



UNI-SEMICONDUCTOR CO., LTD

宇力半导体有限公司



LM339 Data Sheet

V 1.1

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LM339

Quad Differential Comparators

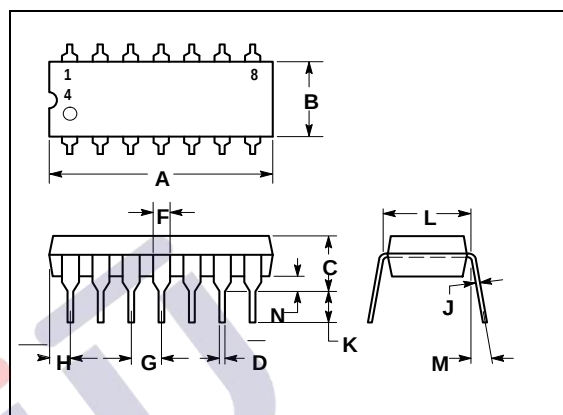
DESCRIPTION:

The LM339 consists of four independent voltage comparators with an offset voltage specification as low as 2.0mV max. for two comparators which were designed specifically to operation from a single power supply over a wide range of voltages. Operate from split power supplies is also possible, and the low power supply current drain is independent of the magnitude of the power supply voltage. These comparators also have a unique characteristic in that the input common-mode voltage range includes ground, even though operated from a single power supply voltage.

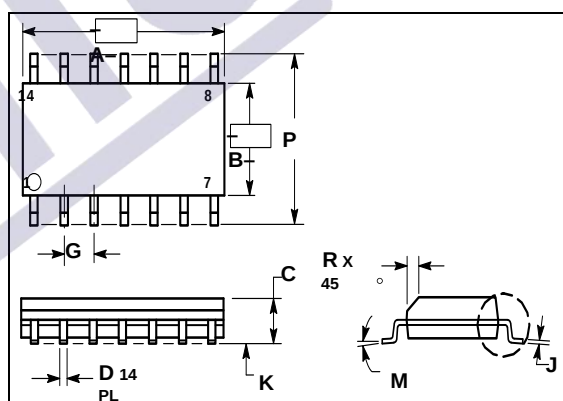
FEATURE:

- Wide supply voltage range: single supply operation: 2V to 36V dual supply operation: $\pm 1V$ to $\pm 18V$
- Very low supply current drain (0.8mA) independent of supply voltage (2.0mW/comparator at 5.0 V_{DC})
- Low input biasing current: 25nA
- Low input offset current: 5.0nA; Low input offset voltage: 5.0mV
- Input common-mode voltage range includes ground
- Differential input voltage range equal to the power supply voltage
- Output voltage compatible with TTL, DTL, ECL, MOS and CMOS logic systems.

Outline Drawing

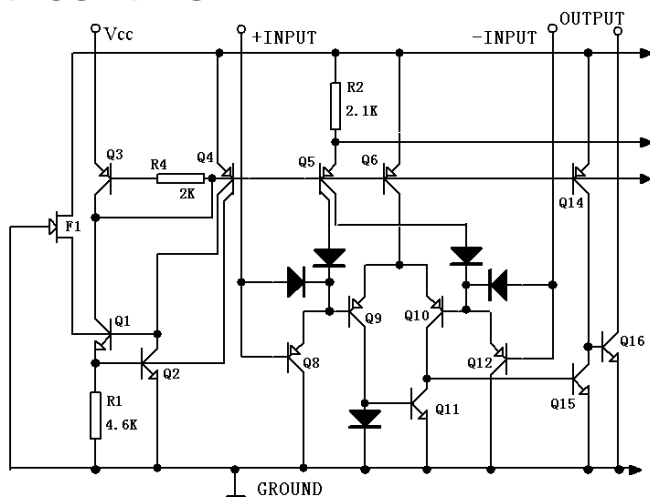


DIP14

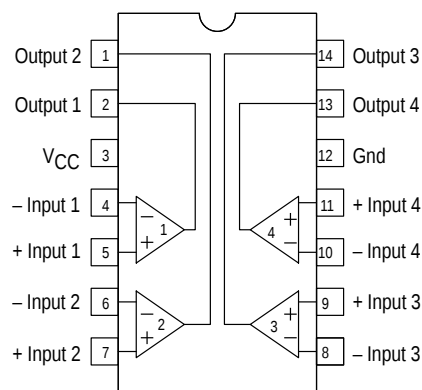


SOP14

BLOCK DIAGRAM



PIN CONFIGURATION



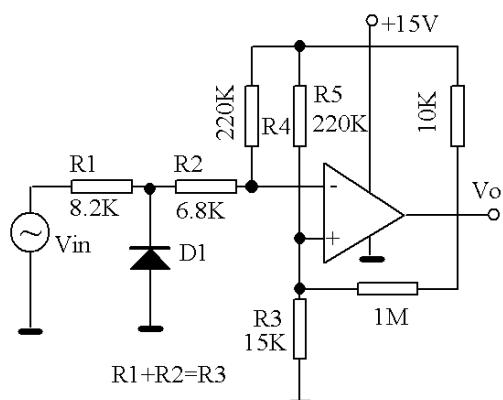
ABSOLUTE MAXIMUM RATINGS

Characteristics		Symbol	Value		Unit
			Min	Max	
Supply Voltage	Single supply voltage	V_{CC}		± 18	V
	Dual supplies voltage			36	
Differential Input Voltage		V_{IDR}		36	V
Input common-mode voltage		V_{ICR}	-0.3	36	V
Output short-circuit to ground		I_{OG}		20	mA
Input Current		I_{IN}		50	mA
Maximum junction temperature		T_J		125	$^{\circ}\text{C}$
Power Dissipation		P_D		570	mW
Operating Temperature Range		T_{amb}	0	70	$^{\circ}\text{C}$
Storage Temperature Range		T_{stg}	-65	150	$^{\circ}\text{C}$

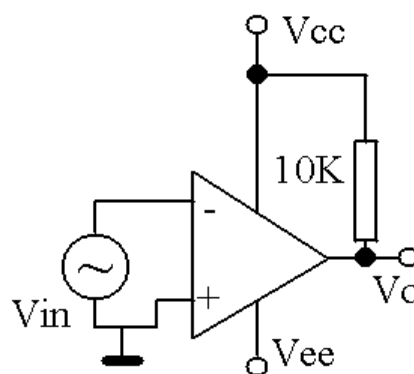
ELECTRICAL CHARACTERISTICS (Unless otherwise specified : $V_{CC}=5V$, $T_{amb}=25^{\circ}\text{C}$)

Characteristics	Test conditions	Symbol	Min	Typ.	Max	Unit
Input Offset Voltage		V_{IO}		± 1.0	± 5.0	mV
	$0^{\circ}\text{C} \leq T_a \leq 70^{\circ}\text{C}$				± 9.0	
Input Offset Current		I_{IO}		± 5.0	± 50	nA
	$0^{\circ}\text{C} \leq T_a \leq 70^{\circ}\text{C}$				± 150	
Input Bias Current		I_{IB}		25	250	nA
	$0^{\circ}\text{C} \leq T_a \leq 70^{\circ}\text{C}$				400	
Input Common-mode Voltage Range		V_{ICR}	0		$V_{CC}-1.5$	V
	$0^{\circ}\text{C} \leq T_a \leq 70^{\circ}\text{C}$		0		$V_{CC}-2.0$	
Supply Current	$R_L=\infty$ dual comparator	I_{CC}		0.4	1.0	mA
	$R_L=\infty$, dual comparator $V_{CC}=30V$				2.5	
Voltage Gain	$R_L \geq 15K\Omega$, $V_{CC}=15V$	G_V	50	200		V/mV
Large Signal Response Time	$V_{IN}=\text{TTL Logic Swing}$, $V_{REF}=1.4V$, $V_{RL}=5.0V$, $R_L=5.1K\Omega$	t_{RES}		300		ns
Response Time	$V_{RL}=5.0V$, $R_L=5.1K\Omega$	t_{RES}		1.3		μs
Input Differential Voltage		V_{ID}			V_{CC}	V
Output Sink Current	$V_{IN}(-) \geq 1.0V$, $V_{IN}(+) = 0V$, $V_O \leq 1.5V$	I_{SINK}	6.0	16		mA
output saturation voltage	$V_{IN}(-) \geq 1.0V$, $V_{IN}(+) = 0V$, $I_{SINK} \leq 4.0\text{mA}$	V_{SAT}		150	400	mV
	$V_{IN}(-) \geq 1.0V$, $V_{IN}(+) = 0V$, $I_{SINK} \leq 4.0\text{mA}$ $0^{\circ}\text{C} \leq T_a \leq 70^{\circ}\text{C}$				700	
Output Leakage Current	$V_{IN}(+) \geq 1.0V$, $V_{IN}(-) = 0V$, $V_O = 5.0V$	I_{OL}		0.1		nA
	$V_{IN}(+) \geq 1.0V$, $V_{IN}(-) = 0V$, $V_O = 30V$ $0^{\circ}\text{C} \leq T_a \leq 70^{\circ}\text{C}$				1000	

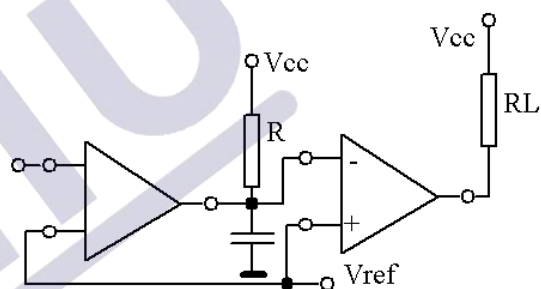
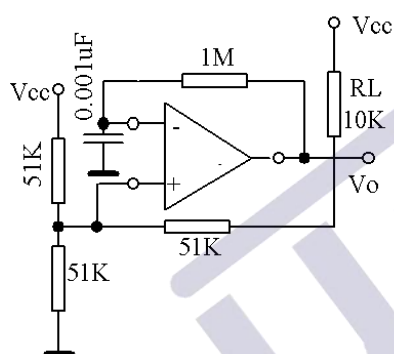
APPLICATION CIRCUIT



Applied single power Supply



Applied split power supplies



TYPICAL CHARACTERISTICS CURVES:

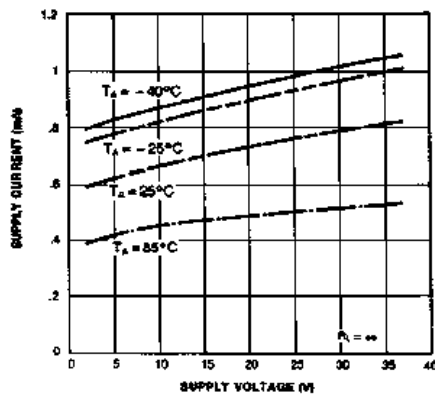


Figure 1. Supply Current vs Supply Voltage

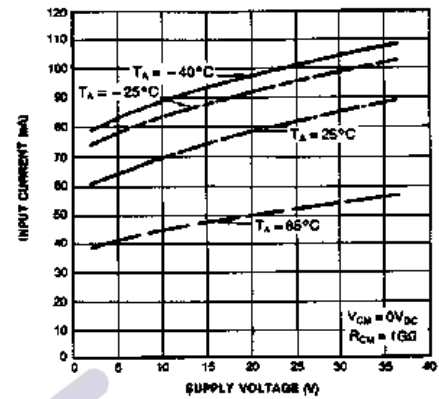


Figure 2. Input Current vs Supply Voltage

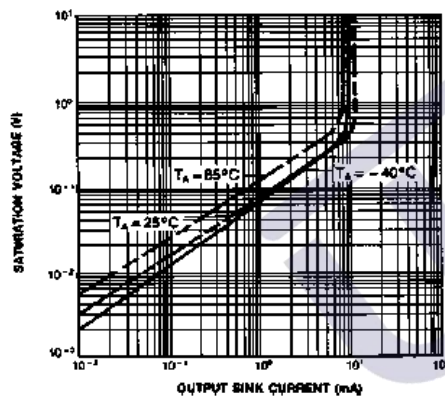


Figure 3. Output Saturation Voltage vs Sink Current

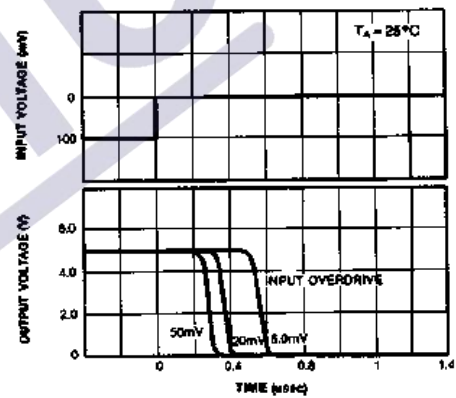


Figure 4. Response Time for Various Input Overdrive-Negative Transition

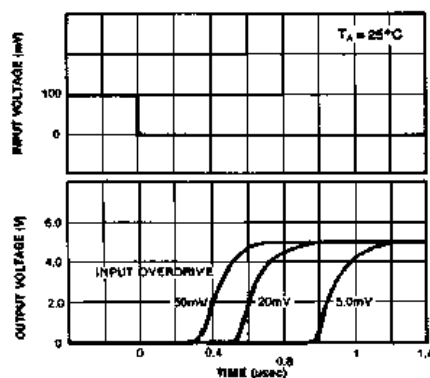


Figure 5. Response Time for Various Input Overdrive-Positive Transition

1.版本记录

DATE	REV.	DESCRIPTION
2018/04/19	1.0	First Release
2021/06/12	1.1	Layout adjustment

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