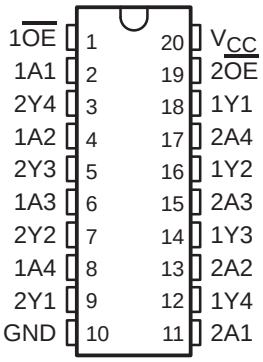
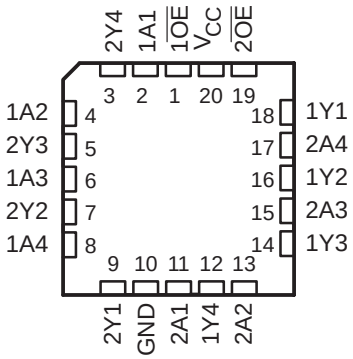
- **3-State Outputs Drive Bus Lines or Buffer Memory Address Registers**
- **pnp Inputs Reduce dc Loading**
- **Package Options Include Plastic Small-Outline (DW) Packages, Ceramic Chip Carriers (FK), and Standard Plastic (N) and Ceramic (J) 300-mil DIPs**

SN54ALS244C, SN54AS244A . . . J PACKAGE
SN74ALS244C, SN74AS244A . . . DW OR N PACKAGE
(TOP VIEW)



SN54ALS244C, SN54AS244A . . . FK PACKAGE
(TOP VIEW)



description

These octal buffers and line drivers are designed specifically to improve the performance and density of 3-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters. With the ′ALS240A, ′ALS241C, ′AS240A, and ′AS241A, these devices provide the choice of selected combinations of inverting outputs, symmetrical active-low output-enable ($\overline{OE}$) inputs, and complementary OE and $\overline{OE}$ inputs.

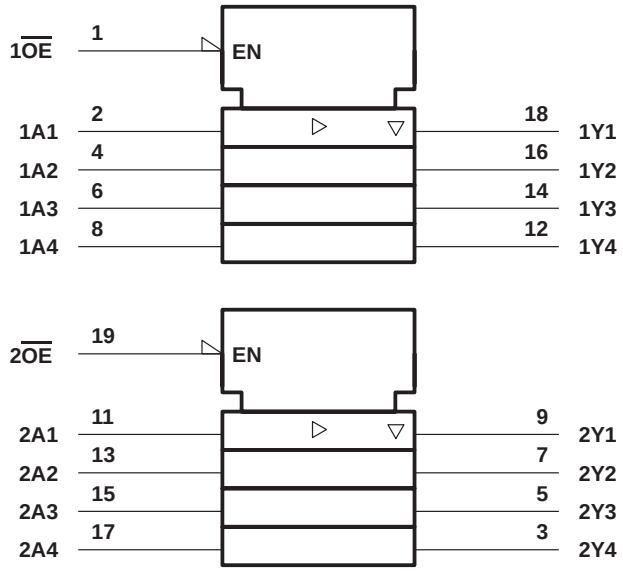
The -1 version of SN74ALS244C is identical to the standard version, except that the recommended maximum I_{OL} for the -1 version is 48 mA. There is no -1 version of the SN54ALS244C.

The SN54ALS244C and SN54AS244A are characterized for operation over the full military temperature range of –55°C to 125°C. The SN74ALS244C and SN74AS244A are characterized for operation from 0°C to 70°C.

FUNCTION TABLE
(each buffer)

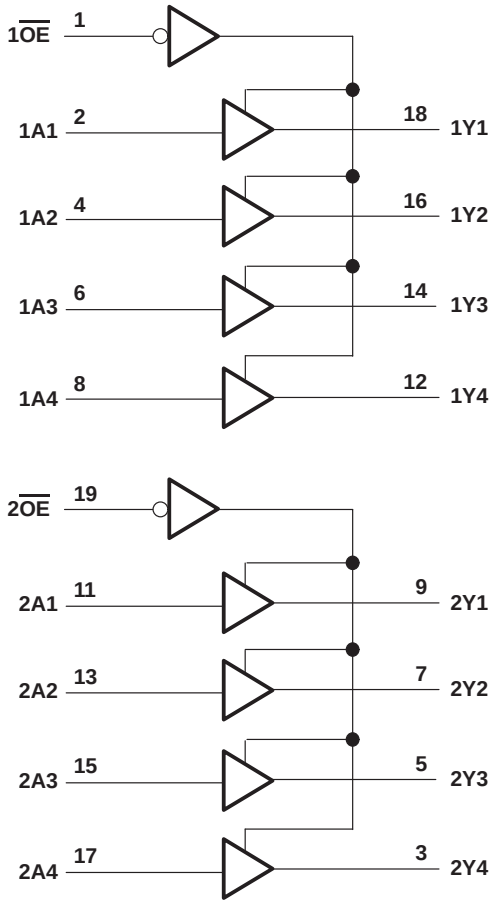
INPUTS		OUTPUT
$\overline{OE}$	A	Y
L	H	H
L	L	L
H	X	Z

logic symbol†



† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagram (positive logic)



absolute maximum ratings over operating free-air temperature range (unless otherwise noted)‡

Supply voltage, V_{CC} . . . . . 7 V
Input voltage, V_I . . . . . 7 V
Voltage applied to a disabled 3-state output . . . . . 5.5 V
Operating free-air temperature range, T_A: SN54ALS244C . . . . . –55°C to 125°C
SN74ALS244C . . . . . 0°C to 70°C
Storage temperature range . . . . . –65°C to 150°C

‡ Stresses beyond those listed under “absolute maximum ratings” 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.

recommended operating conditions

		SN54ALS244C			SN74ALS244C			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC}	Supply voltage	4.5	5	5.5	4.5	5	5.5	V
V_{IH}	High-level input voltage	2			2			V
V_{IL}	Low-level input voltage			0.8†			0.8	V
				0.7‡				
I_{OH}	High-level output current			–12			–15	mA
I_{OL}	Low-level output current			12			24	mA
							48§	
T_A	Operating free-air temperature	–55		125	0		70	°C

† Applies over temperature range –55°C to 70°C
‡ Applies over temperature range 70°C to 125°C
§ Applies only to the -1 version and only if V_{CC} is between 4.75 V and 5.25 V

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS		SN54ALS244C			SN74ALS244C			UNIT
			MIN	TYP¶	MAX	MIN	TYP¶	MAX	
V_{IK}	V_{CC} = 4.5 V,	I_I = –18 mA			–1.5			–1.5	V
V_{OH}	V_{CC} = 4.5 V to 5.5 V	I_{OH} = –0.4 mA	V_{CC} –2			V_{CC} –2			V
		I_{OH} = –3 mA	2.4	3.2		2.4	3.2		
	V_{CC} = 4.5 V	I_{OH} = –12 mA	2						
		I_{OH} = –15 mA				2			
V_{OL}	V_{CC} = 4.5 V	I_{OL} = 12 mA		0.25	0.4		0.25	0.4	V
		I_{OL} = 24 mA					0.35	0.5	
		I_{OL} = 48 mA (-1 version)					0.35	0.5	
I_{OZH}	V_{CC} = 5.5 V,	V_O = 2.7 V			20			20	µA
I_{OZL}	V_{CC} = 5.5 V,	V_O = 0.4 V			–20			–20	µA
I_I	V_{CC} = 5.5 V,	V_I = 7 V			0.1			0.1	mA
I_{IH}	V_{CC} = 5.5 V,	V_I = 2.7 V			20			20	µA
I_{IL}	V_{CC} = 5.5 V,	V_I = 0.4 V			–0.1			–0.1	mA
I_O#	V_{CC} = 5.5 V,	V_O = 2.25 V	–20		–112	–30		–112	mA
I_{CC}	V_{CC} = 5.5 V	Outputs high		9	18		9	17	mA
		Outputs low		15	25		15	24	
		Outputs disabled		17	29		17	27	

¶ All typical values are at V_{CC} = 5 V, T_A = 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}.

switching characteristics (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 4.5 V to 5.5 V, C_L = 50 pF, R1 = 500 Ω, R2 = 500 Ω, T_A = MIN to MAX†				UNIT
			SN54ALS244C		SN74ALS244C		
			MIN	MAX	MIN	MAX	
t_{PLH}	A	Y	1	16	2	10	ns
t_{PHL}			3	12	3	10	
t_{PZH}	$\overline{OE}$	Y	1	26	3	20	ns
t_{PZL}			1	24	3	20	
t_{PHZ}	$\overline{OE}$	Y	2	10	2	10	ns
t_{PLZ}			1	26	1	13	

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

absolute maximum ratings over operating free-air temperature range (unless otherwise noted)‡

Supply voltage, V_{CC} . . . . . 7 V
Input voltage, V_I . . . . . 7 V
Voltage applied to a disabled 3-state output . . . . . 5.5 V
Operating free-air temperature range, T_A: SN54AS244A . . . . . –55°C to 125°C
SN74AS244A . . . . . 0°C to 70°C
Storage temperature range . . . . . –65°C to 150°C

‡ Stresses beyond those listed under “absolute maximum ratings” 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.

recommended operating conditions

		SN54AS244A			SN74AS244A			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC}	Supply voltage	4.5	5	5.5	4.5	5	5.5	V
V_{IH}	High-level input voltage	2			2			V
V_{IL}	Low-level input voltage			0.8			0.8	V
I_{OH}	High-level output current			–12			–15	mA
I_{OL}	Low-level output current			48			64	mA
T_A	Operating free-air temperature	–55		125	0		70	°C

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER		TEST CONDITIONS		SN54AS244A			SN74AS244A			UNIT
				MIN	TYP†	MAX	MIN	TYP†	MAX	
V_{IK}		V_{CC} = 4.5 V,	I_I = –18 mA			–1.2			–1.2	V
V_{OH}		V_{CC} = 4.5 V to 5.5 V,	I_{OH} = –2 mA	V_{CC} –2			V_{CC} –2			V
		V_{CC} = 4.5 V	I_{OH} = –3 mA	2.4	3.4		2.4	3.4		
			I_{OH} = –12 mA	2.4						
			I_{OH} = –15 mA				2.4			
V_{OL}		V_{CC} = 4.5 V	I_{OL} = 48 mA			0.55				V
			I_{OL} = 64 mA						0.55	
I_{OZH}		V_{CC} = 5.5 V,	V_O = 2.7 V			50			50	µA
I_{OZL}		V_{CC} = 5.5 V,	V_O = 0.4 V			–50			–50	µA
I_I		V_{CC} = 5.5 V,	V_I = 7 V			0.1			0.1	mA
I_{IH}		V_{CC} = 5.5 V,	V_I = 2.7 V			20			20	µA
I_{IL}	$\overline{OE}$	V_{CC} = 5.5 V,	V_I = 0.4 V			–0.5			–0.5	mA
	A					–1			–1	
I_O‡		V_{CC} = 5.5 V,	V_O = 2.25 V	–50		–150	–50		–150	mA
I_{CC}		V_{CC} = 5.5 V	Outputs high		22	34		22	34	mA
			Outputs low		60	90		60	90	
			Outputs disabled		34	54		34	54	

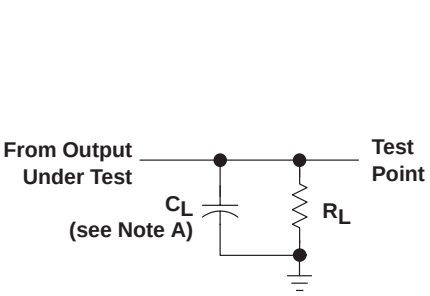
† All typical values are at V_{CC} = 5 V, T_A = 25°C.
‡ The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, I_{OS}.

switching characteristics (see Figure 1)

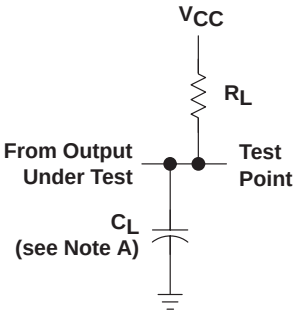
PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 4.5 V to 5.5 V, C_L = 50 pF, R1 = 500 Ω, R2 = 500 Ω, T_A = MIN to MAX§				UNIT
			SN54AS244A		SN74AS244A		
			MIN	MAX	MIN	MAX	
t_{PLH}	A	Y	2	9	2	6.2	ns
t_{PHL}			1	7	1	6.2	
t_{PZH}	$\overline{OE}$	Y	1	10	1	9	ns
t_{PZL}			2	8	2	7.5	
t_{PHZ}	$\overline{OE}$	Y	1	6.5	1	6	ns
t_{PLZ}			1	10.5	1	9	

§ For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

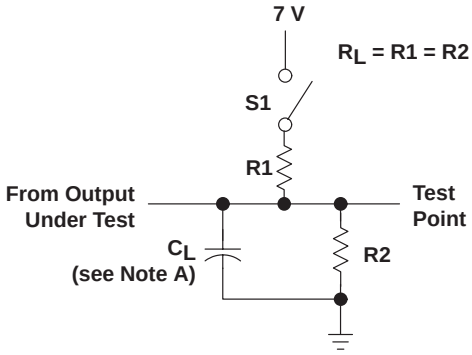
PARAMETER MEASUREMENT INFORMATION
SERIES 54ALS/74ALS AND 54AS/74AS DEVICES



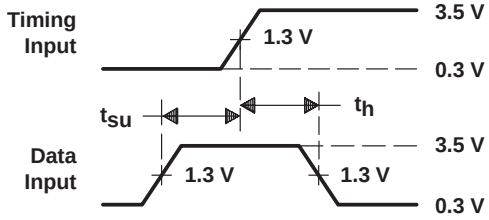
LOAD CIRCUIT FOR
BI-STATE
TOTEM-POLE OUTPUTS



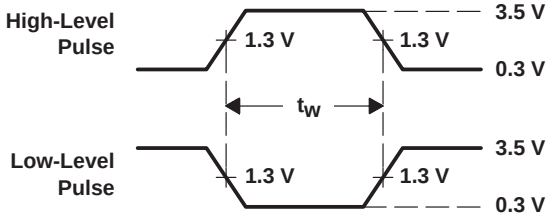
LOAD CIRCUIT
FOR OPEN-COLLECTOR OUTPUTS



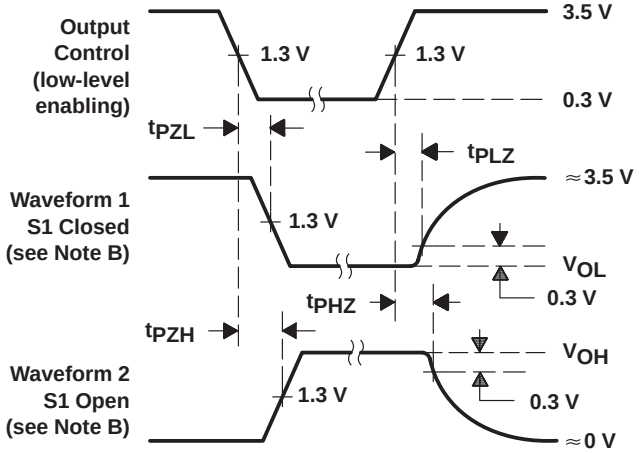
LOAD CIRCUIT
FOR 3-STATE OUTPUTS



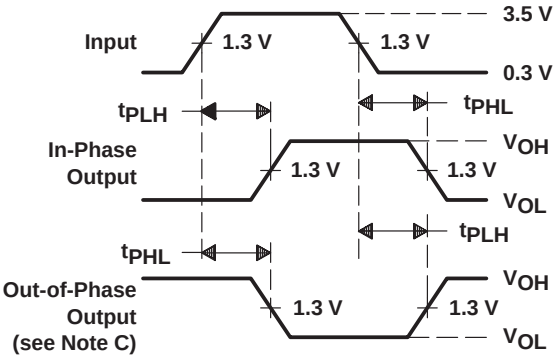
VOLTAGE WAVEFORMS
SETUP AND HOLD TIMES



VOLTAGE WAVEFORMS
PULSE DURATIONS



VOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES, 3-STATE OUTPUTS



VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES

NOTES: A. C_L includes probe and jig capacitance.
B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
C. When measuring propagation delay items of 3-state outputs, switch S1 is open.
D. All input pulses have the following characteristics: PRR ≤ 1 MHz, $t_r = t_f$ = 2 ns, duty cycle = 50%.
E. The outputs are measured one at a time with one transition per measurement.

Figure 1. Load Circuits and Voltage Waveforms

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SN74AS244A, Octal Buffers / Drivers With 3-State Outputs

DEVICE STATUS: **ACTIVE**

PARAMETER NAME	SN54AS244A	SN74AS244A
Voltage Nodes (V)	5	5
Vcc range (V)	4.5 to 5.5	4.5 to 5.5
Input Level	TTL	TTL
Output Level	TTL	TTL
Output Drive (mA)		-15/64
tpd max (ns)		6.2
Static Current		62

FEATURES

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- 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
- pnp Inputs Reduce dc Loading
- Package Options Include Plastic Small-Outline (DW) Packages, Ceramic Chip Carriers (FK), and Standard Plastic (N) and Ceramic (J) 300-mil DIPs

DESCRIPTION

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These octal buffers and line drivers are designed specifically to improve the performance and density of 3-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters. With the ´ALS240A, ´ALS241C, ´AS240A, and ´AS241A, these devices provide the choice of selected combinations of inverting outputs, symmetrical active-low output-enable ($\overline{OE}$) inputs, and complementary OE and $\overline{OE}$ inputs.

The -1 version of SN74ALS244C is identical to the standard version, except that the recommended maximum I_{OL} for the -1 version is 48 mA. There is no -1 version of the SN54ALS244C.

The SN54ALS244C and SN54AS244A are characterized for operation over the full military temperature range of -55°C to 125°C. The SN74ALS244C and SN74AS244A are characterized for operation from 0°C to 70°C.

TECHNICAL DOCUMENTS

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DATASHEET

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Full datasheet in Acrobat PDF: sn74as244a.pdf (110 KB,Rev.C) (Updated: 08/01/1995)

APPLICATION NOTES

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View Application Notes for Digital Logic

- Advanced Schottky (ALS and AS) Logic Families (SDAA010 - Updated: 08/01/1995)
- Advanced Schottky Load Management (SDYA016 - Updated: 02/01/1997)
- Designing With Logic (Rev. C) (SDYA009C - Updated: 06/01/1997)
- Evaluation of Nickel/Palladium/Gold-Finished Surface-Mount Integrated Circuits (SZZA026 - Updated: 06/20/2001)
- Input and Output Characteristics of Digital Integrated Circuits (SDYA010 - Updated: 10/01/1996)
- Live Insertion (SDYA012 - Updated: 10/01/1996)
- Timing Differences of 10-pF Versus 50pF Loading (SCEA004 - Updated: 11/01/1996)

RELATED DOCUMENTS

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View Related Documentation for Digital Logic

- Logic Reference Guide (SCYB004, 1032 KB - Updated: 10/23/2001)
- Logic Selection Guide Second Half 2002 (Rev. R) (SDYU001R, 4274 KB - Updated: 07/19/2002)
- Military Semiconductors Selection Guide 2002 (Rev. B) (SGYC003B, 1648 KB - Updated: 04/22/2002)

PRICING/AVAILABILITY/PKG

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DEVICE INFORMATION							TI INVENTORY STATUS AS OF 3:00 PM GMT, 26 Sep 2002			REPORTED DISTRIBUTOR INVENTORY AS OF 3:00 PM GMT, 26 Sep 2002		
ORDERABLE DEVICE	STATUS	PACKAGE TYPE|PINS	TEMP (°C)	PRODUCT CONTENT	BUDGETARY PRICING QTY | $US	STD PACK QTY	IN STOCK	IN PROGRESS QTY|DATE	LEAD TIME	DISTRIBUTOR COMPANY|REGION	IN STOCK	PURCHASE
SN74AS244ADW	ACTIVE	SOP (DW) | 20	0 TO 70	View Contents	1KU | 1.29	25	75	3950 | 19 Sep	5 WKS			
								>10k | 11 Oct				
SN74AS244ADWR	ACTIVE	SOP (DW) | 20	0 TO 70	View Contents	1KU | 1.29	2000	N/A*	4555 | 23 Sep	5 WKS			
								1445 | 04 Oct				
								>10k | 11 Oct				
SN74AS244AN	ACTIVE	PDIP (N) | 20	0 TO 70	View Contents	1KU | 1.19	20	N/A*	4714 | 26 Sep	5 WKS			
								580 | 03 Oct				
								>10k | 14 Oct				
SN74AS244ANSR	ACTIVE	SOP (NS) | 20		View Contents	1KU | 1.19	2000	N/A*	>10k | 14 Oct	5 WKS			
								77 | 22 Oct				

MODELS

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- IBIS Model of SN74AS244A (SDAM009, 65 KB - Updated: 08/09/2000)
  IBIS Model of SN74AS244A (SDAM009, 10 KB, ZIP - Updated: 08/09/2000)

Table Data Updated on: 9/26/2002

PRODUCT FOLDER | PRODUCT INFO: FEATURES | DESCRIPTION | DATASHEETS | PRICING/AVAILABILITY/PKG | APPLICATION NOTES | RELATED DOCUMENTS

PRODUCT SUPPORT: TRAINING

SN74ALS244C-1, Octal Buffers/Line Drivers with 3-State Outputs

DEVICE STATUS: **ACTIVE**

PARAMETER NAME	SN74ALS244C-1
Voltage Nodes (V)	5
Vcc range (V)	4.75 to 5.25
Input Level	TTL
Output Level	TTL
Output Drive (mA)	-15/48
tpd max (ns)	10
Static Current	20.5

FEATURES

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- 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
- pnp Inputs Reduce dc Loading
- Package Options Include Plastic Small-Outline (DW) Packages, Ceramic Chip Carriers (FK), and Standard Plastic (N) and Ceramic (J) 300-mil DIPs

DESCRIPTION

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These octal buffers and line drivers are designed specifically to improve the performance and density of 3-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters. With the ´ALS240A, ´ALS241C, ´AS240A, and ´AS241A, these devices provide the choice of selected combinations of inverting outputs, symmetrical active-low output-enable ($\overline{OE}$) inputs, and complementary OE and $\overline{OE}$ inputs.

The -1 version of SN74ALS244C is identical to the standard version, except that the recommended maximum I_{OL} for the -1 version is 48 mA. There is no -1 version of the SN54ALS244C.

The SN54ALS244C and SN54AS244A are characterized for operation over the full military temperature range of -55°C to 125°C. The SN74ALS244C and SN74AS244A are characterized for operation from 0°C to 70°C.

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DATASHEET

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Full datasheet in Acrobat PDF: sn74als244c-1.pdf (110 KB,Rev.C) (Updated: 08/01/1995)

APPLICATION NOTES

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View Application Notes for Digital Logic

- Advanced Schottky (ALS and AS) Logic Families (SDAA010 - Updated: 08/01/1995)
- Bus-Interface Devices With Output-Damping Resistors Or Reduced-Drive Outputs (Rev. A) (SCBA012A - Updated: 08/01/1997)
- Designing With Logic (Rev. C) (SDYA009C - Updated: 06/01/1997)
- Evaluation of Nickel/Palladium/Gold-Finished Surface-Mount Integrated Circuits (SZZA026 - Updated: 06/20/2001)
- Input and Output Characteristics of Digital Integrated Circuits (SDYA010 - Updated: 10/01/1996)
- Live Insertion (SDYA012 - Updated: 10/01/1996)
- Timing Differences of 10-pF Versus 50pF Loading (SCEA004 - Updated: 11/01/1996)

RELATED DOCUMENTS

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- Logic Selection Guide Second Half 2002 (Rev. R) (SDYU001R, 4274 KB - Updated: 07/19/2002)
- Military Semiconductors Selection Guide 2002 (Rev. B) (SGYC003B, 1648 KB - Updated: 04/22/2002)

PRICING/AVAILABILITY/PKG

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DEVICE INFORMATION							TI INVENTORY STATUS AS OF 3:00 PM GMT, 26 Sep 2002			REPORTED DISTRIBUTOR INVENTORY AS OF 3:00 PM GMT, 26 Sep 2002		
ORDERABLE DEVICE	STATUS	PACKAGE TYPE|PINS	TEMP (°C)	PRODUCT CONTENT	BUDGETARY PRICING QTY | $US	STD PACK QTY	IN STOCK	IN PROGRESS QTY|DATE	LEAD TIME	DISTRIBUTOR COMPANY|REGION	IN STOCK	PURCHASE
SN74ALS244C-1DW	ACTIVE	SOP (DW) | 20	0 TO 70	View Contents	1KU | 1.02	25	N/A*	>10k | 14 Oct	4 WKS			
SN74ALS244C-1DWR	ACTIVE	SOP (DW) | 20	0 TO 70	View Contents	1KU | 1.02	2000	N/A*	>10k | 11 Oct	4 WKS			
SN74ALS244C-1N	ACTIVE	PDIP (N) | 20	0 TO 70	View Contents	1KU | 0.98	20	820	30 | 07 Oct	4 WKS	Avnet | AMERICA	450	BUY NOW
								>10k | 14 Oct				
SN74ALS244C-1NSR	ACTIVE	SOP (NS) | 20		View Contents	1KU | 0.98	2000	N/A*	>10k | 24 Sep	4 WKS			
								>10k | 25 Sep				
								>10k | 14 Oct				

Table Data Updated on: 9/26/2002