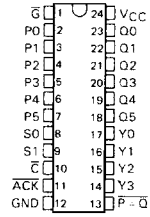
- **'ALS29806 is a 6-Bit Identity Comparator Controlling a 2- to 4-Bit Decoder**
- **'ALS29809 is a 9-Bit Identity Comparator**
- **Low Power Dissipation . . . 50 mW Typical**
- **'ALS29806 and 'ALS29809 are Functionally Equivalent to AM29806 and AM29809**
- **Internal Pull-Up Resistor on Q Inputs**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

description

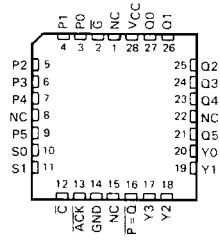
The 'ALS29806 and 'ALS29809 are 6-bit and 9-bit comparators, respectively. The 'ALS29806 and 'ALS29809 compare two data words applied to the P and Q inputs. When the two words are identical, the $\overline{P=Q}$ output goes low. Both devices feature an open-collector acknowledge ($\overline{ACK}$) output 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.

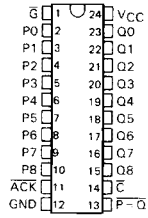
SN54ALS29806 . . . JT PACKAGE
SN74ALS29806 . . . DW OR NT PACKAGE
(TOP VIEW)



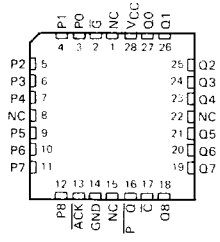
SN54ALS29806 . . . FK PACKAGE
SN74ALS29806 . . . FN PACKAGE
(TOP VIEW)



SN54ALS29809 . . . JT PACKAGE
SN74ALS29809 . . . DW OR NT PACKAGE
(TOP VIEW)



SN54ALS29809 . . . FK PACKAGE
SN74ALS29809 . . . FN PACKAGE
(TOP VIEW)



NC – No internal connection

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

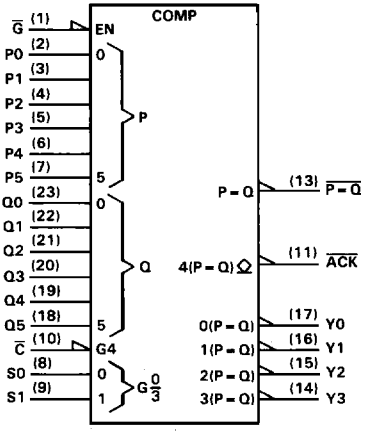
INPUTS			OUTPUTS	
$\overline{G}$	P,Q	$\overline{C}$	$\overline{P=Q}$	$\overline{ACK}$
H	X	X	H	H
X	P≠Q	X	H	H
L	P=Q	L	L	L
L	P=Q	H	L	H

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≠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

logic symbol†

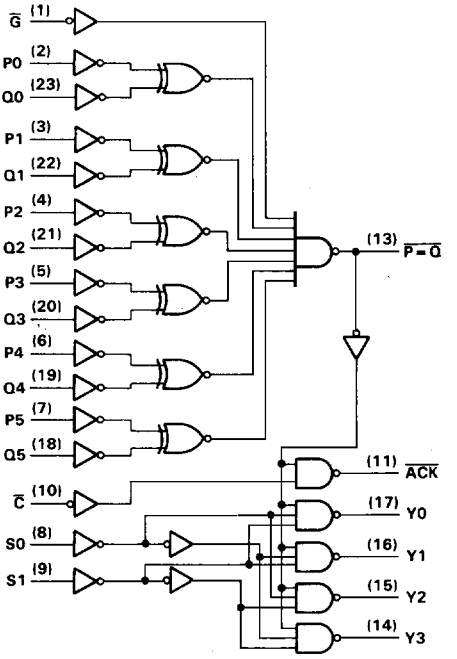
'ALS29806



†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)

'ALS29806



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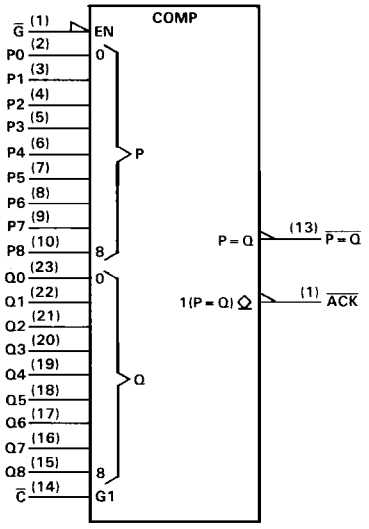
FUNCTION TABLE

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

logic symbol†

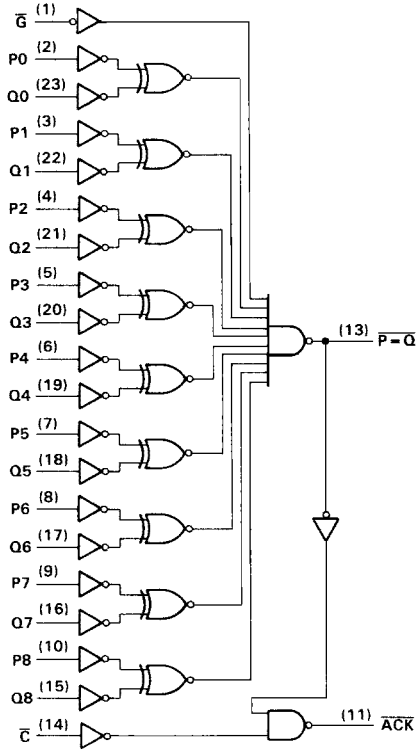
'ALS29809



†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)

'ALS29809



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 SN54ALS29809			SN74ALS29806 SN74ALS29809			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
V_{OH}	High-level output voltage	$\overline{ACK}$			5.5			5.5	V
I_{OH}	High-level output current	$\overline{P=Q}$, Y			−3			−3	mA
I_{OL}	Low-level output current	$\overline{ACK}$			32			32	mA
		$\overline{P=Q}$, Y			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 SN54ALS29809			SN74ALS29806 SN74ALS29809			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}−2.2			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
		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‡	V_{CC} = 5.5 V,	V_I = 2.4 V			−250			−250	µA
	All other					20			20	
I_{IL}	Q‡	V_{CC} = 5.5 V,	V_I = 0.5 V			−2			−1	mA
	All other					−0.6			−0.6	
I_{OS}§		V_{CC} = 5.5 V,	V_O = 0 V	−60		−150	−60		−150	mA
I_{CC}	'ALS29806	V_{CC} = 5.5 V,	See Note 1		14	22		14	22	mA
	'ALS29809				10	20		10	20	

† All typical values are at V_{CC} = 5 V, T_A = 25°C.
‡ All Q inputs have internal pull-up resistors of 27 kΩ 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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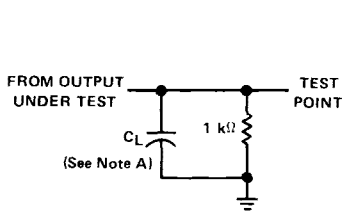
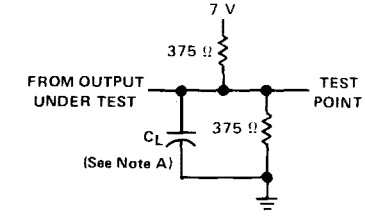
switching characteristics

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

PARAMETER MEASUREMENT INFORMATION

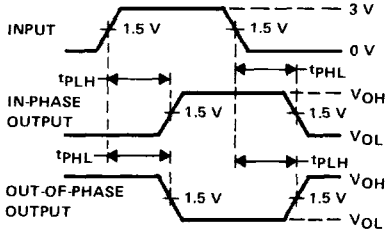


LOAD CIRCUIT FOR
$\overline{P=Q}$ AND Y OUTPUTS



LOAD CIRCUIT FOR
$\overline{ACK}$ OUTPUT

NOTE A: C_L includes probe and jig capacitance.



VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES

FIGURE 1

TYPICAL APPLICATION

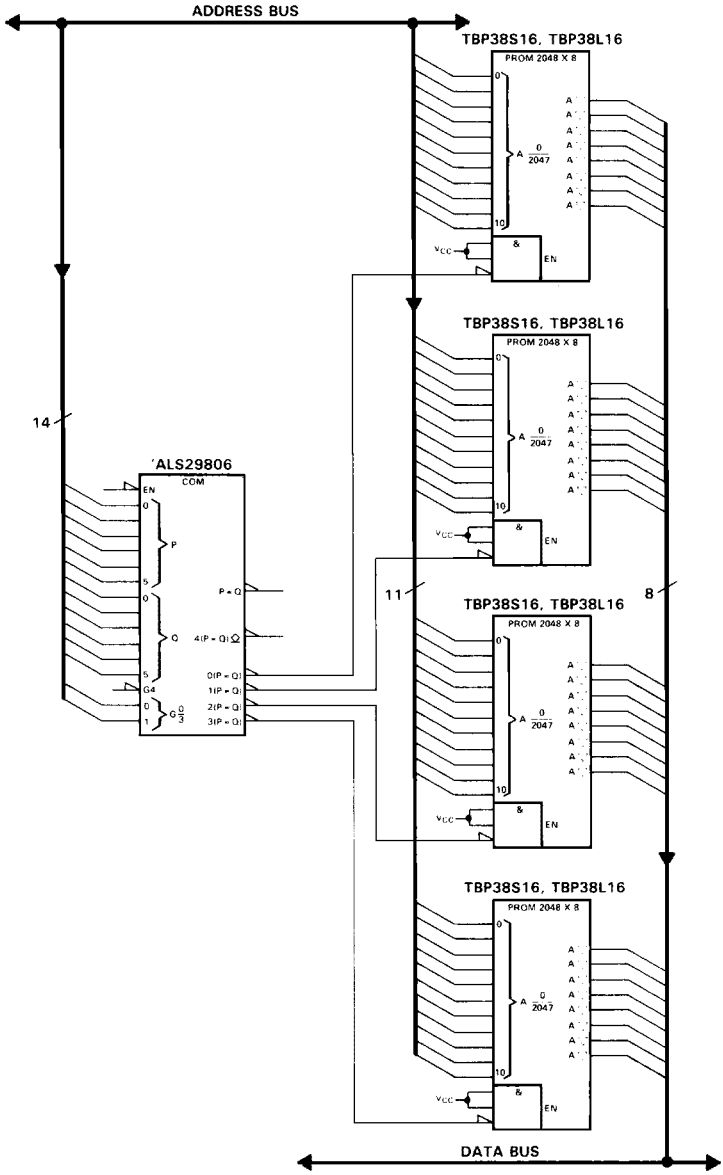


FIGURE 2. MEMORY BANK DECODER