

2.5V/3.3V 1-to-4 address driver with 30 Ω termination resistors (3-State)

74ALVT162344

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: +12mA/-12mA
- 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
- Outputs include series resistance of 30 Ω making external termination resistors unnecessary

DESCRIPTION

The 74ALVT162344 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 74ALVT162344 is a 1-to-4 address driver used in applications where four separate memory locations must be addressed by a single address.

The 74ALVT162344 is designed with 30 Ω series resistance in both the pull-up and pull-down output structures. This design reduces line noise in applications such as memory address drivers, clock drivers, and bus receivers/transmitters.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS T _{amb} = 25°C	TYPICAL		UNIT
			2.5V	3.3V	
t _{PLH} t _{PHL}	Propagation delay nAx to nBx or nBx to nAx	C _L = 50pF	3.6 2.3	2.8 2.1	ns
C _{IN}	Input capacitance DIR, \overline{OE}	V _I = 0V or V _{CC}	3	3	pF
C _{Out}	Output capacitance	V _{I/O} = 0V or V _{CC}	9	9	pF
I _{CCZ}	Total supply current	Outputs disabled	40	70	μ A

ORDERING INFORMATION

PACKAGES	TEMPERATURE RANGE	OUTSIDE NORTH AMERICA	NORTH AMERICA	DWG NUMBER
56-Pin Plastic SSOP Type III	-40°C to +85°C	74ALVT162344 DL	AV162344 DL	SOT371-1
56-Pin Plastic TSSOP Type II	-40°C to +85°C	74ALVT162344 DGG	AV162344 DGG	SOT364-1

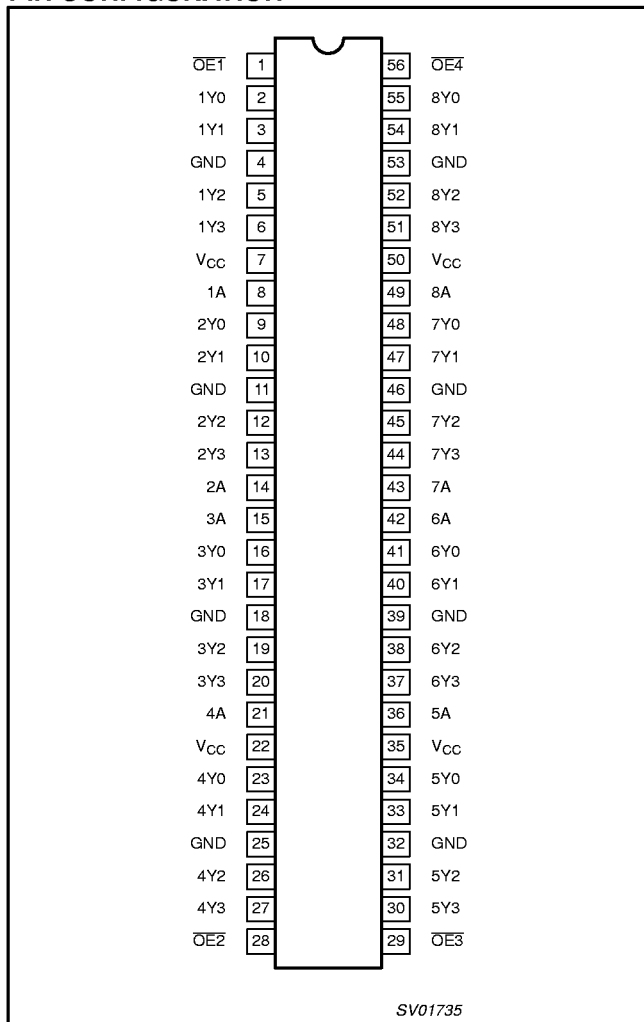
PIN DESCRIPTION

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

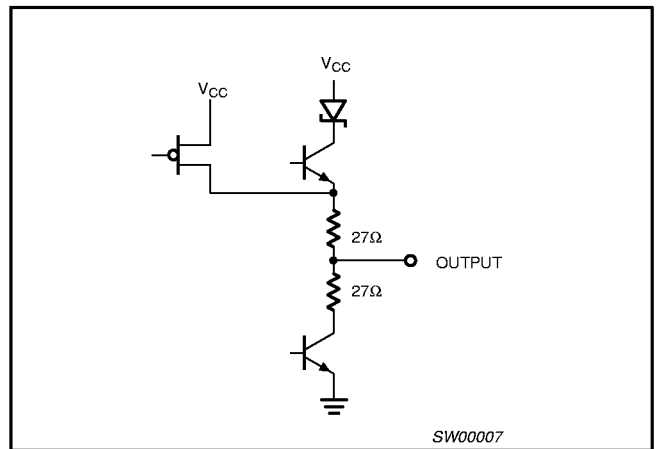


FUNCTION TABLE

INPUTS		OUTPUTS	OPERATING MODE
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

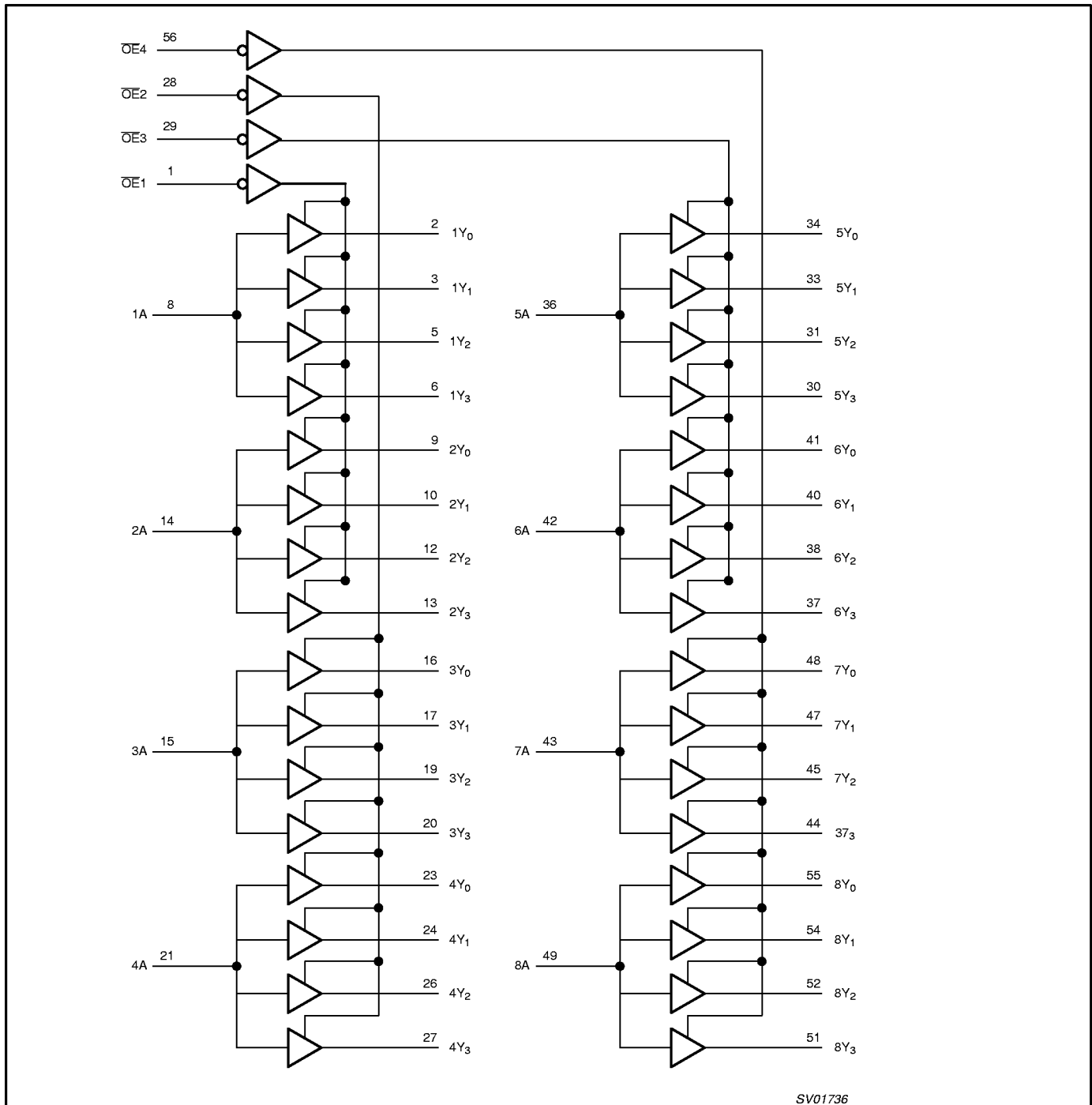
SCHEMATIC OF EACH OUTPUT



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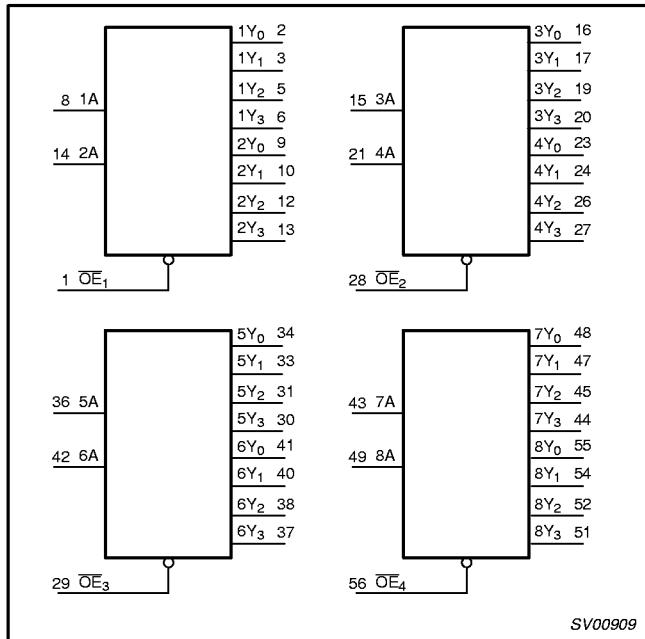
LOGIC DIAGRAM



LOGIC SYMBOL

2.5V/3.3V 1-to-4 address driver with 30Ω termination resistors (3-State)

74ALVT162344



ABSOLUTE MAXIMUM RATINGS^{1, 2}

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		-12	mA
I _{OL}	Low-level output current		12		12	mA
Δt/Δv	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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DC ELECTRICAL CHARACTERISTICS (3.3V ± 0.3V RANGE)

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} = 3.0V; I _{OH} = -12mA	2.0	2.3		V
V _{OL}	Low-level output voltage	V _{CC} = 3.0V; I _{OL} = 12mA		0.5	0.8	V
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 inputs	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°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 ± 0.3V 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. This is the bus hold overdrive current required to force the input to the opposite state.

AC CHARACTERISTICS (3.3V ± 0.3V 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} = +3.3V ± 0.3V			
			MIN	TYP	MAX	
t _{PLH} t _{PHL}	Propagation delay nAx to nYx	1	0.5 0.5	2.8 2.1	4.3 3.1	ns
t _{PZH} t _{PZL}	Output enable time to High and Low level	2	1.0 1.0	3.6 2.8	6.2 4.4	ns
t _{PHZ} t _{PLZ}	Output disable time from High and Low level	2	1.0 1.0	4.5 2.5	6.3 4.3	ns

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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}	Bus Hold current A inputs ⁶	V _{CC} = 2.5V; V _I = 0.7V		106		μA
		V _{CC} = 5.5V; V _I = 1.7V		-70		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:

- All typical values are at V_{CC} = 2.5V and T_{amb} = 25°C.
- This is the increase in supply current for each input at the specified voltage level other than V_{CC} or GND
- 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.
- Unused pins at V_{CC} or GND.
- I_{CCZ} is measured with outputs pulled up to V_{CC} or pulled down to ground.
- Not guaranteed.

AC CHARACTERISTICS (2.5V ± 0.2V RANGE)

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

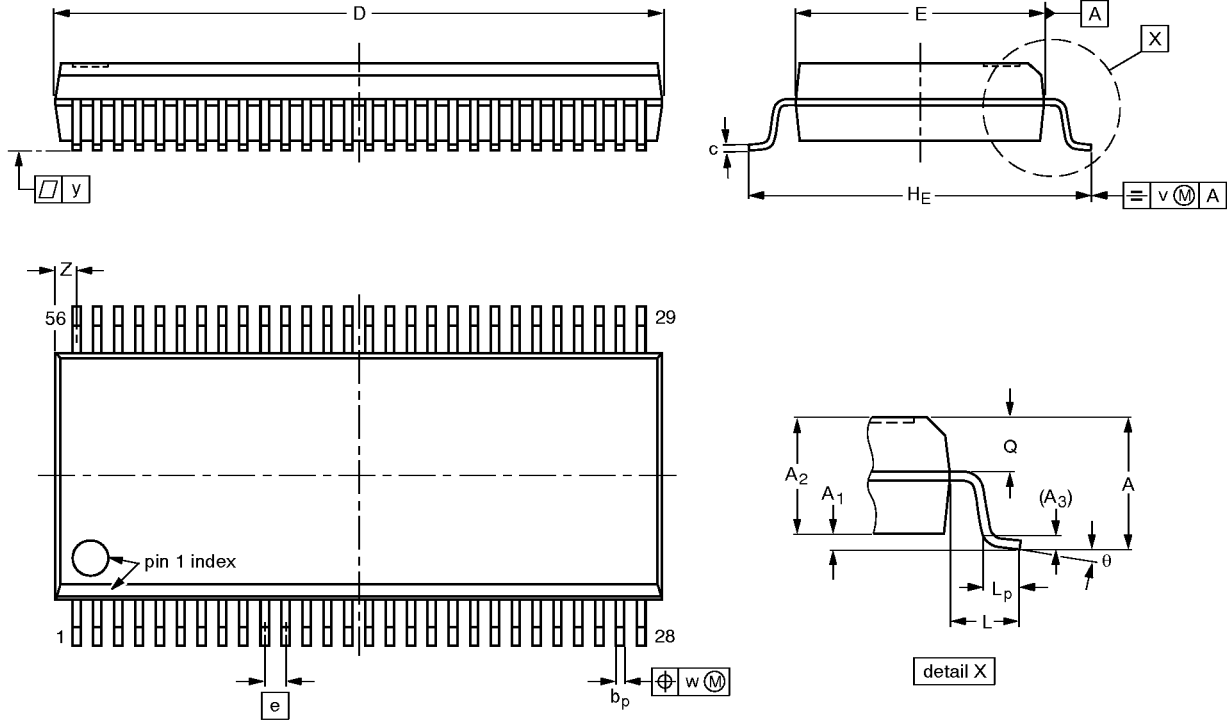
SYMBOL	PARAMETER	WAVEFORM	LIMITS			UNIT
			T _{amb} = -40 to +85°C V _{CC} = +2.5V ± 0.2V			
			MIN	TYP	MAX	
t _{PLH} t _{PHL}	Propagation delay nAx to nYx	1	0.5 0.5	3.6 2.3	5.8 3.7	ns
t _{PZH} t _{PZL}	Output enable time to High and Low level	2	1.0 1.0	4.6 3.4	8.0 5.3	
t _{PHZ} t _{PLZ}	Output disable time from High and Low level	2	1.0 1.0	3.6 3.2	6.1 5.1	ns

2.5V/3.3V 1-to-4 address driver with 30Ω termination resistors (3-State)

74ALVT162344

SSOP56: plastic shrink small outline package; 56 leads; body width 7.5 mm

SOT371-1



DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A ₁	A ₂	A ₃	b _p	c	D ⁽¹⁾	E ⁽¹⁾	e	H _E	L	L _p	Q	v	w	y	Z ⁽¹⁾	θ
mm	2.8	0.4 0.2	2.35 2.20	0.25	0.3 0.2	0.22 0.13	18.55 18.30	7.6 7.4	0.635	10.4 10.1	1.4	1.0 0.6	1.2 1.0	0.25	0.18	0.1	0.85 0.40	8° 0°

Note

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

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT371-1		MO-118AB				93-11-02 95-02-04

2.5V/3.3V 1-to-4 address driver with 30Ω termination resistors (3-State)

74ALVT162344

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

SOT364-1

