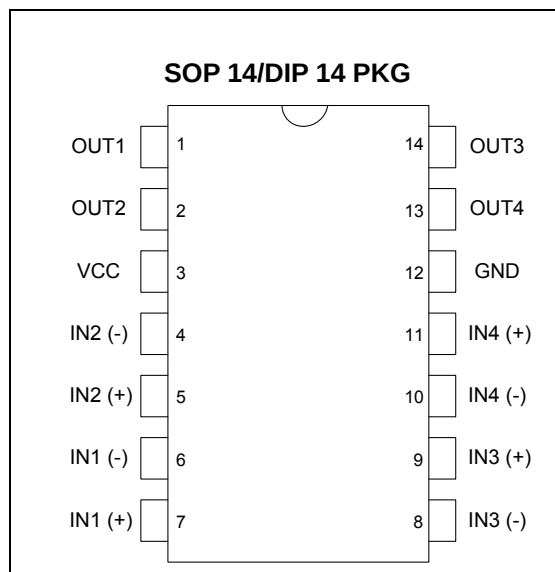


FEATURES

- Wide range of supply voltages
- Low supply current drain independent of supply voltage
- Low input biasing current
- Low input offset current
- Low input offset voltage
- Input common-mode voltage range includes ground
- Differential input voltage range equal to the power supply voltage
- Low output saturation voltage
- Output voltage compatible with TTL, MOS and CMOS logic



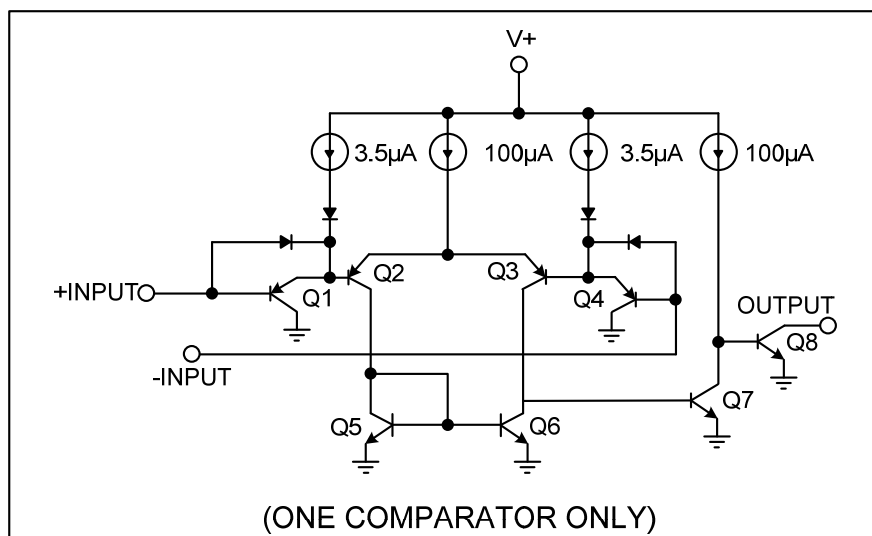
ORDERING INFORMATION

Device	Package
LM339D	SOP 14
LM339N	DIP 14

DESCRIPTION

The LM339 consists of four independent voltage comparators. These were designed specifically to operate from a single power supply over a wide range of voltages. Operation from split power supplies is also possible and the low power supply current drain is independent of the magnitude of the power supply voltage. The outputs can be connected to other open-collector outputs to achieve wired-AND relationships.

EQUIPMENT CIRCUIT



QUAD Operational Amplifiers

LM339

ABSOLUTE MAXIMUM RATING

CHARACTERISTIC	SYMBOL	Value	UNIT
Supply Voltage	V_{CC}	40	V
Input Voltage	V_{IN}	-0.3 ~ 40	V
Operating Temperature Range	T_{OPR}	-40 ~ 125	°C

ELECTRICAL CHARACTERISTICS

At specified free-air temperature, $V_{CC}=5V$ (unless otherwise noted)

PARAMETER	TEST CONDITIONS*		MIN	TYP	MAX	UNIT
V_{IO} Input offset voltage	$V_{CC}=5V$ to $30V$ $V_{IC}=V_{ICR}$ min, $V_O=1.4V$	25°C		2	5	mV
		Full range			9	
I_{IO} Input offset current	$V_O=1.4V$	25°C		5	50	nA
		Full range			150	
I_{IB} Input bias current	$V_O=1.4V$	25°C		-25	-250	nA
		Full range			-400	
V_{ICR} Common-mode input voltage range		25°C	0 to $V_{CC}-1.5$			V
		Full range	0 to $V_{CC}-2$			
A_{VD} Large-signal differential voltage amplification	$V_{CC}=15V$ $V_O=1.4V$ to $11.4V$ $R_L \geq 15k\Omega$ to V_{CC}	25°C	50	200		V/mV
I_{OH} High-level output current	$V_{CC}=5V$, $V_{ID}=1V$	25°C		0.1	50	nA
	$V_{CC}=30V$, $V_{ID}=1V$	Full range			1	uA
I_{OL} Low-level output current	$I_{OL}=1.5V$, $V_{ID}=-1V$	25°C	6			mA
V_{OL} Low-level output voltage	$I_{OL}=4mA$, $V_{ID}=-1V$	25°C		150	400	mV
		Full range			700	
I_{CC} Supply current	$R_L=\infty$	$V_{CC}=5V$	Full range	0.8	2	mA
		$V_{CC}=30V$	Full range		2.5	

* Full range (MIN to MAX), for the LM339 is - 40 °C to 125 °C. All characteristics are measured with zero common-mode input voltage unless otherwise specified.

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

SWITCHING CHARACTERISTICS, $V_{CC}=5V$, $T_A=25^\circ C$

PARAMETER	TEST CONDITIONS*		MI	TY	M	UNIT
Response time	R_L connected to 5V through 5.1k, $CL=15pF$ * (See Note 1)	100mV input step with 5-mA overdrive		13		us
		Full range		0.3		

SUPPLY

Graph 1: I^+_{SUPPLY} CURRENT (mA) vs. V^+_{SUPPLY} VOLTAGE - V_{DC} . Curves for $T_A = -55^\circ C, 0^\circ C, +25^\circ C, +70^\circ C, +125^\circ C$. $R_L = \infty$.

INPUT CURRENT

Graph 2: I_N INPUT CURRENT (nA) vs. V^+_{SUPPLY} VOLTAGE - V_{DC} . Curves for $T_A = -55^\circ C, 0^\circ C, +25^\circ C, +70^\circ C, +125^\circ C$. $V_{IN(CM)} = 0V_{DC}$, $R_{IN(CM)} = 10k\Omega$.

OUTPUT SATURATION VOLTAGE

Graph 3: V_O SATURATION VOLTAGE (V_{OC}) vs. I_O OUTPUT SINK CURRENT (mA). Curves for $T_A = +125^\circ C, +70^\circ C, +25^\circ C, 0^\circ C, -55^\circ C$. Region labeled "OUT OF SATURATION".

RESPONSE TIME FOR VARIOUS INPUT OVERDRIVES-NEGATIVE TRANSITION

Graph 4: Output voltage V_O vs. Time (μs) for negative input overdrives. Input voltage V_{IN} is shown. Overdrive levels: 5mV, 20mV. $T_A = +25^\circ C$. Schematic shows a 5.1K resistor and a 5mV input source.

RESPONSE TIME FOR VARIOUS INPUT OVERDRIVES-POSITIVE TRANSITION

Graph 5: Output voltage V_O vs. Time (μs) for positive input overdrives. Input voltage V_{IN} is shown. Overdrive levels: 5mV, 20mV. $T_A = +25^\circ C$. Schematic shows a 5.1K resistor and a 5mV input source.

LM339

