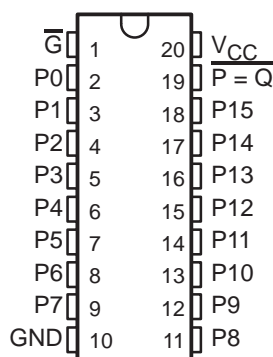


# SN54ALS526, SN54ALS527, SN54ALS528 SN74ALS526, SN74ALS527, SN74ALS528 FUSE-PROGRAMMABLE IDENTITY COMPARATORS

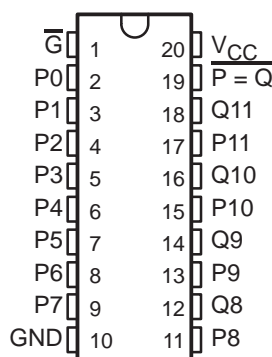
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- Can Be Programmed and Verified on Most Incoming Test Equipment
- Reduces Board and Package Size for Similar Fixed Comparator Functions
- High-Speed Address Recognition
- Package Options Include Plastic Small Outline Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil 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

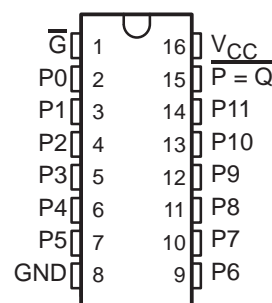
SN54ALS526 . . . J PACKAGE  
SN74ALS526 . . . DW OR N PACKAGE  
(TOP VIEW)



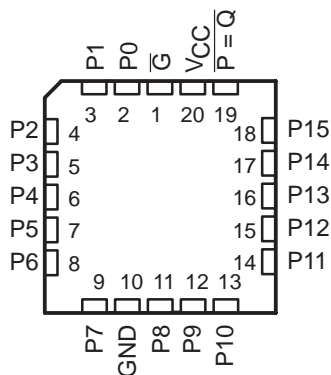
SN54ALS527 . . . J PACKAGE  
SN74ALS527 . . . DW OR N PACKAGE  
(TOP VIEW)



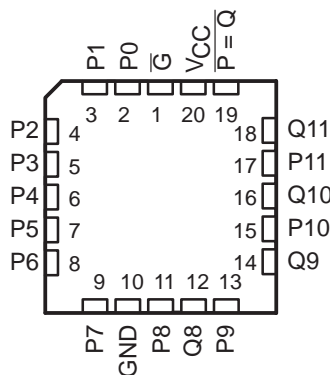
SN54ALS528 . . . J PACKAGE  
SN54ALS528 . . . DW OR N PACKAGE  
(TOP VIEW)



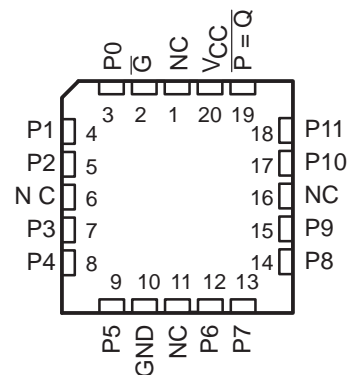
SN54ALS526 . . . FK PACKAGE  
(TOP VIEW)



SN54ALS527 . . . FK PACKAGE  
(TOP VIEW)



SN54ALS528 . . . FK PACKAGE  
(TOP VIEW)



NC—No internal connection

PRODUCTION DATA information is 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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5BASIC



# SN54ALS526, SN54ALS527, SN54ALS528 SN74ALS526, SN74ALS527, SN74ALS528 FUSE-PROGRAMMABLE IDENTITY COMPARATORS

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## 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  $\overline{P} = \overline{Q}$  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  $\overline{P} = \overline{Q}$  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  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The SN74ALS526, SN74ALS527, and SN74ALS528 are characterized for operation from  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

## programming procedure

Before any fuses are blown, the inputs will recognize a low logic level. Therefore, only the bits that are to recognize a high logic level require programming. A fuse is blown by applying 12 volts ( $V_{IH}$ ) to the desired P input 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.

- Step 1. Take  $\overline{G}$  to  $V_{IL}$  and apply  $V_{IH}$  to all P inputs<sup>†</sup>.
- Step 2. Take desired P input to  $V_{IHH}$ , output will be low if the fuse is intact.
- Step 3. Pulse  $\overline{G}$  to  $V_{IHH}$ . After  $\overline{G}$  has returned to  $V_{IL}$ , the output will be high indicating that the fuse is blown.
- Step 4. Take P input back to  $V_{IH}$ . Repeat steps 2 through 4 to program additional inputs.

## verification procedure

These devices can be checked to determine which fuses, if any, are blown. Figure 1 shows how verification can be accomplished during programming.

- Step 1. Take  $\overline{G}$  and all P inputs<sup>†</sup> to  $V_{IL}$ . If the output is low, all fuses are intact.
- Step 2. Take all P inputs<sup>†</sup> to  $V_{IH}$ . The output should be high except when all fuses are blown. If all fuses are blown then the output will be low.
- Step 3. Take test input to  $V_{IHH}$ , leaving other inputs at  $V_{IH}$ . If the output goes low, the fuse is intact. If the output goes high, the fuse is blown.
- Step 4. Take test input back to  $V_{IH}$ . Repeat steps 3 and 4 to test additional inputs.

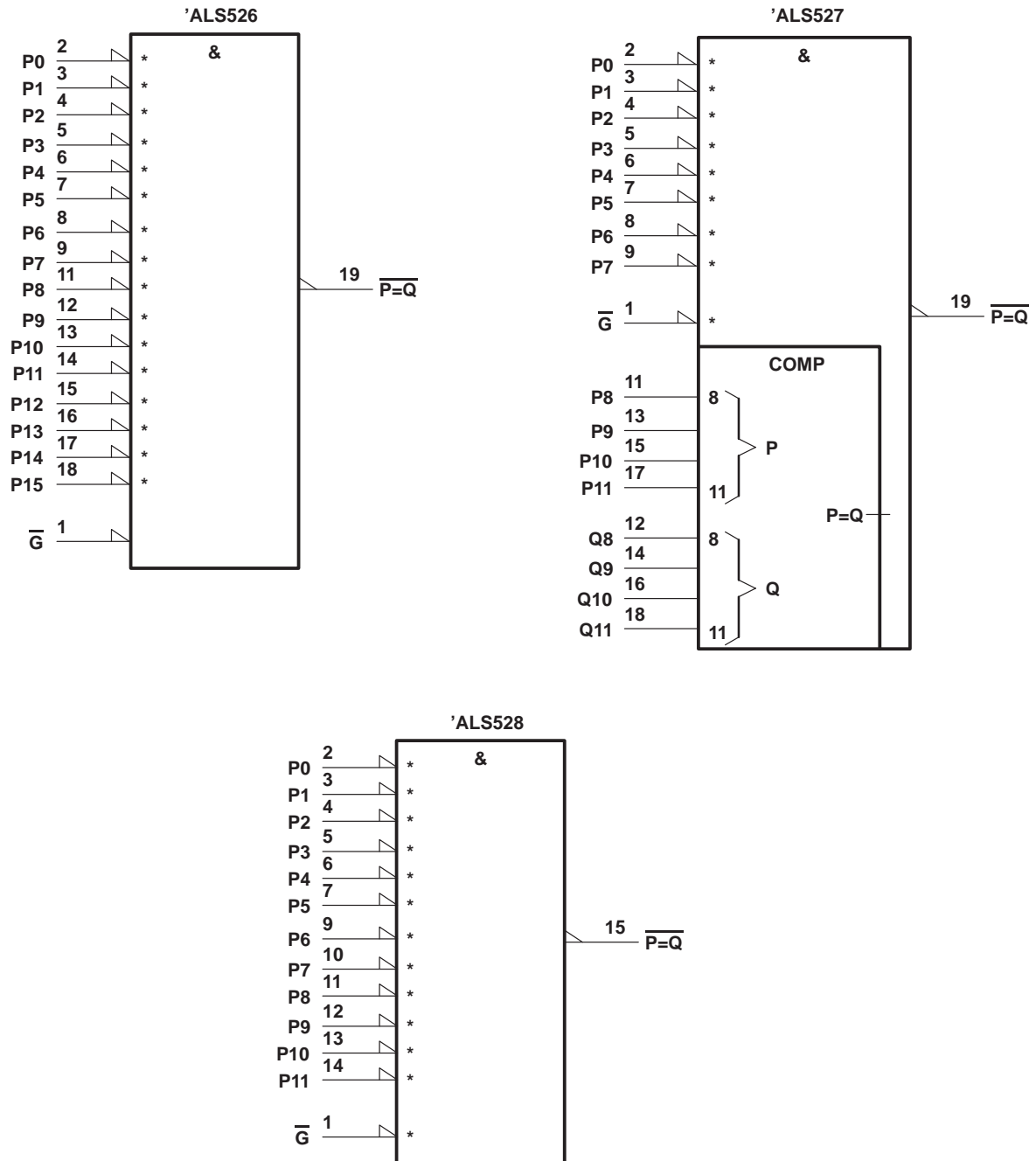
<sup>†</sup> For the 'ALS527, P8 through P11 inputs must match the Q8 through Q11 inputs.



SN54ALS526, SN54ALS527, SN54ALS528  
 SN74ALS526, SN74ALS527, SN74ALS528  
 FUSE-PROGRAMMABLE IDENTITY COMPARATORS

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logic symbols†



† These symbols are in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

Pin numbers shown are for DW, J, and N packages.

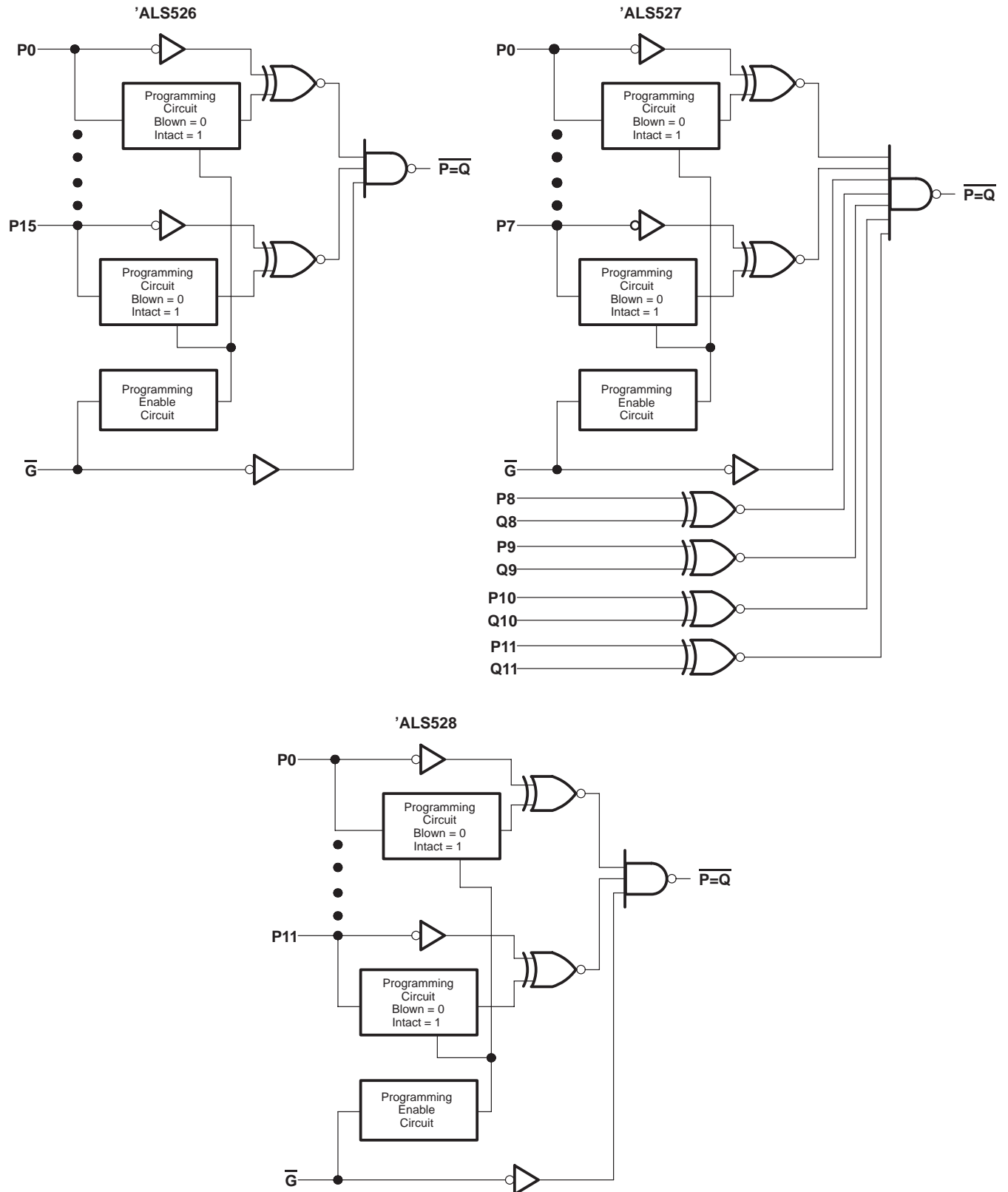
\*These inputs can be programmed to be active high. The asterisk is not a part of the symbol. For a correct symbol for the programmed device, delete the polarity symbol ( $\triangle$ ) at any input whose programming fuse has been blown.



SN54ALS526, SN54ALS527, SN54ALS528  
 SN74ALS526, SN74ALS527, SN74ALS528  
 FUSE-PROGRAMMABLE IDENTITY COMPARATORS

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logic diagrams (positive logic)





SN54ALS526, SN54ALS527, SN54ALS528  
SN74ALS526, SN74ALS527, SN74ALS528  
**FUSE-PROGRAMMABLE IDENTITY COMPARATORS**  
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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)	7 V
Operating free-air temperature range: SN54ALS'	–55°C to 125°C
SN74ALS'	0°C 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			0.7			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					0.35	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, $V_O = 2.7$ V			20			20		μA
$I_{IL}$	$V_{CC} = 5.5$ V, $V_I = 0.4$ V			–0.2			–0.2		mA
$I_{O\ddagger}$	$V_{CC} = 5.5$ V, $V_O = 2.25$ V		–30		–130	–30		–130	mA
$I_{CC}$	'ALS526	$V_{CC} = 5.5$ V, All inputs at 4.5 V		16	27		16	27	mA
	'ALS527			15	24		15	24	
	'ALS528			13	21		13	21	

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

‡ 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 2)**

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V <sub>CC</sub> = 4.5 V to 5.5 V, R <sub>L</sub> = 50 pF, R <sub>L</sub> = 680 Ω, T <sub>A</sub> = MIN to MAX§				UNIT
			SN54ALS'		SN74ALS'		
			MIN	MAX	MIN	MAX	
t <sub>PLH</sub>	P or Q	P = Q	3	18	3	15	ns
t <sub>PHL</sub>			2	15	2	12	
t <sub>PLH</sub>	G	P = Q	2	18	2	15	ns
t <sub>PHL</sub>			2	15	2	12	

§ The conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

NOTE 2: Load circuit and voltage waveforms are shown in Section 1.

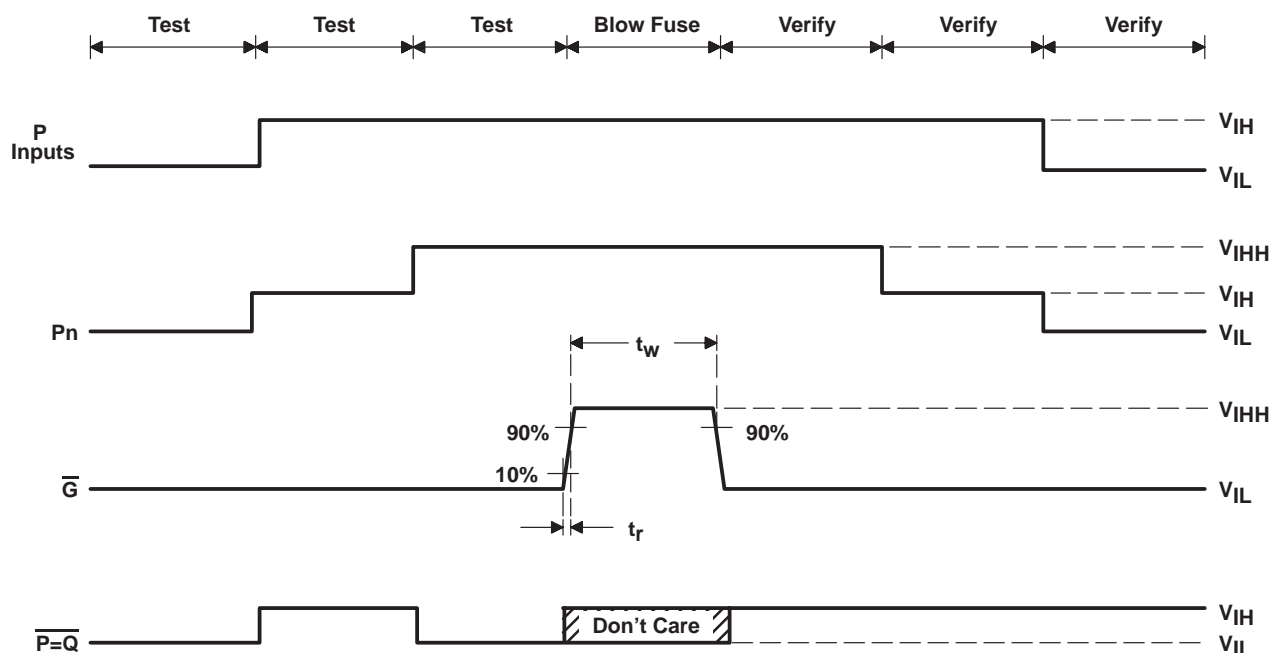


# SN54ALS526, SN54ALS527, SN54ALS528 SN74ALS526, SN74ALS527, SN74ALS528 FUSE-PROGRAMMABLE IDENTITY COMPARATORS

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## 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	11.5	12.5	V
$V_{CC}$	Supply voltage	6.5	7.5	V
$I_{IHH}$	Program-pulse input current	Pin ( $\bar{G}$ low)	10	mA
		$\bar{G}$	1.24	
$I_{CCHH}$	Supply current with $V_{IHH}$ applied	'ALS526	31	mA
		'ALS527	29	
		'ALS528	26	
$t_W$	Pulse duration, program	10	50	$\mu$ s
$t_r$	Rise time, program voltage		10	$\mu$ s



Illustrated above is the following sequence:

- NOTES: A. It is desired to program a particular input to recognize a high level input. With  $\bar{G}$  low and all  $P$  inputs<sup>†</sup> at  $V_{IL}$ , the output is low if no fuses are blown.
- B. With  $\bar{G}$  low and all  $P$  inputs<sup>†</sup> at  $V_{IH}$ , the output is high unless all fuses are blown.
- C. When the desired input is taken to  $V_{IHH}$ , the output goes low if the fuse is intact.
- D.  $\bar{G}$  is pulsed to  $V_{IHH}$  blowing the desired fuse.
- E. After  $\bar{G}$  is low, output will be high indicating that the fuse is blown.
- F. The programmed input returns to  $V_{IH}$ , the output is high unless all fuses have been blown.
- G. All  $P$  inputs<sup>†</sup> are taken to  $V_{IL}$ , the output is high if a fuse has been blown.

<sup>†</sup> For the 'ALS527, P8 through P11 inputs must match the Q8 through Q11 inputs.

Figure 1. Programming Waveforms



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