

NE/SE521 High-Speed Dual-Differential Comparator/Sense Amp

Product Specification

Linear Products

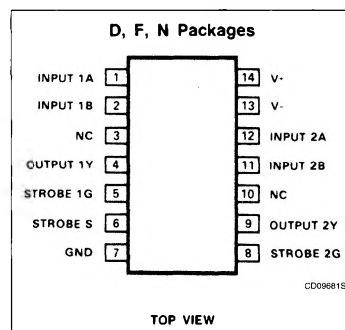
FEATURES

- 12ns maximum guaranteed propagation delay
- 20 μ A maximum input bias current
- TTL compatible strobes and outputs
- Large common-mode input voltage range
- Operates from standard supply voltages
- Military qualifications pending

APPLICATIONS

- MOS memory sense amp
- A-to-D conversion
- High-speed line receiver

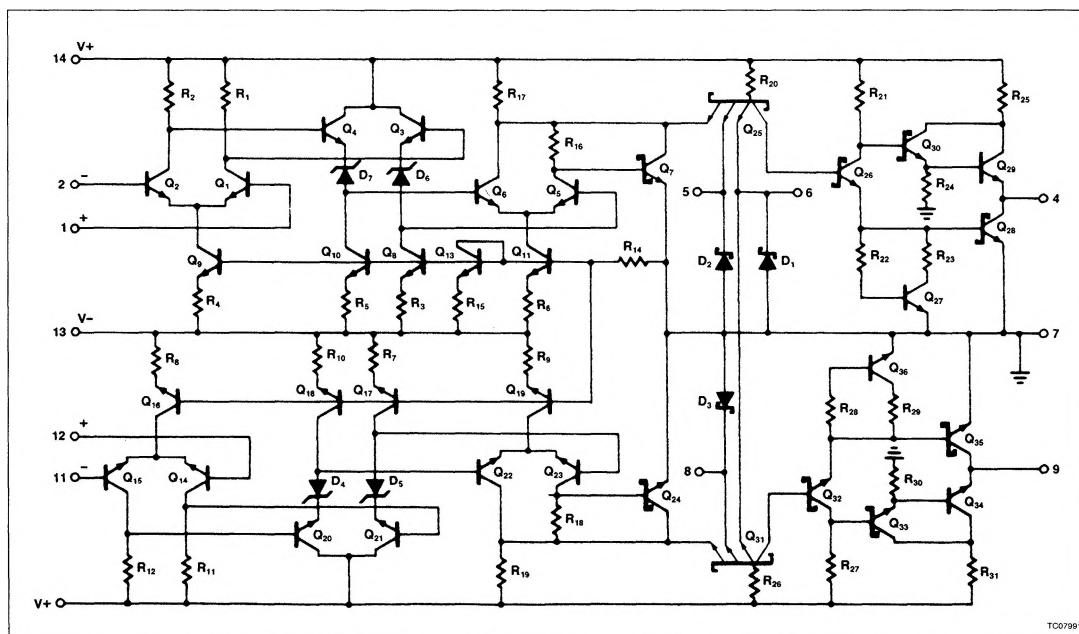
PIN CONFIGURATION



ORDERING INFORMATION

DESCRIPTION	TEMPERATURE RANGE	ORDER CODE
14-Pin Plastic DIP	0 to +70°C	NE521N
14-Pin SO Package	0 to +70°C	NE521D
14-Pin Cerdip	0 to +70°C	NE521F
14-Pin Cerdip	-55°C to +125°C	SE521F

EQUIVALENT SCHEMATIC



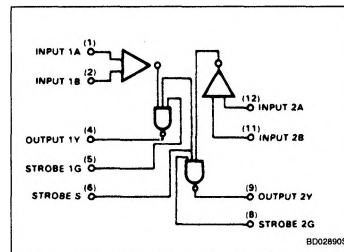
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LOGIC FUNCTIONS

V_{ID} A ⁺ , B ⁻	STROBE S	STROBE G	OUTPUT (Y)
$V_{ID} \leq -V_{OS}$	H	H	L
$-V_{OS} < V_{ID} < V_{OS}$	H	H	Undefined
$V_{ID} \geq V_{OS}$	H	H	H
X	L	X	H
X	X	L	H

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	RATING	UNIT
V+	Supply voltage	+7	V
V-	Negative	-7	V
V_{IDR}	Differential input voltage	± 6	V
V_{IN}	Input voltage	± 5	V
	Common mode	+5.25	V
P_D	Maximum power dissipation ¹		
	$T_A = 25^\circ\text{C}$ (still-air)		
	F package	1190	mW
	N package	1420	mW
	D package	1040	mW
T_A	Operating temperature range		
	NE521	0 to 70	$^\circ\text{C}$
	SE521	-55 to +125	$^\circ\text{C}$
T_{STG}	Storage temperature range	-65 to +150	$^\circ\text{C}$
T_{SOLD}	Lead soldering temperature (10 sec. max)	+300	$^\circ\text{C}$

NOTE:

1. Derate above 25°C at the following rates:
 F package at 9.5mW/ $^\circ\text{C}$.
 N package at 11.4mW/ $^\circ\text{C}$.
 D package at 8.3mW/ $^\circ\text{C}$.

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DC ELECTRICAL CHARACTERISTICS (SE521) $V_+ = +5V$, $V_- = -5V$, $T_A = -55^\circ C$ to $+125^\circ C$, unless otherwise specified.

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS			UNIT
			Min	Typ	Max	
V_{OS}	Input offset voltage At $25^\circ C$ Over temperature range	$V_+ = +4.5V$, $V_- = -4.5V$		6	7.5 15	mV
I_{BIAS}	Input bias current At $25^\circ C$ Over temperature range	$V_+ = +5.5V$, $V_- = -5.5V$		7.5	20 40	μA
I_{OS}	Input offset current At $25^\circ C$ Over temperature range	$V_+ = +5.5V$, $V_- = -5.5V$		1.0	5 12	μA
V_{CM}	Common-mode voltage range	$V_+ = +4.5V$, $V_- = -4.5V$	± 3			V
V_{IL}	Low level input voltage At $25^\circ C$ Over temperature				0.8 0.7	V
V_{IH}	High level input voltage		2.0			V
I_{IH}	Input current High	$V_+ = +5.5V$, $V_- = -5.5V$ $V_{IH} = 2.7V$ 1G or 2G strobe Common strobe S			50 100	μA μA
I_{IL}	Input Current Low	$V_{IL} = 0.5V$ 1G or 2G strobe Common strobe S			-2.0 -4.0	mA mA
V_{OH} V_{OL}	Output voltage High Low	$V_{(IS)} = 2.0V$ $V_+ = +4.5V$, $V_- = -4.5V$, $I_{LOAD} = -1mA$ $V_+ = +4.5V$, $V_- = -4.5V$, $I_{LOAD} = 10mA$ $T_A = 25^\circ C$, $I_{LOAD} = 20mA$	2.5 -4.5	3.4 -5.0	0.5 0.5	V
V_+ V_-	Supply voltage Positive Negative		4.5 -4.5	5.0 -5.0	5.5 -5.5	V
I_{CC+} I_{CC-}	Supply current Positive Negative	$V_+ = 5.5V$, $V_- = -5.5V$, $T_A = 25^\circ C$		27 -15	35 -28	mA
I_{SC}	Short-circuit output current		-35		-115	mA

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DC ELECTRICAL CHARACTERISTICS (NE521) $V_+ = +5V$, $V_- = -5V$, $T_A = 0$ to $70^\circ C$, unless otherwise specified.

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS			UNIT
			Min	Typ	Max	
V_{OS}	Input offset voltage At $25^\circ C$ Over temperature range	$V_+ = +4.75V$, $V_- = -4.75V$		6	7.5 10	mV
I_{BIAS}	Input bias current At $25^\circ C$ Over temperature range	$V_+ = +5.25V$, $V_- = -5.25V$		7.5	20 40	μA
I_{OS}	Input offset current At $25^\circ C$ Over temperature range	$V_+ = +5.25V$, $V_- = -5.25V$		1.0	5 12	μA
V_{CM}	Common-mode voltage range	$V_+ = +4.75V$, $V_- = -4.75V$	± 3			V
I_{IH}	Input current High	$V_+ = +5.25V$, $V_- = -5.25V$ $V_{IH} = 2.7V$ 1G or 2G strobe Common strobe S			50 100	μA μA
I_{IL}	Input Current Low	$V_{IL} = 0.5V$ 1G or 2G strobe Common strobe S			-2.0 -4.0	mA mA
V_{OH} V_{OL}	Output voltage High Low	$V_{I(S)} = 2.0V$ $V_+ = +4.75V$, $V_- = -4.75V$, $I_{LOAD} = -1mA$ $V_+ = +5.25V$, $V_- = -5.25V$, $I_{LOAD} = 20mA$	2.7	3.4	0.5	V
V_+ V_-	Supply voltage Positive Negative		4.75 -4.75	5.0 -5.0	5.25 -5.25	V
I_{CC+} I_{CC-}	Supply current Positive Negative	$V_+ = 5.25V$, $V_- = -5.25V$, $T_A = 25^\circ C$		27 -15	35 -28	mA
I_{SC}	Short-circuit output current		-40		-100	mA

AC ELECTRICAL CHARACTERISTICS $T_A = 25^\circ C$, $R_L = 280\Omega$, $C_L = 15pF$, $V_+ = 5V$, $V_- = 5V$.

SYMBOL	PARAMETER	FROM INPUT	TO OUTPUT	LIMITS			UNIT
				Min	Typ	Max	
Large-signal switching speed							
t _{PLH(D)}	Propagation delay Low to high ¹	Amp	Output		8	12	ns
t _{PHL(D)}	High to low ¹	Amp	Output		6	9	
t _{PLH(S)}	Low to high ²	Strobe	Output		4.5	10	
t _{PHL(S)}	High to low ²	Strobe	Output		3.0	6	
f _{MAX}	Max. operating frequency			40	55		MHz

NOTES:

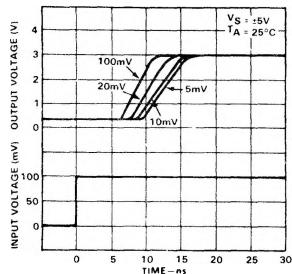
- Response time measured from 0V point of $\pm 100mV_{p,p}$ 10MHz square wave to the 1.5V point of the output.
- Response time measured from 1.5V point of input to 1.5V point of the output.

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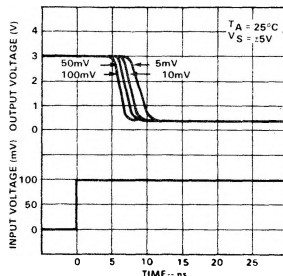
TYPICAL PERFORMANCE CHARACTERISTICS

Response Time for Various Input Overdrives



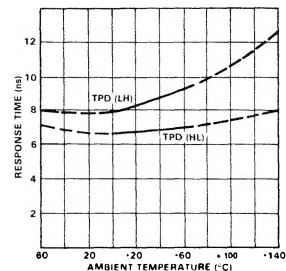
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Response Time for Various Input Overdrives



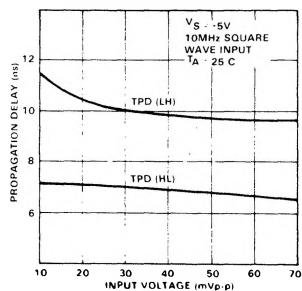
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Response Time vs Temperature



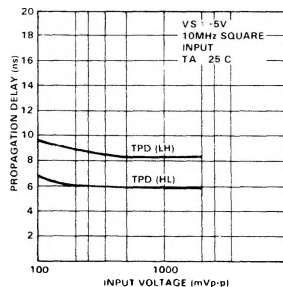
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Propagation Delay for Various Input Voltage



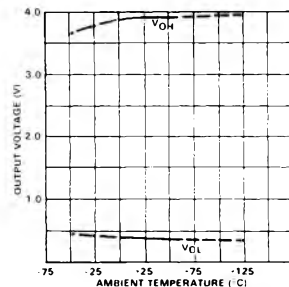
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Propagation Delay for Various Input Voltages



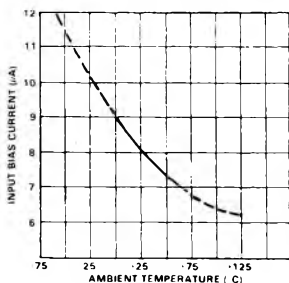
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Output Voltage vs Ambient Temperature



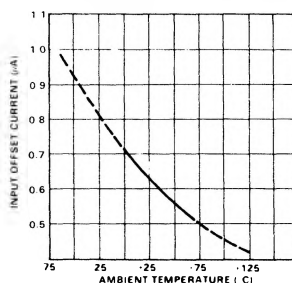
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Input Bias Current vs Ambient Temperature



OP039505

Input Offset Current vs Ambient Temperature



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