

DATA SHEET

74ABT162827A

20-bit buffer/line driver, non-inverting,
with 30 Ω termination resistors (3-State)

Product data

2002 Apr 03

Replaces 74ABT162827A/74ABTH162827A dated 1998 Feb 27

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74ABT162827A

FEATURES

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

DESCRIPTION

The 74ABT162827A high-performance BiCMOS device combines low static and dynamic power dissipation with high speed and high output drive.

The 74ABT162827A 20-bit buffers provide high performance bus interface buffering for wide data/address paths or buses carrying parity. They have NOR Output Enables ($\overline{nOE1}$, $\overline{nOE2}$) for maximum control flexibility.

The 74ABT162827A 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 $T_{amb} = 25\text{ }^{\circ}\text{C}$; GND = 0 V	TYPICAL	UNIT
t_{PLH} t_{PHL}	Propagation delay nAx to nYx	$C_L = 50\text{ pF}$; $V_{CC} = 5\text{ V}$	1.8 1.9	ns
C_{IN}	Input capacitance	$V_I = 0\text{ V}$ or V_{CC}	4	pF
C_{OUT}	Output capacitance	$V_O = 0\text{ V}$ or V_{CC} ; 3-State	6	pF
I_{CCZ}	Quiescent supply current	Outputs disabled; $V_{CC} = 5.5\text{ V}$	500	μA
I_{CCL}		Outputs LOW; $V_{CC} = 5.5\text{ V}$	9	mA

ORDERING INFORMATION

PACKAGES	TEMPERATURE RANGE	ORDER CODE	DWG NUMBER
56-Pin Plastic SSOP Type III	-40 $^{\circ}\text{C}$ to +85 $^{\circ}\text{C}$	74ABT162827ADL	SOT371-1
56-Pin Plastic TSSOP Type II	-40 $^{\circ}\text{C}$ to +85 $^{\circ}\text{C}$	74ABT162827ADGG	SOT364-1

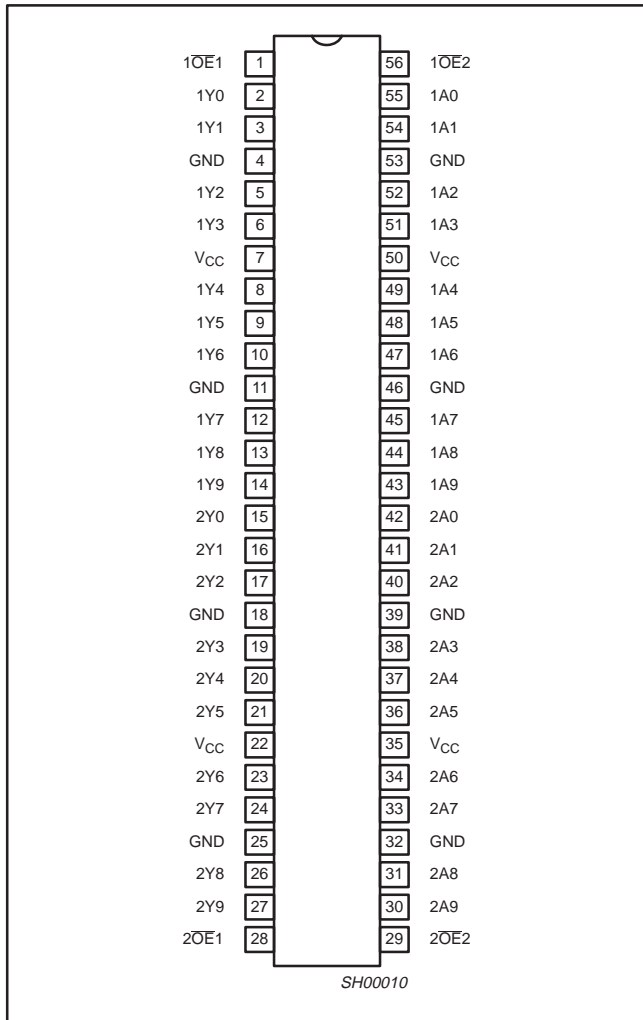
PIN DESCRIPTION

PIN NUMBER	SYMBOL	FUNCTION
55, 54, 52, 51, 49, 48, 47, 45, 44, 43, 42, 41, 40, 38, 37, 36, 34, 33, 31, 30	1A0 - 1A9 2A0 - 2A9	Data inputs
2, 3, 5, 6, 8, 9, 10, 12, 13, 14, 15, 16, 17, 19, 20, 21, 23, 24, 26, 27	1Y0 - 1Y9 2Y0 - 2Y9	Data outputs
1, 56, 28, 29	$\overline{1OE0}$, $\overline{1OE1}$ $\overline{2OE0}$, $\overline{2OE1}$	Output enable inputs (Active-LOW)
4, 11, 18, 25, 32, 39, 46, 53	GND	Ground (0 V)
7, 22, 35, 50	V_{CC}	Positive supply voltage

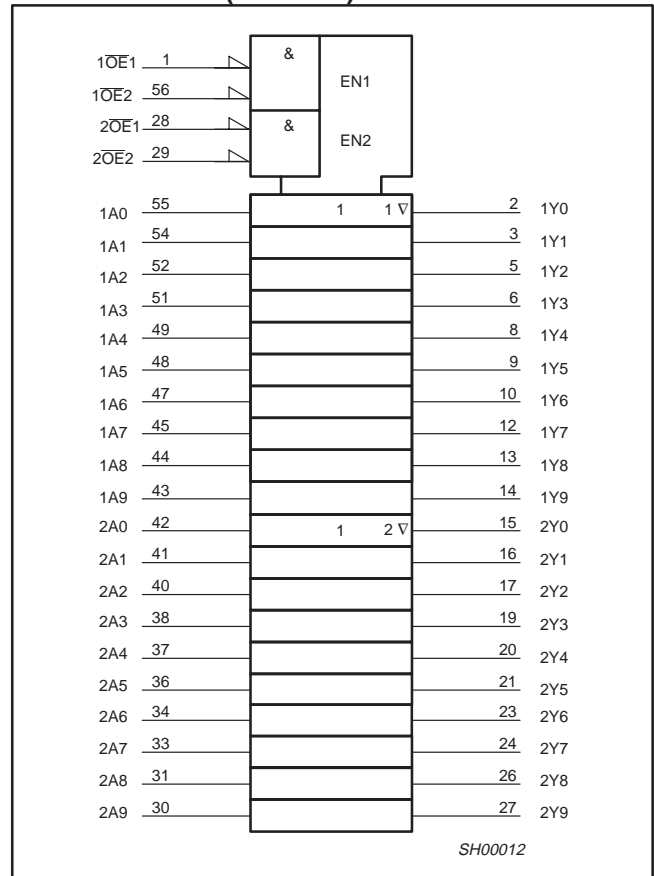
20-bit buffer/line driver, non-inverting, with 30 Ω termination resistors (3-State)

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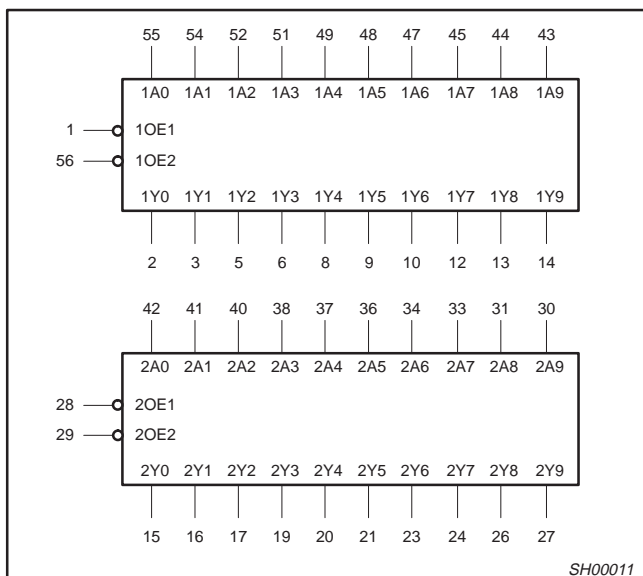
PIN CONFIGURATION



LOGIC SYMBOL (IEEE/IEC)



LOGIC SYMBOL



FUNCTION TABLE

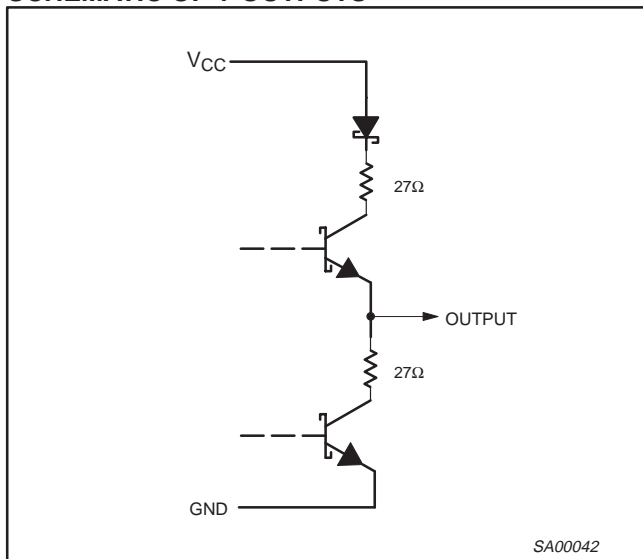
INPUTS		OUTPUTS	OPERATING MODE
nOE _x	nA _x	nY _x	
L	L	L	Transparent
L	H	H	Transparent
H	X	Z	High impedance

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

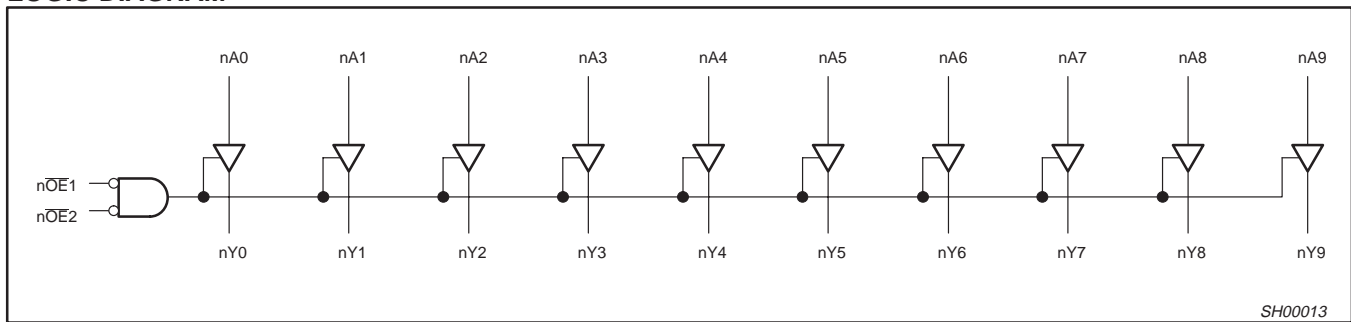
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SCHEMATIC OF Y OUTPUTS



LOGIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS^{1, 2}

SYMBOL	PARAMETER	CONDITIONS	RATING	UNIT
V _{CC}	DC supply voltage		-0.5 to +7.0	V
I _{IK}	DC input diode current	V _I < 0 V	-18	mA
V _I	DC input voltage ³		-1.2 to +7.0	V
I _{OK}	DC output diode current	V _O < 0 V	-50	mA
V _{OUT}	DC output voltage ³	Output in Off or HIGH state	-0.5 to +5.5	V
I _{OUT}	DC output current	Output in LOW state	128	mA
		Output in HIGH state	-64	mA
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 voltage ratings may be exceeded if the input and output current ratings are observed.

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RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	LIMITS		UNIT
		MIN	MAX	
V _{CC}	DC supply voltage	4.5	5.5	V
V _I	Input voltage	0	V _{CC}	V
V _{IH}	HIGH-level input voltage	2.0	–	V
V _{IL}	LOW-level Input voltage	–	0.8	V
I _{OH}	HIGH-level output current	–	–32	mA
I _{OL}	LOW-level output current	–	12	mA
$\Delta t/\Delta v$	Input transition rise or fall rate	0	10	ns/V
T _{amb}	Operating free-air temperature range	–40	+85	°C

DC ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS					UNIT
			T _{amb} = +25 °C			T _{amb} = –40 °C to +85 °C		
			MIN	TYP	MAX	MIN	MAX	
V _{IK}	Input clamp voltage	V _{CC} = 4.5 V; I _{IK} = –18 mA		–0.9	–1.2		–1.2	V
V _{OH}	HIGH-level output voltage	V _{CC} = 4.5 V; I _{OH} = –3 mA; V _I = V _{IL} or V _{IH}	2.5	3.1		2.5		V
		V _{CC} = 5.0 V; I _{OH} = –3 mA; V _I = V _{IL} or V _{IH}	3.0	3.6		3.0		V
		V _{CC} = 4.5 V; I _{OH} = –32 mA; V _I = V _{IL} or V _{IH}	2.0	2.7		2.0		V
V _{OL}	LOW-level output voltage	V _{CC} = 4.5 V; I _{OH} = 8 mA; V _I = V _{IL} or V _{IN}			0.65		0.65	V
		V _{CC} = 4.5 V; I _{OL} = 12 mA; V _I = V _{IL}			0.80		0.80	V
I _I	Input leakage current	V _{CC} = 5.5 V; V _I = GND or 5.5 V		±0.01	±1.0		±1.0	μA
I _{OFF}	Power-off leakage current	V _{CC} = 0.0 V; V _O = 4.5 V; V _I = 0 V or 5.5 V		±5.0	±100		±100	μA
I _{PU} /I _{PD}	Power-up/down 3-State output current ³	V _{CC} = 2.1 V; V _O = 0.5 V; V _I = GND or V _{CC} ; V _{OE} = Don't care		±5.0	±50		±50	μA
I _{OZH}	3-State output High current	V _{CC} = 5.5 V; V _O = 2.7 V; V _I = V _{IL} or V _{IH}		1.0	10		10	μA
I _{OZL}	3-State output Low current	V _{CC} = 5.5 V; V _O = 0.5 V; V _I = V _{IL} or V _{IH}		–1.0	–10		–10	μA
I _{CEX}	Output High leakage current	V _{CC} = 5.5 V; V _O = 5.5 V; V _I = GND or V _{CC}		1.0	50		50	μA
I _O	Output current ¹	V _{CC} = 5.5 V; V _O = 2.5 V	–50	–70	–180	–50	–180	mA
I _{CCH}	Quiescent supply current	V _{CC} = 5.5 V; Outputs HIGH, V _I = GND or V _{CC}		0.5	1		1	mA
I _{CCL}		V _{CC} = 5.5 V; Outputs LOW, V _I = GND or V _{CC}		9	19		19	mA
I _{CCZ}		V _{CC} = 5.5 V; Outputs 3-State; V _I = GND or V _{CC}		0.5	1		1	mA
ΔI_{CC}	Additional supply current per input pin ²	V _{CC} = 5.5 V; one input at 3.4 V, other inputs at V _{CC} or GND		0.2	1		1	mA

NOTES:

- Not more than one output should be tested at a time, and the duration of the test should not exceed one second.
- This is the increase in supply current for each input at 3.4 V.
- This parameter is valid for any V_{CC} between 0 V and 2.1 V with a transition time of up to 10 msec. From V_{CC} = 2.1 V to V_{CC} = 5 V \pm 10% a transition time of up to 100 μ sec is permitted.

20-bit buffer/line driver, non-inverting, with 30 Ω termination resistors (3-State)

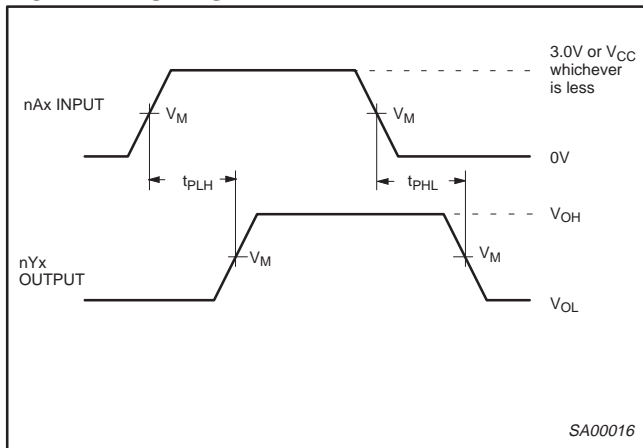
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AC CHARACTERISTICS

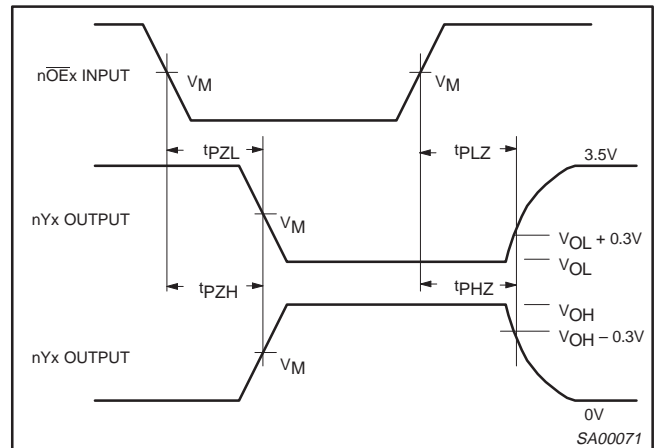
GND = 0 V, $t_R = t_F = 2.5 \text{ ns}$, $C_L = 50 \text{ pF}$, $R_L = 500 \text{ } \Omega$

SYMBOL	PARAMETER	WAVEFORM	LIMITS					UNIT
			$T_{\text{amb}} = +25 \text{ } ^\circ\text{C}$ $V_{\text{CC}} = +5.0 \text{ V}$			$T_{\text{amb}} = -40 \text{ } ^\circ\text{C to } +85 \text{ } ^\circ\text{C}$ $V_{\text{CC}} = +5.0\text{V} \pm 0.5\text{V}$		
			MIN	TYP	MAX	MIN	MAX	
t_{PLH} t_{PHL}	Propagation delay nAx to nYx	1	1.0	1.8	2.6	1.0	2.9	ns
t_{PZH} t_{PZL}	Output enable time to High and Low level	2	1.5	3.0	4.2	1.5	5.2	ns
t_{PHZ} t_{PLZ}	Output disable time from High and Low level	2	2.0	3.4	4.8	2.0	5.4	ns

AC WAVEFORMS



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}	closed
t_{PZL}	closed
All other	open

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.

Input Pulse Definition

$V_M = 1.5\text{V}$

FAMILY	INPUT PULSE REQUIREMENTS				
	Amplitude	Rep. Rate	t_W	t_R	t_F
74ABT/H16	3.0V	1MHz	500ns	2.5ns	2.5ns

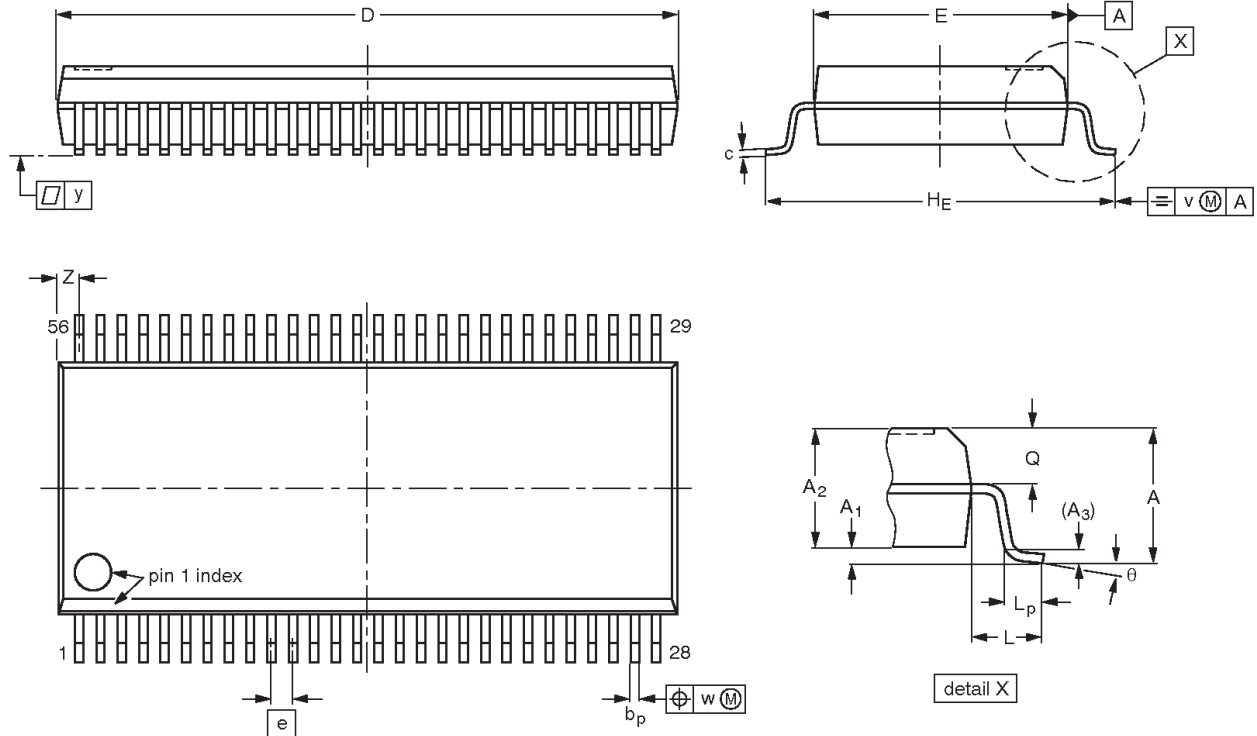
SA00018

20-bit buffer/line driver, non-inverting,
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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.

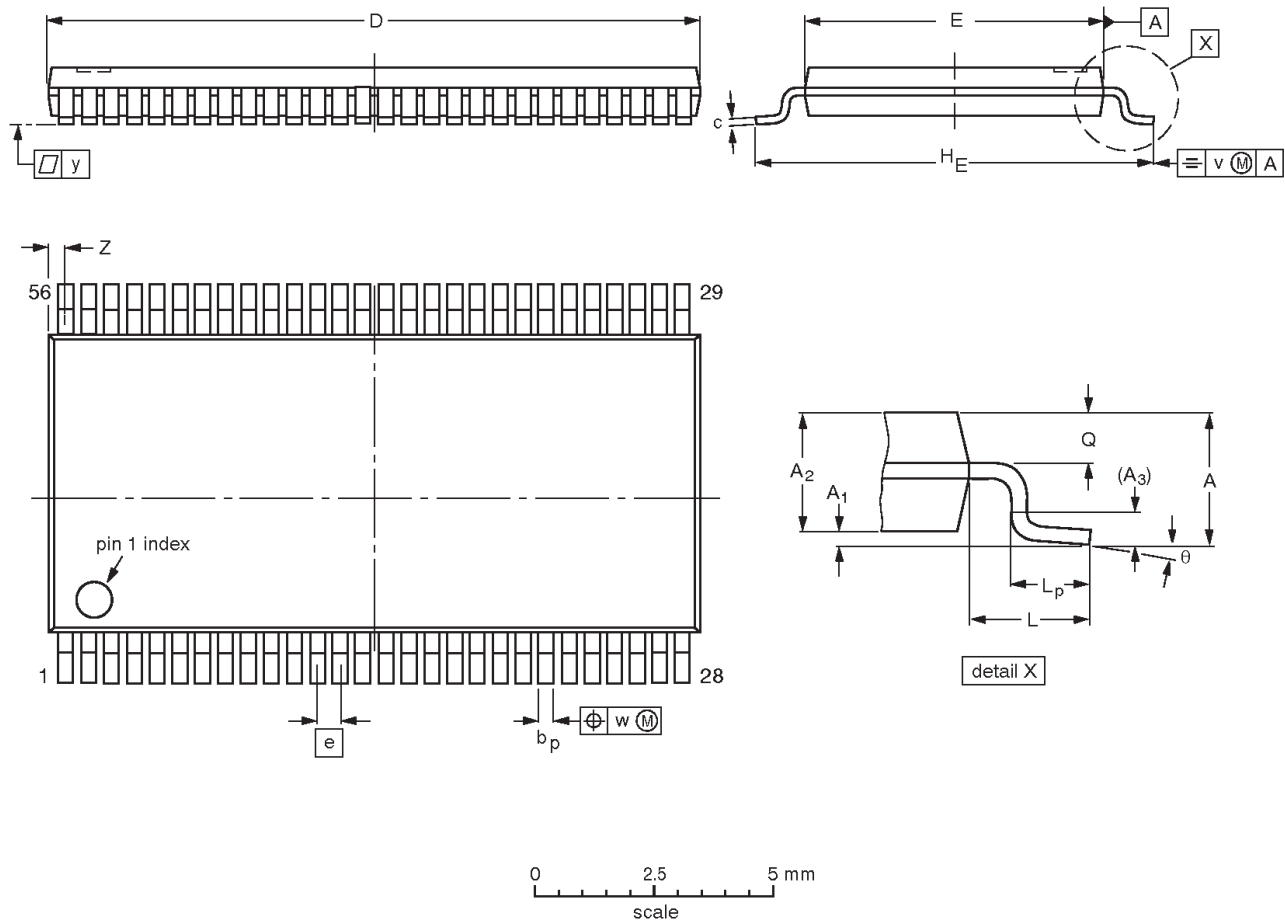
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT371-1		MO-118				95-02-04 99-12-27

20-bit buffer/line driver, non-inverting,
with 30 Ω termination resistors (3-State)

74ABT162827A

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

SOT364-1



DIMENSIONS (mm are the original dimensions).

UNIT	A max.	A ₁	A ₂	A ₃	b _p	c	D ⁽¹⁾	E ⁽²⁾	e	H _E	L	L _p	Q	v	w	y	Z	θ
mm	1.2	0.15 0.05	1.05 0.85	0.25	0.28 0.17	0.2 0.1	14.1 13.9	6.2 6.0	0.5	8.3 7.9	1.0	0.8 0.4	0.50 0.35	0.25	0.08	0.1	0.5 0.1	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			
SOT364-1		MO-153				95-02-10 99-12-27

20-bit buffer/line driver, non-inverting, with 30 Ω termination resistors (3-State)

74ABT162827A

Data sheet status

Data sheet status ^[1]	Product status ^[2]	Definitions
Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.
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Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

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