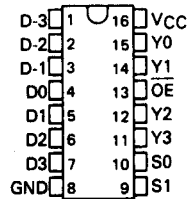


SN54S350, SN74S350 **FOUR-BIT SHIFTER WITH THREE-STATE OUTPUTS**

D2745, DECEMBER 1983 — REVISED MARCH 1988

- Shifts 4-Bits of Data to 0, 1, 2 or 3 Places Under Control of Two Select Lines
- Three-State Outputs for Bus Organized Systems
- 6.5 ns Typical Data Propagation Delay

SN54S350 . . . J PACKAGE
SN74S350 . . . D OR N PACKAGE
(TOP VIEW)



description

The 'S350 is operationally equivalent to a 4-input multiplexer with the inputs connected so that the select code causes shifts of the data word. This makes it possible to perform shifts of 0, 1, 2, or 3 places on words of any length, with suitable interconnection.

A 7-bit data word is introduced at the D inputs and is shifted according to the code applied to the select inputs S0 and S1. Y0 through Y3 are 3-state outputs con-

SN54S350 . . . FK PACKAGE
(TOP VIEW)

Note 2: Output rise/fall time measured between the 10% and 90% points of full-scale transition.

Ordering Information

T-51-09-08

Model Number	MTRE*	Package	Ambient Temperature
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B1453SC883	0.54×10^6	40-pin 0.6" Ceramic Sidebrazed DIP	-55° to +125° C.
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*MTRE is calculated per MIL Handbook 217.

SN54S350, SN74S350 FOUR-BIT SHIFTER WITH THREE-STATE OUTPUTS

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

Supply voltage, V_{CC} (see Note 1)	7 V
Input voltage	5.5 V
Voltage applied to a disabled 3-state output	5.5 V
Operating free-air temperature range: SN54S350	-55°C to 125°C
SN74S350	0°C to 70°C
Storage temperature range	-65°C to 150°C

NOTE 1: Voltage values are with respect to network ground terminal.

recommended operating conditions

	SN54S350			SN74S350			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			-2			-6.5	mA
I_{OL} Low-level output current			20			20	mA
T_A Operating free-air temperature	-55		125	0		70	$^{\circ}\text{C}$

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TTL Devices

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

PARAMETER		TEST CONDITIONS†	SN54S350			SN74S350			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}		$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, V_{IL} = 0.8 \text{ V}, I_{OH} = \text{MAX}$	2.4	3.4		2.4	3.4		V
V_{OL}		$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, V_{IL} = 0.8 \text{ V}, I_{OL} = 20 \text{ mA}$			0.5			0.5	V
I_{OZH}		$V_{CC} = \text{MAX}, V_O = 2.4 \text{ V}$			50			50	μA
I_{OZL}		$V_{CC} = \text{MAX}, V_O = 0.5 \text{ V}$			-50			-50	μA
I_I		$V_{CC} = \text{MAX}, V_I = 5.5 \text{ V}$			1			1	mA
I_{IH}	D-2, D-1, D-0, D1, D2 inputs	$V_{CC} = \text{MAX}, V_I = 2.7 \text{ V}$			75			75	μA
	All others				50			50	
I_{IL}	D-2, D-1 D-0, D1, D2 inputs	$V_{CC} = \text{MAX}, V_I = 0.5 \text{ V}$			-3			-3	mA
	All others				-2			-2	
$I_{OS}§$		$V_{CC} = \text{MAX}, V_O = 0$	-40		-100	-40		-100	mA
I_{CC}		$V_{CC} = \text{MAX}, V_I = 0$ All inputs = GND		60	85		60	85	mA

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

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

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

SN54S350, SN74S350 **FOUR-BIT SHIFTER WITH THREE-STATE OUTPUTS**

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

switching characteristics, VCC = 5 V, IA = 25 °C (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
tPLH	Data	Any Y	RL = 280 Ω, CL = 15 pF		5	9	ns
tPHL					8	12	ns
tPLH	Select	Any Y			11	17	ns
tPHL					13	20	ns
tPZH	OE	Any Y				19.5	ns
tPZL						21	ns
tPHZ	OE	Any Y	RL = 280 Ω, CL = 5 pF		8	13	ns
tPLZ						10	15

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

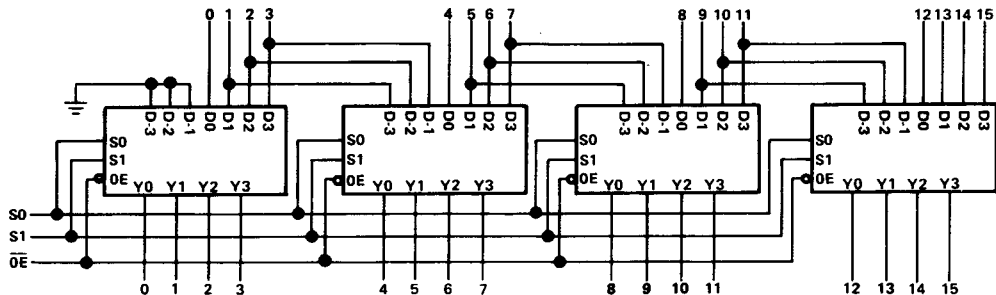
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TYPICAL APPLICATION DATA

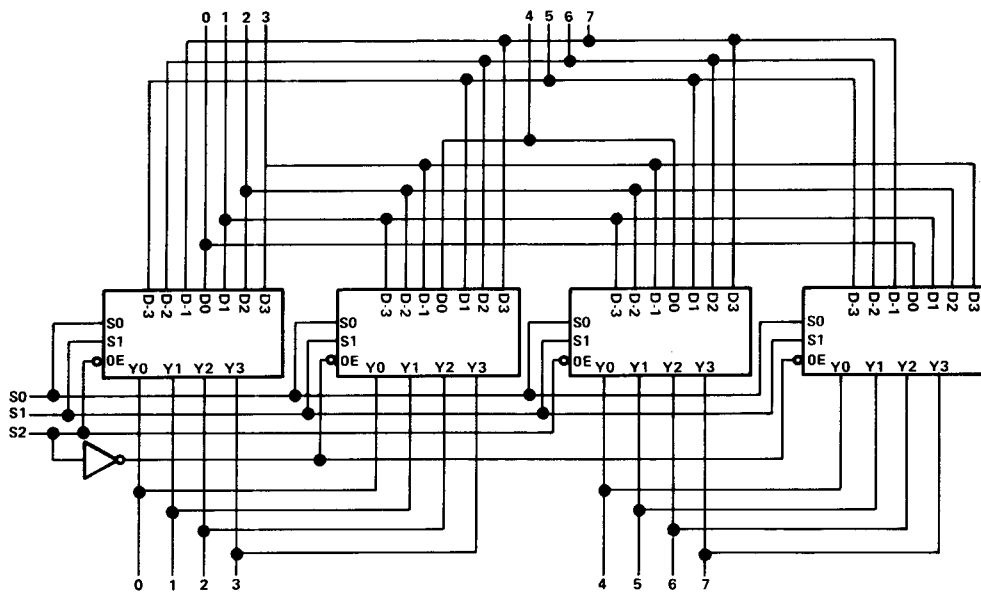
16-Bit Shift-Up 0 to 3 Places, Zero Backfill



S1 S0

- L L NO SHIFT
- L H SHIFT 1 PLACE
- H L SHIFT 2 PLACES
- H H SHIFT 3 PLACES

8-Bit End-Around Shift 0 to 7 Places



S2 S1 S0

- L L L NO SHIFT
- L L H SHIFT END AROUND 1
- L H L SHIFT END AROUND 2
- L H H SHIFT END AROUND 3
- H L L SHIFT END AROUND 4
- H L H SHIFT END AROUND 5
- H H L SHIFT END AROUND 6
- H H H SHIFT END AROUND 7

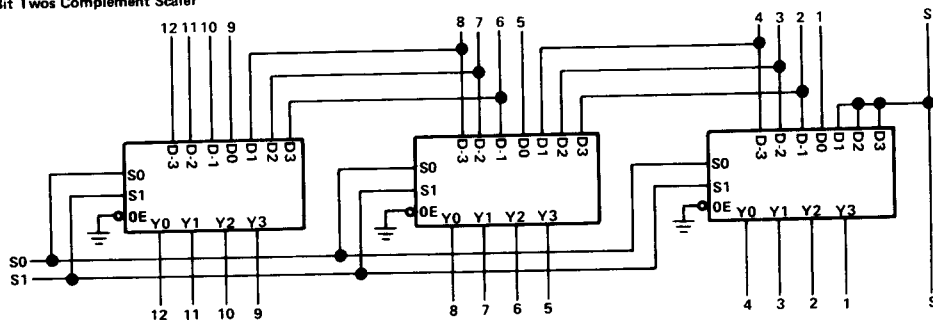
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SN54S350, SN74S350 FOUR-BIT SHIFTER WITH THREE-STATE OUTPUTS

TYPICAL APPLICATION DATA

13-Bit Twos Complement Scaler



S1 S0	SCALE
L L ÷ 8	1/8
H H ÷ 4	1/4
H L ÷ 2	1/2
H H NO CHANGE	1

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