Signetics

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

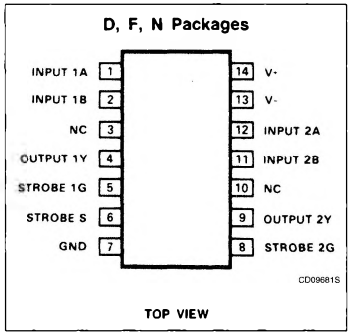
Product Specification

Linear Products

FEATURES
- 12ns maximum guaranteed propagation delay
- 20μA 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

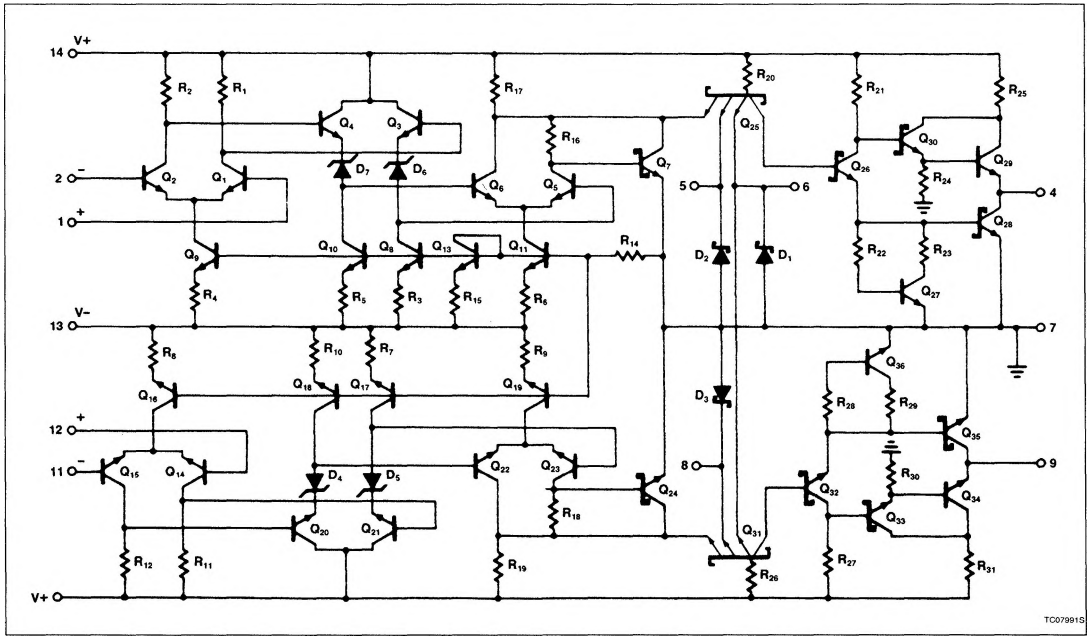
PIN CONFIGURATION



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

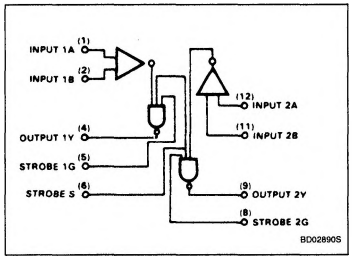


High-Speed Dual-Differential Comparator/Sense Amp NE/SE521

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
	Supply voltage		
V+	Positive	+7	V
V−	Negative	−7	V
V_{IDR}	Differential input voltage	±6	V
V_{IN}	Input voltage		
	Common mode	±5	V
	Strobe/gate	+5.25	V
P_D	Maximum power dissipation[1] T_A = 25°C (still-air)		
	F package	1190	mW
	N package	1420	mW
	D package	1040	mW
T_A	Operating temperature range		
	NE521	0 to 70	°C
	SE521	−55 to +125	°C
T_{STG}	Storage temperature range	−65 to +150	°C
T_{SOLD}	Lead soldering temperature (10 sec. max)	+300	°C

NOTE:

1. Derate above 25°C at the following rates:
   F package at 9.5mW/°C.
   N package at 11.4mW/°C.
   D package at 8.3mW/°C.

DC ELECTRICAL CHARACTERISTICS (SE521) V+ = +5V, V– = –5V, T_A = –55°C to +125°C, unless otherwise specified.

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS			UNIT
			Min	Typ	Max	
V_{OS}	Input offset voltage At 25°C Over temperature range	V+ = +4.5V, V– = –4.5V		6	7.5 15	mV
I_{BIAS}	Input bias current At 25°C Over temperature range	V+ = +5.5V, V– = –5.5V		7.5	20 40	μA
I_{OS}	Input offset current At 25°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°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	$V_{I(S)}$ = 2.0V V+ = +4.5V, V– = –4.5V, I_{LOAD} = –1mA V+ = +4.5V, V– = –4.5V, I_{LOAD} = 10mA T_A = 25°C, I_{LOAD} = 20mA	2.5	3.4	 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°C		27 –15	35 –28	mA
I_{SC}	Short-circuit output current		–35		–115	mA

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

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS			UNIT
			Min	Typ	Max	
V_{OS}	Input offset voltage At 25°C Over temperature range	$V+ = +4.75V$, $V- = -4.75V$		6	7.5 10	mV
I_{BIAS}	Input bias current At 25°C Over temperature range	$V+ = +5.25V$, $V- = -5.25V$		7.5	20 40	µA
I_{OS}	Input offset current At 25°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	$V+ = 5.25V$, $V- = -5.25V$, $T_A = 25°C$		27 -15	35 -28	mA
I_{SC}	Short-circuit output current		-40		-100	mA

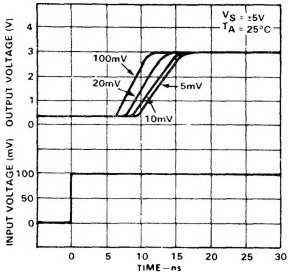
AC ELECTRICAL CHARACTERISTICS $T_A = 25°C$, $R_L = 280\Omega$ $C_L = 15pF$ $V+ = 5V$ $V- = 5V$.

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

NOTES:
1. Response time measured from 0V point of ±100mV$_{p-p}$ 10MHz square wave to the 1.5V point of the output.
2. Response time measured from 1.5V point of input to 1.5V point of the output.

TYPICAL PERFORMANCE CHARACTERISTICS

Response Time for Various Input Overdrives



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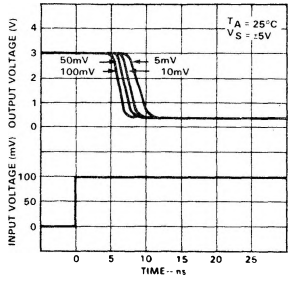
Response Time for Various Input Overdrives



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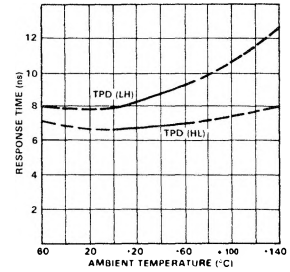
Response Time vs Temperature



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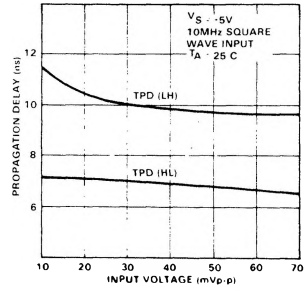
Propagation Delay for Various Input Voltage



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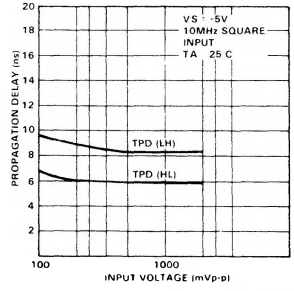
Propagation Delay for Various Input Voltages



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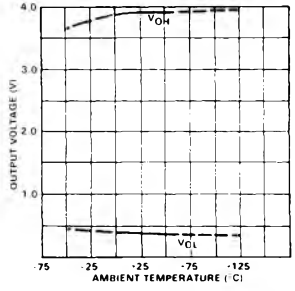
Output Voltage vs Ambient Temperature



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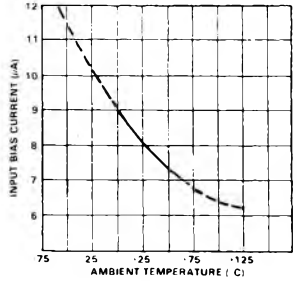
Input Bias Current vs Ambient Temperature



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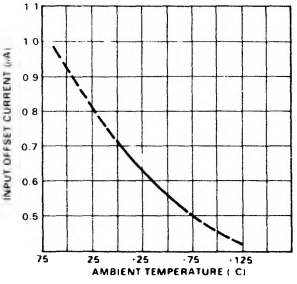
Input Offset Current vs Ambient Temperature



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