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Rochester branded components are manufactured using either die/wafers purchased from the original suppliers or Rochester wafers recreated from the original IP. All recreations are done with the approval of the OCM.

Parts are tested using original factory test programs or Rochester developed test solutions to guarantee product meets or exceed the OCM data sheet.

### **Quality Overview**

- ISO-9001
- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-35835
  - Class Q Military
  - Class V Space Level
- Qualified Suppliers List of Distributors (QSLD)
  - Rochester is a critical supplier to DLA and meets all industry and DLA standards.

Rochester Electronics, LLC is committed to supplying products that satisfy customer expectations for quality and are equal to those originally supplied by industry manufacturers.

The original manufacturer's datasheet accompanying this document reflects the performance and specifications of the Rochester manufactured version of this device. Rochester Electronics guarantees the performance of its semiconductor products to the original OEM specifications. 'Typical' values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.

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

D2934, MARCH 1986

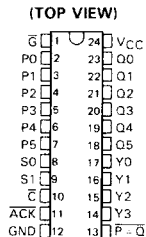
- 'ALS29806 is a 6-Bit Identity Comparator Controlling a 2- to 4-Bit Decoder
- 'ALS29809 is a 9-Bit Identity Comparator
- Low Power Dissipation . . . 50 mW Typical
- 'ALS29806 and 'ALS29809 are Functionally Equivalent to AM29806 and AM29809
- Internal Pull-Up Resistor on Q Inputs
- Package Options Include 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  $P=Q$  output goes low. Both devices feature an open-collector acknowledge ( $\overline{ACK}$ ) output that goes low when  $P=Q$  and the controlling input ( $\overline{C}$ ) are low. The 'ALS29806 features a 2- to 4-bit decoder whose selected output goes low when the  $P=Q$  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).

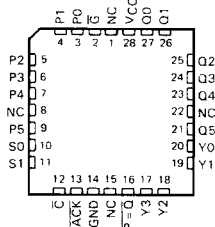
The SN54ALS29806 and SN54ALS29809 are characterized for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The SN74ALS29806 and SN74ALS29809 are characterized for operation from  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

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



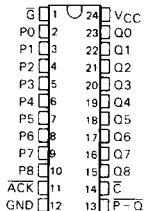
SN54ALS29806 . . . FK PACKAGE  
SN74ALS29806 . . . FN PACKAGE

(TOP VIEW)



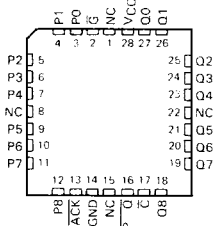
SN54ALS29809 . . . JT PACKAGE  
SN74ALS29809 . . . DW OR NT PACKAGE

(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  $P=Q$  AND  $ACK$  OUTPUTS

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

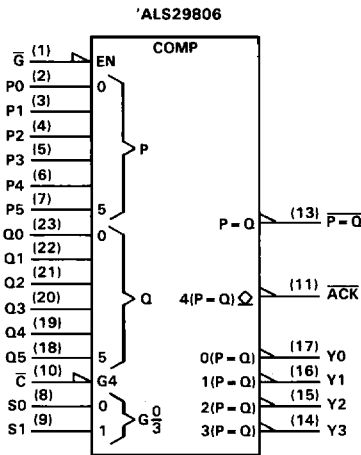
FUNCTION TABLE  
FOR DECODER OUTPUTS

INPUTS					OUTPUTS			
$\bar{G}$	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

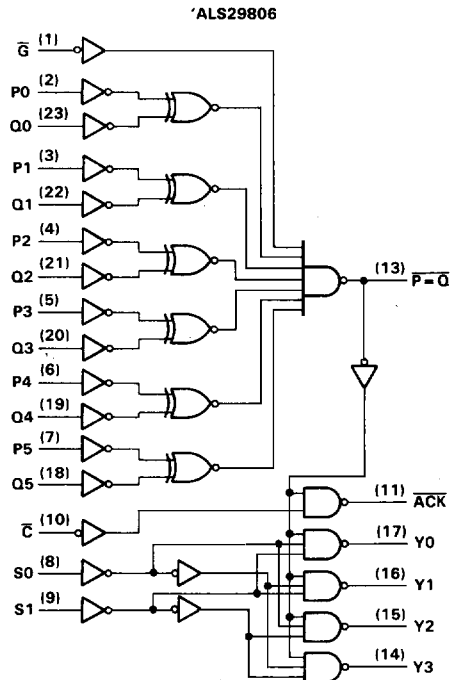
logic symbol†

ALS and AS Circuits



†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)

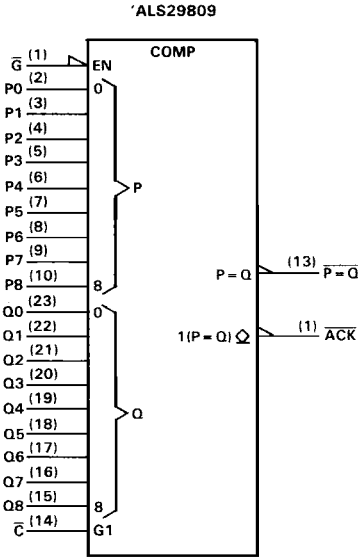


# SN54ALS29809, SN74ALS29809 COMPARATOR AND 2- TO 4-BIT DECODER

FUNCTION TABLE

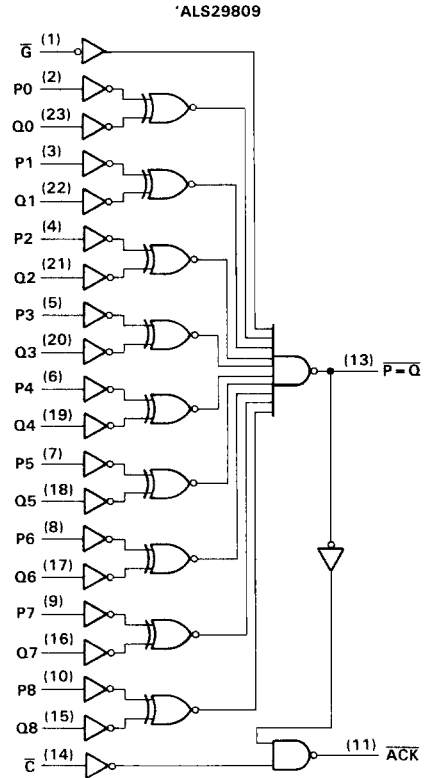
INPUTS			OUTPUTS	
$\bar{G}$	P,Q	$\bar{C}$	$\bar{P=Q}$	ACK
H	X	X	H	H
X	$P \neq Q$	X	H	H
L	$P = Q$	L	L	L
L	$P = Q$	H	L	H

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 <sup>†</sup> .....	-55°C to 125°C
SN74 <sup>†</sup> .....	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			-3			-3	mA
$I_{OL}$	Low-level output current			32			32	mA
				12			24	
$T_A$	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 <sup>†</sup>	MAX	MIN	TYP <sup>†</sup>	MAX	
$V_{IK}$	$V_{CC} = 4.5\text{ V}$ , $I_I = -18\text{ mA}$			-1.2			-1.2	V
$V_{OH}$	$V_{CC} = 4.5\text{ V to }5.5\text{ V}$ , $I_{OH} = -0.4\text{ mA}$	$V_{CC} - 2.2$			$V_{CC} - 2$			V
	$V_{CC} = 4.5\text{ V}$ , $I_{OH} = -3\text{ mA}$	2.4	3.2		2.4	3.2		
$I_{OH}$	$\overline{ACK}$ $V_{CC} = 5.5\text{ V}$ , $V_{OH} = 5.5\text{ V}$			0.1			0.1	mA
$V_{OL}$	$\overline{P} = \overline{Q}$ , Y $V_{CC} = 4.5\text{ V}$ , $I_{OL} = 12\text{ mA}$		0.25	0.4		0.25	0.4	V
	$\overline{ACK}$ $V_{CC} = 4.5\text{ V}$ , $I_{OL} = 24\text{ mA}$					0.32	0.5	
	$V_{CC} = 4.5\text{ V}$ , $I_{OL} = 32\text{ mA}$		0.34	0.5		0.34	0.5	
$I_I$	$V_{CC} = 5.5\text{ V}$ , $V_I = 5.5\text{ V}$			0.1			0.1	mA
$I_{IH}$	$Q^{\ddagger}$ All other			-250			-250	$\mu\text{A}$
	$V_{CC} = 5.5\text{ V}$ , $V_I = 2.4\text{ V}$			20			20	
$I_{IL}$	$Q^{\ddagger}$ All other			-2			-1	mA
	$V_{CC} = 5.5\text{ V}$ , $V_I = 0.5\text{ V}$			-0.6			-0.6	
$I_{OS}^{\S}$	$V_{CC} = 5.5\text{ V}$ , $V_O = 0\text{ V}$	-60		-150	-60		-150	mA
$I_{CC}$	$\overline{ALS29806}$ $\overline{ALS29809}$		14	22		14	22	mA
	See Note 1		10	20		10	20	

<sup>†</sup> All typical values are at  $V_{CC} = 5\text{ V}$ ,  $T_A = 25^\circ\text{C}$ .

<sup>‡</sup> All Q inputs have internal pull-up resistors of 27 k $\Omega$  nominal.

<sup>§</sup> 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  $\overline{Q}$  grounded and P and Q at 4.5 V.

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

**switching characteristics**

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V <sub>CC</sub> = 5 V, C <sub>L</sub> = 50 pF, R <sub>L</sub> = (see Figure 1), T <sub>A</sub> = 25 °C			V <sub>CC</sub> = 4.5 V to 5.5 V, C <sub>L</sub> = 50 pF, R <sub>L</sub> = (see Figure 1), T <sub>A</sub> = MIN to MAX			UNIT	
			ALS29806 ALS29809			SN54ALS29806 SN54ALS29809		SN74ALS29806 SN74ALS29809		
			MIN	TYP	MAX	MIN	MAX	MIN		MAX
t <sub>PLH</sub>	P or Q	$\overline{P} = \overline{Q}$	8	11	3	15	3	13	ns	
t <sub>PHL</sub>			7	10	2	13	2	11		
t <sub>PLH</sub>	P or Q	Y	9	11	3	17	3	13	ns	
t <sub>PHL</sub>			9	12	5	17	5	14		
t <sub>PLH</sub>	$\overline{Q}$	$\overline{P} = \overline{Q}$	9	12	3	15	3	14	ns	
t <sub>PHL</sub>			7	10	2	14	2	12		
t <sub>PLH</sub>	$\overline{Q}$	Y	8	11	3	17	3	15	ns	
t <sub>PHL</sub>			10	13	5	19	5	16		
t <sub>PLH</sub>	S0 or S1	Y	6	10	2	15	2	13	ns	
t <sub>PHL</sub>			8	11	2	15	2	13		
t <sub>PLH</sub>	P or Q	$\overline{ACK}$	11	14	5	22	5	17	ns	
t <sub>PHL</sub>			10	13	4	18	4	16		
t <sub>PLH</sub>	$\overline{Q}$	$\overline{ACK}$	10	14	5	22	5	17	ns	
t <sub>PHL</sub>			10	14	4	19	4	17		
t <sub>PLH</sub>	$\overline{C}$	$\overline{ACK}$	8	11	3	21	3	18	ns	
t <sub>PHL</sub>			7	11	3	17	3	15		

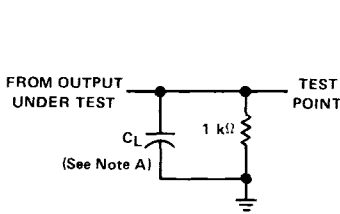
**2**

**ALS and AS Circuits**

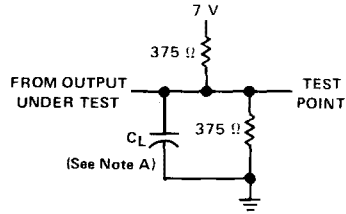


**SN54ALS29806, SN54ALS29809  
 SN74ALS29806, SN74ALS29809  
 COMPARATOR AND 2- TO 4-BIT DECODER**

**PARAMETER MEASUREMENT INFORMATION**

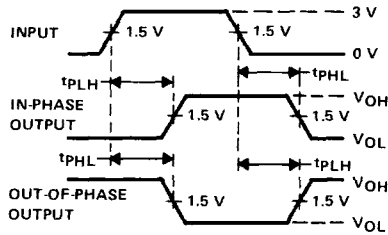


**LOAD CIRCUIT FOR  
 $\overline{P-Q}$  AND Y OUTPUTS**



**LOAD CIRCUIT FOR  
 $\overline{ACK}$  OUTPUT**

NOTE A:  $C_L$  includes probe and jig capacitance.



**VOLTAGE WAVEFORMS  
 PROPAGATION DELAY TIMES**

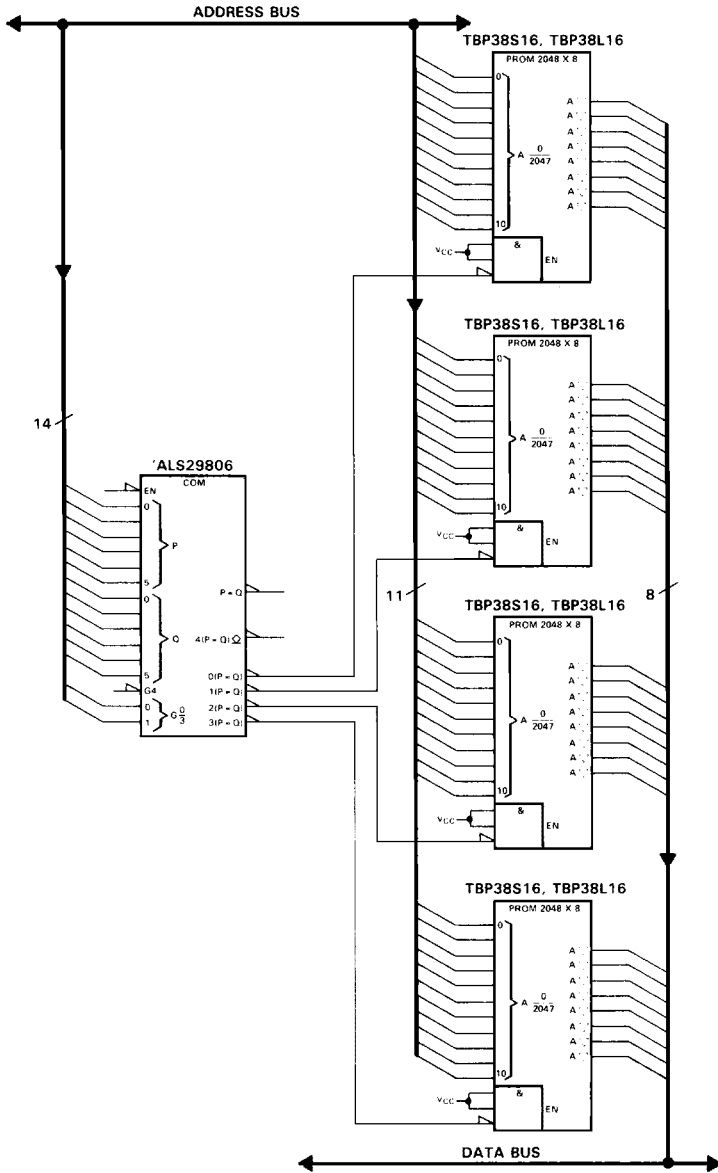
**FIGURE 1**

**2**

**ALS and AS Circuits**

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

**TYPICAL APPLICATION**



**FIGURE 2. MEMORY BANK DECODER**



# 2

## ALS and AS Circuits