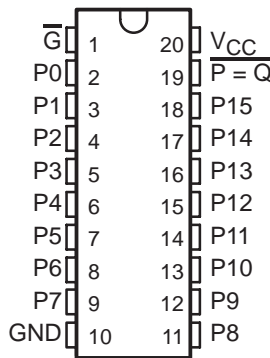


# SN54ALS526, SN54ALS527, SN54ALS528 SN74ALS526, SN74ALS527, SN74ALS528 FUSE-PROGRAMMABLE IDENTITY COMPARATORS

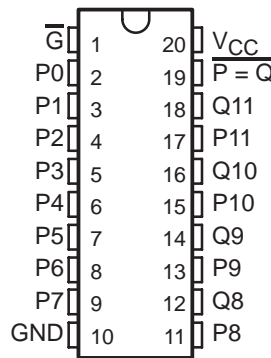
SDAS051A – JUNE 1994 – REVISED MAY 1986

- 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

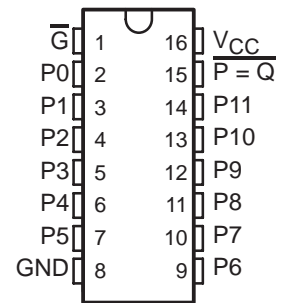
SN54ALS526 . . . J PACKAGE  
SN74ALS526 . . . DW OR N PACKAGE  
(TOP VIEW)



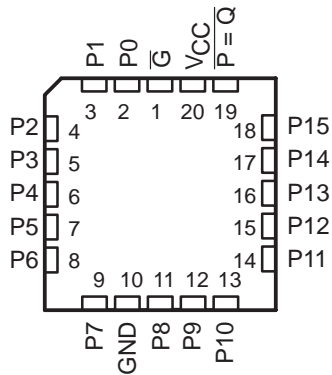
SN54ALS527 . . . J PACKAGE  
SN74ALS527 . . . DW OR N PACKAGE  
(TOP VIEW)



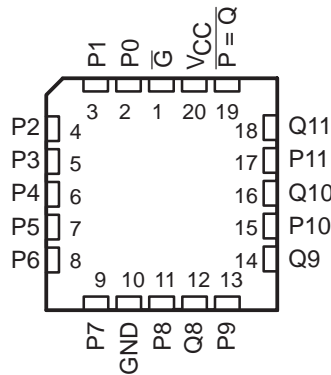
SN54ALS528 . . . J PACKAGE  
SN54ALS528 . . . DW OR N PACKAGE  
(TOP VIEW)



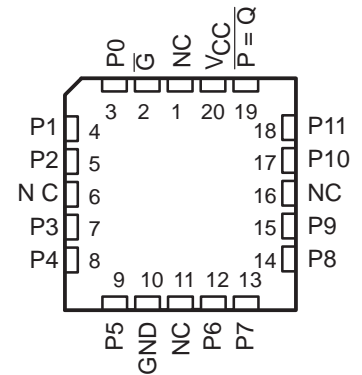
SN54ALS526 . . . FK PACKAGE  
(TOP VIEW)



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.



POST OFFICE BOX 655303 • DALLAS, TEXAS 75265  
POST OFFICE BOX 1443 • HOUSTON, TEXAS 77001

Copyright © 1986, Texas Instruments Incorporated  
5BASIC

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

SDAS051A – JUNE 1984–REVISED MAY 1986

---

## 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  $V_{IH}$ , output will be low if the fuse is intact.
- Step 3. Pulse  $\overline{G}$  to  $V_{IH}$ . 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.

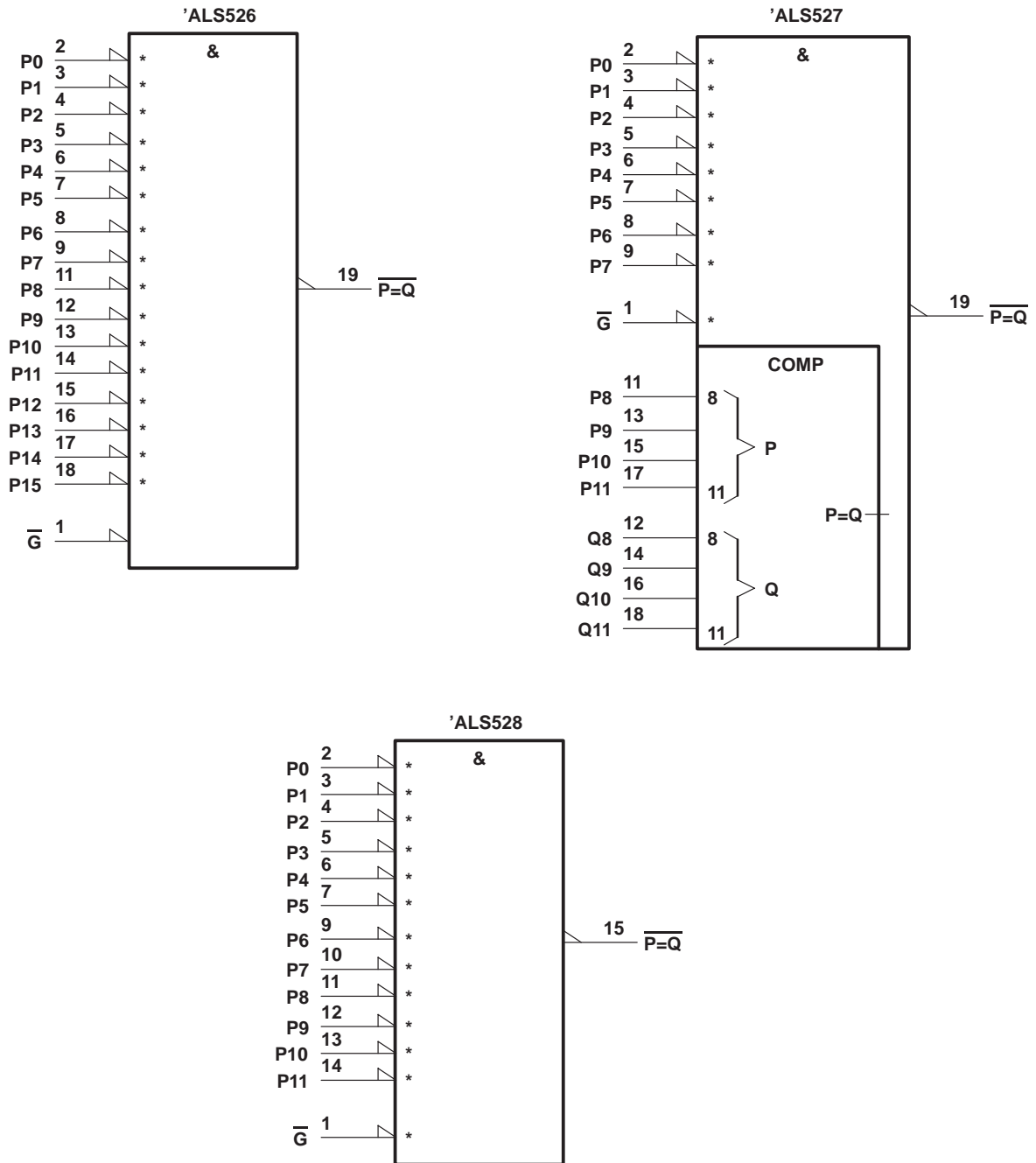
- Step 1. Take  $\overline{G}$  and all P inputs<sup>†</sup> to  $V_{IL}$ . If the output is low, all fuses are intact.
- Step 2. Take all P inputs<sup>†</sup> to  $V_{IH}$ . The output should be high except when all fuses are blown. If all fuses are blown then the output will be low.
- Step 3. Take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

SDAS051A - JUNE 1984-REVISED MAY 1986

## logic symbols†



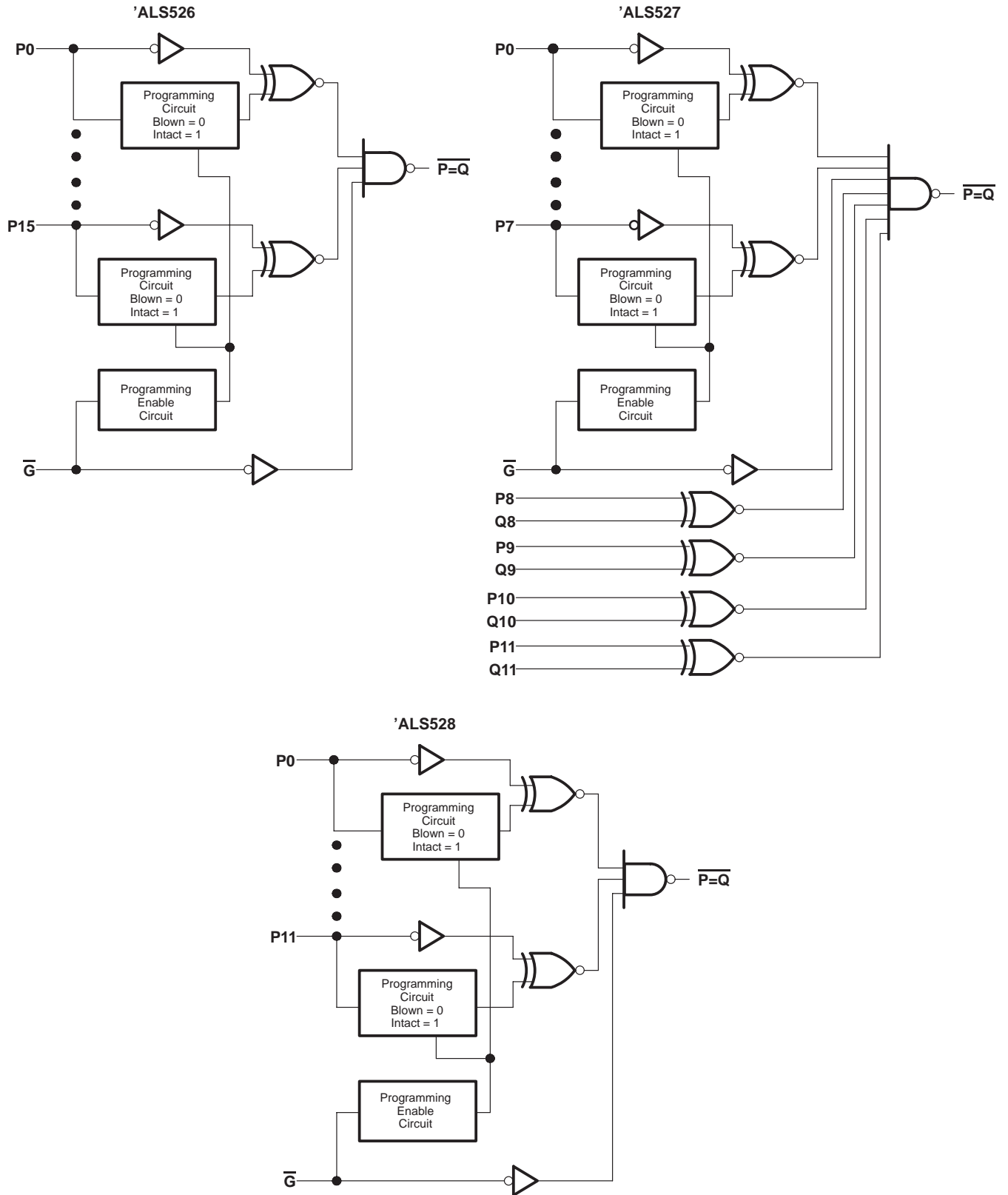
† These symbols are in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12. Pin numbers shown are for DW, J, and N packages.

\*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 ( $\nabla$ ) at any input whose programming fuse has been blown.

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

SDAS051A – JUNE 1984–REVISED MAY 1986

## logic diagrams (positive logic)



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

SDAS051A – JUNE 1984–REVISED MAY 1986

## 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	
$V_{IK}$	$V_{CC} = 4.5\text{ V}$ , $I_I = -18\text{ mA}$			–1.5			–1.5	V
$V_{OH}$	$V_{CC} = 4.5\text{ V to }5.5\text{ V}$ , $I_{OH} = -0.4\text{ mA}$	$V_{CC} - 2$			$V_{CC} - 2$			V
	$V_{CC} = 4.5\text{ V}$ , $I_{OH} = -1\text{ mA}$	2.4	3					
	$V_{CC} = 4.5\text{ V}$ , $I_{OH} = -2.6\text{ mA}$				2.4	2.9		
$V_{OL}$	$V_{CC} = 4.5\text{ V}$ , $I_{OL} = 12\text{ mA}$		0.25	0.4		0.25	0.4	V
	$V_{CC} = 4.5\text{ V}$ , $I_{OL} = 24\text{ mA}$					0.35	0.5	
$I_I$	$V_{CC} = 5.5\text{ V}$ , $V_I = 5.5\text{ V}$			0.1			0.1	mA
$I_{IH}$	$V_{CC} = 5.5\text{ V}$ , $V_O = 2.7\text{ V}$			20			20	μA
$I_{IL}$	$V_{CC} = 5.5\text{ V}$ , $V_I = 0.4\text{ V}$			–0.2			–0.2	mA
$I_{O}^{\ddagger}$	$V_{CC} = 5.5\text{ V}$ , $V_O = 2.25\text{ V}$			–30			–130	mA
$I_{CC}$	$V_{CC} = 5.5\text{ V}$ , All inputs at 4.5 V		16	27		16	27	mA
			15	24		15	24	
			13	21		13	21	

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

‡ 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)	$V_{CC} = 4.5\text{ V to }5.5\text{ V}$ , $R_L = 50\text{ pF}$ , $R_L = 680\ \Omega$ , $T_A = \text{MIN to MAX}^{\S}$				UNIT
			SN54ALS'		SN74ALS'		
			MIN	MAX	MIN	MAX	
$t_{PLH}$	P or Q	$\overline{P = Q}$	3	18	3	15	ns
$t_{PHL}$			2	15	2	12	
$t_{PLH}$	$\overline{G}$	$\overline{P = Q}$	2	18	2	15	ns
$t_{PHL}$			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.

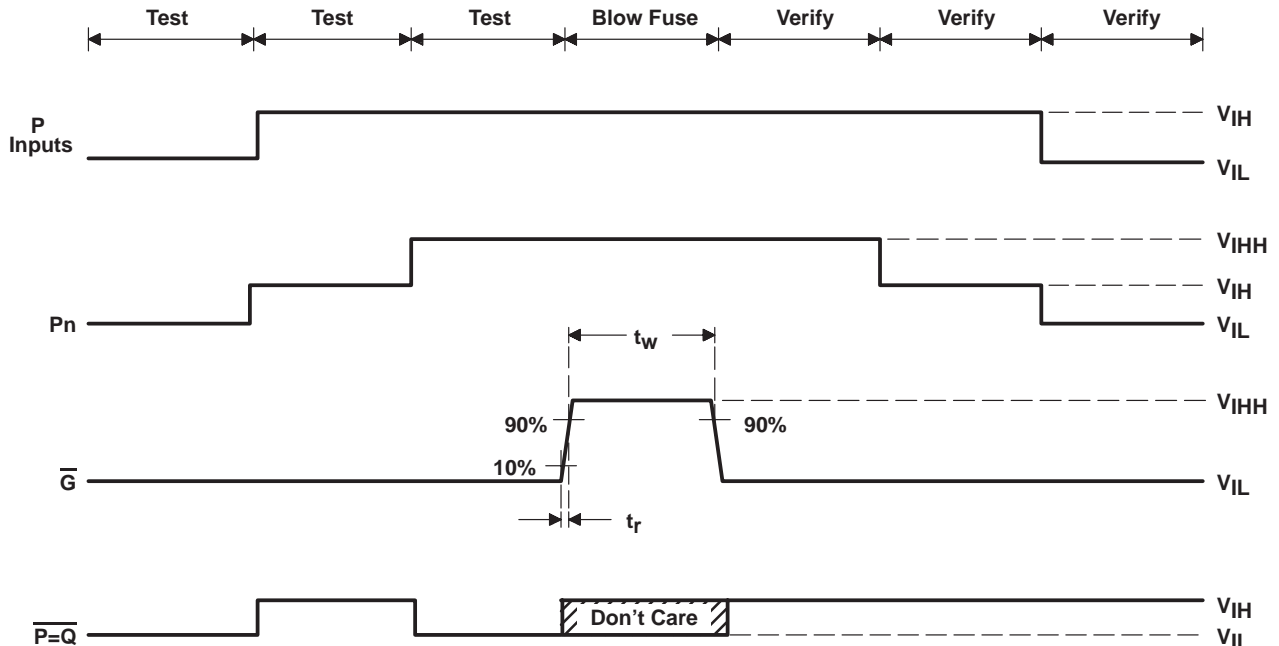


# SN54ALS526, SN54ALS527, SN54ALS528 SN74ALS526, SN74ALS527, SN74ALS528 FUSE-PROGRAMMABLE IDENTITY COMPARATORS

SDAS051A – JUNE 1984–REVISED MAY 1986

## 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

## IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

TI products are not authorized for use in safety-critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, unless officers of the parties have executed an agreement specifically governing such use. Buyers represent that they have all necessary expertise in the safety and regulatory ramifications of their applications, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of TI products in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by TI. Further, Buyers must fully indemnify TI and its representatives against any damages arising out of the use of TI products in such safety-critical applications.

TI products are neither designed nor intended for use in military/aerospace applications or environments unless the TI products are specifically designated by TI as military-grade or "enhanced plastic." Only products designated by TI as military-grade meet military specifications. Buyers acknowledge and agree that any such use of TI products which TI has not designated as military-grade is solely at the Buyer's risk, and that they are solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI products are neither designed nor intended for use in automotive applications or environments unless the specific TI products are designated by TI as compliant with ISO/TS 16949 requirements. Buyers acknowledge and agree that, if they use any non-designated products in automotive applications, TI will not be responsible for any failure to meet such requirements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

### Products

Amplifiers	<a href="http://amplifier.ti.com">amplifier.ti.com</a>
Data Converters	<a href="http://dataconverter.ti.com">dataconverter.ti.com</a>
DSP	<a href="http://dsp.ti.com">dsp.ti.com</a>
Clocks and Timers	<a href="http://www.ti.com/clocks">www.ti.com/clocks</a>
Interface	<a href="http://interface.ti.com">interface.ti.com</a>
Logic	<a href="http://logic.ti.com">logic.ti.com</a>
Power Mgmt	<a href="http://power.ti.com">power.ti.com</a>
Microcontrollers	<a href="http://microcontroller.ti.com">microcontroller.ti.com</a>
RFID	<a href="http://www.ti-rfid.com">www.ti-rfid.com</a>
RF/IF and ZigBee® Solutions	<a href="http://www.ti.com/lprf">www.ti.com/lprf</a>

### Applications

Audio	<a href="http://www.ti.com/audio">www.ti.com/audio</a>
Automotive	<a href="http://www.ti.com/automotive">www.ti.com/automotive</a>
Broadband	<a href="http://www.ti.com/broadband">www.ti.com/broadband</a>
Digital Control	<a href="http://www.ti.com/digitalcontrol">www.ti.com/digitalcontrol</a>
Medical	<a href="http://www.ti.com/medical">www.ti.com/medical</a>
Military	<a href="http://www.ti.com/military">www.ti.com/military</a>
Optical Networking	<a href="http://www.ti.com/opticalnetwork">www.ti.com/opticalnetwork</a>
Security	<a href="http://www.ti.com/security">www.ti.com/security</a>
Telephony	<a href="http://www.ti.com/telephony">www.ti.com/telephony</a>
Video & Imaging	<a href="http://www.ti.com/video">www.ti.com/video</a>
Wireless	<a href="http://www.ti.com/wireless">www.ti.com/wireless</a>

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265  
Copyright © 2008, Texas Instruments Incorporated