

Voltage comparator

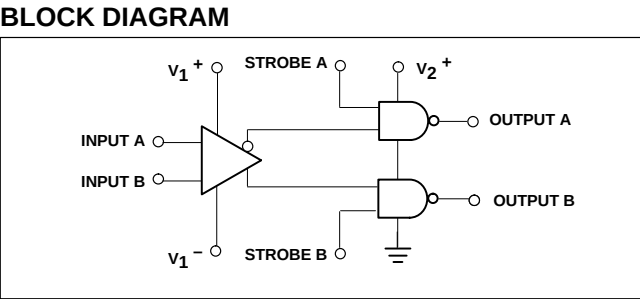
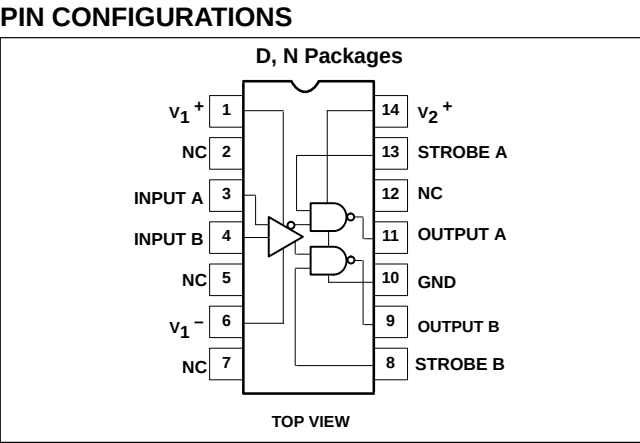
NE529

DESCRIPTION

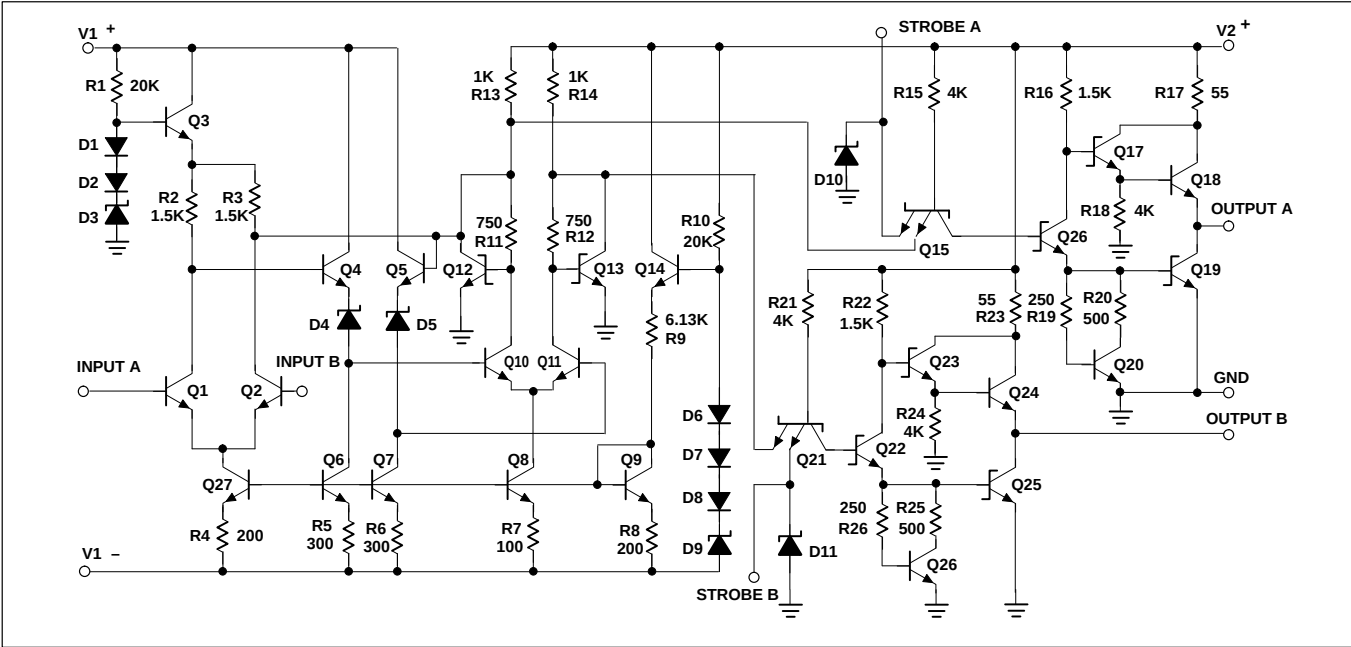
The NE529 is a high-speed analog voltage comparator which, for the first time, mates state-of-the-art Schottky diode technology with the conventional linear process. This allows simultaneous fabrication of high-speed TTL gates with a precision linear amplifier on a single monolithic chip.

- 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



DESCRIPTION	TEMPERATURE RANGE	ORDER CODE	DWG #
14-Pin Plastic Dual In-Line Package (DIP)	0 to +70°C	NE529N	0405B
14-Pin Small Outline (SO) Package	0 to +70°C	NE529D	0175D



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ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	RATING	UNIT
V_{1+}	Positive supply voltage	+15	V
V_{1-}	Negative supply voltage	-15	V
V_{2+}	Gate supply voltage	+7	V
V_{OUT}	Output voltage	+7	V
V_{IN}	Differential input voltage	± 5	V
V_{CM}	Input common mode voltage	± 6	V
P_D	Maximum power dissipation ¹ $T_A=25^\circ\text{C}$ (still-air)		
	N package	1420	mW
	D package	1040	mW
T_A	Operating temperature range	0 to +70	$^\circ\text{C}$
T_{STG}	Storage temperature range	-65 to +150	$^\circ\text{C}$
T_{SOLD}	Lead soldering temperature (10 sec max)	+300	$^\circ\text{C}$

NOTES:

- Derate above 25°C at the following rates:
N package at $11.5\text{mW}/^\circ\text{C}$
D package at $8.3\text{mW}/^\circ\text{C}$

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DC ELECTRICAL CHARACTERISTICS

 $V_1=+10V$, $V_2=+5.0V$, $V_1=-10V$, unless otherwise specified.

SYMBOL	PARAMETER	TEST CONDITIONS	NE529			UNIT
			Min	Typ	Max	
Input characteristics						
V _{OS}	Input offset voltage @ 25°C Over temperature range				6 10	mV
I _{BIAS}	Input bias current @ 25°C Over temperature range	V _{IN} =0V		5	20 50	μA
I _{OS}	Input offset current @ 25°C Over temperature range	V _{IN} =0V		2	5 15	μA μA
V _{CM}	Common-mode voltage range		-5	0		V
Gate characteristics						
V _{OUT}	Output voltage “1” state “0” state	V ₂ + =4.75V, I _{SOURCE} =-1mA V ₂ + =4.75V, I _{SINK} =10mA	2.7	3.3	 0.5	V V
	Strobe inputs “0” Input current ¹ “1” Input current @ 25°C ¹ Over temperature range “0” input voltage “1” input voltage	V ₂ + =5.25V, V _{STROBE} =0.5V V ₂ + =5.25V, V _{STROBE} =2.7V V ₂ + =5.25V, V _{STROBE} =2.7V V ₂ + =4.75V V ₂ + =4.75V	 2.0		-2 100 200 0.8	mA μA μA V V
I _{SC}	Short-circuit output current	V ₂ + =5.25V, V _{OUT} =0V	-18		-70	mA
Power supply requirements						
V ₁ + V ₁ - V ₂ +	Supply voltage		5 -6 4.75	 5	10 -10 5.25	V V V
I ₁ + I ₁ - I ₂ +	Supply current	V ₁ + =10V, V ₁ - =-10V V ₂ + =5.25V Over temp. Over temp. Over temp.			5 10 20	mA mA mA

NOTES:

- See logic function table.

AC ELECTRICAL CHARACTERISTICS

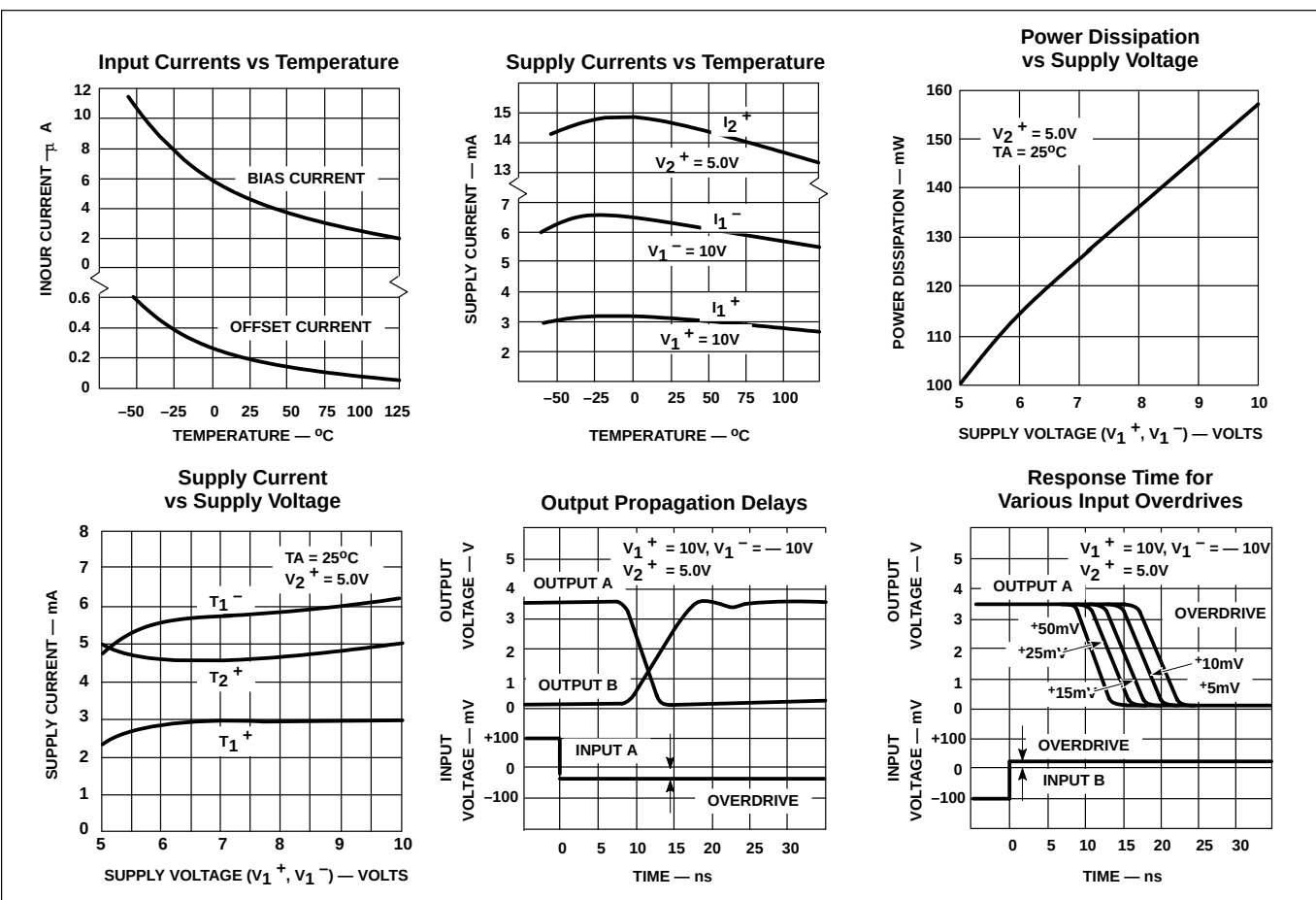
 $T_A=25^\circ C$ (See AC test circuit).

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

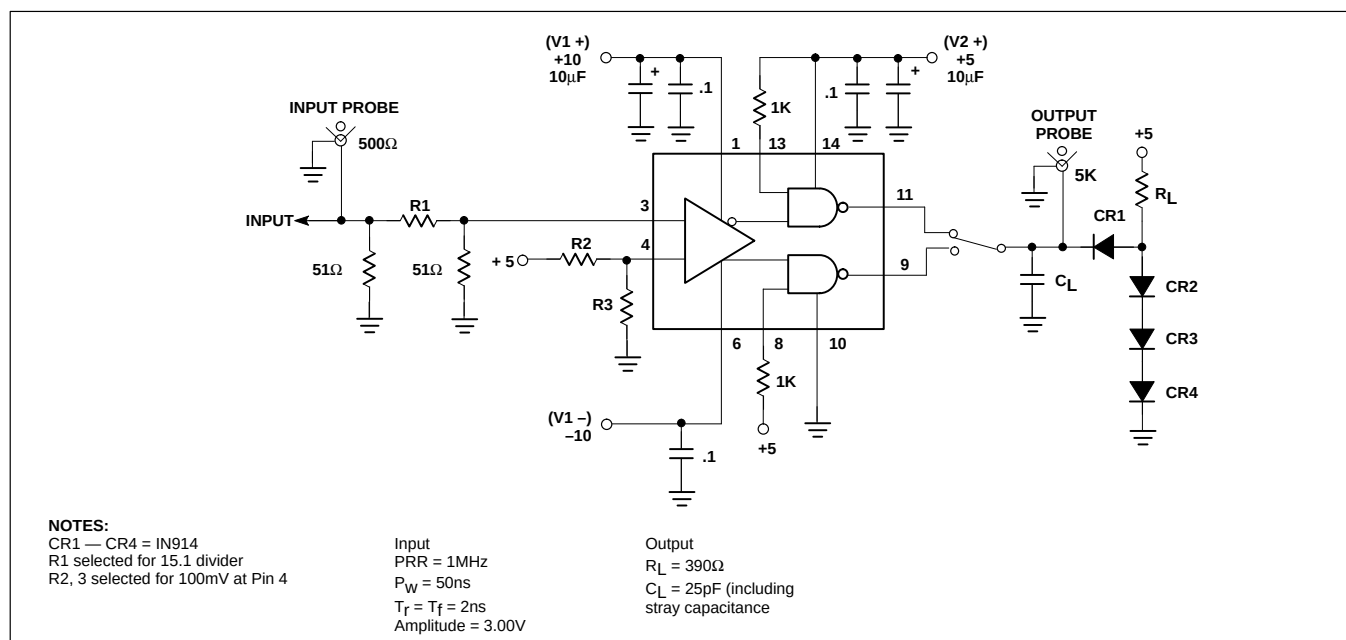
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TYPICAL PERFORMANCE CHARACTERISTICS



RESPONSE TIME TEST CIRCUIT



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APPLICATIONS

One of the main features of the device is that supply voltages (V_+ , V_-) need not be balanced, as in the following diagrams. For proper operation, however, negative supply (V_-) should always be at least 6V more than the ground terminal (pin 6). Input Common-Mode

range should be limited to values of 2V less than the supply voltages (V_+ and V_-) up to a maximum of $\pm 5V$ 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.

LOGIC FUNCTION

V_{ID} (A^+ , B^-)	STROBE A	STROBE B	OUTPUT A	OUTPUT B
$V_{ID} \leq -V_{OS}$	H	X	L	H
$-V_{OS} < V_{ID} < V_{OS}$	H	H	Undefined	Undefined
$V_{ID} \geq V_{OS}$	X	H	H	L
X	L	L	H	H

TYPICAL APPLICATIONS

