

SN54ALS29806, SN54ALS29809 SN74ALS29806, SN74ALS29809 COMPARATOR AND 2- TO 4-BIT DECODER

D2934, MARCH 1986

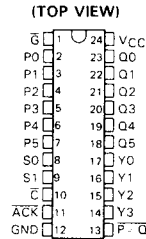
- 'ALS29806 is a 6-Bit Identity Comparator Controlling a 2- to 4-Bit Decoder
- 'ALS29809 is a 9-Bit Identity Comparator
- Low Power Dissipation . . . 50 mW Typical
- 'ALS29806 and 'ALS29809 are Functionally Equivalent to AM29806 and AM29809
- Internal Pull-Up Resistor on Q Inputs
- Package Options Include Both Plastic and Ceramic Chip Carriers in Addition to Plastic and Ceramic DIPs
- Dependable Texas Instruments Quality and Reliability

description

The 'ALS29806 and 'ALS29809 are 6-bit and 9-bit comparators, respectively. The 'ALS29806 and 'ALS29809 compare two data words applied to the P and Q inputs. When the two words are identical, the $\overline{P=Q}$ output goes low. Both devices feature an open-collector acknowledge (\overline{ACK}) output that goes low when $\overline{P=Q}$ and the controlling input (\overline{C}) are low. The 'ALS29806 features a 2- to 4-bit decoder whose selected output goes low when the $\overline{P=Q}$ output is low. The 'ALS29806 and 'ALS29809 can be cascaded by tying the $\overline{P=Q}$ output to the enable \overline{G} of the next device. If the \overline{G} input is high, all the outputs will be inactive (high).

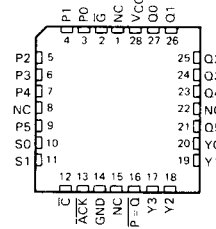
The SN54ALS29806 and SN54ALS29809 are characterized for operation over the full military temperature range of -55°C to 125°C . The SN74ALS29806 and SN74ALS29809 are characterized for operation from 0°C to 70°C .

SN54ALS29806 . . . JT PACKAGE
SN74ALS29806 . . . DW OR NT PACKAGE



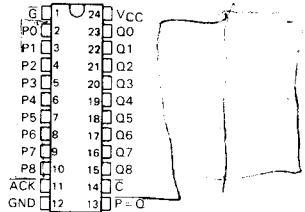
SN54ALS29806 . . . FK PACKAGE
SN74ALS29806 . . . FN PACKAGE

(TOP VIEW)



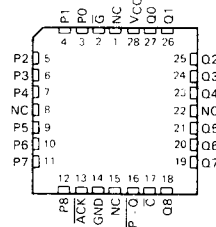
SN54ALS29809 . . . JT PACKAGE
SN74ALS29809 . . . DW OR NT PACKAGE

(TOP VIEW)



SN54ALS29809 . . . FK PACKAGE
SN74ALS29809 . . . FN PACKAGE

(TOP VIEW)



NC—No internal connection

PRODUCTION DATA documents contain information current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

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SN54ALS29806, SN74ALS29806 COMPARATOR AND 2- TO 4-BIT DECODER

FUNCTION TABLE
FOR $\overline{P=Q}$ AND ACK OUTPUTS

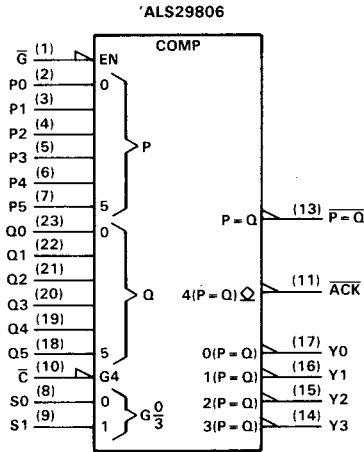
INPUTS			OUTPUTS	
\overline{G}	P,Q	\overline{C}	$\overline{P=Q}$	ACK
H	X	X	H	H
X	$P \neq Q$	X	H	H
L	$P = Q$	L	L	L
L	$P = Q$	H	L	H

FUNCTION TABLE
FOR DECODER OUTPUTS

INPUTS				OUTPUTS			
\overline{G}	P,Q	S1	S0	Y3	Y2	Y1	Y0
H	X	X	X	H	H	H	H
X	$P \neq Q$	X	X	H	H	H	H
L	$P = Q$	L	L	H	H	H	L
L	$P = Q$	L	H	H	H	L	H
L	$P = Q$	H	L	H	L	H	H
L	$P = Q$	H	H	L	H	H	H

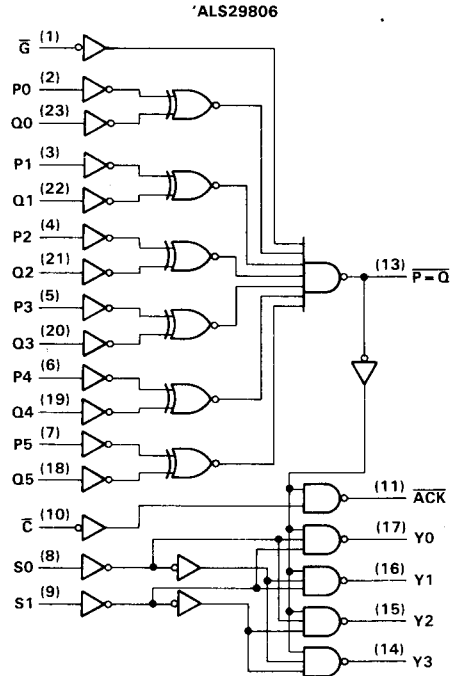
2 logic symbol†

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†This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12. Pin numbers shown are for DW, JT and NT packages.

logic diagram (positive logic)

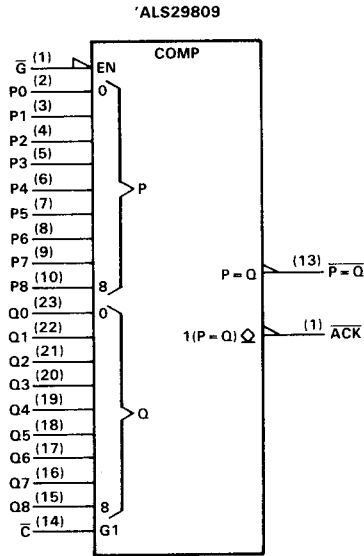


SN54ALS29809, SN74ALS29809 COMPARATOR AND 2- TO 4-BIT DECODER

FUNCTION TABLE

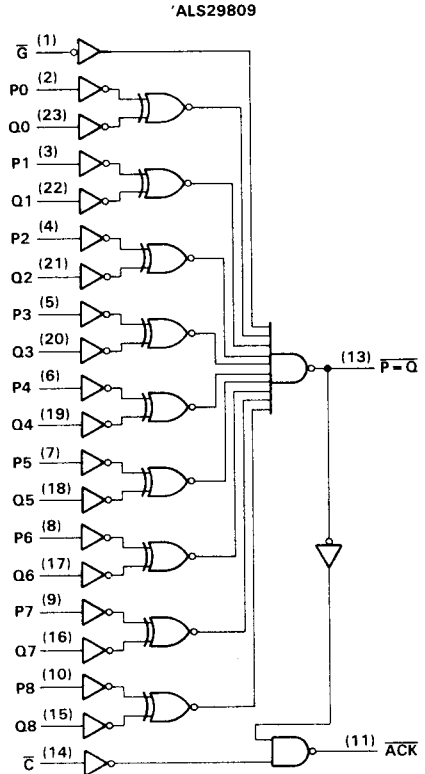
INPUTS			OUTPUTS	
\bar{G}	P, Q	\bar{C}	$P=Q$	ACK
H	X	X	H	H
X	$P \neq Q$	X	H	H
L	$P=Q$	L	L	L
L	$P=Q$	H	L	H

logic symbol†



†This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.
Pin numbers shown are for DW, JT and NT packages.

logic diagram (positive logic)



SN54ALS29806, SN54ALS29809
SN74ALS29806, SN74ALS29809
COMPARATOR AND 2- TO 4-BIT DECODER

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

Supply voltage, V_{CC}	7 V
Input voltage, V_I	5.5 V
Operating free-air temperature range: SN54 [†]	-55°C to 125°C
SN74 [†]	0°C to 70°C
Storage temperature range	-65°C to 150°C

recommended operating conditions

		SN54ALS29806			SN74ALS29806			UNIT
		SN54ALS29809			SN74ALS29809			
		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
V_{OH}	High-level output voltage			5.5			5.5	V
I_{OH}	High-level output current	$\overline{P=Q}, Y$			-3			mA
I_{OL}	Low-level output current	\overline{ACK}			32			mA
		$\overline{P=Q}, Y$			12			
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	SN54ALS29806			SN74ALS29806			UNIT
		SN54ALS29809			SN74ALS29809			
		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, $I_{OH} = -0.4 mA$	$V_{CC} - 2.2$			$V_{CC} - 2$			V
	$V_{CC} = 4.5 V, I_{OH} = -3 mA$	2.4	3.2		2.4	3.2		
I_{OH}	\overline{ACK} , $V_{CC} = 5.5 V, V_{OH} = 5.5 V$			0.1			0.1	mA
V_{OL}	$\overline{P=Q}, Y$, $V_{CC} = 4.5 V, I_{OL} = 12 mA$		0.25	0.4		0.25	0.4	V
	$\overline{P=Q}, Y$, $V_{CC} = 4.5 V, I_{OL} = 24 mA$					0.32	0.5	
	\overline{ACK} , $V_{CC} = 4.5 V, I_{OL} = 32 mA$		0.34	0.5		0.34	0.5	
I_I	$V_{CC} = 5.5 V, V_I = 5.5 V$			0.1			0.1	mA
I_{IH}	Q^{\ddagger}	$V_{CC} = 5.5 V, V_I = 2.4 V$		-250			-250	μA
	All other			20			20	
I_{IL}	Q^{\ddagger}	$V_{CC} = 5.5 V, V_I = 0.5 V$		-2			-1	mA
	All other			-0.6			-0.6	
I_{OS}^{\S}	$V_{CC} = 5.5 V, V_O = 0 V$	-60		-150	-60		-150	mA
I_{CC}	'ALS29806	$V_{CC} = 5.5 V, \text{ See Note 1}$		14	22		14	mA
	'ALS29809			10	20		10	

[†] All typical values are at $V_{CC} = 5 V, T_A = 25^\circ C$.

[‡] All Q inputs have internal pull-up resistors of 27 k Ω nominal.

[§] Not more than one output should be shorted at a time, and the duration of the short circuit should not exceed one second.

NOTE 1: I_{CC} is measured with \overline{G} grounded and P and Q at 4.5 V.

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SN54ALS29806, SN54ALS29809
SN74ALS29806, SN74ALS29809
COMPARATOR AND 2- TO 4-BIT DECODER

switching characteristics

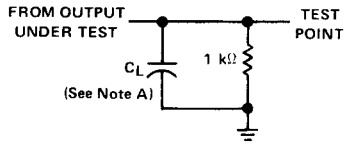
PARAMETER	FROM (INPUT)	TO (OUTPUT)	VCC = 5 V, CL = 50 pF, RL = (see Figure 1), TA = 25°C			VCC = 4.5 V to 5.5 V, CL = 50 pF, RL = (see Figure 1), TA = MIN to MAX				UNIT
			'ALS29806 'ALS29809			SN54ALS29806 SN54ALS29809		SN74ALS29806 SN74ALS29809		
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
tPLH	P or Q	P = Q	8	11	3	+ 15	3	+ 13	ns	
tPHL			7	10	2	+ 13	2	+ 11		
tPLH	P or Q	Y	9	11	3	+ 17	3	+ 13	ns	
tPHL			9	12	5	+ 17	5	+ 14		
tPLH	Q	P = Q	9	12	3	+ 15	3	+ 14	ns	
tPHL			7	10	2	+ 14	2	+ 12		
tPLH	Q	Y	8	11	3	+ 17	3	+ 15	ns	
tPHL			10	13	5	+ 19	5	+ 16		
tPLH	S0 or S1	Y	6	10	2	+ 15	2	+ 13	ns	
tPHL			8	11	2	+ 15	2	+ 13		
tPLH	P or Q	ACK	11	14	5	+ 22	5	+ 17	ns	
tPHL			10	13	4	+ 18	4	+ 16		
tPLH	Q	ACK	10	14	5	+ 22	5	+ 17	ns	
tPHL			10	14	4	+ 19	4	+ 17		
tPLH	C	ACK	8	11	3	+ 21	3	+ 18	ns	
tPHL			7	11	3	+ 17	3	+ 15		

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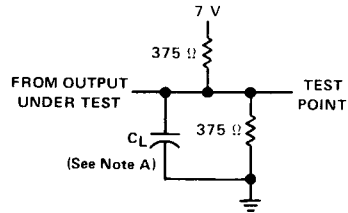
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COMPARATOR AND 2- TO 4-BIT DECODER**

PARAMETER MEASUREMENT INFORMATION

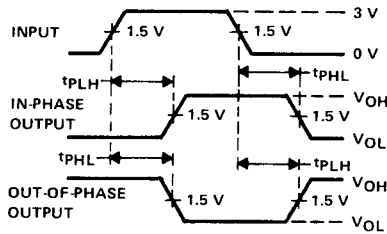


**LOAD CIRCUIT FOR
P-Q AND Y OUTPUTS**



**LOAD CIRCUIT FOR
ACK OUTPUT**

NOTE A: C_L includes probe and jig capacitance.



**VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES**

FIGURE 1

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 SN74ALS29806, SN74ALS29809
 COMPARATOR AND 2- TO 4-BIT DECODER

TYPICAL APPLICATION

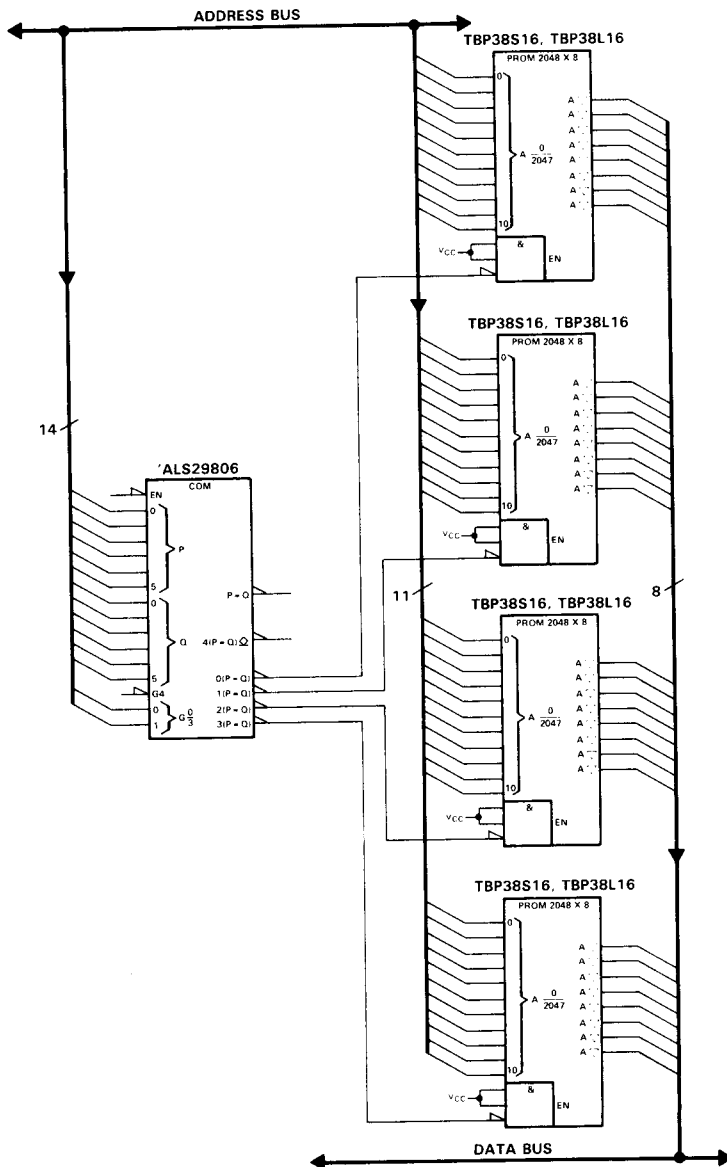


FIGURE 2. MEMORY BANK DECODER