# High-Speed Dual-Differential Comparator/Sense Amp

#### **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

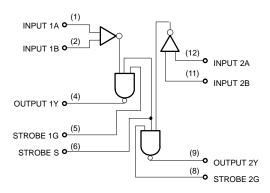


Figure 1. Block Diagram

#### LOGIC FUNCTION TABLE

V <sub>ID</sub> (A+, B-)	STRS	STRG	Output Transistor
<-V <sub>OS</sub> -V <sub>OS</sub> < V <sub>ID</sub> < V <sub>OS</sub> > V <sub>OS</sub>	H H H	H H H	ON Undefined OFF
Х	L	Х	OFF
Х	Х	L	OFF



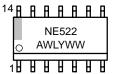
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#### MARKING DIAGRAMS

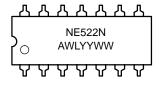
SOIC-14 D SUFFIX CASE 751A





PDIP-14 N SUFFIX CASE 646



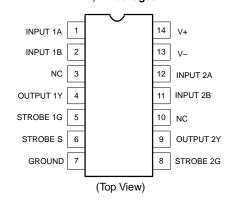


A = Assembly Location WL = Wafer Lot

WL = Wafer Lot YY, Y = Year WW = Work Week

#### **PIN CONNECTIONS**

#### D, N Packages



#### **ORDERING INFORMATION**

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

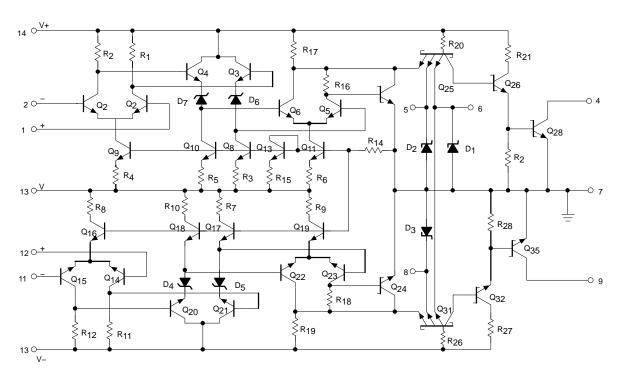


Figure 2. Equivalent Schematic

#### **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 <sub>IN</sub>	±5.0 +5.25	V
Power Dissipation	P <sub>D</sub>	600	mW
Thermal Resistance, Junction-to-Ambient  N Package D Package	R <sub>θJA</sub>	100 145	°C/W
Operating Temperature Range	T <sub>amb</sub>	0 to 70	°C
Operating Junction Temperature	TJ	150	°C
Storage Temperature Range	T <sub>stg</sub>	-65 to +150	°C
Lead Soldering Temperature (10 sec max)	T <sub>sld</sub>	+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<sub>amb</sub> = 0 °C to +70 °C, unless otherwise noted.)

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

# AC ELECTRICAL CHARACTERISTICS ( $T_{amb} = 25^{\circ}C$ ; $R_{L} = 280~\Omega$ ; $C_{L} = 15~pF$ , unless otherwise noted.)

Characteristic	Symbol	From Input	To Output	Min	Тур	Max	Unit
Input Resistance	I <sub>R</sub>	-	-	-	4.0	-	kΩ
Input Capacitance	Ic	-	-	_	3.0	-	pF

#### Large-signal switching speed

Propagation Delay							ns
Low to High (Note 1)	t <sub>PLH(D)</sub>	Amp	Output	_	10	15	
High to Low (Note 1)	t <sub>PHL(D)</sub>	Amp	Output	_	8.0	12	
Low to High (Note 2)	t <sub>PLH(S)</sub>	Strobe	Output	_	6.0	13	
High to Low (Note 2)	t <sub>PHL(S)</sub>	Strobe	Output	-	5.0	9.0	
Maximum Operating Frequency	I <sub>MAX</sub>	ı	ı	25	35	-	MHz

Response time measured from 0 V point of +100 mV<sub>P-P</sub> 10 MHz square wave to the 1.5 V point of the output.
 Response time measured from 1.5 V point of the input to 1.5 V point of the output.

#### TYPICAL PERFORMANCE CHARACTERISTICS

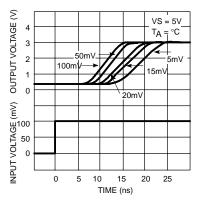


Figure 3. Response Time for Various Input Overdrives

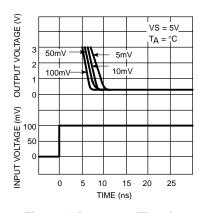


Figure 4. Response Time for Various Input Overdrives

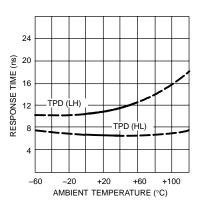


Figure 5. Response Time vs. Temperature

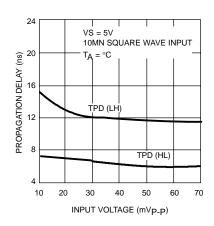


Figure 6. Propagation Delay for Various Input Voltages

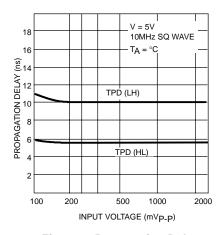


Figure 7. Propagation Delay for Various Input Voltages

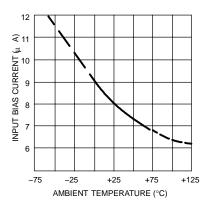


Figure 8. Input Bias Current vs. Ambient Temperature

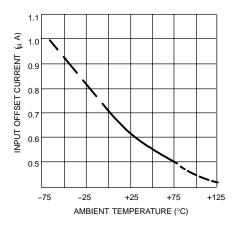


Figure 9. Input Offset Current vs. Ambient Temperature

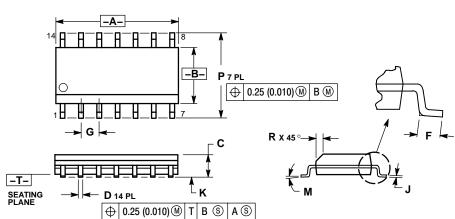
# **ORDERING INFORMATION**

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

<sup>†</sup>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

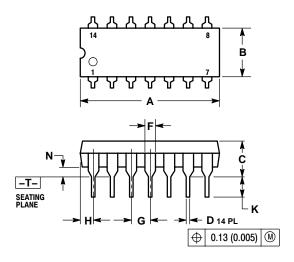


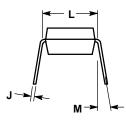
- NOTES:
  1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: MILLIMETER.
  3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
  4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
  5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION ALLOWABLE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

	MILLIN	METERS	INCHES		
DIM	MIN	MAX	MIN	MAX	
Α	8.55	8.75	0.337	0.344	
В	3.80	4.00	0.150	0.157	
U	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		
7	0.19	0.25	0.008	0.009	
K	0.10	0.25	0.004	0.009	
М	0 °	7°	0 °	7°	
Р	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.

	INC	HES	MILLIN	IETERS
DIM	MIN	MAX	MIN	MAX
Α	0.715	0.770	18.16	18.80
В	0.240	0.260	6.10	6.60
С	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	
Н	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

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