

High-Noise-Immunity Logic (HNIL) Summary

general

The High-Noise-Immunity Logic (HNIL) family of integrated circuits is intended for applications requiring a higher degree of inherent electrical noise immunity than is available with more standard forms of integrated circuit logic families. The considerably higher input threshold exhibited by HNIL is obtained by using, in the input circuitry, a reverse-biased base-emitter junction which operates in the avalanche breakdown mode. The relatively slow propagation delays of HNIL also enhance the noise rejection capability of this type of integrated circuit. Buffered outputs on all elements and wide logic swings eliminate the necessity for interface circuitry in most applications. HNIL is ideally suited for industrial and consumer applications requiring maximum noise immunity and excellent line-driving capability. Typical applications include control circuitry in appliances, numerical-control machines, process control, materials handling, and electrostatic copying equipment. The Texas Instruments HNIL integrated circuits are designed to be pin-for-pin replacements for the Amelco series 300 devices. For information concerning availability of additional HNIL circuits and full military temperature range devices, please contact L/CC Product Marketing, Box 5012, M.S. 914, Dallas, Texas 75222, Phone 214-238-3081.

functional index

FUNCTION	OPERATING TEMPERATURE RANGE -30°C to 85°C	PACKAGES* Dual-In-Line	
NAND GATES			
Dual 5-Input NAND Gate (Active Pull-Up)	SN15301	J	N
Quadruple 2-Input NAND Gates (Open-Collector)	SN15302	J	N
	SN15323	J	N
Quadruple 2-Input NAND Gates (Resistive Pull-Up)	SN15303	J	N
	SN15324	J	N
Quadruple 2-Input NAND Gate (Active Pull-Up)	SN15321	J	N
Dual 2-Input, Dual 3-Input NAND Gate (Active Pull-Up)	SN15325	J	N
Dual 2-Input, Dual 3-Input NAND Gate (Resistive Pull-Up)	SN15326	J	N
FLIP-FLOPS			
Dual J-K Flip-Flop	SN15312	J	N
Dual Monostable Multivibrator	SN15342	J	N
Quadruple $\overline{D}\overline{G}$ Flip-Flop	SN15370	J	N

* For outline drawings of all packages, see Section 1.

-SEE ORDERING INSTRUCTIONS PAGE 1-1-

TENTATIVE DATA

This document provides tentative information on a product in the developmental stage. Texas Instruments reserves the right to change or discontinue this product without notice.

TEXAS INSTRUMENTS
INCORPORATED
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SERIES 15300

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

Supply voltage	16.5 V
Input voltage (exclusive of expanders)	16.5 V
Input voltage (expanders)	6 V
Output voltage	16.5 V
Output current at (or below) 25°C free-air temperature:	
SN15301, SN15302	80 mA
All other types	15 mA
Duration of output short-circuit to ground (See Note 1)	unlimited
Operating free-air temperature range	-30°C to 85°C
Storage temperature range	-65°C to 150°C

electrical characteristics over rated operating free-air temperature range

PARAMETER	V _{OH} at I _O = 0	V _{OH} at I _O	I _{OH} at V _O = 13.5 V	V _{OL} at I _O	V _{OL} at I _O	I _{IL} at V _I = 1.8 V	I _{IH} † at V _I = 15 V	I _{CC} ‡ at V _{CC} = 15 V
UNIT	V min	V min mA	μA max	V max mA	V max mA	mA max	μA max	mA max
SN15301	12	8 -15		1.6 50	1.8 75	-1.9	100	40
SN15302			100	0.7 30	1.2 60	-1.9	100	40
SN15303	12	8 -0.3		0.8 40	1.2 60	-1.9	100	43
SN15312	12	8 -5		1.8 9.5		-1.9 -3.8§	100	36
SN15321	12	8 -5		1.6 9.5		-1.9	100	18
SN15323			100	0.6 11		-1.9	100	6
SN15324	12	8 -0.3		0.8 15		-1.9	100	36
SN15325	12	8 -5		1.6 9.5		-1.9	100	18
SN15326	12	8 -0.3		0.8 15		-1.9	100	36
SN15342	12	8 -5		1.8 9.5		-1.9	100	22.5
SN15370	12	8 -0.3		0.6 8.8		-1.9 -3.8#	100	45

Test conditions (unless otherwise specified):	V _{CC}	13.5 V
	V _{IH}	6.75 V
	V _{IL}	5 V
	V _I (I _{IL} test)	1.8 V

† Typically less than 1 μA at 25°C free-air temperature.

‡ Measured with all inputs open.

§ Applies to preset and clear inputs only.

Applies to data input only.

NOTE 1: All outputs may be shorted simultaneously.

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

TEXAS INSTRUMENTS
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switching characteristics

GATES

PARAMETER	t _{PLH}	t _{PHL}
UNIT	ns max	ns max
SN15301	250	200
SN15302	300	200
SN15303	300	200
SN15326	400	150

FLIP-FLOPS

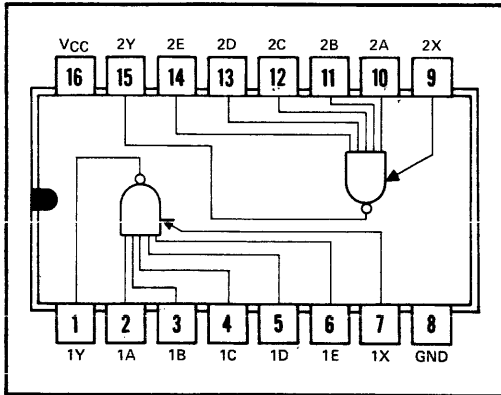
PARAMETER	t _{PLH}	t _{PHL}	TEST CONDITIONS				
			CLOCK	SET	RESET	D	\bar{G}
UNIT	ns max	ns max					
SN15312	200	200					
	150	200					
SN15342	200	150					
SN15370	500	300				6.75 V	
					5 V		
	320					5 V	
	200					5 V	

- NOTES: 1. $V_{CC} = 13.5$ V, high level of pulses is 10 V, low level of pulses is 0 V.
 2. Measurements are made from the 5.5-V point on the input waveform to the 50% point on the output waveform.
 3. Load for SN15301, SN15302, and SN15303 is 2 k Ω to V_{CC} , 50 pF to GND. Load for all other devices is 10 k Ω to V_{CC} , 10 pF to GND.
 4. The output pulse width ($t_w \approx 0.7 RC$) of the SN15342 is determined by an external capacitor, and for precision applications, an external timing resistor which should not exceed 62 k Ω or be less than 2 k Ω . For normal applications the 20 k Ω nominal internal resistor is connected by shorting pin 1 to pin 3 or pin 15 to pin 13.

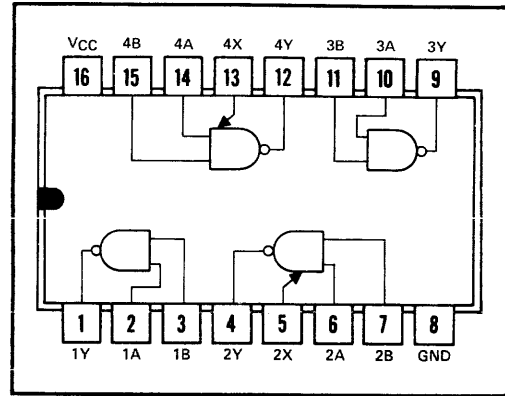
SERIES 15300

terminal assignments, J or N dual-in-line packages (top views)

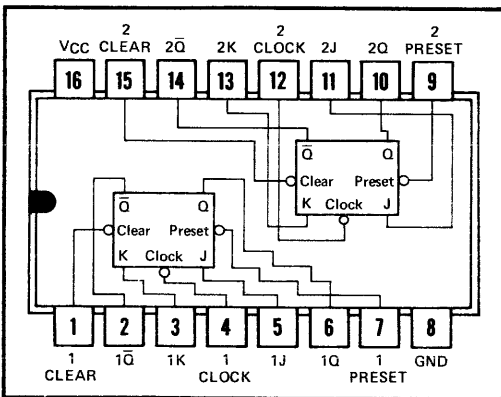
SN15301



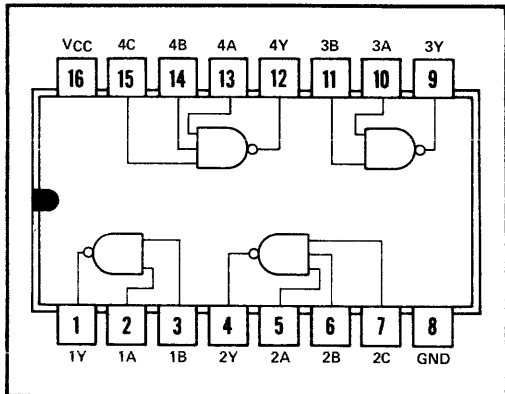
SN15302, SN15303, SN15321, SN15324



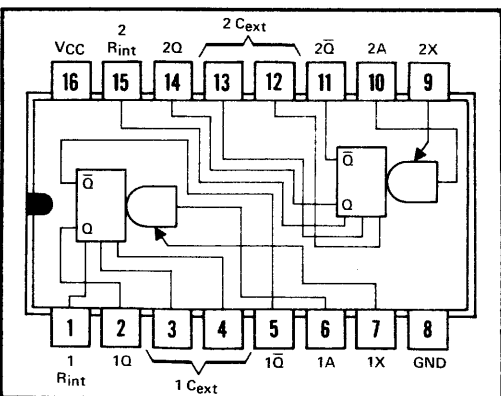
SN15312



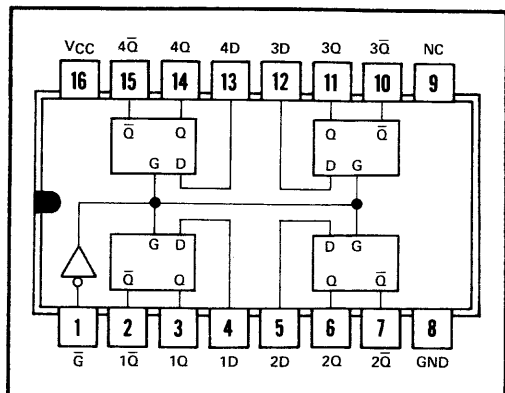
SN15325, SN15326



SN15342



SN15370



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NC—No internal connection