Voltage comparator

529

FEATURES

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

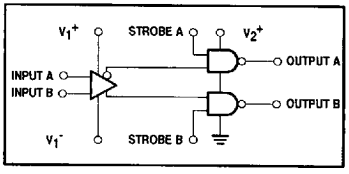
APPLICATIONS

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

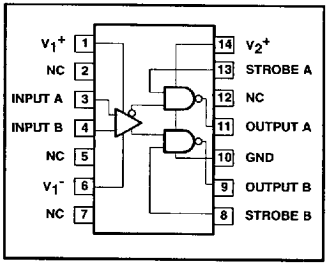
DESCRIPTION

The 529 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.

BLOCK DIAGRAM



PIN CONFIGURATION

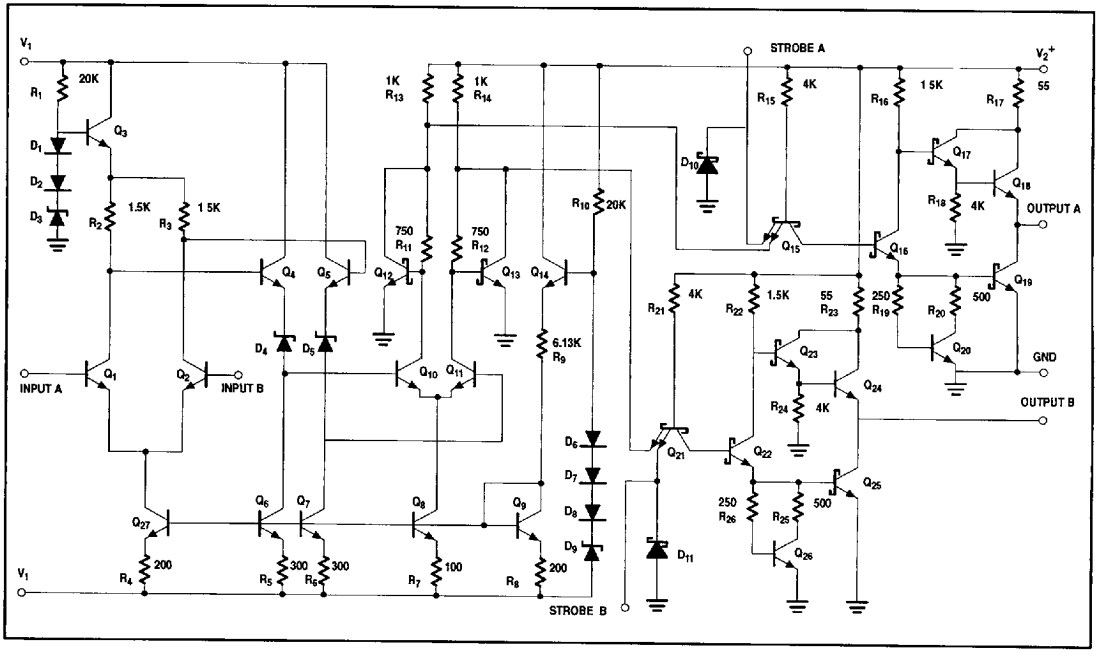


ORDERING INFORMATION

DESCRIPTION	ORDER CODE	PACKAGE DESIGNATOR*
14-Pin Ceramic DIP	529/BCA	GDIP1-T14

* MIL-STD 1835 or Appendix A of 1995 Military Data Handbook

EQUIVALENT SCHEMATIC



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ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	RATING[1]	UNIT
V_1+	Positive supply voltage	+15	V
V_1-	Negative supply voltage	-15	V
V_2+	Gate supply voltage	+7	V
V_O	Output voltage	+7	V
V_{ID}	Differential input voltage	±5	V
V_{ICR}	Input common mode voltage	±6	V
P_D	Power dissipation	600	mW
T_{STG}	Storage temperature range	-65 to +150	°C

DC ELECTRICAL CHARACTERISTICS

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

SYMBOL	PARAMETER	TEST CONDITIONS	$T_{amb} = +25°C$			$T_{amb} = -55°C, +125°C$			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Input Characteristics									
V_{IO}	Input offset voltage				4			6	mV
V_{IB}	Input bias current	$V_1 = 0V$		5	12			36	µA
I_{IO}	Input offset current	$V_1 = 0V$		2	3			9	µA
V_{ICR}	Common mode voltage range		±5			±5			V
Gate Characteristics									
V_{OH}	Output voltage "1" State	$V_2+ = 4.5V$, $I_{OH} = -1mA$	2.5	3.3		2.5			V
V_{OL}	Output voltage "0" State	$V_2+ = 4.5V$, $I_{OL} = 10mA$			0.5			0.5	V
V_{IK}	Input clamp voltage	$I_{IK} = -18mA$, $V_2+ = 4.5V$			-1.5			-1.5	V
I_{IL}	Strobe inputs "0" current[2]	$V_2+ = 5.5V$, $V_{STROBE} = 0.5V$			-2			-2	mA
I_{IH}	Strobe inputs "1" current	$V_2+ = 5.5V$, $V_{STROBE} = 2.7V$			50			200	µA
V_{IL}	Strobe inputs "0" voltage	$V_2+ = 4.5V$			0.8			0.8	V
V_{IH}	Strobe inputs "1" voltage	$V_2+ = 4.5V$	2.0			2.0			V
I_{SC}	Short-circuit output current	$V_2+ = 5.5V$, $V_O = 0V$	-18		-70	-18		-70	mA
Power Supply Requirements									
V_1+	Supply voltage comparator		5		10	5		10	V
V_1-	Supply voltage comparator		-6		-10	-6		-10	V
v_2+	Supply voltage gate		4.5	5	5.5	4.5	5	5.5	V
V_1+	Supply current comparator	$V_1+ = 10V$			5			5	mA
I_1-	Supply current comparator	$V_1- = -10V$			10			10	mA
I_2+	Supply current gate	$V_2+ = +5.5V$			20			20	mA

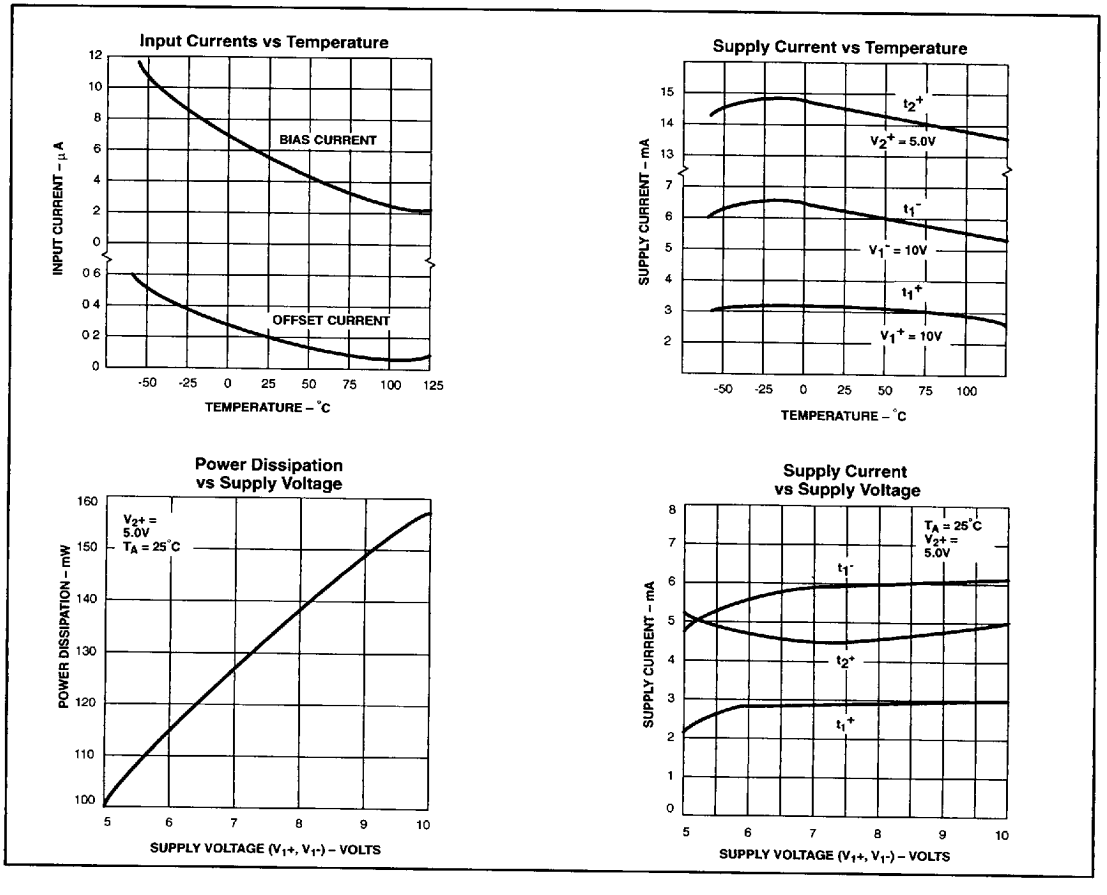
AC ELECTRICAL CHARACTERISTICS

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

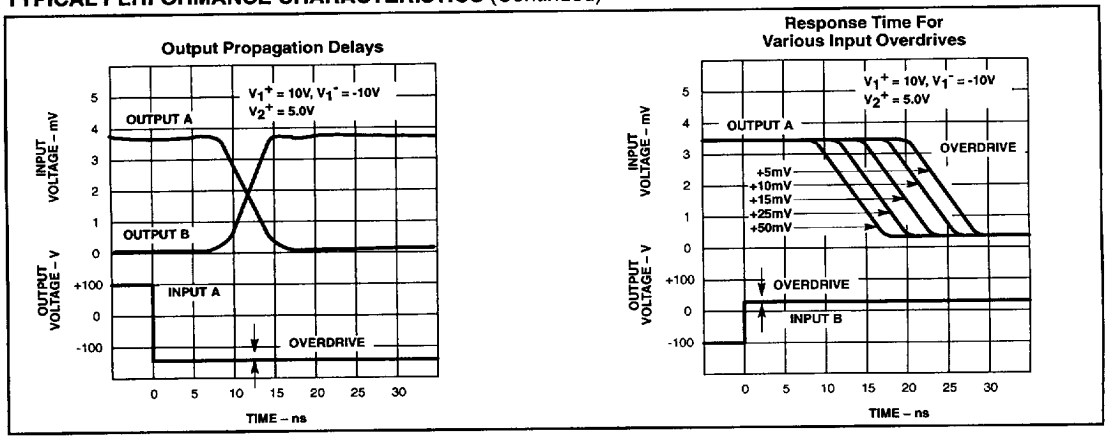
SYMBOL	PARAMETER	TO	FROM	TEST CONDITIONS	T_{amb} = +25°C			T_{amb} = -55°C, +125°C			UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	
	Transient response propagation delay time										
t_{PLH}	Low-to-High	Output	Input	V_1 = ±100mV step		12	22				ns
t_{PHL}	High-to-Low					10	20				ns
Δt	Delay between output A and B	Output	Output	R_L = 390Ω		2	5				ns
	Strobe delay time	Output	Strobe	C_L = 15pF							
t_D	t_{on} Turn-on time					6					ns
t_D	t_{off} Turn-off time					6					ns

NOTES:
1. Operation beyond the limit in this table may impair useful life of the device.
2. See logic function table.

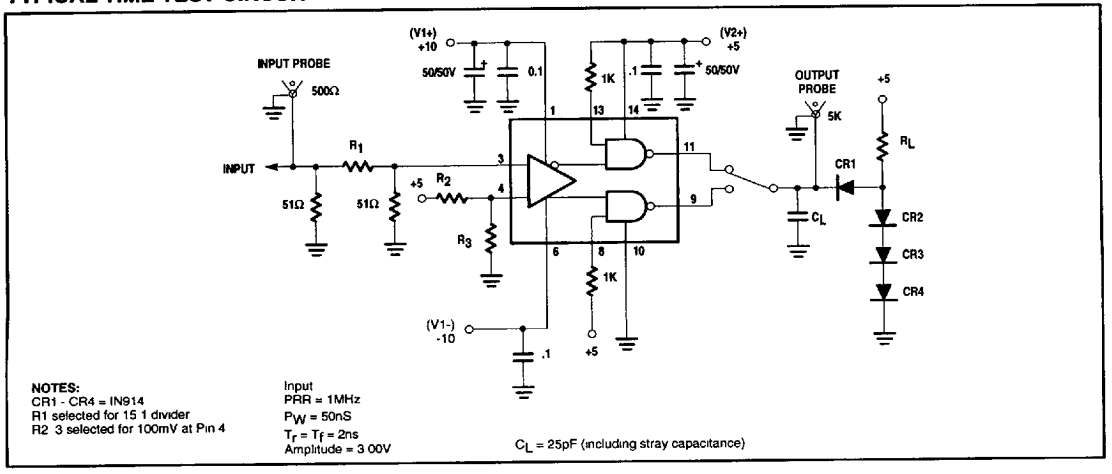
TYPICAL PERFORMANCE CHARACTERISTICS



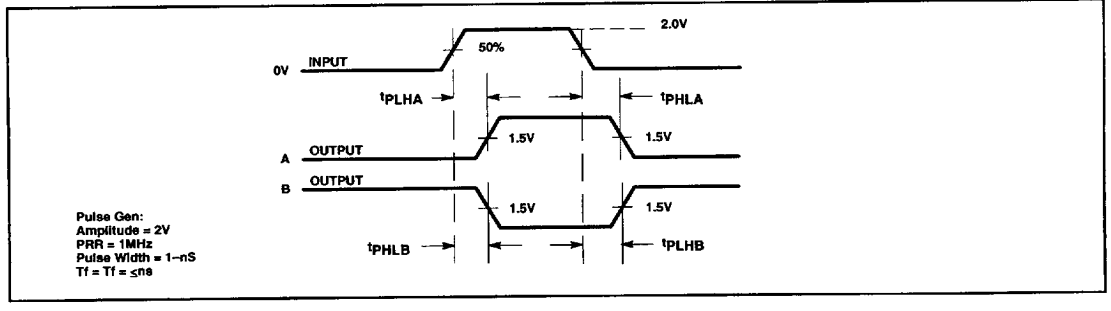
TYPICAL PERFORMANCE CHARACTERISTICS (Continued)



TYPICAL TIME TEST CIRCUIT



SWITCHING TIME WAVEFORMS



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527 LOGIC FUNCTION

V_I (A^+, B^-)	STROBE A	STROBE B	OUTPUT A	OUTPUT B
$> V_O$	X	h/l	H	l/h
$< -V_O$	h/l	X	l/h	H

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 ±6V 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