

SN54F64, SN74F64 4-2-3-2 INPUT AND-OR-INVERT GATES

D3178, AUGUST 1988—REVISED JANUARY 1989

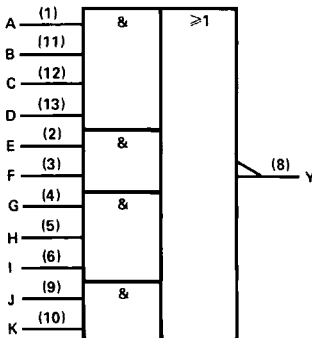
- Package Options Include Plastic "Small Outline" Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs
- Dependable Texas Instruments Quality and Reliability

description

These devices contain 4-2-3-2 input AND-OR-INVERT gates. They perform the Boolean function $Y = \overline{ABCD + EF + GHI + JK}$. The 'F64 has totem-pole outputs.

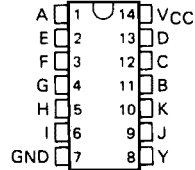
The SN54F64 is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74F64 is characterized for operation from 0°C to 70°C .

logic symbol†

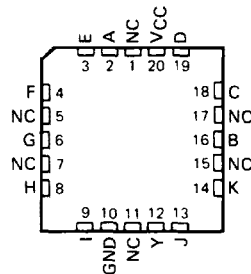


†This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.
Pin numbers shown are for D, J, and N packages.

SN54F64 . . . J PACKAGE
SN74F64 . . . D OR N PACKAGE
(TOP VIEW)

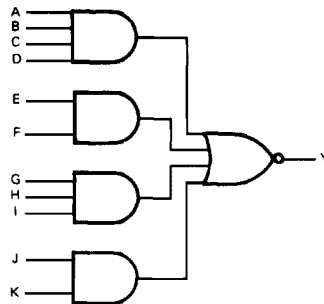


SN54F64 . . . FK PACKAGE
(TOP VIEW)



NC—No internal connection

logic diagram (each device) (positive logic)



SN54F64, SN74F64

4-2-3-2 INPUT AND-OR-INVERT GATES

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

Supply voltage, V_{CC}	-0.5 V to 7 V
Input voltage†	-1.2 V to 7 V
Input current	-30 mA to 5 mA
Voltage applied to any output in the high state	-0.5 V to V_{CC}
Current into any output in the low state	40 mA
Operating free-air temperature range: SN54F64	-55°C to 125°C
SN74F64	0°C to 70°C
Storage temperature range	-65°C to 150°C

†The input voltage ratings may be exceeded provided the input current ratings are observed.

recommended operating conditions

	SN54F64			SN74F64			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			2			V
V_{IL} Low-level input voltage			0.8			0.8	V
I_{IK} Input clamp current			-18			-18	mA
I_{OH} High-level output current			-1			-1	mA
I_{OL} Low-level output current			20			20	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	SN54F64		SN74F64		UNIT		
		MIN	TYP‡	MAX	MIN		TYP‡	MAX
V_{IK}	$V_{CC} = 4.5\text{ V}, I_I = -18\text{ mA}$			-1.2		-1.2	V	
V_{OH}	$V_{CC} = 4.5\text{ V}, I_{OH} = -1\text{ mA}$	2.4	3.4	2.5	3.4		V	
	$V_{CC} = 4.75\text{ V}, I_{OH} = -1\text{ mA}$			2.7				
V_{OL}	$V_{CC} = 4.5\text{ V}, I_{OL} = 20\text{ mA}$		0.30	0.5	0.30	0.5	V	
I_I	$V_{CC} = 5.5\text{ V}, V_I = 7\text{ V}$			0.1		0.1	mA	
I_{IH}	$V_{CC} = 5.5\text{ V}, V_I = 2.7\text{ V}$			20		20	μA	
I_L	$V_{CC} = 5.5\text{ V}, V_I = 0.5\text{ V}$			-0.6		-0.6	mA	
I_{OS}^{\S}	$V_{CC} = 5.5\text{ V}, V_O = 0$			-60	-150	-60	-150	mA
I_{CCH}	$V_{CC} = 5.5\text{ V}, V_I = 0$			1.9	2.8	1.9	2.8	mA
I_{CCL}	$V_{CC} = 5.5\text{ V},$ See Note 1			3.1	4.7	3.1	4.7	mA

switching characteristics (see Note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 5\text{ V}, C_L = 50\text{ pF}, R_L = 500\ \Omega, T_A = 25^\circ\text{C}$						UNIT	
			$V_{CC} = 4.5\text{ V to } 5.5\text{ V}, C_L = 50\text{ pF}, R_L = 500\ \Omega, T_A = \text{MIN to MAX}^{\dagger}$							
			F64		SN54F64		SN74F64			
		MIN	TYP†	MAX	MIN	MAX	MIN	MAX		
t_{PLH}	Any	Y	1.7	4.6	6	1.7	8.5	1.7	7	ns
t_{PHL}			1.2	3.2	4.5	1.2	6.5	1.2	5.5	

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

§ Not more than one output should be shorted at a time and the duration of the short circuit should not exceed one second.

† For conditions shown as MIN or MAX, use the appropriate value specified under Recommended Operating Conditions.

NOTES: 1. I_{CCL} is measured with one input per gate at 4.5 V and all others grounded.

2. Load circuits and waveforms are shown in Section 1.

2

Data Sheets