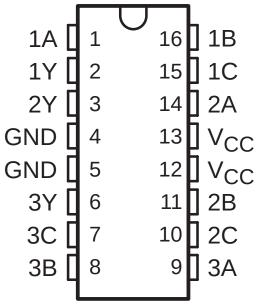
54ACT11027, 74ACT11027
TRIPLE 3-INPUT POSITIVE-NOR GATES

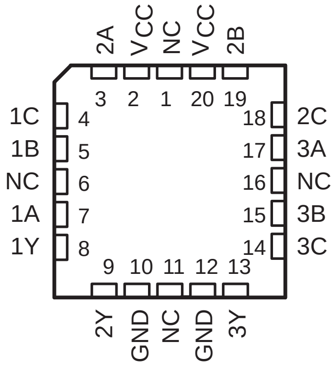
SCAS020A − D2957, JULY 1987 − REVISED APRIL 1993

- **Inputs Are TTL-Voltage Compatible**
- **Flow-Through Architecture Optimizes PCB Layout**
- **Center-Pin V_{CC} and GND Configurations Minimize High-Speed Switching Noise**
- ***EPIC*™ (Enhanced-Performance Implanted CMOS) 1-μm Process**
- **500-mA Typical Latch-Up Immunity at 125°C**
- **Package Options Include Plastic Small-Outline Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs**

54ACT11027 . . . J PACKAGE
74ACT11027 . . . D OR N PACKAGE
(TOP VIEW)



54ACT11027 . . . FK PACKAGE
(TOP VIEW)



NC − No internal connection

description

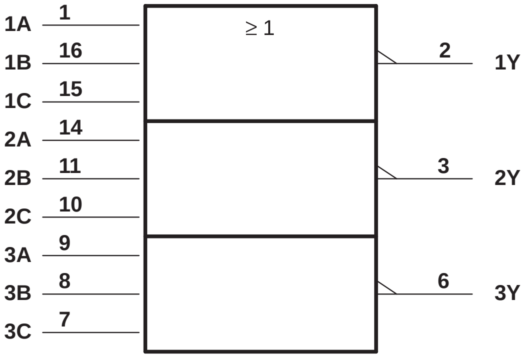
These devices contain three independent 3-input NOR gates. They perform the Boolean functions $Y = \overline{A + B + C}$ or $Y = \overline{A} \bullet \overline{B} \bullet \overline{C}$ in positive logic.

The 54ACT11027 is characterized for operation over the full military temperature range of −55°C to 125°C. The 74ACT11027 is characterized for operation from − 40°C to 85°C.

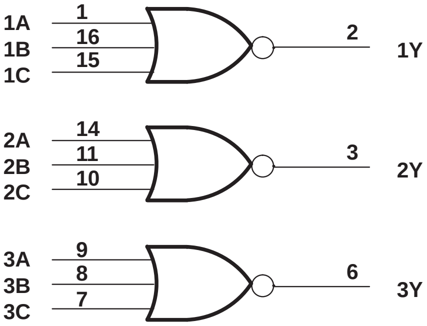
FUNCTION TABLE
(each gate)

INPUTS			OUTPUT
A	**B**	**C**	**Y**
H	X	X	L
X	H	X	L
X	X	H	L
L	L	L	H

logic symbol†



logic diagram (positive logic)



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† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

Pin numbers shown are for the D, J, and N packages.

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TEXAS INSTRUMENTS

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

Supply voltage range, V_{CC}	−0.5 V to 6 V
Input voltage range, V_I (see Note 1)	−0.5 V to V_{CC} + 0.5 V
Output voltage range, V_O (see Note 1)	−0.5 V to V_{CC} + 0.5 V
Input clamp current, I_{IK} ($V_I < 0$ or $V_I > V_{CC}$)	± 20 mA
Output clamp current, I_{OK} ($V_O < 0$ or $V_O > V_{CC}$)	± 50 mA
Continuous output current, I_O (V_O = 0 to V_{CC})	± 50 mA
Continuous current through V_{CC} or GND	± 100 mA
Storage temperature range	− 65°C to 150°C

[†] Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTE 1: The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

recommended operating conditions

		54ACT11027		74ACT11027		UNIT
		MIN	MAX	MIN	MAX	
V_{CC}	Supply voltage	4.5	5.5	4.5	5.5	V
V_{IH}	High-level input voltage	2		2		V
V_{IL}	Low-level input voltage		0.8		0.8	V
V_I	Input voltage	0	V_{CC}	0	V_{CC}	V
V_O	Output voltage	0	V_{CC}	0	V_{CC}	V
I_{OH}	High-level output current		−24		−24	mA
I_{OL}	Low-level output current		24		24	mA
$\Delta t/\Delta v$	Input transition rise or fall rate	0	10	0	10	ns/V
T_A	Operating free-air temperature	−55	125	− 40	85	°C

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS	V_{CC}	T_A = 25°C			54ACT11027		74ACT11027		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V_{OH}	I_{OH} = − 50 µA	4.5 V	4.4			4.4		4.4		V
		5.5 V	5.4			5.4		5.4		
	I_{OH} = − 24 mA	4.5 V	3.94			3.7		3.8		
		5.5 V	4.94			4.7		4.8		
	I_{OH} = − 50 mA[‡]	5.5 V				3.85				
	I_{OH} = − 75 mA[‡]	5.5 V						3.85		
V_{OL}	I_{OL} = 50 µA	4.5 V			0.1		0.1		0.1	V
		5.5 V			0.1		0.1		0.1	
	I_{OL} = 24 mA	4.5 V			0.36		0.5		0.44	
		5.5 V			0.36		0.5		0.44	
	I_{OL} = 50 mA[‡]	5.5 V					1.65			
	I_{OL} = 75 mA[‡]	5.5 V							1.65	
I_I	$V_I = V_{CC}$ or GND	5.5 V			± 0.1		± 1		± 1	µA
I_{CC}	$V_I = V_{CC}$ or GND, $I_O = 0$	5.5 V			4		80		40	µA
ΔI_{CC}[§]	One input at 3.4 V, Other inputs at GND or V_{CC}	5.5 V			0.9		1		1	mA
C_i	$V_I = V_{CC}$ or GND	5 V		3.5						pF

[‡] Not more than one output should be tested at a time, and the duration of the test should not exceed 10 ms.

[§] This is the increase in supply current for each input that is at one of the specified TTL voltage levels rather than 0 V or V_{CC}.

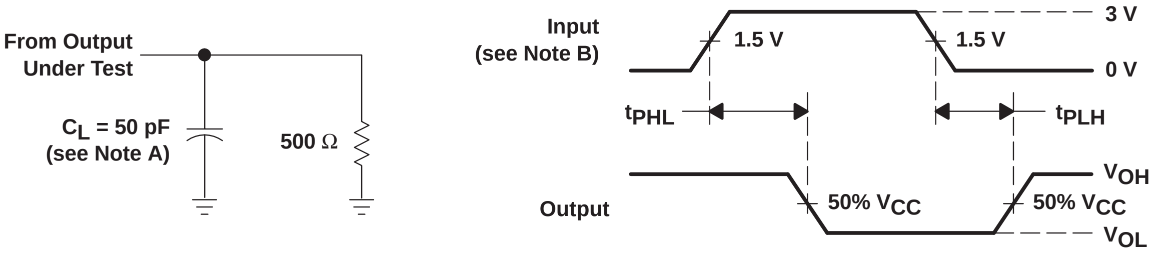
switching characteristics over recommended operating free-air temperature range (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	T_A = 25°C			54ACT11027		74ACT11027		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	Any	Y	1.5	5	9.2	1.5	10.6	1.5	10.1	ns
t_{PHL}			1.5	6	8.6	1.5	10	1.5	9.4	

operating characteristics, V_{CC} = 5 V, T_A = 25°C

PARAMETER		TEST CONDITIONS	TYP	UNIT
C_{pd}	Power dissipation capacitance per gate	C_L = 50 pF, f = 1 MHz	27	pF

PARAMETER MEASUREMENT INFORMATION



LOAD CIRCUIT **VOLTAGE WAVEFORMS**

NOTES:
A. C_L includes probe and jig capacitance.
B. Input pulses are supplied by generators having the following characteristics: PRR ≤ 10 MHz, Z_O = 50 Ω, t_r = 3 ns, t_f = 3 ns.
C. The outputs are measured one at a time with one input transition per measurement.

Figure 1. Load Circuit and Voltage Waveforms

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