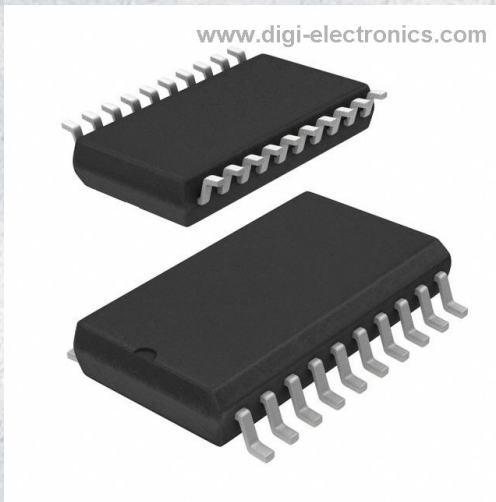


# 74LVX574SJ Datasheet



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|                              |  |
|------------------------------|--|
| DiGi Electronics Part Number | 74LVX574SJ-DG  |
| Manufacturer                 | <a href="#">onsemi</a>   |
| Manufacturer Product Number  | 74LVX574SJ   |
| Description                  | IC FF D-TYPE SNGL 8BIT 20SOP   |
| Detailed Description         | Flip Flop 1 Element D-Type 8 Bit Positive Edge 20-S OIC (0.209", 5.30mm Width) |



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## Purchase and inquiry

Manufacturer Product Number:

74LVX574SJ

Series:

74LVX

Function:

Standard

Output Type:

Tri-State, Non-Inverted

Number of Bits per Element:

8

Max Propagation Delay @ V, Max CL:

16.7ns @ 3.3V, 50pF

Current - Output High, Low:

4mA, 4mA

Current - Quiescent (Iq):

4  $\mu$ A

Operating Temperature:

-40°C ~ 85°C (TA)

Supplier Device Package:

20-SOP

Base Product Number:

74LVX574

Manufacturer:

onsemi

Product Status:

Obsolete

Type:

D-Type

Number of Elements:

1

Clock Frequency:

75 MHz

Trigger Type:

Positive Edge

Voltage - Supply:

2V ~ 3.6V

Input Capacitance:

4 pF

Mounting Type:

Surface Mount

Package / Case:

20-SOIC (0.209", 5.30mm Width)

## Environmental & Export classification

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99

REACH Status:

REACH Unaffected

HTSUS:

8542.39.0001



June 1993  
Revised April 2005

## 74LVX574

### Low Voltage Octal D-Type Flip-Flop with 3-STATE Outputs

#### General Description

The LVX574 is a high-speed octal D-type flip-flop which is controlled by an edge-triggered clock input (CP) and a buffered common Output Enable ( $\overline{OE}$ ) input. When the  $\overline{OE}$  input is HIGH, the eight outputs are in a high impedance state. The LVX574 is functionally identical to the LVX374 but with inputs and outputs on opposite sides of the package. The inputs tolerate up to 7V allowing interface of 5V systems to 3V systems.

#### Features

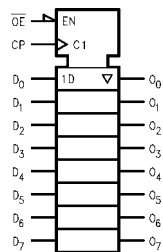
- Input voltage translation from 5V to 3V
- Ideal for low power/low noise 3.3V applications
- Guaranteed simultaneous switching noise level and dynamic threshold performance

#### Ordering Code:

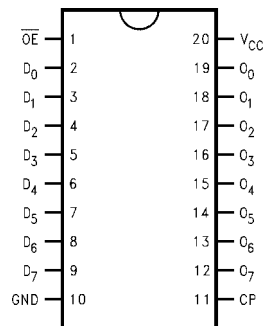
| Order Number | Package Number | Package Description   |
|--------------|----------------|---|
| 74LVX574M    | M20B           | 20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide  |
| 74LVX574SJ   | M20D           | Pb-Free 20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide       |
| 74LVX574MTC  | MTC20          | 20-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide |

Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.  
Pb-Free package per JEDEC J-STD-020B.

#### Logic Symbol



#### Connection Diagram



#### Pin Descriptions

| Pin Names                      | Description                 |
|--------------------------------|-----------------------------|
| D <sub>0</sub> -D <sub>7</sub> | Data Inputs                 |
| CP                             | Clock Pulse Input           |
| $\overline{OE}$                | 3-STATE Output Enable Input |
| O <sub>0</sub> -O <sub>7</sub> | 3-STATE Outputs             |

74LVX574 Low Voltage Octal D-Type Flip-Flop with 3-STATE Outputs

74LVX574

## Functional Description

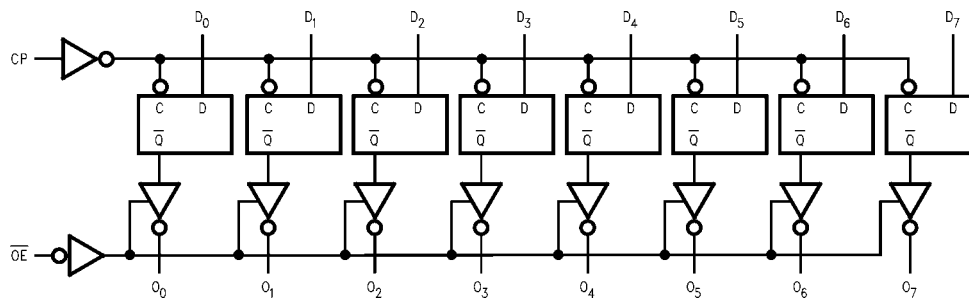
The LVX574 consists of eight edge-triggered flip-flops with individual D-type inputs and 3-STATE true outputs. The buffered clock and buffered Output Enable are common to all flip-flops. The eight flip-flops will store the state of their individual D inputs that meet the setup and hold time requirements on the LOW-to-HIGH Clock (CP) transition. With the Output Enable ( $\overline{OE}$ ) LOW, the contents of the eight flip-flops are available at the outputs. When the  $\overline{OE}$  is HIGH, the outputs go to the high impedance state. Operation of the  $\overline{OE}$  input does not affect the state of the flip-flops.

## Truth Table

| Inputs |    |                 | Outputs |
|--------|----|-----------------|---------|
| $D_n$  | CP | $\overline{OE}$ | $O_n$   |
| H      | ↗  | L               | H       |
| L      | ↗  | L               | L       |
| X      | X  | H               | Z       |

H = HIGH Voltage Level  
 L = LOW Voltage Level  
 X = Immaterial  
 Z = High Impedance  
 ↗ = LOW-to-HIGH Transition

## Logic Diagram



**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                   |
| DC Input Voltage ( $V_I$ )                                 | -0.5V to 7V              |
| 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 ( $I_O$ )              | $\pm 25$ mA              |
| DC $V_{CC}$ or Ground Current<br>( $I_{CC}$ or $I_{GND}$ ) | $\pm 75$ mA              |
| Storage Temperature ( $T_{STG}$ )                          | -65°C to +150°C          |
| Power Dissipation  | 180 mW                   |

**Recommended Operating Conditions** (Note 2)

|  |                    |
|--|--------------------|
| Supply Voltage ( $V_{CC}$ )                      | 2.0V to 3.6V       |
| Input Voltage ( $V_I$ )                          | 0V to 5.5V         |
| Output Voltage ( $V_O$ )                         | 0V to $V_{CC}$     |
| Operating Temperature ( $T_A$ )                  | -40°C to +85°C     |
| Input Rise and Fall Time ( $\Delta t/\Delta V$ ) | 0 ns/V to 100 ns/V |

**Note 1:** The "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the Electrical Characteristics tables are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

**Note 2:** Unused inputs must be held HIGH or LOW. They may not float.

**DC Electrical Characteristics**

| Symbol   | Parameter                           | $V_{CC}$ | $T_A = +25^\circ\text{C}$ |     |            | $T_A = -40^\circ\text{C to } +85^\circ\text{C}$ |           | Units         | Conditions   |
|----------|-------------------------------------|----------|---------------------------|-----|------------|---|-----------|---------------|--|
|          |                                     |          | Min                       | Typ | Max        | Min   | Max       |               |  |
| $V_{IH}$ | HIGH Level<br>Input Voltage         | 2.0      | 1.5                       |     |            | 1.5   |           | V             |  |
|          |                                     | 3.0      | 2.0                       |     |            | 2.0   |           |               |  |
|          |                                     | 3.6      | 2.4                       |     |            | 2.4   |           |               |  |
| $V_{IL}$ | LOW Level<br>Input Voltage          | 2.0      |                           |     | 0.5        |   | 0.5       | V             |  |
|          |                                     | 3.0      |                           |     | 0.8        |   | 0.8       |               |  |
|          |                                     | 3.6      |                           |     | 0.8        |   | 0.8       |               |  |
| $V_{OH}$ | HIGH Level<br>Output Voltage        | 2.0      | 1.9                       | 2.0 |            | 1.9   |           | V             | $V_{IN} = V_{IH}$ or $V_{IL}$<br>$I_{OH} = -50 \mu\text{A}$<br>$I_{OH} = -50 \mu\text{A}$<br>$I_{OH} = -4 \text{mA}$ |
|          |                                     | 3.0      | 2.9                       | 3.0 |            | 2.9   |           |               |  |
|          |                                     | 3.0      | 2.58                      |     |            | 2.48  |           |               |  |
| $V_{OL}$ | LOW Level<br>Output Voltage         | 2.0      |                           | 0.0 | 0.1        |   | 0.1       | V             | $V_{IN} = V_{IH}$ or $V_{IL}$<br>$I_{OL} = 50 \mu\text{A}$<br>$I_{OL} = 50 \mu\text{A}$<br>$I_{OL} = 4 \text{mA}$    |
|          |                                     | 3.0      |                           | 0.0 | 0.1        |   | 0.1       |               |  |
|          |                                     | 3.0      |                           |     | 0.36       |   | 0.44      |               |  |
| $I_{OZ}$ | 3-STATE Output<br>Off-State Current | 3.6      |                           |     | $\pm 0.25$ |   | $\pm 2.5$ | $\mu\text{A}$ | $V_{IN} = V_{IH}$ or $V_{IL}$<br>$V_{OUT} = V_{CC}$ or GND   |
| $I_{IN}$ | Input Leakage Current               | 3.6      |                           |     | $\pm 0.1$  |   | $\pm 1.0$ | $\mu\text{A}$ | $V_{IN} = 5.5V$ or GND   |
| $I_{CC}$ | Quiescent Supply Current            | 3.6      |                           |     | 4.0        |   | 40.0      | $\mu\text{A}$ | $V_{IN} = V_{CC}$ or GND   |

**Noise Characteristics** (Note 3)

| Symbol    | Parameter                                | $V_{CC}$<br>(V) | $T_A = 25^\circ\text{C}$ |       | Units | $C_L$ (pF) |
|-----------|--|-----------------|--------------------------|-------|-------|------------|
|           |  |                 | Typ                      | Limit |       |            |
| $V_{OLP}$ | Quiet Output Maximum Dynamic $V_{OL}$    | 3.3             | 0.5                      | 0.8   | V     | 50         |
| $V_{OLV}$ | Quiet Output Minimum Dynamic $V_{OL}$    | 3.3             | -0.5                     | -0.8  | V     | 50         |
| $V_{IHD}$ | Minimum HIGH Level Dynamic Input Voltage | 3.3             |                          | 2.0   | V     | 50         |
| $V_{ILD}$ | Maximum LOW Level Dynamic Input Voltage  | 3.3             |                          | 0.8   | V     | 50         |

**Note 3:** (Input  $t_r = t_f = 3$  ns)

74LVX574

| AC Electrical Characteristics (Note 4) |   |                        |                        |      |      |                                 |   |       |   |
|--|---|------------------------|------------------------|------|------|---------------------------------|---|-------|---|
| Symbol                                 | Parameter   | V <sub>CC</sub><br>(V) | T <sub>A</sub> = +25°C |      |      | T <sub>A</sub> = -40°C to +85°C |   | Units | Conditions                                    |
|  |   |                        | Min                    | Typ  | Max  | Min                             | Max   |       |   |
| f <sub>MAX</sub>                       | Maximum<br>Clock<br>Frequency                     | 2.7                    | 60                     | 115  |      | 50                              |   | MHZ   | C <sub>L</sub> = 15 pF                        |
|  |   |                        | 45                     | 60   |      | 40                              |   |       | C <sub>L</sub> = 50 pF                        |
|  |   | 3.3 ± 0.3              | 80                     | 125  |      | 65                              |   |       | C <sub>L</sub> = 15 pF                        |
|  |   |                        | 50                     | 75   |      | 45                              |   |       | C <sub>L</sub> = 50 pF                        |
| t <sub>PLH</sub>                       | Propagation<br>Delay Time<br>CP to O <sub>n</sub> | 2.7                    |                        | 9.2  | 14.5 | 1.0                             | 17.5  | ns    | C <sub>L</sub> = 15 pF                        |
| t <sub>PHL</sub>                       |   |                        |                        | 11.5 | 18.0 | 1.0                             | 21.0  |       | C <sub>L</sub> = 50 pF                        |
| 3.3 ± 0.3                              |   |                        | 8.5                    | 13.2 | 1.0  | 15.5                            | C <sub>L</sub> = 15 pF                        |       |   |
|  |   |                        | 11.0                   | 16.7 | 1.0  | 19.0                            | C <sub>L</sub> = 50 pF                        |       |   |
| t <sub>PZL</sub>                       | 3-STATE Output<br>Enable Time                     | 2.7                    |                        | 9.8  | 15.0 | 1.0                             | 18.5  | ns    | C <sub>L</sub> = 15 pF, R <sub>L</sub> = 1 kΩ |
| t <sub>PZH</sub>                       |   |                        |                        | 11.4 | 18.5 | 1.0                             | 22.0  |       | C <sub>L</sub> = 50 pF, R <sub>L</sub> = 1 kΩ |
| 3.3 ± 0.3                              |   |                        | 8.2                    | 12.8 | 1.0  | 15.0                            | C <sub>L</sub> = 15 pF, R <sub>L</sub> = 1 kΩ |       |   |
|  |   |                        | 10.7                   | 16.3 | 1.0  | 18.5                            | C <sub>L</sub> = 50 pF, R <sub>L</sub> = 1 kΩ |       |   |
| t <sub>PLZ</sub>                       | 3-STATE Output<br>Disable Time                    | 2.7                    |                        | 12.1 | 19.1 | 1.0                             | 22.0  | ns    | C <sub>L</sub> = 50 pF, R <sub>L</sub> = 1 kΩ |
| t <sub>PHZ</sub>                       |   | 3.3 ± 0.3              |                        | 11.0 | 15.0 | 1.0                             | 17.0  |       | C <sub>L</sub> = 50 pF, R <sub>L</sub> = 1 kΩ |
| t <sub>w</sub>                         | CP Pulse  | 2.7                    | 6.5                    |      |      | 7.5                             |   | ns    |   |
|  | Width   | 3.3 ± 0.3              | 5.0                    |      |      | 5.0                             |   |       |   |
| t <sub>s</sub>                         | Setup Time  | 2.7                    | 5.0                    |      |      | 5.0                             |   | ns    |   |
|  | D <sub>n</sub> to CP                              | 3.3 ± 0.3              | 3.5                    |      |      | 3.5                             |   |       |   |
| t <sub>H</sub>                         | Hold Time   | 2.7                    | 1.5                    |      |      | 1.5                             |   | ns    |   |
|  | D <sub>n</sub> to CP                              | 3.3 ± 0.3              | 1.5                    |      |      | 1.5                             |   |       |   |
| t <sub>OSHL</sub>                      | Output to Output                                  | 2.7                    |                        |      | 1.5  |                                 | 1.5   | ns    | C <sub>L</sub> = 50 pF                        |
| t <sub>OSLH</sub>                      | Skew (Note 4)                                     | 3.3                    |                        |      | 1.5  |                                 | 1.5   |       |   |

**Note 4:** Parameter guaranteed by design. t<sub>OSLH</sub> = |t<sub>PLHm</sub> - t<sub>PLHn</sub>|, t<sub>OSHL</sub> = |t<sub>PHLm</sub> - t<sub>PHLn</sub>|.

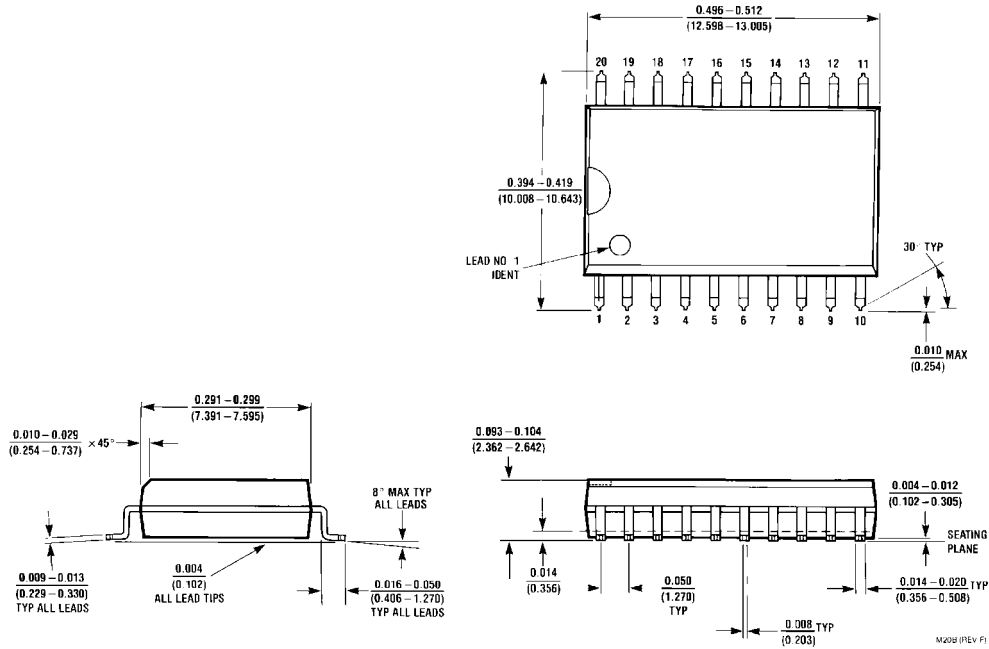
### Capacitance

| Symbol           | Parameter                                 | T <sub>A</sub> = +25°C |     |     | T <sub>A</sub> = -40°C to +85°C |     | Units |
|------------------|---|------------------------|-----|-----|---------------------------------|-----|-------|
|                  |   | Min                    | Typ | Max | Min                             | Max |       |
| C <sub>IN</sub>  | Input Capacitance                         |                        | 4   | 10  |                                 | 10  | pF    |
| C <sub>OUT</sub> | Output Capacitance                        |                        | 6   |     |                                 |     | pF    |
| C <sub>PD</sub>  | Power Dissipation<br>Capacitance (Note 5) |                        | 27  |     |                                 |     | pF    |

**Note 5:** C<sub>PD</sub> is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

$$\text{Average operating current can be obtained by the equation: } I_{CC(\text{opr.})} = \frac{C_{PD} \times V_{CC} \times f_{IN} + I_{CC}}{8 \text{ (per latch)}}$$

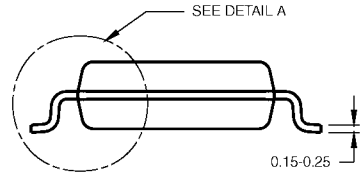
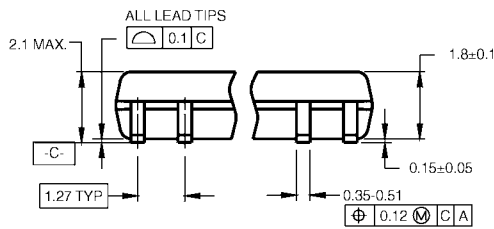
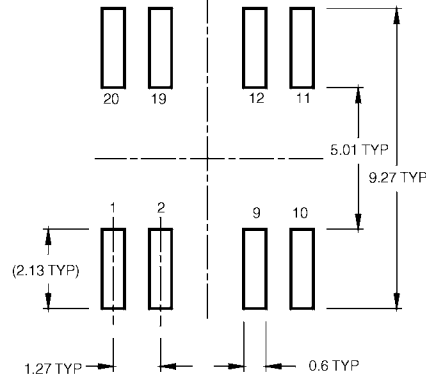
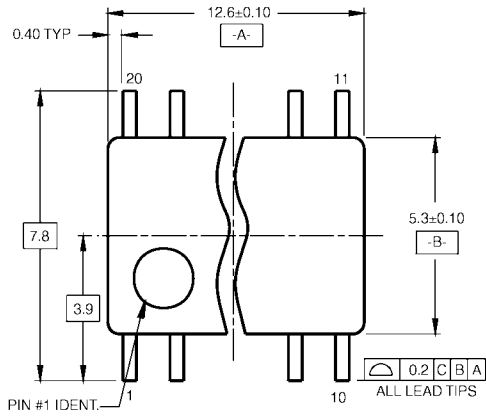
**Physical Dimensions** inches (millimeters) unless otherwise noted



**20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide  
Package Number M20B**

74LVX574

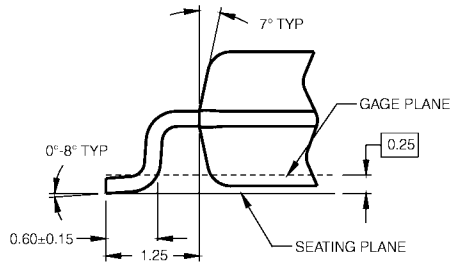
**Physical Dimensions** inches (millimeters) unless otherwise noted (Continued)



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.

M20DRevB1

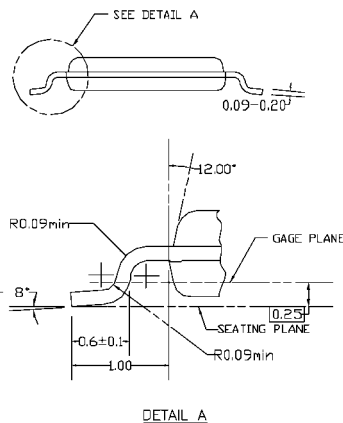
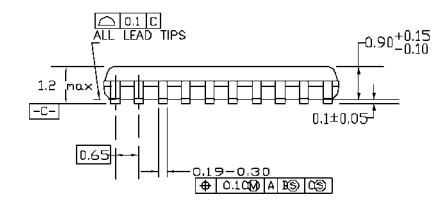
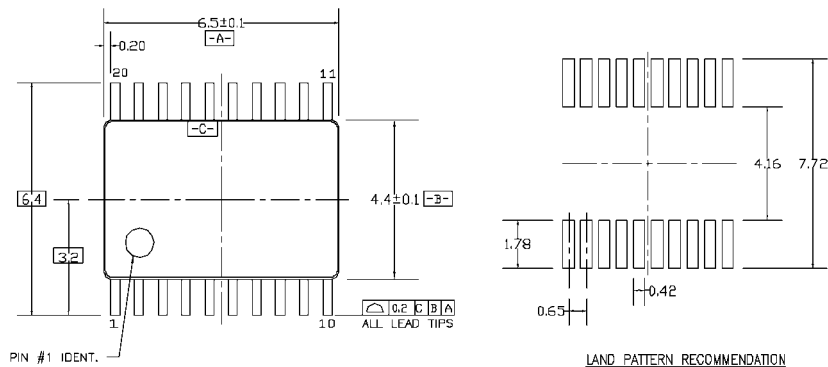


DETAIL A

**Pb-Free 20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide Package Number M20D**



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



DIMENSIONS ARE IN MILLIMETERS

NOTES:

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

MTC20REVD1

**20-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide Package Number MTC20**

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