

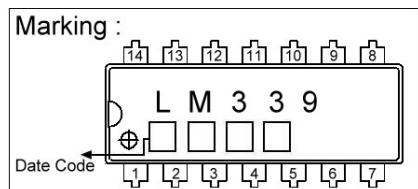
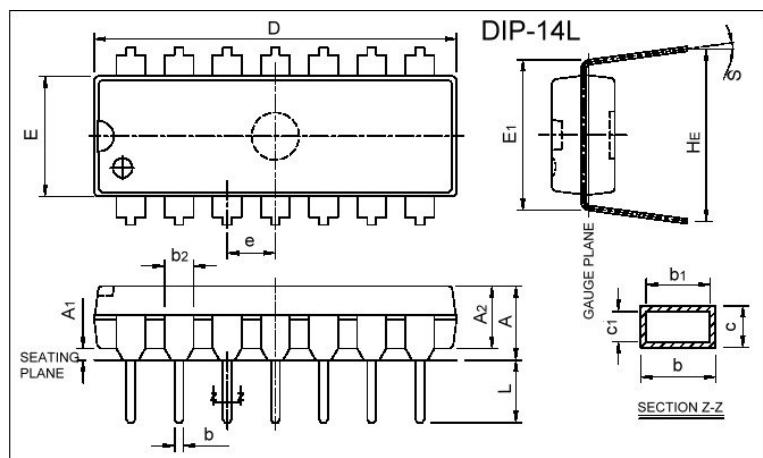
### Description

The SHLM339 consists of four independent voltage comparators, designed specifically to operate from a single power supply over a wide voltage range.

### Features

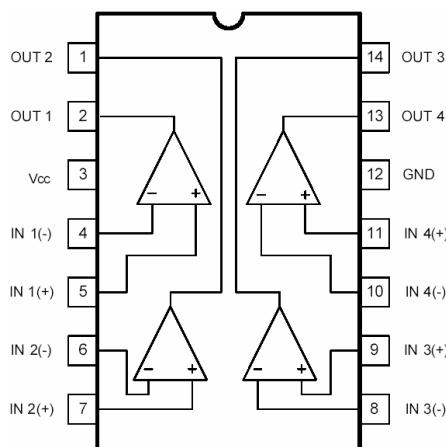
- \*Single or dual supply operation.
- \*Wide operating supply range ( $V_{CC}=2V \sim 36V$ ).
- \*Input common-mode voltage includes ground.
- \*Low supply current drain  $I_{CC} = 0.8mA$  (Typical).
- \*Low input bias current  $I_{BIAST}=25nA$  (Typical)
- \*Output compatible with TTL, DTL, and CMOS logic system.

### Package Dimensions

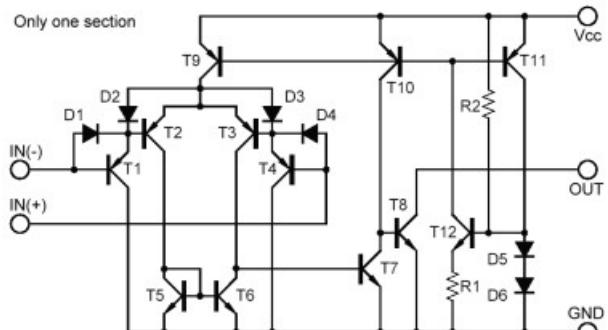


REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	-	5.334	c1	0.203	0.279
A1	0.381	-	D	18.92	19.69
A2	3.175	3.429	E	6.096	6.604
b	0.406	0.508	E1	7.493	8.001
b1	0.356	0.508	e	2.413	2.667
b2	1.270	1.778	HE	8.509	9.525
c	0.203	0.356	L	3.175	3.683
			S	0°	15°

### Pin Configurations



### Block Diagram



### Absolute Maximum Ratings at $T_a = 25^\circ C$

Parameter	Symbol	Value	Unit
Supply Voltage	$V_{CC}$	$\pm 18$ or $36$	V
Differential Input Voltage	$V_{I(Diff)}$	36	V
Input voltage	$V_{IN}$	-0.3~36	V
Power Dissipation	$P_D$	570	mW
Operating Temperature	$T_{OPR}$	0 ~ +70	°C
Storage Temperature	$T_{STG}$	-65 ~ 150	°C

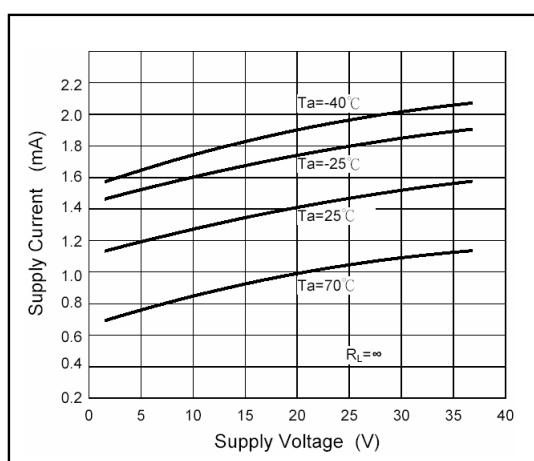
**Electrical Characteristics** ( $V_{CC}=5V$ ,  $T_a=25^\circ C$ , All voltage referenced to GND unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input offset voltage	$V_{IO}$	$V_{CC}=5 \sim 30$ , $V_{ICR} = V_{ICR(\min)}$ $V_O=1.4V$ , $R_S=0$	-	$\pm 2$	$\pm 5$	mV
Input offset current	$I_{IO}$	$V_O=1.4V$	-	$\pm 5$	$\pm 50$	nA
Input bias current	$I_{IBIAS}$	$V_O=1.4V$	-	-25	-250	nA
Common-mode input voltage range (Note1)	$V_{ICR}$		0	-	$V_{CC}-1.5$	V
Supply current	$I_{CC}$	$R_L=\infty$ , $V_{CC}=5V$	-	0.8	2.0	mA
		$R_L=\infty$ , $V_{CC}=30V$ (Full Range)	-	-	2.5	mA
Large signal differential Voltage amplification	$A_{VD}$	$V_{CC}=15V$ , $V_O=1.4V \sim 11.4V$ $R_L \geq 15K\Omega$ to $V_{CC}$	50	200	-	V/mV
Response time	$t_{RES}$	TTL-level input step (Note2) $V_{RL}=5V$ , $R_L=5.1 K\Omega$ , $C_L=15pF$	-	350	-	ns
		100mV input step with (Note2) 5mV overdrive $V_{RL}=5V$ , $R_L=5.1K\Omega$ , $C_L=15pF$	-	1400	-	ns
Low-level output current	$I_{OL}$	$V_{IN(-)}=1V$ , $V_{IN(+)}=0V$ $V_{OL}=1.5V$	6	18	-	mA
Low-level output voltage1	$V_{OL}$	$V_{IN(-)}=1V$ , $V_{IN(+)}=0V$ $I_{OL}=4mA$	-	150	400	mV
High-level output current	$I_{OH}$	$V_{IN(+)}=1V$ $V_{OH}=5V$	-	0.1	-	nA
		$V_{IN(-)}=0V$ $V_{OH}=30V$ (Full Range)	-	-	1.0	uA

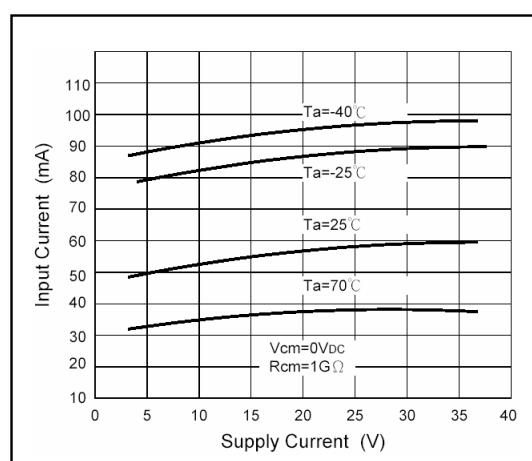
Note 1.The voltage at either input or common-mode should not be allowed to negative by more than 0.3V. The upper end of the common-mode voltage range is  $V_{CC}-1.5V$ , but either or both input can go to 30V without damage.

2.The response time specified is the interval between the input step function and instant when the output crosses 1.4V.

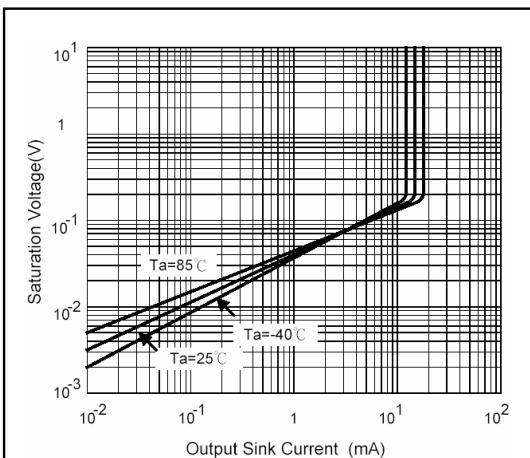
### Typical performance Characteristics



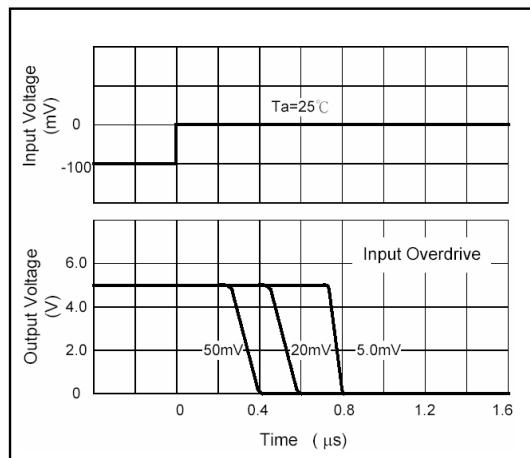
**Fig 1. Supply Current**



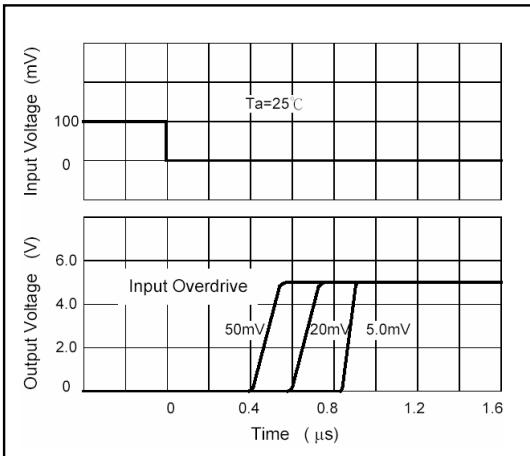
**Fig 2. Input Current**



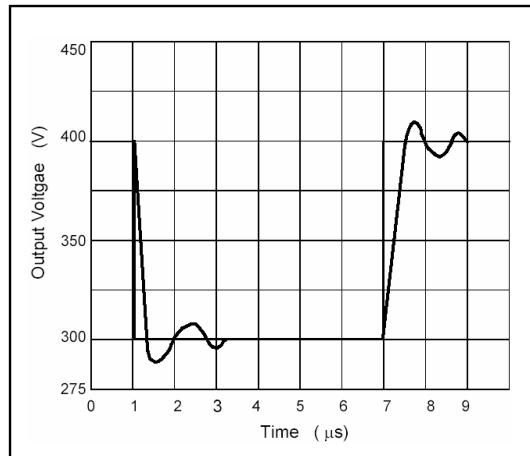
**Fig 3. Output Saturation Voltage**



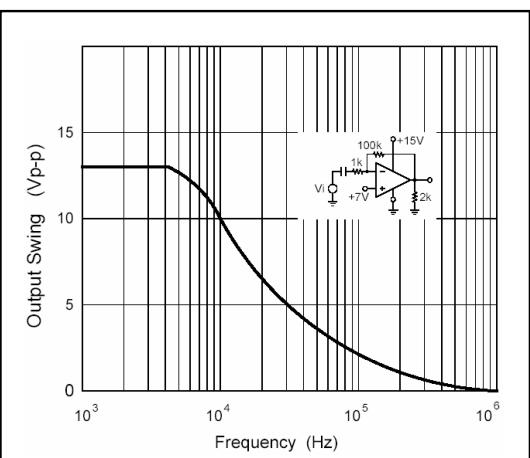
**Fig 4. Response Time For Various Input Overdrive Negative Transition**



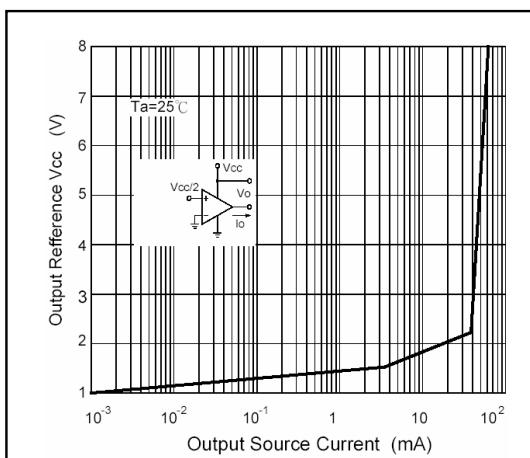
**Fig 5. Response Time For Various Input Overdrive Positive Transition**



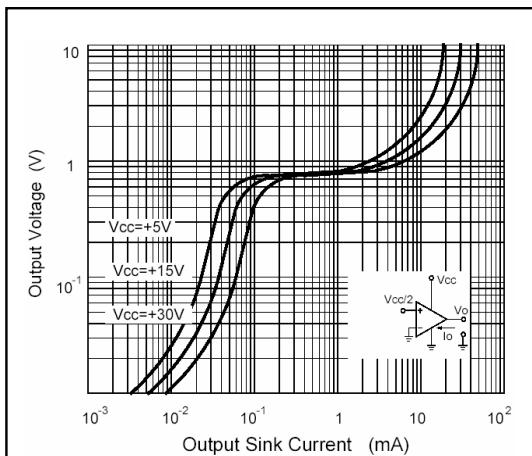
**Fig 6. Voltage Follower Pulse Response (Small Signal)**



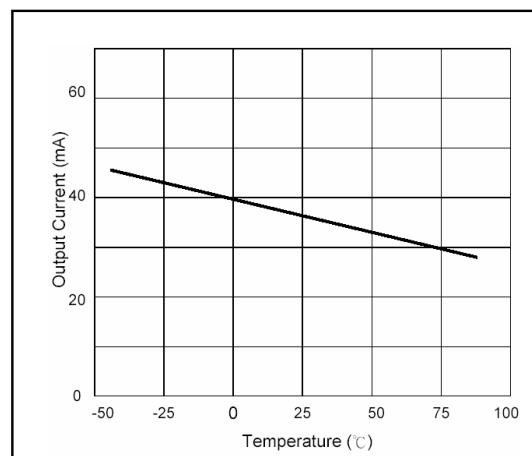
**Fig 7. Large Signal Frequency Response**



**Fig 8. Output Characteristics Current Sourcing**



**Fig 9. Output Characteristics  
Current Sinking**



**Fig 10. Current Limiting**