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LM339/LM339A, LM239A, LM2901

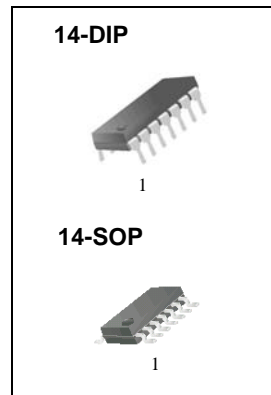
Quad Comparator

Features

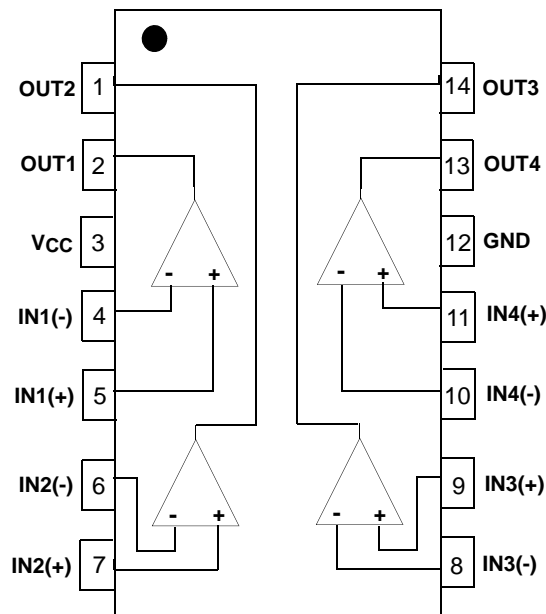
- Single or Dual Supply Operation
- Wide Range of Supply Voltage
LM2901, LM339/LM339A, LM239A: 2 ~ 36V (or $\pm 1 \sim \pm 18V$)
- Low Supply Current Drain 800 μA Typ.
- Open Collector Outputs for Wired and Connectors
- Low Input Bias Current 25nA Typ.
- Low Input Offset Current $\pm 2.3nA$ Typ.
- Low 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

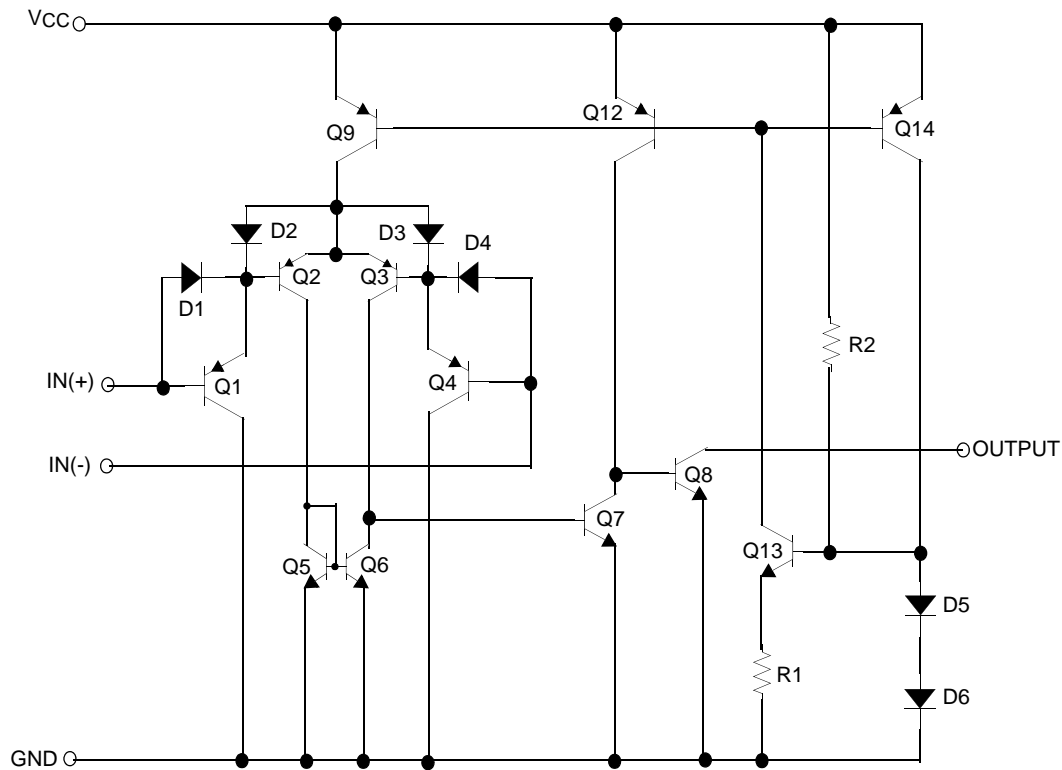
The LM339/LM339A ,LM239A, LM2901 consist of four independent voltage comparators designed to operate from single power supply over a wide voltage range.



Internal Block Diagram



Schematic Diagram



Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Supply Voltage	VCC	±18 or 36	V
Differential Input Voltage	V _{I(DIFF)}	36	V
Input Voltage	V _I	-0.3 to +36	V
Output Short Circuit to GND	-	Continuous	-
Power Dissipation	PD	570	mW
Operating Temperature	TOPR	0 ~ +70	°C
LM339/LM339A		-40 ~ +85	
LM2901		-25 ~ +85	
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}	$V_I =$ 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	-	μs
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	-	-	
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
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)

(VCC = 5V, TA = 25°C, unless otherwise specified)

Parameter	Symbol	Conditions	LM2901			Unit
			Min.	Typ.	Max.	
Input Offset Voltage	VIO	VO(P) = 1.4V, RS = 0Ω	-	2	7	mV
		Note1	-	9	15	
Input Offset Current	IIO		-	2.3	50	nA
		Note1	-	50	200	
Input Bias Current	IBIAS		-	57	250	nA
		Note1	-	200	500	
Input Common Mode Voltage Range	VI(R)	LM2901, VCC = 30V	0	-	VCC-1.5	V
		Note1	0	-	VCC-2	
Supply Current	ICC	RL = ∞, VCC = 5V	-	1.1	2.0	mA
		RL = ∞, VCC = 30V	-	1.6	2.5	
Voltage Gain	GV	VCC = 15V, RL ≥ 15kΩ (for large swing)	25	100	-	V/mV
Large Signal Response Time	TLRES	VI = TTL Logic Swing VREF = 1.4V, VRL = 5V, RL = 5.1kΩ (Note2)	-	300	-	ns
Response Time	TRES	VRL = 5V, RL = 5.1kΩ (Note2)	-	1.3	-	μs
Output Sink Current	ISINK	VI(-) ≥ 1V, VI(+) = 0V, VO(P) ≤ 1.5V	6	18	-	mA
Output Saturation Voltage	VSAT	VI(-) ≥ 1V, VI(+) = 0V	-	140	400	mV
		ISINK = 4mA	Note1	-	700	
Output Leakage Current	IO(LKG)	VI(-) = 0V	VO(P) = 5V	-	0.1	nA
		VI(+) = 1V	VO(P) = 30V	-	-	1.0
Differential Voltage	VI(DIFF)	Note1	-	-	36	V

Note:

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

Typical Performance Characteristics

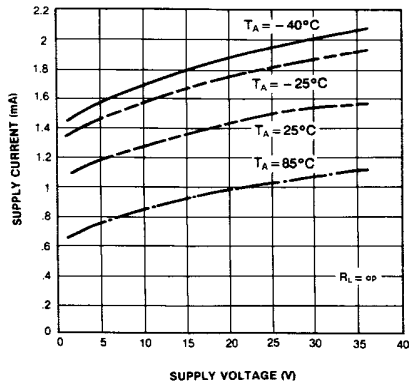


Figure 1. Supply Current vs Supply Voltage

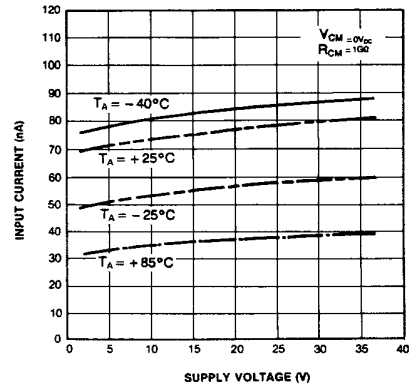


Figure 2. Input Current vs Supply Voltage

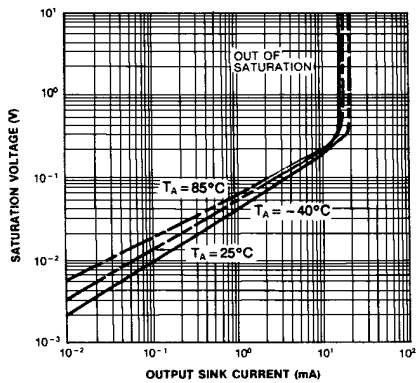


Figure 3. Output Saturation Voltage vs Sink Current

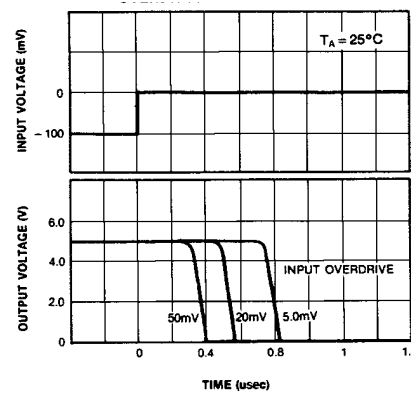


Figure 4. Response Time for Various Input Overdrive-Negative Transition

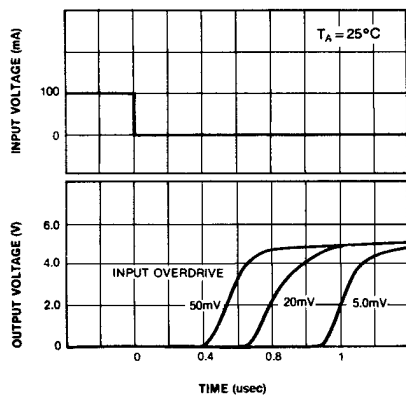


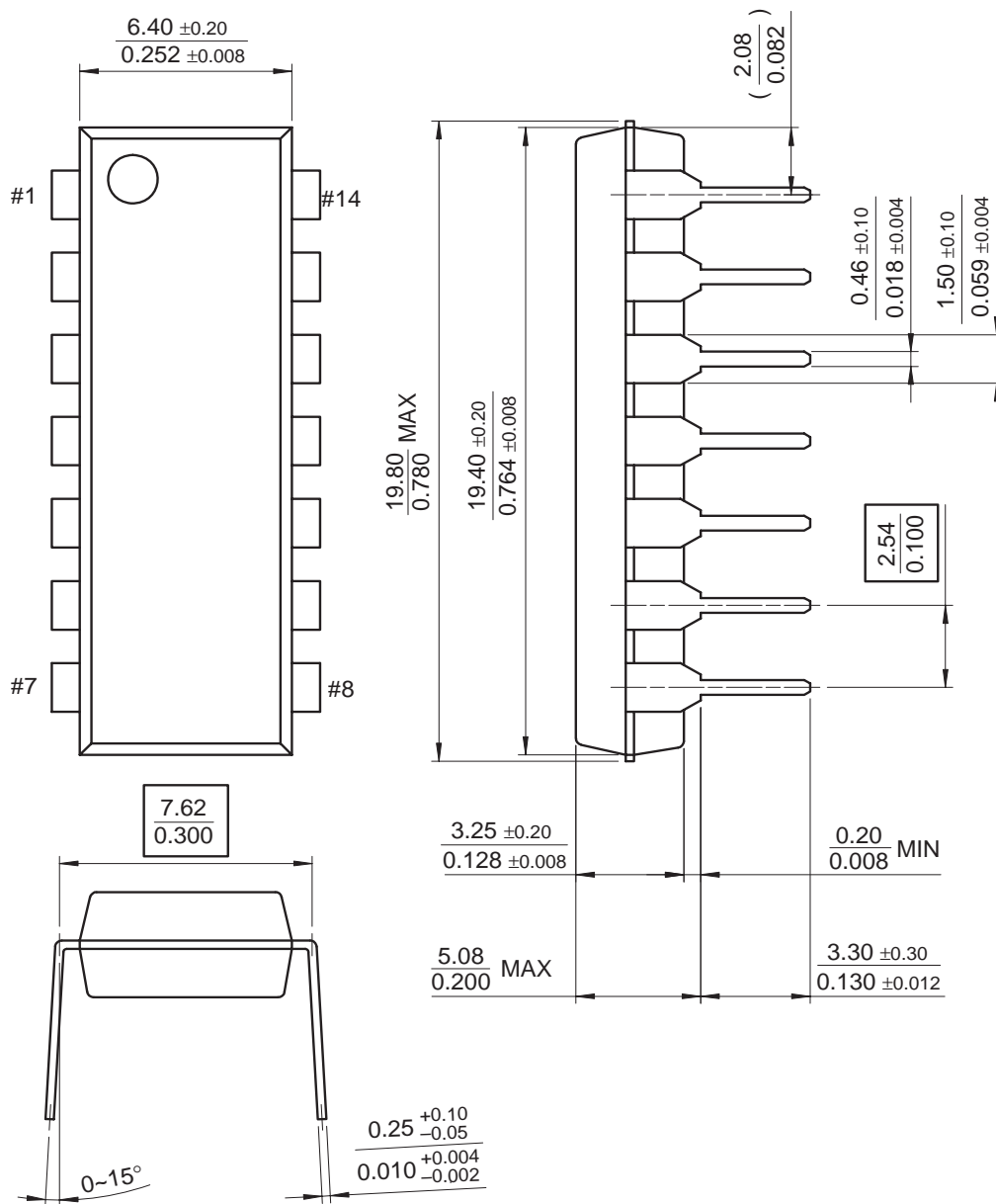
Figure 5. Response Time for Various Input Overdrive-Positive Transition

Mechanical Dimensions

Package

Dimensions in millimeters

14-DIP

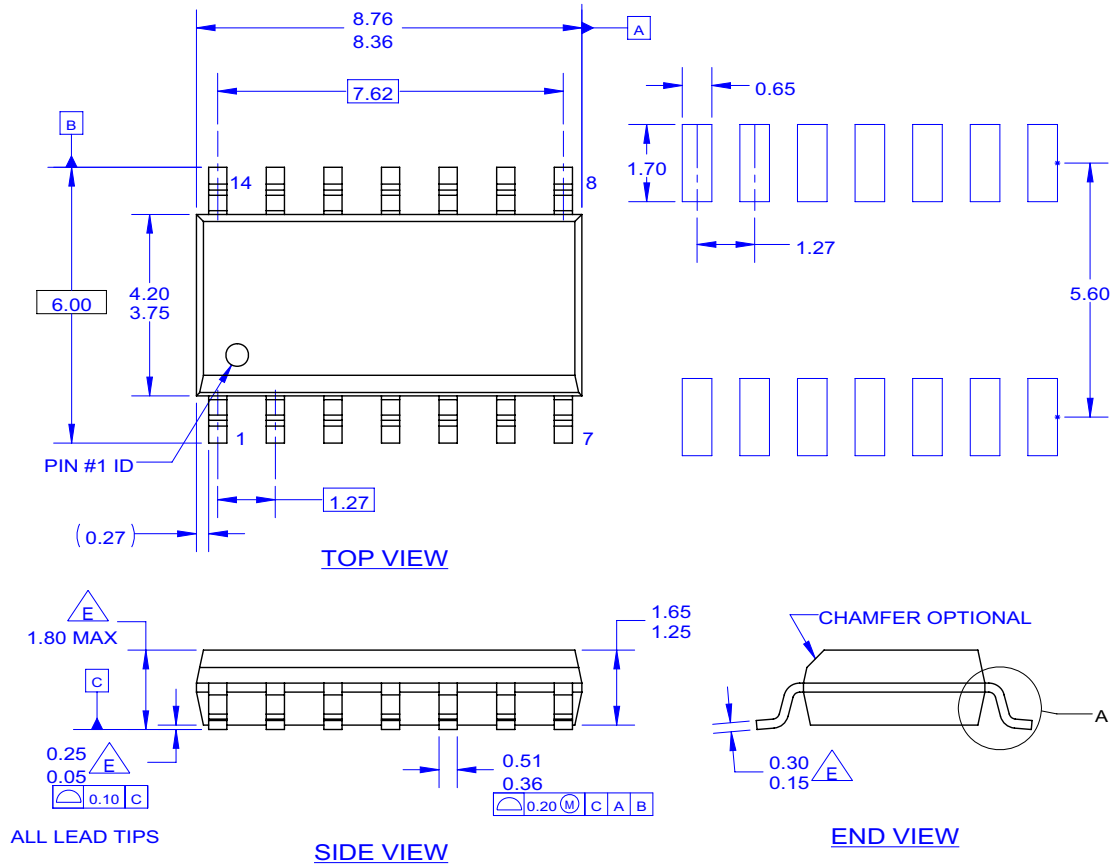


Mechanical Dimensions (Continued)

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.

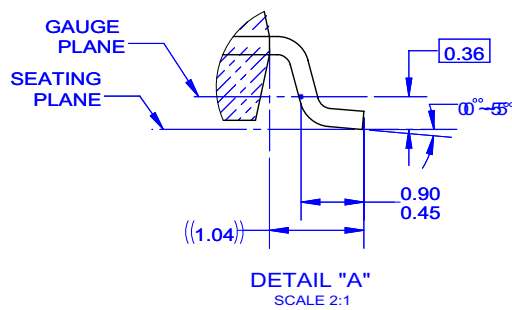
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D. DIMENSIONS AND TOLERANCES AS PER ASME Y14.5-1994.

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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