

# 74F245

## Octal Bidirectional Transceiver with 3-STATE Outputs

### Features

- Non-inverting buffers
- Bidirectional data path
- A outputs sink 24mA
- B outputs sink 64mA

### General Description

The 74F245 contains eight non-inverting bidirectional buffers with 3-STATE outputs and is intended for bus-oriented applications. Current sinking capability is 24mA at the A Ports and 64mA at the B Ports. The Transmit/Receive ( $T/\bar{R}$ ) input determines the direction of data flow through the bidirectional transceiver. Transmit (active HIGH) enables data from A Ports to B Ports; Receive (active LOW) enables data from B Ports to A Ports. The Output Enable input, when HIGH, disables both A and B Ports by placing them in a High Z condition.

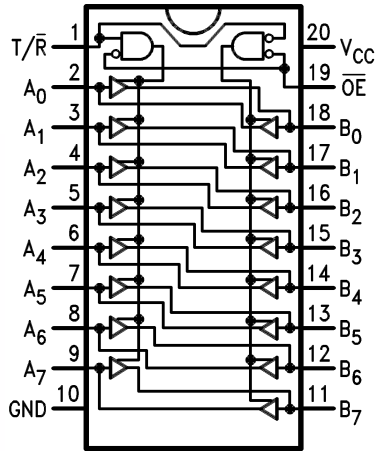
### Ordering Information

Order Number	Package Number	Package Description
74F245SC	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide
74F245SJ	M20D	20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
74F245MSA	MSA20	20-Lead Shrink Small Outline Package (SSOP), JEDEC MO-150, 5.3mm Wide
74F245MTC	MTC20	20-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide
74F245PC	N20A	20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide

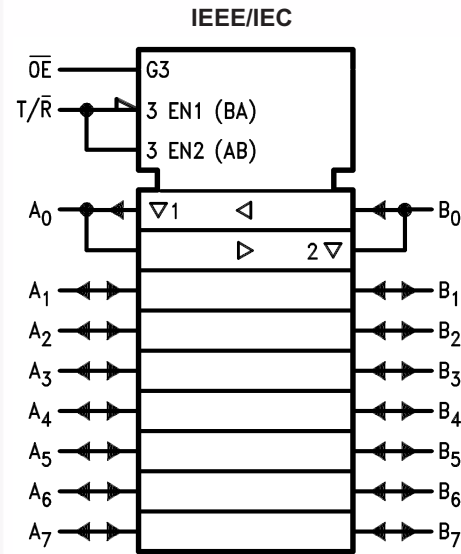
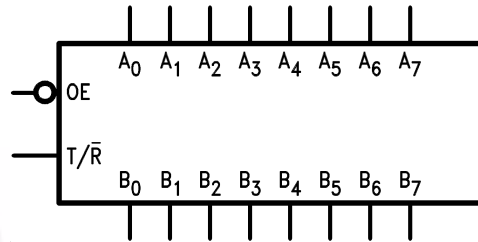
Device also available in Tape and Reel. Specify by appending suffix letter "X" to the ordering number.

 All packages are lead free per JEDEC: J-STD-020B standard.

### Connection Diagram



### Logic Symbols



### Truth Table

Inputs		Output
$\overline{OE}$	$T/\overline{R}$	
L	L	Bus B Data to Bus A
L	H	Bus A Data to Bus B
H	X	High Z State

H = HIGH Voltage Level  
 L = LOW Voltage Level  
 X = Immaterial

### Unit Loading/Fan Out

Pin Names	Description	U.L. HIGH/LOW	Input $I_{IH}/I_{IL}$ Output $I_{OH}/I_{OL}$
$\overline{OE}$	Output Enable Input (Active LOW)	1.0/2.0	20 $\mu$ A/-1.2mA
$T/\overline{R}$	Transmit/Receive Input	1.0/2.0	20 $\mu$ A/-1.2mA
$A_0-A_7$	Side A Inputs or 3-STATE Outputs	3.5/1.083 150/40 (38.3)	70 $\mu$ A/-0.65mA -3 mA/24mA (20mA)
$B_0-B_7$	Side B Inputs or 3-STATE Outputs	3.5/1.083 600/106.6 (80)	70 $\mu$ A/-0.65mA -12mA/64mA (48mA)

## 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
$T_{STG}$	Storage Temperature	-65°C to +150°C
$T_A$	Ambient Temperature Under Bias	-55°C to +125°C
$T_J$	Junction Temperature Under Bias	-55°C to +150°C
$V_{CC}$	$V_{CC}$ Pin Potential to Ground Pin	-0.5V to +7.0V
$V_I$	Input Voltage <sup>(1)</sup>	-0.5V to +7.0V
$I_I$	Input Current <sup>(1)</sup>	-30mA to +5.0mA
	Voltage Applied to Output in HIGH State (with $V_{CC} = 0V$ )	
	Standard Output	-0.5V to $V_{CC}$
	3-STATE Output	-0.5V to +5.5V
	Current Applied to Output in LOW State (Max.)	twice the rated $I_{OL}$ (mA)
	ESD Last Passing Voltage (Min.)	4000V

### Note:

1. Either voltage limit or current limit is sufficient to protect inputs.

## 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
$T_A$	Free Air Ambient Temperature	0°C to +70°C
$V_{CC}$	Supply Voltage	+4.5V to +5.5V

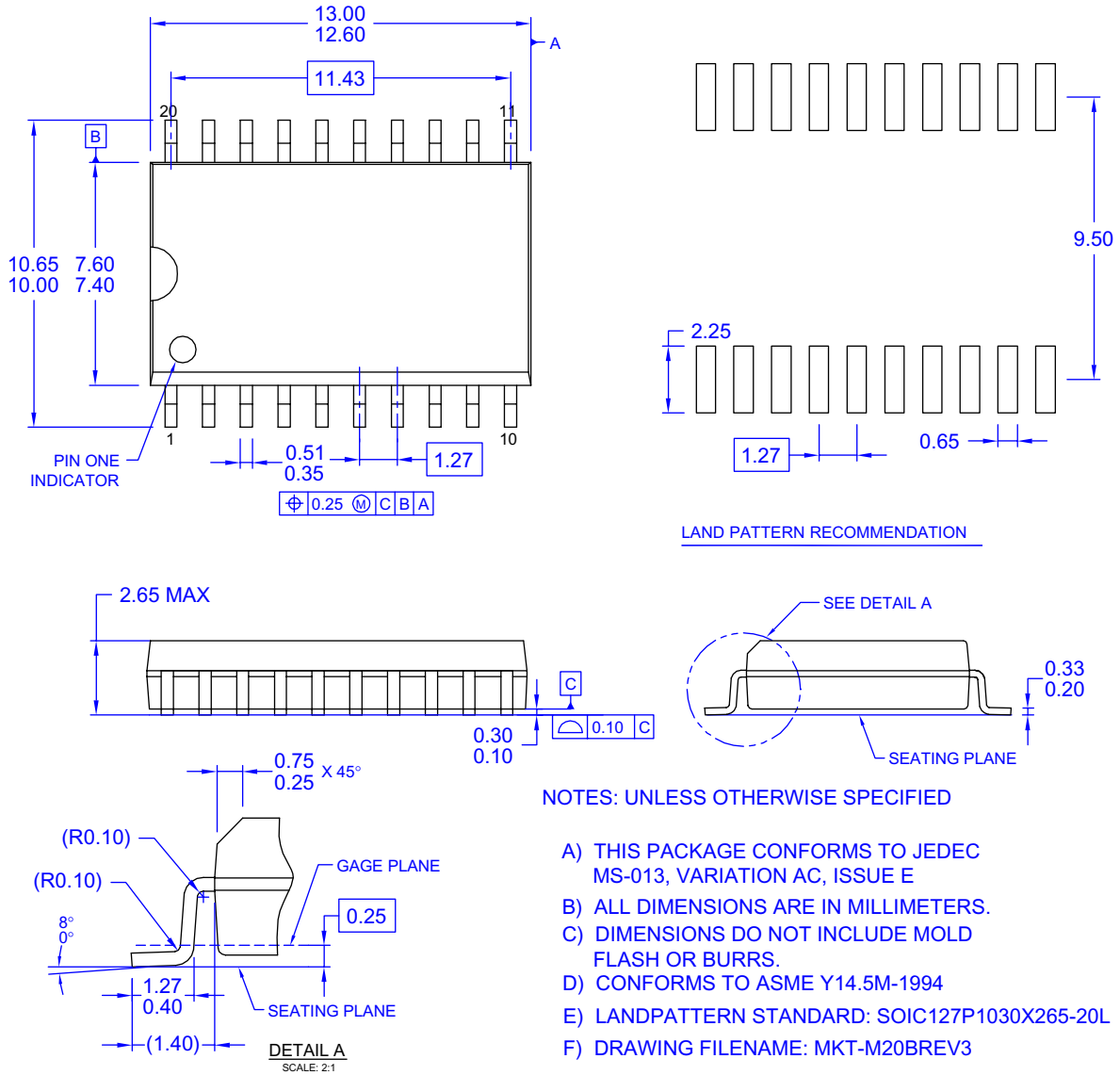
## DC Electrical Characteristics

Symbol	Parameter	V <sub>CC</sub>	Conditions	Min.	Typ.	Max.	Units
V <sub>IH</sub>	Input HIGH Voltage		Recognized as a HIGH Signal	2.0			V
V <sub>IL</sub>	Input LOW Voltage		Recognized as a LOW Signal			0.8	V
V <sub>CD</sub>	Input Clamp Diode Voltage	Min.	I <sub>IN</sub> = -18mA			-1.2	V
V <sub>OH</sub>	Output HIGH Voltage	10% V <sub>CC</sub>	Min. I <sub>OH</sub> = -3mA (A <sub>n</sub> )	2.4			V
		10% V <sub>CC</sub>		I <sub>OH</sub> = -15mA (B <sub>n</sub> )	2.0		
		5% V <sub>CC</sub>		I <sub>OH</sub> = -3mA (A <sub>n</sub> )	2.7		
V <sub>OL</sub>	Output LOW Voltage	10% V <sub>CC</sub>	Min. I <sub>OL</sub> = 24mA (A <sub>n</sub> )			0.5	V
		10% V <sub>CC</sub>		I <sub>OL</sub> = 64mA (B <sub>n</sub> )			
I <sub>IH</sub>	Input HIGH Current	Max.	V <sub>IN</sub> = 2.7V			5.0	μA
I <sub>BVI</sub>	Input HIGH Current Breakdown Test	Max.	V <sub>IN</sub> = 7.0V ( $\overline{OE}$ , T/ $\overline{R}$ )			7.0	μA
I <sub>BVIT</sub>	Input HIGH Current Breakdown (I/O)	Max.	V <sub>IN</sub> = 5.5V (A <sub>n</sub> , B <sub>n</sub> )			0.5	mA
I <sub>CEx</sub>	Output HIGH Leakage Current	Max.	V <sub>OUT</sub> = V <sub>CC</sub> (A <sub>n</sub> , B <sub>n</sub> )			50	μA
V <sub>ID</sub>	Input Leakage Test	0.0	I <sub>ID</sub> = 1.9μA, All Other Pins Grounded	4.75			V
I <sub>OD</sub>	Output Leakage Circuit Current	0.0	V <sub>IOD</sub> = 150mV, All Other Pins Grounded			3.75	μA
I <sub>IL</sub>	Input LOW Current	Max.	V <sub>IN</sub> = 0.5V (T/ $\overline{R}$ , $\overline{OE}$ )			-1.2	mA
I <sub>IH</sub> + I <sub>OZH</sub>	Output Leakage Current	Max.	V <sub>OUT</sub> = 2.7V (A <sub>n</sub> , B <sub>n</sub> )			70	μA
I <sub>IL</sub> + I <sub>OZL</sub>	Output Leakage Current	Max.	V <sub>OUT</sub> = 0.5V (A <sub>n</sub> , B <sub>n</sub> )			-650	μA
I <sub>OS</sub>	Output Short-Circuit Current	Max.	V <sub>OUT</sub> = 0V (A <sub>n</sub> )	-60		-150	mA
			V <sub>OUT</sub> = 0V (B <sub>n</sub> )	-100		-225	
I <sub>ZZ</sub>	Bus Drainage Test	0.0V	V <sub>OUT</sub> = 5.25V(A <sub>n</sub> , B <sub>n</sub> )			500	μA
I <sub>CCH</sub>	Power Supply Current	Max.	V <sub>O</sub> = HIGH		70	90	mA
I <sub>CCL</sub>	Power Supply Current	Max.	V <sub>O</sub> = LOW		95	120	mA
I <sub>CCZ</sub>	Power Supply Current	Max.	V <sub>O</sub> = HIGH Z		85	110	mA

## AC Electrical Characteristics

Symbol	Parameter	$T_A = +25^\circ\text{C}$ , $V_{CC} = +5.0\text{V}$ , $C_L = 50\text{pF}$			$T_A = -55^\circ\text{C to } +125^\circ\text{C}$ , $C_L = 50\text{pF}$		$T_A = 0^\circ\text{C to } +70^\circ\text{C}$ , $C_L = 50\text{pF}$		Units
		Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
$t_{PLH}$ , $t_{PHL}$	Propagation Delay, $A_n$ to $B_n$ or $B_n$ to $A_n$	2.5	4.2	6.0	2.0	7.5	2.0	7.0	ns
		2.5	4.2	6.0	2.0	7.5	2.0	7.0	
$t_{PZH}$ , $t_{PZL}$	Output Enable Time	3.0	5.3	7.0	2.5	9.0	2.5	8.0	ns
		3.5	6.0	8.0	3.0	10.0	3.0	9.0	
$t_{PHZ}$ , $t_{PLZ}$	Output Disable Time	2.0	5.0	6.5	2.0	9.0	2.0	7.5	ns
		2.0	5.0	6.5	2.0	10.0	2.0	7.5	

**Physical Dimensions**



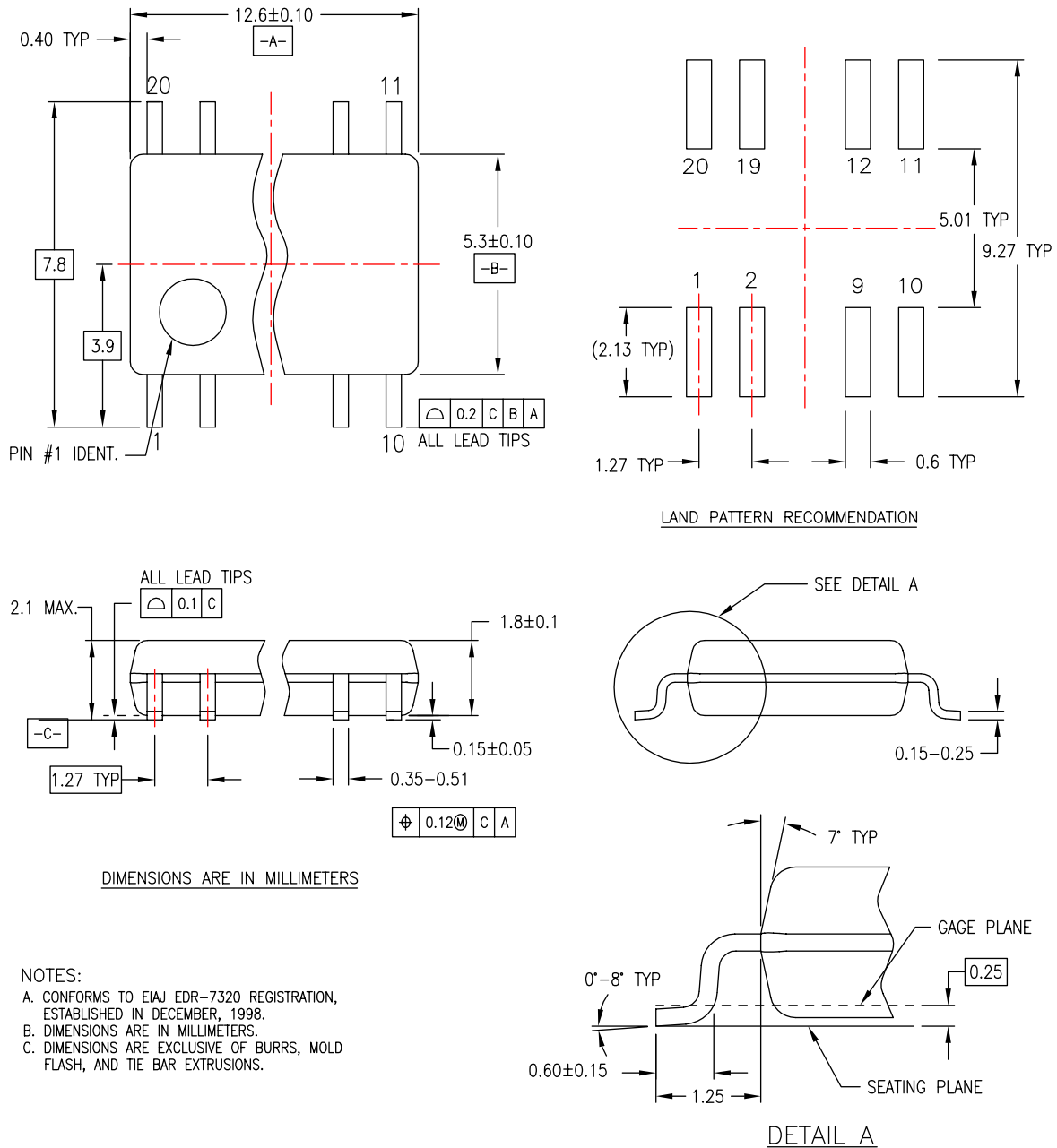
**Figure 1. 20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide**

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Physical Dimensions (Continued)



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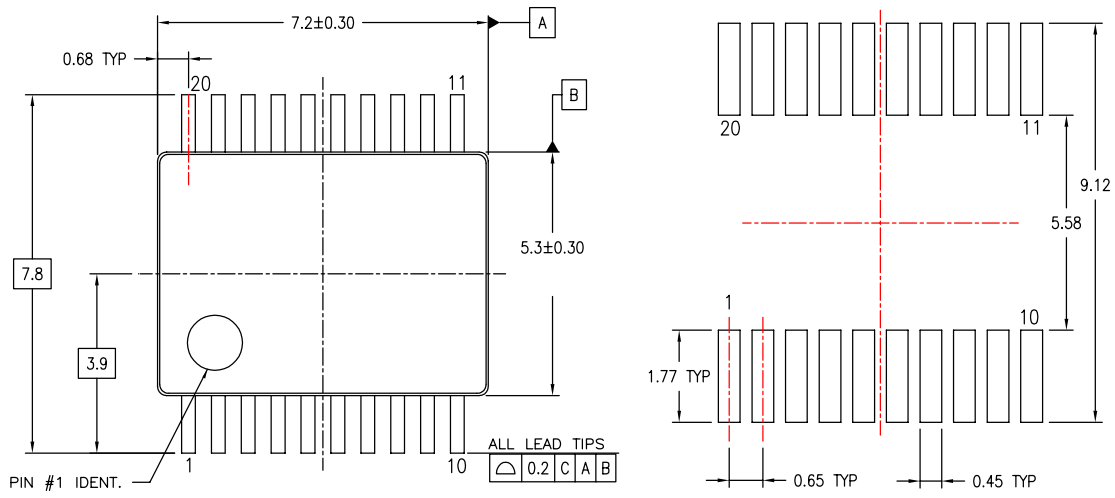
Figure 2. 20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide

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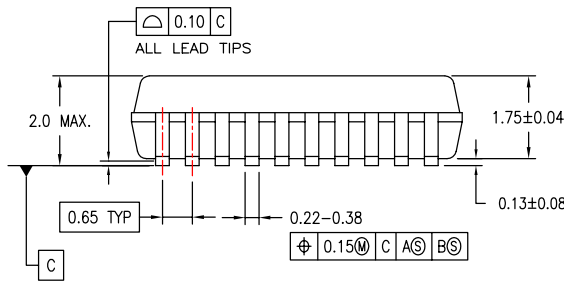
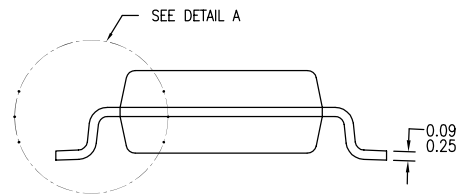
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Physical Dimensions (Continued)



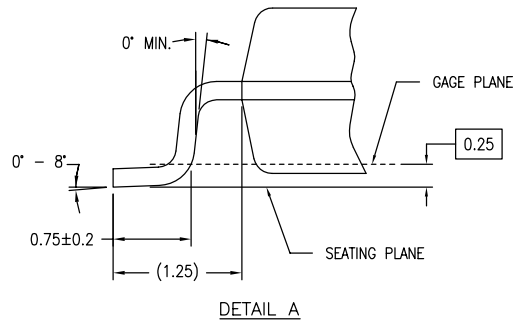
LAND PATTERN RECOMMENDATIONS



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NOTES:

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- B. DIMENSIONS ARE IN MILLIMETERS.
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- D. DIMENSIONS AND TOLERANCES PER ASME Y14.5M - 1994.



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Figure 3. 20-Lead Shrink Small Outline Package (SSOP), JEDEC MO-150, 5.3mm Wide

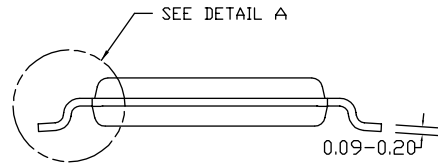
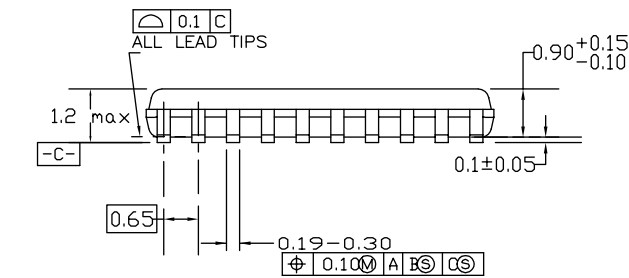
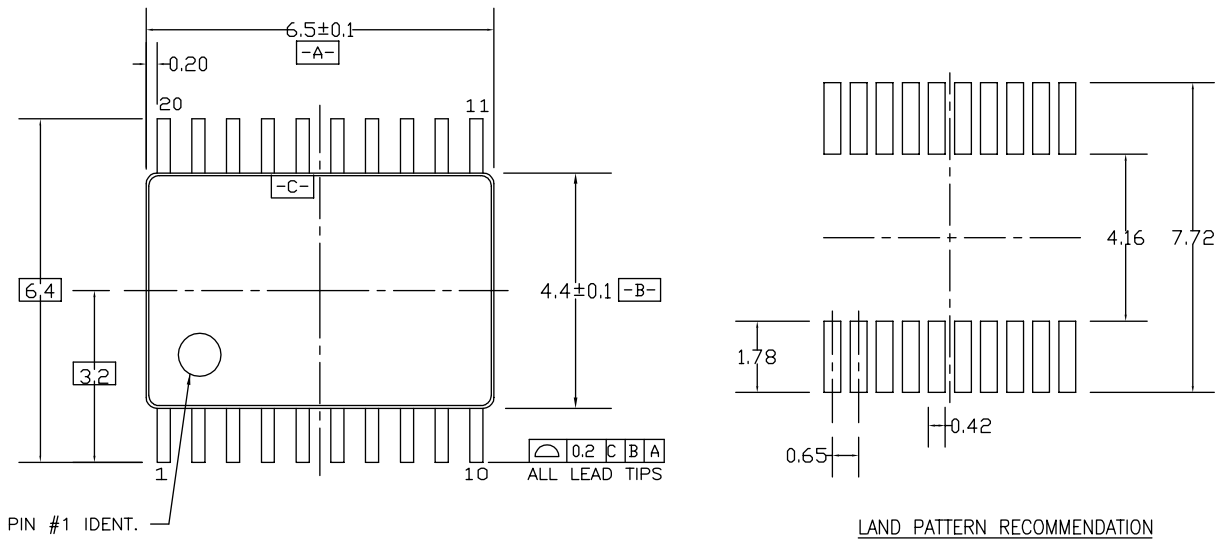
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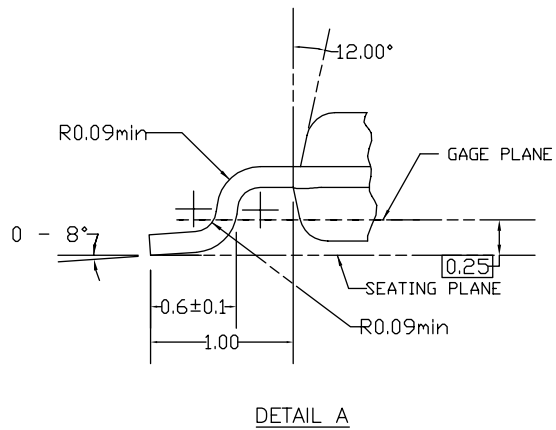
Physical Dimensions (Continued)



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- C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLDS FLASH, AND TIE BAR EXTRUSIONS.
- D. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M, 1982.



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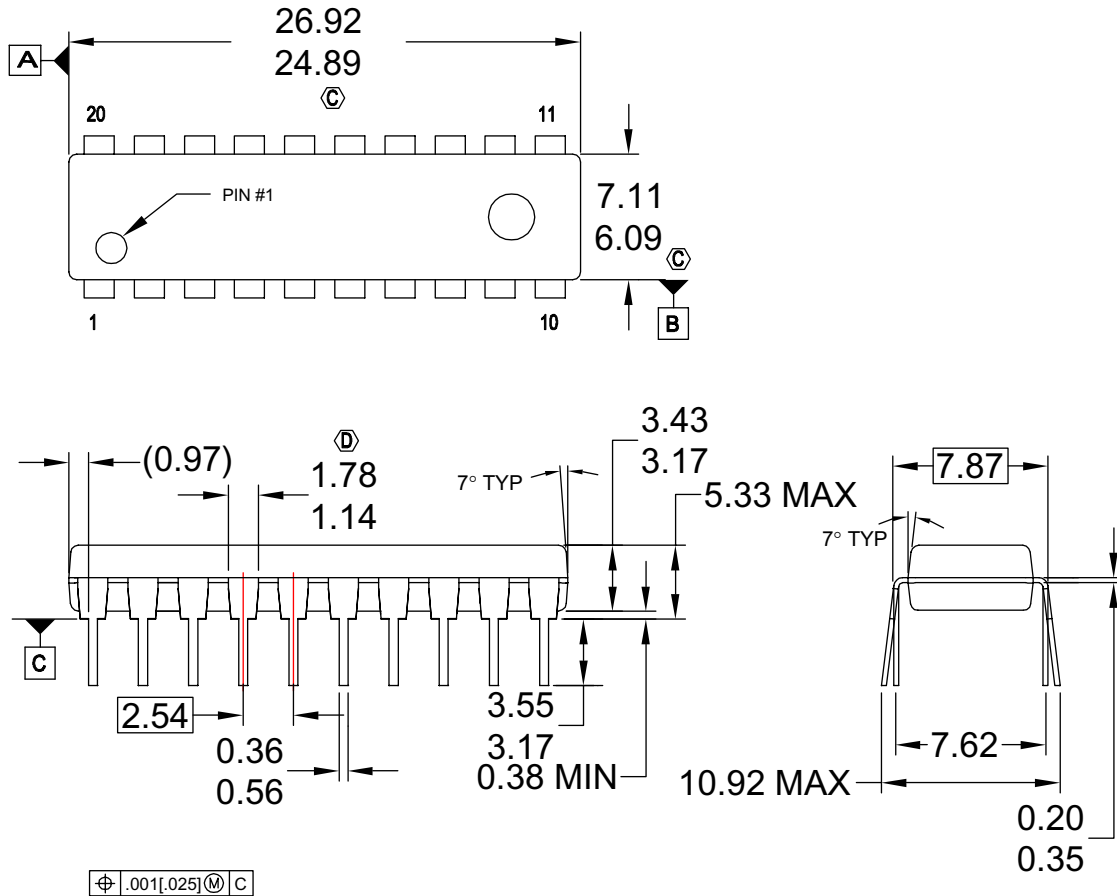
Figure 4. 20-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide

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Physical Dimensions (Continued)



NOTES:

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- 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 5. 20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide

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