

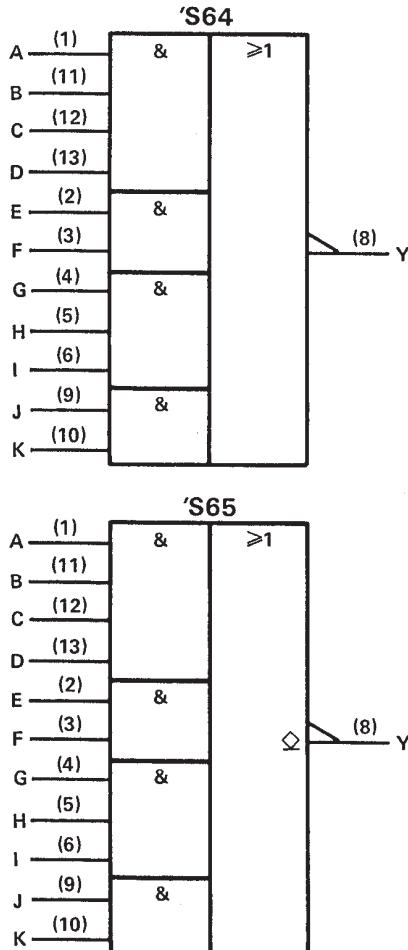
- Package Options Include Plastic "Small Outline" Packages, Ceramic Chip Carriers and Flat Packages, and Plastic and Ceramic DIPs
- Dependable Texas Instruments Quality and Reliability

description

These devices contain 4-2-3-2 input AND-OR-INVERT gates. They perform the Boolean function $Y = ABCD + EF + GHI + JK$. The 'S64 has totem-pole outputs and the 'S65 has open-collector outputs.

The SN54S64 and the SN54S65 are characterized for operation over the full military temperature range of -55°C to 125°C . The SN74S64 and the SN74S65 are characterized for operation from 0°C to 70°C .

logic symbols[†]

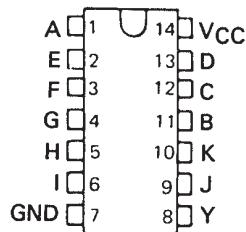


[†]These symbols are in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

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

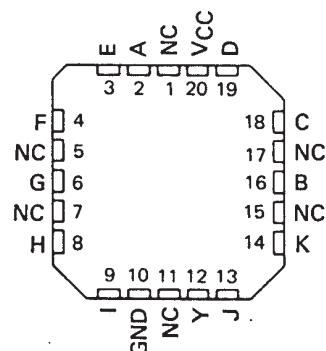
SN54S64, SN54S65 . . . J OR W PACKAGE
SN74S64, SN74S65 . . . D OR N PACKAGE

(TOP VIEW)



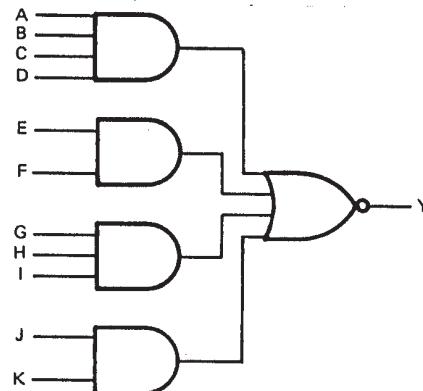
SN54S64, SN54S65 . . . FK PACKAGE

(TOP VIEW)



NC – No internal connection

logic diagram (each device) (positive logic)



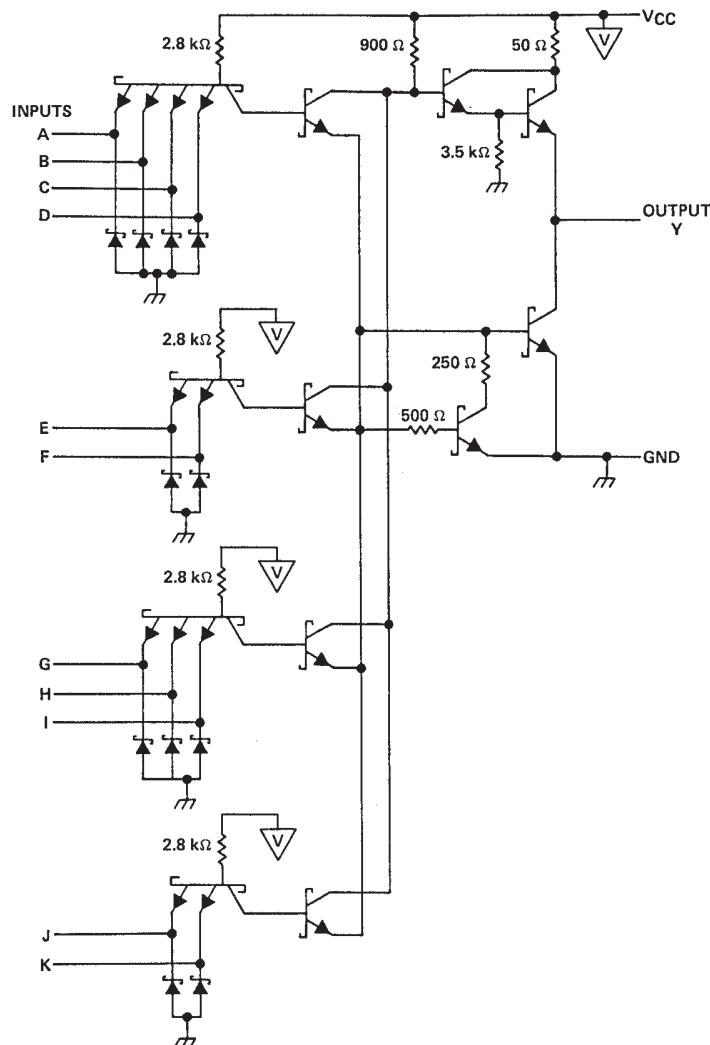
**SN54S64, SN54S65,
SN74S64, SN74S65**

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

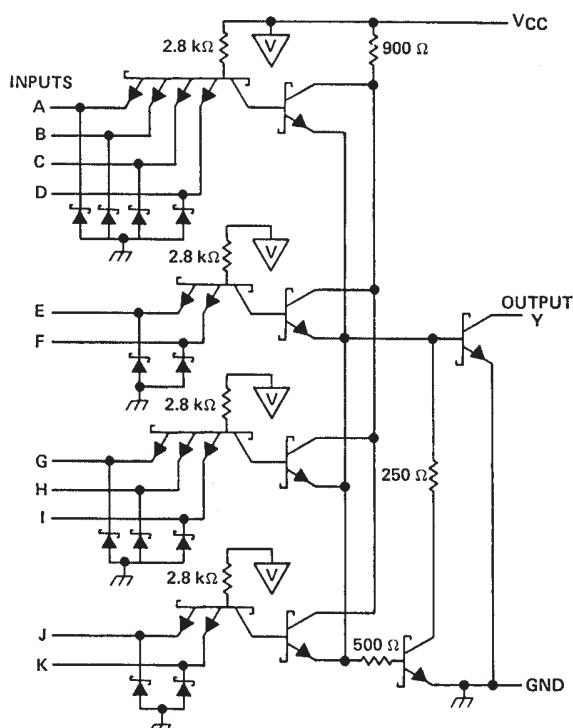
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schematics (each gate)

'S64



'S65



Resistor values shown are nominal and in ohms.

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

recommended operating conditions

		SN54S64			SN74S64			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC}	Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V_{IH}	High-level input voltage		2			2		V
V_{IL}	Low-level input voltage			0.8			0.8	V
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	$^{\circ}\text{C}$

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

PARAMETER	TEST CONDITIONS [†]	SN54S64			SN74S64			UNIT
		MIN	TYP [‡]	MAX	MIN	TYP [‡]	MAX	
V_{IK}	$V_{CC} = \text{MIN}$, $I_I = -18 \text{ mA}$			-1.2			-1.2	V
V_{OH}	$V_{CC} = \text{MIN}$, $V_{IL} = 0.8 \text{ V}$, $I_{OH} = -1 \text{ mA}$	2.5	3.4		2.7	3.4		V
V_{OL}	$V_{CC} = \text{MIN}$, $V_{IH} = 2 \text{ V}$, $I_{OL} = 20 \text{ mA}$			0.5			0.5	V
I_I	$V_{CC} = \text{MAX}$, $V_I = 5.5 \text{ V}$			1			1	mA
I_{IH}	$V_{CC} = \text{MAX}$, $V_I = 2.7 \text{ V}$			50			50	μA
I_{IL}	$V_{CC} = \text{MAX}$, $V_I = 0.5 \text{ V}$			-2			-2	mA
$I_{OS\$}$	$V_{CC} = \text{MAX}$	-40		-100	-40		-100	mA
I_{CCH}	$V_{CC} = \text{MAX}$, $V_I = 0$		7	12.5		7	12.5	mA
I_{CCL}	$V_{CC} = \text{MAX}$, $V_I = 4.5 \text{ V}$		8.5	16		8.5	16	mA

[†] For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

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

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

switching characteristics, $V_{CC} = 5 \text{ V}$, $T_A = 25^{\circ}\text{C}$ (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH}	Any	Y	$R_L = 280 \Omega$, $C_L = 15 \text{ pF}$		3.5	5.5	ns
t_{PHL}					3.5	5.5	ns
t_{PLH}		Y	$R_L = 280 \Omega$, $C_L = 50 \text{ pF}$		5		ns
t_{PHL}					5.5		ns

NOTE 2: Load circuits and voltage waveforms are shown in Section 1.

SN54S65, SN54S65 4-2-3-2 INPUT AND-OR-INVERT GATES

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recommended operating conditions

	SN54S65			SN74S65			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC} Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V_{IH} High-level input voltage	2			2			V
V_{IL} Low-level input voltage			0.8			0.8	V
V_{OH} High-level output voltage			5.5			5.5	V
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 [†]	SN54S65			SN74S65			UNIT
		MIN	TYP [‡]	MAX	MIN	TYP [‡]	MAX	
V_{IK}	$V_{CC} = \text{MIN}$, $I_I = -18 \text{ mA}$			1.2			1.2	V
I_{OH}	$V_{CC} = \text{MIN}$, $V_{IL} = 0.8 \text{ V}$, $V_{OH} = 5.5 \text{ V}$						0.25	mA
	$V_{CC} = \text{MIN}$, $V_{IL} = 0.7 \text{ V}$, $V_{OH} = 5.5 \text{ V}$			0.25				
V_{OL}	$V_{CC} = \text{MIN}$, $V_{IH} = 2 \text{ V}$, $I_{OL} = 20 \text{ mA}$	0.2	0.4		0.2	0.4		V
I_I	$V_{CC} = \text{MAX}$, $V_I = 5.5 \text{ V}$			1			1	mA
I_{IH}	$V_{CC} = \text{MAX}$, $V_I = 2.7 \text{ V}$			50			50	μA
I_{IL}	$V_{CC} = \text{MAX}$, $V_I = 0.5 \text{ V}$			–2			–2	mA
I_{CCH}	$V_{CC} = \text{MAX}$, $V_I = 0$	6	11		6	11		mA
I_{CCL}	$V_{CC} = \text{MAX}$, $V_I = 4.5 \text{ V}$	8.5	16		8.5	16		mA

[†]For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

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

switching characteristics, $V_{CC} = 5 \text{ V}$, $T_A = 25^\circ\text{C}$ (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH}	Any	Y	$R_L = 280 \Omega$, $C_L = 15 \text{ pF}$	2	5	7.5	ns
t_{PHL}				2	5.5	8.5	ns
t_{PLH}			$R_L = 280 \Omega$, $C_L = 50 \text{ pF}$	8			ns
t_{PHL}				6.5			ns

NOTE 2: Load circuits and voltage waveforms are shown in Section 1.

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