

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.

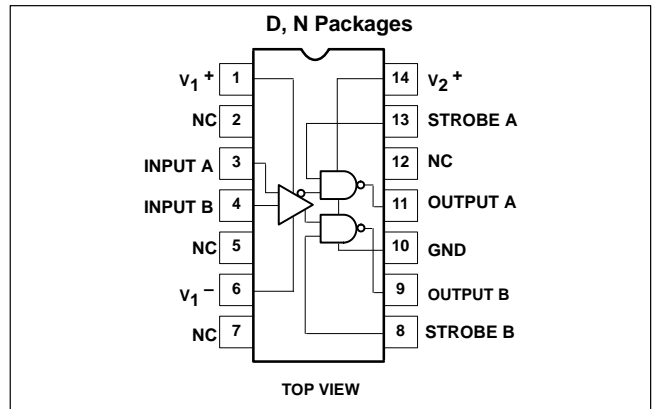
FEATURES

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

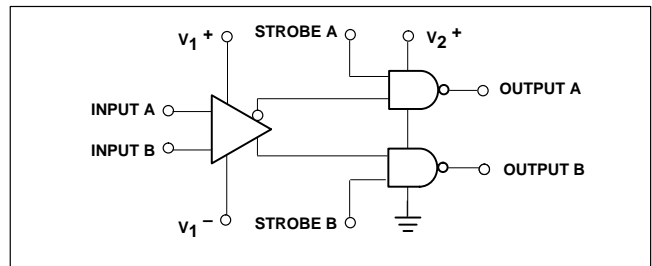
APPLICATIONS

- A/D conversion
- ECL-to-TTL interface
- TTL-to-ECL interface
- Memory sensing
- Optical data coupling

PIN CONFIGURATIONS

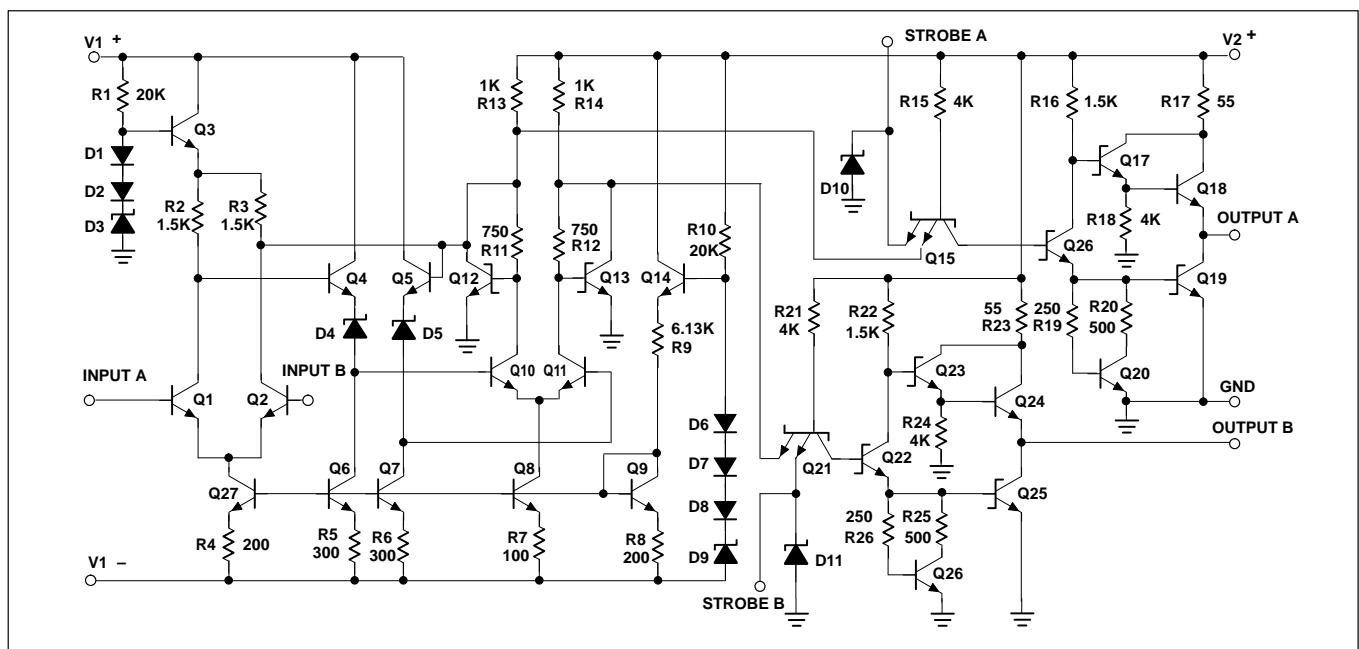


BLOCK DIAGRAM



ORDERING INFORMATION

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°C (still-air)		
	N package	1420	mW
	D package	1040	mW
T _A	Operating temperature range	0 to +70	°C
T _{STG}	Storage temperature range	-65 to +150	°C
T _{SOLD}	Lead soldering temperature (10 sec max)	+300	°C

NOTES:

- Derate above 25°C at the following rates:
 N package at 11.5mW/°C
 D package at 8.3mW/°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
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		V V
	Strobe inputs "0" Input current ¹ "1" Input current @ 25°C ¹ Over temperature range "0" input voltage "1" input voltage	$V_{2+}=5.25V$, $V_{STROBE}=0.5V$ $V_{2+}=5.25V$, $V_{STROBE}=2.7V$ $V_{2+}=5.25V$, $V_{STROBE}=2.7V$ $V_{2+}=4.75V$ $V_{2+}=4.75V$			-2 100 200 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		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:

1. See logic function table.

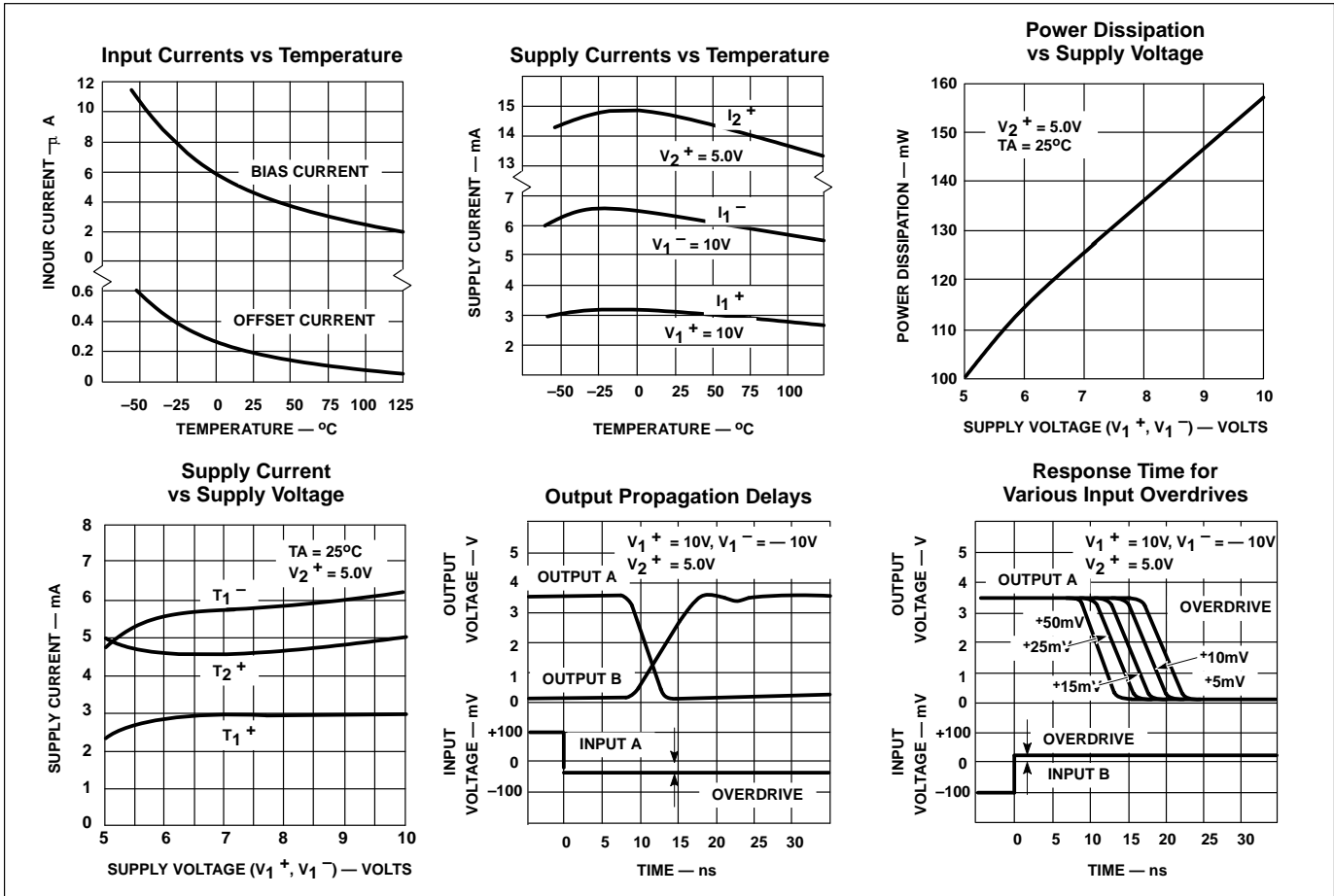
AC ELECTRICAL CHARACTERISTICS $T_A=25^\circ C$ (See AC test circuit).

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

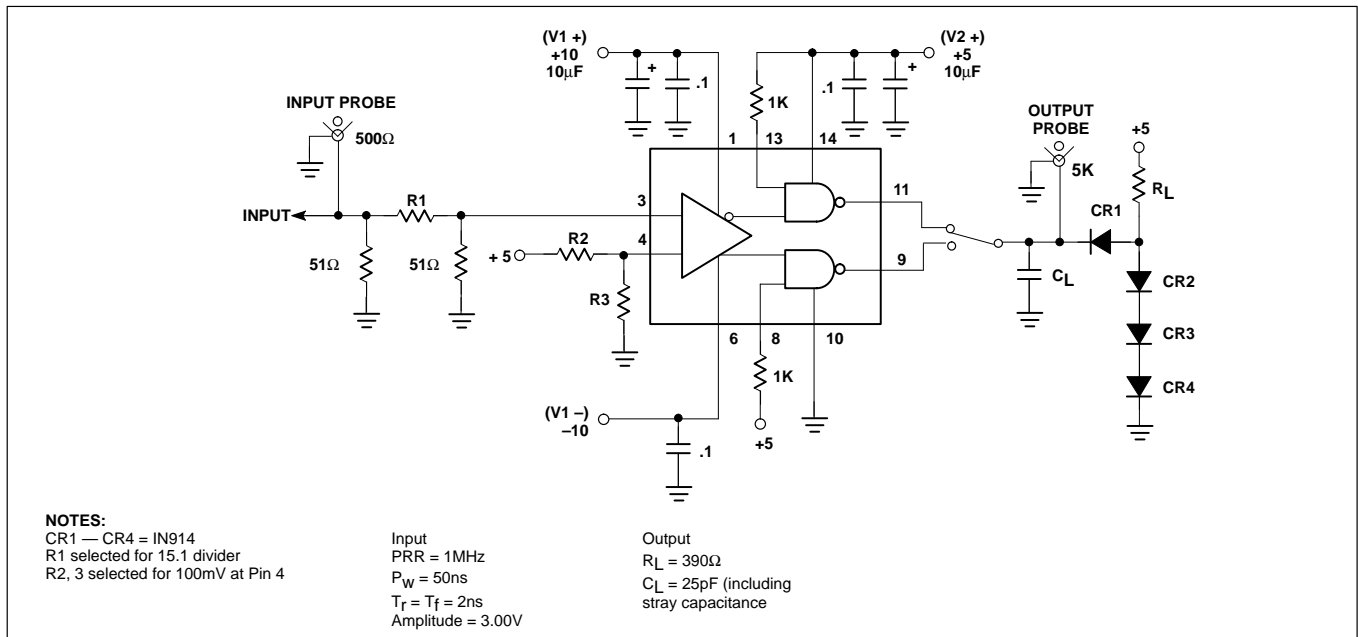
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TYPICAL PERFORMANCE CHARACTERISTICS



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

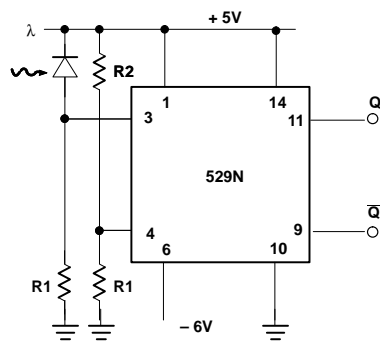
range should be limited to values of 2V less than the supply voltages (V_+ and V_-) up to a maximum of $\pm 5V$ as supply voltages are increased.

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

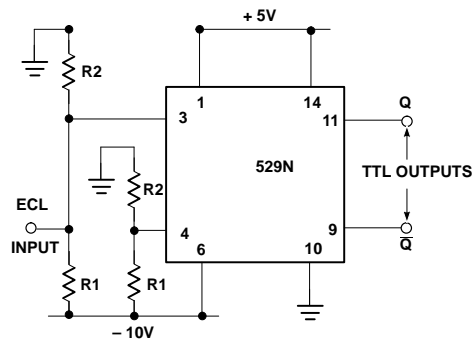
LOGIC FUNCTION

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

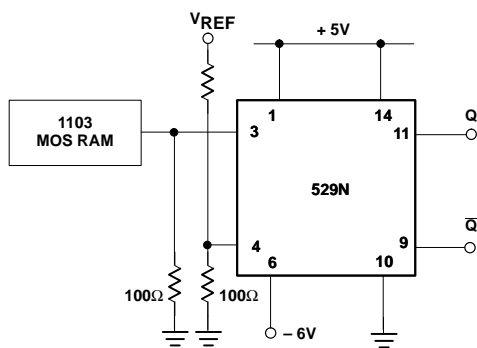
TYPICAL APPLICATIONS



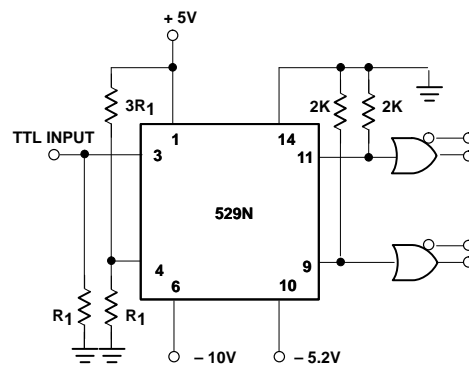
Photodiode Detector



ECL-to-TTL Interface



MOS Memory Sense AMP



TTL-to-ECL Interface