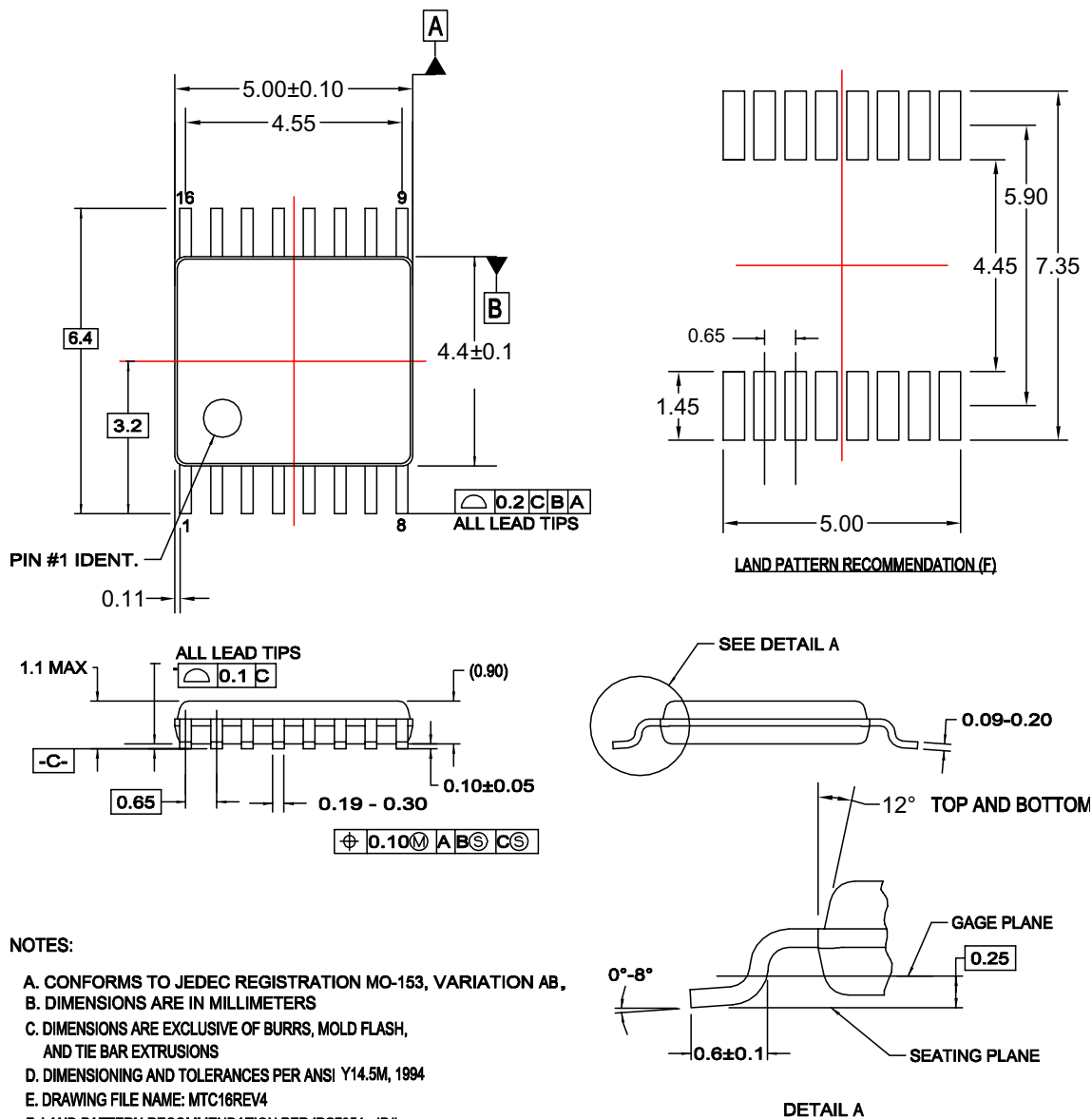
DETAIL A

M16DREVC

**Figure 2. 16-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide  
Package Number M16D**

**Physical Dimensions** (Continued)

Dimensions are in millimeters unless otherwise noted.



MTC16rev4

**Figure 3. 16-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide Package Number MTC16**



## TRADEMARKS

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

|                                                  |                                |                                                                                   |                             |
|--------------------------------------------------|--------------------------------|-----------------------------------------------------------------------------------|-----------------------------|
| ACE <sup>®</sup>                                 | <i>i-Lo</i> <sup>™</sup>       | Power-SPM <sup>™</sup>                                                            | TinyBoost <sup>™</sup>      |
| Across the board. Around the world. <sup>™</sup> | ImpliedDisconnect <sup>™</sup> | PowerTrench <sup>®</sup>                                                          | TinyBuck <sup>™</sup>       |
| ActiveArray <sup>™</sup>                         | IntelliMAX <sup>™</sup>        | Programmable Active Droop <sup>™</sup>                                            | TinyLogic <sup>®</sup>      |
| Bottomless <sup>™</sup>                          | ISOPPLANAR <sup>™</sup>        | QFET <sup>®</sup>                                                                 | TINYOPTO <sup>™</sup>       |
| Build it Now <sup>™</sup>                        | MICROCOUPLER <sup>™</sup>      | QS <sup>™</sup>                                                                   | TinyPower <sup>™</sup>      |
| CoolFET <sup>™</sup>                             | MicroPak <sup>™</sup>          | QT Optoelectronics <sup>™</sup>                                                   | TinyWire <sup>™</sup>       |
| CROSSVOLT <sup>™</sup>                           | MICROWIRE <sup>™</sup>         | Quiet Series <sup>™</sup>                                                         | TruTranslation <sup>™</sup> |
| CTL <sup>™</sup>                                 | Motion-SPM <sup>™</sup>        | RapidConfigure <sup>™</sup>                                                       | μSerDes <sup>™</sup>        |
| Current Transfer Logic <sup>™</sup>              | MSX <sup>™</sup>               | RapidConnect <sup>™</sup>                                                         | UHC <sup>®</sup>            |
| DOVE <sup>™</sup>                                | MSXPro <sup>™</sup>            | ScalarPump <sup>™</sup>                                                           | UniFET <sup>™</sup>         |
| E <sup>2</sup> CMOS <sup>™</sup>                 | OCX <sup>™</sup>               | SMART START <sup>™</sup>                                                          | VCX <sup>™</sup>            |
| EcoSPARK <sup>®</sup>                            | OCXPro <sup>™</sup>            | SPM <sup>®</sup>                                                                  | Wire <sup>™</sup>           |
| EnSigna <sup>™</sup>                             | OPTOLOGIC <sup>®</sup>         | STEALTH <sup>™</sup>                                                              |                             |
| FACT Quiet Series <sup>™</sup>                   | OPTOPLANAR <sup>®</sup>        | SuperFET <sup>™</sup>                                                             |                             |
| FACT <sup>®</sup>                                | PACMAN <sup>™</sup>            | SuperSOT <sup>™</sup> -3                                                          |                             |
| FAST <sup>®</sup>                                | PDP-SPM <sup>™</sup>           | SuperSOT <sup>™</sup> -6                                                          |                             |
| FASTr <sup>™</sup>                               | POP <sup>™</sup>               | SuperSOT <sup>™</sup> -8                                                          |                             |
| FPS <sup>™</sup>                                 | Power220 <sup>®</sup>          | SyncFET <sup>™</sup>                                                              |                             |
| FRFET <sup>®</sup>                               | Power247 <sup>®</sup>          | TCM <sup>™</sup>                                                                  |                             |
| GlobalOptoisolator <sup>™</sup>                  | PowerEdge <sup>™</sup>         | The Power Franchise <sup>®</sup>                                                  |                             |
| GTO <sup>™</sup>                                 | PowerSaver <sup>™</sup>        |  |                             |
| HiSeC <sup>™</sup>                               |                                |                                                                                   |                             |

## 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:

1. 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 a significant injury of the user.
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 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. I26