

Low Power Low Offset Voltage Quad Comparators

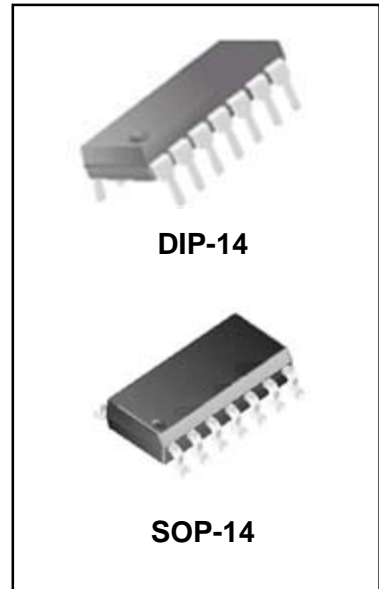
DESCRIPTION:

The LR339 consists of four independent precision voltage comparators. These were designed specifically to operate from a signal power supply over a wide range of voltage. 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 LR339 also have a unique characteristic in that the input common-mode voltage range includes ground, even though operated from a single power supply voltage.

FEATURE:

- Low input biasing current: 25nA(Typ.)
- Low input offset current: $\pm 5.0\text{nA}$ (Typ.)
- Low output saturation voltage: 130mV
- Output voltage compatible with TTL,CMOS

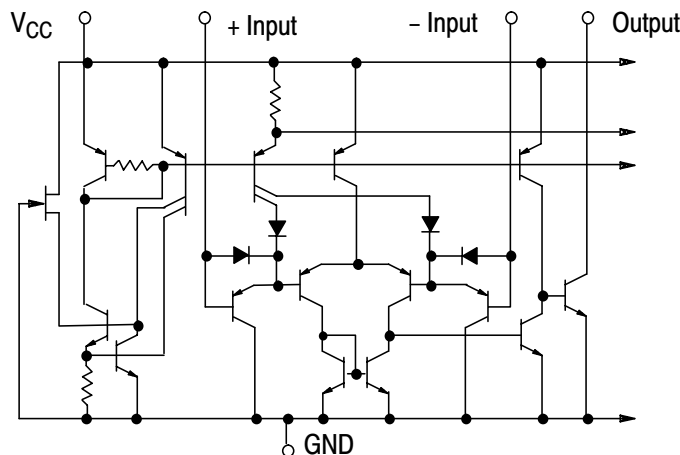
LR339



ORDERING INFORMATION

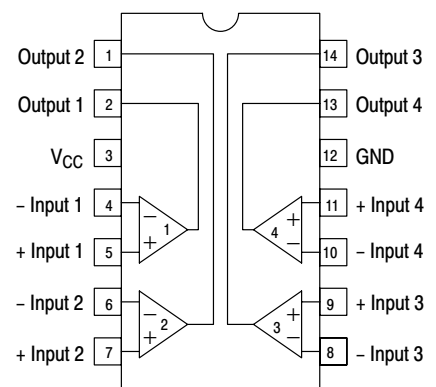
Device	Package
LR339	DIP-14
LR339D	SOP-14

BLOCK DIAGRAM



NOTE: Diagram shown is for 1 comparator.

PIN CONFIGURATION



(Top View)

PIN DESCRIPTIONS

No	Description	Symbol	No	Description	Symbol
1	Output 2	OUT2	8	-Input3	IN3 (-)
2	Output 1	OUT1	9	+Input3	IN3 (+)
3	Supply Voltage	Vcc	10	-Input4	IN4 (-)
4	-Input1	IN1 (-)	11	+Input4	IN4 (+)
5	+Input1	IN1 (+)	12	Ground	GND
6	-Input2	IN2 (-)	13	Output 4	OUT4
7	+Input2	IN2 (+)	14	Output 3	OUT3

ABSOLUTE MAXIMUM RATINGS

Characteristics	Symbol	Value	Unit
Supply Voltage	Vcc	36 or ± 18	V
Differential Input Voltage	VIDR	36	V
Input Voltage	VICMR	-0.3~Vcc	V
Input Current	Isc	50	
Power Dissipation (*)	Pd	1.0	W
Operating Temperature Range	Tamb	0~75	°C
Storage Temperature Range	Tstg	-65~150	°C

Note (*): Power dissipation reduces 8 mW/°C for using above Ta=25°C.

ELECTRICAL CHARACTERISTICS (Unless otherwise specified :Vcc=5V, Tamb=25°C)

Characteristics	Test conditions	Symbol	Mi	Typ.	Max	Unit
Input Offset Voltage		Vio		± 2.0	± 5.0	mV
	0°C ≤ Ta ≤ 70°C				± 9.0	
Input Offset Current		Iio		± 5.0	± 50	nA
	0°C ≤ Ta ≤ 70°C				± 150	
Input Bias Current		IIB		25	250	nA
	0°C ≤ Ta ≤ 70°C				400	
Input Common-mode Voltage Range		VICR	0		Vcc-1.5	V
	0°C ≤ Ta ≤ 70°C		0		Vcc-2.0	
Supply Current	RL=∞	Icc		0.8	2.0	mA
	RL=∞, Vcc=30V			1.0	2.5	
Voltage Gain	RL ≥ 15KΩ, Vcc=15V	Gv	50	200		V/mV
Large Signal Response Time	VIN=TTL Logic Swing, VREF=1.4V, VRL=5.0V, RL=5.1KΩ	tRES		300		ns
Response Time	VRL=5.0V, RL=5.1KΩ	tRES		1.3		ns
Input Differential Voltage		VID			Vcc	V
Output Sink Current	VIN (-) ≥ 1.0V, VIN (+) = 0V, Vo ≤ 1.5V	ISINK	6.0	16		mA
output saturation voltage	VIN (-) ≥ 1.0V, VIN (+) = 0V, ISINK ≤ 4.0mA	VSAT		130	400	mV
	VIN (-) ≥ 1.0V, VIN (+) = 0V, ISINK ≤				700	
Output Leakage Current	VIN (+) ≥ 1.0V, VIN (-) = 0V, Vo=5.0V	IOL		0.1		nA
	VIN (+) ≥ 1.0V, VIN (-) = 0V, Vo=30V 0°C ≤ Ta ≤ 70°C				1000	

APPLICATION CIRCUIT

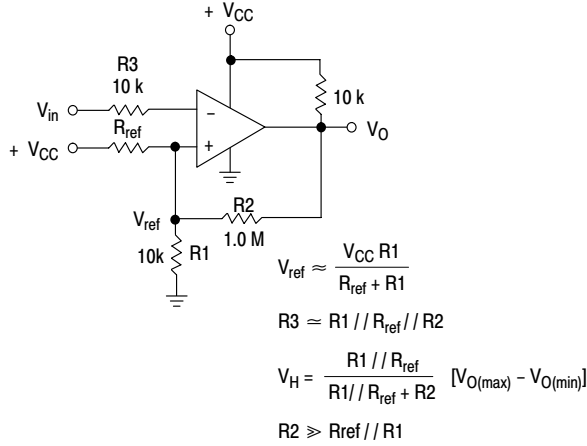


Figure 1. Inverting Comparator with Hysteresis

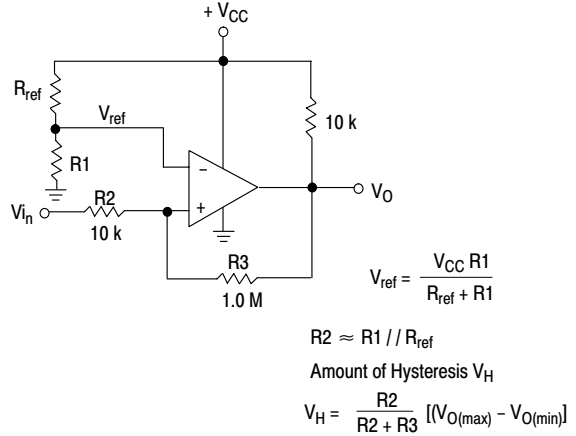
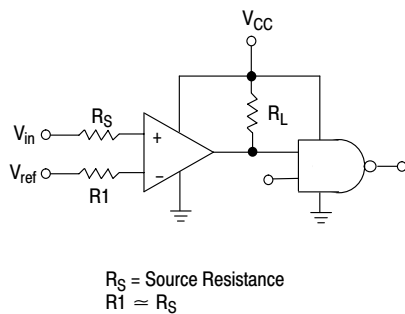


Figure 2. Noninverting Comparator with Hysteresis



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

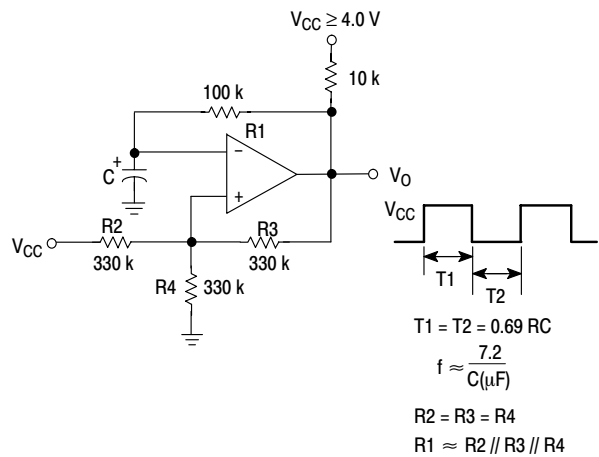
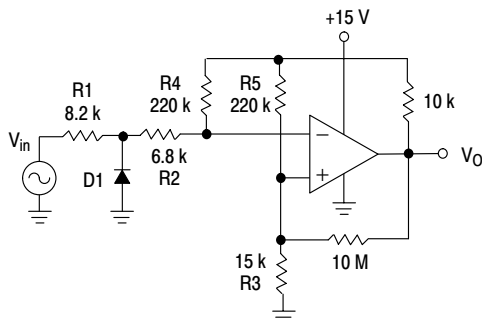


Figure 4. Squarewave Oscillator



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

$$R1 + R2 = R3$$

$$R3 \leq \frac{R5}{10} \text{ for small error in zero crossing}$$

Figure 5. Zero Crossing Detector (Single Supply)

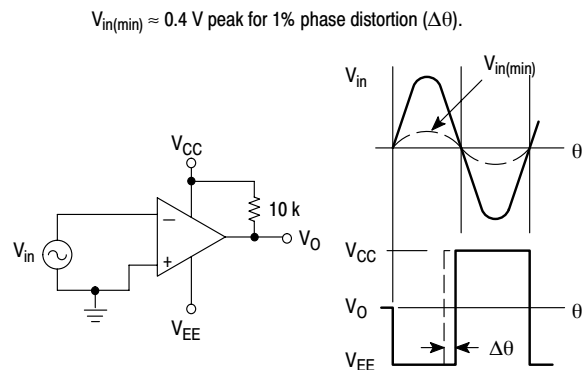


Figure 6. Zero Crossing Detector (Split Supplies)

TYPICAL CHARACTERISTICS CURVES

($V_{CC} = 15\text{ Vdc}$, $T_A = +25^\circ\text{C}$ (each comparator) unless otherwise noted.)

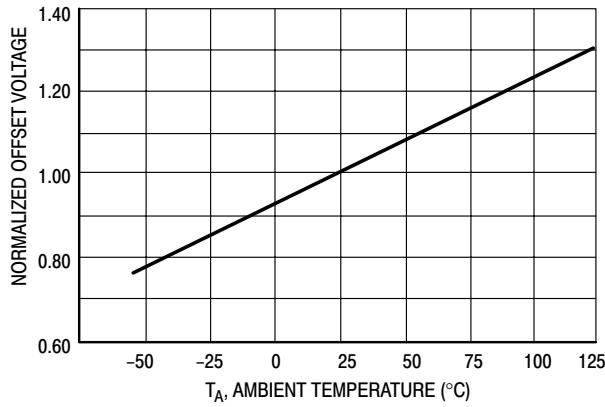


Figure 7. Normalized Input Offset Voltage

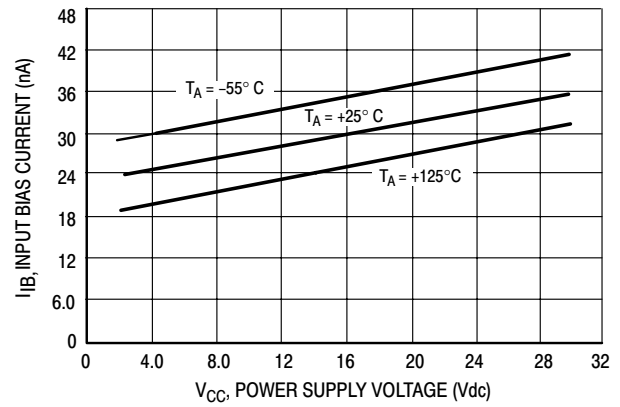


Figure 8. Input Bias Current

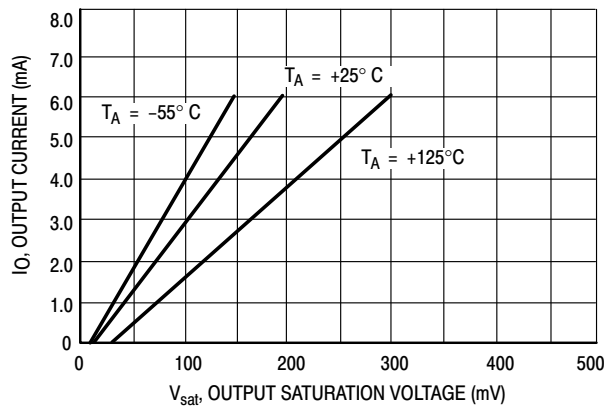
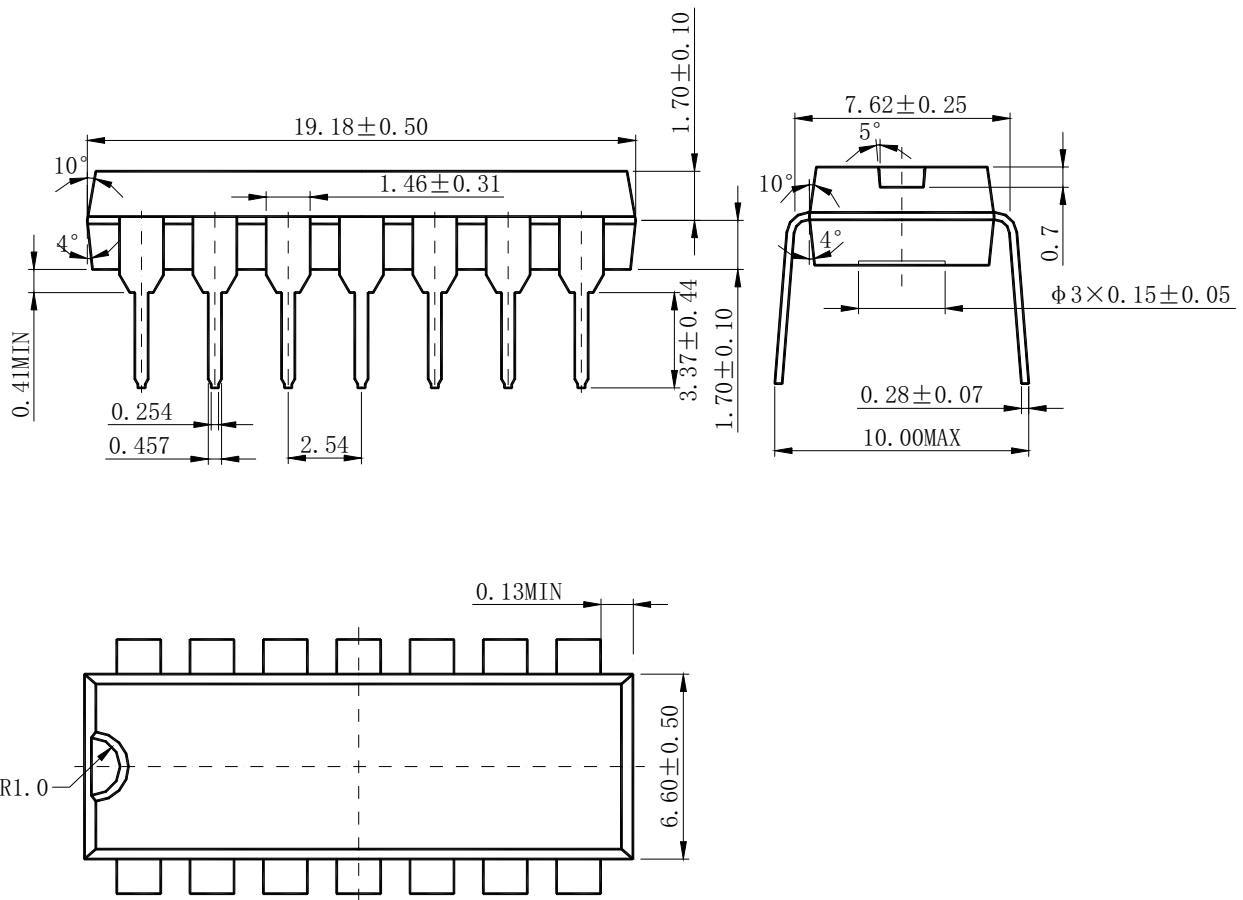


Figure 9. Output Sink Current versus Output Saturation Voltage

Mechanical Dimensions

DIP-14

Unit: mm



Mechanical Dimensions (Continued)

SOP-14

Unit: mm

