

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

D3178, AUGUST 1988—REVISED JANUARY 1989

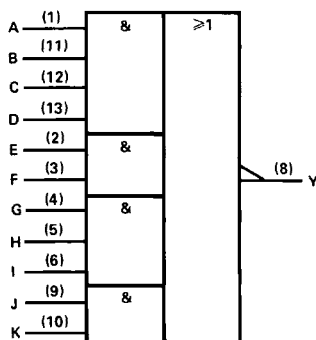
- Package Options Include Plastic "Small Outline" Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs
- Dependable Texas Instruments Quality and Reliability

## 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  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The SN74F64 is characterized for operation from  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

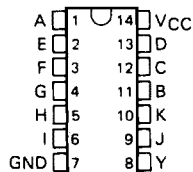
## logic symbol†



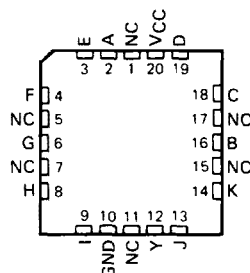
†This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

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

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

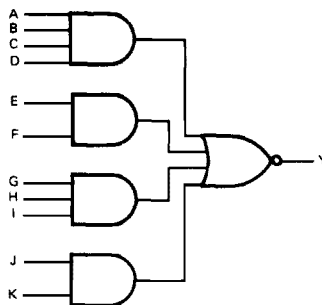


SN54F64 . . . FK PACKAGE  
(TOP VIEW)



NC—No internal connection

## logic diagram (each device) (positive logic)



2

Data Sheets

# 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 <sup>†</sup> .....	-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

<sup>†</sup>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 <sup>‡</sup> MAX	MIN	TYP <sup>‡</sup> 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)	$V_{CC} = 5\text{ V},$ $C_L = 50\text{ pF},$ $R_L = 500\ \Omega,$ $T_A = 25^\circ\text{C}$		$V_{CC} = 4.5\text{ V to }5.5\text{ V},$ $C_L = 50\text{ pF},$ $R_L = 500\ \Omega,$ $T_A = \text{MIN to MAX}^{\dagger}$				UNIT
			F64		SN54F64		SN74F64		
			MIN	TYP <sup>‡</sup> 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	

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

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

<sup>†</sup>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