INTEGRATED CIRCUITS

DATA SHEET

74ALS241A/74ALS241A-1

Octal buffer (3-state)

Product specification IC05 Data Handbook

1991 Feb 08





74ALS241A/74ALS241A-1

FEATURES

- Octal bus interface
- 3-State buffer outputs sink 24mA and source 15mA
- The -1 version sinks 48 mA

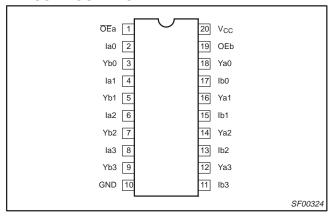
DESCRIPTION

The 74ALS241A is an octal buffer that is ideal for driving bus lines or buffer memory address registers. The outputs are all capable of sinking 24mA and sourcing up to 15mA, producing very good capacitive drive characteristics. The device features two output enables, $\overline{\text{OE}}$ a and $\overline{\text{OE}}$ b, each controlling four of the 3-State outputs.

The 74ALS241A-1 sinks 48mA I_{OL} if the V_{CC} is limited to 5.0V ± 0.25 V.

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74ALS241A	4.5ns	18mA
74ALS241A-1	4.5ns	18mA

PIN CONFIGURATION



ORDERING INFORMATION

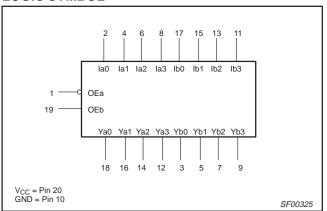
	ORDER CODE	
DESCRIPTION	COMMERCIAL RANGE V_{CC} = 5V ±10%, T_{amb} = 0°C to +70°C	DRAWING NUMBER
20-pin plastic DIP	74ALS241AN, 74ALS241A-1N	SOT146-1
20-pin plastic SOL	74ALS241AD, 74ALS241A-1D	SOT163-1
20-pin plastic SSOP Type II	74ALS241ADB, 74ALS241A-1DB	SOT339-1

INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

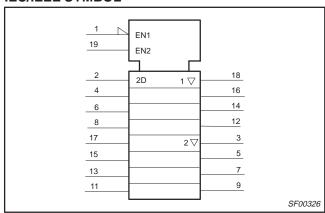
PINS	DESCRIPTION	74ALS (U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
lan, Ibn	Data inputs	1.0/1.0	20μA/0.1mA
ŌĒa, ŌĒb	Output Enable inputs (active-Low)	1.0/1.0	20μA/0.1mA
Yan, Ybn	Data outputs	750/240	15mA/24mA
Yan, Ybn	Data outputs (-1 version)	750/480	15mA/48mA

NOTE: One (1.0) ALS unit load is defined as: 20μA in the High state and 0.1mA in the Low state.

LOGIC SYMBOL



IEC/IEEE SYMBOL

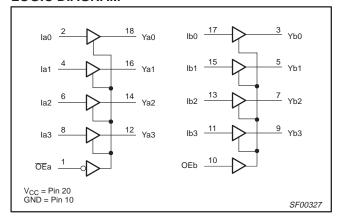


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LOGIC DIAGRAM



FUNCTION TABLE

	INP	OUTF	OUTPUTS			
OE a	la	ŌĒb	lb	Ya	Yb	
L	L	Н	L	L	L	
L	Н	Н	Н	Н	Н	
Н	Х	L	Х	Z	Z	

High voltage level

Low voltage level

X = Don't care Z = High impedance "off" state

ABSOLUTE MAXIMUM RATINGS

(Operation beyond the limit set forth in this table may impair the useful life of the device. Unless otherwise noted these limits are over the operating free air temperature range.)

SYMBOL	PARAMETER	RATING	UNIT			
V _{CC}	Supply voltage		−0.5 to +7.0	V		
V _{IN}	Input voltage	-0.5 to +7.0	V			
I _{IN}	Input current	−30 to +5	mA			
V _{OUT}	Voltage applied to output in High output state	−0.5 to V _{CC}	V			
_ ·	Current applied to output in Law output state	All versions	48	mA		
lout	Current applied to output in Low output state	-1 version	96	mA		
T _{amb}	Operating free-air temperature range	ree-air temperature range				
T _{stg}	Storage temperature range		−65 to +150	°C		

RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER		UNIT			
STWIBUL			MIN	NOM	MAX	UNII
V _{CC}	Supply voltage		4.5	5.0	5.5	V
V _{IH}	High-level input voltage		2.0			V
V_{IL}	Low-level input voltage			0.8	V	
I _{IK}	Input clamp current				-18	mA
I _{OH}	High-level output current				-15	mA
	Low lovel output ourrent	All versions			24	mA
lol	Low-level output current	-1 version			48 ¹	mA
T _{amb}	Operating free-air temperature range		0		+70	°C

NOTE:

1. The 48mA limit applies only under the condition of V_{CC} = 5.0V ±5%.

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DC ELECTRICAL CHARACTERISTICS

(Over recommended operating free-air temperature range unless otherwise noted.)

OVMDOL	DADAMETE		TEGT COMPLET	101101		LIMITS		UNIT
SYMBOL	PARAMETER	ζ	TEST CONDIT	MIN	N TYP ² MAX		UNIT	
			V _{CC} ±10%, V _{IL} = MAX,	$I_{OH} = -0.4$ mA	V _{CC} – 2			V
V _{OH}	High-level output voltage		$V_{IH} = MIN$	$I_{OH} = -3mA$	2.4	3.2		V
OH			$V_{CC} = MIN, V_{IL} = MAX, V_{IH} = MIN$	I _{OH} = -15mA	2.0			V
		All versions	$V_{CC} = MIN, V_{IL} = MAX,$ $I_{OL} = 12mA$			0.25	0.40	V
V _{OL}	Low-level output voltage	All versions	V _{IH} = MIN	I _{OL} = 24mA		0.35	0.50	V
02		-1 version	$V_{CC} = 4.75V$, $V_{IL} = MAX$, $V_{IH} = MIN$	I _{OL} = 48mA		0.35	0.50	V
V _{IK}	Input clamp voltage		$V_{CC} = MIN, I_I = I_{IK}$ $V_{CC} = MAX, V_I = 7.0V$			-0.73	-1.5	V
lį	Input current at maximum	input voltage					0.1	mA
I _{IH}	High-level input current	$V_{CC} = MAX, V_I = 2.7V$					20	μΑ
I _{IL}	Low-level input current		$V_{CC} = MAX, V_I = 0.4V$				-0.1	mA
I _{OZH}	Off-state output current, High-level voltage applied		$V_{CC} = MAX, V_I = 2.7V$				20	μА
I _{OZL}	Off-state output current, Low-level voltage applied		V _{CC} = MAX, V _I = 0.4V				-20	μΑ
ΙO	Output current ³		$V_{CC} = MAX, V_O = 2.25V$		-30		-112	mA
		Іссн				7	15	mA
I _{CC}	Supply current (total) I _{CCL}		$V_{CC} = MAX$	$V_{CC} = MAX$		21	26	mA
		I _{CCZ}				25	30	mA

NOTES:

- 1. For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable type.
- All typical values are at V_{CC} = 5V, T_{amb} = 25°C.
 The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, I_{OS}.

AC ELECTRICAL CHARACTERISTICS

			LIM	J	
SYMBOL	PARAMETER	TEST CONDITION	T _{amb} = 0°C V _{CC} = +5. C _L = 50pF,	UNIT	
			MIN	MAX	
t _{PLH} t _{PHL}	Propagation delay In to Yn	Waveform 1	1.5 1.5	10.0 10.0	ns
t _{PZH} t _{PZL}	Output Enable time to High or Low level	Waveform 2 Waveform 3	1.0 2.5	10.0 12.0	ns
t _{PHZ} t _{PLZ}	Output disable time from High or Low level	Waveform 2 Waveform 3	1.0 2.5	10.0 12.0	ns

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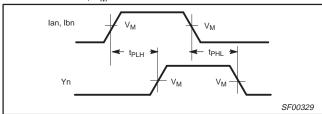
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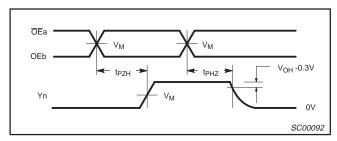
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AC WAVEFORMS

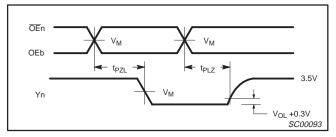
For all waveforms, $V_M = 1.3V$.



Waveform 1. Propagation Delay for Non-Inverting Output

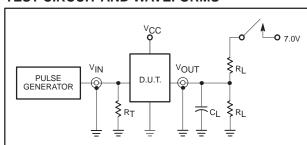


Waveform 2. 3-State Output Enable Time to High Level and Output Disable Time from High Level



Waveform 3. 3-State Output Enable Time to Low Level and Output Disable Time from Low Level

TEST CIRCUIT AND WAVEFORMS



Test Circuit for 3-State Outputs

SWITCH POSITION

TEST	SWITCH
t_{PLZ}, t_{PZL}	closed
All other	open

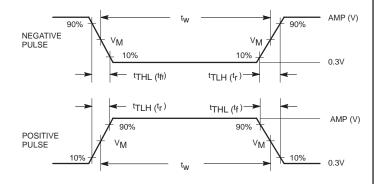
DEFINITIONS:

R_L = Load resistor;

see AC electrical characteristics for value.

C_L = Load capacitance includes jig and probe capacitance; see AC electrical characteristics for value.

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



Input Pulse Definition

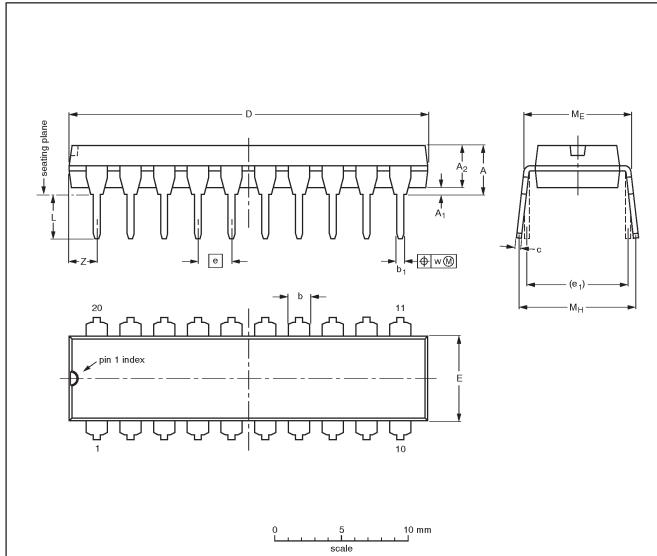
Comily	INPUT PULSE REQUIREMENTS							
Family	Amplitude	V _M	Rep.Rate	t _w	t _{TLH}	t _{THL}		
74ALS	3.5V	1.3V	1MHz	500ns	2.0ns	2.0ns		

SC00072

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DIP20: plastic dual in-line package; 20 leads (300 mil)

SOT146-1



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

UNIT	A max.	A ₁ min.	A ₂ max.	b	b ₁	С	D ⁽¹⁾	E ⁽¹⁾	е	e ₁	L	ME	M _H	w	Z ⁽¹⁾ max.
mm	4.2	0.51	3.2	1.73 1.30	0.53 0.38	0.36 0.23	26.92 26.54	6.40 6.22	2.54	7.62	3.60 3.05	8.25 7.80	10.0 8.3	0.254	2.0
inches	0.17	0.020	0.13	0.068 0.051	0.021 0.015	0.014 0.009	1.060 1.045	0.25 0.24	0.10	0.30	0.14 0.12	0.32 0.31	0.39 0.33	0.01	0.078

Note

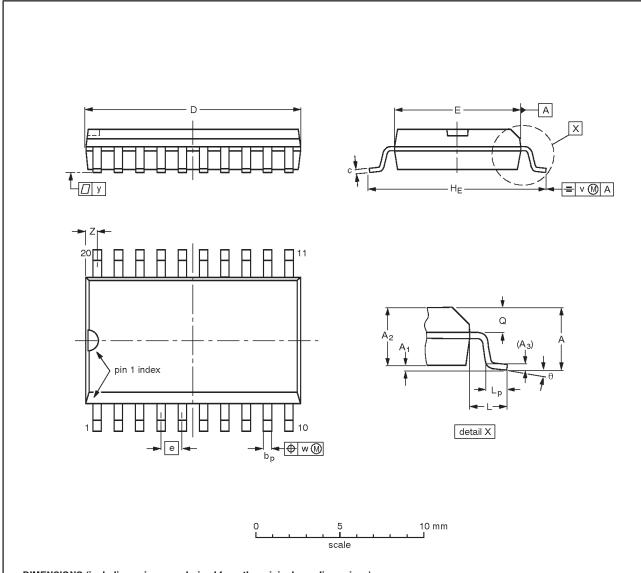
1. Plastic or metal protrusions of 0.25 mm maximum per side are not included.

OUTLINE		REFER	RENCES		EUROPEAN	ISSUE DATE
VERSION	IEC	JEDEC	EIAJ		PROJECTION	ISSUE DATE
SOT146-1			SC603			-92-11-17- 95-05-24

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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 ₁	A ₂	A ₃	bp	O	D ⁽¹⁾	E ⁽¹⁾	е	HE	L	Lp	Q	v	w	у	z ⁽¹⁾	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°
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	o°

Note

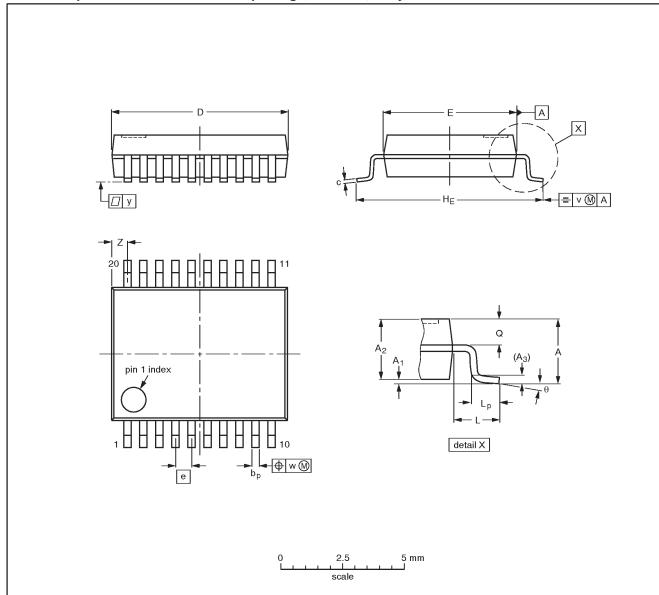
1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.

OUTLINE		REFER	EUROPEAN	ISSUE DATE			
VERSION	IEC	JEDEC	EIAJ		PROJECTION	1930E DATE	
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.	Α1	A ₂	A ₃	bр	С	D ⁽¹⁾	E ⁽¹⁾	е	HE	L	Lp	Ø	v	w	у	Z ⁽¹⁾	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		REFER	RENCES	EUROPEAN	ISSUE DATE	
VERSION	IEC	JEDEC	EIAJ		PROJECTION	ISSUE DATE
SOT339-1		MO-150AE				93-09-08 95-02-04

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	DEFINITIONS						
Data Sheet Identification	Product Status	Definition					
Objective Specification	Formative or in Design	This data sheet contains the design target or goal specifications for product development. Specification may change in any manner without notice.					
Preliminary Specification	Preproduction Product	This data sheet contains preliminary data, and supplementary data will be published at a later date. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.					
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