High-speed dual-differential comparator/sense amp NE/SE521

FEATURES

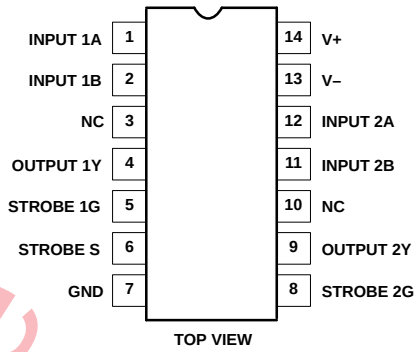
- 12ns maximum guaranteed propagation delay
- 20µA maximum input bias current
- TTL compatible strobes and outputs
- Large common-mode input voltage range
- Operates from standard supply voltages
- Military qualifications pending

APPLICATIONS

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

PIN CONFIGURATION

D, F, N Packages

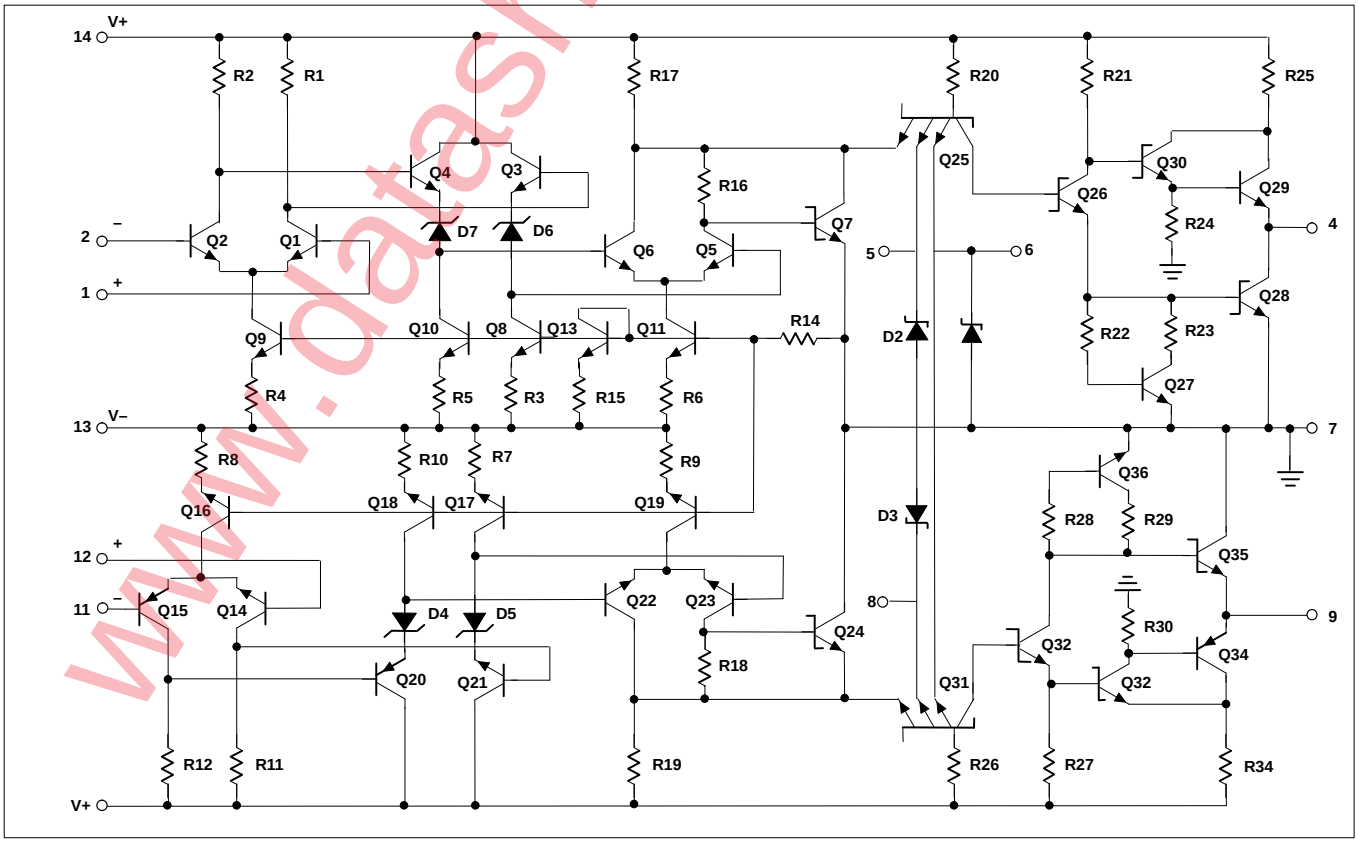


TOP VIEW

ORDERING INFORMATION

DESCRIPTION	TEMPERATURE RANGE	ORDER CODE	DWG #
14-Pin Plastic Dual In-Line Package (DIP)	0 to +70°C	NE521N	0405B
14-Pin SO Package	0 to +70°C	NE521D	0175D
14-Pin Ceramic Dual In-Line Package (CERDIP)	0 to +70°C	NE521F	0581B
14-Pin Ceramic Dual In-Line Package (CERDIP)	-55°C to +125°C	SE521F	0581B

EQUIVALENT SCHEMATIC



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LOGIC FUNCTIONS

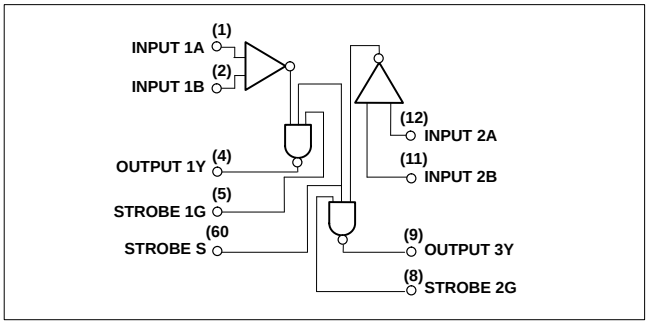
V_{ID} A^+, B^-	STROBE S	STROBE G	OUTPUT (Y)
$V_{ID} \leq -V_{OS}$	H	H	L
$-V_{OS} < V_{ID} < V_{OS}$	H	H	Undefined
$V_{ID} \geq V_{OS}$	H	H	H
X	L	X	H
X	X	L	H

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

NOTES:
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

BLOCK DIAGRAM



DC ELECTRICAL CHARACTERISTICS (SE521)

V+=+5V, V-=-5V, TA=-55°C to +125°C, unless otherwise specified.

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

DC ELECTRICAL CHARACTERISTICS(NE521)

V+=+5V, V-=-5V, TA=0 to 70°C, unless otherwise specified.

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

AC ELECTRICAL CHARACTERISTICS

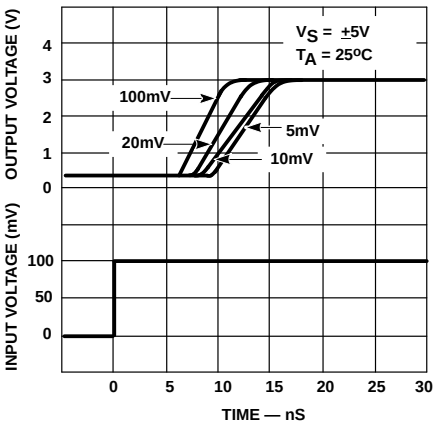
T_A=25°C, R_L=280W C_L=15pF V+=5V V-=5V**.**

SYMBOL	PARAMETER	FROM INPUT	TO OUTPUT	LIMITS			UNIT
				Min	Typ	Max	
Large-signal switching speed							
	Propagation delay						
$t_{PLH(D)}$	Low to high[1]	Amp	Output		8	12	
$t_{PHL(D)}$	High to low[1]	Amp	Output		6	9	ns
$t_{PLH(S)}$	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

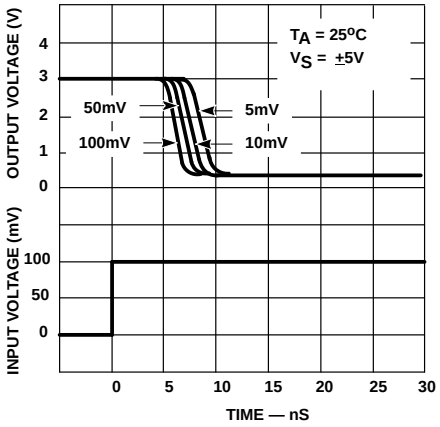
NOTES:
1. Response time measured from 0V point of ±100mV_{P-P} 10MHz square wave to the 1.5V point of the output.
2. Response time measured from 1.5V point of input to 1.5V point of the output.

TYPICAL PERFORMANCE CHARACTERISTICS

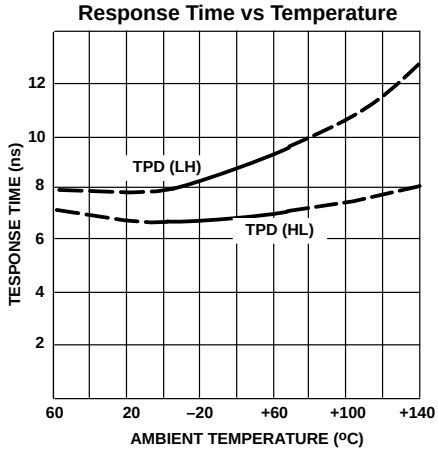
Response Time for Various Input Overdrives



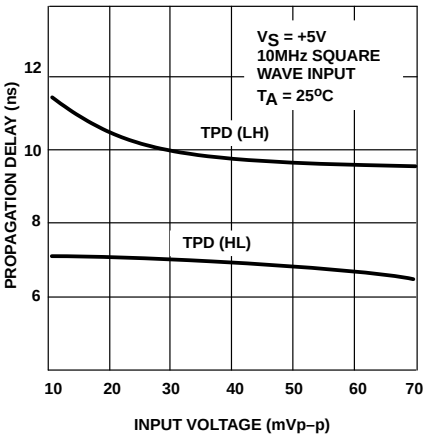
Response Time for Various Input Overdrives



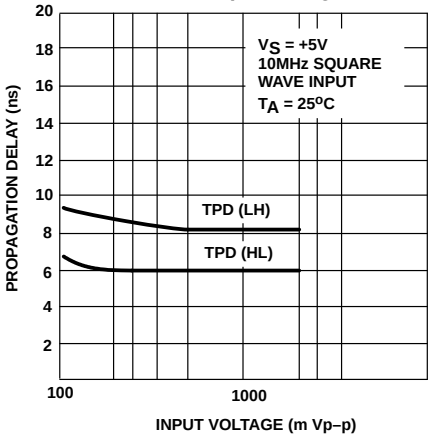
Response Time vs Temperature



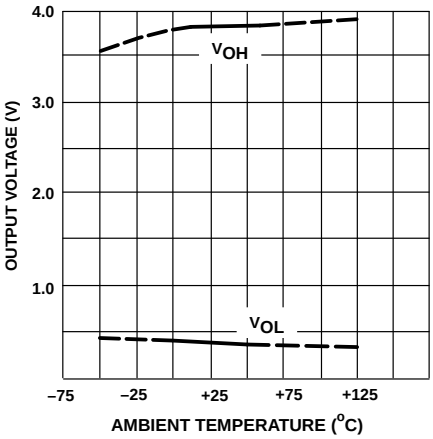
Propagation Delay for Various Input Voltages



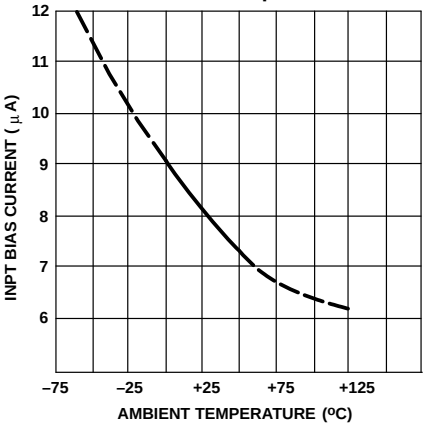
Propagation Delay for Various Input Voltages



Output Voltage vs Ambient Temperature



Input Bias Current vs Ambient Temperature



Input Offset Current vs Ambient Temperature

