

## 74AC573, 74ACT573 Octal Latch with 3-STATE Outputs

### Features

- $I_{CC}$  and  $I_{OZ}$  reduced by 50%
- Inputs and outputs on opposite sides of package allowing easy interface with microprocessors
- Useful as input or output port for microprocessors
- Functionally identical to 74AC373 and 74ACT373
- 3-STATE outputs for bus interfacing
- Outputs source/sink 24mA
- 74ACT573 has TTL-compatible inputs

### General Description


The 74AC573 and 74ACT573 are high-speed octal latches with buffered common Latch Enable (LE) and buffered common Output Enable ( $\overline{OE}$ ) inputs.

The 74AC573 and 74ACT573 are functionally identical to the 74AC373 and 74ACT373 but with inputs and outputs on opposite sides.

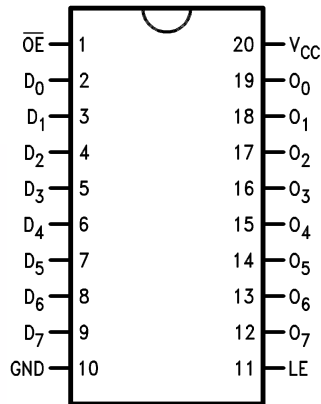
### Ordering Information

Order Number	Package Number	Package Description
74AC573SC	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide
74AC573SJ	M20D	20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
74AC573MTC	MTC20	20-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide
74ACT573SC	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide
74ACT573SJ	M20D	20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
74ACT573MTC	MTC20	20-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide
74ACT573PC	N20A	20-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



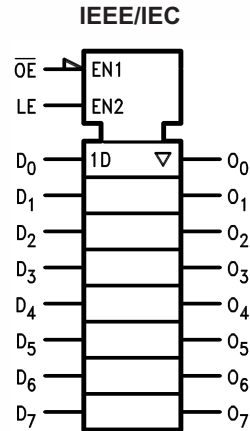
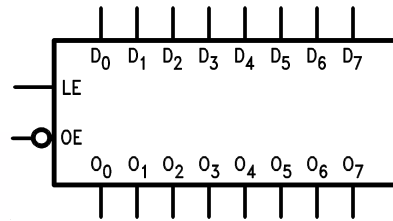
### Pin Description

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

### Functional Description

The 74AC573 and 74ACT573 contain eight D-type latches with 3-STATE output buffers. 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-type input changes. When LE is LOW the latches store the information that was present on the D-type inputs a setup time preceding the HIGH-to-LOW transition of LE. The 3-STATE buffers are controlled by the Output Enable ( $\overline{OE}$ ) input. When  $\overline{OE}$  is LOW, the buffers are enabled. When  $\overline{OE}$  is HIGH the buffers are in the high impedance mode but this does not interfere with entering new data into the latches.

### Logic Symbols



### Truth Table

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

H = HIGH Voltage

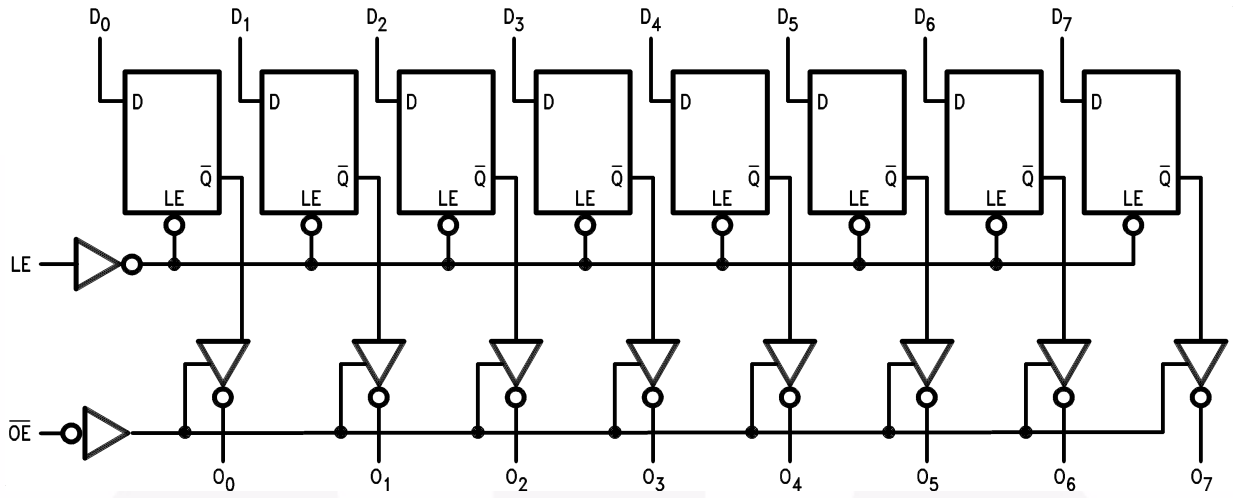
L = LOW Voltage

Z = High Impedance

X = Immaterial

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

**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
$I_{IK}$	DC Input Diode Current $V_I = -0.5V$	-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 $V_O = -0.5V$	-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 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: $V_{IN}$ 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: $V_{IN}$ 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> (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	3.15			
		5.5		2.75	3.85	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	1.35			
		5.5		2.75	1.65	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	4.4			
		5.5		5.49	5.4	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		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>(1)</sup>		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	0.1			
		5.5		0.001	0.1	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		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>(1)</sup>		0.36	0.44		
I <sub>IN</sub> <sup>(2)</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>(3)</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>(2)</sup>	Maximum Quiescent Supply Current	5.5	V <sub>IN</sub> = V <sub>CC</sub> or GND		4.0	40.0		μA	
I <sub>OZ</sub>	Maximum 3-STATE Leakage Current	5.5	V <sub>I</sub> (OE) = V <sub>IL</sub> , V <sub>IH</sub> ; V <sub>I</sub> = V <sub>CC</sub> , GND; V <sub>O</sub> = V <sub>CC</sub> , GND		±0.25	±2.5		μA	

**Notes:**

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

## DC Electrical Characteristics for ACT

Symbol	Parameter	V <sub>CC</sub> (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>OZ</sub>	Maximum 3-STATE Leakage Current	5.5	V <sub>I</sub> = V <sub>IL</sub> , V <sub>IH</sub> ; V <sub>O</sub> = V <sub>CC</sub> , GND		±0.25	±2.5		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 <sub>CC</sub> (V) <sup>(6)</sup>	T <sub>A</sub> = +25°C, C <sub>L</sub> = 50pF			T <sub>A</sub> = -40°C to +85°C, C <sub>L</sub> = 50pF		Units
			Min.	Typ.	Max.	Min.	Max.	
t <sub>PHL</sub> , t <sub>PLH</sub>	Propagation Delay, D <sub>n</sub> to O <sub>n</sub>	3.3	0.5	8.5	10.5	2.5	11.0	ns
		5.0	1.5	5.5	7.0	1.5	7.5	
t <sub>PLH</sub> , t <sub>PHL</sub>	Propagation Delay, LE to O <sub>n</sub>	3.3	2.5	8.5	12.0	2.5	12.5	ns
		5.0	2.0	6.0	8.0	2.0	8.5	
t <sub>PZL</sub> , t <sub>PZH</sub>	Output Enable Time	3.3	2.5	8.5	13.0	2.5	13.5	ns
		5.0	1.5	6.0	8.5	1.5	9.0	
t <sub>PHZ</sub> , t <sub>PLZ</sub>	Output Disable Time	3.3	1.0	9.0	14.5	1.0	15.0	ns
		5.0	1.0	6.0	9.5	1.0	10.0	

**Note:**

6. Voltage range 5.0 is 5.0V ± 0.5V. Voltage range 3.3 is 3.3V ± 0.3V.

## AC Operating Requirements for AC

Symbol	Parameter	V <sub>CC</sub> (V) <sup>(7)</sup>	T <sub>A</sub> = +25°C, C <sub>L</sub> = 50pF		T <sub>A</sub> = -40°C to +85°C, C <sub>L</sub> = 50pF	Units
			Typ.	Guaranteed Minimum		
t <sub>S</sub>	Setup Time, HIGH or LOW, D <sub>n</sub> to LE	3.3	0	3.0	3.0	ns
		5.0	0	3.0	3.0	
t <sub>H</sub>	Hold Time, HIGH or LOW, D <sub>n</sub> to LE	3.3	0	1.5	1.5	ns
		5.0	0	1.5	1.5	
t <sub>W</sub>	LE Pulse Width, HIGH	3.3	2.0	4.0	4.0	ns
		5.0	2.0	4.0	4.0	

**Note:**

7. Voltage range 5.0 is 5.0V ± 0.5V. Voltage range 3.3 is 3.3V ± 0.3V.

## AC Electrical Characteristics for ACT

Symbol	Parameter	$V_{CC}$ (V) <sup>(8)</sup>	$T_A = +25^\circ\text{C}$ , $C_L = 50\text{pF}$			$T_A = -40^\circ\text{C to } +85^\circ\text{C}$ , $C_L = 50\text{pF}$		Units
			Min.	Typ.	Max.	Min.	Max.	
$t_{PLH}, t_{PHL}$	Propagation Delay, $D_n$ to $O_n$	5.0	2.5	6.0	10.5	2.0	12.0	ns
$t_{PLH}$	Propagation Delay, LE to $O_n$	5.0	3.0	6.0	10.5	2.5	12.0	ns
$t_{PHL}$	Propagation Delay, LE to $O_n$	5.0	2.5	5.5	9.5	2.0	10.5	ns
$t_{PZH}$	Output Enable Time	5.0	2.0	5.5	10.0	1.5	11.0	ns
$t_{PZL}$	Output Enable Time	5.0	1.5	5.5	9.5	1.5	10.5	ns
$t_{PHZ}$	Output Disable Time	5.0	2.5	6.5	11.0	1.5	12.5	ns
$t_{PLZ}$	Output Disable Time	5.0	1.5	5.0	8.5	1.0	9.5	ns

## Note:

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

## AC Operating Requirements for ACT

Symbol	Parameter	$V_{CC}$ (V) <sup>(9)</sup>	$T_A = +25^\circ\text{C}$ , $C_L = 50\text{pF}$		$T_A = -40^\circ\text{C to } +85^\circ\text{C}$ , $C_L = 50\text{pF}$		Units
			Typ.	Guaranteed Minimum	Guaranteed Minimum	Guaranteed Minimum	
$t_S$	Setup Time, HIGH or LOW, $D_n$ to LE	5.0	1.5	3.0	3.5	3.5	ns
$t_H$	Hold Time, HIGH or LOW, $D_n$ to LE	5.0	-1.5	0	0	0	ns
$t_W$	LE Pulse Width, HIGH	5.0	2.0	3.5	4.0	4.0	ns

## Note:

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

## Capacitance

Symbol	Parameter	Conditions	Typ.	Units
$C_{IN}$	Input Capacitance	$V_{CC} = \text{OPEN}$	5.0	pF
$C_{PD}$	Power Dissipation Capacitance	$V_{CC} = 5.0\text{V}$	25.0	pF
	AC			
	ACT		42.0	



Physical Dimensions

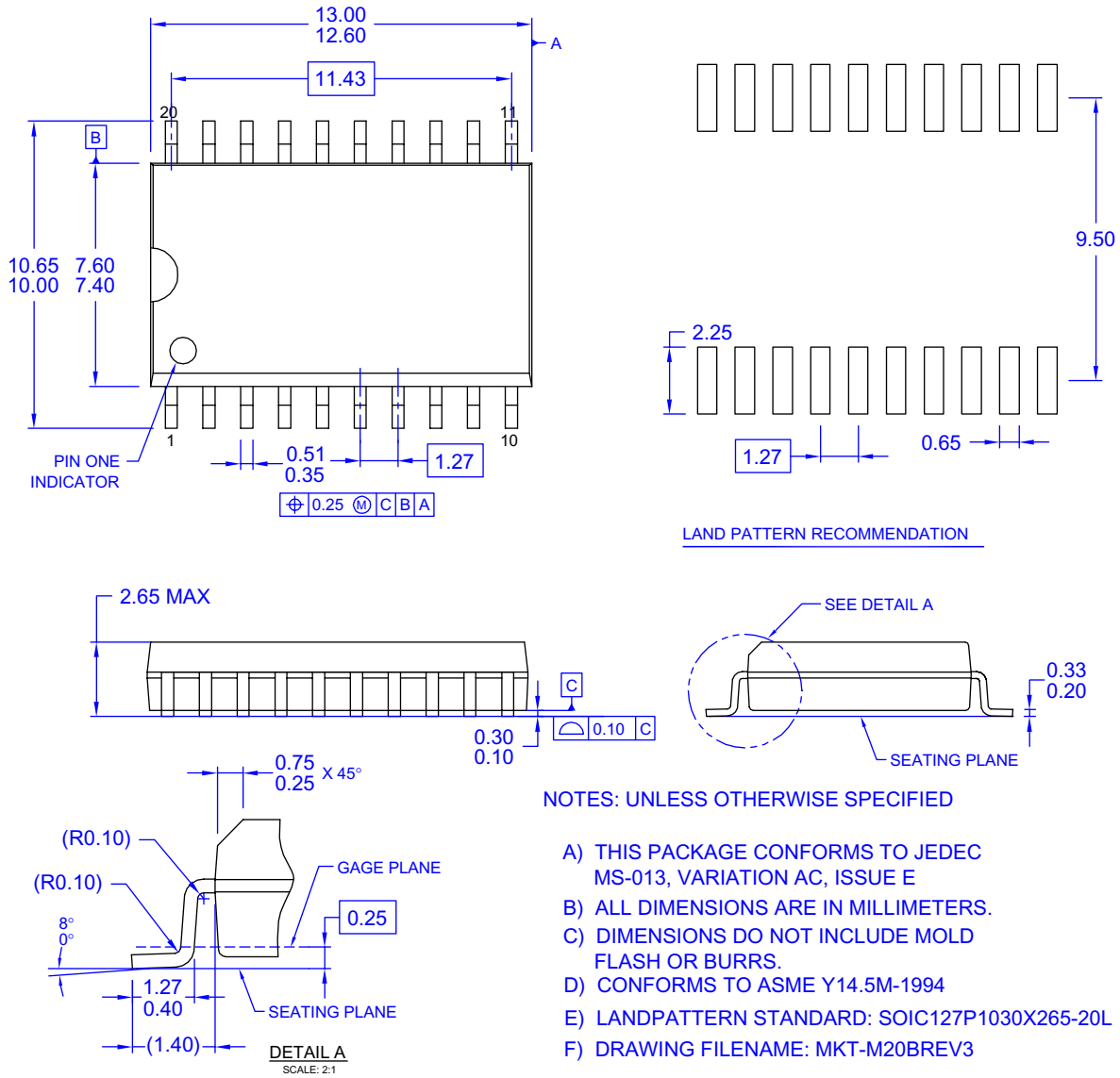


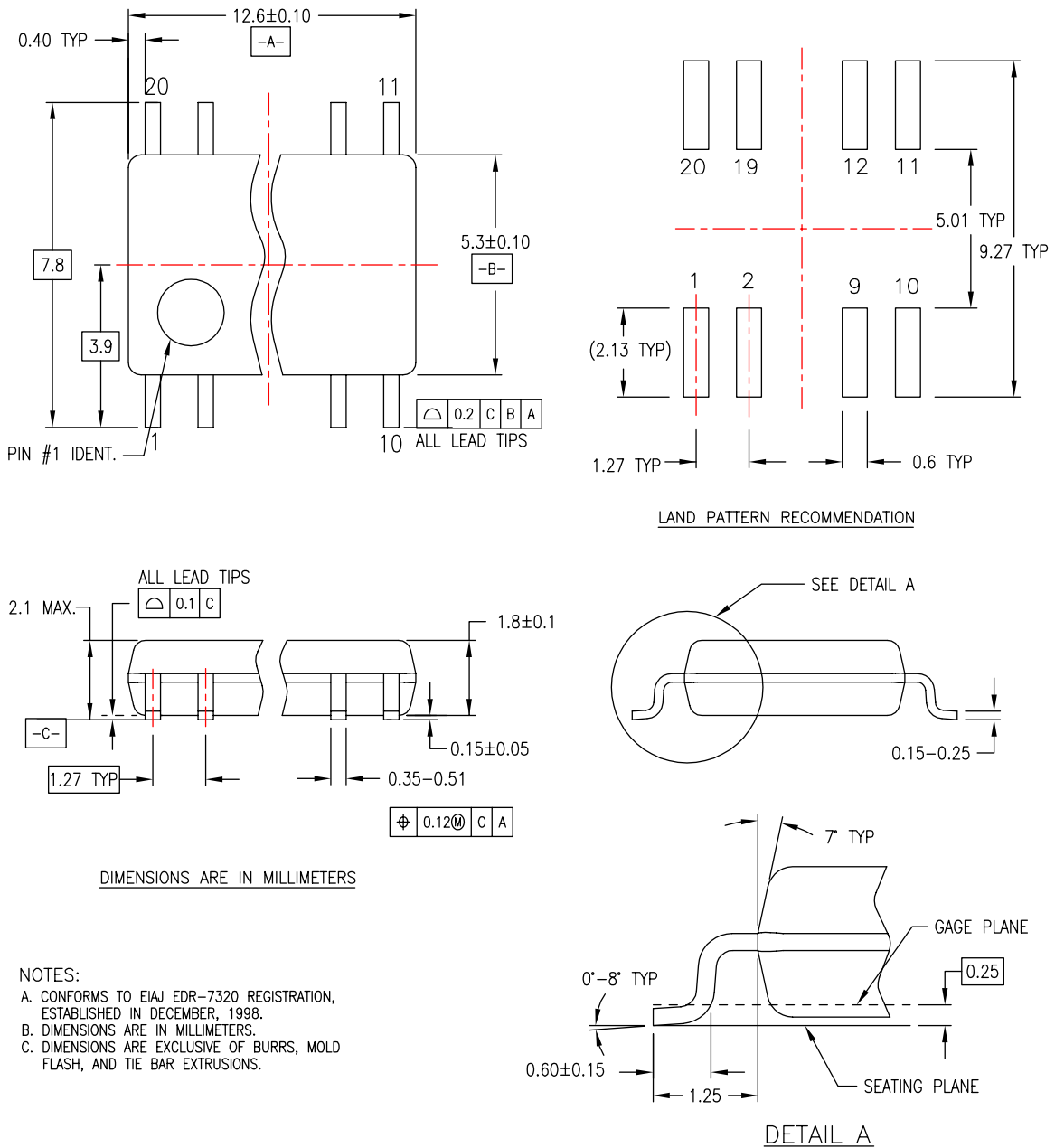
Figure 1. 20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide

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**Physical Dimensions** (Continued)



M20DREVC

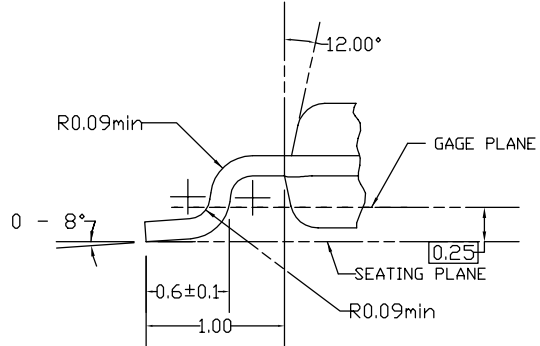
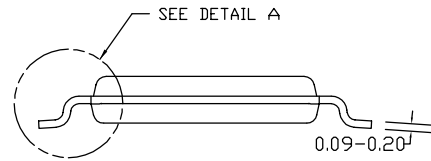
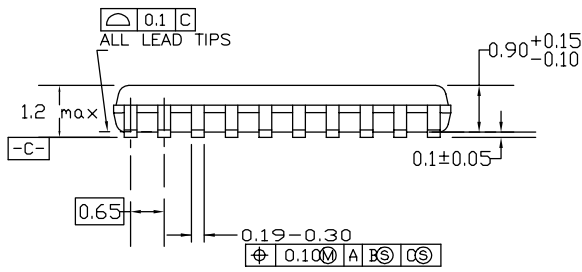
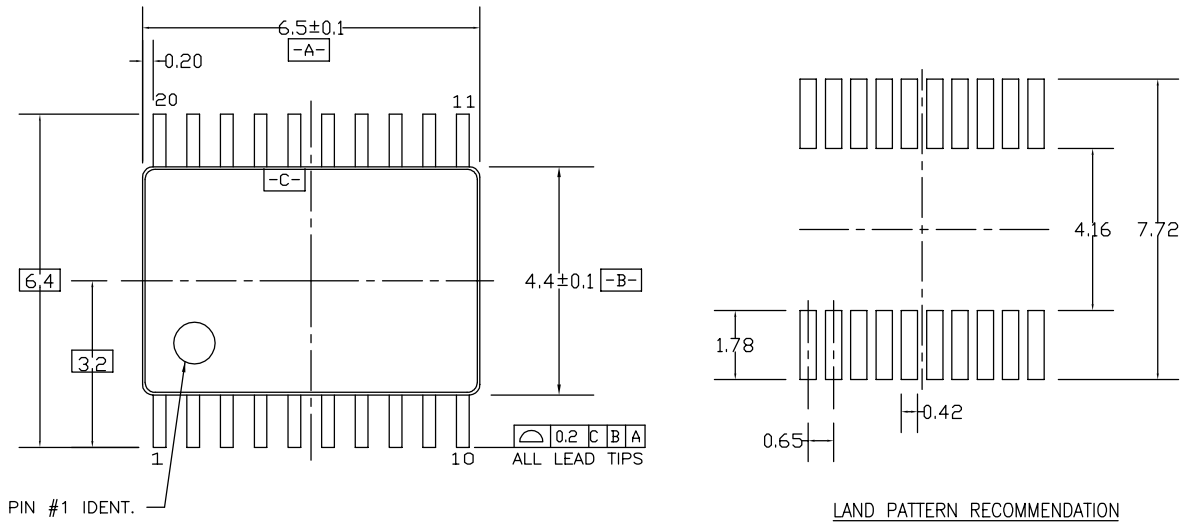
**Figure 2. 20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide**

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Physical Dimensions (Continued)



DIMENSIONS ARE IN MILLIMETERS

NOTES:

- A. CONFORMS TO JEDEC REGISTRATION MD-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.

MTC20REV D1

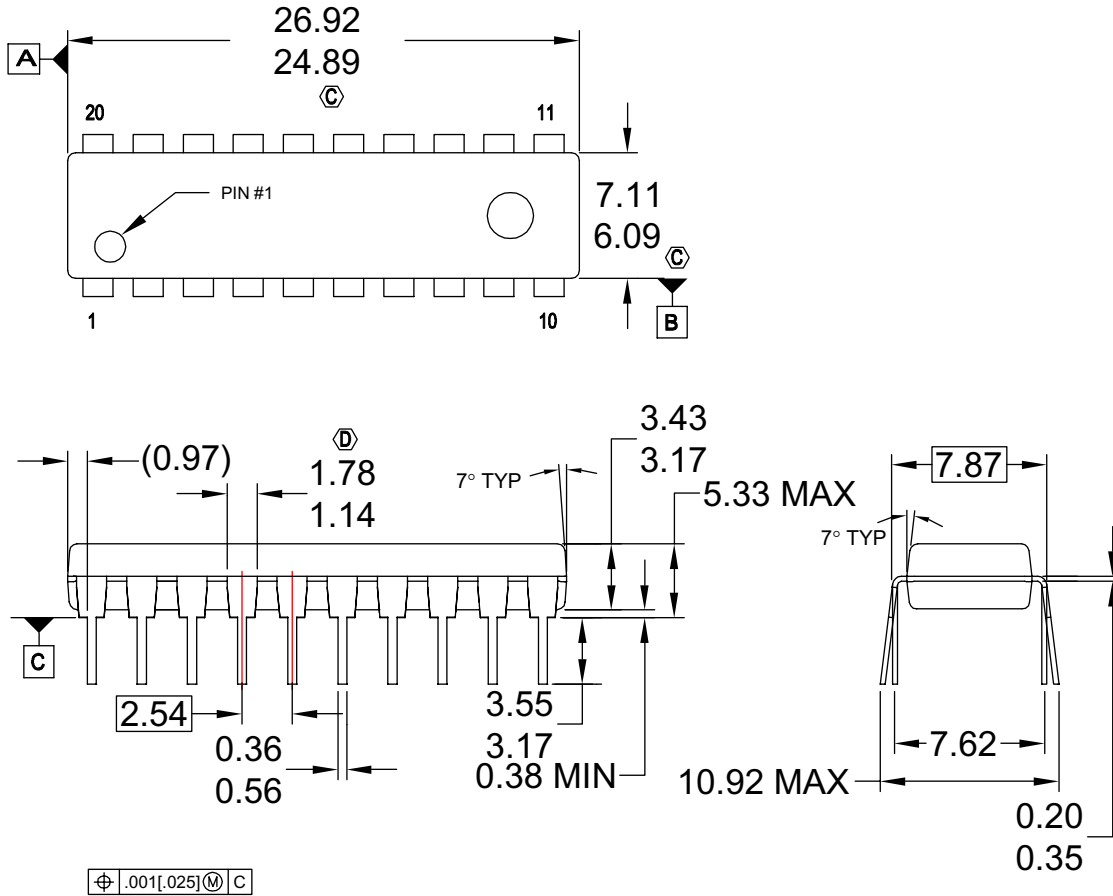
Figure 3. 20-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide

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**Physical Dimensions** (Continued)



**NOTES:**

- A. CONFORMS TO JEDEC REGISTRATION MS-001, VARIATIONS AD.
- B. ALL DIMENSIONS ARE IN MILLIMETERS
- C. DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS. MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED 0.25MM.
- D. DOES NOT INCLUDE DAMBAR PROTRUSIONS. DAMBAR PROTRUSIONS SHALL NOT EXCEED 0.25MM.
- E. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
- F. DRAWING FILE NAME: N20AREV8

**Figure 4. 20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide**

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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 the 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.

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