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Please note: As part of the Fairchild Semiconductor integration, some of the Fairchild orderable part numbers will need to change in order to meet ON Semiconductor's system requirements. Since the ON Semiconductor product management systems do not have the ability to manage part nomenclature that utilizes an underscore (_), the underscore (_) in the Fairchild part numbers will be changed to a dash (-). This document may contain device numbers with an underscore (_). Please check the ON Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at www.onsemi.com. Please email any questions regarding the system integration to Fairchild_questions@onsemi.com.

LM339/LM339A, LM239A, LM2901

Quad Comparator

Features

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

14-DIP

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14-SOP

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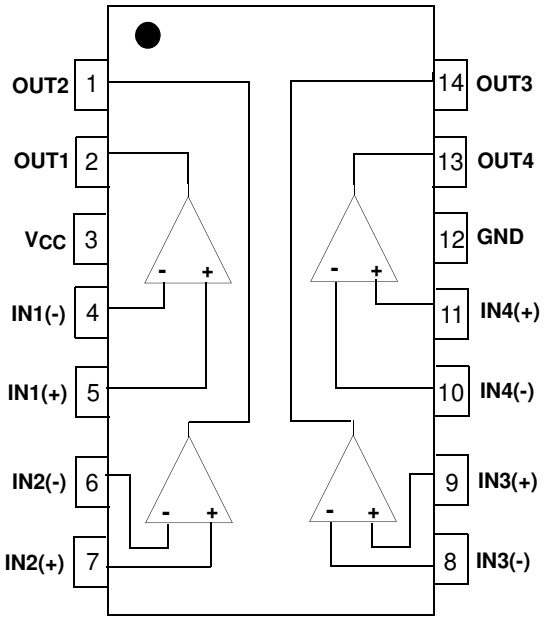
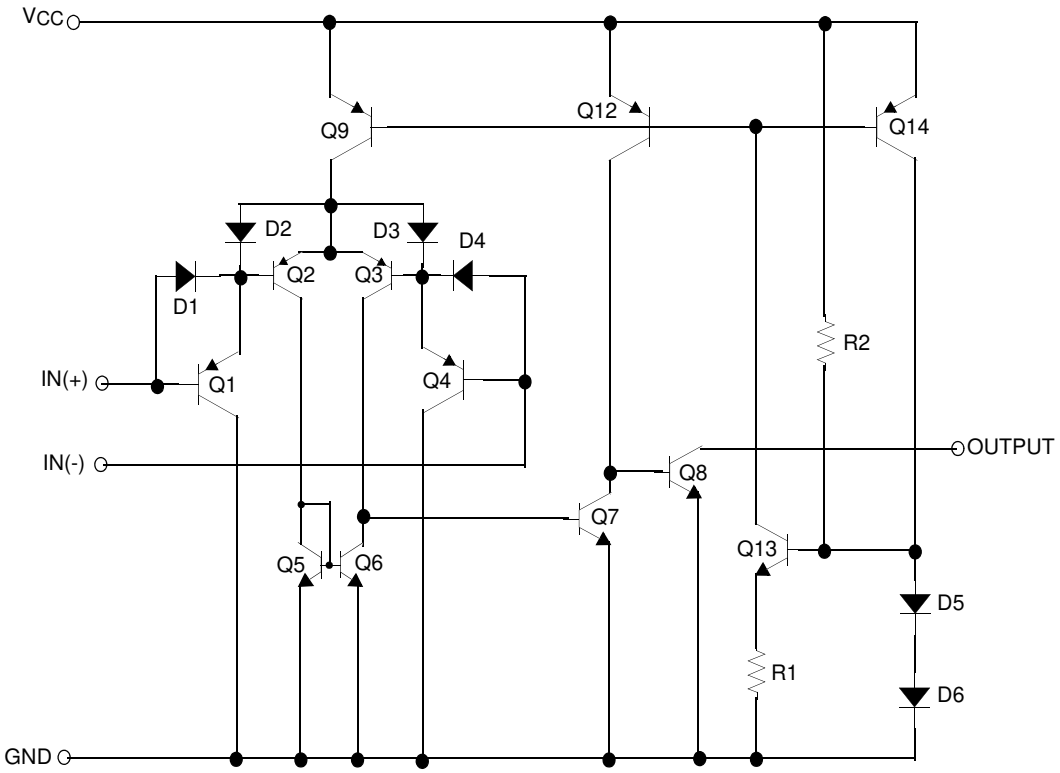
Internal Block Diagram



Schematic Diagram



Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Supply Voltage	V_{CC}	±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	P_D	570	mW
Operating Temperature LM339/LM339A LM2901 LM239A	T_{OPR}	 0 ~ +70 -40 ~ +85 -25 ~ +85	°C
Storage Temperature	T_{STG}	-65 ~ +150	°C

Electrical Characteristics

(V_{CC} = 5V, T_A = 25°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 = 0Ω		-	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 = ∞		-	1.1	2.0	-	1.1	2.0	mA
Voltage Gain	G_V	V_{CC} =15V, R_L ≥ 15kΩ (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 = 5.1kΩ (Note2)		-	300	-	-	300	-	ns
Response Time	T_{RES}	V_{RL} = 5V, R_L = 5.1kΩ (Note2)		-	1.3	-	-	1.3	-	μs
Output Sink Current	I_{SINK}	$V_{I(-)}$ ≥ 1V, $V_{I(+)}$ = 0V, $V_{O(P)}$ ≤ 1.5V		6	18	-	6	18	-	mA
Output Saturation Voltage	V_{SAT}	$V_{I(-)}$ ≥ 1V, $V_{I(+)}$ = 0V		-	140	400	-	140	400	mV
		I_{SINK} = 4mA	Note1	-	-	700	-	-	700	
Output Leakage Current	$I_{O(LKG)}$	$V_{I(-)}$ = 0V $V_{I(+)}$ = 1V	$V_{O(P)}$ = 5V	-	0.1	-	-	0.1	-	nA
			$V_{O(P)}$ = 30V	-	-	1.0	-	-	1.0	μA
Differential Voltage	$V_{I(DIFF)}$		Note1	-	-	36	-	-	36	V

Note:

1. LM339/LM339A : 0 ≤ T_A ≤ +70°C
   LM2901 : -40 ≤ T_A ≤ +85°C
   LM239A : -25 ≤ T_A ≤ +85°C
2. These parameters, although guaranteed, are not 100% tested in production.

Electrical Characteristics (Continued)

(V_{CC} = 5V, T_A = 25°C, unless otherwise specified)

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

Note:

1. LM339/LM339A : 0 ≤ T_A ≤ +70°C
   LM2901 : -40 ≤ T_A ≤ +85°C
   LM239A : -25 ≤ T_A ≤ +85°C
2. These parameters, although guaranteed, are not 100% tested in production.

Typical Performance Characteristics

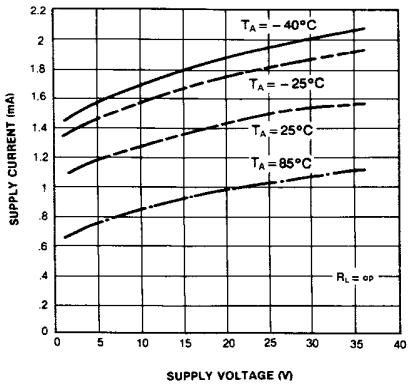


Figure 1. Supply Current vs Supply Voltage

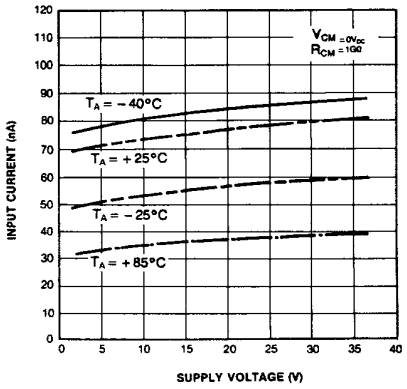


Figure 2. Input Current vs Supply Voltage

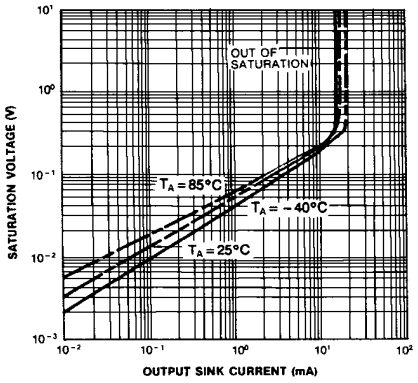


Figure 3. Output Saturation Voltage vs Sink Current

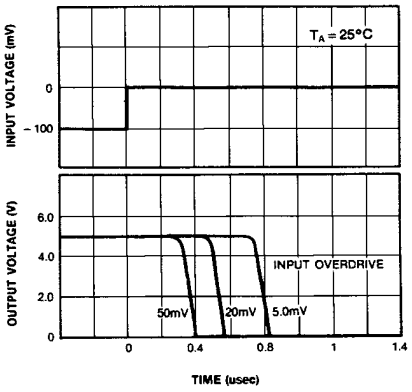


Figure 4. Response Time for Various Input Overdrive-Negative Transition

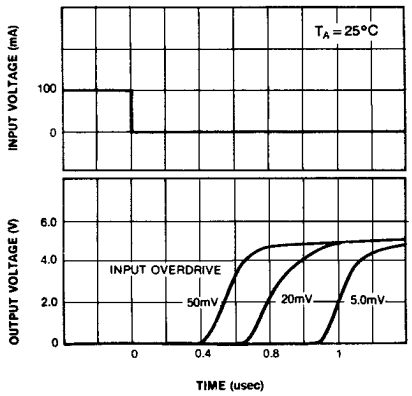


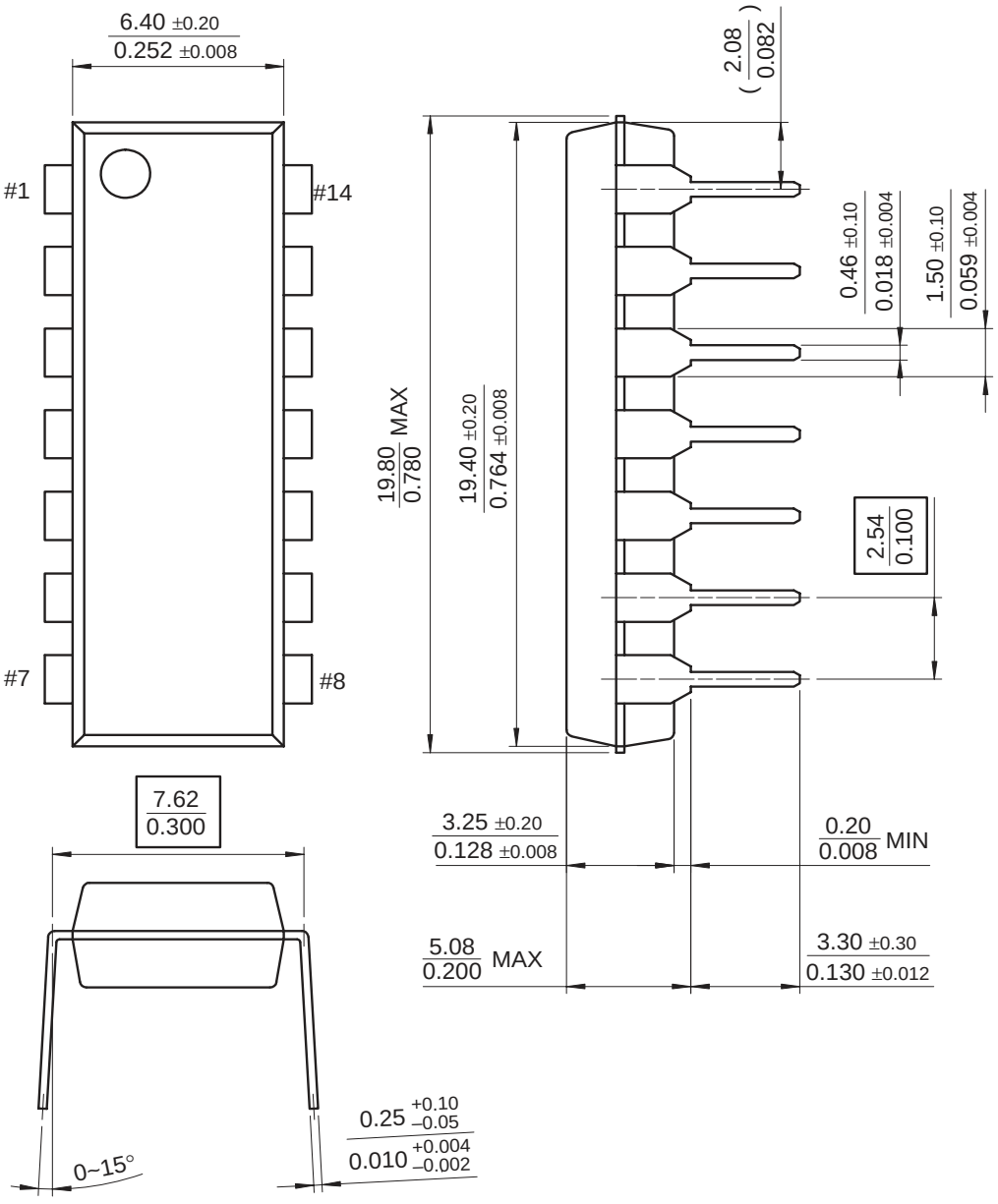
Figure 5. Response Time for Various Input Overdrive-Positive Transition

Mechanical Dimensions

Package

Dimensions in millimeters

14-DIP

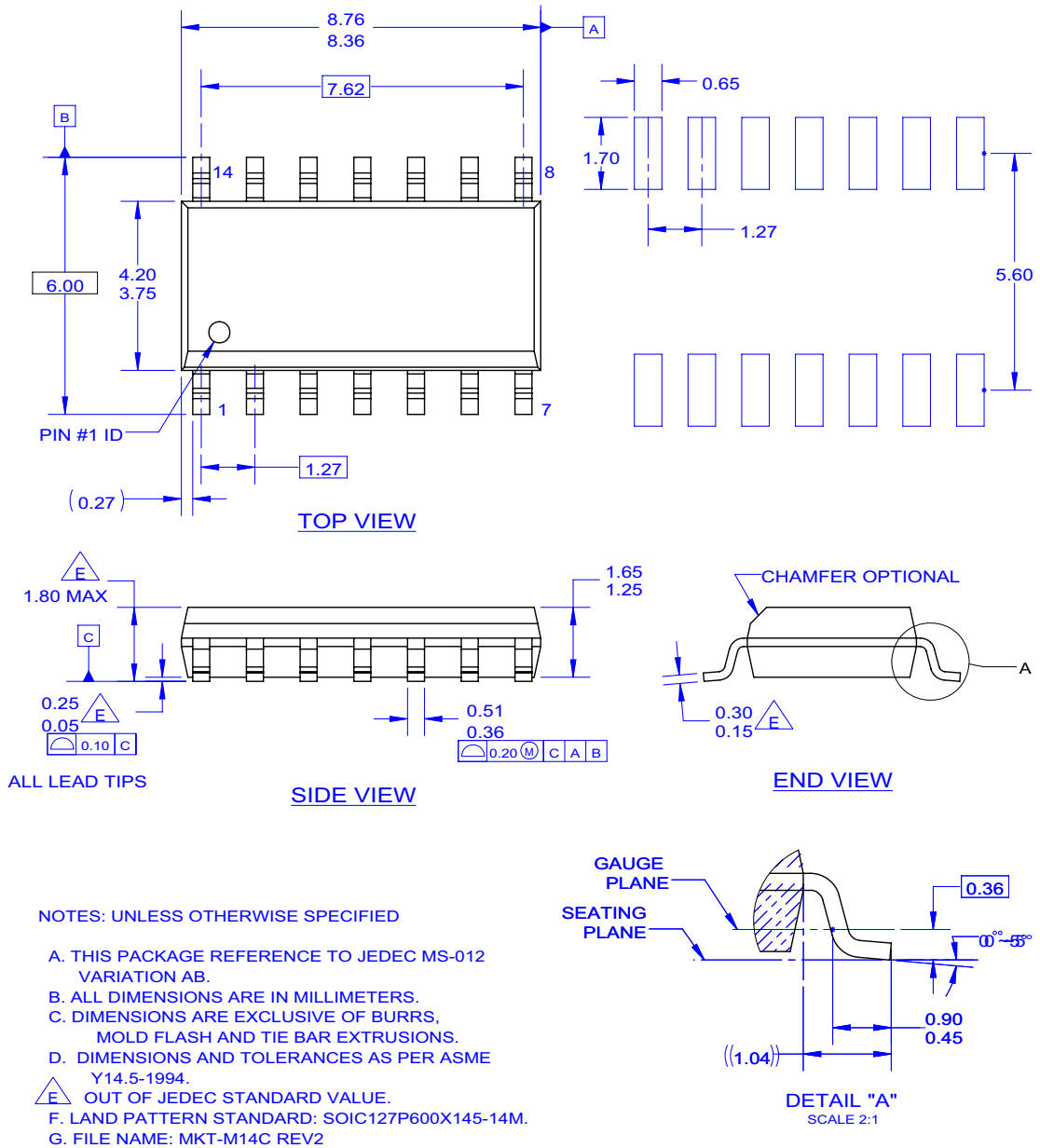


Mechanical Dimensions (Continued)

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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