NE522

High-Speed Dual-Differential Comparator/Sense Amp

ON Semiconductor®

http://onsemi.com

Features

- 15 ns Maximum Guaranteed Propagation Delay
- 20 μA 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

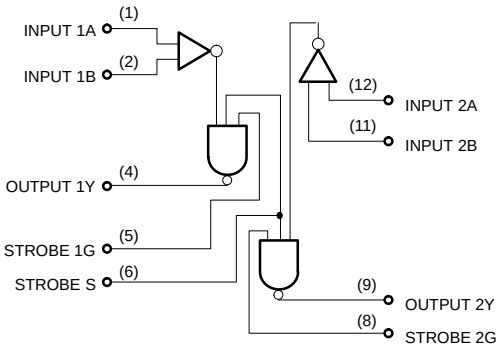


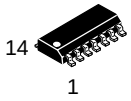
Figure 1. Block Diagram

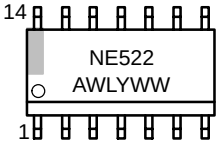
LOGIC FUNCTION TABLE

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

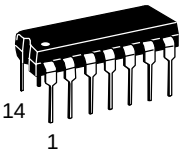
MARKING DIAGRAMS

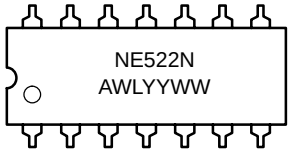
SOIC−14
D SUFFIX
CASE 751A





PDIP−14
N SUFFIX
CASE 646

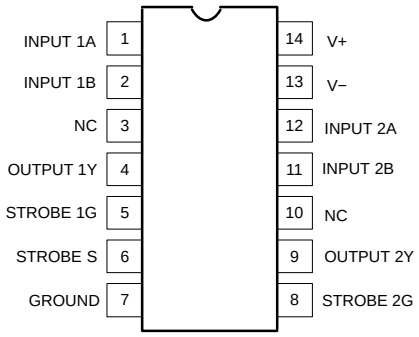




A = Assembly Location
WL = Wafer Lot
YY, Y = Year
WW = Work Week

PIN CONNECTIONS

D, N Packages



(Top View)

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

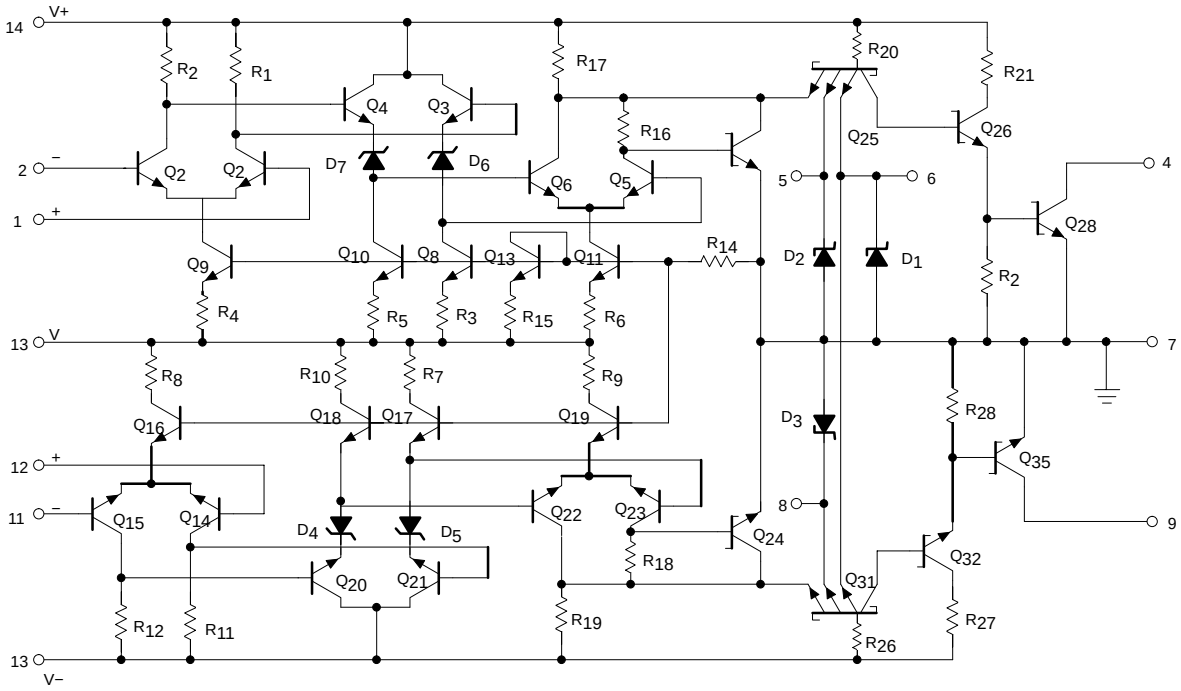


Figure 2. Equivalent Schematic

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Single Supply Voltage Positive Negative	 V+ V−	 +7.0 −7.0	V
Differential Input Voltage	V_{IDR}	±6.0	V
Input Voltage Common-Mode Strobe/Gate	V_{IN}	 ±5.0 +5.25	V
Power Dissipation	P_D	600	mW
Thermal Resistance, Junction−to−Ambient N Package D Package	$R_{\theta JA}$	 100 145	°C/W
Operating Temperature Range	T_{amb}	0 to 70	°C
Operating Junction Temperature	T_J	150	°C
Storage Temperature Range	T_{stg}	−65 to +150	°C
Lead Soldering Temperature (10 sec max)	T_{sld}	+230	°C

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

DC ELECTRICAL CHARACTERISTICS ($V\pm$ = $\pm$5.0 V $\pm$5%; T_{amb} = 0 °C to +70 °C, unless otherwise noted.)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Offset Voltage At 25°C Overtemperature Range	V_{OS}	V + = +4.75 V; V − = −4.75 V	 − −	 6.0 −	 7.5 10	mV
Input Bias Current At 25°C Overtemperature Range	I_{BIAS}	V + = +5.25 V; V − = −5.25 V	 − −	 7.5 −	 20 40	μA
Input Offset Current At 25°C Overtemperature Range	I_{OS}	V + = +5.25 V; V − = −5.25 V	 − −	 1.0 −	 5.0 12	μA
Common-Mode Voltage Range	V_{CM}	V + = +4.75 V; V − = −4.75 V	−3.0	−	+3.0	V
LOW-Level Input Voltage At 25°C Overtemperature Range	V_{IL}	−	 − −	 − −	 0.8 0.7	V
High Level Temperature	V_{IH}	−	2.0	−	−	V
HIGH-Level Input Current 1G or 2G Strobe Common Strobe S	I_{IH}	V + = +5.25 V; V − = −5.25 V; V_{IH} = 2.7 V	 − −	 − −	 50 100	μA
LOW-Level Input Current 1G or 2G Strobe Common Strobe S	I_{IL}	V_{IL} = 0.5 V	 − −	 − −	 −2.0 −4.0	mA
LOW-Level Output Voltage	V_{OL}	V + = +5.25 V; V − = −5.25 V; $V_{I(S)}$ = 2.0 V; I_{LOAD} = 20 mA	−	−	0.5	V
HIGH-Level Output Current	I_{OH}	V + = +4.75 V; V − = −4.75 V; V_{OH} = 5.25 V	−	−	250	μA
Supply Voltage Positive Negative	 V+ V−	−	 4.75 −4.75	 5.0 −5.0	 5.25 −5.25	V
Supply Current Positive Negative	 I_{CC+} I_{CC-}	V + = +5.25 V; V − = −5.25 V; T_{amb} = 25°C	 − −	 27 −15	 35 −28	mA

AC ELECTRICAL CHARACTERISTICS (T_{amb} = 25°C; R_L = 280 Ω; C_L = 15 pF, unless otherwise noted.)

Characteristic	Symbol	From Input	To Output	Min	Typ	Max	Unit
Input Resistance	I_R	−	−	−	4.0	−	kΩ
Input Capacitance	I_C	−	−	−	3.0	−	pF
Large−signal switching speed							
Propagation Delay							ns
Low to High (Note 1)	$t_{PLH(D)}$	Amp	Output	−	10	15	
High to Low (Note 1)	$t_{PHL(D)}$	Amp	Output	−	8.0	12	
Low to High (Note 2)	$t_{PLH(S)}$	Strobe	Output	−	6.0	13	
High to Low (Note 2)	$t_{PHL(S)}$	Strobe	Output	−	5.0	9.0	
Maximum Operating Frequency	I_{MAX}	−	−	25	35	−	MHz

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

TYPICAL PERFORMANCE CHARACTERISTICS

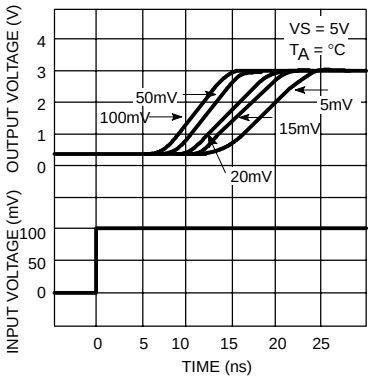


Figure 3. Response Time for Various Input Overdrives

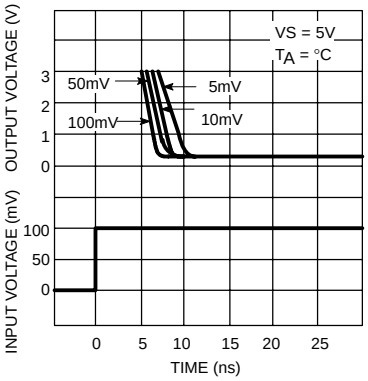


Figure 4. Response Time for Various Input Overdrives

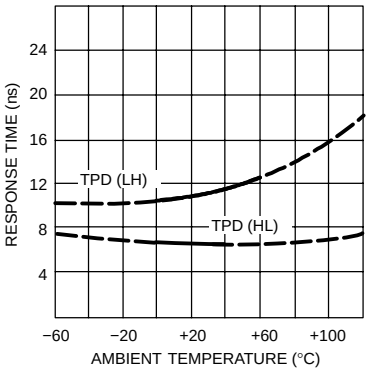


Figure 5. Response Time vs. Temperature

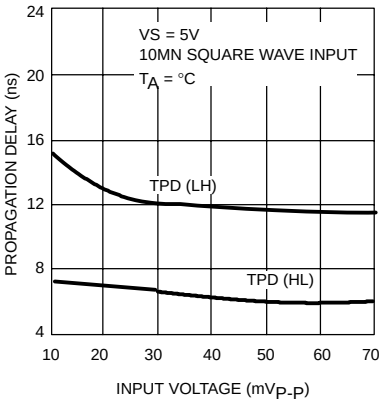


Figure 6. Propagation Delay for Various Input Voltages

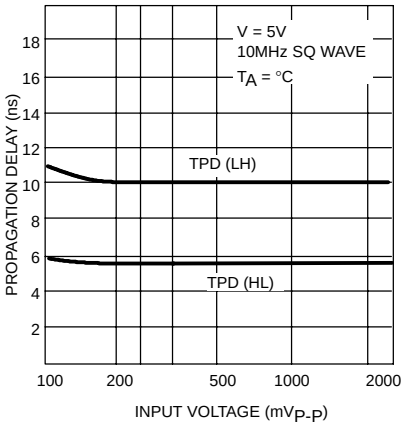


Figure 7. Propagation Delay for Various Input Voltages

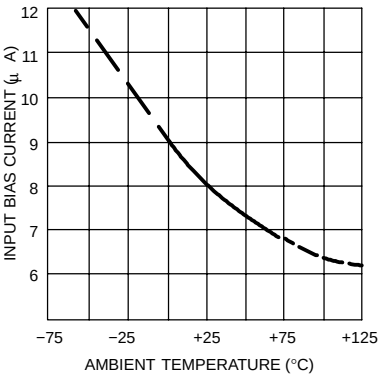


Figure 8. Input Bias Current vs. Ambient Temperature

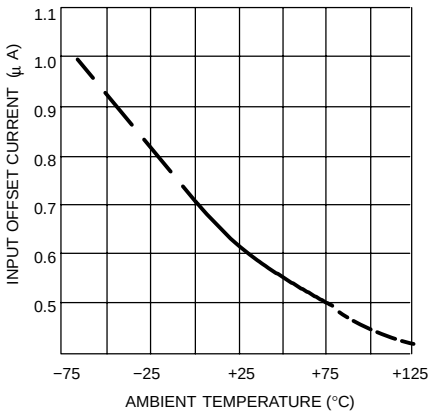


Figure 9. Input Offset Current vs. Ambient Temperature

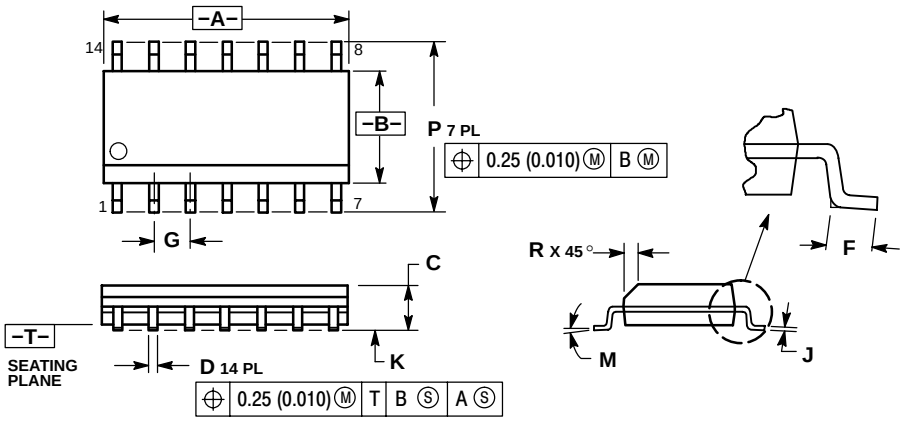
ORDERING INFORMATION

Device	Description	Temperature Range	Shipping†
NE522D	14−Pin Plastic SO	0 to +70°C	55 Units/Rail
NE522DR2	14−Pin Plastic SO	0 to +70°C	2500 Tape & Reel
NE522N	14−Pin Plastic DIP	0 to +70°C	25 Units/Rail

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

PACKAGE DIMENSIONS

SOIC−14
D SUFFIX
CASE 751A−03
ISSUE G

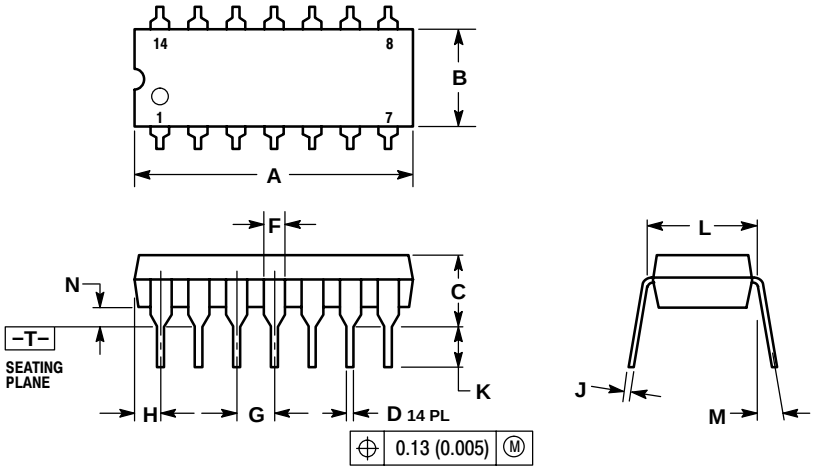


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	8.55	8.75	0.337	0.344
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.054	0.068
D	0.35	0.49	0.014	0.019
F	0.40	1.25	0.016	0.049
G	1.27 BSC		0.050 BSC	
J	0.19	0.25	0.008	0.009
K	0.10	0.25	0.004	0.009
M	0 °	7 °	0 °	7 °
P	5.80	6.20	0.228	0.244
R	0.25	0.50	0.010	0.019

PACKAGE DIMENSIONS

PDIP−14
N SUFFIX
CASE 646−06
ISSUE M



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEADS WHEN FORMED PARALLEL.
4. DIMENSION B DOES NOT INCLUDE MOLD FLASH.
5. ROUNDED CORNERS OPTIONAL.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.715	0.770	18.16	18.80
B	0.240	0.260	6.10	6.60
C	0.145	0.185	3.69	4.69
D	0.015	0.021	0.38	0.53
F	0.040	0.070	1.02	1.78
G	0.100 BSC		2.54 BSC	
H	0.052	0.095	1.32	2.41
J	0.008	0.015	0.20	0.38
K	0.115	0.135	2.92	3.43
L	0.290	0.310	7.37	7.87
M	---	10°	---	10°
N	0.015	0.039	0.38	1.01

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
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NE522/D