High-Speed Dual-Differential Comparator/Sense Amp

Features

- TTL-Compatible Strobes and Outputs
- Large Common-Mode Input Voltage Range
- Operates from Standard Supply Voltages
- Pb-Free Packages are Available

Applications

- MOS Memory Sense Amp
- A-to-D Conversion
- High-Speed Line Receiver

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
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
Maximum Power Dissipation (Note 1) T _A = 25°C (Still-Air) N Package D Package	P _D	1420 1040	mW
Thermal Resistance, Junction-to-Ambient N Package D Package	$R_{ heta JA}$	100 145	°C/W
Operating Temperature Range	T _A	0 to 70	°C
Storage Temperature Range	T _{stg}	-65 to +150	°C
Operating Junction Temperature	TJ	150	°C
Lead Soldering Temperature (10 sec max)	T _{sld}	+230	°C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. Derate above 25°C at the following rates:

N package at 10 mW/°C

D package at 6.9 mW/°C.

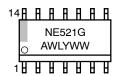


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MARKING DIAGRAMS







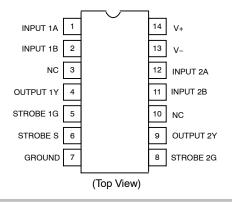


A = Assembly Location

WL = Wafer Lot Y, YY = Year WW = Work Week G = Pb-Free Package

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.

LOGIC FUNCTION TABLE

V _{ID} (A ⁺ , B)	Strobe S	Strobe G	Output (Y)
$V_{ID} \leq -V_{OS}$	Н	Н	L
-V _{OS} < V _{ID} < V _{OS}	Н	Н	Undefined
$V_{ID} \ge V_{OS}$	Н	Н	Н
X	L	Х	Н
X	X	L	Н

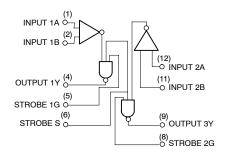


Figure 1. Block Diagram

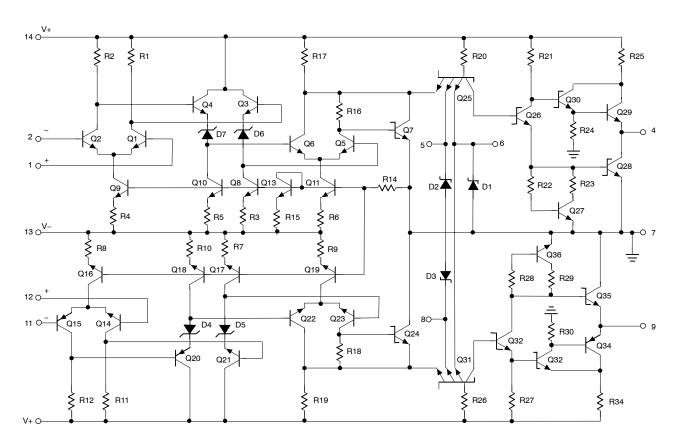


Figure 2. Equivalent Schematic

DC ELECTRICAL CHARACTERISTICS (V+ = +5.0 V; V- = -5.0 V, $T_A = 0^{\circ}C$ to +70°C, unless otherwise noted.)

				Limits		
Characteristic	Test Conditions	Symbol	Min	Тур	Max	Unit
Input Offset Voltage At 25°C Overtemperature Range	V+ = +4.75 V; V- = -4.75 V	V _{OS}	- -	6.0 -	7.5 10	mV
Input Bias Current At 25°C Overtemperature Range	V+ = +5.25 V; V- = -5.25 V	I _{BIAS}	- -	7.5 -	20 40	μΑ
Input Offset Current At 25°C Overtemperature Range	V+ = +5.25 V; V- = -5.25 V	los	- -	1.0	5.0 12	μΑ
Common-Mode Voltage Range	V+ = +4.75 V; V- = -4.75 V	V _{CM}	-3.0	_	+3.0	V
Input Current High	V+ = +5.25 V; V- = -5.25 V V _{IH} = 2.7 V 1G or 2G Strobe Common Strobe S	I _{IH}	- -	- -	50 100	μΑ
Input Current Low	V _{IL} = 0.5 V 1G or 2G Strobe Common Strobe S	I _{IL}	- -	- -	-2.0 -4.0	mA
Output Voltage High Low	$V_{I(S)} = 2.0 \text{ V}$ V+ = +4.75 V; V- = -4.75 V; $I_{LOAD} = -1.0 \text{ mA}$ V+ = +5.25 V; V- = -5.25 V; $I_{LOAD} = 20 \text{ mA}$	V _{OH}	2.7	3.4	0.5	V
Supply Voltage Positive Negative	-	V+ V-	4.75 -4.75	5.0 -5.0	5.25 -5.25	V
Supply Current Positive Negative	V+ = +5.25 V; V- = -5.25 V; T _A = 25°C	I _{CC+}	- -	27 -15	35 -28	mA
Short-Circuit Output Current	-	I _{SC}	-40	-	-100	mA

AC ELECTRICAL CHARACTERISTICS ($T_A = 25^{\circ}C$; $R_1 = 280 \Omega$; $C_1 = 15 pF$, $V_2 = 5.0 V$; $V_3 = 5.0 V$, guaranteed by characterization)

					Limits		
Characteristic	From Input	To Output	Symbol	Min	Тур	Max	Unit
Large-Signal Switching Speed							
Propagation Delay							ns
Low to High (Note 2)	Amp	Output	t _{PLH(D)}	_	9.6	12	
High to Low (Note 2)	Amp	Output	t _{PHL(D)}	-	8.2	9.0	
Low to High (Note 3)	Strobe	Output	t _{PLH(S)}	_	4.8	10	
High to Low (Note 3)	Strobe	Output	t _{PHL(S)}	_	3.9	6.0	
Max. Operating Frequency	-	_	f _{MAX}	40	55	-	MHz

^{2.} Response time measured from 0 V point of \pm 100 mV_{P-P} 10 MHz square wave to the 1.5 V point of the output. 3. Response time measured from 1.5 V point of input to 1.5 V point of the output.

TYPICAL PERFORMANCE CHARACTERISTICS

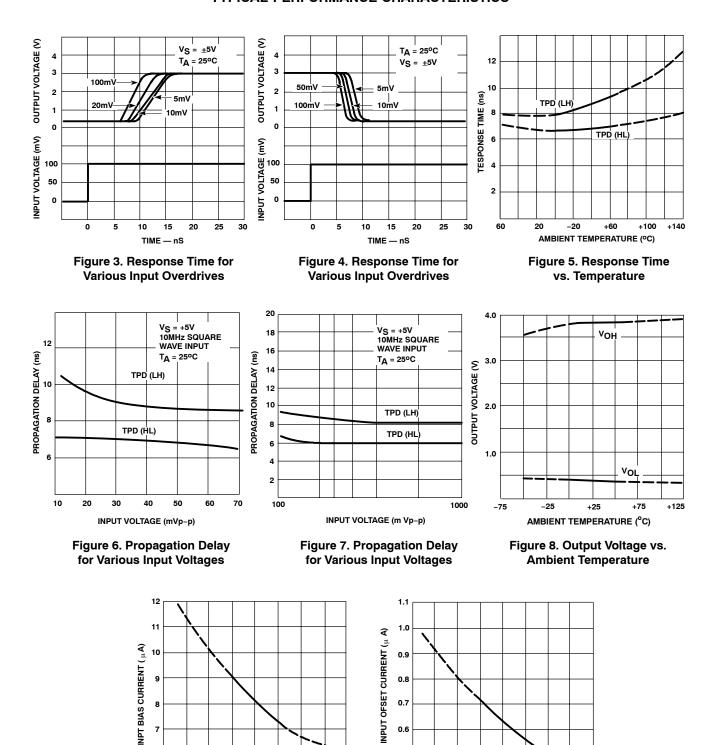


Figure 9. Input Bias Current vs. Ambient Temperature

AMBIENT TEMPERATURE (°C)

-75

Figure 10. Input Offset Current vs. Ambient Temperature

+25

AMBIENT TEMPERATURES (°C)

+125

0.5

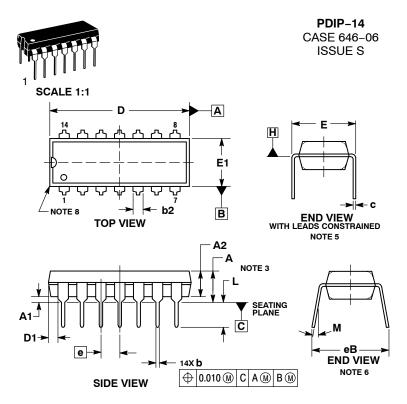
-75

-25

ORDERING INFORMATION

Device	Temperature Range	Package	Shipping [†]
NE521D		SOIC-14	
NE521DG		SOIC-14 (Pb-Free)	55 Units/Rail
NE521DR2		SOIC-14	
NE521DR2G	0 to +70°C	SOIC-14 (Pb-Free)	2500/Tape & Reel
NE521N		PDIP-14	
NE521NG		PDIP-14 (Pb-Free)	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.



DATE 22 APR 2015

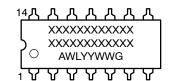
NOTES:

- 1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
 2. CONTROLLING DIMENSION: INCHES.
 3. DIMENSIONS A, A1 AND L ARE MEASURED WITH THE PACKAGE SEATED IN JEDEC SEATING PLANE GAUGE GS-3.
 4. DIMENSIONS D, D1 AND E1 DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS. MOLD FLASH OR PROTRUSIONS ARE
- NOT TO EXCEED 0.10 INCH.
 DIMENSION E IS MEASURED AT A POINT 0.015 BELOW DATUM PLANE H WITH THE LEADS CONSTRAINED PERPENDICULAR TO DATUM C.
- DIMENSION 6B IS MEASURED AT THE LEAD TIPS WITH THE LEADS UNCONSTRAINED.
- DATUM PLANE H IS COINCIDENT WITH THE BOTTOM OF THE LEADS, WHERE THE LEADS EXIT THE BODY.

 PACKAGE CONTOUR IS OPTIONAL (ROUNDED OR SQUARE
- CORNERS).

	INC	HES	MILLIM	ETERS
DIM	MIN	MAX	MIN	MAX
Α		0.210		5.33
A1	0.015		0.38	
A2	0.115	0.195	2.92	4.95
b	0.014	0.022	0.35	0.56
b2	0.060	TYP	1.52 TYP	
С	0.008	0.014	0.20	0.36
D	0.735	0.775	18.67	19.69
D1	0.005		0.13	
Е	0.300	0.325	7.62	8.26
E1	0.240	0.280	6.10	7.11
е	0.100	BSC	2.54 BSC	
eB		0.430		10.92
L	0.115	0.150	2.92	3.81
М		10°		10°

GENERIC MARKING DIAGRAM*



XXXXX = Specific Device Code = Assembly Location

WL = Wafer Lot YY = Year WW = Work Week = Pb-Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot " ■", may or may not be present.

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PDIP-14 CASE 646-06 ISSUE S

DATE 22 APR 2015

STYLE 1: PIN 1. COLLECTOR 2. BASE 3. EMITTER 4. NO CONNECTION 5. EMITTER 6. BASE 7. COLLECTOR 8. COLLECTOR 9. BASE 10. EMITTER 11. NO CONNECTION 12. EMITTER 13. BASE 14. COLLECTOR	STYLE 2: CANCELLED	STYLE 3: CANCELLED	STYLE 4: PIN 1. DRAIN 2. SOURCE 3. GATE 4. NO CONNECTION 5. GATE 6. SOURCE 7. DRAIN 8. DRAIN 9. SOURCE 10. GATE 11. NO CONNECTION 12. GATE 13. SOURCE 14. DRAIN
STYLE 5: PIN 1. GATE 2. DRAIN 3. SOURCE 4. NO CONNECTION 5. SOURCE 6. DRAIN 7. GATE 8. GATE 9. DRAIN 10. SOURCE 11. NO CONNECTION 12. SOURCE 13. DRAIN 14. GATE	STYLE 6: PIN 1. COMMON CATHODE 2. ANODE/CATHODE 3. ANODE/CATHODE 4. NO CONNECTION 5. ANODE/CATHODE 6. NO CONNECTION 7. ANODE/CATHODE 8. ANODE/CATHODE 9. ANODE/CATHODE 10. NO CONNECTION 11. ANODE/CATHODE 12. ANODE/CATHODE 13. NO CONNECTION 14. COMMON ANODE	STYLE 7: PIN 1. NO CONNECTION 2. ANODE 3. ANODE 4. NO CONNECTION 5. ANODE 6. NO CONNECTION 7. ANODE 8. ANODE 9. ANODE 10. NO CONNECTION 11. ANODE 12. ANODE 13. NO CONNECTION 14. COMMON CATHODE	STYLE 8: PIN 1. NO CONNECTION 2. CATHODE 3. CATHODE 4. NO CONNECTION 5. CATHODE 6. NO CONNECTION 7. CATHODE 8. CATHODE 9. CATHODE 10. NO CONNECTION 11. CATHODE 12. CATHODE 13. NO CONNECTION 14. COMMON ANODE
STYLE 9: PIN 1. COMMON CATHODE 2. ANODE/CATHODE 3. ANODE/CATHODE 4. NO CONNECTION 5. ANODE/CATHODE 6. ANODE/CATHODE 7. COMMON ANODE 8. COMMON ANODE 9. ANODE/CATHODE 10. ANODE/CATHODE 11. NO CONNECTION 12. ANODE/CATHODE 13. ANODE/CATHODE 14. COMMON CATHODE	STYLE 10: PIN 1. COMMON CATHODE 2. ANODE/CATHODE 3. ANODE/CATHODE 4. ANODE/CATHODE 5. ANODE/CATHODE 6. NO CONNECTION 7. COMMON ANODE 8. COMMON CATHODE 9. ANODE/CATHODE 10. ANODE/CATHODE 11. ANODE/CATHODE 12. ANODE/CATHODE 13. NO CONNECTION 14. COMMON ANODE	STYLE 11: PIN 1. CATHODE 2. CATHODE 3. CATHODE 4. CATHODE 5. CATHODE 6. CATHODE 7. CATHODE 8. ANODE 9. ANODE 10. ANODE 11. ANODE 12. ANODE 13. ANODE 14. ANODE	STYLE 12: PIN 1. COMMON CATHODE 2. COMMON ANODE 3. ANODE/CATHODE 4. ANODE/CATHODE 5. ANODE/CATHODE 6. COMMON ANODE 7. COMMON CATHODE 8. ANODE/CATHODE 9. ANODE/CATHODE 10. ANODE/CATHODE 11. ANODE/CATHODE 12. ANODE/CATHODE 13. ANODE/CATHODE 14. ANODE/CATHODE 14. ANODE/CATHODE

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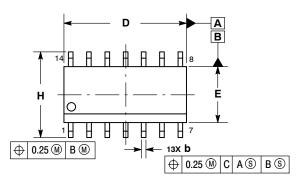
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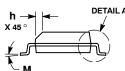
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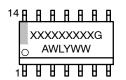




- NOTES:
 1. DIMENSIONING AND TOLERANCING PER
 - ASME Y14.5M, 1994.
 CONTROLLING DIMENSION: MILLIMETERS.
 - DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE PROTRUSION SHALL BE 0.13 TOTAL IN EXCESS OF AT
- MAXIMUM MATERIAL CONDITION.
 DIMENSIONS D AND E DO NOT INCLUDE MOLD PROTRUSIONS.
- 5. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE

	MILLIN	IETERS	INC	HES
DIM	MIN	MAX	MIN	MAX
Α	1.35	1.75	0.054	0.068
A1	0.10	0.25	0.004	0.010
АЗ	0.19	0.25	0.008	0.010
b	0.35	0.49	0.014	0.019
D	8.55	8.75	0.337	0.344
Е	3.80	4.00	0.150	0.157
œ	1.27	1.27 BSC		BSC
Н	5.80	6.20	0.228	0.244
h	0.25	0.50	0.010	0.019
L	0.40	1.25	0.016	0.049
М	0 °	7°	0 °	7 °

GENERIC MARKING DIAGRAM*

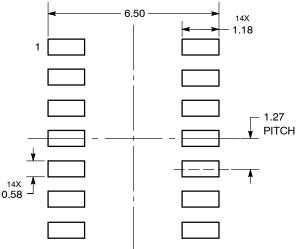


XXXXX = Specific Device Code Α = Assembly Location

WL = Wafer Lot Υ = Year WW = Work Week G = Pb-Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator. "G" or microdot " ■". may or may not be present.

SOLDERING FOOTPRINT*



DIMENSIONS: MILLIMETERS

C SEATING PLANE

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^{*}For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

SOIC-14 CASE 751A-03 ISSUE L

DATE 03 FEB 2016

STYLE 1: PIN 1. COMMON CATHODE 2. ANODE/CATHODE 3. ANODE/CATHODE 4. NO CONNECTION 5. ANODE/CATHODE 6. NO CONNECTION 7. ANODE/CATHODE 8. ANODE/CATHODE 9. ANODE/CATHODE 10. NO CONNECTION 11. ANODE/CATHODE 12. ANODE/CATHODE 13. NO CONNECTION 14. COMMON ANODE	STYLE 2: CANCELLED	STYLE 3: PIN 1. NO CONNECTION 2. ANODE 3. ANODE 4. NO CONNECTION 5. ANODE 6. NO CONNECTION 7. ANODE 8. ANODE 9. ANODE 10. NO CONNECTION 11. ANODE 12. ANODE 13. NO CONNECTION 14. COMMON CATHODE	STYLE 4: PIN 1. NO CONNECTION 2. CATHODE 3. CATHODE 4. NO CONNECTION 5. CATHODE 6. NO CONNECTION 7. CATHODE 8. CATHODE 9. CATHODE 10. NO CONNECTION 11. CATHODE 12. CATHODE 13. NO CONNECTION 14. COMMON ANODE
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