

# LM339/LM339A, LM239A, LM2901

## Quad Comparator

勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-34970699  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)

### Features

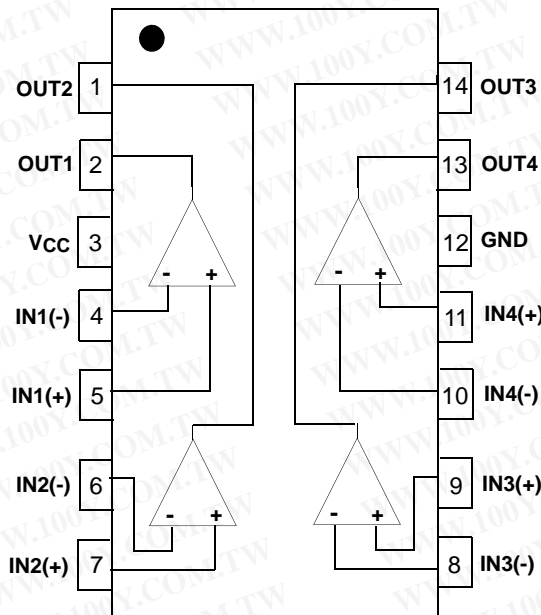
- Single or Dual Supply Operation
- Wide Range of Supply Voltage  
 LM2901, LM339/LM339A, LM239A: 2 ~ 36V (or  $\pm 1 \sim \pm 18V$ )
- Low Supply Current Drain 800 $\mu$ A Typ.
- Open Collector Outputs for Wired and Connectors
- Low Input Bias Current 25nA Typ.
- Low Input Offset Current  $\pm 2.3nA$  Typ.
- Low Input Offset Voltage  $\pm 1.4mV$  Typ.
- Input Common Mode Voltage Range Includes Ground.
- Low Output Saturation Voltage
- Output Compatible With TTL, DTL and MOS Logic System

### Description

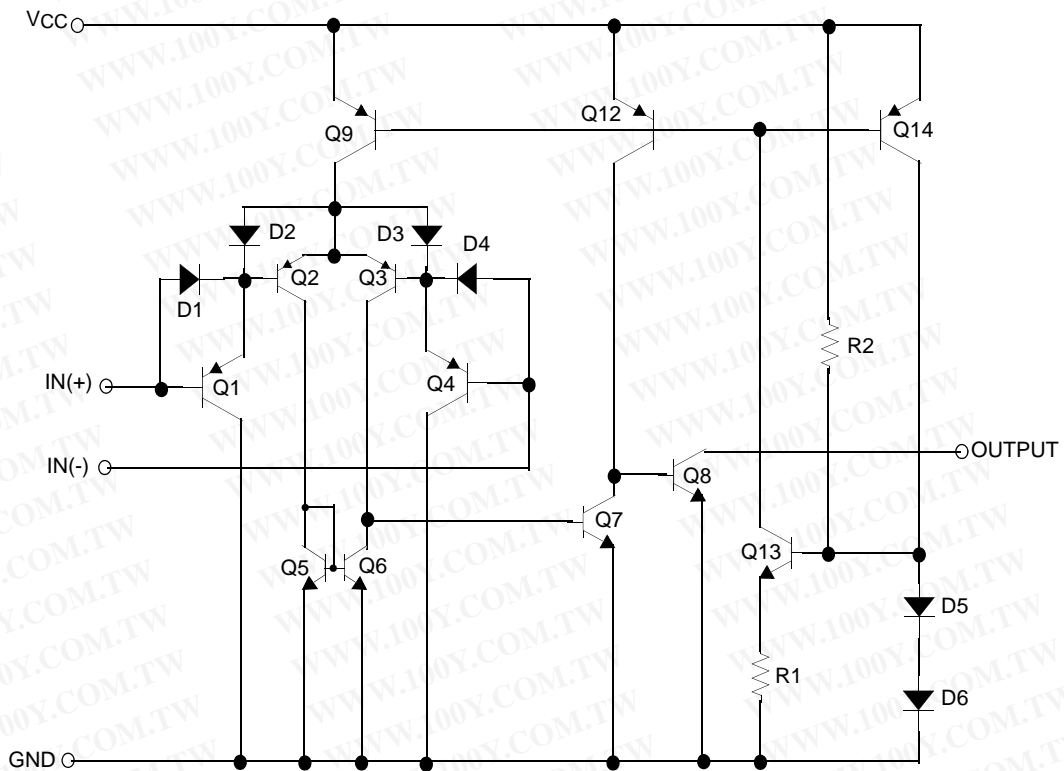
The LM339/LM339A, LM239A, LM2901 consist of four independent voltage comparators designed to operate from single power supply over a wide voltage range.



### Internal Block Diagram



## Schematic Diagram



## Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Supply Voltage	VCC	±18 or 36	V
Differential Input Voltage	VI(DIFF)	36	V
Input Voltage	VI	-0.3 to +36	V
Output Short Circuit to GND	-	Continuous	-
Power Dissipation	PD	570	mW
Operating Temperature LM339/LM339A LM2901 LM239A	TOPR	0 ~ +70 -40 ~ +85 -25 ~ +85	°C
Storage Temperature	TSTG	-65 ~ +150	°C

## Electrical Characteristics

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

Parameter	Symbol	Conditions	LM239A/LM339A			LM339			Unit	
			Min.	Typ.	Max.	Min.	Typ.	Max.		
Input Offset Voltage	$V_{IO}$	$V_{O(P)} = 1.4V$ , $R_S = 0\Omega$	-	1	2	-	1.4	5	mV	
		Note1	-	-	4.0	-	-	9.0		
Input Offset Current	$I_{IO}$	$I_{IN(+)} - I_{IN(-)}$ , $V_{CM} = 0V$	-	2.3	50	-	2.3	50	nA	
		Note1	-	-	150	-	-	150		
Input Bias Current	$I_{BIAS}$	$V_{CM} = 0V$	-	57	250	-	57	250	nA	
		Note1	-	-	400	-	-	400		
Input Common Mode Voltage Range	$V_{I(R)}$	$V_{CC} = 30V$	0	-	$V_{CC}-1.5$	0	-	$V_{CC}-1.5$	V	
		Note1	0	-	$V_{CC}-2$	0	-	$V_{CC}-2$		
Supply Current	$I_{CC}$	$V_{CC} = 5V$ , $R_L = \infty$	-	1.1	2.0	-	1.1	2.0	mA	
Voltage Gain	$G_V$	$V_{CC} = 15V$ , $R_L \geq 15k\Omega$ (for large swing)	50	200	-	50	200	-	V/mV	
Large Signal Response Time	$T_{LRES}$	$V_I = \text{TTL Logic Swing}$ $V_{REF} = 1.4V$ , $V_{RL} = 5V$ , $R_L = 5.1k\Omega$ (Note2)	-	300	-	-	300	-	ns	
Response Time	$T_{RES}$	$V_{RL} = 5V$ , $R_L = 5.1k\Omega$ (Note2)	-	1.3	-	-	1.3	-	$\mu s$	
Output Sink Current	$I_{SINK}$	$V_{I(-)} \geq 1V$ , $V_{I(+)} = 0V$ , $V_{O(P)} \leq 1.5V$	6	18	-	6	18	-	mA	
Output Saturation Voltage	$V_{SAT}$	$V_{I(-)} \geq 1V$ , $V_{I(+)} = 0V$	-	140	400	-	140	400	mV	
		$I_{SINK} = 4mA$	Note1	-	-	700	-	-		700
Output Leakage Current	$I_{O(LKG)}$	$V_{I(-)} = 0V$	$V_{O(P)} = 5V$	-	0.1	-	-	0.1	-	nA
		$V_{I(+)} = 1V$	$V_{O(P)} = 30V$	-	-	1.0	-	-	1.0	$\mu A$
Differential Voltage	$V_{I(DIFF)}$	Note1	-	-	36	-	-	36	V	

### Note:

- LM339/LM339A :  $0 \leq T_A \leq +70^\circ C$   
LM2901 :  $-40 \leq T_A \leq +85^\circ C$   
LM239A :  $-25 \leq T_A \leq +85^\circ C$
- These parameters, although guaranteed, are not 100% tested in production.

**Electrical Characteristics** (Continued)(V<sub>CC</sub> = 5V, T<sub>A</sub> = 25°C, unless otherwise specified)

Parameter	Symbol	Conditions	LM2901			Unit
			Min.	Typ.	Max.	
Input Offset Voltage	V <sub>IO</sub>	VO(P) = 1.4V, R <sub>S</sub> = 0Ω	-	2	7	mV
		Note1	-	9	15	
Input Offset Current	I <sub>IO</sub>		-	2.3	50	nA
		Note1	-	50	200	
Input Bias Current	I <sub>BIAS</sub>		-	57	250	nA
		Note1	-	200	500	
Input Common Mode Voltage Range	V <sub>I(R)</sub>	LM2901, V <sub>CC</sub> = 30V	0	-	V <sub>CC</sub> -1.5	V
		Note1	0	-	V <sub>CC</sub> -2	
Supply Current	I <sub>CC</sub>	R <sub>L</sub> = ∞, V <sub>CC</sub> = 5V	-	1.1	2.0	mA
		R <sub>L</sub> = ∞, V <sub>CC</sub> = 30V	-	1.6	2.5	
Voltage Gain	G <sub>V</sub>	V <sub>CC</sub> = 15V, R <sub>L</sub> ≥ 15kΩ (for large swing)	25	100	-	V/mV
Large Signal Response Time	TLRES	V <sub>I</sub> = TTL Logic Swing V <sub>REF</sub> = 1.4V, V <sub>RL</sub> = 5V, R <sub>L</sub> = 5.1kΩ (Note2)	-	300	-	ns
Response Time	T <sub>RES</sub>	V <sub>RL</sub> = 5V, R <sub>L</sub> = 5.1kΩ (Note2)	-	1.3	-	μs
Output Sink Current	I <sub>SINK</sub>	V <sub>I(-)</sub> ≥ 1V, V <sub>I(+)</sub> = 0V, V <sub>O(P)</sub> ≤ 1.5V	6	18	-	mA
Output Saturation Voltage	V <sub>SAT</sub>	V <sub>I(-)</sub> ≥ 1V, V <sub>I(+)</sub> = 0V	-	140	400	mV
		I <sub>SINK</sub> = 4mA	Note1	-	700	
Output Leakage Current	I <sub>O(LKG)</sub>	V <sub>I(-)</sub> = 0V	VO(P) = 5V	-	0.1	nA
		V <sub>I(+)</sub> = 1V	VO(P) = 30V	-	-	1.0
Differential Voltage	V <sub>I(DIFF)</sub>	Note1	-	-	36	V

**Note:**

- LM339/LM339A : 0 ≤ T<sub>A</sub> ≤ +70°C  
LM2901 : -40 ≤ T<sub>A</sub> ≤ +85°C  
LM239A : -25 ≤ T<sub>A</sub> ≤ +85°C
- These parameters, although guaranteed, are not 100% tested in production.

## Typical Performance Characteristics

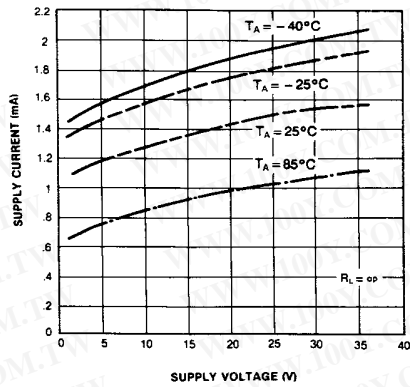


Figure 1. Supply Current vs Supply Voltage

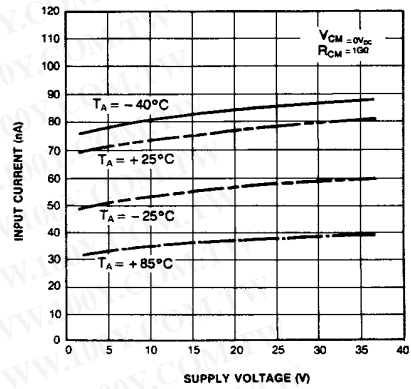


Figure 2. Input Current vs Supply Voltage

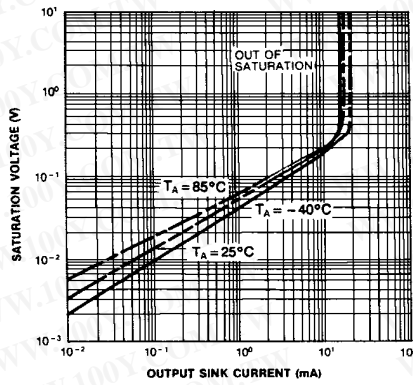


Figure 3. Output Saturation Voltage vs Sink Current

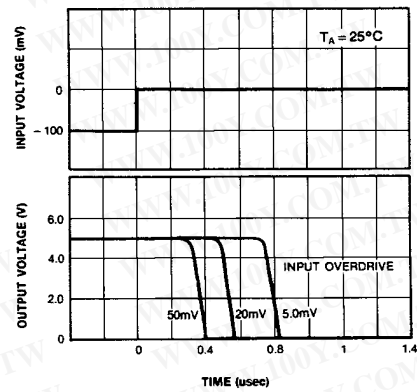


Figure 4. Response Time for Various Input Overdrive-Negative Transition

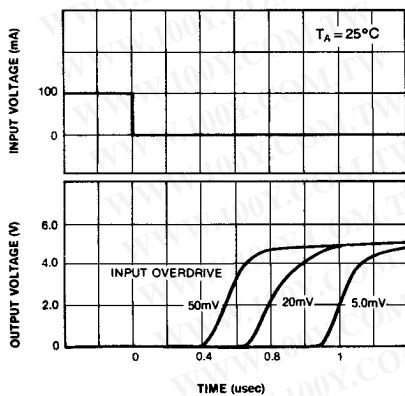


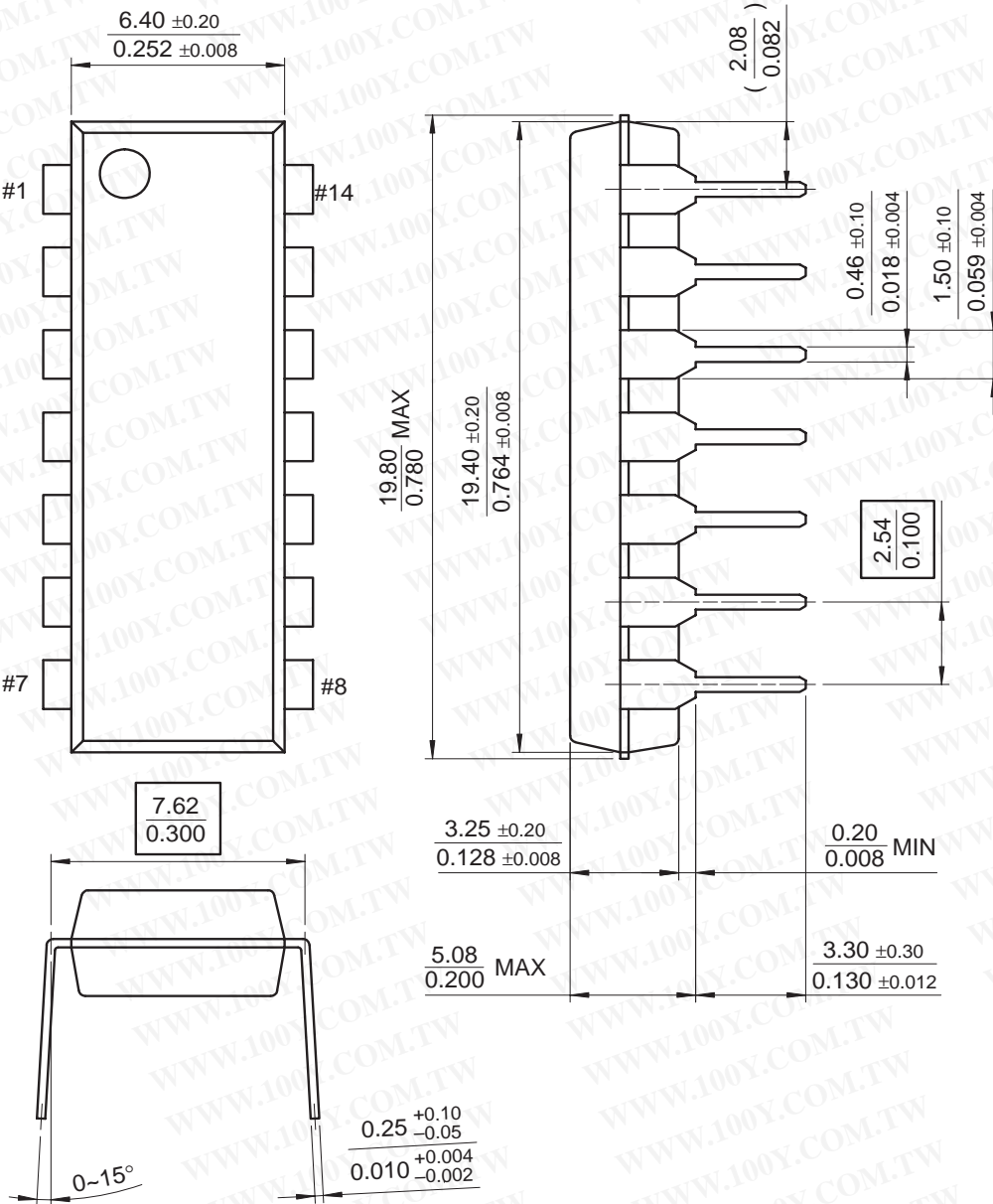
Figure 5. Response Time for Various Input Overdrive-Positive Transition

# Mechanical Dimensions

## Package

Dimensions in millimeters

### 14-DIP

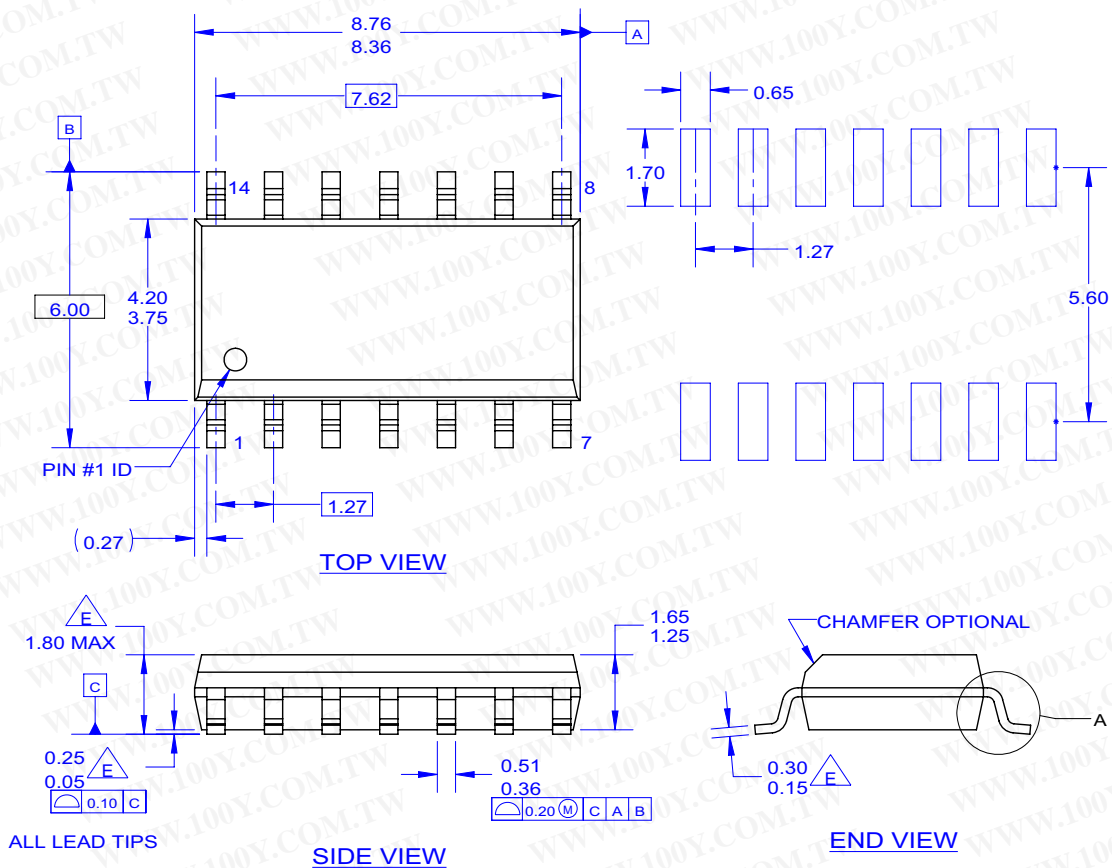


# Mechanical Dimensions (Continued)

## Package

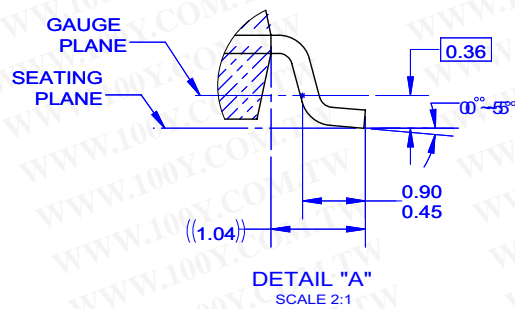
Dimensions in millimeters

### 14-SOP



**NOTES: UNLESS OTHERWISE SPECIFIED**

- A. THIS PACKAGE REFERENCE TO JEDEC MS-012 VARIATION AB.
- B. ALL DIMENSIONS ARE IN MILLIMETERS.
- C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.
- D. DIMENSIONS AND TOLERANCES AS PER ASME Y14.5-1994.
- E. OUT OF JEDEC STANDARD VALUE.
- F. LAND PATTERN STANDARD: SOIC127P600X145-14M.
- G. FILE NAME: MKT-M14C REV2



## Ordering Information

Product Number	Package	Operating Temperature
LM339N	14-DIP	0 ~ +70°C
LM339AN		
LM339M	14-SOP	
LM339AM		
LM2901N	14-DIP	-40 ~ +85°C
LM2901M	14-SOP	
LM239AN	14-DIP	-25 ~ +85°C
LM239AM	14-SOP	

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