

# 74AC241, 74ACT241

## Octal Buffer/Line Driver with 3-STATE Outputs

### Features

- $I_{CC}$  and  $I_{OZ}$  reduced by 50%
- Non-inverting 3-STATE outputs drive bus lines or buffer memory address registers
- Outputs source/sink 24mA
- ACT241 has TTL-compatible inputs

### General Description

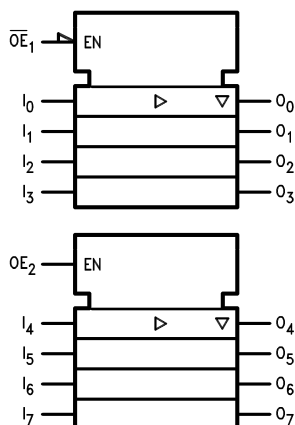
The AC/ACT241 is an octal buffer and line driver designed to be employed as a memory address driver, clock driver and bus-oriented transmitter or receiver which provides improved PC board density.

### Ordering Information

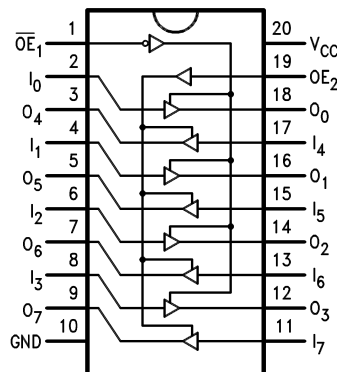
Order Number	Package Number	Package Description
74AC241SC	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide
74AC241SJ	M20D	20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
74AC241MTC	MTC20	20-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide
74ACT241SC	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide
74ACT241SJ	M20D	20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
74ACT241MTC	MTC20	20-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide

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

### Logic Symbol



### Connection Diagram



### Pin Descriptions

Pin Names	Description
$\overline{OE}_1$	3-STATE Output Enable Input
$OE_2$	3-STATE Output Enable Input (Active HIGH)
$I_0$ - $I_7$	Inputs
$O_0$ - $O_7$	Outputs

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## Truth Table

Inputs		Outputs
$\overline{OE}_1$	$I_n$	Pins 12, 14, 16, 18
L	L	L
L	H	H
H	X	Z

Inputs		Outputs
$OE_2$	$I_n$	Pins 3, 5, 7, 9
H	L	L
H	H	H
L	X	Z

H = HIGH Voltage Level

X = Immaterial

L = LOW Voltage Level

Z = High Impedance

## 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 $V_I = -0.5V$ $V_I = V_{CC} + 0.5V$	-20mA +20mA
$V_I$	DC Input Voltage	-0.5V to $V_{CC} + 0.5V$
$I_{OK}$	DC Output Diode Current $V_O = -0.5V$ $V_O = V_{CC} + 0.5V$	-20mA +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 ACT	2.0V to 6.0V 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		I <sub>OH</sub> = -24mA			3.86		3.76	
		5.5		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		I <sub>OL</sub> = 24mA			0.36		0.44	
		5.5		I <sub>OL</sub> = 24mA <sup>(1)</sup>			0.36		0.44	
I <sub>IN</sub> <sup>(3)</sup>	Maximum Input Leakage Current	5.5	V <sub>I</sub> = V <sub>CC</sub> , GND		±0.1	±0.1		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		
I <sub>OLD</sub>	Minimum Dynamic Output Current <sup>(2)</sup>	5.5	V <sub>OLD</sub> = 1.65V Max.			75		mA		
I <sub>OHD</sub>				V <sub>OHD</sub> = 3.85V Min.			-75		mA	
I <sub>CC</sub> <sup>(3)</sup>	Maximum Quiescent Supply Current	5.5	V <sub>IN</sub> = V <sub>CC</sub> or GND		4.0	40.0		μA		

**Notes:**

1. All outputs loaded; thresholds on input associated with output under test.
2. Maximum test duration 2.0ms, one output loaded at a time.
3. 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>.

## 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	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	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>CC1</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. V <sub>OHD</sub> = 3.85V Min.			75		mA	
						-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>PLH</sub>	Propagation Delay, Data to Output	3.3	1.5	6.0	9.0	1.5	10.0	ns
		5.0	1.5	5.0	7.0	1.0	7.5	
t <sub>PHL</sub>	Propagation Delay, Data to Output	3.3	1.5	6.0	9.0	1.0	10.5	ns
		5.0	1.5	4.5	7.0	1.0	7.5	
t <sub>PZH</sub>	Output Enable Time	3.3	1.5	6.5	12.5	1.0	13.0	ns
		5.0	1.5	5.5	9.0	1.0	9.5	
t <sub>PZL</sub>	Output Enable Time	3.3	1.5	7.0	12.0	1.5	13.0	ns
		5.0	1.5	5.5	9.0	1.0	9.5	
t <sub>PHZ</sub>	Output Disable Time	3.3	2.0	8.0	12.0	2.0	12.5	ns
		5.0	1.5	6.5	10.0	1.0	10.5	
t <sub>PLZ</sub>	Output Disable Time	3.3	1.5	7.0	12.5	1.0	13.0	ns
		5.0	1.5	6.0	10.0	1.0	10.5	

**Note:**

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

### AC Electrical Characteristics for ACT

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
			Min.	Typ.	Max.	Min.	Max.	
t <sub>PLH</sub>	Propagation Delay, Data to Output	5.0	1.5	6.5	9.0	1.5	10.0	ns
t <sub>PHL</sub>	Propagation Delay, Data to Output	5.0	1.5	7.0	9.0	1.5	10.0	ns
t <sub>PZH</sub>	Output Enable Time	5.0	1.5	6.0	9.0	1.0	10.0	ns
t <sub>PZL</sub>	Output Enable Time	5.0	1.5	7.0	10.0	1.5	11.0	ns
t <sub>PHZ</sub>	Output Disable Time	5.0	1.5	8.0	10.5	1.5	11.5	ns
t <sub>PLZ</sub>	Output Disable Time	5.0	2.0	7.0	10.5	1.5	11.5	ns

**Note:**

7. Voltage range 5.0 is 5.0V ± 0.5V.

### Capacitance

Symbol	Parameter	Conditions	Typ.	Units
C <sub>IN</sub>	Input Capacitance	V <sub>CC</sub> = OPEN	4.5	pF
C <sub>PD</sub>	Power Dissipation Capacitance	V <sub>CC</sub> = 5.0V	45.0	pF

### Physical Dimensions

Dimensions are in inches (millimeters) unless otherwise noted.

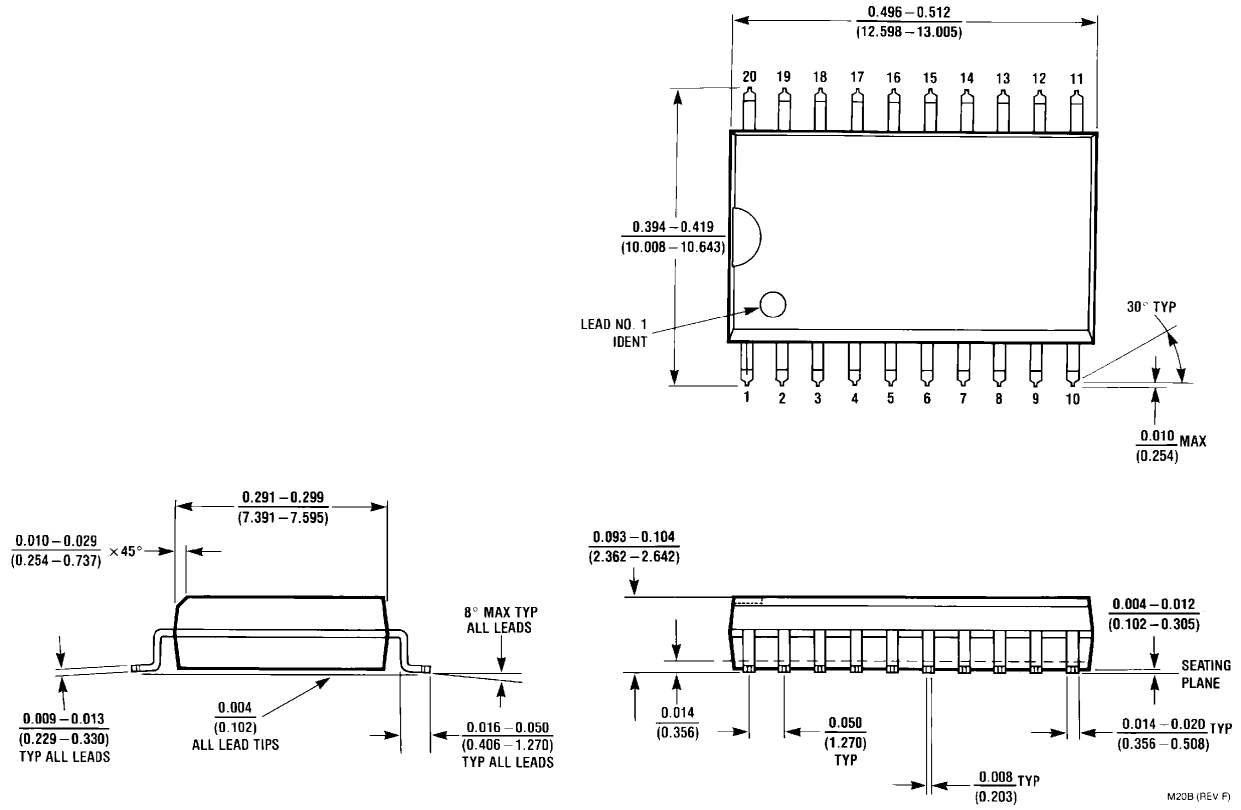
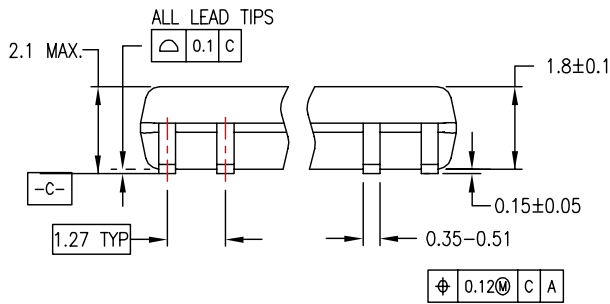
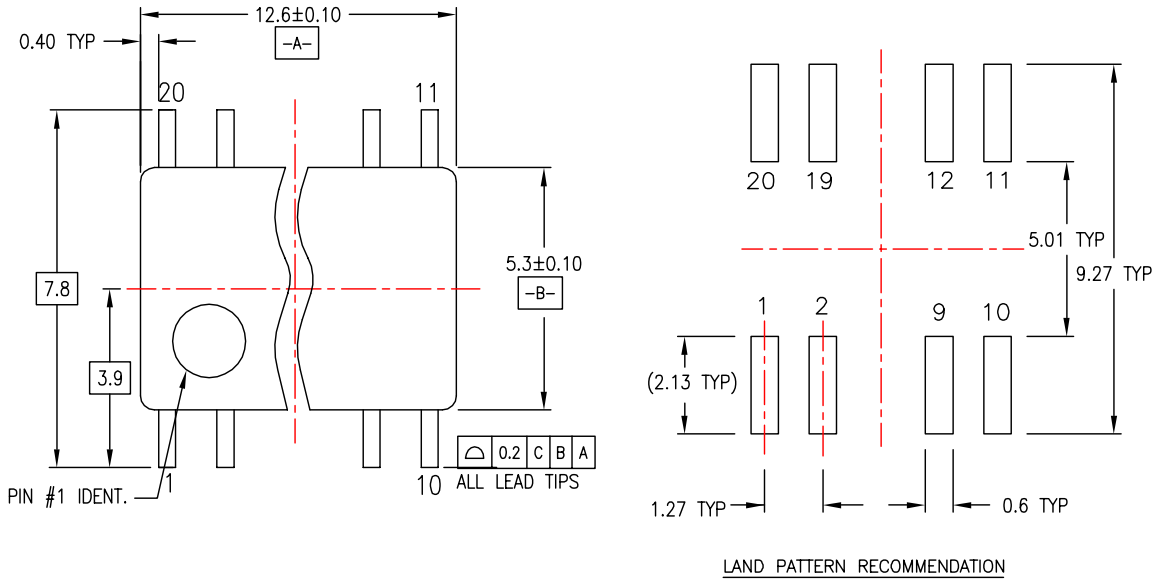


Figure 1. 20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide Package Number M20B

M20B (REV F)

### Physical Dimensions (Continued)

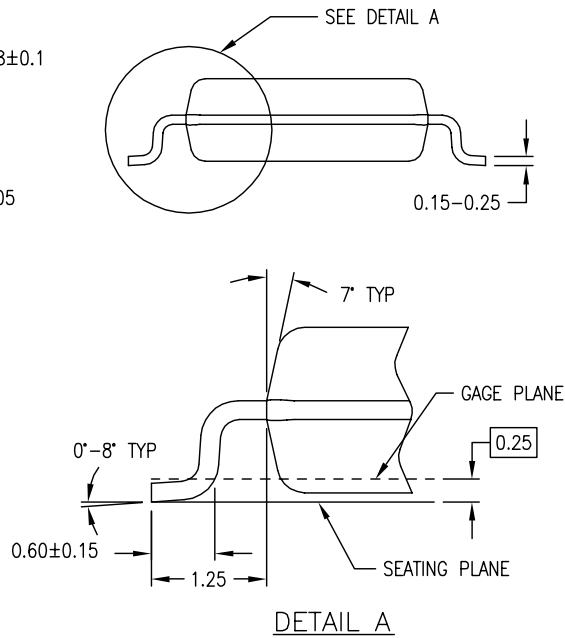
Dimensions are in millimeters unless otherwise noted.



DIMENSIONS ARE IN MILLIMETERS

**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 THE TIE BAR EXTRUSIONS.

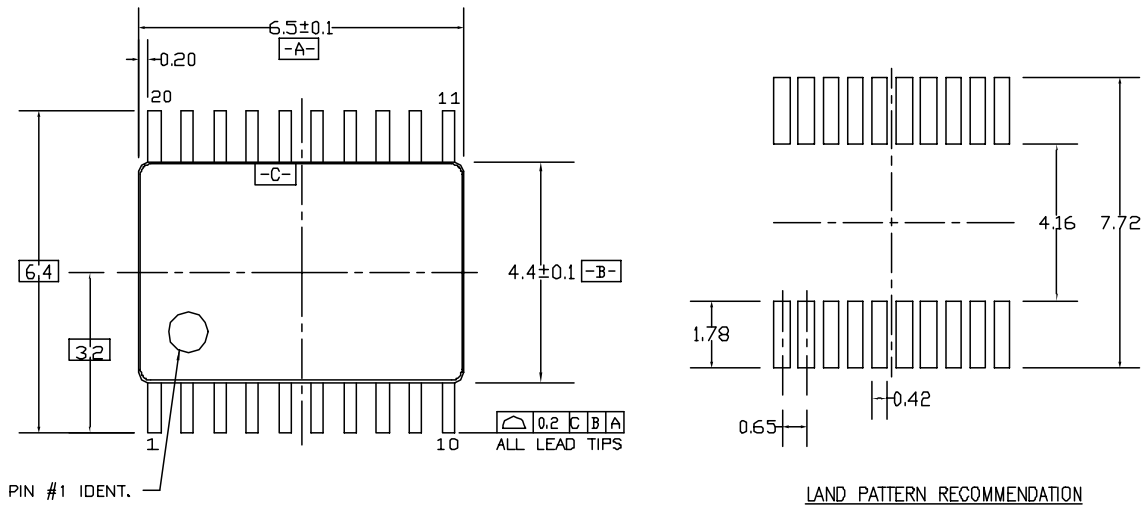


M20DREVC

**Figure 2. 20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide Package Number M20D**

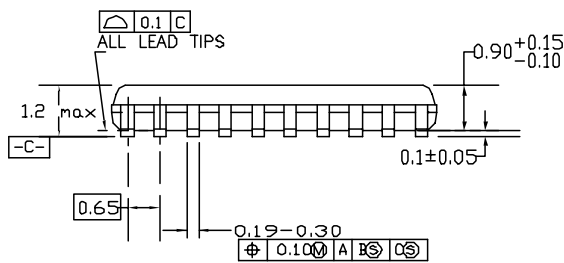
**Physical Dimensions** (Continued)

Dimensions are in millimeters unless otherwise noted.

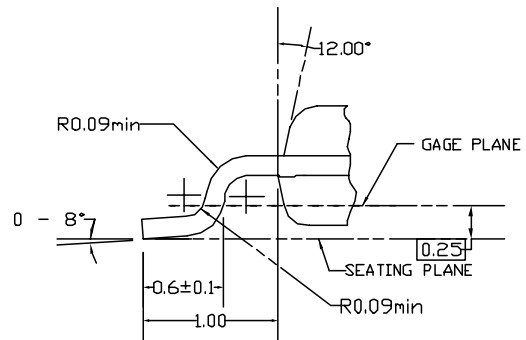
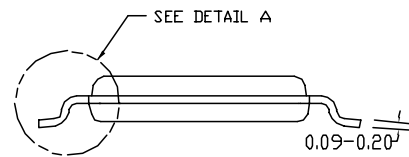


PIN #1 IDENT.

LAND PATTERN RECOMMENDATION



DIMENSIONS ARE IN MILLIMETERS



DETAIL A

NOTES:

- A. CONFORMS TO JEDEC REGISTRATION MO-153, VARIATION AC, REF NOTE 6, DATE 7/93.
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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.


MTC20REV D1

**Figure 3. 20-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide Package Number MTC20**



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EcoSPARK <sup>®</sup>	OCXPro <sup>™</sup>	SuperFET <sup>™</sup>	
EnSigna <sup>™</sup>	OPTOLOGIC <sup>®</sup>	SuperSOT <sup>™</sup> -3	
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FACT <sup>®</sup>	PACMAN <sup>™</sup>	SuperSOT <sup>™</sup> -8	
FAST <sup>®</sup>	POP <sup>™</sup>	SyncFET <sup>™</sup>	
FASTr <sup>™</sup>	Power220 <sup>®</sup>	TCM <sup>™</sup>	
FPS <sup>™</sup>	Power247 <sup>®</sup>	The Power Franchise <sup>®</sup>	
FRFET <sup>®</sup>	PowerEdge <sup>™</sup>	 ™	
GlobalOptoisolator <sup>™</sup>	PowerSaver <sup>™</sup>	TinyBoost <sup>™</sup>	
GTO <sup>™</sup>	PowerTrench <sup>®</sup>	TinyBuck <sup>™</sup>	

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## 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 design.
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