

VOLTAGE COMPARATOR

SE/NE527

DESCRIPTION

The SE/NE527 is a high speed analog voltage comparator which, in 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. The SE/NE527 is similar in design to the Signetics SE/NE529 voltage comparator except that it incorporates a "Emitter Follower" input stage for extremely low input currents. This opens the door to a whole new range of applications for analog voltage comparators.

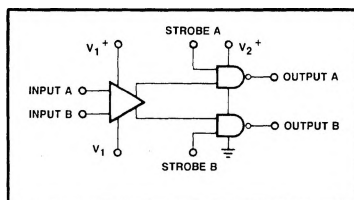
FEATURES

- 15ns propagation delay
- Complementary output gates
- TTL or ECL compatible outputs
- Wide common mode and differential voltage range
- Mil std 883A,B,C available
- Typical Gain of 5000

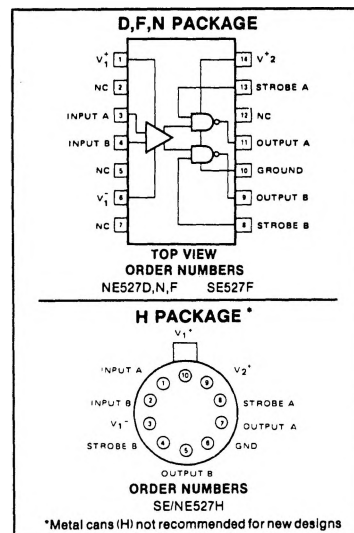
APPLICATIONS

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

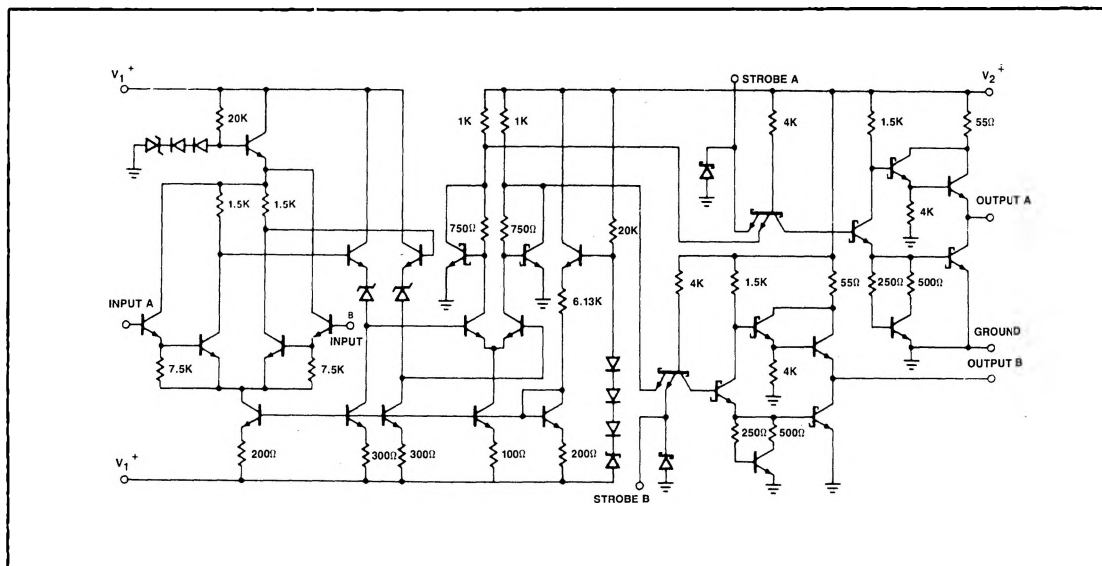
BLOCK DIAGRAM



PIN CONFIGURATIONS



EQUIVALENT SCHEMATIC



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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		
NE527	0 to +70	°C
SE527	-55 to +125	°C
Storage temperature range	-65 to +150	°C
Lead temperature (soldering, 60sec)	+300	°C

DC ELECTRICAL CHARACTERISTICS $V_{1+} = 10V$, $V_{1-} = -10V$, $V_{2+} = +5.0V$

PARAMETER	TEST CONDITIONS	SE527			NE527			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				2			2	μA
Over temperature range				4			4	μA
Input offset current @ 25°C	$V_{IN} = 0V$			0.5			0.75	μA
Over temperature range				1			1	μA
Common mode voltage range				±5				V
GATE CHARACTERISTICS								
Output voltage	$V_{2+} = 4.75V$, $I_{SOURCE} = -1mA$ $V_{2+} = 4.75V$, $I_{SINK} = 10mA$	2.5	3.3		2.7	3.3		
"1" State								V
"0" State				0.5			0.5	V
Strobe inputs	$V_{2+} = 5.25V$, $V_{STROBE} = 0.5V$ $V_{2+} = 5.25V$, $V_{STROBE} = 2.7V$ Over temperature range $V_{2+} = 5.25V$, $V_{STROBE} = 2.7V$ $V_{2+} = 4.75V$ $V_{2+} = 4.75V$	2.0			2.0			
"0" Input current ¹								mA
"1" Input current @ 25°C ¹								μA
Over temperature range								μA
"0" Input voltage								V
"1" Input voltage								V
Short circuit	$V_{2+} = 5.25V$, $V_{OUT} = 0V$	-18			-18			
Output current				-70			-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	$V_{1+} = 10V$, $V_{1-} = -10V$ $V_{2+} = 5.25V$ Over temp. Over temp. Over temp.							
I_{1+}				5			5	mA
I_{1-}				10			10	mA
I_{2+}				20			20	mA

NOTES

1. See logic function table.

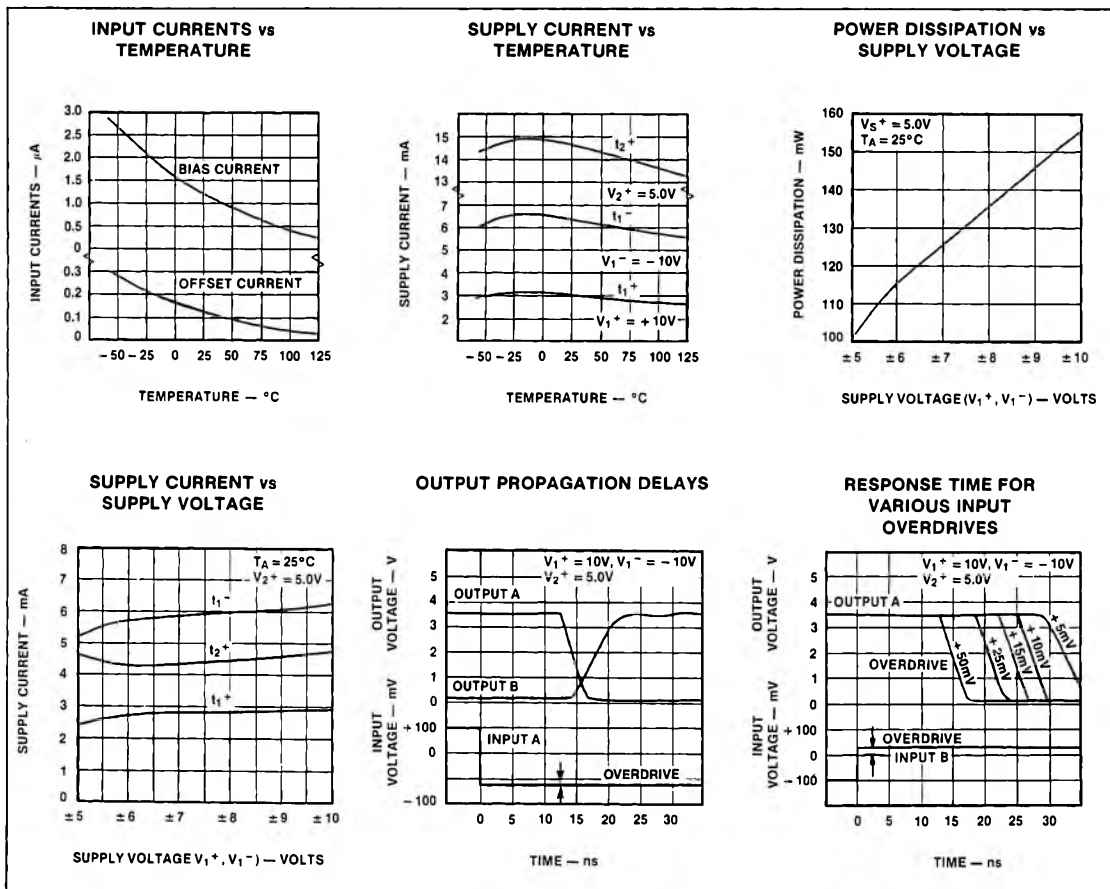
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AC ELECTRICAL CHARACTERISTICS $T_A = 25^\circ\text{C}$ unless otherwise specified.

PARAMETER	TEST CONDITIONS	LIMITS			UNIT
		Min	Typ	Max	
Transient response propagation delay time t_{PLH} t_{PHL}	$V_{IN} = \pm 100\text{mV}$ step		16 14	26 24	ns ns
			2	5	ns
Delay between output A and B					ns
Strobe delay time t_{on} Turn-on time t_{off} Turn-off time			6 6		ns ns

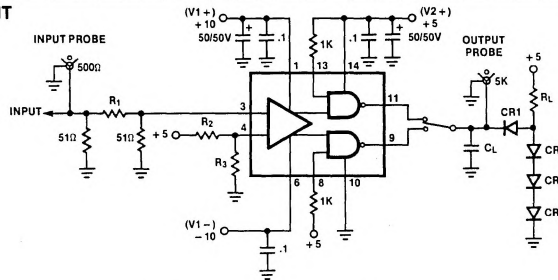
TYPICAL PERFORMANCE CHARACTERISTICS



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RESPONSE TIME TEST CIRCUIT



CR1 - CR4 = IN914
R1 SELECTED FOR 15:1 DIVIDER
R2,3 SELECTED FOR 100mV AT PIN 4
INPUT
PRR = 1MHz
P_W = 50ns
T_r = T_f = 2ns
AMPLITUDE = 3.00V

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.

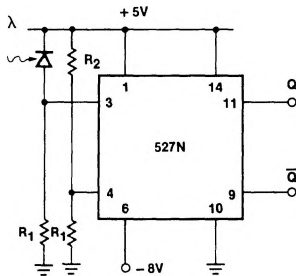
It is also important to note that Output A is in phase with Input A and Output B is in phase with Input B.

NE527 LOGIC FUNCTION

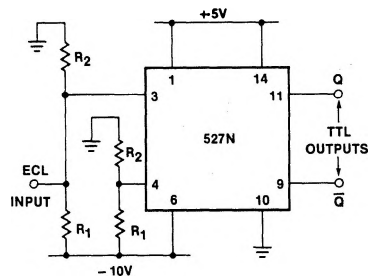
V _{IN} (A ⁺ , B ⁻)	STR 'A'	STR 'B'	OUT 'A'	OUT 'B'	COMMENT
> V _{off}	X	h/l	H	l/h	Read I _{ILB} , I _{IHA}
< -V _{off}	h/l	X	l/h	H	Read I _{ILA} , I _{IHB}

TYPICAL APPLICATIONS

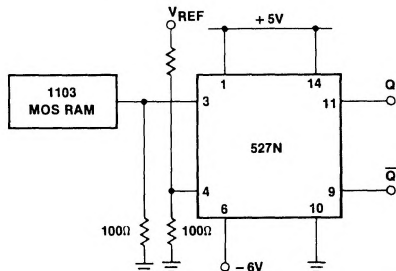
PHOTODIODE DETECTOR



ECL TO TTL INTERFACE



MOS MEMORY SENSE AMP



TTL TO ECL INTERFACE

