

# Quad Differential Comparators



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**VSP MIKRON**

**LM339nd2**

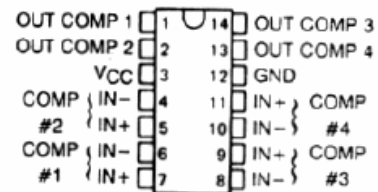
## DESCRIPTION

The LM339 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

## PACKAGE INFORMATION



## ELECTRICAL CHARACTERISTICS

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

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

\* Full range (MIN to MAX), for the LM339 is  $0\text{ }^\circ\text{C}$  to  $70\text{ }^\circ\text{C}$ . 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.

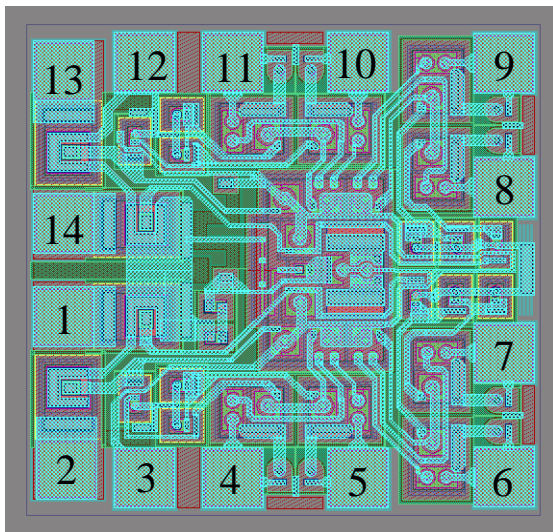
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## Pad Location



Wafer Thickness:  $460 \pm 30 \mu\text{m}$  (or  $350 \pm 30 \mu\text{m}$ ,  $280 \pm 30 \mu\text{m}$ )  
 Top metal: AlSi  
 Backside metal: - (or Ti-Ni (V)-Ag)  
 Wafer size: 100 mm

Chip size: 0,9 x 0,87 mm

### PAD LOCATION COORDINATES

Pad N	Pad Name	Pad size ( $\mu\text{m} \times \mu\text{m}$ )	Coordinates, $\mu\text{m}$		Pad N	Pad Name	Pad size ( $\mu\text{m} \times \mu\text{m}$ )	Coordinates, $\mu\text{m}$	
			X	Y				X	Y
1	1 OUT	89 x 89	100	365	8	3 IN -	89 x 89	800	570
2	2 OUT	89 x 89	105	115	9	3 IN +	89 x 89	800	770
3	V <sub>CC</sub>	89 x 89	230	100	10	4 IN -	89 x 89	570	770
4	2 IN-	89 x 89	370	100	11	4 IN +	89 x 89	370	770
5	2 IN +	89 x 89	570	100	12	GND	89 x 89	230	770
6	1 IN-	89 x 89	800	100	13	4 OUT	89 x 89	100	760
7	1 IN+	89 x 89	800	300	14	3 OUT	89 x 89	100	510