VOLTAGE COMPARATOR — SE/NE529

DESCRIPTION

The SE/NE529 is a high speed analog voltage comparator which, for the first time mates state-of-the-art Schottky diode technology with the conventional linear process. This allows simultaneous fabrication of high speed T²L gates with a precision linear amplifier on a single monolithic chip.

FEATURES

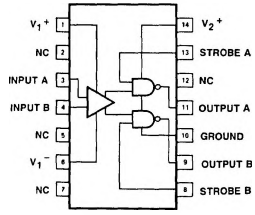
- **10ns propagation delay**
- **Complementary output gates**
- **TTL or ECL compatible outputs**
- **Wide common mode and differential voltage range**
- **Typical Gain 5000**

APPLICATIONS

- **A/D conversion**
- **ECL to TTL interface**
- **TTL to ECL interface**
- **Memory sensing**
- **Optical data coupling**
- **Mil std 883A,B,C available**

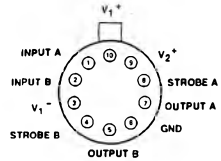
PIN CONFIGURATION

D,F,N PACKAGE



TOP VIEW
ORDER NUMBERS
SE/NE529F, NE529N,D

H PACKAGE*

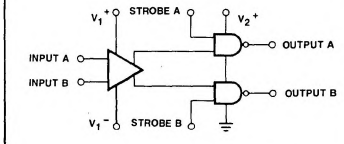


ORDER NUMBERS
SE/NE529H
*Metal cans (H) not recommended for new designs

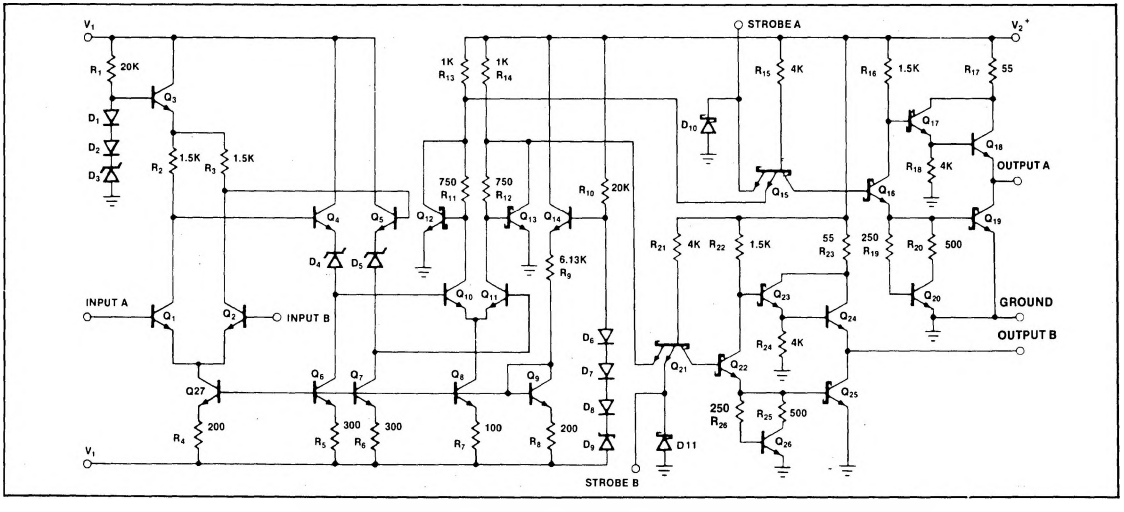
ABSOLUTE MAXIMUM RATINGS

PARAMETER	RATING	UNIT
Positive supply voltage (V1+)	+15	V
Negative supply voltage (V1-)	-15	V
Gate supply voltage (V2+)	+7	V
Output voltage	+7	V
Differential input voltage	±5	V
Input common mode voltage	±6	V
Power dissipation	600	mW
Operating temperature range		
NE529	0 to +70	°C
SE529	-55 to +125	°C
Storage temperature range	-65 to +150	°C
Lead temperature (soldering, 60 sec)	+300	°C

BLOCK DIAGRAM



EQUIVALENT SCHEMATIC



Signetics

VOLTAGE COMPARATOR — SE/NE529

DC ELECTRICAL CHARACTERISTICS $V_1+ = +10V, V_2+ = +5.0V, V_1- = -10V$

PARAMETER	TEST CONDITIONS	SE529			NE529			UNIT
		Min	Typ	Max	Min	Typ	Max	
INPUT CHARACTERISTICS								
Input offset voltage @25°C				4			6	mV
Over temperature range				6			10	mV
Input bias current @25°C			5	12		5	20	μA
Over temperature range	V_{IN} = 0V			36			50	μA
Input offset current @25°C			2	3		2	5	μA
Over temperature range	V_{IN} = 0V			9			15	μA
Common mode voltage range			0	±5		0	±5	V
GATE CHARACTERISTICS								
Output voltage								
"1" state	$V_2+ = 4.75V, I_{source} = -1mA$	2.5	3.3		2.7	3.3		V
"0" state	$V_2+ = 4.75V, I_{sink} = 10mA$			0.5			0.5	V
Strobe inputs								
"0" Input current[1]	$V_2+ = 5.25V, V_{strobe} = 0.5V$			-2			-2	mA
"1" Input current @ 25°C[1]	$V_2+ = 5.25V, V_{strobe} = 2.7V$			50			100	μA
Over temperature range	$V_2+ = 5.25V, V_{strobe} = 2.7V$			200			200	μA
"0" input voltage	$V_2+ = 4.75V$			0.8			0.8	V
"1" input voltage	$V_2+ = 4.75V$	2.0			2.0			V
Short circuit								
Output current	$V_2+ = 5.25V, V_{OUT} = 0V$	-18		-70	-18		-70	mA
POWER SUPPLY REQUIREMENTS								
Supply voltage								
V_1+		5		10	5		10	V
V_1-		-6		-10	-6		-10	V
V_2+		4.5	5	5.5	4.75	5	5.25	V
Supply current	$V_1+ = 10V, V_1- = -10V$ $V_2+ = 5.25V$							
I_1+	Over temp.			5			5	mA
I_1-	Over temp.			10			10	mA
I_2+	Over temp.			20			20	mA

NOTES
1. See logic function table.

AC ELECTRICAL CHARACTERISTICS $T_A = 25°C$

PARAMETER	TEST CONDITIONS	LIMITS			UNIT
		Min	Typ	Max	
Transient response	V_{IN} = ±100mV step				
Propagation delay time					
t_{PLH}			12	22	ns
t_{PHL}			10	20	ns
Delay between output A and B			2	5	ns
Strobe delay time					
t_{ON} turn-on time			6		ns
t_{OFF} turn-off time			6		ns

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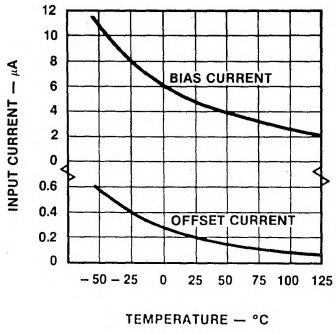
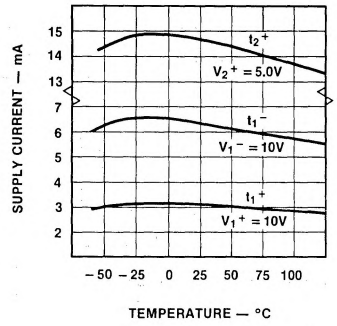
TYPICAL PERFORMANCE CHARACTERISTICS

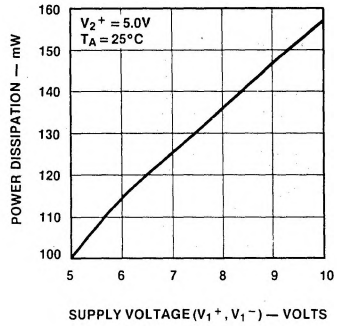
INPUT CURRENTS vs TEMPERATURE



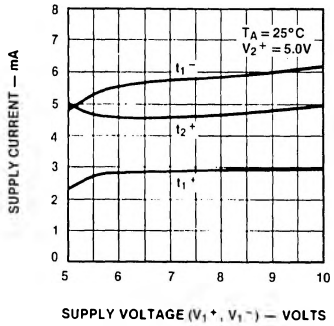
SUPPLY CURRENT vs TEMPERATURE



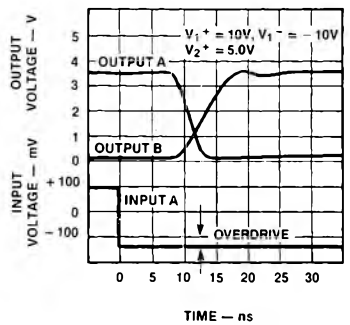
POWER DISSIPATION vs SUPPLY VOLTAGE



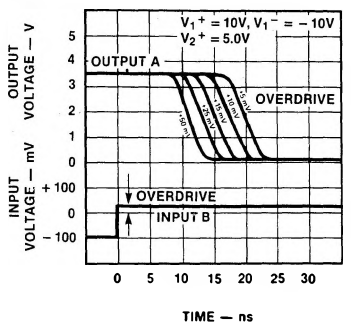
SUPPLY CURRENT vs SUPPLY VOLTAGE



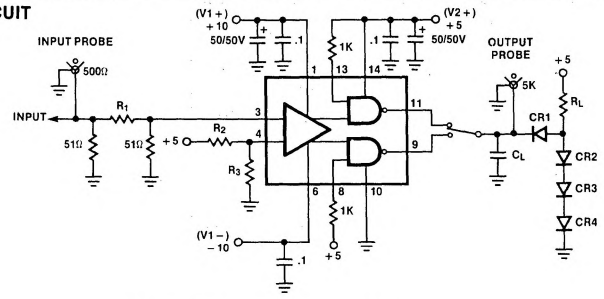
OUTPUT PROPAGATION DELAYS



RESPONSE TIME FOR VARIOUS INPUT OVERDRIVES



RESPONSE TIME TEST CIRCUIT



CR1 – CR4 = IN914
R1 SELECTED FOR 15:1 DIVIDER
R2,3 SELECTED FOR 100mV AT PIN 4

INPUT
PRR = 1MHz
PW = 50ns
Tr = Tf = 2ns
AMPLITUDE = 3.00V

VOLTAGE COMPARATOR

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APPLICATIONS

One of the main features of the device is that supply voltages (V1+, V1−) need not be balanced, as indicated in the following diagrams. For proper operation, however, negative supply (V1−) should always be at least six volts more negative than the ground terminal (pin 6). Input Common Mode range should be limited to values of two volts less than the supply voltages (V1+ and V1−) up to a maximum of ±6 volts as supply voltages are increased.

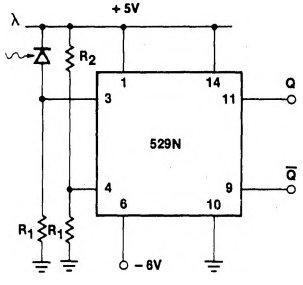
It is also important to note that Output A is in phase with Input A and Output B is in phase with Input B.

NE529 LOGIC FUNCTION

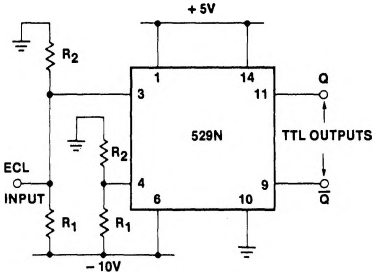
V_{IN} (A^+, B^-)	STR 'A'	STR 'B'	OUT 'A'	OUT 'B'	COMMENT
$> V_{off}$	X	h/l	H	l/h	Read I_{ILB}, I_{IHA}
$< -V_{off}$	h/l	X	l/h	H	Read I_{ILA}, I_{IHB}

TYPICAL APPLICATIONS

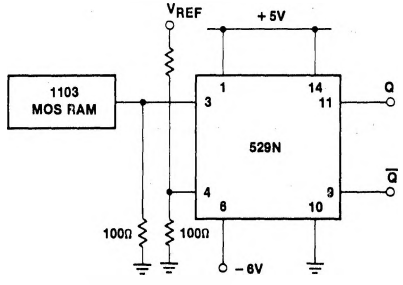
PHOTODIODE DETECTOR



ECL TO TTL INTERFACE



MOS MEMORY SENSE AMP



TTL TO ECL INTERFACE