

## FEATURES

- Ultra Fast (10ns typ)
- Operates Off Single +5V Supply, or  $\pm 5V$
- Complementary Output to TTL
- Low Offset Voltage
- No Minimum Input Slew Rate Requirement
- No Power Supply Current Spiking
- Output Latch Capability

## APPLICATIONS

- High Speed A to D Converters
- High Speed Sampling Circuits
- Line Receiver
- Extended Range V to F Converters
- Fast Pulse Height/Width Discriminators

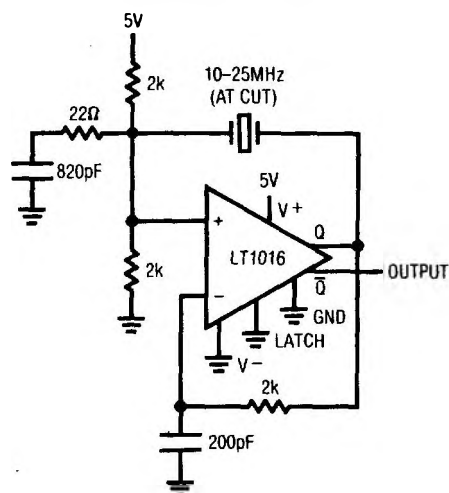
## DESCRIPTION

The LT1016 is an ultra fast (10ns) comparator specifically designed to interface directly to TTL logic while operating off either a dual  $\pm 5V$  supply or a single +5V supply. Tight offset voltage specifications and high gain allow the LT1016 to be used in precision applications. Matched complementary outputs further extend the versatility of this new comparator.

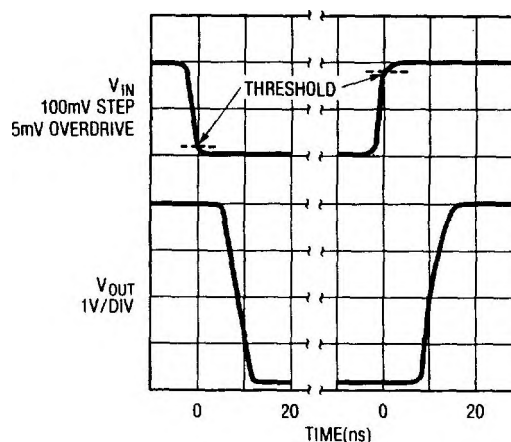
A unique output stage is featured on the LT1016. It provides active drive in both directions for maximum speed into TTL logic or passive loads, yet does not exhibit the large current spikes normally found in "totem pole" output stages. This eliminates the need for a minimum input slew rate typical of other very fast comparators. The ability of the LT1016 to remain stable with the outputs in the active region greatly reduces the problem of output "glitching" when the input signal is slow moving or is low level.

The LT1016 has a true latch pin for retaining input data at the outputs. The outputs will remain latched as long as the latch pin is held high. Quiescent negative power supply current is only 3mA — about ten times lower than competitive units. This reduces die temperature and allows the negative supply pin to be driven from virtually any supply voltage with a simple resistive divider. Device performance is not affected by variations in negative supply voltage.

**10-25MHz Crystal Oscillator**



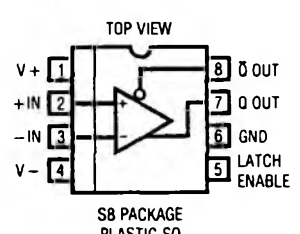
**Response Time**



## ABSOLUTE MAXIMUM RATINGS

Positive Supply Voltage (Note 4)	7V
Negative Supply Voltage	7V
Differential Input Voltage	$\pm 5V$
Input Voltage (Either Input)	Equal to Supplies
Latch Pin Voltage	Equal to Supplies
Output Current (Continuous)	$\pm 20mA$
Operating Temperature Range	$0^{\circ}C$ to $70^{\circ}C$
Storage Temperature Range	$-65^{\circ}C$ to $150^{\circ}C$
Lead Temperature (Soldering, 10 sec.)	$300^{\circ}C$

## PACKAGE/ORDER INFORMATION

 <p>TOP VIEW</p> <p>S8 PACKAGE PLASTIC SO</p>	ORDER PART NUMBER
	LT1016CS8
	PART MARKING
	1016

## ELECTRICAL CHARACTERISTICS

$V^+ = 5V$ ,  $V^- = 5V$ ,  $V_{OUT}(Q) = 1.4V$ ,  $V_{LATCH} = 0V$ ,  $T_A = 25^{\circ}C$ , unless otherwise noted.

SYMBOL	PARAMETERS	CONDITIONS	MIN	LT1016C TYP	MAX	UNITS
$V_{OS}$	Input Offset Voltage	$R_S \leq 100\Omega$ (Note 1)		1.0	$\pm 3$ $\pm 3.5$	mV mV
$\frac{\Delta V_{OS}}{\Delta T}$	Input Offset Voltage Drift			4		$\mu V/^{\circ}C$
$I_{OS}$	Input Offset Current	(Note 1)		0.3 0.3	1 1.3	$\mu A$ $\mu A$
$I_B$	Input Bias Current	(Note 2)		5	10 13	$\mu A$ $\mu A$
	Input Voltage Range	(Note 5)	$-3.75$		$+3.5$	V
		Single +5V Supply	$+1.25$		$+3.5$	V
CMRR	Common-Mode Rejection	$-3.75V \leq V_{CM} \leq +3.5V$	80	96		dB
PSRR	Supply Voltage Rejection	Positive Supply $4.6V \leq V^+ \leq 5.4V$	60	75		dB
		Negative Supply $2V \leq V^- \leq 7V$	80	100		dB
$A_V$	Small Signal Voltage Gain	$1V \leq V_{OUT} \leq 2V$	1400	3000		V/V
$V_{OH}$	Output High Voltage	$V^+ \geq 4.6V$ , $I_{OUT} = 1mA$	2.7	2.9		V
		$I_{OUT} = 10mA$	2.4	2.8		V
$V_{OL}$	Output Low Voltage	$I_{SINK} = 4mA$		0.3	0.5	V
		$I_{SINK} = 10mA$		0.4		V
$I^+$	Positive Supply Current			25	35	mA
$I^-$	Negative Supply Current			3	5	mA
$V_{IH}$	Latch Pin Hi Input Voltage		2.0			V
$V_{IL}$	Latch Pin Lo Input Voltage				0.8	V
$I_{IL}$	Latch Pin Current	$V_{LATCH} = 0V$			500	$\mu A$

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SYMBOL	PARAMETERS	CONDITIONS		LT1016C			UNITS
				MIN	TYP	MAX	
$t_{PD}$	Propagation Delay (Note 3)	$\Delta V_{IN} = 100mV$ , $0D = 5mV$	●		10	14 16	ns ns
		$\Delta V_{IN} = 100mV$ , $0D = 20mV$	●		9	12 15	ns ns
$\Delta t_{PD}$	Differential Propagation Delay	(Note 3) $\Delta V_{IN} = 100mV$ , $0D = 5mV$				3	ns
	Latch Setup Time				2		ns

The ● denotes the specifications which apply over the full operating temperature range.

**Note 1:** Input offset voltage is defined as the average of the two voltages measured by forcing first one output, then the other to 1.4V. Input offset current is defined in the same way.

**Note 2:** Input bias current ( $I_B$ ) is defined as the average of the two input currents.

**Note 3:** Propagation delay is measured with the overdrive added to actual  $V_{OS}$ . Guaranteed but not tested.

**Note 4:** Electrical specifications apply only up to 5.4V.

**Note 5:** See text for discussion of input voltage range for supplies other than  $\pm 5V$ , or  $+5V$ .