



Is Now Part of



**ON Semiconductor®**

To learn more about ON Semiconductor, please visit our website at  
[www.onsemi.com](http://www.onsemi.com)

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](http://www.onsemi.com). Please email any questions regarding the system integration to [Fairchild\\_questions@onsemi.com](mailto:Fairchild_questions@onsemi.com).

ON Semiconductor and the ON Semiconductor logo are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

# LM339/LM339A, LM239A, LM2901

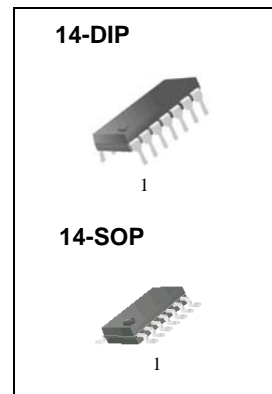
## Quad Comparator

### Features

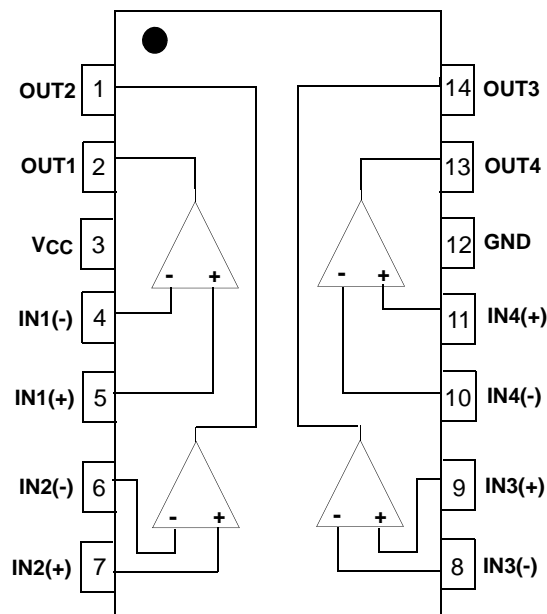
- Single or Dual Supply Operation
- Wide Range of Supply Voltage  
LM2901, LM339/LM339A, LM239A: 2 ~ 36V (or  $\pm 1 \sim \pm 18V$ )
- Low Supply Current Drain 800 $\mu$ A Typ.
- Open Collector Outputs for Wired and Connectors
- Low Input Bias Current 25nA Typ.
- Low Input Offset Current  $\pm 2.3nA$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

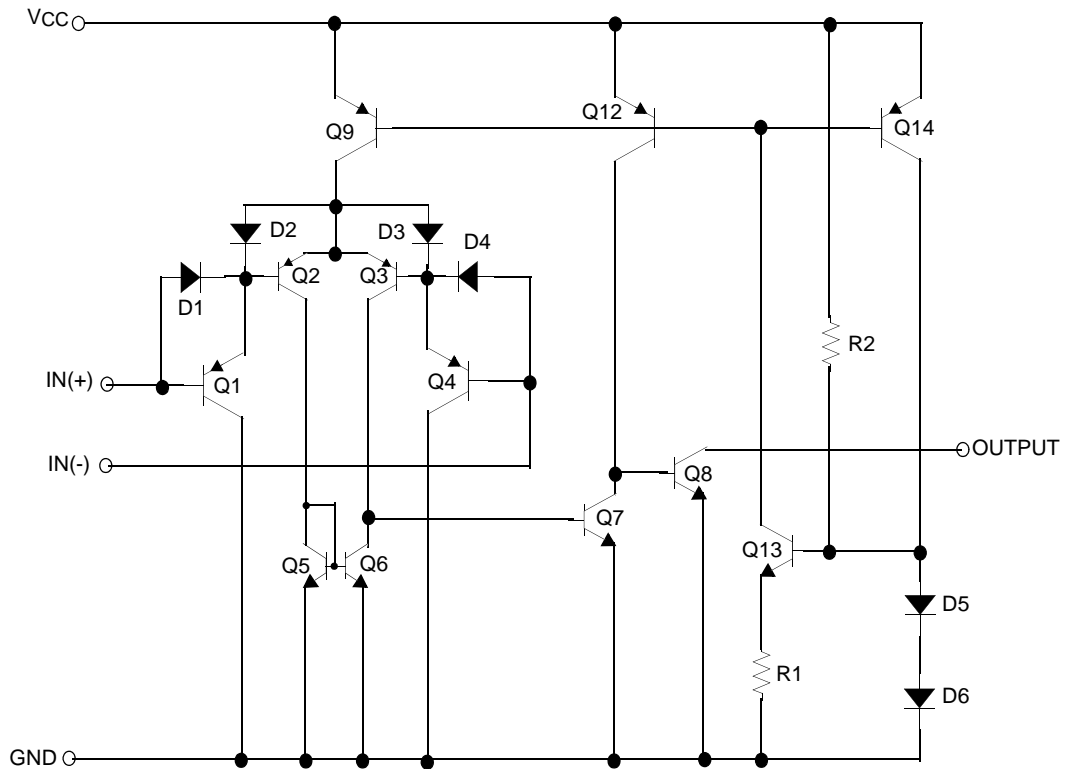
The LM339/LM339A, LM239A, LM2901 consist of four independent voltage comparators designed to operate from single power supply over a wide voltage range.



### Internal Block Diagram



## Schematic Diagram



## Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Supply Voltage	V <sub>CC</sub>	±18 or 36	V
Differential Input Voltage	V <sub>I(DIFF)</sub>	36	V
Input Voltage	V <sub>I</sub>	-0.3 to +36	V
Output Short Circuit to GND	-	Continuous	-
Power Dissipation	P <sub>D</sub>	570	mW
Operating Temperature			
LM339/LM339A	T <sub>OPR</sub>	0 ~ +70	°C
LM2901		-40 ~ +85	
LM239A		-25 ~ +85	
Storage Temperature	T <sub>STG</sub>	-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
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	T <sub>LRES</sub>	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	μA
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

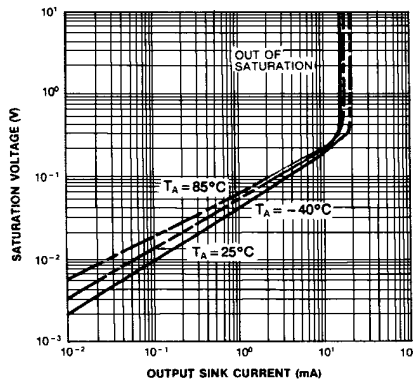


Figure 3. Output Saturation Voltage vs Sink Current

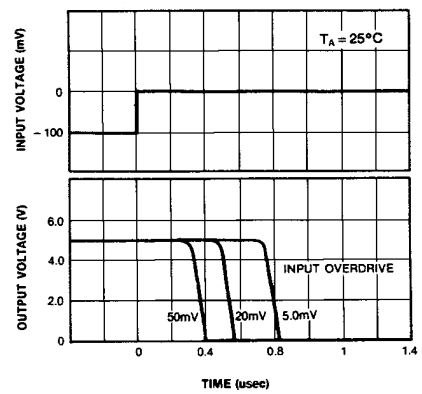


Figure 4. Response Time for Various Input Overdrive-Negative Transition

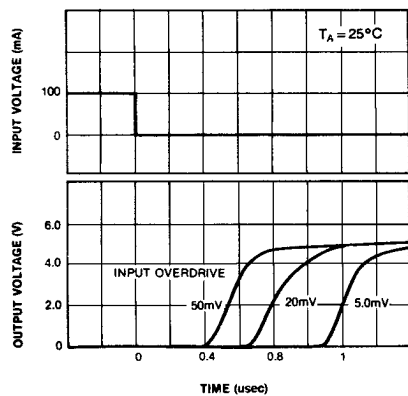


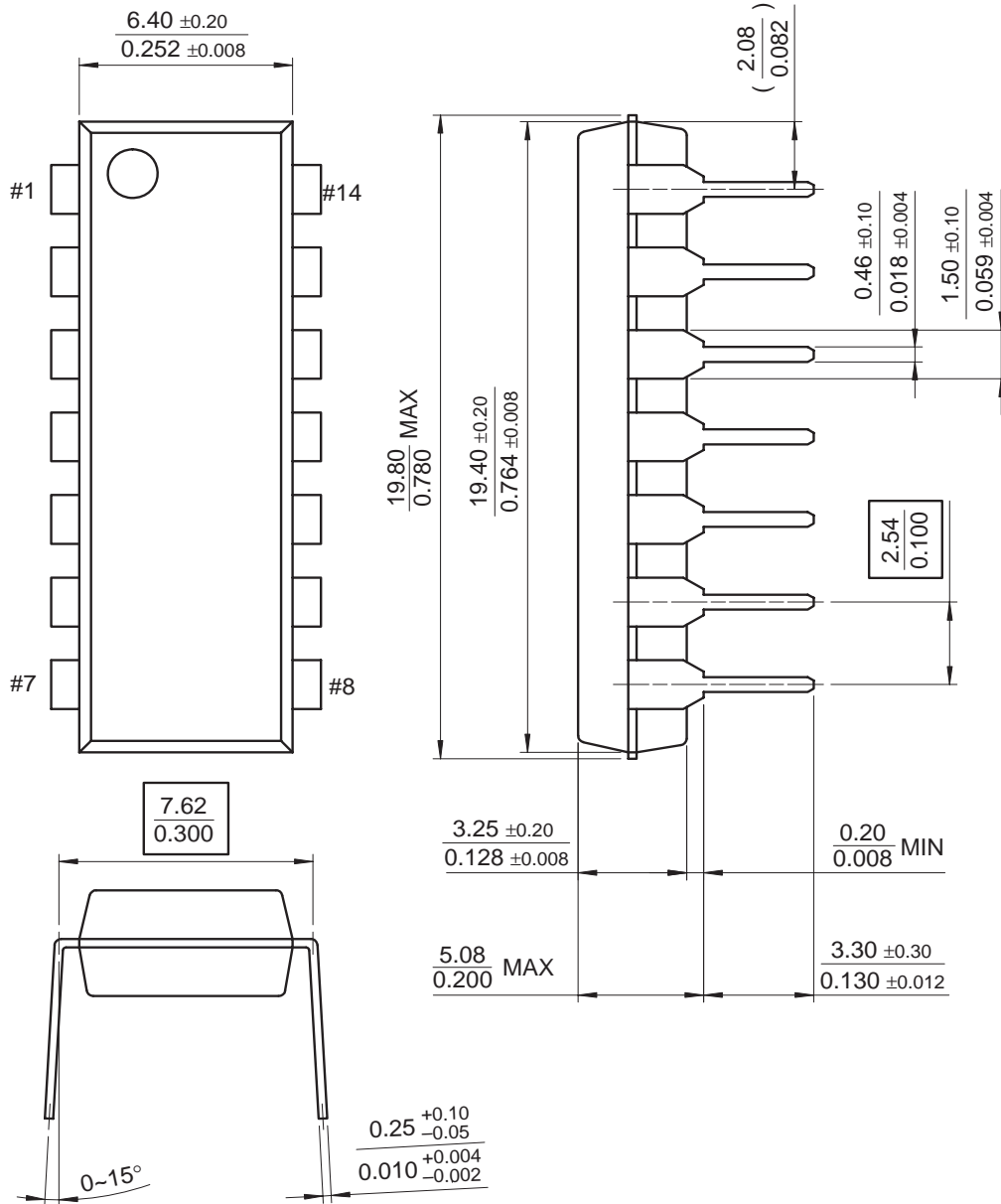
Figure 5. Response Time for Various Input Overdrive-Positive Transition

# Mechanical Dimensions

## Package

Dimensions in millimeters

### 14-DIP

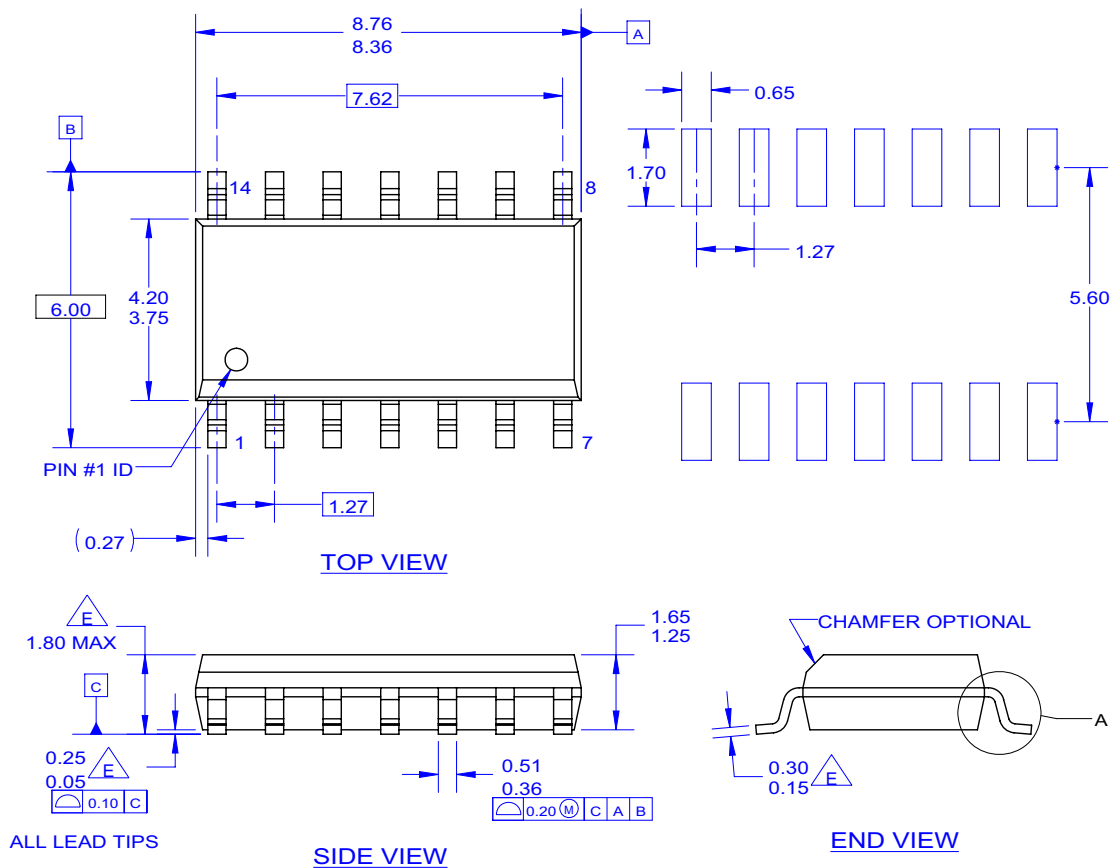


# Mechanical Dimensions (Continued)

## Package

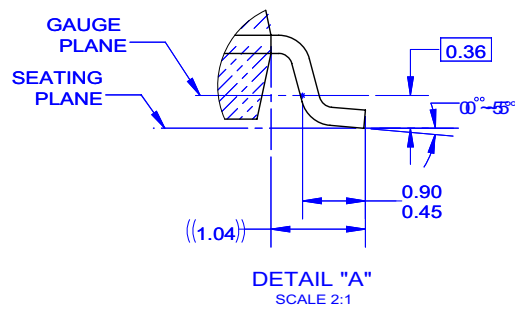
Dimensions in millimeters

### 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	

### DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

### LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

ON Semiconductor and  are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## PUBLICATION ORDERING INFORMATION

### LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor  
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA  
**Phone:** 303-675-2175 or 800-344-3860 Toll Free USA/Canada  
**Fax:** 303-675-2176 or 800-344-3867 Toll Free USA/Canada  
**Email:** [orderlit@onsemi.com](mailto:orderlit@onsemi.com)

**N. American Technical Support:** 800-282-9855 Toll Free  
USA/Canada  
**Europe, Middle East and Africa Technical Support:**  
Phone: 421 33 790 2910  
**Japan Customer Focus Center**  
Phone: 81-3-5817-1050

**ON Semiconductor Website:** [www.onsemi.com](http://www.onsemi.com)  
**Order Literature:** <http://www.onsemi.com/orderlit>  
For additional information, please contact your local  
Sales Representative

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[ON Semiconductor:](#)

[LM239AMX](#)



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.