

Quadruple Differential Comparators

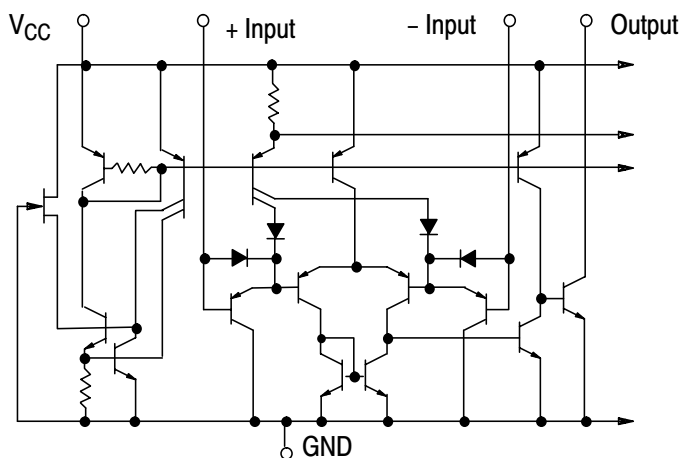
DESCRIPTION

The LR339D consists of four independent voltage comparators. These were designed specifically to operate from a single power supply over a wide range of voltages. Operation from split power supplies is also possible and the low power supply current drain is independent of the magnitude of the power supply voltage. The outputs can be connected to other open-collector outputs to achieve wired-AND relationships.

FEATURES

- Wide supply voltage range
- Low supply current drain independent of supply voltage
- Low input biasing current
- Low input offset current
- Low input offset voltage
- Input common-mode voltage range includes GND
- Differential input voltage range equal to the power supply voltage
- Low output saturation voltage
- Output voltage compatible with TTL, MOS and CMOS logic

BLOCK DIAGRAM



NOTE: Diagram shown is for 1 comparator.

LR339D

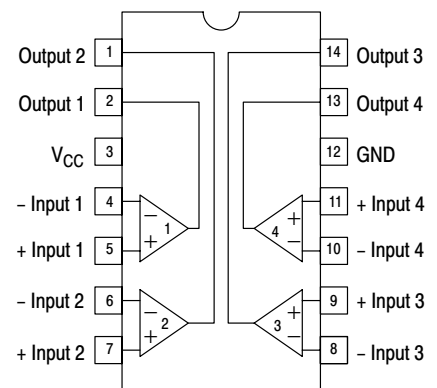


SOP-14

ORDERING INFORMATION

Device	Package
LR339D	SOP-14

PIN CONFIGURATION



(Top View)

ABSOLUTE MAXIMUM RATINGS

CHARACTERISTICS	SYMBOL	VALUE	UNIT
Supply Voltage	V_{CC}	30	V
Differential Input Voltage	V_{IDR}	30	V
Input Voltage	V_{ICMR}	-0.3~ V_{CC}	V
Power Dissipation	P_D	1.0	W
Operating Temperature Range	T_{amb}	-40~85	°C
Storage Temperature Range	T_{stg}	-65~150	°C

ELECTRICAL CHARACTERISTICS

 (at specified free-air temperature, $V_{CC} = 5V$ unless otherwise noted.)

PARAMETER	SYMBOL	TEST CONDITIONS*	MIN	TYP	MAX	UNIT	
Input offset voltage	V_{IO}	$V_{CC} = 5V$ to 30V	25°C	2	5	mV	
		$V_{IC} = V_{ICRmin}$, $V_O = 1.4V$	Full temperature range		9		
Input offset current	I_{IO}	$V_O = 1.4V$	25°C	5	50	nA	
			Full temperature range		150		
Input bias current	I_{IB}	$V_O = 1.4V$	25°C	-25	-250	nA	
			Full temperature range		-400		
Common-mode input voltage range**	V_{ICR}		25°C	0 to $V_{CC}-1.5$		V	
			Full temperature range	0 to $V_{CC}-2$			
Large-signal differential voltage amplification	A_{VD}	$V_{CC} = 15V$, $V_O = 1.4V$ to 11.4V, $R_L \geq 15k\Omega$ to V_{CC}	25°C	50	200	V/mV	
			25°C		0.1	50	nA
High-level output current	I_{OH}	$V_{OH} = 5V$, $V_{ID} = 1V$	Full temperature range		1	μA	
		$V_{OH} = 30V$, $V_{ID} = 1V$	25°C		150	400	mV
Low-level output voltage	V_{OL}	$I_{OL} = 4mA$, $V_{ID} = -1V$	Full temperature range		700		
Low-level output current	I_{OL}	$V_{OL} = 1.5V$, $V_{ID} = -1V$	25°C	6		mA	
Supply current	I_{CC}	$R_L = \infty$	$V_{CC} = 5V$	25°C	0.8	2	mA
			$V_{CC} = 30V$	Full temperature range		2.5	

* Operating temperature for the R339D is -40°C to +85°C, MAX Junction temperature +125°C. All characteristics are measured with zero common-mode input voltage unless otherwise specified.

** The voltage at either input or common-mode should not be allowed to go negative by more than 0.3V. The upper end of the common-mode voltage range is $V_{CC} - 1.5V$, but either or both inputs can go to 30V without damage.

SWITCHING CHARACTERISTICS

 ($V_{CC}=5V$, $T_A = 25^\circ C$ unless otherwise noted.)

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Response time	R_L connected to 5V through 5.1k Ω , $C_L=15pF^*$ (See Note 1)	100-mV input step with 5-mV overdrive		1.3	μs
		TTL-level input step		0.3	

* C_L includes probe and jig capacitance.

NOTE 1 : The response time specified is the interval between the input step function and the instant, when the output crosses 1.4V.

TYPICAL APPLICATIONS

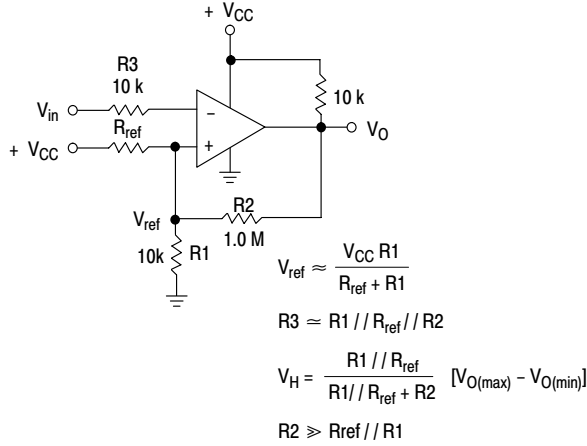


Figure 1. Inverting Comparator with Hysteresis

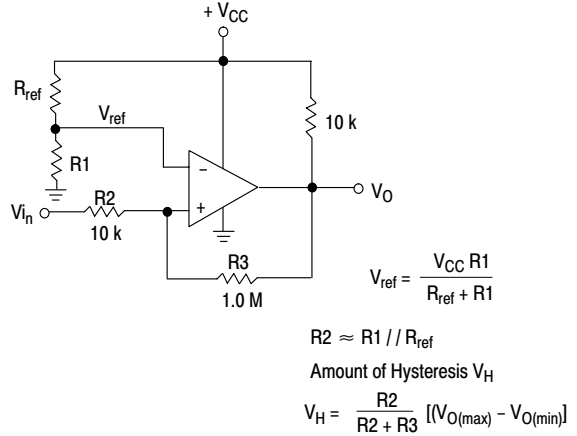
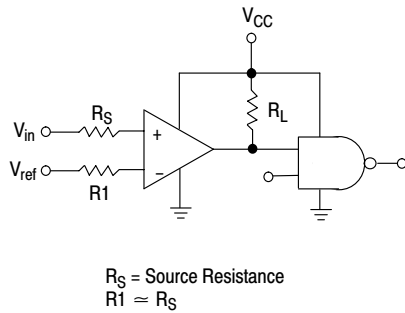


Figure 2. Noninverting Comparator with Hysteresis



Logic	Device	V _{CC} (V)	R _L kΩ
CMOS	1/4 MC14001	+15	100
TTL	1/4 MC7400	+5.0	10

Figure 3. Driving Logic

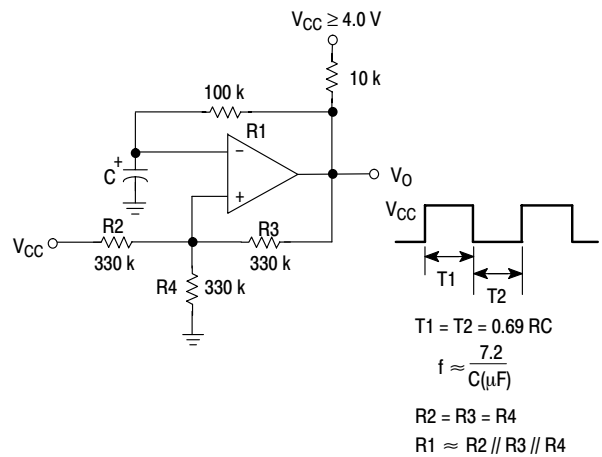
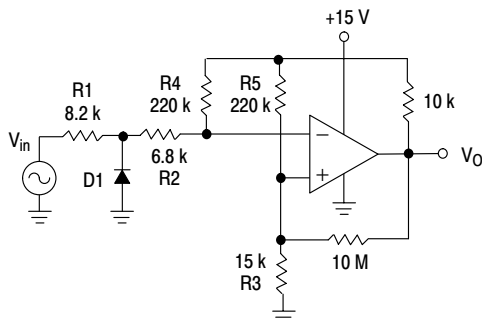


Figure 4. Squarewave Oscillator



D1 prevents input from going negative by more than 0.6 V.

$$R_1 + R_2 = R_3$$

$$R_3 \leq \frac{R_5}{10} \text{ for small error in zero crossing}$$

Figure 5. Zero Crossing Detector (Single Supply)

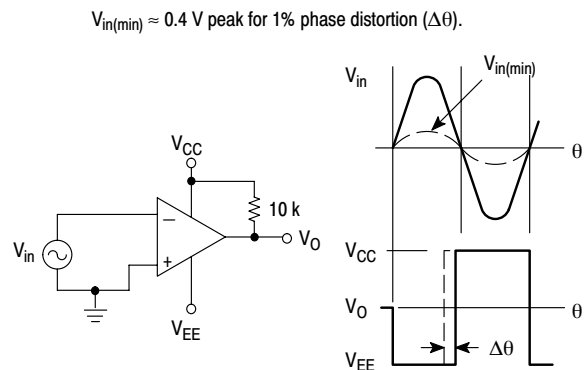
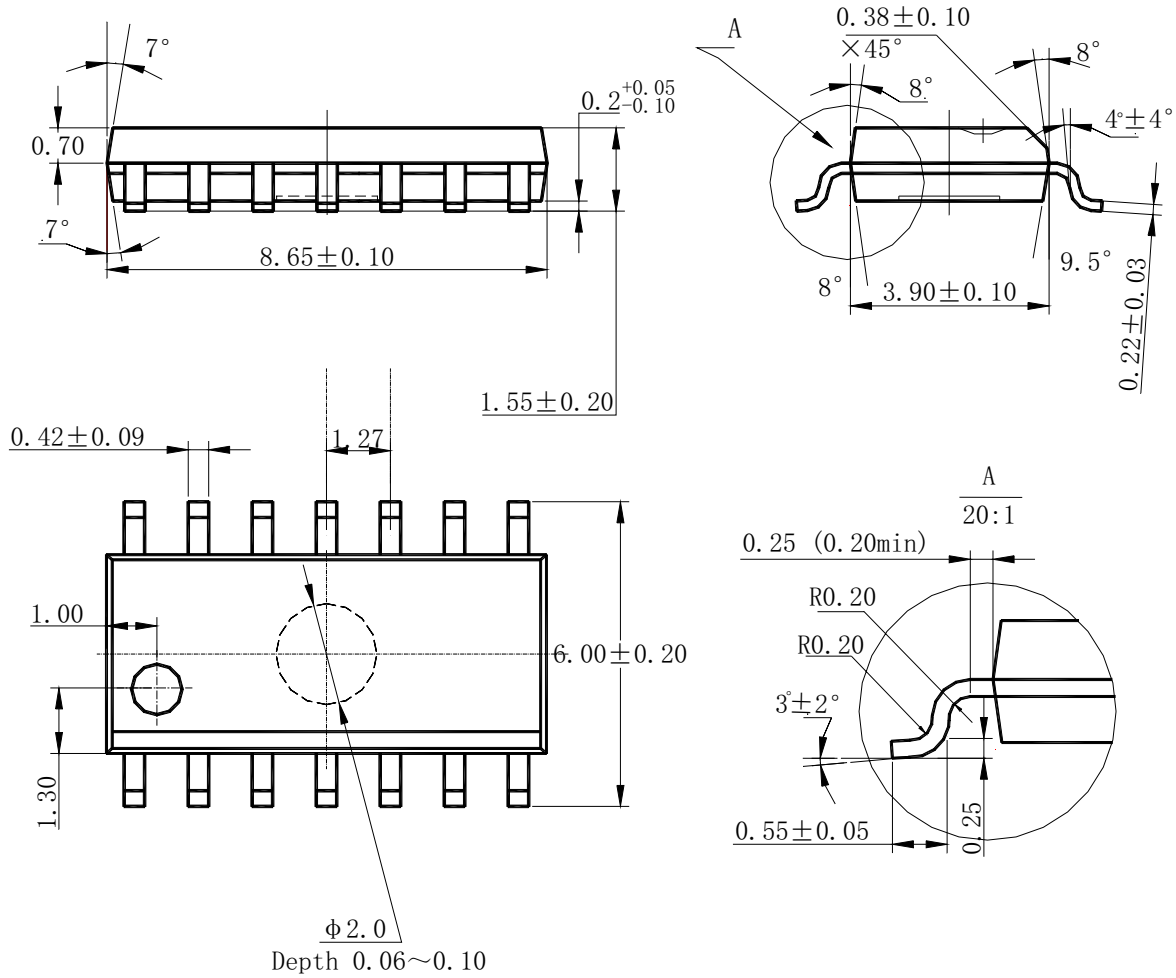


Figure 6. Zero Crossing Detector (Split Supplies)

MECHANICAL DIMENSIONS

SOP-14

Unit: mm



DISCLAIMER

- Before you use our Products, you are requested to carefully read this document and fully understand its contents. LRC shall not be in any way responsible or liable for failure, malfunction or accident arising from the use of any LRC's Products against warning, caution or note contained in this document.
- All information contained in this document is current as of the issuing date and subject to change without any prior notice. Before purchasing or using LRC's Products, please confirm the latest information with a LRC sales representative.