

74ACT245

Octal Bidirectional Transceiver with 3-STATE Inputs/Outputs

The AC/ACT245 contains eight non-inverting bidirectional buffers with 3-STATE outputs and is intended for bus-oriented applications. Current sinking capability is 24mA at both the A and B ports. The Transmit/Receive (T/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.

Rochester Electronics Manufactured Components

Rochester branded components are manufactured using either die/wafers purchased from the original suppliers or Rochester wafers recreated from the original IP. All re-creations are done with the approval of the Original Component Manufacturer (OCM).

Parts are tested using original factory test programs or Rochester developed test solutions to guarantee product meets or exceeds the OCM data sheet.

Quality Overview

- ISO-9001
- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-35835
 Class Q Military
 - Class V Space Level
- Qualified Suppliers List of Distributors (QSLD)
 - Rochester is a critical supplier to DLA and meets all industry and DLA standards.

Rochester Electronics, LLC is committed to supplying products that satisfy customer expectations for quality and are equal to those originally supplied by industry manufacturers.

The original manufacturer's datasheet accompanying this document reflects the performance and specifications of the Rochester manufactured version of this device. Rochester Electronics guarantees the performance of its semiconductor products to the original OCM specifications. 'Typical' values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.

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January 2008

74AC245, 74ACT245 Octal Bidirectional Transceiver with 3-STATE Inputs/Outputs

Features

- I_{CC} and I_{OZ} reduced by 50%
- Non-inverting buffers
- Bidirectional data path
- A and B outputs source/sink 24mA
- ACT245 has TTL-compatible inputs

General Description

The AC/ACT245 contains eight non-inverting bidirectional buffers with 3-STATE outputs and is intended for bus-oriented applications. Current sinking capability is 24mA at both the A and B ports. The Transmit/Receive (T/\overline{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.

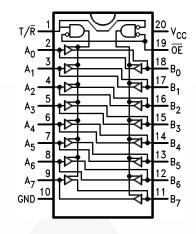
Ordering Information

Order Number	Package Number	Package Description
74AC245SC	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide
74AC245SJ	M20D	20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
74AC245MTC	MTC20	20-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide
74AC245PC	N20A	20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide
74ACT245SC	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide
74ACT245SJ	M20D	20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
74ACT245MSA	MSA20	20-Lead Shrink Small Outline Package (SSOP), JEDEC MO-150, 5.3mm Wide
74ACT245MTC	MTC20	20-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide
74ACT245PC	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.

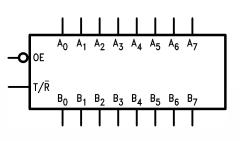
Connection Diagram



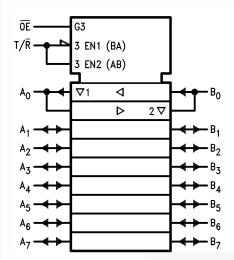
Pin Description

Pin Names	Description
ŌĒ	Output Enable Input
T/R	Transmit/Receive Input
A ₀ -A ₇	Side A 3-STATE Inputs or 3-STATE Outputs
B ₀ –B ₇	Side B 3-STATE Inputs or 3-STATE Outputs

Logic Symbol



IEEE/IEC



Truth Table

Inp	uts	
OE	T/R	Outputs
L	L	Bus B Data to Bus A
L	Н	Bus A Data to Bus B
Н	Х	HIGH-Z State

H = HIGH Voltage Level

L = LOW Voltage Level

X = Immaterial

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
VI	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
Vo	DC Output Voltage	-0.5V to V _{CC} + 0.5V
Ι _Ο	DC Output Source or Sink Current	±50mA
I _{CC} or I _{GND}	DC V _{CC} or Ground Current per Output Pin	±50mA
T _{STG}	Storage Temperature	-65°C to +150°C
TJ	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
VI	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:	125mV/ns
	$\rm V_{IN}$ from 30% to 70% of $\rm V_{CC}, \rm V_{CC}$ @ 3.3V, 4.5V, 5.5V	
$\Delta V / \Delta t$	Minimum Input Edge Rate, ACT Devices:	125mV/ns
	V _{IN} from 0.8V to 2.0V, V _{CC} @ 4.5V, 5.5V	

				T _A = -	⊦25°C	$T_A = -40^{\circ}C \text{ to } +85^{\circ}C$	
Symbol	Parameter	V _{CC} (V)	Conditions	Тур.	G	uaranteed Limits	Units
V _{IH}	Minimum HIGH Level	3.0	$V_{OUT} = 0.1V \text{ or}$	1.5	2.1	2.1	V
	Input Voltage	4.5	V _{CC} – 0.1V	2.25	3.15	3.15	
		5.5		2.75	3.85	3.85	
V _{IL}	Maximum LOW Level	3.0	$V_{OUT} = 0.1V \text{ or}$	1.5	0.9	0.9	V
	Input Voltage	4.5	V _{CC} – 0.1V	2.25	1.35	1.35	1
		5.5	-	2.75	1.65	1.65	1
V _{OH}	Minimum HIGH Level	3.0	Ι _{ΟUT} = –50μΑ	2.99	2.9	2.9	V
	Output Voltage	4.5	-	4.49	4.4	4.4	1
		5.5	-	5.49	5.4	5.4	1
		3.0	$V_{IN} = V_{IL} \text{ or } V_{IH},$ $I_{OH} = -12 \text{mA}$		2.56	2.46	-
		4.5	$V_{IN} = V_{IL} \text{ or } V_{IH},$ $I_{OH} = -24 \text{mA}$		3.86	3.76	
		5.5	$V_{IN} = V_{IL} \text{ or } V_{IH},$ $I_{OH} = -24 \text{mA}^{(1)}$		4.86	4.76	
V _{OL}	Maximum LOW Level	3.0	Ι _{ΟUT} = 50μΑ	0.002	0.1	0.1	V
	Output Voltage	4.5		0.001	0.1	0.1	1
		5.5		0.001	0.1	0.1	
		3.0	$V_{IN} = V_{IL} \text{ or } V_{IH},$ $I_{OL} = 12 \text{mA}$		0.36	0.44	
		4.5	$V_{IN} = V_{IL} \text{ or } V_{IH},$ $I_{OL} = 24 \text{mA}$		0.36	0.44	
		5.5	$V_{IN} = V_{IL} \text{ or } V_{IH},$ $I_{OL} = 24 \text{mA}^{(1)}$		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	5.5	V _{OLD} = 1.65V Max.			75	mA
I _{OHD}	Output Current ⁽³⁾	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	μΑ
I _{OZT}	Maximum I/O Leakage Current	5.5			±0.3	±3.0	μA

DC Electrical Characteristics for AC

Notes:

1. All outputs loaded; thresholds on input associated with output under test.

2. I_{IN} and I_{CC} @ 3.0V are guaranteed to be less than or equal to the respective limit @ 5.5V V_{CC}.

3. Maximum test duration 2.0ms, one output loaded at a time.

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	Parameter			T _A = +25°C		$T_A = -40^{\circ}C \text{ to } +85^{\circ}C$	
Symbol		V _{CC} (V)	Conditions	Тур.	G	uaranteed Limits	Units
V _{IH}	Minimum HIGH Level	4.5	$V_{OUT} = 0.1V$ or	1.5	2.0	2.0	V
	Input Voltage	5.5	V _{CC} – 0.1V	1.5	2.0	2.0	
V _{IL}	Maximum LOW	4.5	$V_{OUT} = 0.1V$ or	1.5	0.8	0.8	V
	Level Input Voltage	5.5	V _{CC} – 0.1V	1.5	0.8	0.8	
V _{OH}	Minimum HIGH Level	4.5	$I_{OUT} = -50 \mu A$	4.49	4.4	4.4	V
	Output Voltage	5.5		5.49	5.4	5.4	
		4.5	$V_{IN} = V_{IL} \text{ or } V_{IH},$ $I_{OH} = -24 \text{mA}$		3.86	3.76	
		5.5	$V_{IN} = V_{IL} \text{ or } V_{IH},$ $I_{OH} = -24 \text{mA}^{(4)}$		4.86	4.76	
OL	Maximum LOW Level Output Voltage	4.5	Ι _{ΟUT} = 50μΑ	0.001	0.1	0.1	V
		5.5		0.001	0.1	0.1	
		4.5	$V_{IN} = V_{IL} \text{ or } V_{IH},$ $I_{OL} = 24 \text{mA}$		0.36	0.44	
		5.5	$V_{IN} = V_{IL} \text{ or } V_{IH},$ $I_{OL} = 24 \text{mA}^{(4)}$		0.36	0.44	
I _{IN}	Maximum Input Leakage Current	5.5	$V_I = V_{CC}$, GND		±0.1	±1.0	μA
I _{CCT}	Maximum I _{CC} /Input	5.5	$V_I = V_{CC} - 2.1V$	0.6		1.5	mA
I _{OLD}	Minimum Dynamic	5.5	$V_{OLD} = 1.65V$ Max.			75	mA
I _{OHD}	Output Current ⁽⁵⁾	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
I _{OZT}	Maximum I/O Leakage Current	5.5			±0.3	±3.0	μA

Notes:

4. All outputs loaded; thresholds on input associated with output under test.

5. Maximum test duration 2.0ms, one output loaded at a time.

	$T_A = +25^{\circ}C,$ $C_L = 50pF$			T _A = -
V _{CC} (V) ⁽⁶⁾	Min.	Тур.	Max.	Min
3.3	1.5	5.0	8.5	1.0
5.0	1.5	3.5	6.5	1.0
3.3	1.5	5.0	8.5	1.0

AC Electrical Characteristics for AC

				$\begin{array}{l} \textbf{T}_{\textbf{A}}=+25^{\circ}\textbf{C},\\ \textbf{C}_{\textbf{L}}=\textbf{50}\textbf{p}\textbf{F} \end{array}$		$\label{eq:T_A} \begin{split} T_A = -40^\circ C \ to \ +85^\circ C, \\ C_L = 50 p F \end{split}$		
Symbol	Parameter	V _{CC} (V) ⁽⁶⁾	Min.	Тур.	Max.	Min.	Max.	Units
t _{PLH}	Propagation Delay,	3.3	1.5	5.0	8.5	1.0	9.0	ns
	A_n to B_n or B_n to A_n	5.0	1.5	3.5	6.5	1.0	7.0	
t _{PHL}	Propagation Delay,	3.3	1.5	5.0	8.5	1.0	9.0	ns
	A_n to B_n or B_n to A_n	5.0	1.5	3.5	6.0	1.0	7.0	
t _{PZH}	Output Enable Time	3.3	2.5	7.0	11.5	2.0	12.5	ns
		5.0	1.5	5.0	8.5	1.0	9.0	
t _{PZL}	Output Enable Time	3.3	2.5	7.5	12.0	2.0	13.5	ns
		5.0	1.5	5.5	9.0	1.0	9.5	
t _{PHZ}	Output Disable Time	3.3	2.0	6.5	12.0	1.0	12.5	ns
		5.0	1.5	5.5	9.0	1.0	10.0	
t _{PLZ}	Output Disable Time	3.3	2.0	7.0	11.5	1.5	13.0	ns
		5.0	1.5	5.5	9.0	1.0	10.0	

Note:

6. Voltage range 3.3 is 3.3V \pm 0.3V. Voltage range 5.0 is 5.0V \pm 0.5V.

AC Electrical Characteristics for ACT

				λ = +25° C _L = 50p			C to +85°C, 50pF	
Symbol	Parameter	V _{CC} (V) ⁽⁷⁾	Min.	Тур.	Max.	Min.	Max.	Units
t _{PLH}	Propagation Delay, A_n to B_n or B_n to A_n	5.0	1.5	4.0	7.5	1.5	8.0	ns
t _{PHL}	Propagation Delay, A_n to B_n or B_n to A_n	5.0	1.5	4.0	8.0	1.0	9.0	ns
t _{PZH}	Output Enable Time	5.0	1.5	5.0	10.0	1.5	11.0	ns
t _{PZL}	Output Enable Time	5.0	1.5	5.5	10.0	1.5	12.0	ns
t _{PHZ}	Output Disable Time	5.0	1.5	5.5	10.0	1.0	11.0	ns
t _{PLZ}	Output Disable Time	5.0	2.0	5.0	10.0	1.5	11.0	ns

Note:

7. Voltage range 5.0 is 5.0V \pm 0.5V.

Capacitance

Symbol	Parameter	Conditions	Тур.	Units
C _{IN}	Input Capacitance	V _{CC} = OPEN	4.5	pF
C _{I/O}	Input/Output Capacitance	$V_{CC} = 5.0V$	15.0	pF
C _{PD}	Power Dissipation Capacitance	$V_{CC} = 5.0V$	45.0	pF

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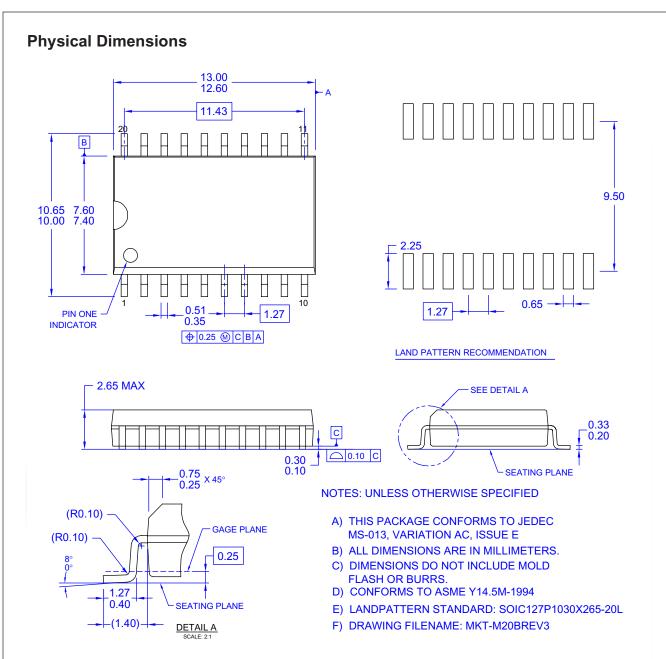
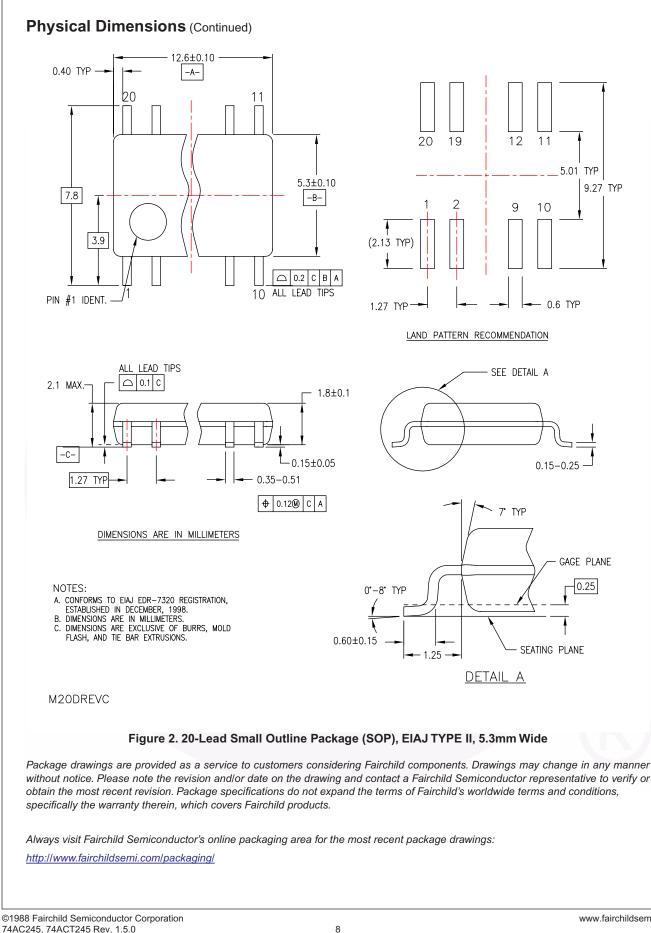
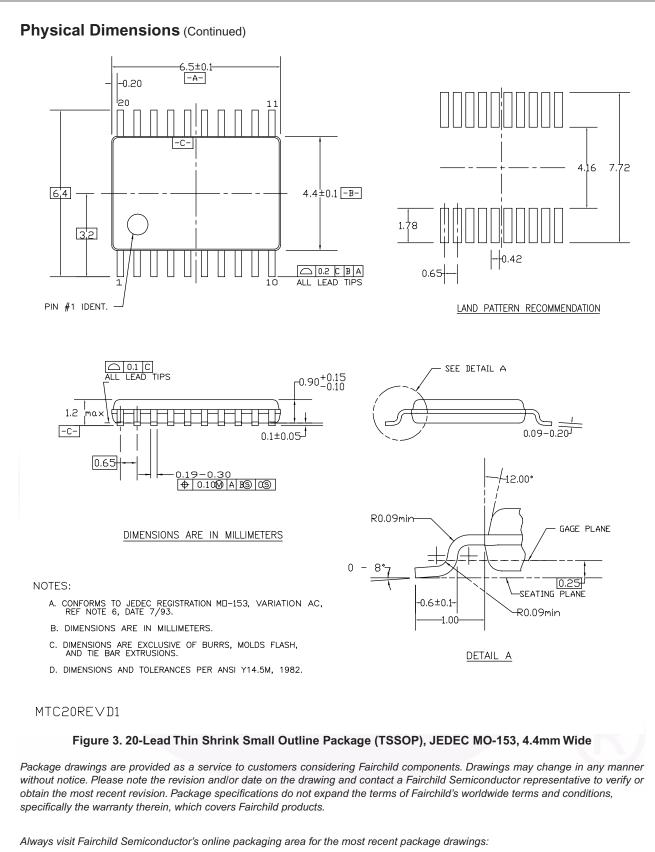


Figure 1. 20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide

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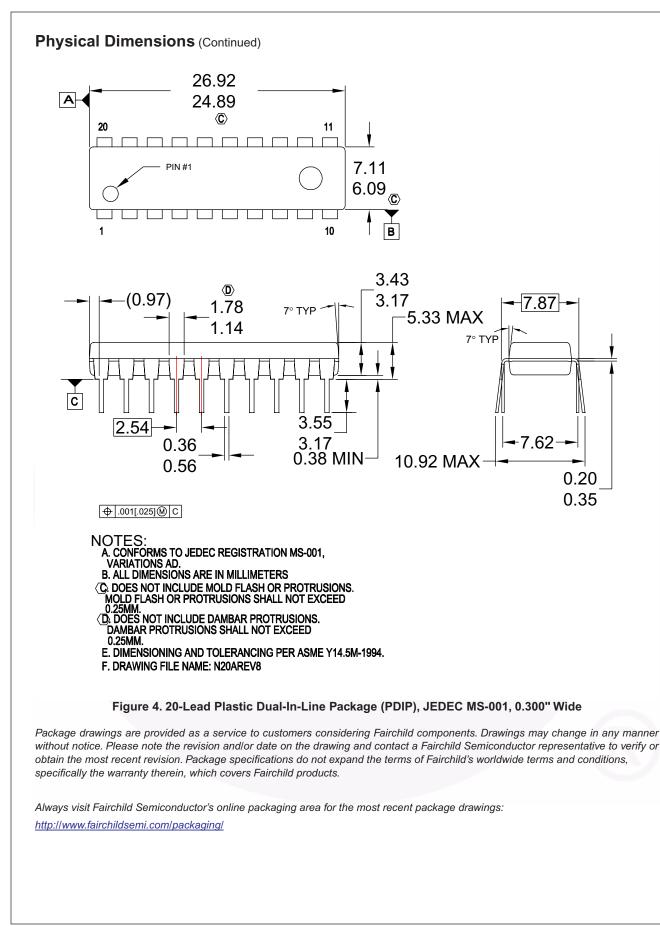
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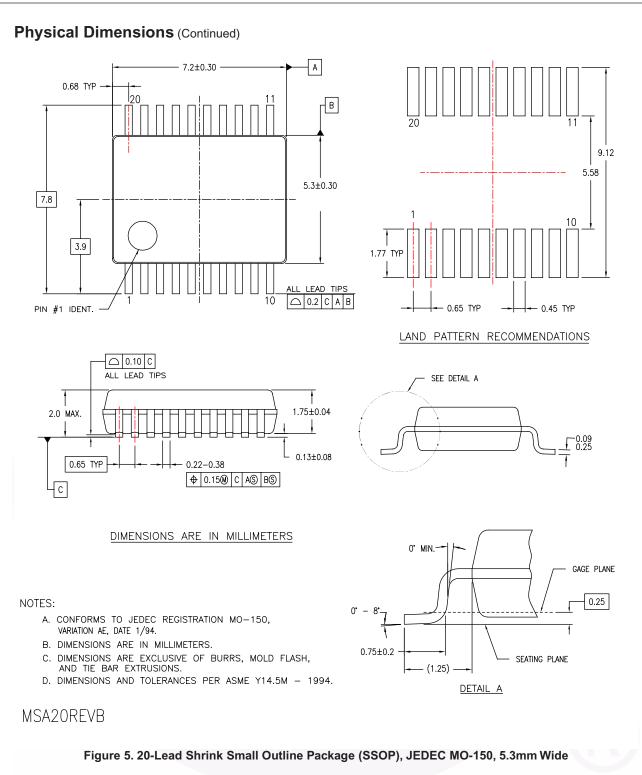




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