- Can Be Programmed and Verified on Most Incoming Test Equipment
- Reduces Board and Package Size for Similar Fixed Comparator Functions
- High-Speed Address Recognition
- Package Options Include Both Plastic and Ceramic Chip Carriers in Addition to Plastic and Ceramic DIPs
- Dependable Texas Instruments Quality and Reliability

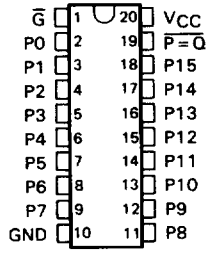
Programming Capabilities

'ALS526 — Fuse Programmable 16-Bit Identity Comparator

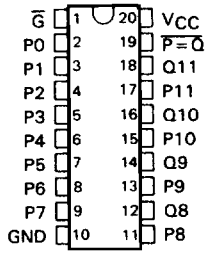
'ALS527 — Fuse Programmable 8-Bit Identity Comparator and 4-Bit Comparator

'ALS528 — Fuse Programmable 12-Bit Identity Comparator

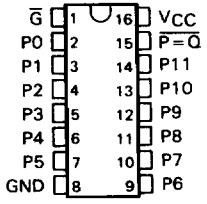
SN54ALS526 . . . J PACKAGE
SN74ALS526 . . . N PACKAGE
(TOP VIEW)



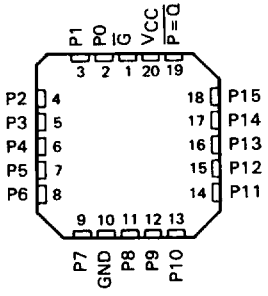
SN54ALS527 . . . J PACKAGE
SN74ALS527 . . . N PACKAGE
(TOP VIEW)



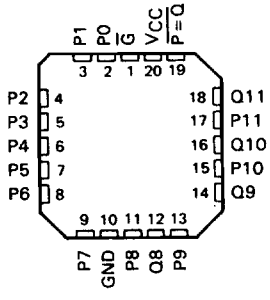
SN54ALS528 . . . J PACKAGE
SN54ALS528 . . . N PACKAGE
(TOP VIEW)



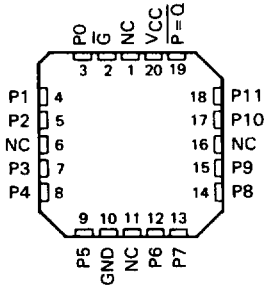
SN54ALS526 . . . FH PACKAGE
SN54ALS526 . . . FN PACKAGE
(TOP VIEW)



SN54ALS527 . . . FH PACKAGE
SN74ALS527 . . . FN PACKAGE
(TOP VIEW)



SN54ALS528 . . . FH PACKAGE
SN74ALS528 . . . FN PACKAGE
(TOP VIEW)



NC—No internal connection

2

ALS AND AS CIRCUITS

PRODUCT PREVIEW

This document contains information on a product under development. Texas Instruments reserves the right to change or discontinue this product without notice.

description

The 'ALS526 and 'ALS528 are fuse-programmable identity comparators designed for easy programming in fixed-comparator applications. The 'ALS526 compares a 16-bit data word against a preprogrammed 16-bit data word while the 'ALS528 compares a 12-bit data word against a preprogrammed 12-bit data word. The $\overline{P=Q}$ output will go low when the applied data word (P inputs) matches the preprogrammed data word (Q represents the preprogrammed data word). Programming is easily accomplished on the bench or with conventional automatic test equipment. Special equipment such as PROM-programmers are not required.

The 'ALS527 is a combination of an 8-bit fuse-programmable comparator and a conventional 4-bit comparator. For the $\overline{P=Q}$ output to go low, the applied data word P0 through P7 must match the preprogrammed data word Q0 through Q7, and the applied data word P8 through P11 must match the applied data word Q8 through Q11.

The SN54ALS526, SN54ALS527, and SN54ALS528 are characterized for operation over the full military temperature range of −55°C to 125°C. The SN74ALS526, SN74ALS527, and SN74ALS528 are characterized for operation from 0°C to 70°C.

programming details

Before any fuses are blown, the inputs are programmed to recognize a low logic level. Therefore, only the bits that are to be programmed to recognize a high logic level require a fuse to be blown. A fuse is easily blown by applying 12 volts (V_{IHH}) to the desired P input pin and also to the $\overline{G}$ input. This permanently programs the pin to recognize a high. Only one input pin should be programmed at a time.

verification details

Before the device is programmed, all of the fuses are intact. In this condition, the $\overline{P=Q}$ output should go low only if lows are applied to all the P inputs. On the 'ALS527, the same is true for the P0 and P7 inputs, but in addition, the P8 through P11 inputs must match the Q8 through Q11 inputs.

It is possible to check the fuse circuitry before actually blowing it in the following manner. By placing a high (V_{IH}) at the desired P input pin while leaving a low on the $\overline{G}$ input, the $\overline{P=Q}$ output should be high. If the P input is then taken to V_{IHH}, the $\overline{P=Q}$ output should go low assuming all other P inputs are at a high level (V_{IH}).

In this condition, the fuse will not be blown as long as $\overline{G}$ is at V_{IL}. When $\overline{G}$ is taken to V_{IHH}, the fuse will be blown and the input will be permanently programmed to recognize a high logic level. The timing diagram in Figure 1 shows the recommended programming sequence. After all desired input pins have been programmed, it is easy to verify the device by applying the programmed data word and checking to be sure that the $\overline{P=Q}$ output is low.

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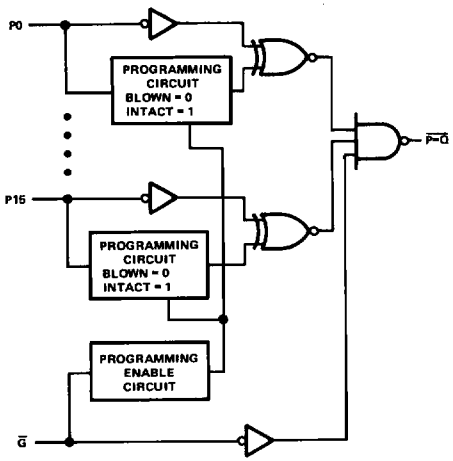
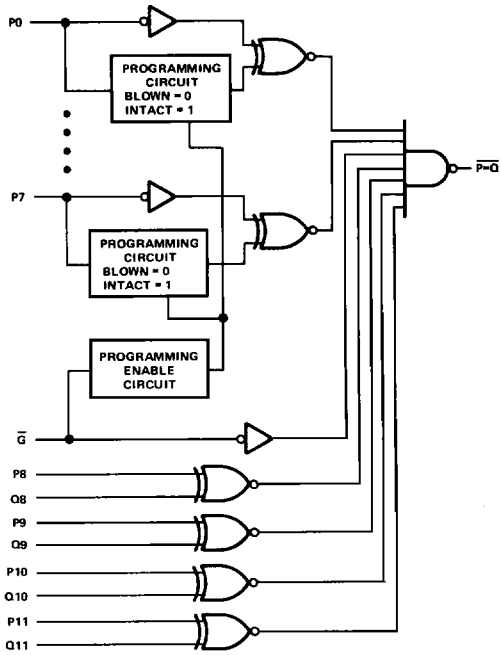
logic diagrams (positive logic)

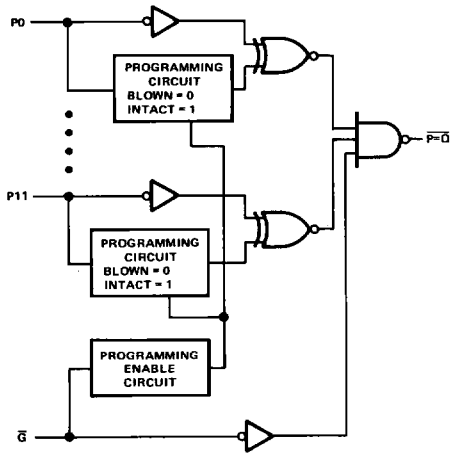
'ALS526



'ALS527



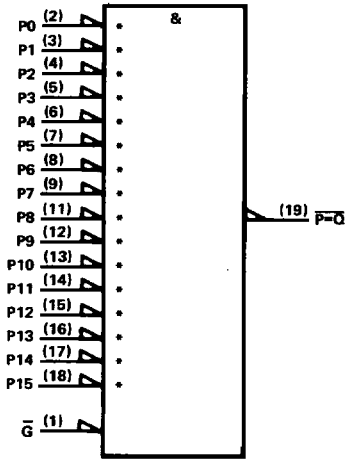
'ALS528



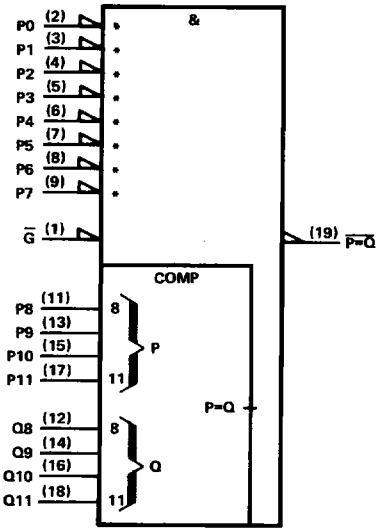
Pin numbers shown are for J and N packages.

logic symbols

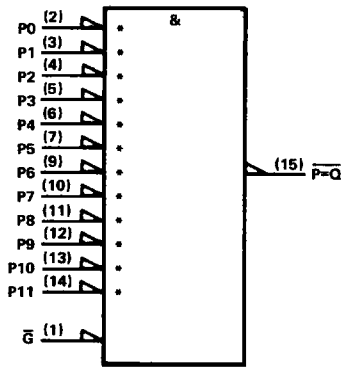
'ALS526



'ALS527



'ALS528



*These inputs can be programmed to be active high. The asterisk is not a part of the symbol. For a correct symbol for the programmed device, delete the polarity symbol ( ) at any input whose programming fuse has been blown.

Pin numbers shown are for J and N packages.

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

Supply voltage, V_{CC} (see Note 1) . . . . . 7 V
Input voltage (see Note 1) . . . . . 5.5 V
Operating free-air temperature range: SN54ALS' . . . . . −55°C to 125°C
SN74ALS' . . . . . 0°CC to 70°C
Storage temperature range . . . . . −65°C to 150°C

NOTE 1: These ratings apply except for programming pins during a programming cycle.

recommended operating conditions

		SN54ALS'			SN74ALS'			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		5.5	2		5.5	V
V_{IL}	Low-level input voltage			0.8			0.8	V
I_{OH}	High-level output current			−1			−2.6	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		SN54ALS'			SN74ALS'			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
		V_{CC} = 4.5 V,	I_{OH} = −1 mA	2.4	3					
		V_{CC} = 4.5 V,	I_{OH} = −2.6 mA				2.4	2.9		
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					0.36	0.5	
I_I		V_{CC} = 5.5 V,	V_I = 5.5 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_{IL} = 0.4 V			−0.2			−0.2	mA
I_O‡		V_{CC} = 5.5 V,	V_O = 2.25 V	−30		−130	−30		−130	mA
I_{CC}	'ALS526	V_{CC} = 5.5 V, All P inputs at 4.5 V, $\overline{G}$ input at GND			14			14		mA
	'ALS527				13			13		
	'ALS528				13			13		

†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 tue short-circuit output current, I_{OS}.

switching characteristics (see Note 2)

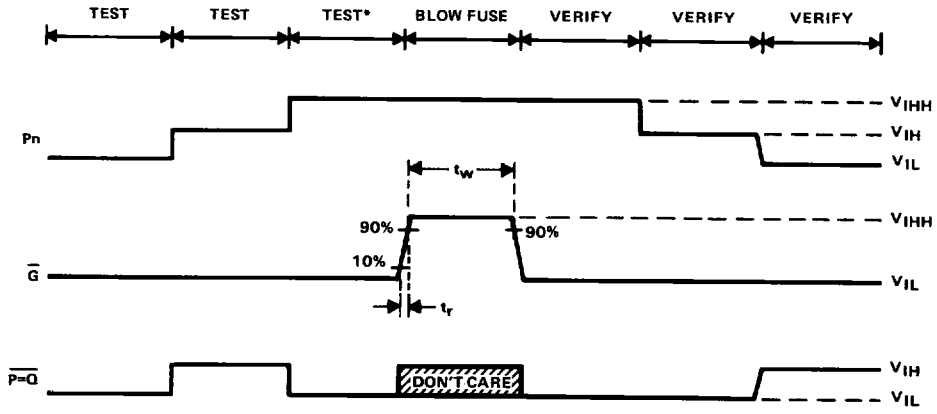
PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 4.5 V to 5.5 V, C_L = 50 pF, R_L = 500 Ω, T_A = MIN to MAX						UNIT
			SN54ALS'			SN74ALS'			
			MIN	TYP†	MAX	MIN	TYP†	MAX	
t_{PLH}	P or Q	$\overline{P=Q}$		8			8		ns
t_{PHL}				9			9		
t_{PLH}	$\overline{G}$	$\overline{P=Q}$		6			6		ns
t_{PHL}				6			6		

†All typical values are at V_{CC} = 5 V, T_A = 25°C.
NOTE 2: For load circuit and voltage waveforms, see page 1-12.

programming parameters

	PARAMETER		MIN	MAX	UNIT
V_{IH}	High-level input voltage		2	5.5	V
V_{IL}	Low-level input voltage			0.8	V
V_{IHH}	Program-pulse input voltage		10.5	12	V
V_{CC}	Supply voltage		5	7	V
I_{IHH}	Program-pulse input current	Pn ($\overline{G}$ low)		2.08	mA
		$\overline{G}$		1.24	
I_{CCHH}	Supply current with V_{IHH} applied	'ALS526			mA
		'ALS527			
		'ALS528			
t_w	Pulse duration, program		10	50	μs
t_r	Rise time, program voltage			10	μs

programming waveforms



*This test is only true if all other P inputs are at V_{IH}.

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