

# 74LCX373

## Low Voltage Octal Transparent Latch with 5V Tolerant Inputs and Outputs

### General Description

The LCX373 consists of eight latches with 3-STATE outputs for bus organized system applications. The device is designed for low voltage (3.3V or 2.5V)  $V_{CC}$  applications with capability of interfacing to a 5V signal environment.

The LCX373 is fabricated with an advanced CMOS technology to achieve high speed operation while maintaining CMOS low power dissipation.

### Features

- 5V tolerant inputs and outputs
- 2.3V–3.6V  $V_{CC}$  specifications provided
- 8.0 ns  $t_{PD}$  max ( $V_{CC} = 3.3V$ ), 10  $\mu A$   $I_{CC}$  max
- Power-down high impedance inputs and outputs
- Supports live insertion/withdrawal (Note )
- $\pm 24$  mA output drive ( $V_{CC} = 3.0V$ )
- Implements patented noise/EMI reduction circuitry
- Latch-up performance exceeds JEDEC 78 conditions
- ESD performance:
  - Human Body Model > 2000V
  - Machine Model > 200V
- Leadless Pb-Free DQFN package

**Note 1:** To ensure the high-impedance state during power up or down,  $\overline{OE}$  should be tied to  $V_{CC}$  through a pull-up resistor: the minimum value or the resistor is determined by the current-sourcing capability of the driver.

### Ordering Code:

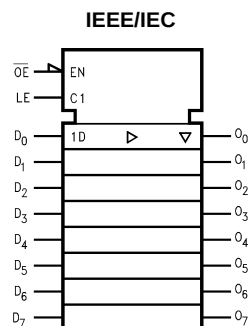
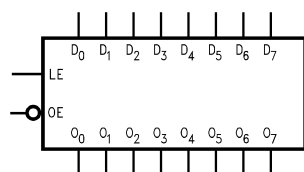
| Order Number                             | Package Number | Package Description                                                                                 |
|------------------------------------------|----------------|-----------------------------------------------------------------------------------------------------|
| 74LCX373WM                               | M20B           | 20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide                          |
| 74LCX373SJ                               | M20D           | Pb-Free 20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide                               |
| 74LCX373BQX<br>(Preliminary)<br>(Note 2) | MLP020B        | Pb-Free 20-Terminal Depopulated Quad Very-Thin Flat Pack No Leads (DQFN), JEDEC MO-241, 2.5 x 4.5mm |
| 74LCX373MSA                              | MSA20          | 20-Lead Shrink Small Outline Package (SSOP), JEDEC MO-150, 5.3mm Wide                               |
| 74LCX373MTC                              | MTC20          | 20-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide                         |
| 74LCX373MTCX_NL<br>(Note 3)              | MTC20          | Pb-Free 20-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide                 |

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

**Note 2:** DQFN package available in Tape and Reel only.

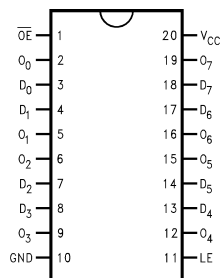
**Note 3:** "\_NL" indicates Pb-Free package (per JEDEC J-STD-020B). Device available in Tape and Reel only.

## Logic Symbols

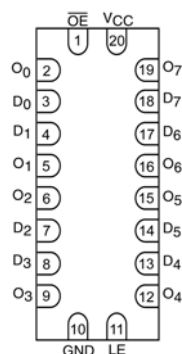


## Connection Diagrams

Pin Assignments for  
SOIC, SOP, SSOP, TSSOP



Pad Assignments for DQFN



(Top View)

## Pin Descriptions

| Pin Names                      | Description           |
|--------------------------------|-----------------------|
| D <sub>0</sub> –D <sub>7</sub> | Data Inputs           |
| LE                             | Latch Enable Input    |
| $\overline{\text{OE}}$         | Output Enable Input   |
| O <sub>0</sub> –O <sub>7</sub> | 3-STATE Latch Outputs |

## Truth Table

| Inputs |                        |                | Outputs        |
|--------|------------------------|----------------|----------------|
| LE     | $\overline{\text{OE}}$ | D <sub>n</sub> | O <sub>n</sub> |
| X      | H                      | X              | Z              |
| H      | L                      | L              | L              |
| H      | L                      | H              | H              |
| L      | L                      | X              | O <sub>0</sub> |

H = HIGH Voltage Level

L = LOW Voltage Level

Z = High Impedance

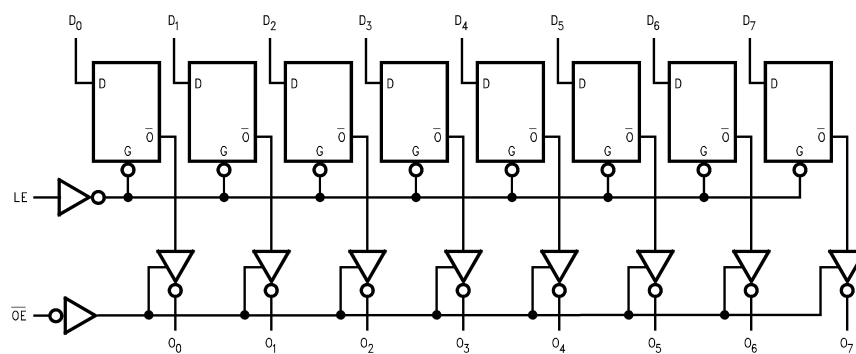
X = Immaterial

O<sub>0</sub> = Previous O<sub>0</sub> before HIGH-to-LOW transition of Latch Enable

## Functional Description

The LCX373 contains eight D-type latches with 3-STATE standard outputs. When the Latch Enable (LE) input is HIGH, data on the D<sub>n</sub> inputs enters the latches. In this condition the latches are transparent, i.e. a latch output will change state each time its D input changes. When LE is LOW, the latches store the information that was present on the D inputs a setup time preceding the HIGH-to-LOW transition of LE. The 3-STATE standard outputs are controlled by the Output Enable ( $\overline{\text{OE}}$ ) input. When  $\overline{\text{OE}}$  is LOW, the standard outputs are in the 2-state mode. When  $\overline{\text{OE}}$  is HIGH, the standard outputs are in the high impedance mode but this does not interfere with entering new data into the latches.

## 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**(Note 4)

| Symbol    | Parameter                        | Value                                  | Conditions                                                | Units |
|-----------|----------------------------------|----------------------------------------|-----------------------------------------------------------|-------|
| $V_{CC}$  | Supply Voltage                   | -0.5 to +7.0                           |                                                           | V     |
| $V_I$     | DC Input Voltage                 | -0.5 to +7.0                           |                                                           | V     |
| $V_O$     | DC Output Voltage                | -0.5 to +7.0<br>-0.5 to $V_{CC} + 0.5$ | Output in 3-STATE<br>Output in HIGH or LOW State (Note 5) | V     |
| $I_{IK}$  | DC Input Diode Current           | -50                                    | $V_I < \text{GND}$                                        | mA    |
| $I_{OK}$  | DC Output Diode Current          | -50<br>+50                             | $V_O < \text{GND}$<br>$V_O > V_{CC}$                      | mA    |
| $I_O$     | DC Output Source/Sink Current    | $\pm 50$                               |                                                           | mA    |
| $I_{CC}$  | DC Supply Current per Supply Pin | $\pm 100$                              |                                                           | mA    |
| $I_{GND}$ | DC Ground Current per Ground Pin | $\pm 100$                              |                                                           | mA    |
| $T_{STG}$ | Storage Temperature              | -65 to +150                            |                                                           | °C    |

**Recommended Operating Conditions** (Note 6)

| Symbol              | Parameter                                                 | Min                    | Max | Units    |
|---------------------|-----------------------------------------------------------|------------------------|-----|----------|
| $V_{CC}$            | Supply Voltage                                            | Operating              | 2.0 | 3.6      |
|                     |                                                           | Data Retention         | 1.5 | 3.6      |
| $V_I$               | Input Voltage                                             | 0                      | 5.5 | V        |
| $V_O$               | Output Voltage                                            | HIGH or LOW State      | 0   | $V_{CC}$ |
|                     |                                                           | 3-STATE                | 0   | 5.5      |
| $I_{OH}/I_{OL}$     | Output Current                                            | $V_{CC} = 3.0V - 3.6V$ |     | $\pm 24$ |
|                     |                                                           | $V_{CC} = 2.7V - 3.0V$ |     | $\pm 12$ |
|                     |                                                           | $V_{CC} = 2.3V - 2.7V$ |     | $\pm 8$  |
|                     |                                                           |                        |     | mA       |
| $T_A$               | Free-Air Operating Temperature                            | -40                    | 85  | °C       |
| $\Delta t/\Delta V$ | Input Edge Rate, $V_{IN} = 0.8V - 2.0V$ , $V_{CC} = 3.0V$ | 0                      | 10  | ns/V     |

**Note 4:** 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 5:**  $I_O$  Absolute Maximum Rating must be observed.

**Note 6:** Unused inputs must be held HIGH or LOW. They may not float.

**DC Electrical Characteristics**

| Symbol    | Parameter                 | Conditions                                                  | $V_{CC}$<br>(V) | $T_A = -40^\circ\text{C to } +85^\circ\text{C}$ |           | Units         |
|-----------|---------------------------|-------------------------------------------------------------|-----------------|-------------------------------------------------|-----------|---------------|
|           |                           |                                                             |                 | Min                                             | Max       |               |
| $V_{IH}$  | HIGH Level Input Voltage  |                                                             | 2.3 – 2.7       | 1.7                                             |           | V             |
|           |                           |                                                             | 2.7 – 3.6       | 2.0                                             |           |               |
| $V_{IL}$  | LOW Level Input Voltage   |                                                             | 2.3 – 2.7       |                                                 | 0.7       | V             |
|           |                           |                                                             | 2.7 – 3.6       |                                                 | 0.8       |               |
| $V_{OH}$  | HIGH Level Output Voltage | $I_{OH} = -100 \mu\text{A}$                                 | 2.3 – 3.6       | $V_{CC} - 0.2$                                  |           | V             |
|           |                           | $I_{OH} = -8 \text{ mA}$                                    | 2.3             | 1.8                                             |           |               |
|           |                           | $I_{OH} = -12 \text{ mA}$                                   | 2.7             | 2.2                                             |           |               |
|           |                           | $I_{OH} = -18 \text{ mA}$                                   | 3.0             | 2.4                                             |           |               |
|           |                           | $I_{OH} = -24 \text{ mA}$                                   | 3.0             | 2.2                                             |           |               |
| $V_{OL}$  | LOW Level Output Voltage  | $I_{OL} = 100 \mu\text{A}$                                  | 2.3 – 3.6       |                                                 | 0.2       | V             |
|           |                           | $I_{OL} = 8 \text{ mA}$                                     | 2.3             |                                                 | 0.6       |               |
|           |                           | $I_{OL} = 12 \text{ mA}$                                    | 2.7             |                                                 | 0.4       |               |
|           |                           | $I_{OL} = 16 \text{ mA}$                                    | 3.0             |                                                 | 0.4       |               |
|           |                           | $I_{OL} = 24 \text{ mA}$                                    | 3.0             |                                                 | 0.55      |               |
| $I_I$     | Input Leakage Current     | $0 \leq V_I \leq 5.5V$                                      | 2.3 – 3.6       |                                                 | $\pm 5.0$ | $\mu\text{A}$ |
| $I_{OZ}$  | 3-STATE Output Leakage    | $0 \leq V_O \leq 5.5V$<br>$V_I = V_{IH} \text{ or } V_{IL}$ | 2.3 – 3.6       |                                                 | $\pm 5.0$ | $\mu\text{A}$ |
| $I_{OFF}$ | Power-Off Leakage Current | $V_I \text{ or } V_O = 5.5V$                                | 0               |                                                 | 10        | $\mu\text{A}$ |
| $I_{CC}$  | Quiescent Supply Current  | $V_I = V_{CC} \text{ or } \text{GND}$                       | 2.3 – 3.6       |                                                 | 10        | $\mu\text{A}$ |
|           |                           | $3.6V \leq V_I$ , $V_O \leq 5.5V$ (Note 7)                  | 2.3 – 3.6       |                                                 | $\pm 10$  |               |

## DC Electrical Characteristics (Continued)

| Symbol          | Parameter                             | Conditions                               | V <sub>CC</sub><br>(V) | T <sub>A</sub> = -40°C to +85°C |     | Units |
|-----------------|---------------------------------------|------------------------------------------|------------------------|---------------------------------|-----|-------|
|                 |                                       |                                          |                        | Min                             | Max |       |
| $\Delta I_{CC}$ | Increase in I <sub>CC</sub> per Input | V <sub>IH</sub> = V <sub>CC</sub> - 0.6V | 2.3 - 3.6              |                                 | 500 | μA    |

Note 7: Outputs disabled or 3-STATE only.

## AC Electrical Characteristics

| Symbol            | Parameter                        | T <sub>A</sub> = -40° C to +85° C, R <sub>L</sub> = 500Ω |     |                        |     |                               |      | Units |
|-------------------|----------------------------------|----------------------------------------------------------|-----|------------------------|-----|-------------------------------|------|-------|
|                   |                                  | V <sub>CC</sub> = 3.3V ± 0.3V                            |     | V <sub>CC</sub> = 2.7V |     | V <sub>CC</sub> = 2.5V ± 0.2V |      |       |
|                   |                                  | C <sub>L</sub> = 50pF                                    |     | C <sub>L</sub> = 50pF  |     | C <sub>L</sub> = 30pF         |      |       |
|                   |                                  | Min                                                      | Max | Min                    | Max | Min                           | Max  |       |
| t <sub>PHL</sub>  | Propagation Delay                | 1.5                                                      | 8.0 | 1.5                    | 9.0 | 1.5                           | 9.6  | ns    |
| t <sub>PLH</sub>  | D <sub>n</sub> to O <sub>n</sub> | 1.5                                                      | 8.0 | 1.5                    | 9.0 | 1.5                           | 9.6  |       |
| t <sub>PHL</sub>  | Propagation Delay                | 1.5                                                      | 8.5 | 1.5                    | 9.5 | 1.5                           | 10.5 | ns    |
| t <sub>PLH</sub>  | LE to O <sub>n</sub>             | 1.5                                                      | 8.5 | 1.5                    | 9.5 | 1.5                           | 10.5 |       |
| t <sub>PZL</sub>  | Output Enable Time               | 1.5                                                      | 8.5 | 1.5                    | 9.5 | 1.5                           | 10.5 | ns    |
| t <sub>PZH</sub>  |                                  | 1.5                                                      | 8.5 | 1.5                    | 9.5 | 1.5                           | 10.5 |       |
| t <sub>PLZ</sub>  | Output Disable Time              | 1.5                                                      | 7.5 | 1.5                    | 8.5 | 1.5                           | 9.0  | ns    |
| t <sub>PHZ</sub>  |                                  | 1.5                                                      | 7.5 | 1.5                    | 8.5 | 1.5                           | 9.0  |       |
| t <sub>S</sub>    | Setup Time, D <sub>n</sub> to LE | 2.5                                                      |     | 2.5                    |     | 4.0                           |      | ns    |
| t <sub>H</sub>    | Hold Time, D <sub>n</sub> to LE  | 1.5                                                      |     | 1.5                    |     | 2.0                           |      | ns    |
| t <sub>W</sub>    | LE Pulse Width                   | 3.3                                                      |     | 3.3                    |     | 4.0                           |      | ns    |
| t <sub>OSHL</sub> | Output to Output Skew            |                                                          | 1.0 |                        |     |                               |      | ns    |
| t <sub>OSLH</sub> | (Note 8)                         |                                                          | 1.0 |                        |     |                               |      |       |

Note 8: Skew is defined as the absolute value of the difference between the actual propagation delay for any two separate outputs of the same device. The specification applies to any outputs switching in the same direction, either HIGH-to-LOW (t<sub>OSHL</sub>) or LOW-to-HIGH (t<sub>OSLH</sub>).

## Dynamic Switching Characteristics

| Symbol           | Parameter                                   | Conditions                                                           | V <sub>CC</sub><br>(V) | T <sub>A</sub> = 25°C | Units |
|------------------|---------------------------------------------|----------------------------------------------------------------------|------------------------|-----------------------|-------|
|                  |                                             |                                                                      |                        | Typical               |       |
| V <sub>OLP</sub> | Quiet Output Dynamic Peak V <sub>OL</sub>   | C <sub>L</sub> = 50 pF, V <sub>IH</sub> = 3.3V, V <sub>IL</sub> = 0V | 3.3                    | 0.8                   | V     |
|                  |                                             | C <sub>L</sub> = 30pF, V <sub>I</sub> = 2.5V, V <sub>IL</sub> = 0V   | 2.5                    | 0.6                   |       |
| V <sub>OLV</sub> | Quiet Output Dynamic Valley V <sub>OL</sub> | C <sub>L</sub> = 50 pF, V <sub>IH</sub> = 3.3V, V <sub>IL</sub> = 0V | 3.3                    | -0.8                  | V     |
|                  |                                             | C <sub>L</sub> = 30pF, V <sub>I</sub> = 2.5V, V <sub>IL</sub> = 0V   | 2.5                    | -0.6                  |       |

## Capacitance

| Symbol           | Parameter                     | Conditions                                                                  | Typical | Units |
|------------------|-------------------------------|-----------------------------------------------------------------------------|---------|-------|
| C <sub>IN</sub>  | Input Capacitance             | V <sub>CC</sub> = Open, V <sub>I</sub> = 0V or V <sub>CC</sub>              | 7       | pF    |
| C <sub>OUT</sub> | Output Capacitance            | V <sub>CC</sub> = 3.3V, V <sub>I</sub> = 0V or V <sub>CC</sub>              | 8       | pF    |
| C <sub>PD</sub>  | Power Dissipation Capacitance | V <sub>CC</sub> = 3.3V, V <sub>I</sub> = 0V or V <sub>CC</sub> , f = 10 MHz | 25      | pF    |

# AC LOADING and WAVEFORMS Generic for LCX Family

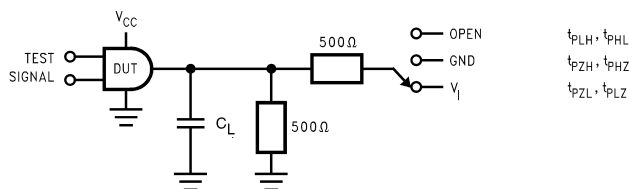
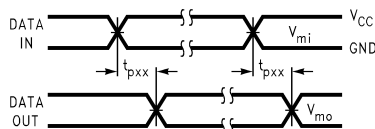
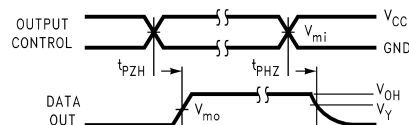


FIGURE 1. AC Test Circuit ( $C_L$  includes probe and jig capacitance)

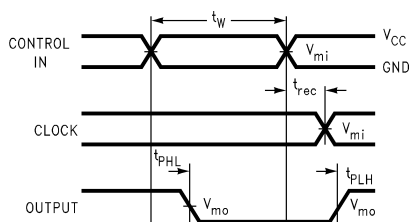
| Test                  | Switch                                                                        |
|-----------------------|-------------------------------------------------------------------------------|
| $t_{PLH}$ , $t_{PHL}$ | Open                                                                          |
| $t_{PZL}$ , $t_{PLZ}$ | 6V at $V_{CC} = 3.3 \pm 0.3V$<br>$V_{CC} \times 2$ at $V_{CC} = 2.5 \pm 0.2V$ |
| $t_{PZH}$ , $t_{PHZ}$ | GND                                                                           |



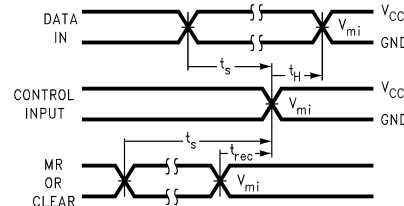
Waveform for Inverting and Non-Inverting Functions



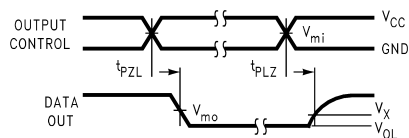
3-STATE Output High Enable and Disable Times for Logic



Propagation Delay, Pulse Width and  $t_{rec}$  Waveforms



Setup Time, Hold Time and Recovery Time for Logic



3-STATE Output Low Enable and Disable Times for Logic

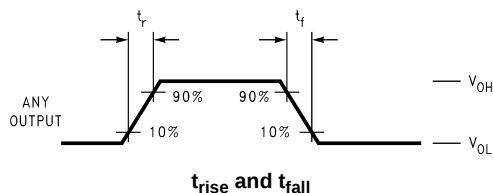
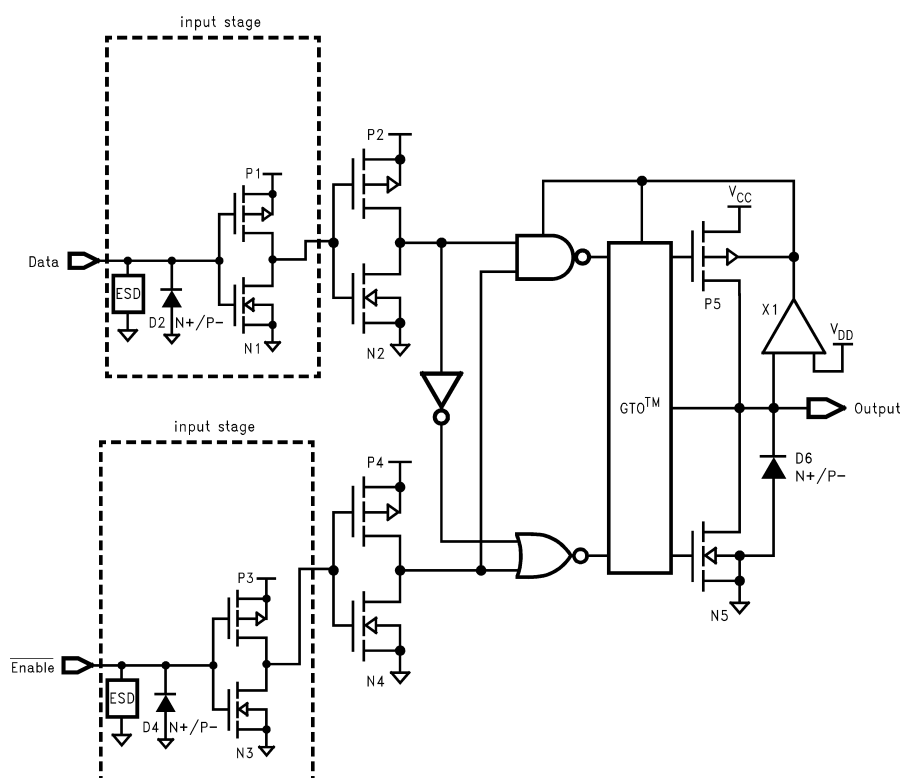


FIGURE 2. Waveforms  
(Input Characteristics;  $f = 1MHz$ ,  $t_r = t_f = 3ns$ )

| Symbol   | $V_{CC}$        |                 |                  |
|----------|-----------------|-----------------|------------------|
|          | $3.3V \pm 0.3V$ | 2.7V            | $2.5V \pm 0.2V$  |
| $V_{mi}$ | 1.5V            | 1.5V            | $V_{CC}/2$       |
| $V_{mo}$ | 1.5V            | 1.5V            | $V_{CC}/2$       |
| $V_x$    | $V_{OL} + 0.3V$ | $V_{OL} + 0.3V$ | $V_{OL} + 0.15V$ |
| $V_y$    | $V_{OH} - 0.3V$ | $V_{OH} - 0.3V$ | $V_{OH} - 0.15V$ |

# Schematic Diagram Generic for LCX Family

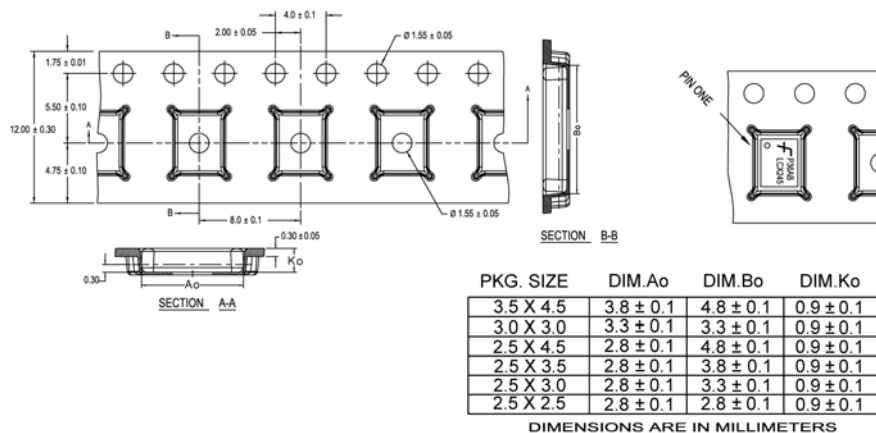


## Tape and Reel Specification

### Tape Format for DQFN

| Package Designator | Tape Section       | Number Cavities | Cavity Status | Cover Tape Status |
|--------------------|--------------------|-----------------|---------------|-------------------|
| BQX                | Leader (Start End) | 125 (typ)       | Empty         | Sealed            |
|                    | Carrier            | 3000            | Filled        | Sealed            |
|                    | Trailer (Hub End)  | 75 (typ)        | Empty         | Sealed            |

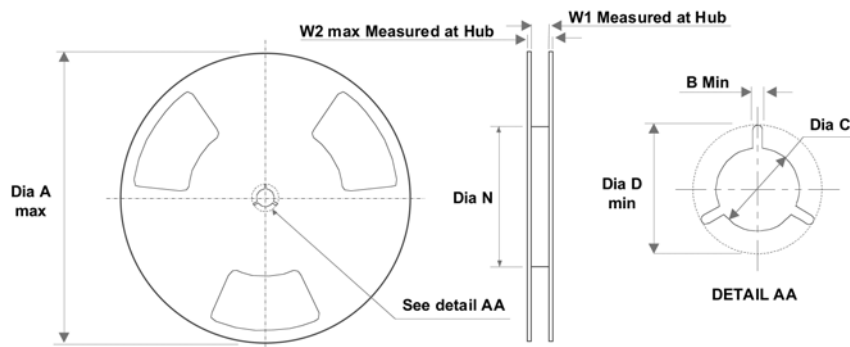
### TAPE DIMENSIONS inches (millimeters)



NOTES: unless otherwise specified

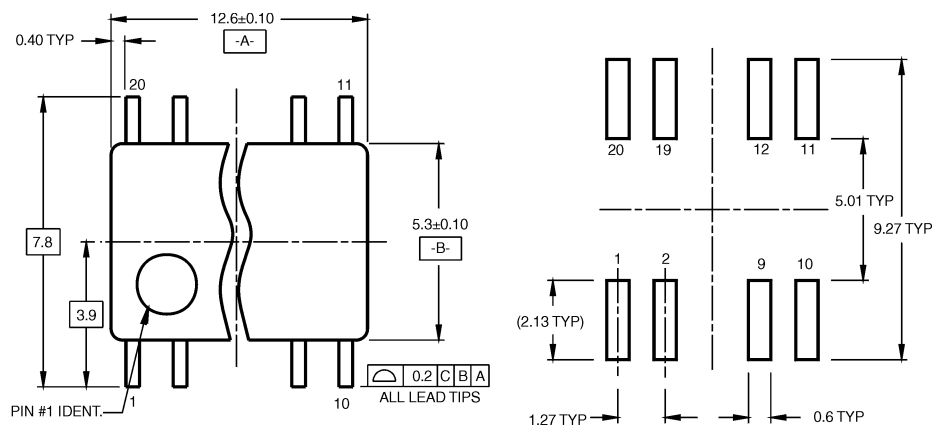
1. Cumulative pitch for feeding holes and cavities (chip pockets) not to exceed 0.008[0.20] over 10 pitch span.
2. Smallest allowable bending radius.
3. Thru hole inside cavity is centered within cavity.
4. Tolerance is  $\pm 0.002[0.05]$  for these dimensions on all 12mm tapes.
5. Ao and Bo measured on a plane 0.120[0.30] above the bottom of the pocket.
6. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
7. Pocket position relative to sprocket hole measured as true position of pocket. Not pocket hole.
8. Controlling dimension is millimeter. Dimension in inches rounded.

### REEL DIMENSIONS inches (millimeters)

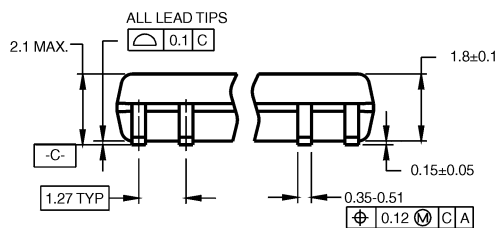


| Tape Size | A               | B               | C                | D                | N                | W1              | W2              |
|-----------|-----------------|-----------------|------------------|------------------|------------------|-----------------|-----------------|
| 12 mm     | 13.0<br>(330.0) | 0.059<br>(1.50) | 0.512<br>(13.00) | 0.795<br>(20.20) | 2.165<br>(55.00) | 0.488<br>(12.4) | 0.724<br>(18.4) |

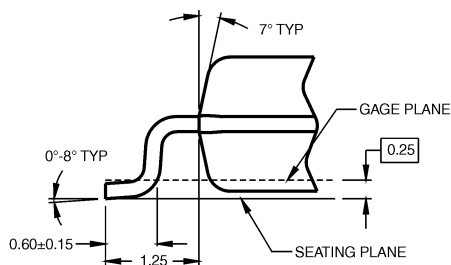
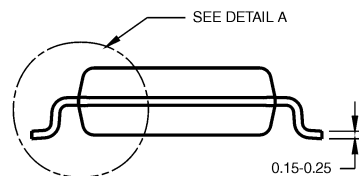


**Physical Dimensions** inches (millimeters) unless otherwise noted (Continued)

## LAND PATTERN RECOMMENDATION



DIMENSIONS ARE IN MILLIMETERS



DETAIL A

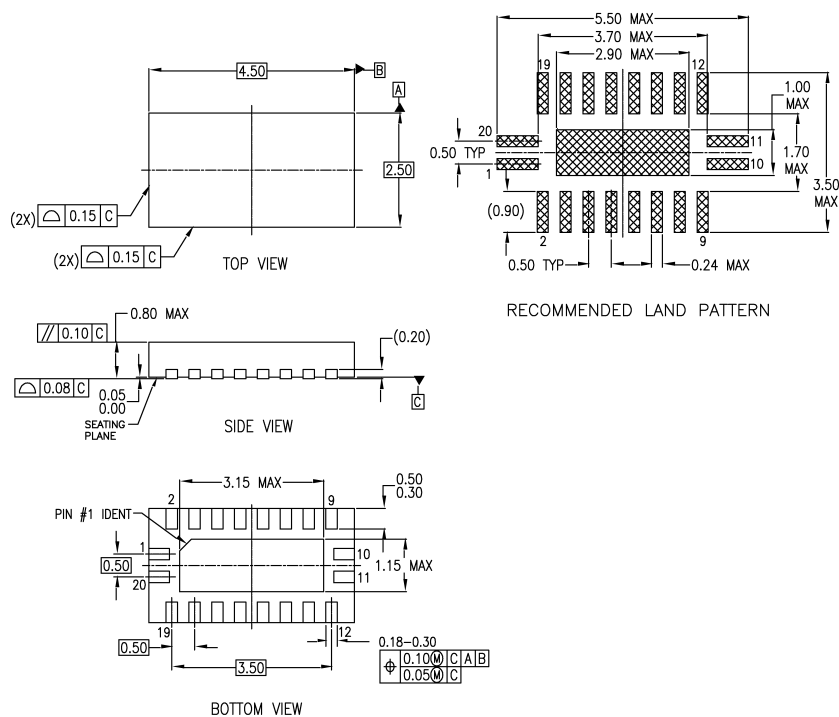
NOTES:

- 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

**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)



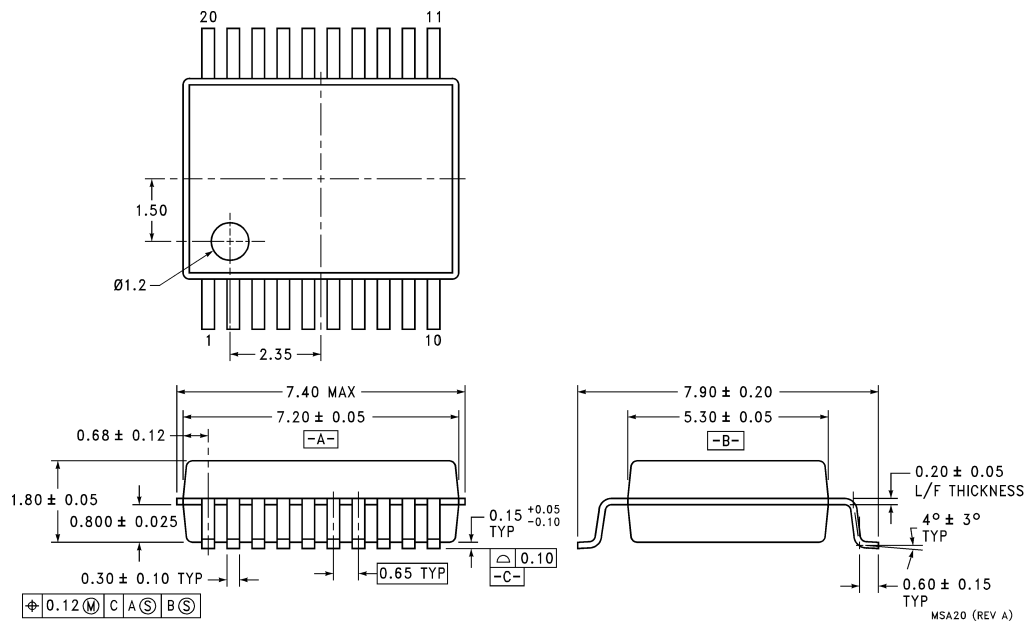
## NOTES:

- A. CONFORMS TO JEDEC REGISTRATION MO-241, VARIATION AC
- B. DIMENSIONS ARE IN MILLIMETERS.
- C. DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994

MLP020BrevA

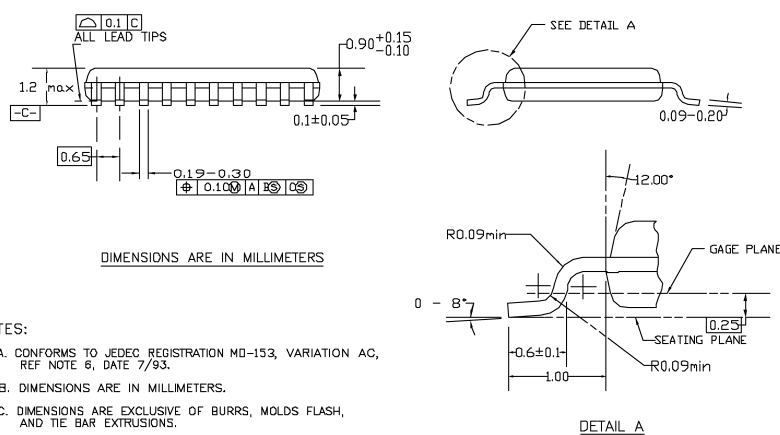
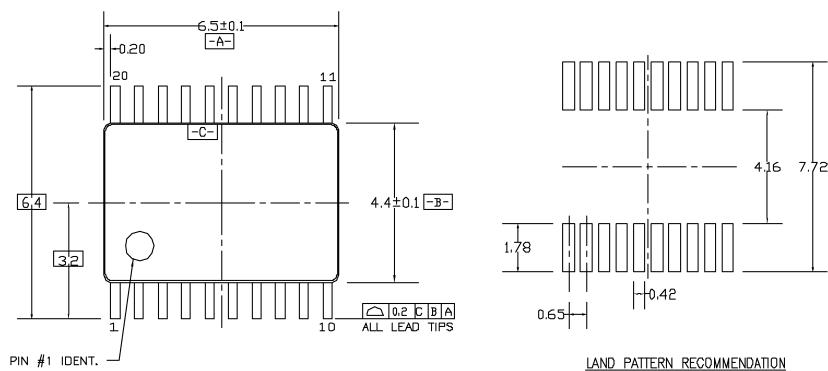
**Pb-Free 20-Terminal Depopulated Quad Very-Thin Flat Pack No Leads (DQFN), JEDEC MO-241, 2.5 x 4.5mm  
Package Number MLP020B**

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



**20-Lead Shrink Small Outline Package (SSOP), JEDEC MO-150, 5.3mm Wide  
Package Number MSA20**

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



## NOTES:

- CONFORMS TO JEDEC REGISTRATION MO-153, VARIATION AC, REF NOTE 6, DATE 7/93.
- DIMENSIONS ARE IN MILLIMETERS.
- DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLDS FLASH, AND TIE BAR EXTRUSIONS.
- 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**

## 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.

## 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, or (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.

2. 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, and supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice in order 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 in order 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.                                                   |