- **High Capacitive Drive Capability**
- **'ALS1804A Has Typical Delay Time of 4 ns (C_L = 50 pF) and Typical Power Dissipation of 3.4 mW per Gate**
- **'AS1804 Has Typical Delay Time of 2.6 ns (C_L = 50 pF) and Typical Power Dissipation of Less than 9 mW per Gate**
- **Center V_{CC} and GND Configuration Provides Minimum Lead inductance in High Current Switching Applications**
- **Package Options include Plastic Small Outline Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs**
- **Dependable Texas Instruments Quality and Reliability**

description

These devices contain six independent 2-input NAND drivers. They perform the Boolean functions $Y = \overline{A \bullet B}$ or $Y = \overline{A} + \overline{B}$ in positive logic.

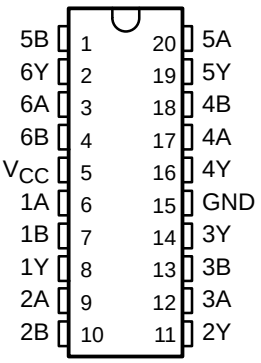
The center pin configuration used in the 'ALS1804A and 'AS1804 provides a reduction of lead inductance when compared to the 'ALS804A and 'AS804B. This reduction of lead inductance will minimize noise generated onto either the V_{CC} or GND bus. This reduction is significant in high current switching applications.

The SN54ALS1804A and SN54AS1804 are characterized for operation over the full military temperature range of –55°C to 125°C. The SN74ALS1804A and SN74AS1804 are characterized for operation from 0°C to 70°C.

FUNCTION TABLE
(each driver)

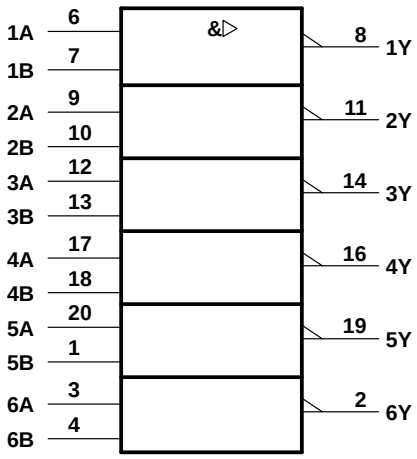
INPUTS		OUTPUT
A	B	Y
H	H	L
L	X	H
X	L	H

SN54ALS1804A, SN54AS1804 . . . J PACKAGE
SN74ALS1804A, SN74AS1804 . . . DW OR N PACKAGE
(TOP VIEW)



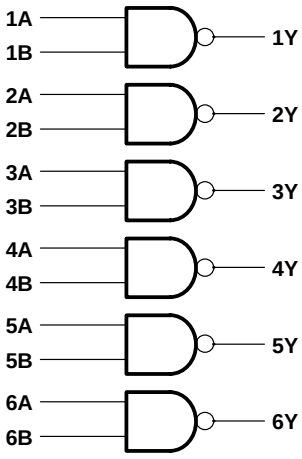
Use 'ALS804A or 'AS804 for chip carrier option.

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 . . . . . 7 V
Operating free-air temperature range: SN54ALS1804A . . . . . –55°C to 125°C
SN74ALS1804A . . . . . 0°C to 70°C
Storage temperature range . . . . . –65°C to 150°C

recommended operating conditions

		SN54ALS1804A			SN74ALS1804A			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			0.7			0.8	V
I_{OH}	High-level output current			–12			–15	mA
I_{OL}	Low-level output current			12			24	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		SN54ALS1804A			SN74ALS1804A			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} = –0.4 mA	V_{CC}–2			V_{CC}–2			V
	V_{CC} = 4.5 V,	I_{OH} = –3 mA	2.4	3.2		2.4	3.2		
	V_{CC} = 4.5 V,	I_{OH} = –12 mA	2						
	V_{CC} = 4.5 V,	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
	V_{CC} = 4.5 V,	I_{OL} = 24 mA					0.35	0.5	
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	–30		–112	–30		–112	mA
I_{CCH}	V_{CC} = 5.5 V,	V_I = 0		0.9	2.5		0.9	2.5	mA
I_{CCL}	V_{CC} = 5.5 V,	V_I = 4.5 V		7	12		7	12	mA

† 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 Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 5 V, C_L = 50 pF, R_L = 500 Ω, T_A = 25°C	V_{CC} = 4.5 V to 5.5 V, C_L = 50 pF, R_L = 500 Ω, T_A = MIN to MAX				UNIT
			'ALS1804A	SN54ALS1804A		SN74ALS1804A		
			TYP	MIN	MAX	MIN	MAX	
t_{PLH}	A or B	Y	4	2	9	2	7	ns
t_{PHL}			4	2	9	2	8	

NOTE 1: Load circuit and voltage waveforms are shown in Section 1.

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

Supply voltage, V_{CC} . . . . . 7 V
Input voltage . . . . . 7 V
Operating free-air temperature range: SN54AS1804 . . . . . –55°C to 125°C
SN74AS1804 . . . . . 0°C to 70°C
Storage temperature range . . . . . –65°C to 150°C

recommended operating conditions

		SN54AS1804			SN74AS1804			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			–40			–48	mA
I_{OL}	Low-level output current			40			48	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		SN54AS1804			SN74AS1804			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	3.2		2.4	3.2		
	V_{CC} = 4.5 V,	I_{OH} = –40 mA	2						
	V_{CC} = 4.5 V,	I_{OH} = –48 mA				2			
V_{OL}	V_{CC} = 4.5 V,	I_{OL} = 40 mA		0.25	0.5				V
	V_{CC} = 4.5 V,	I_{OL} = 48 mA					0.35	0.5	
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			–0.5			–0.5	mA
I_O‡	V_{CC} = 5.5 V,	V_O = 2.25 V	–50		–200	–30		–200	mA
I_{CCH}	V_{CC} = 5.5 V,	V_I = 0		3.5	5		3.5	5	mA
I_{CCL}	V_{CC} = 5.5 V,	V_I = 4.5 V		16	27		16	27	mA

† 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 Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 4.5 V to 5.5 V, C_L = 50 pF, R_L = 500 Ω, T_A = MIN to MAX				UNIT
			SN54AS1804		SN74AS1804		
			MIN	MAX	MIN	MAX	
t_{PLH}	A or B	Y	1	5	1	4	ns
t_{PHL}			1	5	1	4	

NOTE 1: Load circuit and voltage waveforms are shown in Section 1.

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