

2.5V/3.3V 1-to-4 address driver (3-State)

[查询 74ALVT16344DGG-T 供应商](#)

74ALVT16344

FEATURES

- Multiple V_{CC} and GND pins minimize switching noise
- 5V I/O Compatible
- Live insertion/extraction permitted
- 3-State output buffers
- Power-up 3-State
- Output capability: +64mA/-32mA
- Latch-up protection exceeds 500mA per Jedec JC40.2 Std 17
- ESD protection exceeds 2000 V per MIL STD 883 Method 3015 and 200 V per Machine Model

DESCRIPTION

The 74ALVT16344 high-performance BiCMOS device combines low static and dynamic power dissipation with high speed and high output drive. It is designed for V_{CC} operation at 2.5V or 3.3V with I/O compatibility to 5V.

The 74ALVT16344 is a 1-to-4 address driver used in applications where four separate memory locations must be addressed by a single address.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS $T_{amb} = 25^{\circ}\text{C}$	TYPICAL		UNIT
			2.5V	3.3V	
t_{PLH} t_{PHL}	Propagation delay nAx to nBx or nBx to nAx	$C_L = 50\text{pF}$	2.5 1.9	1.9 1.6	ns
C_{IN}	Input capacitance DIR, $\overline{OE}$	$V_I = 0\text{V}$ or V_{CC}	3	3	pF
C_{Out}	Output capacitance	$V_{I/O} = 0\text{V}$ or V_{CC}	9	9	pF
I_{CCZ}	Total supply current	Outputs disabled	40	70	μA

ORDERING INFORMATION

PACKAGES	TEMPERATURE RANGE	OUTSIDE NORTH AMERICA	NORTH AMERICA	DWG NUMBER
56-Pin Plastic SSOP Type III	-40°C to $+85^{\circ}\text{C}$	74ALVT16344 DL	AV16344 DL	SOT371-1
56-Pin Plastic TSSOP Type II	-40°C to $+85^{\circ}\text{C}$	74ALVT16344 DGG	AV16344 DGG	SOT364-1

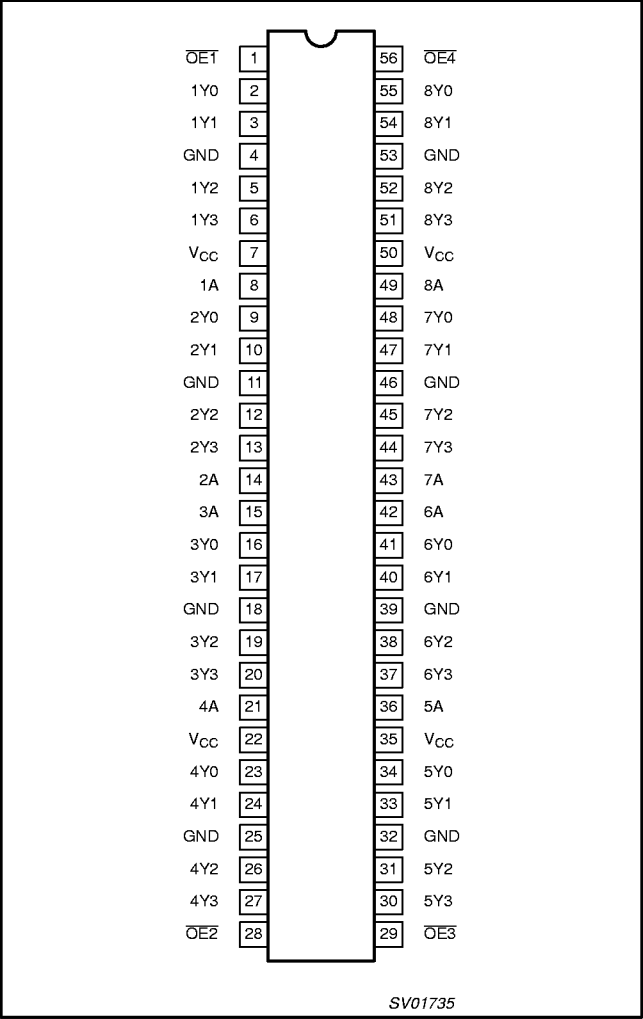
PIN DESCRIPTION

PIN NUMBER	SYMBOL	FUNCTION
8, 14, 15, 21, 36, 42, 43, 49	nA	Data inputs
2, 3, 5, 6, 9, 10, 12, 13, 16, 17, 19, 20, 23, 24, 26, 27, 30, 31, 33, 34, 37, 38, 40, 44, 45, 47, 48, 51, 52, 54, 55,	nY _X	Data outputs
1, 28, 29, 56	$\overline{OE}$	Output enable inputs (active-Low)
4, 11, 18, 25, 32, 39, 46, 53	GND	Ground (0V)
7, 22, 35, 50	V_{CC}	Positive supply voltage

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PIN CONFIGURATION

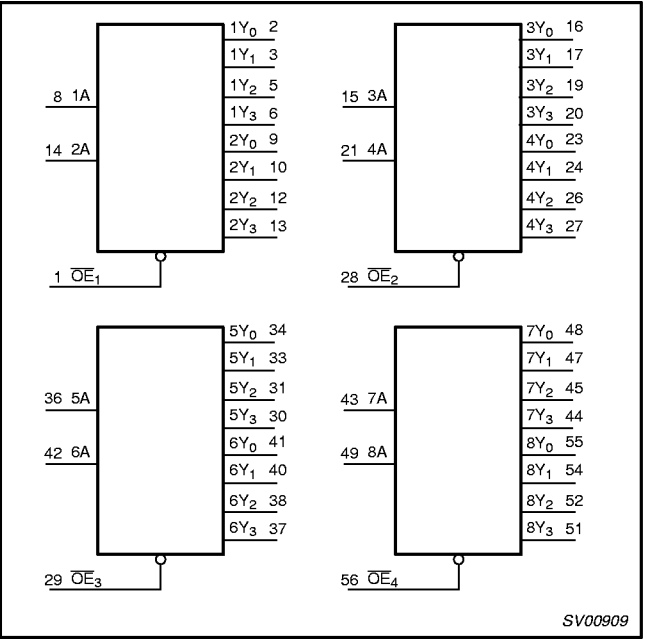


FUNCTION TABLE

INPUTS		OUTPUTS	OPERATING MODE
$\overline{OE}$	nA	nYx	
L	L	L	Transparent
L	H	H	Transparent
H	X	Z	High impedance

X = Don't care
Z = High impedance "off" state
H = High voltage level
L = Low voltage level

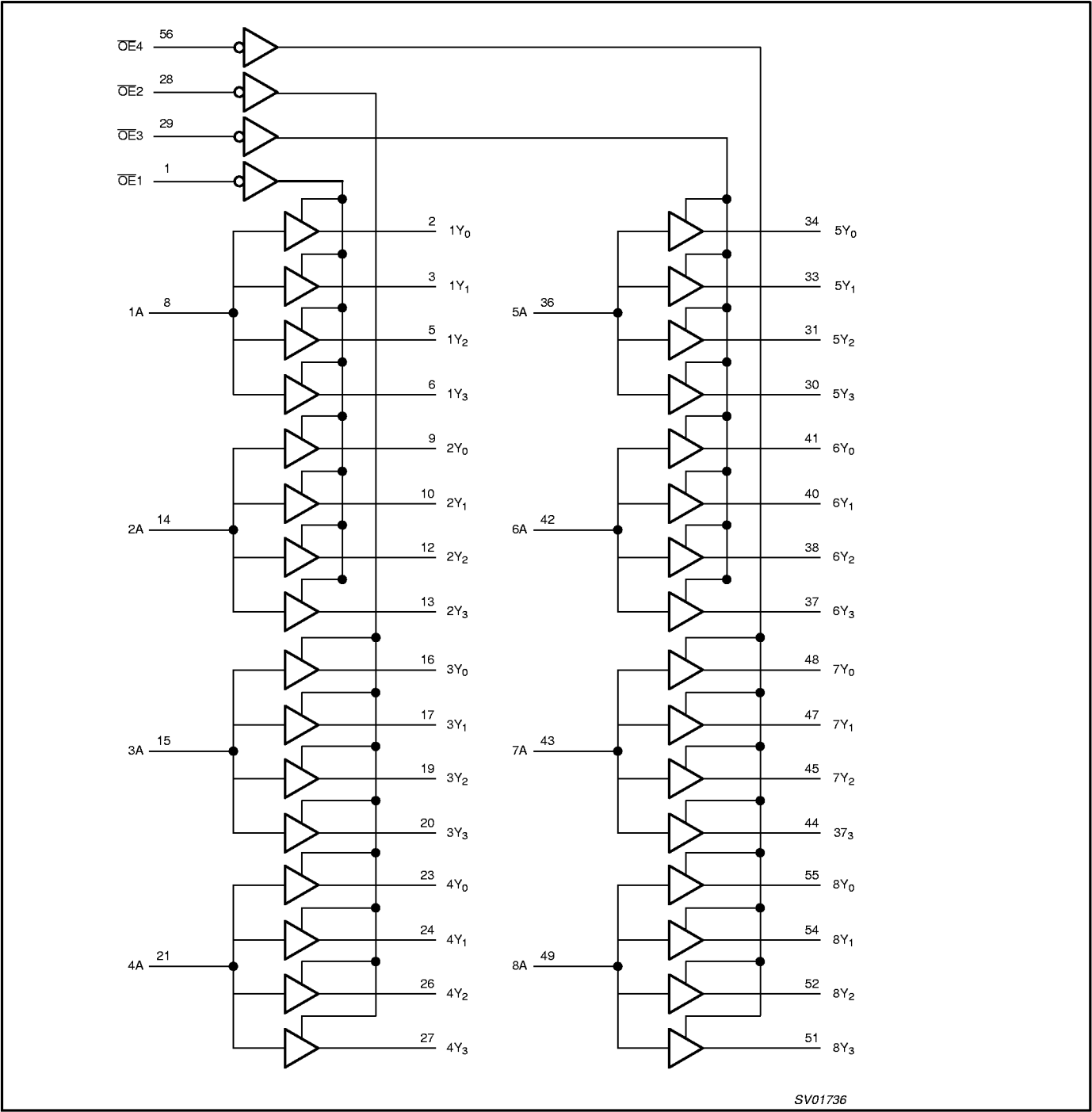
LOGIC SYMBOL



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LOGIC DIAGRAM



2.5V/3.3V 1-to-4 address driver (3-State)

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SYMBOL	PARAMETER	CONDITIONS	RATING	UNIT
V_{CC}	DC supply voltage		-0.5 to +4.6	V
I_{IK}	DC input diode current	$V_I < 0$	-50	mA
V_I	DC input voltage ³		-0.5 to +7.0	V
I_{OK}	DC output diode current	$V_O < 0$	-50	mA
V_{OUT}	DC output voltage ³	Output in Off or High state	-0.5 to +7.0	V
I_{OUT}	DC output current	Output in Low state	128	mA
		Output in High state	-64	
T_{stg}	Storage temperature range		-65 to +150	°C

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.
- The performance capability of a high-performance integrated circuit in conjunction with its thermal environment can create junction temperatures which are detrimental to reliability. The maximum junction temperature of this integrated circuit should not exceed 150°C.
- The input and output negative voltage ratings may be exceeded if the input and output clamp current ratings are observed.

RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	2.5V RANGE LIMITS		3.3V RANGE LIMITS		UNIT
		MIN	MAX	MIN	MAX	
V_{CC}	DC supply voltage	2.3	2.7	3.0	3.6	V
V_I	Input voltage	0	5.5	0	5.5	V
V_{IH}	High-level input voltage	1.7		2.0		V
V_{IL}	Input voltage		0.7		0.8	V
I_{OH}	High-level output current		-8		-32	mA
I_{OL}	Low-level output current		8		32	mA
	Low-level output current; current duty cycle $\leq 50\%$; $f \geq 1\text{kHz}$		24		64	
$\Delta t/\Delta v$	Input transition rise or fall rate; Outputs enabled		10		10	ns/V
T_{amb}	Operating free-air temperature range	-40	+85	-40	+85	°C

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SYMBOL	PARAMETER	TEST CONDITIONS		LIMITS			UNIT
				Temp = -40°C to +85°C			
				MIN	TYP ¹	MAX	
V _{IK}	Input clamp voltage	V _{CC} = 3.0V; I _{IK} = -18mA			-0.85	-1.2	V
V _{OH}	High-level output voltage	V _{CC} = 3.0 to 3.6V; I _{OH} = -100μA		V _{CC} -0.2	V _{CC}		
		V _{CC} = 3.0V; I _{OH} = -32mA		2.0	2.3		
V _{OL}	Low-level output voltage	V _{CC} = 3.0V; I _{OL} = 100μA			0.07	0.2	V
		V _{CC} = 3.0V; I _{OL} = 16mA			0.25	0.4	
		V _{CC} = 3.0V; I _{OL} = 32mA			0.3	0.5	
		V _{CC} = 3.0V; I _{OL} = 64mA			0.4	0.55	
I _I	Input leakage current	V _{CC} = 3.6V; V _I = V _{CC} or GND	Control pins		0.1	±1	μA
		V _{CC} = 0 or 3.6V; V _I = 5.5V			0.1	10	
		V _{CC} = 3.6V; V _I = 5.5V	Data pins ⁴		0.1	10	
		V _{CC} = 3.6V; V _I = V _{CC}			0.1	1	
		V _{CC} = 3.6V; V _I = 0			0.1	-5	
I _{OFF}	Off current	V _{CC} = 0V; V _I or V _O = 0 to 4.5V			0.1	±100	μA
I _{HOLD}	Bus Hold current A or B outputs	V _{CC} = 3V; V _I = 0.8V		75	130		μA
		V _{CC} = 3V; V _I = 2.0V		-75	-200		μA
		V _I = 0V to 3.6V; V _{CC} = 3.6V ⁶		±500			μA
I _{EX}	Current into an output in the High state when V _O > V _{CC}	V _O = 5.5V; V _{CC} = 3.0V			10	125	μA
I _{PU/PD}	Power up/down 3-State output current ³	V _{CC} ≤ 1.2V; V _O = 0.5V to V _{CC} ; V _I = GND or V _{CC} ; OE/OE = Don't care			1	±100	μA
I _{OZH}	3-State output High current	V _{CC} = 3.6V; V _O = 3.0V; V _I = V _{IL} or V _{IH}			0.5	5	μA
I _{OZL}	3-State output Low current	V _{CC} = 3.6V; V _O = 0.5V; V _I = V _{IL} or V _{IH}			0.5	-5	μA
I _{CCH}	Quiescent supply current	V _{CC} = 3.6V; Outputs High, V _I = GND or V _{CC} , I _O = 0			0.06	0.1	mA
I _{CCL}		V _{CC} = 3.6V; Outputs Low, V _I = GND or V _{CC} , I _O = 0			7	8.5	
I _{CCZ}		V _{CC} = 3.6V; Outputs Disabled; V _I = GND or V _{CC} , I _O = 0 ⁵			0.06	0.1	
ΔI _{CC}	Additional supply current per input pin ²	V _{CC} = 3V to 3.6V; One input at V _{CC} -0.6V, Other inputs at V _{CC} or GND			0.05	0.4	mA

NOTES:

1. All typical values are at $V_{CC} = 3.3V$ and $T_{amb} = 25^\circ C$.
2. This is the increase in supply current for each input at the specified voltage level other than V_{CC} or GND.
3. This parameter is valid for any V_{CC} between 0V and 1.2V with a transition time of up to 10msec. From $V_{CC} = 1.2V$ to $V_{CC} = 3.3V \pm 0.3V$ a transition time of 100 μ sec is permitted. This parameter is valid for $T_{amb} = 25^\circ C$ only.
4. Unused pins at V_{CC} or GND.
5. I_{CCZ} is measured with outputs pulled up to V_{CC} or pulled down to ground.
6. This is the bus hold overdrive current required to force the input to the opposite state.

AC CHARACTERISTICS (3.3V $\pm$ 0.3V RANGE)GND = 0V, $t_R = t_F = 2.5ns$, $C_L = 50pF$, $R_L = 500\Omega$

SYMBOL	PARAMETER	WAVEFORM	LIMITS			UNIT
			T _{amb} = -40 to +85°C V _{CC} = +3.3V ±0.3V			
			MIN	TYP	MAX	
t _{PLH} t _{PHL}	Propagation delay nAx to nYx	1	0.5 0.5	1.9 1.6	3.0 2.5	ns
t _{PZH} t _{PZL}	Output enable time to High and Low level	2	1.0 1.0	2.8 2.3	4.7 3.6	ns
t _{PHZ} t _{PLZ}	Output disable time from High and Low level	2	1.0 1.0	3.7 2.3	5.5 4.1	ns

2.5V/3.3V 1-to-4 address driver (3-State)

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DC ELECTRICAL CHARACTERISTICS (2.5V ± 0.2V RANGE)

SYMBOL	PARAMETER	TEST CONDITIONS		LIMITS			UNIT
				Temp = -40°C to +85°C			
				MIN	TYP ¹	MAX	
V _{IK}	Input clamp voltage	V _{CC} = 2.3V; I _{IK} = -18mA			-0.85	-1.2	V
V _{OH}	High-level output voltage	V _{CC} = 2.3 to 2.7V; I _{OH} = -100μA		V _{CC} -0.2	V _{CC}		V
		V _{CC} = 2.3V; I _{OH} = -8mA		1.7	2.1		
V _{OL}	Low-level output voltage	V _{CC} = 2.3V; I _{OL} = 100μA			0.07	0.2	V
		V _{CC} = 2.3V; I _{OL} = 24mA			0.3	0.5	
I _I	Input leakage current	V _{CC} = 2.7V; V _I = V _{CC} or GND	Control pins		0.1	±1	μA
		V _{CC} = 0 or 2.7V; V _I = 5.5V			0.1	10	
		V _{CC} = 2.7V; V _I = 5.5V	Data pins ⁴		0.1	10	
		V _{CC} = 2.7V; V _I = V _{CC}			0.1	1	
		V _{CC} = 2.7V; V _I = 0			0.1	-5	
I _{OFF}	Off current	V _{CC} = 0V; V _I or V _O = 0 to 4.5V			0.1	± 100	μA
I _{HOLD} ⁶	Bus Hold current	V _{CC} = 2.5V; V _I = 0.8V			105		μA
	A inputs	V _{CC} = 2.5V; V _I = 2.0V			10		μA
I _{EX}	Current into an output in the High state when V _O > V _{CC}	V _O = 5.5V; V _{CC} = 2.3V			10	125	μA
I _{PU/PD}	Power up/down 3-State output current ³	V _{CC} ≤ 1.2V; V _O = 0.5V to V _{CC} ; V _I = GND or V _{CC} OE/OE = Don't care			1	100	μA
I _{OZH}	3-State output High current	V _{CC} = 2.7V; V _O = 2.3V; V _I = V _{IL} or V _{IH}			0.5	5	μA
I _{OZL}	3-State output Low current	V _{CC} = 2.7V; V _O = 0.5V; V _I = V _{IL} or V _{IH}			0.5	-5	μA
I _{CCH}	Quiescent supply current	V _{CC} = 2.7V; Outputs High, V _I = GND or V _{CC} , I _O = 0			0.04	0.1	mA
I _{CCL}		V _{CC} = 2.7V; Outputs Low, V _I = GND or V _{CC} , I _O = 0			5.0	6.5	
I _{CCZ}		V _{CC} = 2.7V; Outputs Disabled; V _I = GND or V _{CC} , I _O = 0 ⁵			0.04	0.1	
ΔI _{CC}	Additional supply current per input pin ²	V _{CC} = 2.3V to 2.7V; One input at V _{CC} -0.6V, Other inputs at V _{CC} or GND			0.04	0.4	mA

NOTES:

1. All typical values are at V_{CC} = 2.5V and T_{amb} = 25°C.
2. This is the increase in supply current for each input at the specified voltage level other than V_{CC} or GND.
3. This parameter is valid for any V_{CC} between 0V and 1.2V with a transition time of up to 10msec. From V_{CC} = 1.2V to V_{CC} = 2.5V ± 0.2V a transition time of 100μsec is permitted. This parameter is valid for T_{amb} = 25°C only.
4. Unused pins at V_{CC} or GND.
5. I_{CCZ} is measured with outputs pulled up to V_{CC} or pulled down to ground.
6. Not guaranteed.

AC CHARACTERISTICS (2.5V ± 0.2V RANGE)

GND = 0V, t_R = t_F = 2.5ns, C_L = 50pF, R_L = 500Ω

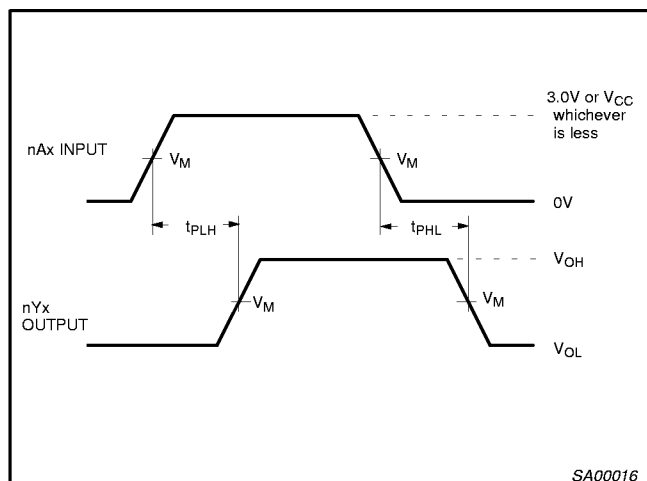
SYMBOL	PARAMETER	WAVEFORM	LIMITS			UNIT
			T _{amb} = -40 to +85°C V _{CC} = +2.5V ±0.2V			
			MIN	TYP	MAX	
t _{PLH} t _{PHL}	Propagation delay nAx to nYx	1	0.5 0.5	2.5 1.9	4.2 3.9	ns
t _{PZH} t _{PZL}	Output enable time to High and Low level	2	1.0 1.0	3.5 2.8	6.1 4.6	ns
t _{PHZ} t _{PLZ}	Output disable time from High and Low level	2	1.0 1.0	2.8 3.1	5.3 4.9	ns

2.5V/3.3V 1-to-4 address driver (3-State)

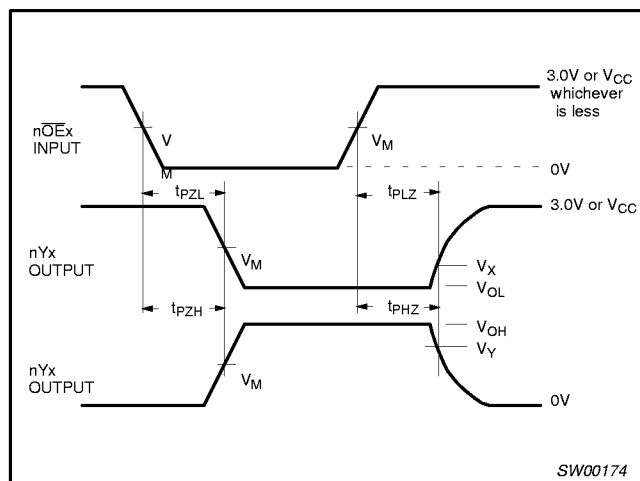
2.5V/3.3V 1-10-4 address on
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AC WAVEFORMS

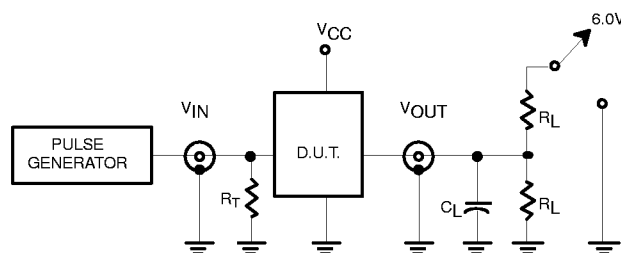
$$V_M = 1.5V \text{ for } V_{CC} \geq 3.0V; V_M = V_{CC}/2 \text{ for } V_{CC} \leq 2.7V$$
$$V_X = V_{OL} + 0.3V \text{ for } V_{CC} \geq 3.0V; V_X = V_{OL} + 0.15V \text{ for } V_{CC} \leq 2.7V$$
$$V_Y = V_{OH} - 0.3V \text{ for } V_{CC} \geq 3.0V; V_Y = V_{OH} - 0.15V \text{ for } V_{CC} \leq 2.7V$$


Waveform 1. Input (nAx) to Output (nYx) Propagation Delays



Waveform 2. 3-State Output Enable and Disable Times

TEST CIRCUIT AND WAVEFORM



Test Circuit for 3-State Outputs

SWITCH POSITION

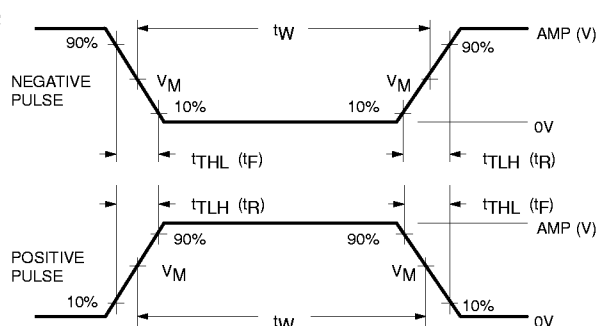
TEST	SWITCH
t _{PLZ} /t _{PZL}	6V or V _{CC} x 2
t _{PLH} /t _{PHL}	Open
t _{PHZ} /t _{PZH}	GND

DEFINITIONS

R_L = Load resistor; see AC CHARACTERISTICS for value.

C_L = Load capacitance includes jig and probe capacitance:
See AC CHARACTERISTICS for value.

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



FAMILY	INPUT PULSE REQUIREMENTS				
	Amplitude	Rep. Rate	t_W	t_R	t_F
74ALVT16	3.0V or V_{CC} whichever is less	$\leq 10\text{MHz}$	500ns	$\leq 2.5\text{ns}$	$\leq 2.5\text{ns}$

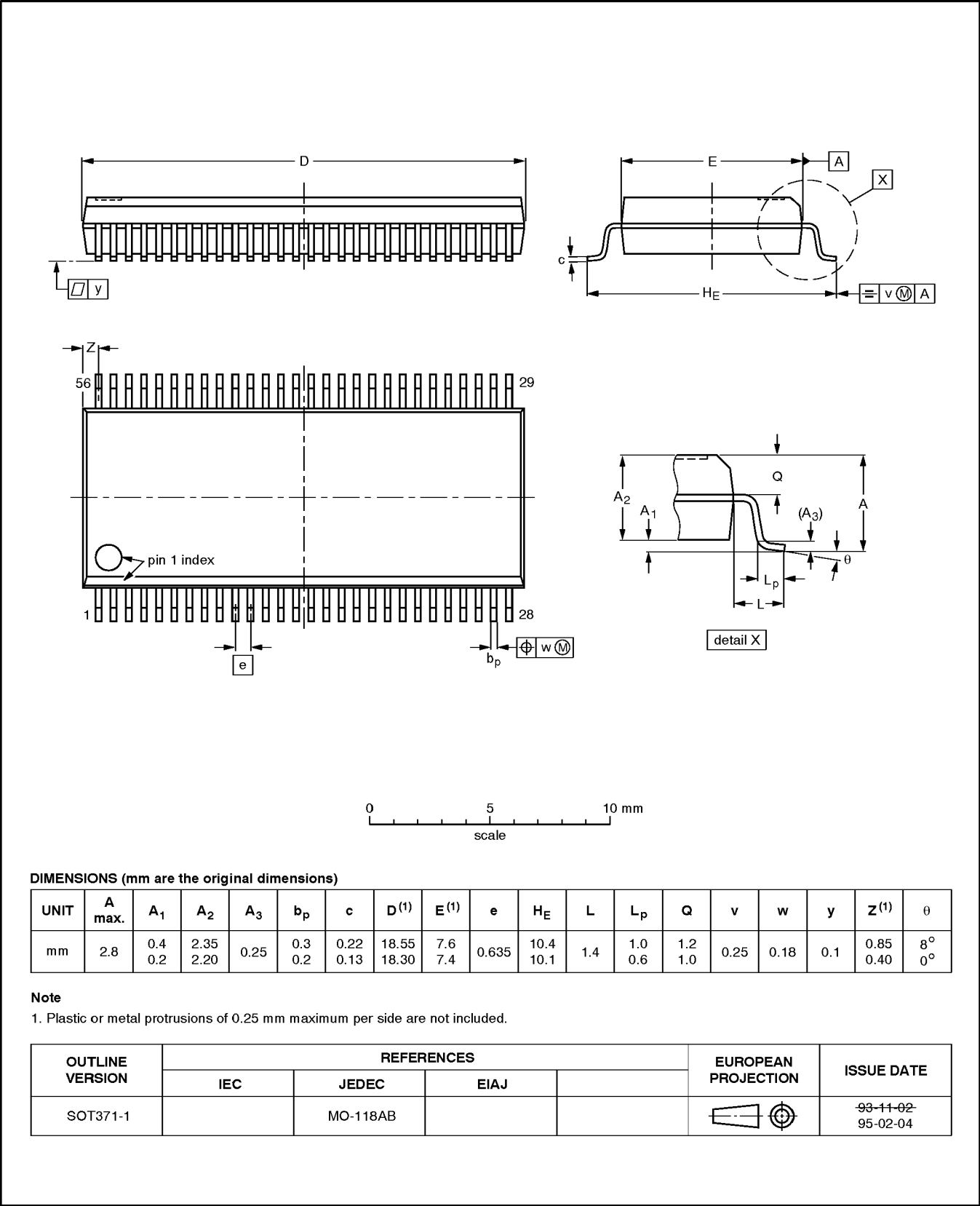
SW00205

2.5V/3.3V 1-to-4 address driver (3-State)
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SSOP56: plastic shrink small outline package; 56 leads; body width 7.5 mm

SOT371-1



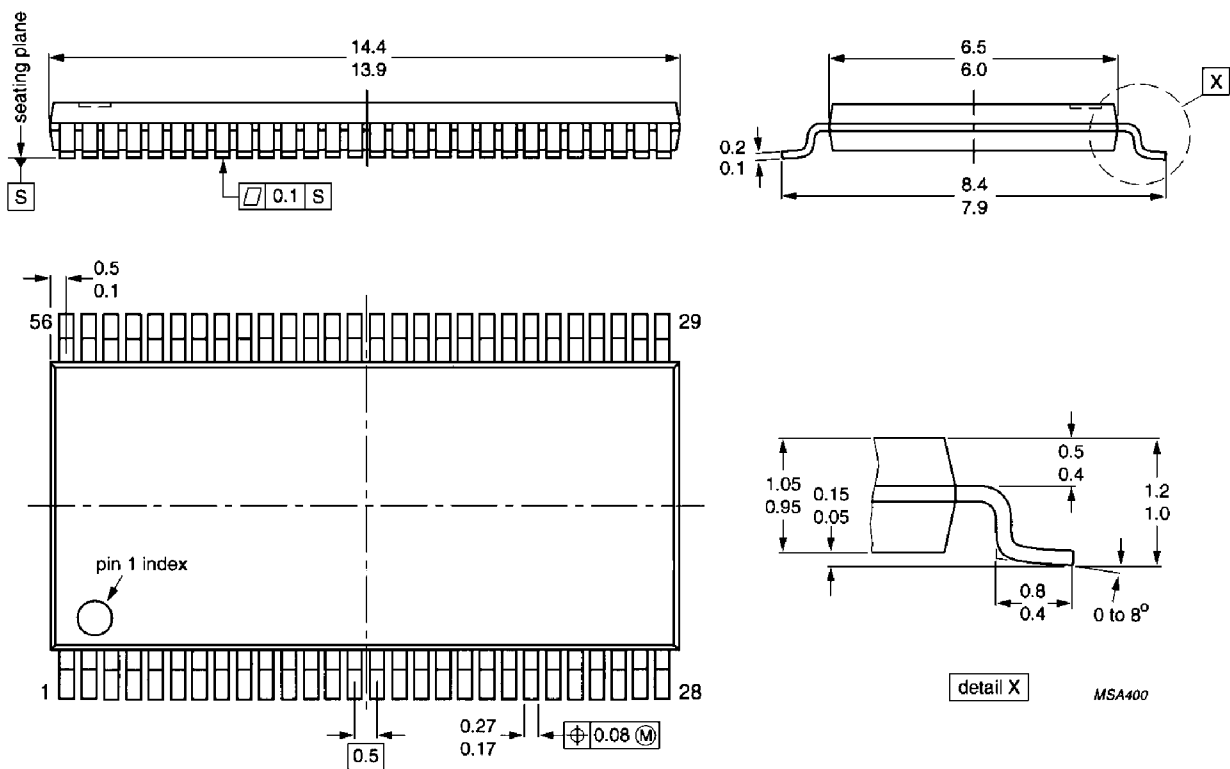
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TSSOP56: plastic thin shrink small outline package; 56 leads; body width 6.1mm

SOT364-1



Dimensions in mm.