Signetics

NE/SE522
High-Speed Dual-Differential Comparator/Sense Amp

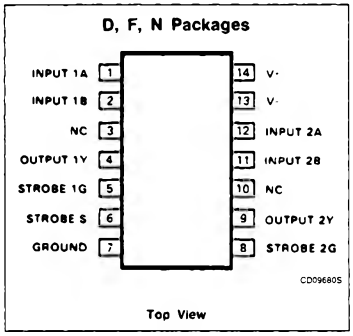
Product Specification

Linear Products

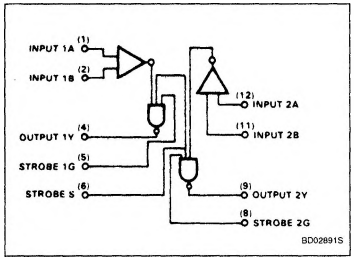
FEATURES
- **15ns maximum guaranteed propagation delay**
- **20μA maximum input bias current**
- **TTL-compatible strobes and outputs**
- **Large common-mode input voltage range**
- **Operates from standard supply voltages**

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

PIN CONFIGURATION



BLOCK DIAGRAM



ORDERING INFORMATION

DESCRIPTION	TEMPERATURE RANGE	ORDER CODE
14-Pin Cerdip	0 to 70°C	NE522F
14-Pin Cerdip	−55°C to 125°C	SE522F
14-Pin Plastic DIP	0 to +70°C	NE522N
14-Pin Plastic SO	0 to 70°C	NE522D

ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	RATING	UNIT
V+ V−	Supply voltage Positive Negative	 +7 −7	V
V_{IDR}	Differential input voltage	±6	V
V_{IN}	Input voltage Common-mode Strobe/gate	 ±5 +5.25	V
P_D	Power dissipation	600	mW
T_A	Operating temperature range NE522 SE522	0 to 70 −55 to +125	°C
T_{STG}	Storage temperature range	−65 to +150	°C
T_{SOLD}	Lead soldering temperature (10sec max)	+300	°C

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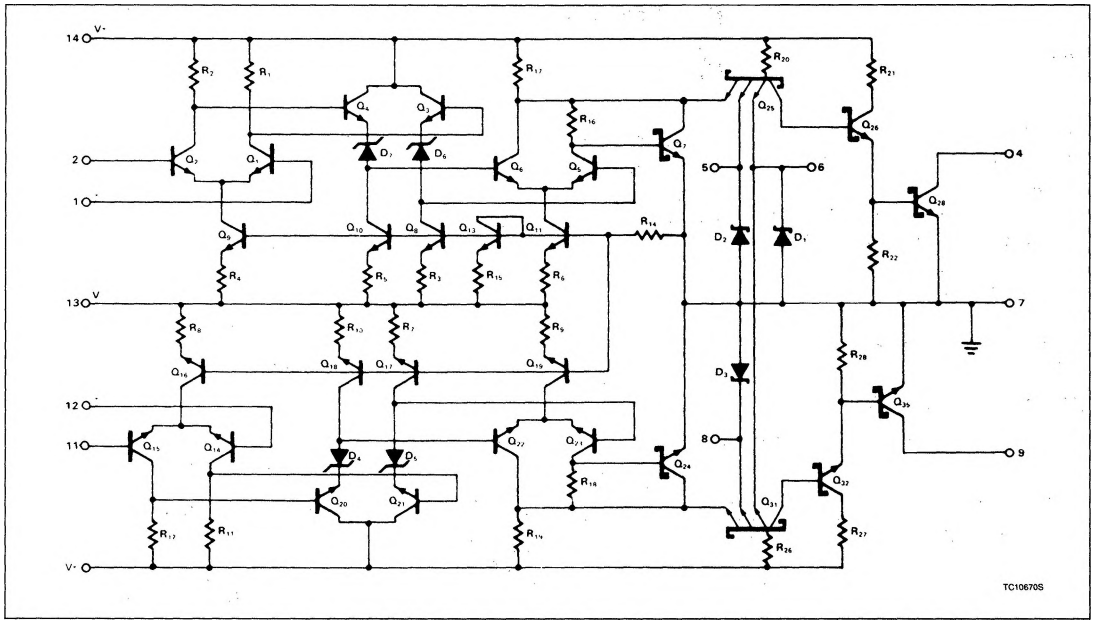
EQUIVALENT SCHEMATIC



DC ELECTRICAL CHARACTERISTICS (SE522)± 5V ± 10%, T_A = −55 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 temperature		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}	Low input current	V_{IL} = 0.5V 1G 2G strobe Common strobe S			 −2 −4	 mA mA
V_{OL}	Output voltage Low	V+ = +4.5V, V− = −4.5V I_{OL} = 20mA, T_A = 25°C I_{OL} = 10mA			 0.5 0.5	V
I_{OH}	Output current High	V_{CC+} = +4.5, V_{CC-} = −4.5V, V_{OH} = 5.5V			250	μA
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

DC ELECTRICAL CHARACTERISTICS (NE522)± 5V ±5%, 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}	Low	V_{IL} = 0.5V 1G 2G strobe Common strobe S			–2.0 –4.0	mA mA
V_{OL}	Output voltage low	V+ = +5.25V, V– = –5.25V, $V_{I(S)}$ = 2.0V I_{LOAD} = 20mA			0.5	V
I_{OH}	Output current high High	V_{CC+} = +4.75 V_{CC-} = –4.75V, V_{OH} = 5.25V			250	µA
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

AC ELECTRICAL CHARACTERISTICS $T_A = 25°C$, $R_L = 280\Omega$, $C_L = 15pF$

SYMBOL	PARAMETER	FROM INPUT	TO OUTPUT	LIMITS			UNIT
				Min	Typ	Max	
I_R	Input resistance				4		kΩ
I_C	Input capacitance				3		pF
Large-signal switching speed							
	Propagation delay						
$t_{PLH(D)}$	Low to high[1]	Amp	Output		10	15	
$t_{PHL(D)}$	High to low[1]	Amp	Output		8	12	ns
$t_{PLH(S)}$	Low to high[2]	Strobe	Output		6	13	
$t_{PHL(S)}$	High to low[2]	Strobe	Output		5	9	
f_{MAX}	Maximum operating frequency			25	35		MHz

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

LOGIC FUNCTION TABLE

V_{ID} (A^+, B^-)	STRS	STRG	Output Transistor
$< -V_{OS}$	H	H	ON
$-V_{OS} < V_{ID} < V_{OS}$	H	H	Undefined
$> V_{OS}$	H	H	OFF
X	L	X	OFF
X	X	L	OFF

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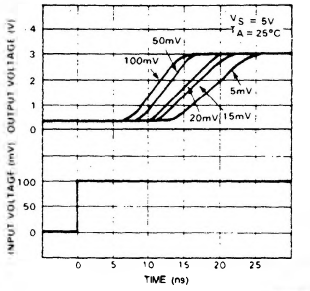
TYPICAL PERFORMANCE CHARACTERISTICS

Response Time for Various Input Overdrives



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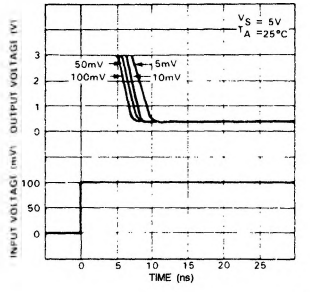
Response Time for Various Input Overdrives



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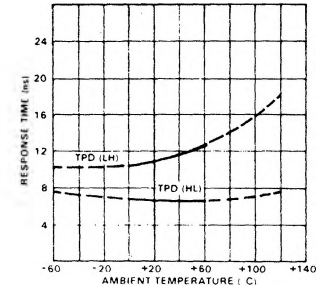
Response Time vs Temperature



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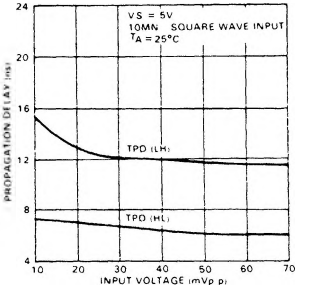
Propagation Delay for Various Input Voltages



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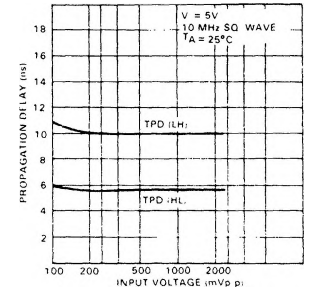
Propagation Delay for Various Input Voltages



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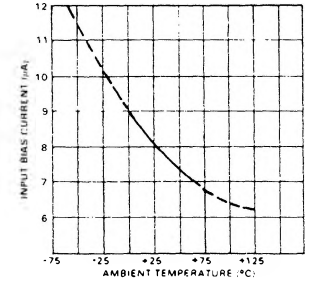
Input Bias Current vs Ambient Temperature



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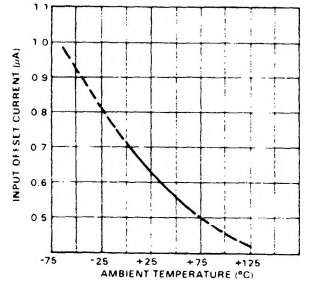
Input Offset Current vs Ambient Temperature



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