

LM2901, LM339/LM339A

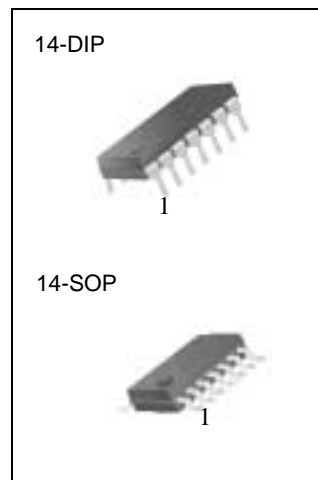
Quad Comparator

Features

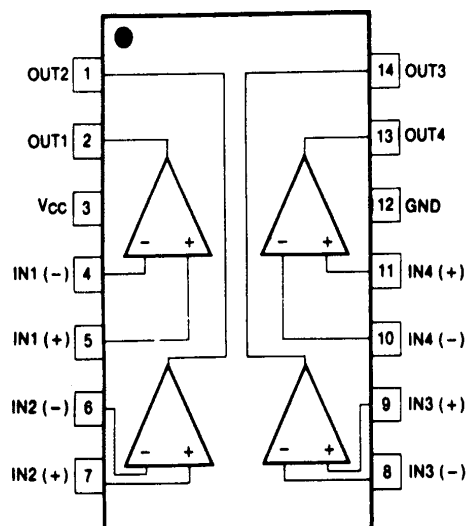
- Single or dual supply operation
- Wide range of supply voltage
LM2901, LM339/LM339A : 2 ~ 36V (or $\pm 1 \sim \pm 18V$)
Low supply current drain 800 μ A Typ.
- Open collector outputs for wired and connectors
- Low input bias current 25nA Typ.
- Low Input offset current $\pm 2.3nA$ Typ.
- Low input offset voltage $\pm 1.4mV$ Typ.
- Common mode input voltage range includes ground.
- Low output saturation voltage
- Output compatible with TTL, DTL and MOS logic system

Description

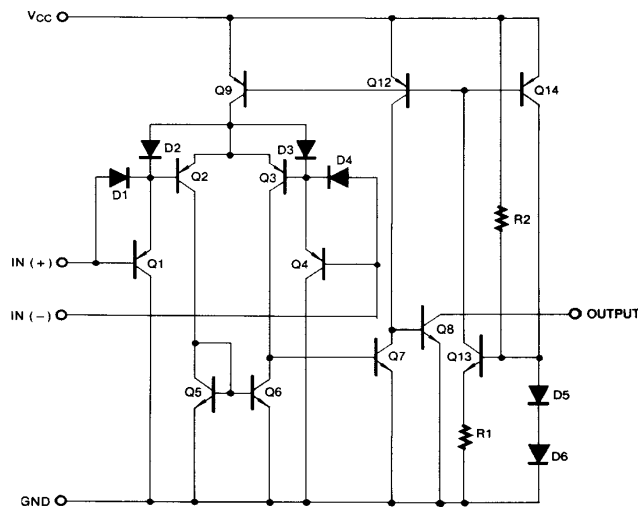
The LM2901, LM339/LM339A consist of four independent voltage comparators designed to operate from single power supply over a wide voltage range.



Internal Block Diagram



Schematic Diagram



Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Supply Voltage	V _{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	T _{OPR}	0 ~ + 70 - 40 ~ + 85	°C
Storage Temperature	T _{STG}	- 65 ~ + 150	°C

Electrical Characteristics

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

Parameter	Symbol	Conditions	LM339A			LM339			Unit	
			Min	Typ	Max	Min	Typ	Max		
Input Offset Voltage	V_{IO}	$V_{O(P)} = 1.4V$, $R_S = 0\Omega$ NOTE 1	-	± 1	± 2	-	± 1.4	± 5	mV	
			-		± 4.0	-	-	± 9.0		
Input Offset Current	I_{IO}	NOTE 1	-	± 2.3	± 50	-	± 2.3	± 50	nA	
			-		± 150	-	-	± 150		
Input Bias Current	I_{BIAS}	NOTE 1	-	57	250	-	57	250	nA	
			-	-	400	-	-	400		
Input Common Mode Voltage Range	$V_{I(R)}$	NOTE 1	0	-	$V_{CC}-1.5$	0	-	$V_{CC}-1.5$	V	
			0	-	$V_{CC}-2$	0	-	$V_{CC}-2$		
Supply Current	I_{CC}	$R_L = \infty$	-	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_{RES}	$V_I = \text{TTL Logic Swing}$ $V_{REF} = 1.4V$, $V_{RL} = 5V$, $R_L = 5.1K\Omega$	-	350	-	-	350	-	ns	
Response Time	t_{TLH}	$V_{RL} = 5V$, $R_L = 5.1K\Omega$	-	1.4	-	-	1.4	-	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}	$V_{I(-)} \geq 1V$, $V_{I(+)} = 0V$ $I_{SINK} = 4mA$	NOTE 1	-	140	400	-	140	400	mV
				-		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	$V_{I(DIFF)}$	NOTE 1	-	-	36	-	-	36	V	

Note 1.

LM339/LM339A: $0 \leq T_A \leq +70^\circ C$

LM2901: $-40 \leq T_A \leq +85^\circ C$

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
		NOTE 1	-	9	15	
Input Offset Current	I _{IO}		-	2.3	50	nA
		NOTE 1	-	50	200	
Input Bias Current	I _{BIAS}		-	57	250	nA
		NOTE 1	-	200	500	
Input Common Mode Voltage Range	V _{I(R)}		0	-	V _{CC} -1.5	V
		NOTE 1	0	-	V _{CC} -2	
Supply Current	I _{CC}	R _L = ∞	-	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 _{RES}	V _I = TTL Logic Swing V _{REF} = 1.4V, V _{R(L)} = 5V, R _L = 5.1KΩ	-	350	-	ns
Response Time	t _{RES}	V _{R(L)} = 5V, R _L = 5.1KΩ	-	1.4	-	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	NOTE 1	-	700	
Output Leakage Current	I _{O(LKG)}	V _{I(-)} = 0V		0.1	-	nA
		V _{I(+)} = 1V	V _{O(P)} = 5V	-	-	1.0
Differential Voltage	V _{I(DIFF)}		NOTE 1	-	36	V

Note 1.

LM339/LM339A : 0 ≤ T_A ≤ +70°CLM2901: -40 ≤ T_A ≤ +85°C

Typical Performance Characteristics

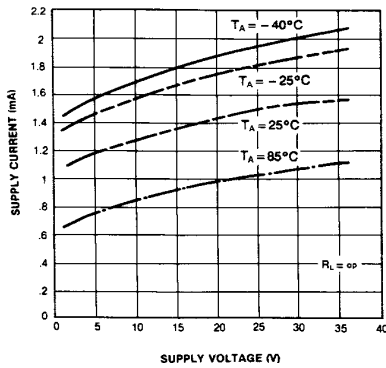


Figure 1. Supply Current Vs Supply Voltage

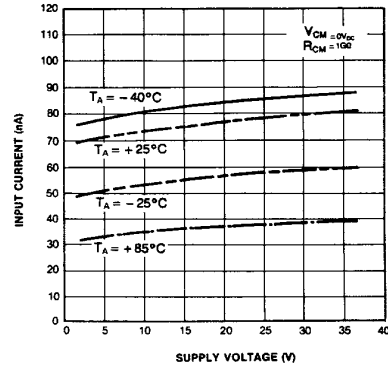


Figure 2. Input Current Vs Supply Voltage

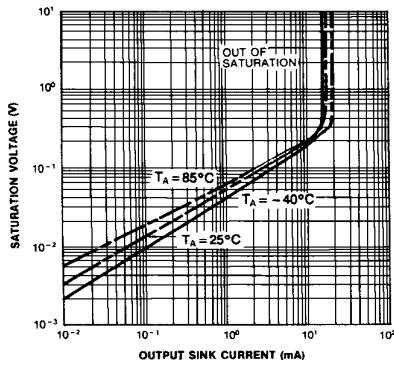


Figure 3. Output Saturation Voltage vs sink Current

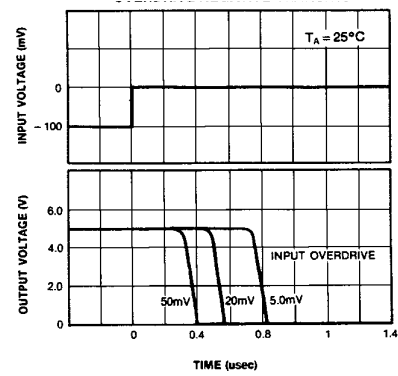


Figure 4. Response Time for Various Input Overdrive-Negative Transition

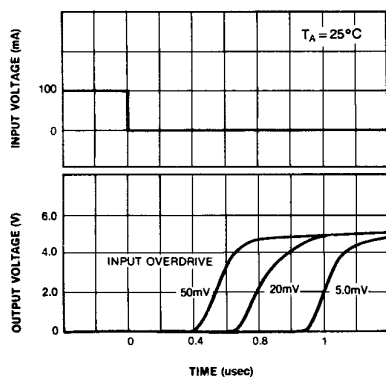
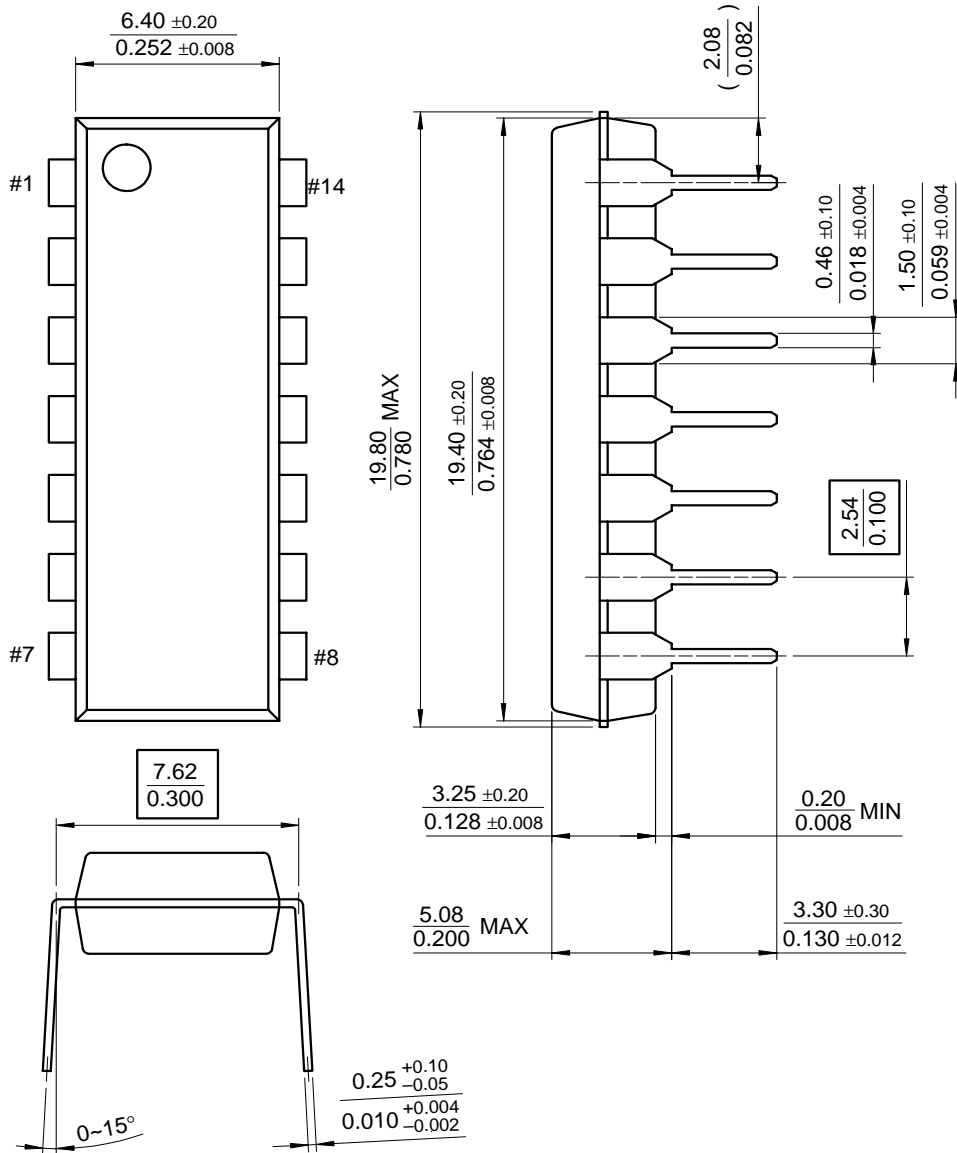


Figure 5. Response Time for Various Input Overdrive-Positive Transition

Mechanical Dimensions

Package

14-DIP



Ordering Information

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

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