

## Octal buffer/line driver (3-State)

[查询"74AC244D"供应商](#)74AC244  
74ACT244

## FEATURES

- 74ACT244 has TTL-compatible inputs
- 74AC244 has CMOS-compatible inputs
- 3-State outputs source/sink 24mA
- 3-State outputs drive bus lines or buffer memory address registers
- Meets or exceeds JEDEC standard for 74AC(T)XX family
- Superior ground bounce noise immunity

## DESCRIPTION

The 74AC244/74ACT244 is an octal non-inverting buffer/line driver with 3-State outputs. The 3-State outputs are controlled by the output enable inputs  $\overline{1OE}$  and  $2OE$ . A HIGH on  $nOE$  causes the outputs to assume a high impedance OFF-state. Schmitt-trigger action at all inputs makes the circuit highly tolerant for slower input rise and fall times.

The '244' is functionally identical to the '240', but the '244' has non-inverting outputs.

## QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	TYPICAL			UNIT
			AC		ACT	
			$V_{CC} = 3.3V$	$V_{CC} = 5.0V$	$V_{CC} = 5.0V$	
$t_{PHL}/t_{PLH}$	Propagation delay $I_n$ to $Y_n$	$C_L = 50pF$	4.3	3.1	4.1	ns
$C_I$	Input capacitance		4.5			pF
$C_{PD}$	Power dissipation capacitance per buffer	$V_I = GND$ to $V_{CC}^1$ outputs enabled outputs disabled	25 5		25 5	pF

## NOTE:

1.  $C_{PD}$  is used to determine the dynamic power dissipation ( $P_D$  in  $\mu W$ ):

$$P_D = C_{PD} \times V_{CC}^2 \times f_i + \sum (C_L \times V_{CC}^2 \times f_o) \text{ where:}$$

$f_i$  = input frequency in MHz;  $C_L$  = output load capacity in pF;

$f_o$  = output frequency in MHz;  $V_{CC}$  = supply voltage in V;

$\sum (C_L \times V_{CC}^2 \times f_o)$  = sum of outputs.

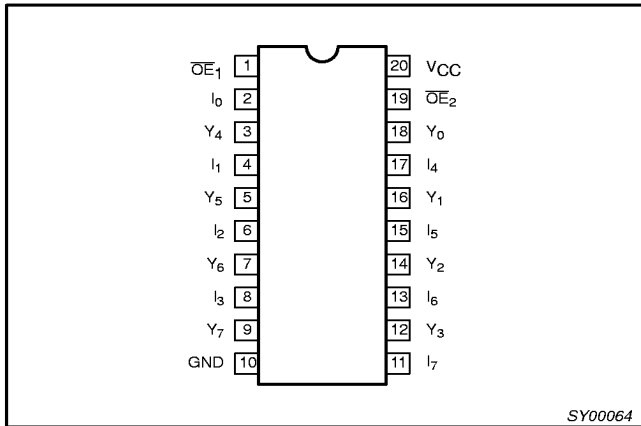
## ORDERING INFORMATION

PACKAGES	TEMPERATURE RANGE	OUTSIDE NORTH AMERICA	NORTH AMERICA	DRAWING NUMBER
20-Pin Plastic SO	-40°C to +85°C	74AC244 D 74ACT244 D	74AC244 D 74ACT244 D	SOT163-1
20-Pin Plastic SSOP Type II	-40°C to +85°C	74AC244 DB 74ACT244 DB	74AC244 DB 74ACT244 DB	SOT339-1
20-Pin Plastic TSSOP Type I	-40°C to +85°C	74AC244 PW 74ACT244 PW	74AC244PW DH 74ACT244PW DH	SOT360-1

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**PIN CONFIGURATION**

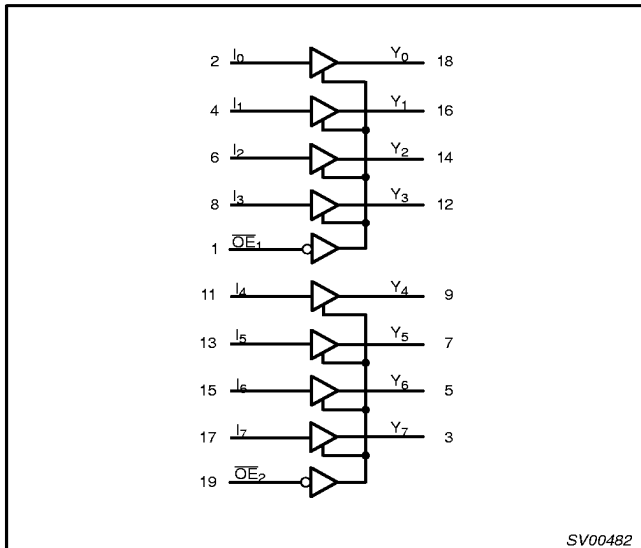


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**PIN LABEL DESCRIPTIONS**

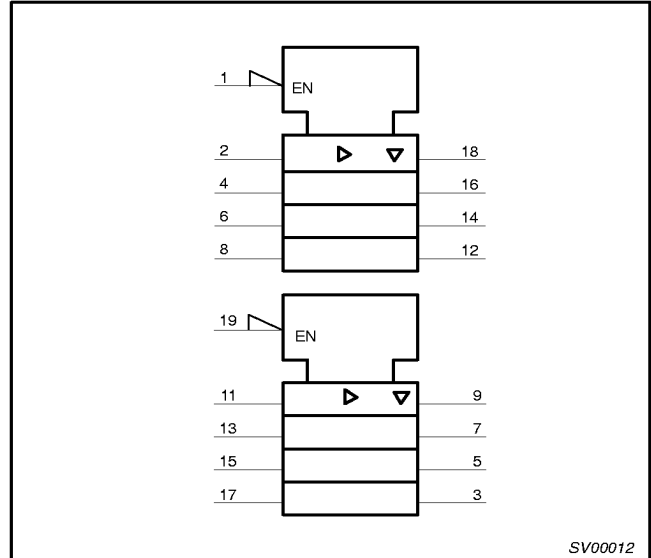
PIN NUMBER	SYMBOL	NAME AND FUNCTION
1, 19	$\overline{OE}_1, \overline{OE}_2$	Output enable inputs (active LOW)
2, 4, 6, 8, 17, 15, 13, 11	I0 – I7	Inputs
18, 16, 14, 12, 3, 5, 7, 9	Y0 – Y7	Outputs
20	V <sub>CC</sub>	Positive power supply
10	GND	Ground (0V)

**LOGIC SYMBOL**



SV00482

**LOGIC SYMBOL (IEEE/IEC)**



SV00012

**FUNCTION TABLE**

INPUTS		OUTPUTS(Y <sub>n</sub> )
$\overline{OE}_m$	I <sub>n</sub>	
L	L	L
L	H	H
H	X	Z

H = HIGH voltage level  
 L = LOW voltage level  
 X = Don't care  
 Z = High impedance "OFF"-state

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## RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	LIMITS		UNIT
		MIN	MAX	
V <sub>CC</sub>	DC supply voltage for 'AC	2.0	6.0	V
V <sub>CC</sub>	DC supply voltage for 'ACT	4.5	5.5	V
V <sub>IN</sub>	DC input voltage range	0	V <sub>CC</sub>	V
V <sub>O</sub>	DC output voltage range	0	V <sub>CC</sub>	V
T <sub>amb</sub>	Operating free-air temperature range	-40	+85	°C
ΔV/Δt	Minimum input edge rate — AC devices V <sub>IN</sub> from 30% to 70% of V <sub>CC</sub> V <sub>CC</sub> @ 3.3V, 4.5V, 5.5V	125		mV/ns
	— ACT devices V <sub>IN</sub> from 0.8V to 2.0V V <sub>CC</sub> @ 4.5V, 5.5V	125		

ABSOLUTE MAXIMUM RATINGS<sup>1</sup>

in accordance with the Absolute Maximum Rating System (IEC134)

Voltages are referenced to GND (ground = 0V)

SYMBOL	PARAMETER	CONDITIONS	RATING	UNIT
V <sub>CC</sub>	DC supply voltage		-0.5 to +7.0	V
I <sub>IK</sub>	DC input diode current	V <sub>IN</sub> = -0.5V	-20	mA
		V <sub>IN</sub> = V <sub>CC</sub> + 0.5V	+20	
V <sub>IN</sub>	DC input voltage		-0.5 to V <sub>CC</sub> + 0.5	V
I <sub>OK</sub>	DC output diode current	V <sub>O</sub> = -0.5V	-20	mA
		V <sub>O</sub> = V <sub>CC</sub> + 0.5V	+20	
V <sub>O</sub>	DC output voltage		-0.5 to V <sub>CC</sub> + 0.5	V
I <sub>O</sub>	DC output source or sink current		± 50	mA
I <sub>CC</sub> , I <sub>GND</sub>	DC V <sub>CC</sub> or GND current per output		± 50	mA
I <sub>CC</sub> , I <sub>GND</sub>	DC V <sub>CC</sub> or GND current		± 200	mA
T <sub>stg</sub>	Storage temperature range		-65 to 150	°C
P <sub>TOT</sub>	Power dissipation per package — plastic mini-pack (SO) — plastic shrink mini-pack (SSOP and TSSOP)	above +70°C derate linearly with 8 mW/K	500	mW
		above +60°C derate linearly with 5.5 mW/K	500	

## NOTES:

- Stresses beyond those listed may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

## Octal buffer/line driver (3-State)

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**DC ELECTRICAL CHARACTERISTICS (74AC244)**

Over recommended operating conditions voltages are referenced to GND (ground = 0V)

SYMBOL	PARAMETER	TEST CONDITIONS	V <sub>CC</sub> (V)	LIMITS			UNIT	
				Temp = -40°C to +85°C				
				MIN	TYP <sup>1</sup>	MAX		
V <sub>IH</sub>	HIGH level Input voltage	V <sub>OUT</sub> = 0.1V or (V <sub>CC</sub> - 0.1V)	3.0	2.1	1.5	V		
			4.5	3.15	2.25			
			5.5	3.85	2.75			
V <sub>IL</sub>	LOW level Input voltage	V <sub>OUT</sub> = 0.1V or (V <sub>CC</sub> - 0.1V)	3.0		1.5	0.9	V	
			4.5		2.25	1.35		
			5.5		2.75	1.65		
V <sub>OH</sub>	HIGH level output voltage	I <sub>OUT</sub> = -50 μA	3.0	2.9	2.99	V		
			4.5	4.4	4.49			
			5.5	5.4	5.49			
			V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> ; I <sub>OH</sub> = -12mA <sup>1</sup>	3.0	2.46		V	
			V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> ; I <sub>OH</sub> = -24mA <sup>1</sup>	4.5	3.76			
			V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> ; I <sub>OH</sub> = -24mA <sup>1</sup>	5.5	4.76			
V <sub>OL</sub>	LOW level output voltage	I <sub>OUT</sub> = 50 μA	3.0		0.01	0.1	V	
			4.5		0.01	0.1		
			5.5		0.01	0.1		
			V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> ; I <sub>OL</sub> = 12mA <sup>1</sup>	3.0			0.44	V
			V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> ; I <sub>OL</sub> = 24mA <sup>1</sup>	4.5			0.44	
			V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> ; I <sub>OL</sub> = 24mA <sup>1</sup>	5.5			0.44	
I <sub>IN</sub>	Input leakage current	V <sub>IN</sub> = V <sub>CC</sub> , GND	5.5			±1.0	μA	
I <sub>OZ</sub>	3-State output OFF-state current	V <sub>IN</sub> = V <sub>IL</sub> , V <sub>IH</sub> V <sub>OUT</sub> = V <sub>CC</sub> , GND	5.5			±2.5	μA	
I <sub>OLD</sub>	Dynamic output current <sup>2</sup>	V <sub>OLD</sub> = 1.65V max	5.5	75			mA	
I <sub>OHD</sub>	Dynamic output current <sup>2</sup>	V <sub>OHD</sub> = 3.85V min	5.5			-75	mA	
I <sub>CC</sub>	Quiescent supply current	V <sub>IN</sub> = V <sub>CC</sub> or GND	5.5			40	μA	

**NOTES:**

1. All outputs loaded
2. Maximum test duration 2.0 ms; one output loaded at a time

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**DC ELECTRICAL CHARACTERISTICS (74ACT244)**

Over recommended operating conditions voltages are referenced to GND (ground = 0V)

SYMBOL	PARAMETER	TEST CONDITIONS	V <sub>CC</sub> (V)	LIMITS			UNIT
				Temp = -40°C to +85°C			
				MIN	TYP <sup>1</sup>	MAX	
V <sub>IH</sub>	HIGH level Input voltage	V <sub>OUT</sub> = 0.1V or (V <sub>CC</sub> - 0.1V)	4.5	2.0	1.5		V
			5.5	2.0	1.5		
V <sub>IL</sub>	LOW level Input voltage	V <sub>OUT</sub> = 0.1V or (V <sub>CC</sub> - 0.1V)	4.5		1.5	0.8	V
			5.5		1.5	0.8	
V <sub>OH</sub>	HIGH level output voltage	I <sub>OUT</sub> = -50 μA	4.5	4.4	4.49		V
			5.5	5.4	5.49		
		V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> ; I <sub>OH</sub> = -24mA <sup>1</sup>	4.5	3.76			V
			5.5	4.76			
V <sub>OL</sub>	LOW level output voltage	I <sub>OUT</sub> = 50 μA	4.5		0.01	0.1	V
			5.5		0.01	0.1	
		V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> ; I <sub>OL</sub> = 24mA <sup>1</sup>	4.5			0.44	V
			5.5			0.44	
I <sub>IN</sub>	Input leakage current	V <sub>IN</sub> = V <sub>CC</sub> , GND	5.5			±1.0	μA
I <sub>OZ</sub>	3-State output OFF-state current	V <sub>IN</sub> = V <sub>IL</sub> , V <sub>IH</sub> V <sub>OUT</sub> = V <sub>CC</sub> , GND	5.5			±2.5	μA
ΔI <sub>CC</sub>	Additional quiescent supply current per input pin	V <sub>IN</sub> = V <sub>CC</sub> - 2.1V Other inputs at V <sub>CC</sub> or GND; I <sub>OUT</sub> = 0	5.5			1.5	mA
I <sub>OLD</sub>	Dynamic output current <sup>2</sup>	V <sub>OLD</sub> = 1.65V max	5.5	75			mA
I <sub>OHD</sub>	Dynamic output current <sup>2</sup>	V <sub>OHD</sub> = 3.85V min	5.5			-75	mA
I <sub>CC</sub>	Quiescent supply current	V <sub>IN</sub> = V <sub>CC</sub> or GND	5.5			40	μA

**NOTES:**

1. All outputs loaded
2. Maximum test duration 2.0ms, one output loaded at a time

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**AC CHARACTERISTICS FOR 74AC244**GND = 0V;  $t_r = t_f = 2.5\text{ns}$ ;  $C_L = 50\text{pF}$ ;  $R_L = 500\Omega$ ; .

SYMBOL	PARAMETER	$V_{CC}^1$	LIMITS					UNIT	WAVEFORM
			$T_{amb} = +25^\circ\text{C}$			$T_{amb} = -40^\circ\text{C to } +85^\circ\text{C}$			
			MIN	TYP	MAX	MIN	MAX		
$t_{PLH}$	Propagation delay $I_n$ to $Y_n$	3.3 5.0	2.0 1.5	4.2 3.0	9.0 6.5	1.5 1.0	10.0 7.5	ns	1
$t_{PHL}$	Propagation delay $I_n$ to $Y_n$	3.3 5.0	2.0 1.5	4.4 3.2	9.0 6.5	1.5 1.0	10.0 7.5	ns	1
$t_{PZH}$	3-State output enable time OE to $Y_n$	3.3 5.0	2.0 1.5	4.9 3.5	9.5 7.0	1.5 1.0	11.0 8.0	ns	2
$t_{PZL}$	3-State output enable time OE to $Y_n$	3.3 5.0	2.0 1.5	5.2 3.9	9.5 7.0	1.5 1.0	11.0 8.0	ns	2
$t_{PHZ}$	3-State output disable time OE to $Y_n$	3.3 5.0	2.0 1.5	4.5 3.9	9.0 7.5	1.5 1.0	10.0 7.5	ns	2
$t_{PLZ}$	3-State output disable time OE to $Y_n$	3.3 5.0	2.0 1.5	4.0 3.0	9.5 7.5	1.5 1.0	10.0 7.5	ns	2

**NOTE:**

1. Voltage range 3.3V is  $V_{CC} = 3.3V \pm 0.3V$   
Voltage range 5.0V is  $V_{CC} = 5.0V \pm 0.5V$

**AC CHARACTERISTICS FOR 74ACT244**GND = 0V;  $t_r = t_f = 2.5\text{ns}$ ;  $C_L = 50\text{pF}$ ;  $R_L = 500\Omega$ ; .

SYMBOL	PARAMETER	$V_{CC}^1$	LIMITS					UNIT	WAVEFORM
			$T_{amb} = +25^\circ\text{C}$			$T_{amb} = -40^\circ\text{C to } +85^\circ\text{C}$			
			MIN	TYP	MAX	MIN	MAX		
$t_{PLH}$	Propagation delay $I_n$ to $Y_n$	5.0	2.0	4.0	9.0	1.5	10.0	ns	1
$t_{PHL}$	Propagation delay $I_n$ to $Y_n$	5.0	2.0	4.2	9.0	1.5	10.0	ns	1
$t_{PZH}$	3-State output enable time OE to $Y_n$	5.0	2.0	4.2	8.5	1.5	9.5	ns	2
$t_{PZL}$	3-State output enable time OE to $Y_n$	5.0	2.0	5.1	8.5	1.5	9.5	ns	2
$t_{PHZ}$	3-State output disable time OE to $Y_n$	5.0	2.0	4.4	8.0	1.5	9.0	ns	2
$t_{PLZ}$	3-State output disable time OE to $Y_n$	5.0	2.0	4.0	8.0	1.5	9.0	ns	2

**NOTE:**

1. These values are at  $V_{CC} = 5.0V \pm 0.5V$

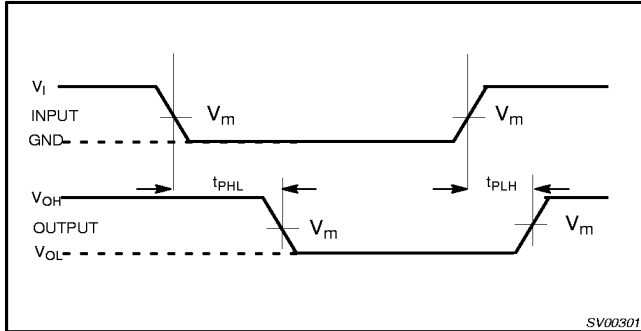
# Octal buffer/line driver (3-State)

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## AC WAVEFORMS

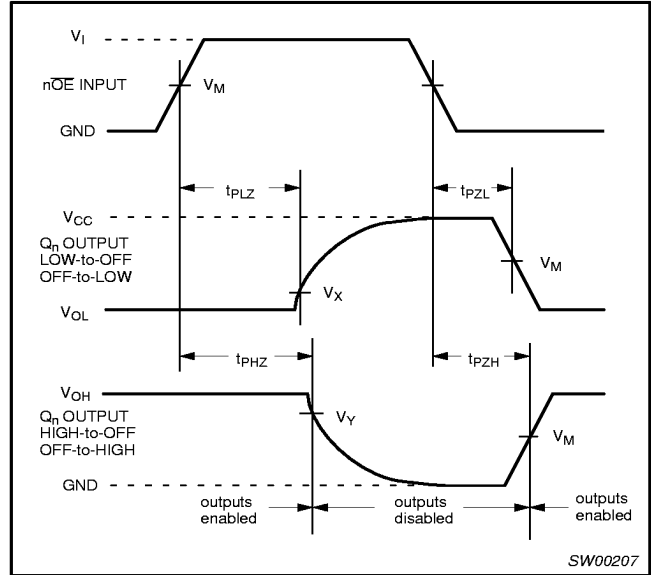
$V_{OL}$  and  $V_{OH}$  are the typical output voltage drops that occur with the output load.



Waveform 1. Input ( $I_n$ ) to output ( $Y_n$ ) propagation delays.

$$V_X = V_{OL} + 0.3V$$

$$V_Y = V_{OH} - 0.3V$$



Waveform 2. 3-State output enable and disable times.

## TEST CIRCUIT

Test Circuit for 3-State Outputs

SWITCH POSITION		FAMILY	$V_{IN}$ Input Requirements	$V_m$ Input	$V_m$ Output
TEST	SWITCH				
$t_{PLH}/t_{PHL}$	Open	AC	GND to $V_{CC}$	50% $V_{CC}$	50% $V_{CC}$
$t_{PLZ}/t_{PZL}$	$2 \times V_{CC}$				
$t_{PHZ}/t_{PZH}$	Open				

**DEFINITIONS**

$R_L$  = Load resistor; see AC characteristics for value.

$C_L$  = Load capacitance, see AC characteristics

$R_T$  = Termination resistance should be equal to  $Z_{OUT}$  of pulse generators.

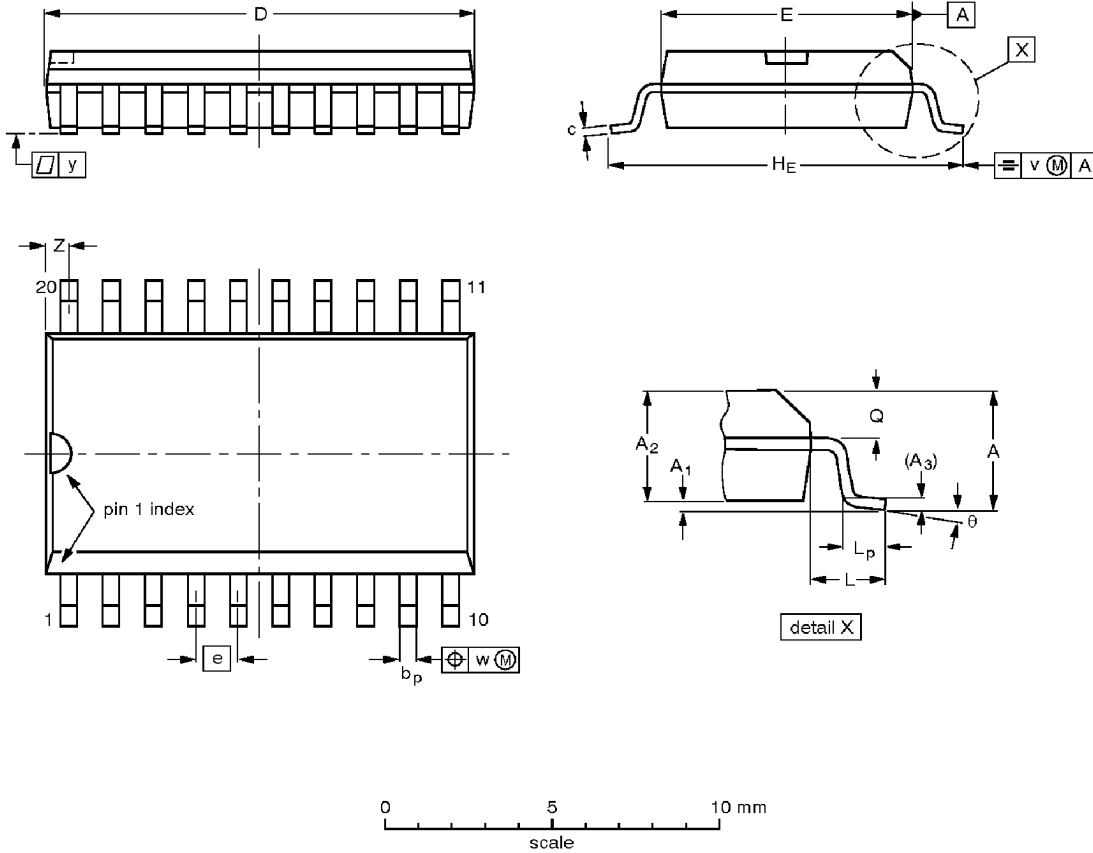
Waveform 3. Load circuitry for switching times.

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SO20: plastic small outline package; 20 leads; body width 7.5 mm

SOT163-1



**DIMENSIONS** (inch dimensions are derived from the original mm dimensions)

UNIT	A max.	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	b <sub>p</sub>	c	D <sup>(1)</sup>	E <sup>(1)</sup>	e	H <sub>E</sub>	L	L <sub>p</sub>	Q	v	w	y	z <sup>(1)</sup>	θ
mm	2.65	0.30 0.10	2.45 2.25	0.25	0.49 0.36	0.32 0.23	13.0 12.6	7.6 7.4	1.27	10.65 10.00	1.4	1.1 0.4	1.1 1.0	0.25	0.25	0.1	0.9 0.4	8° 0°
inches	0.10	0.012 0.004	0.096 0.089	0.01	0.019 0.014	0.013 0.009	0.51 0.49	0.30 0.29	0.050	0.42 0.39	0.055	0.043 0.016	0.043 0.039	0.01	0.01	0.004	0.035 0.016	

**Note**

1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ		
SOT163-1	075E04	MS-013AC			92-11-17 95-01-24

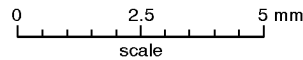
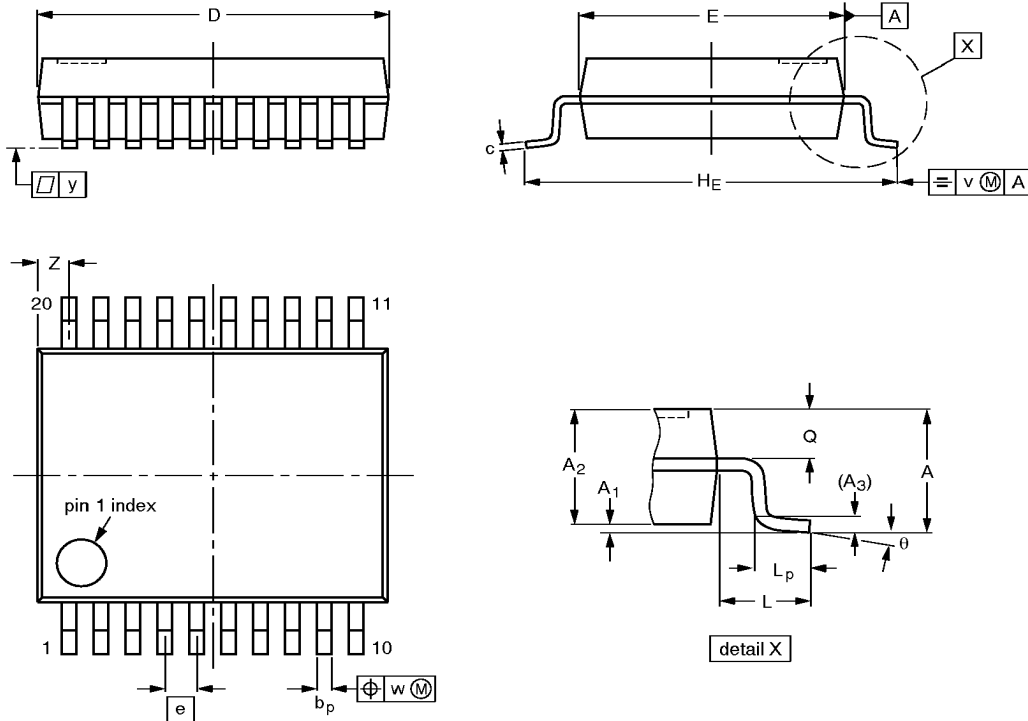


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SSOP20: plastic shrink small outline package; 20 leads; body width 5.3 mm

SOT339-1



DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	b <sub>p</sub>	c	D <sup>(1)</sup>	E <sup>(1)</sup>	e	H <sub>E</sub>	L	L <sub>p</sub>	Q	v	w	y	Z <sup>(1)</sup>	θ
mm	2.0	0.21 0.05	1.80 1.65	0.25	0.38 0.25	0.20 0.09	7.4 7.0	5.4 5.2	0.65	7.9 7.6	1.25	1.03 0.63	0.9 0.7	0.2	0.13	0.1	0.9 0.5	8° 0°

Note

1. Plastic or metal protrusions of 0.20 mm maximum per side are not included.

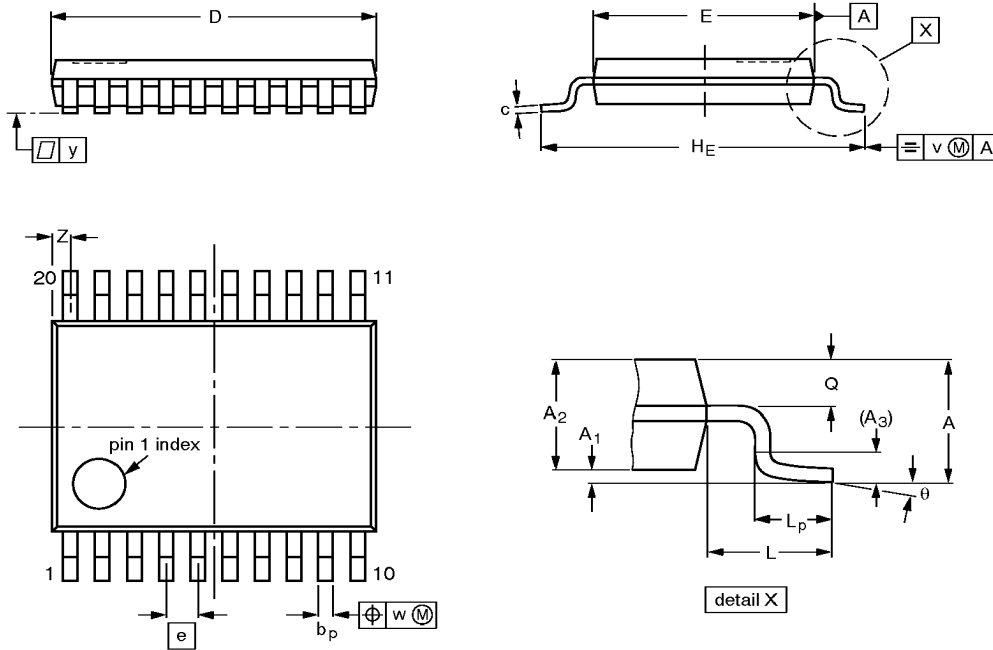
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT339-1		MO-150AE				93-09-08 95-02-04

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TSSOP20: plastic thin shrink small outline package; 20 leads; body width 4.4 mm

SOT360-1



**DIMENSIONS (mm are the original dimensions)**

UNIT	A max.	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	b <sub>p</sub>	c	D <sup>(1)</sup>	E <sup>(2)</sup>	e	H <sub>E</sub>	L	L <sub>p</sub>	Q	v	w	y	z <sup>(1)</sup>	θ
mm	1.10	0.15 0.05	0.95 0.80	0.25	0.30 0.19	0.2 0.1	6.6 6.4	4.5 4.3	0.65	6.6 6.2	1.0	0.75 0.50	0.4 0.3	0.2	0.13	0.1	0.5 0.2	8° 0°

**Notes**

1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.
2. Plastic interlead protrusions of 0.25 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT360-1		MO-153AC				93-06-16 95-02-04