

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.

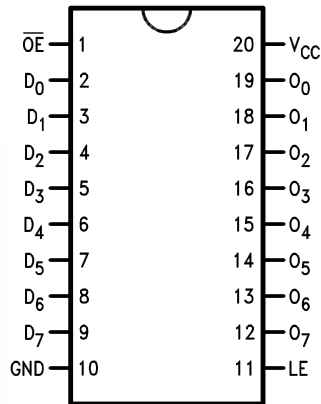
Ordering Information

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



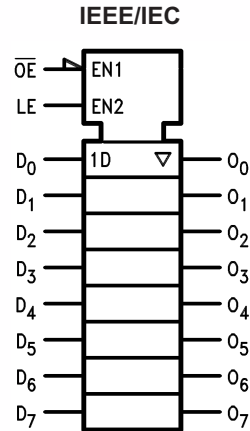
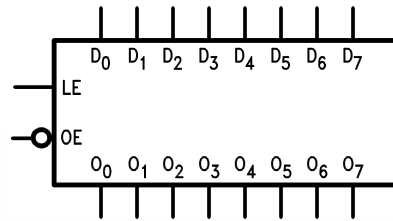
Pin Description

Pin Names	Description
D ₀ –D ₇	Data Inputs
LE	Latch Enable Input
\overline{OE}	3-STATE Output Enable Input
O ₀ –O ₇	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_n 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 _n
L	H	H	H
L	H	L	L
L	L	X	O ₀
H	X	X	Z

H = HIGH Voltage

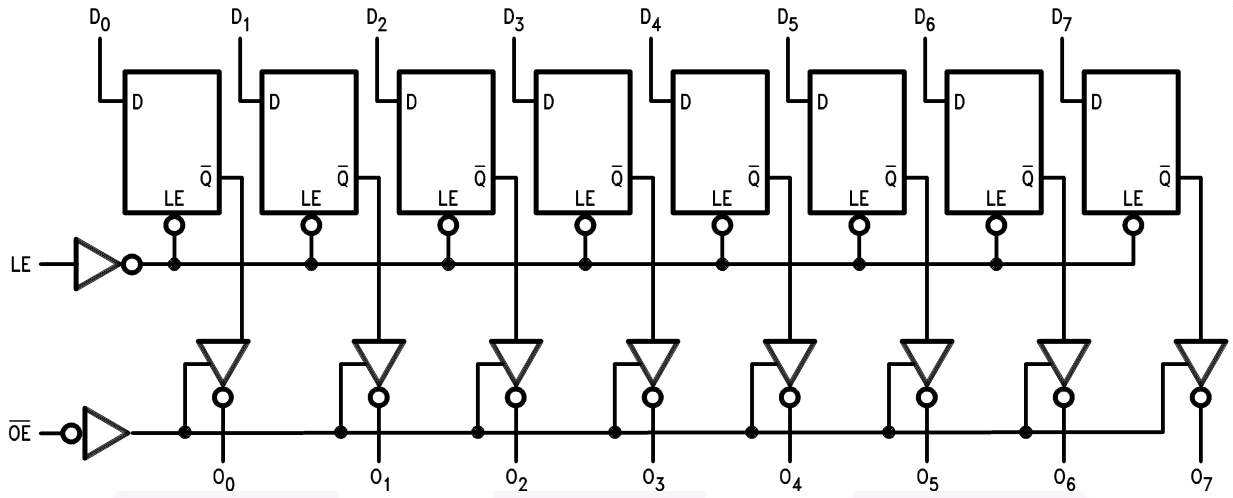
L = LOW Voltage

Z = High Impedance

X = Immaterial

O₀ = Previous O₀ 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 _{CC} (V)	Conditions	T _A = +25°C		T _A = -40°C to +85°C		Units
				Typ.	Guaranteed Limits			
V _{IH}	Minimum HIGH Level Input Voltage	3.0	V _{OUT} = 0.1V or V _{CC} - 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 _{IL}	Maximum LOW Level Input Voltage	3.0	V _{OUT} = 0.1V or V _{CC} - 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 _{OH}	Minimum HIGH Level Output Voltage	3.0	I _{OUT} = -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 _{IN} = V _{IL} or V _{IH} , I _{OH} = -12mA	2.56	2.46			
		4.5		3.86	3.76			
		5.5		4.86	4.76			
V _{OL}	Maximum LOW Level Output Voltage	3.0	I _{OUT} = 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 _{IN} = V _{IL} or V _{IH} , I _{OL} = 12mA	0.36	0.44			
		4.5		0.36	0.44			
		5.5		0.36	0.44			
I _{IN} ⁽²⁾	Maximum Input Leakage Current	5.5	V _I = V _{CC} , GND		±0.1	±1.0	μA	
I _{OLD}	Minimum Dynamic Output Current ⁽³⁾	5.5	V _{OLD} = 1.65V Max.			75	mA	
I _{OHD}		5.5	V _{OHD} = 3.85V Min.			-75	mA	
I _{CC} ⁽²⁾	Maximum Quiescent Supply Current	5.5	V _{IN} = V _{CC} or GND		4.0	40.0	μA	
I _{OZ}	Maximum 3-STATE Leakage Current	5.5	V _I (OE) = V _{IL} , V _{IH} ; V _I = V _{CC} , GND; V _O = V _{CC} , GND		±0.25	±2.5	μA	

Notes:

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

DC Electrical Characteristics for ACT

Symbol	Parameter	V _{CC} (V)	Conditions	T _A = +25°C		T _A = -40°C to +85°C		Units
				Typ.	Guaranteed Limits			
V _{IH}	Minimum HIGH Level Input Voltage	4.5	V _{OUT} = 0.1V or V _{CC} - 0.1V	1.5	2.0	2.0		V
		5.5		1.5	2.0	2.0		
V _{IL}	Maximum LOW Level Input Voltage	4.5	V _{OUT} = 0.1V or V _{CC} - 0.1V	1.5	0.8	0.8		V
		5.5		1.5	0.8	0.8		
V _{OH}	Minimum HIGH Level Output Voltage	4.5	I _{OUT} = -50μA	4.49	4.4	4.4		V
		5.5		5.49	5.4	5.4		
		4.5	V _{IN} = V _{IL} or V _{IH} , I _{OH} = -24mA		3.86	3.76		
		5.5	V _{IN} = V _{IL} or V _{IH} , I _{OH} = -24mA ⁽⁴⁾		4.86	4.76		
V _{OL}	Maximum LOW Level Output Voltage	4.5	I _{OUT} = 50μA	0.001	0.1	0.1		V
		5.5		0.001	0.1	0.1		
		4.5	V _{IN} = V _{IL} or V _{IH} , I _{OL} = 24mA		0.36	0.44		
		5.5	V _{IN} = V _{IL} or V _{IH} , I _{OL} = 24mA ⁽⁴⁾		0.36	0.44		
I _{IN}	Maximum Input Leakage Current	5.5	V _I = V _{CC} , GND		±0.1	±1.0		μA
I _{OZ}	Maximum 3-STATE Leakage Current	5.5	V _I = V _{IL} , V _{IH} ; V _O = V _{CC} , GND		±0.25	±2.5		μA
I _{CCT}	Maximum I _{CC} /Input	5.5	V _I = V _{CC} - 2.1V	0.6		1.5		mA
I _{OLD}	Minimum Dynamic Output Current ⁽⁵⁾	5.5	V _{OLD} = 1.65V Max.			75		mA
I _{OHD}		5.5	V _{OHD} = 3.85V Min.			-75		mA
I _{CC}	Maximum Quiescent Supply Current	5.5	V _{IN} = V _{CC} or GND		4.0	40.0		μA

Notes:

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

AC Electrical Characteristics for AC

Symbol	Parameter	V _{CC} (V) ⁽⁶⁾	T _A = +25°C, C _L = 50pF			T _A = -40°C to +85°C, C _L = 50pF		Units
			Min.	Typ.	Max.	Min.	Max.	
t _{PHL} , t _{PLH}	Propagation Delay, D _n to O _n	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 _{PLH} , t _{PHL}	Propagation Delay, LE to O _n	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 _{PZL} , t _{PZH}	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 _{PHZ} , t _{PLZ}	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 _{CC} (V) ⁽⁷⁾	T _A = +25°C, C _L = 50pF		T _A = -40°C to +85°C, C _L = 50pF	Units
			Typ.	Guaranteed Minimum		
t _S	Setup Time, HIGH or LOW, D _n to LE	3.3	0	3.0	3.0	ns
		5.0	0	3.0	3.0	
t _H	Hold Time, HIGH or LOW, D _n to LE	3.3	0	1.5	1.5	ns
		5.0	0	1.5	1.5	
t _W	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) ⁽⁸⁾	$T_A = +25^\circ\text{C}$, $C_L = 50\text{pF}$			$T_A = -40^\circ\text{C to } +85^\circ\text{C}$, $C_L = 50\text{pF}$		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) ⁽⁹⁾	$T_A = +25^\circ\text{C}$, $C_L = 50\text{pF}$		$T_A = -40^\circ\text{C to } +85^\circ\text{C}$, $C_L = 50\text{pF}$		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

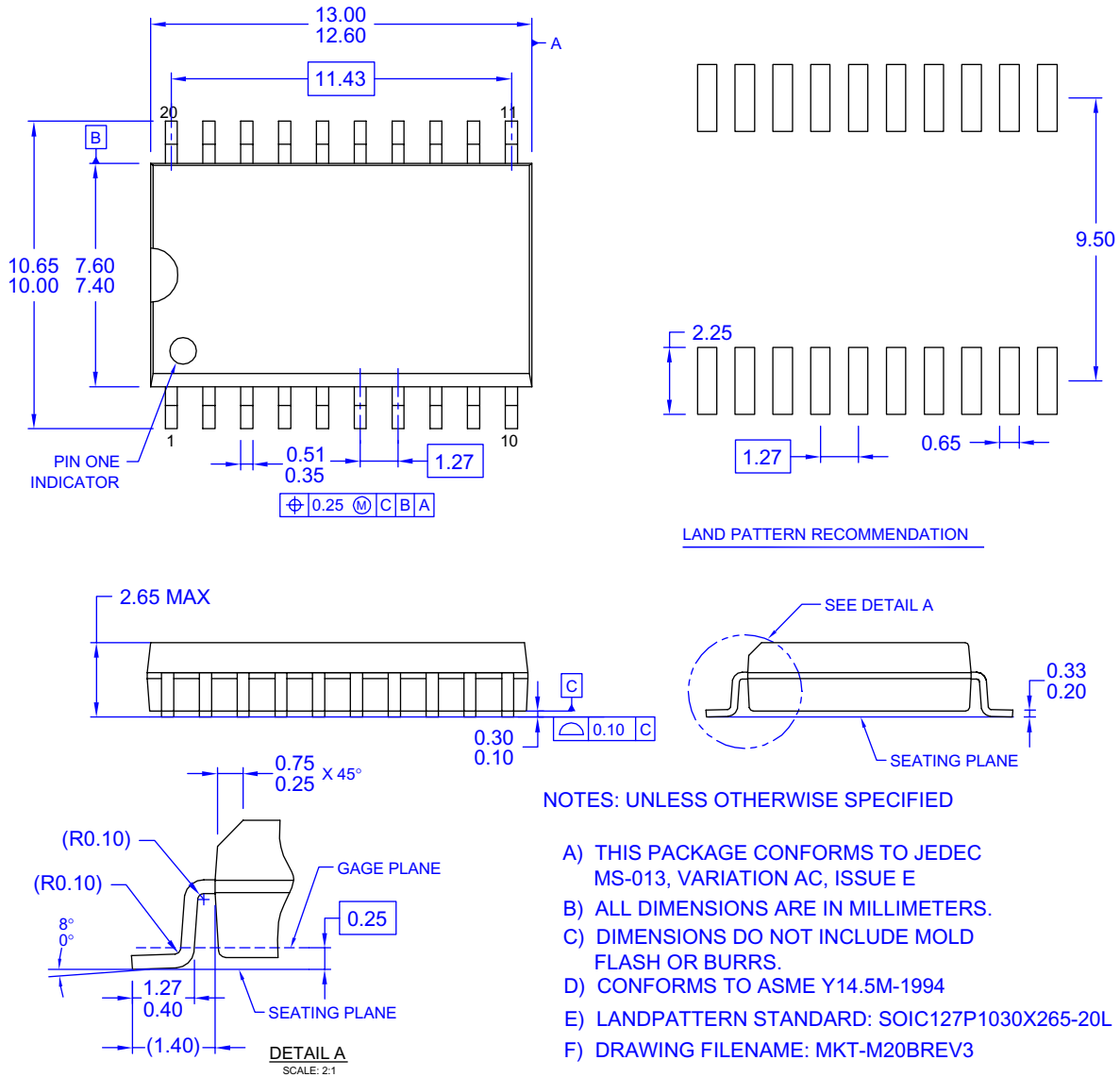


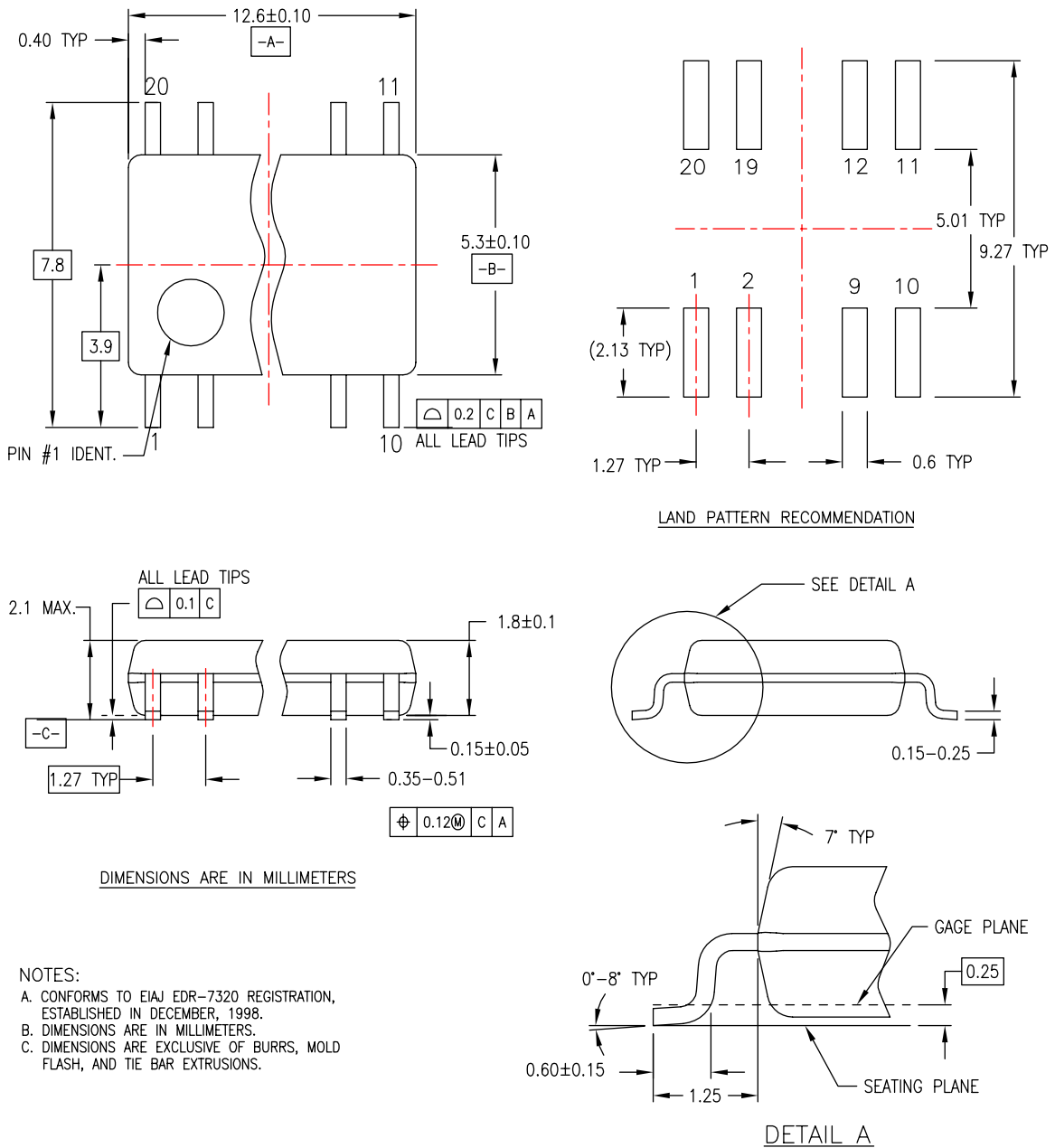
Figure 1. 20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide

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Physical Dimensions (Continued)



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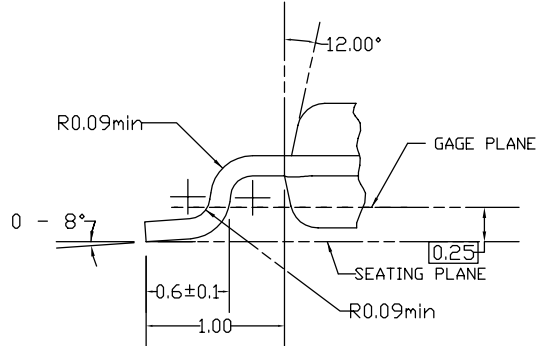
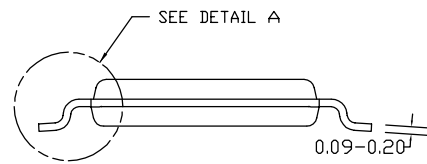
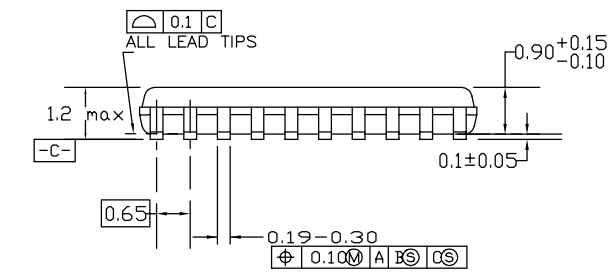
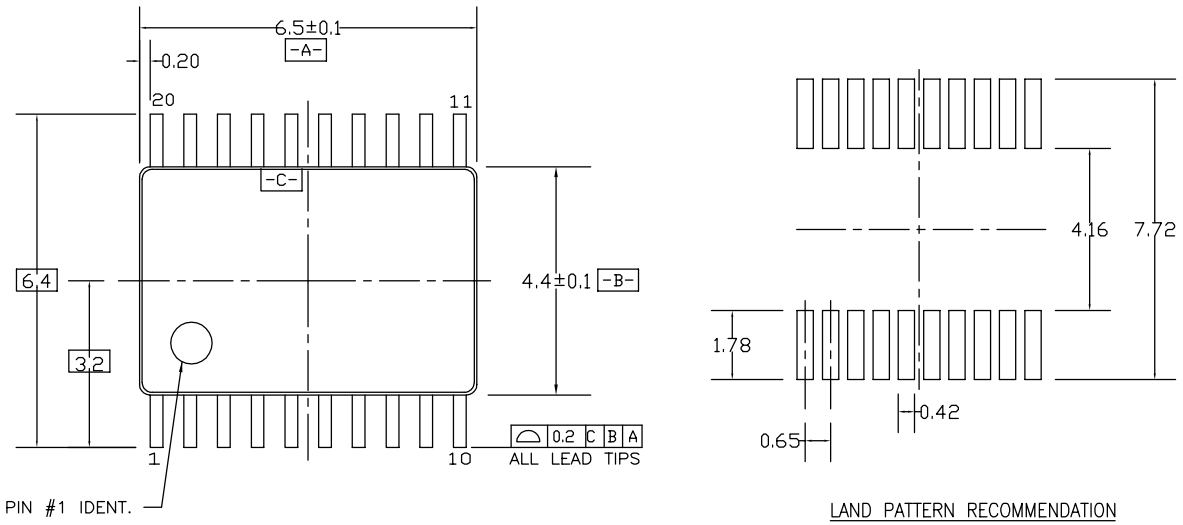
Figure 2. 20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide

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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

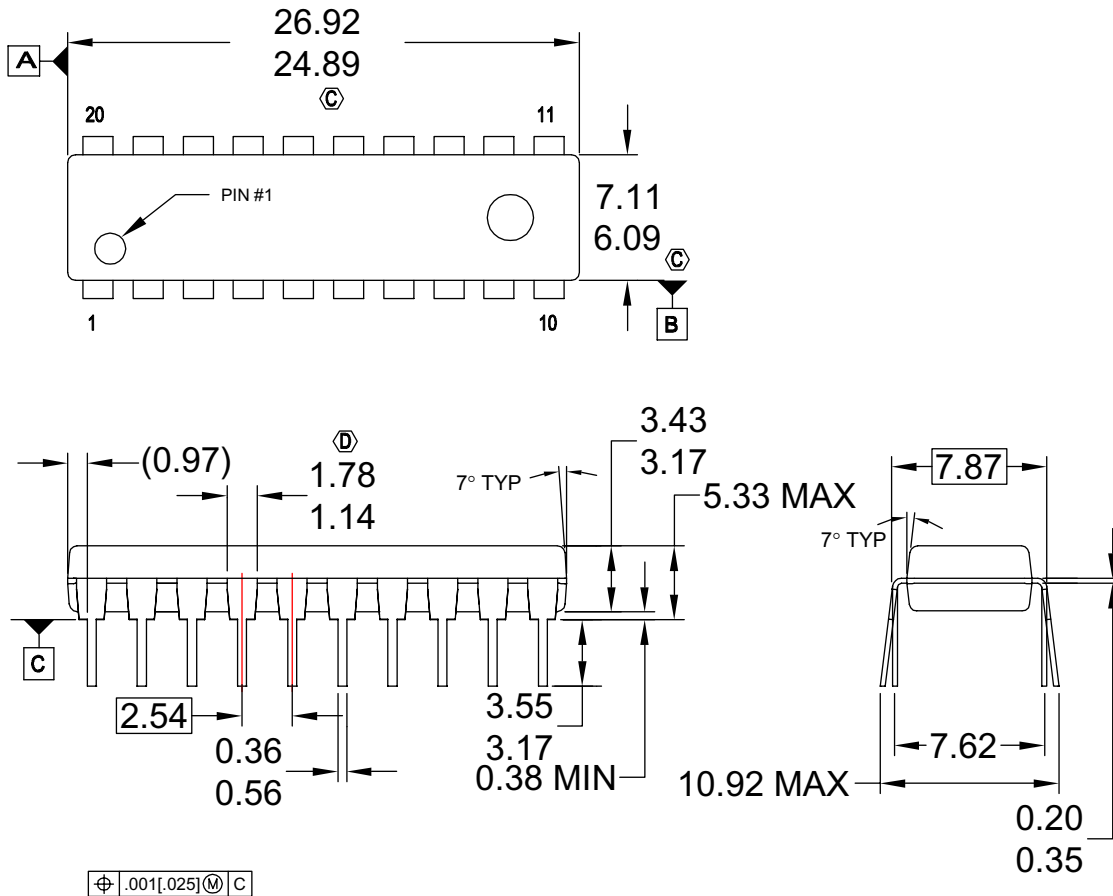
Figure 3. 20-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide

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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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