

# TYPES SN7520, SN7521

## DUAL-CHANNEL SENSE AMPLIFIERS WITH COMPLEMENTARY OUTPUTS

FUNCTION TABLE

INPUTS						OUTPUTS	
A	B	G <sub>Y</sub>	G <sub>Z</sub>	S <sub>A</sub>	S <sub>B</sub>	Y	Z
X	X	L	X	X	X	H	$\overline{G}_Z$
H	X	X	X	H	X	H	$\overline{G}_Z$
X	H	X	X	X	H	H	$\overline{G}_Z$
L	L	H	X	X	X	L	H
L	X	H	X	X	L	L	H
X	L	H	X	L	X	L	H
X	X	H	X	L	L	L	H
X	X	X	L	X	X	X	H

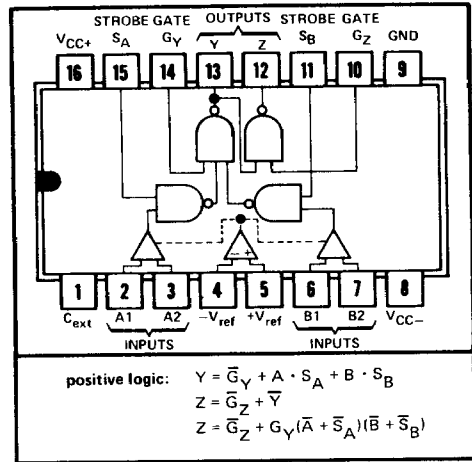
definition of logic levels

INPUT	H	L	X
A or B†	$V_{ID} \geq V_T \text{ max}$	$V_{ID} \leq V_T \text{ min}$	Irrelevant
Any G or S	$V_I \geq V_{IH} \text{ min}$	$V_I \leq V_{IL} \text{ max}$	Irrelevant

† A and B are differential voltages ( $V_{ID}$ ) between A1 and A2 or B1 and B2, respectively. For these circuits,  $V_{ID}$  is considered positive regardless of which terminal of each pair is positive with respect to the other.

J OR N

DUAL-IN-LINE PACKAGE (TOP VIEW)



electrical characteristics (unless otherwise noted  $V_{CC+} = 5 \text{ V}$ ,  $V_{CC-} = -5 \text{ V}$ ,  $T_A = 0^\circ \text{C}$  to  $70^\circ \text{C}$ )

PARAMETER	TEST FIGURE	TEST CONDITIONS	MIN	TYP‡	MAX	UNIT	
$V_T$ Differential input threshold voltage (see Note 3)	1	$V_{ref} = 15 \text{ mV}$	SN7520	11	15	19	mV
			SN7521	8	15	22	
		$V_{ref} = 40 \text{ mV}$	SN7520	36	40	44	
			SN7521	33	40	47	
$V_{ICF}$ Common-mode input firing voltage (see Note 4)	none	$V_{ref} = 40 \text{ mV}$ , $V_I(S) = V_{IH}$ Common-mode input pulse: $t_r \leq 15 \text{ ns}$ , $t_f \leq 15 \text{ ns}$ , $t_w = 50 \text{ ns}$		+2.5		V	
$I_{IB}$ Differential-input bias current	2	$V_{CC+} = 5.25 \text{ V}$ , $V_{CC-} = -5.25 \text{ V}$ , $V_{ID} = 0$		30	75	$\mu\text{A}$	
$I_{IO}$ Differential-input offset current	2	$V_{CC+} = 5.25 \text{ V}$ , $V_{CC-} = -5.25 \text{ V}$ , $V_{ID} = 0$		0.5		$\mu\text{A}$	
$V_{IH}$ High-level input voltage (strobe and gate inputs)	3			2		V	
$V_{IL}$ Low-level input voltage (strobe and gate inputs)	3				0.8	V	
$V_{OH}$ High-level output voltage	3	$V_{CC+} = 4.75 \text{ V}$ , $V_{CC-} = -4.75 \text{ V}$ , $I_{OH} = -400 \mu\text{A}$	2.4	4		V	
$V_{OL}$ Low-level output voltage	3	$V_{CC+} = 4.75 \text{ V}$ , $V_{CC-} = -4.75 \text{ V}$ , $I_{OL} = 16 \text{ mA}$		0.25	0.4	V	
$I_{IH}$ High-level input current (strobe and gate inputs)	4	$V_{CC+} = 5.25 \text{ V}$ , $V_{CC-} = -5.25 \text{ V}$ , $V_{IH} = 2.4 \text{ V}$			40	$\mu\text{A}$	
$I_{IL}$ Low-level input current (strobe and gate inputs)	4	$V_{CC+} = 5.25 \text{ V}$ , $V_{CC-} = -5.25 \text{ V}$ , $V_{IL} = 0.4 \text{ V}$		-1	-1.6	mA	
$I_{OS(Y)}$ Short-circuit output current into Y	5	$V_{CC+} = 5.25 \text{ V}$ , $V_{CC-} = -5.25 \text{ V}$	-3		-5	mA	
$I_{OS(Z)}$ Short-circuit output current into Z	5	$V_{CC+} = 5.25 \text{ V}$ , $V_{CC-} = -5.25 \text{ V}$	-2.1		-3.5	mA	
$I_{CC+}$ Supply current from $V_{CC+}$	6	$V_{CC+} = 5.25 \text{ V}$ , $V_{CC-} = -5.25 \text{ V}$ , $T_A = 25^\circ \text{C}$		28	40	mA	
$I_{CC-}$ Supply current from $V_{CC-}$	6	$V_{CC+} = 5.25 \text{ V}$ , $V_{CC-} = -5.25 \text{ V}$ , $T_A = 25^\circ \text{C}$		-14	-20	mA	

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

NOTES: 3. The differential-input threshold voltage ( $V_T$ ) is defined as the d-c differential-input voltage ( $V_{ID}$ ) required to force the output of the sense amplifier to the logic gate threshold voltage level.

4. Common-mode input firing voltage is the minimum common-mode voltage that will exceed the dynamic range of the input at the specified conditions and cause the logic output to switch. The specified common-mode input signal is applied with a strobe-enable pulse present.

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switching characteristics,  $V_{CC+} = 5\text{ V}$ ,  $V_{CC-} = -5\text{ V}$ ,  $C_{ext} \geq 100\text{ pF}$ ,  $T_A = 25^\circ\text{C}$

PROPAGATION DELAY TIMES			TEST FIGURE	TEST CONDITIONS	MIN	TYP	MAX	UNIT
SYMBOL	FROM INPUT	TO OUTPUT						
$t_{PLH(DY)}$	A1-A2 OR B1-B2	Y	32	$C_L = 15\text{ pF}$ , $R_L = 288\ \Omega$	25	40		ns
$t_{PHL(DY)}$					20			
$t_{PLH(DZ)}$	A1-A2 OR B1-B2	Z	32	$C_L = 15\text{ pF}$ , $R_L = 288\ \Omega$	30			ns
$t_{PHL(DZ)}$					35			
$t_{PLH(SY)}$	STROBE A OR B	Y	32	$C_L = 15\text{ pF}$ , $R_L = 288\ \Omega$	15	30		ns
$t_{PHL(SY)}$					20			
$t_{PLH(SZ)}$	STROBE A OR B	Z	32	$C_L = 15\text{ pF}$ , $R_L = 288\ \Omega$	30			ns
$t_{PHL(SZ)}$					35			
$t_{PLH(GY, Y)}$	GATE $G_Y$	Y	33	$C_L = 15\text{ pF}$ , $R_L = 288\ \Omega$	15	25		ns
$t_{PHL(GY, Y)}$					10			
$t_{PLH(GY, Z)}$	GATE $G_Y$	Z	33	$C_L = 15\text{ pF}$ , $R_L = 288\ \Omega$	15			ns
$t_{PHL(GY, Z)}$					20			
$t_{PLH(GZ, Z)}$	GATE $G_Z$	Z	34	$C_L = 15\text{ pF}$ , $R_L = 288\ \Omega$	15			ns
$t_{PHL(GZ, Z)}$					10			

typical recovery and cycle times,  $V_{CC+} = 5\text{ V}$ ,  $V_{CC-} = -5\text{ V}$ ,  $C_{ext} \geq 100\text{ pF}$ ,  $T_A = 25^\circ\text{C}$

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
$t_{orD}$	Differential-input overload recovery time (see Note 5) <i>Differential Input Pulse:</i> $V_{ID} = 2\text{ V}$ , $t_r = t_f = 20\text{ ns}$		20		ns
$t_{orC}$	Common-mode-input overload recovery time (see Note 6) <i>Common-Mode Input Pulse:</i> $V_{IC} = \pm 2\text{ V}$ , $t_r = t_f = 20\text{ ns}$		20		ns
$t_{cyc(min)}$	Minimum cycle time		200		ns

- NOTES: 5. Differential-input overload recovery time is the time necessary for the device to recover from the specified differential-input-overload signal prior to the strobe-enable signal.  
6. Common-mode-input overload recovery time is the time necessary for the device to recover from the specified common-mode-input overload signal prior to the strobe-enable signal.

### schematic

