DESCRIPTION

The SE/NE 527 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 T^2L gates with a precision linear amplifier on a single monolithic chip.

The SE/NE 527 is similar in design to the Signetics SE/NE 529 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.

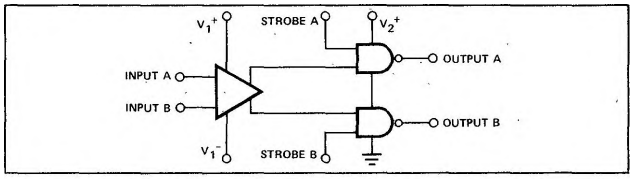
FEATURES

- **15 nsec PROPAGATION DELAY**
- **COMPLEMENTARY OUTPUT GATES**
- **TTL OR ECL COMPATIBLE OUTPUTS**
- **WIDE COMMON MODE AND DIFFERENTIAL VOLTAGE RANGE**

APPLICATIONS

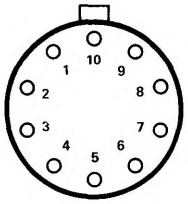
A/D CONVERSION
ECL TO TTL INTERFACE
TTL TO ECL INTERFACE
MEMORY SENSING
OPTICAL DATA COUPLING

BLOCK DIAGRAM



PIN CONFIGURATION

K PACKAGE
(Top View)



1. Input A
2. Input B
3. V_1^-
4. Strobe B
5. Output B
6. Ground
7. Output A
8. Strobe A
9. V_2^+
10. V_1^+

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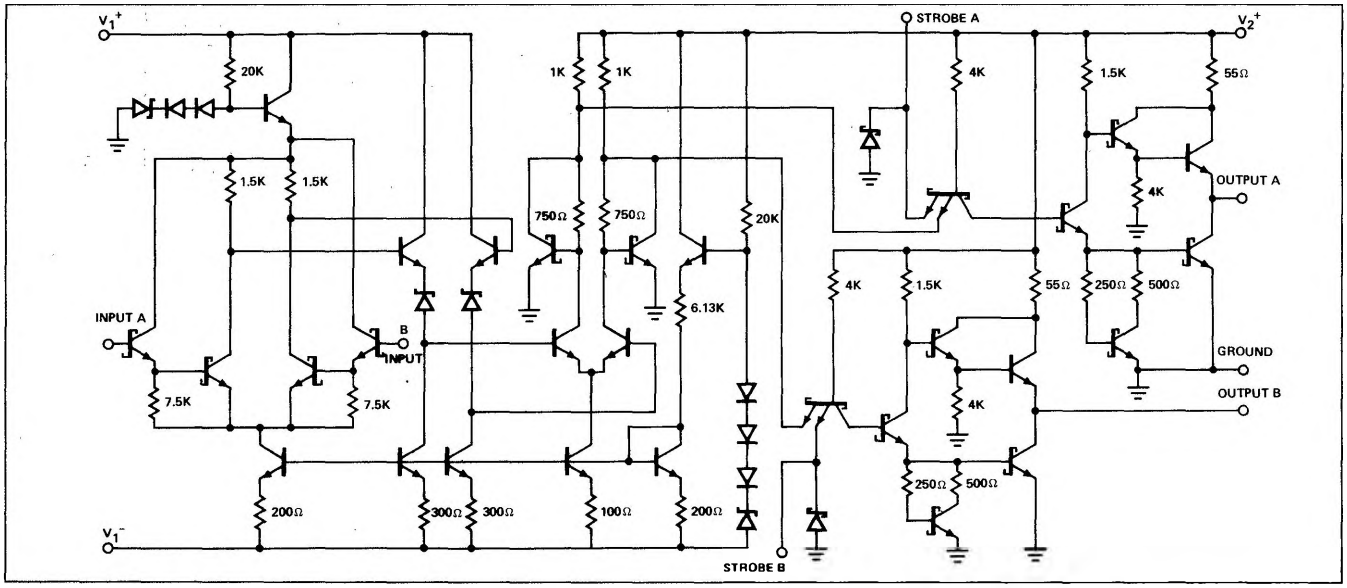
ABSOLUTE MAXIMUM RATINGS

Positive Supply Voltage (V_1^+)	+15 volts
Negative Supply Voltage (V_1^-)	-15 volts
Gate Supply Voltage (V_2^+)	+7 volts
Output Voltage	+15 volts
Differential Input Voltage	±5 volts
Input Common Mode Voltage	±6 volts
Power Dissipation	600mW
Operating Temperature Range	
NE 527	0°C to +70°C
SE 527	-55°C to +125°C
Storage Temperature Range	-65°C to +150°C
Lead Temperature (Soldering 60 seconds)	+300°C

EQUIVALENT CIRCUIT



ELECTRICAL CHARACTERISTICS ($V_1^+ = +10V$, $V_1^- = -10V$, $V_2^+ = +5.0V$, $V_{in} = 0V$)

PARAMET	TEST CONDITIONS	SE 527			NE 527			UNITS
		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	$V_1^+ = 10V$, $V_1^- = -10V$			2			2	μA
over temperature range	$V_{in} = 0V$			4			4	μA
Input Offset Current @25°C	$V_1^+ = 10V$, $V_1^- = -10V$			0.5			0.75	μA
over temperature range	$V_{in} = 0V$			1			1	μA
Voltage Gain	$T_A = 25°C$		5			5		V/mV
Input Resistance	$T_A = 25°C$, f = 1 kHz		500			500		KΩ
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	$V_2^+ = 5.25V$, $V_{strobe} = 0.5V$			-2			-2	mA
"1" Input Current @25°C	$V_2^+ = 5.25V$, $V_{strobe} = 2.7V$			50			100	μA
over temperature range				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	$V_2^+ = 5.25V$, $V_{out} = 0V$	-40		-100	-40		-100	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^+	$T_A = 125°C$			3.25				mA
	$T_A = 25°C$			3.75				mA
	$T_A = -55°C$			4.0				mA
	$0°C \leqslant T_A \leqslant 70°C$						5	mA
I_1^-	$T_A = 125°C$			7.0				mA
	$T_A = 25°C$			7.5				mA
	$T_A = -55°C$			8.5				mA
	$0°C \leqslant T_A \leqslant 70°C$						10	mA
I_2^+	$T_A = 125°C$			15				mA
	$T_A = 25°C$			16				mA
	$T_A = -55°C$			18				mA
	$0°C \leqslant T_A \leqslant 70°C$						20	mA
TRANSIENT RESPONSE	V_{in} = 50 mV overdrive							
Propagation Delay Time								
t_{pd} (0)	$T_A = +25°C$		14			14		ns
t_{pd} (1)	$T_A = +25°C$		16			16		ns
Delay between Output A and B	$T_A = +25°C$		2			2		ns
Strobe Delay Time								
Turn On	$T_A = +25°C$		6			6		ns
Turn Off	$T_A = +25°C$		6			6		ns

Parameters are guaranteed over the temperature range unless otherwise noted.

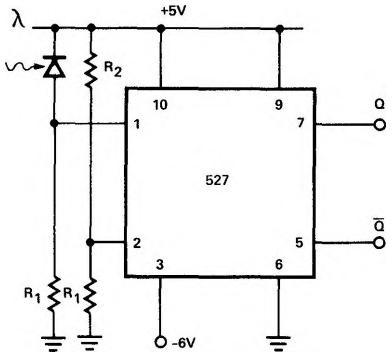
APPLICATIONS

One of the main features of the device is that supply voltages (V_1^+, V_1^-) need not be balanced, as indicated in the following diagrams. For proper operation, however, negative supply (V_1^-) 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 (V_1^+ and V_1^-) up to a maximum of ±6 volts as supply voltages are increased.

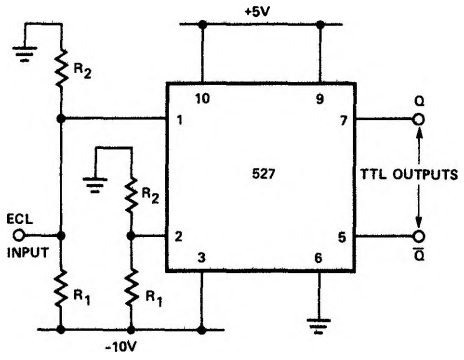
It is also important to note that Output A is in phase with Input A and Output B is in phase with Input B.

TYPICAL APPLICATIONS

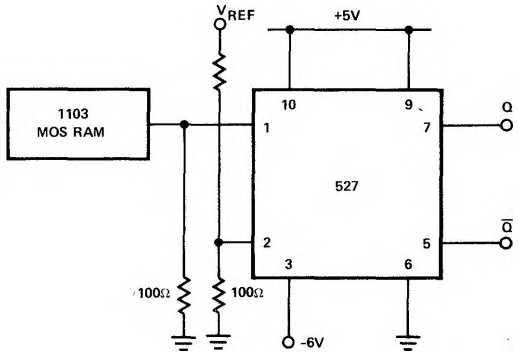
PHOTODIODE DETECTOR



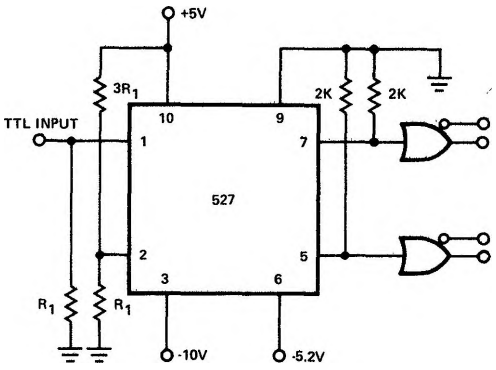
ECL TO TTL INTERFACE



MOS MEMORY SENSE AMP.

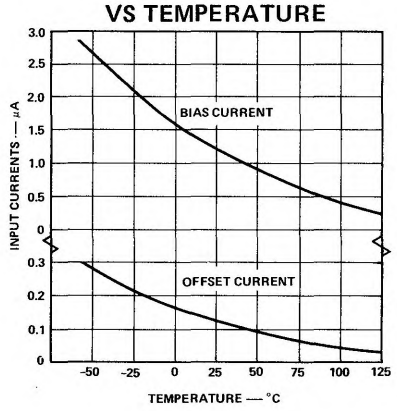


TTL TO ECL INTERFACE

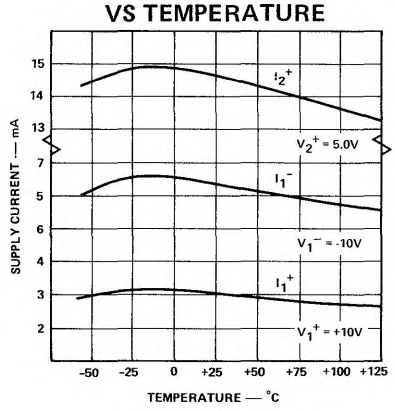


TYPICAL PERFORMANCE CURVES

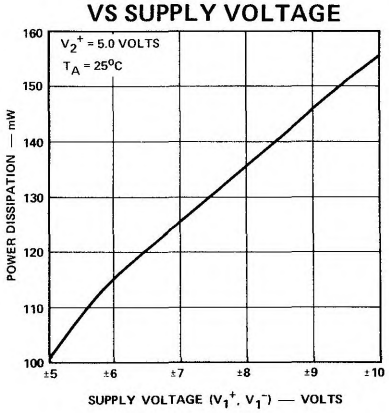
INPUT CURRENTS VS TEMPERATURE



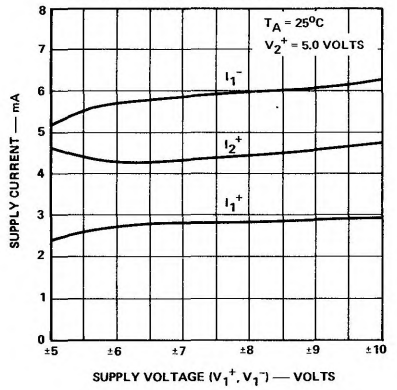
SUPPLY CURRENT VS TEMPERATURE



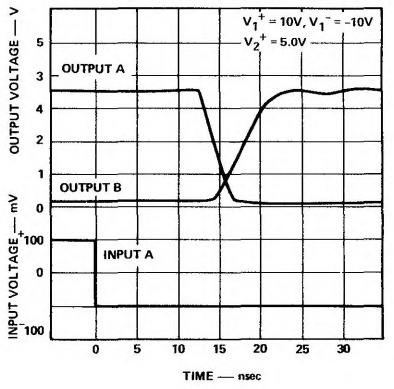
POWER DISSIPATION VS SUPPLY VOLTAGE



SUPPLY CURRENT VS SUPPLY VOLTAGE



OUTPUT PROPAGATION DELAYS



RESPONSE TIME FOR VARIOUS INPUT OVERDRIVES