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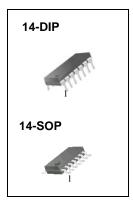
# KA339/KA339A, KA2901 Quad Comparator

#### Features

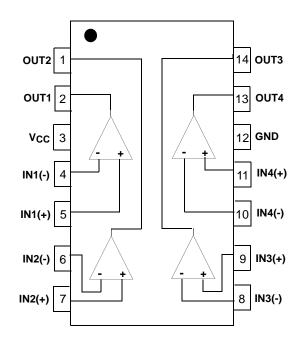
- Single or Dual Supply Operation
- Wide Range of Supply Voltage KA339/KA339A, KA2901 : 2 ~ 36V (or ±1 ~ ±18V)
- Low Supply Current Drain 800µA Typ.
- Open Collector Outputs for Wired and Connectors
- Low Input Bias Current 25nA Typ.
- Low Input Offset Current ±2.3nA Typ.
- Low Input Offset Voltage ±1.4mV Typ.
- Input Common Mode Voltage Range Includes Ground.
- Low Output Saturation Voltage
- Output Compatible With TTL, DTL and MOS Logic System

### Description

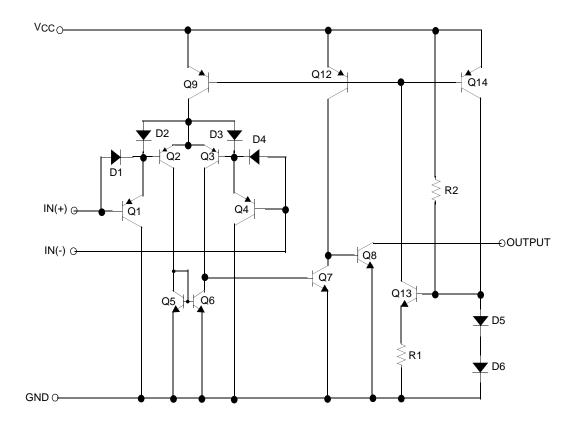
The KA339/KA339A, KA2901 consist of four independent voltage comparators designed to operate from single power supply over a wide voltage range.



### **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 KA339/KA339A KA2901	TOPR	0 ~ +70 -40 ~ +85	°C
Storage Temperature	TSTG	-65 ~ +150	°C

### **Electrical Characteristics**

Deremeter	Symbol	Condi	Conditions		KA339A			KA339		
Parameter	Parameter Symbol Condition		tions	Min.	Тур.	Max.	Min.	Тур.	Max.	Unit
	Vio	VO(P) = 1.4V,	Rs = 0Ω	-	1	2	-	1.4	5	mV
Input Offset Voltage VIO		Note1		-	-	4.0	-	-	9.0	
Input Offset Current	lio	IIN(+) - IIN(-), \	VCM = 0V	-	2.3	50	-	2.3	50	nA
input Onset Ourrent	10		Note1	-	-	150	-	-	150	
Input Bias Current	IBIAS	VCM = 0V		-	57	250	-	57	250	nA
input bias ourient	IDIAS		Note1	-	-	400	-	-	400	
Input Common Mode	VI(R)	VCC = 30V		0	-	Vcc-1.5	0	-	Vcc-1.5	V
Voltage Range	VI(IN)		Note1	0	-	Vcc-2	0	-	Vcc-2	v
Supply Current	ICC	$V_{CC} = 5V, R_L = \infty$		-	1.1	2.0	-	1.1	2.0	mA
Voltage Gain	Gv	$V_{CC}$ = 15V, $R_L \ge 15k\Omega$ (for large swing)		50	200	-	50	200	-	V/mV
Large Signal Response Time	TLRES	$V_{I} = TTL Logic Swing$ $V_{REF} = 1.4V, V_{RL} = 5V,$ $R_{L} = 5.1 k\Omega (Note2)$		-	300	-	-	300	-	ns
Response Time	TRES	V <sub>RL</sub> = 5V, R <sub>L</sub> = 5.1kΩ (Note2)		-	1.3	-	-	1.3	-	μs
Output Sink Current	ISINK	$V_{I(-)} \ge 1V, V_{I(+)} = 0V, V_{O(P)} \le 1.5V$		6	18	-	6	18	-	mA
Output Saturation VSA	Veat	$VI(-) \ge 1V, VI(+) = 0V$		-	140	400	-	140	400	mV
	ISINK = 4	ISINK = 4mA	Note1	-	-	700	-	-	700	111.V
Output Leakage		$V_{I(-)} = 0V$	VO(P) = 5V	-	0.1	-	-	0.1	-	nA
Current	l <sub>o</sub> (LKG)	VI(+) = 1V	VO(P) =30V	-	-	1.0	-	-	1.0	μA
Differential Voltage	VI(DIFF)	Note1		-	-	36	-	-	36	V

#### Note:

1. KA339 / KA339A:  $0 \le T_A \le +70^{\circ}C$ 

KA2901: -40  $\leq$  TA  $\leq$  +85°C

2. These parameters, although guaranteed, are not 100% tested in production.

### Electrical Characteristics (Continued)

(V<sub>CC</sub> = 5V,  $T_A$  = 25°C, unless otherwise specified)

Deveryoter	Querra ha a l	Conditions			11			
Parameter	Symbol Conditions		aitions	Min.	Min. Typ. M		– Unit	
	Vio	VO(P) = 1.4V,	Rs = 0Ω	-	2	7	mV	
Input Offset Voltage VIO		Note1		-	9	15	ΠIV	
Input Offset Current	lio			2.3	50	nA		
input Onset Current			Note1	-	50	200		
Input Bias Current				-	57	250	nA	
Input Bias Current IBIAS			Note1	-	200	500		
Input Common		KA2901, VCC	=30V	0	-	Vcc-1.5		
Mode Voltage Range	VI(R)		Note1	0	-	Vcc-2	V	
	Icc	RL =∞, VCC=5V		-	1.1	2.0		
Supply Current IC		RL =∞, VCC =30V		-	1.6	2.5	mA	
Voltage Gain	Gv	V <sub>CC</sub> =15V, R <sub>L</sub> ≥15kΩ (for large swing)		25	100	-	V/mV	
Large Signal Response Time	TLRES	VI =TTL Logic Swing VREF =1.4V, VRL = 5V, RL =5.1k $\Omega$ (Note2)		-	300	-	ns	
Response Time	TRES	V <sub>RL</sub> = 5V, R <sub>L</sub> =5.1kΩ (Note2)		-	1.3	-	μS	
Output Sink Current	ISINK	$V_{I(-)} \ge 1V, V_{I(+)} = 0V, V_{O(P)} \le 1.5V$		6	18	-	mA	
Output Saturation		VI(-) ≥ 1V, VI(+) =0V		-	140	400		
Voltage	VSAT	ISINK = 4mA	Note1	-	-	700	mV	
Output Leakage		$V_{I(-)} = 0V$ $V_{I(+)} = 1V$	VO(P) = 5V	-	0.1	-	nA	
Current	U(LKG)		VO(P) = 30V	-	-	1.0	μA	
Differential Voltage	VI(DIFF)	- Note1		-	-	36	V	

#### Note:

1. KA339 / KA339A:  $0 \leq T_A \leq +70^\circ C$ 

KA2901: -40  $\leq$  TA  $\leq$  +85°C

2. These parameters, although guaranteed, are not 100% tested in production.

### **Typical Performance Characteristics**

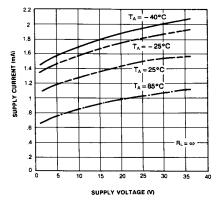


Figure 1. Supply Current vs Supply Voltage

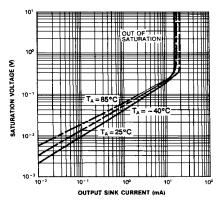


Figure 3. Output Saturation Voltage vs Sink Current

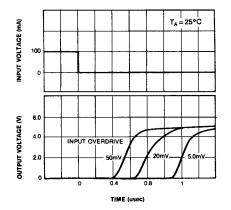


Figure 5. Response Time for Various Input Overdrive-Positive Transition

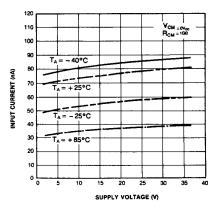


Figure 2. Input Current vs Supply Voltage

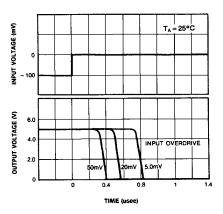
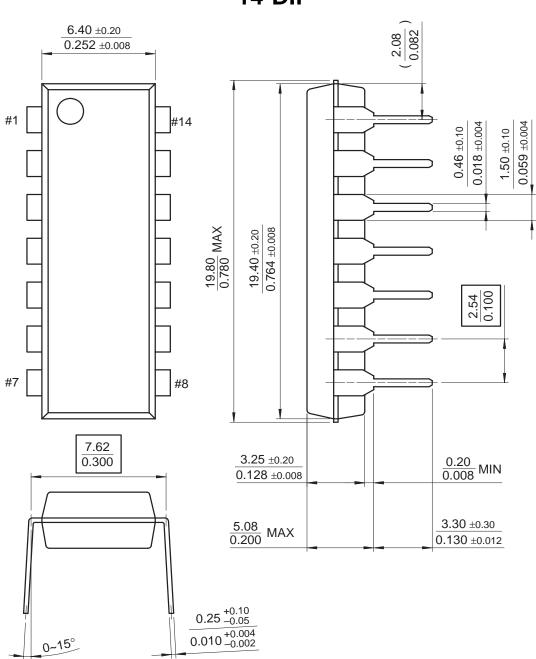


Figure 4. Response Time for Various Input Overdrive-Negative Transition

### **Mechanical Dimensions**

#### Package

#### **Dimensions in millimeters**

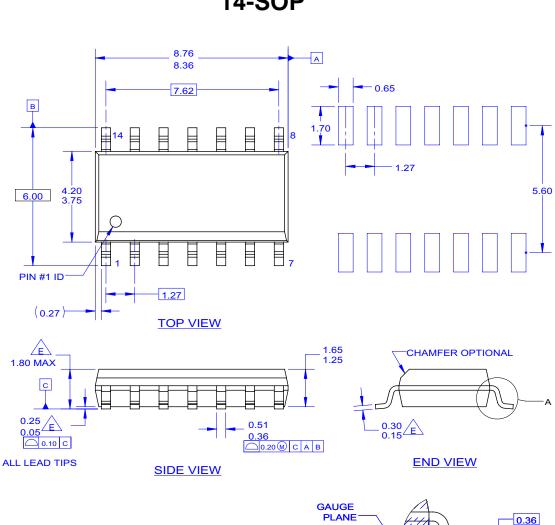


**14-DIP** 

#### Mechanical Dimensions (Continued)

#### Package

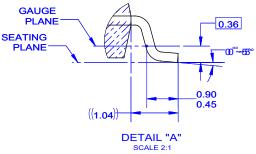




**14-SOP** 

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
- DIMENSIONS AND TOLERAINCES AS FER ASME Y14.5-1994.
  OUT OF JEDEC STANDARD VALUE.
  F. LAND PATTERN STANDARD: SOIC127P600X145-14M.
  G. FILE NAME: MKT-M14C REV2



### **Ordering Information**

Product Number	Package	Operating Temperature			
KA339	14-DIP				
KA339A		0 ~ +70°C			
KA339D	14-SOP	0~+70 8			
KA339AD	14-30F				
KA2901D	14-SOP	-40 ~ +85°C			

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