

QUAD COMPARATOR

339
276-1712

GENERAL DESCRIPTION

The 339 consists of four independent voltage comparators which 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. This comparator also has a unique characteristic in that the input common-mode voltage range includes ground even though operated from a single power supply voltage.

FEATURES

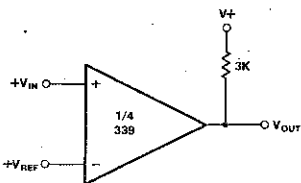
- Wide single supply: Voltage range $2 V_{DC}$ to $32 V_{DC}$ or dual supplies $\pm 1 V_{DC}$ to $\pm 16 V_{DC}$
- Very low supply current drain (0.8 mA)—independent of supply voltage (1 mW/comparator at $+5 V_{DC}$)
- Input common-mode voltage range includes ground.
- Differential input voltage range equal to the power supply voltage
- Low output 1 mV at $5 \mu A$; saturation voltage 70 mV at 1 mA
- Output voltage compatible with TTL (fanout of 2), DTL, ECL, MOS and CMOS logic systems

ABSOLUTE MAXIMUM RATINGS

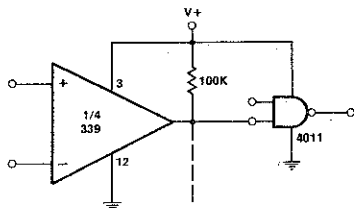
Supply Voltage, $V+$	$32 V_{DC}$ or $\pm 16 V_{DC}$
Differential Input Voltage	$36 V_{DC}$
Input Voltage	$-0.3 V_{DC}$ to $+36 V_{DC}$
Power Dissipation	
Molded DIP	570 mW
Cavity DIP	900 mW
Output Short-Circuit to GND	Continuous
Input Current ($V_{IN} < -0.3 V_{DC}$)	50 mA
Operating Temperature Range	0 to $+70^\circ C$
Storage Temperature Range	-65 to $+150^\circ C$
Lead Temperature (Soldering, 10 seconds)	$300^\circ C$

TYPICAL APPLICATIONS

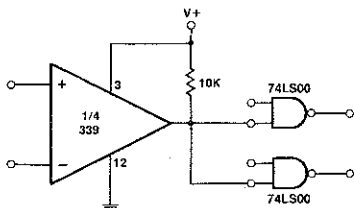
5 VOLT GROUP



Basic Comparator

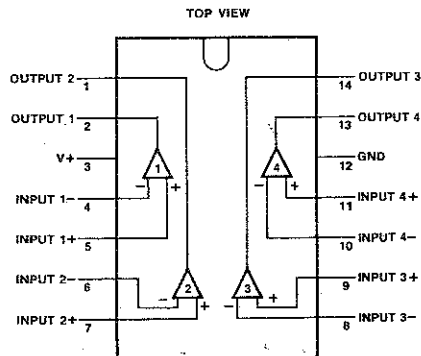


Driving CMOS

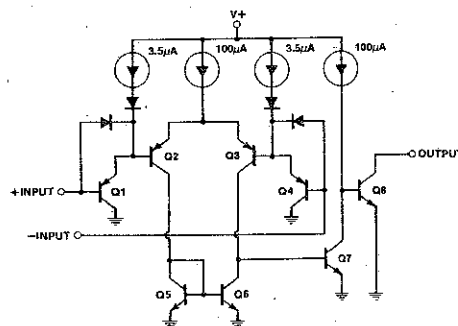


Driving TTL

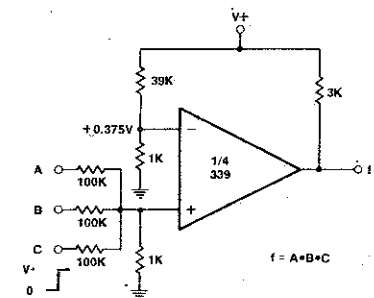
PIN CONNECTION



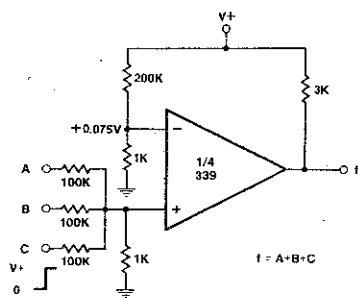
INTERNAL CIRCUIT



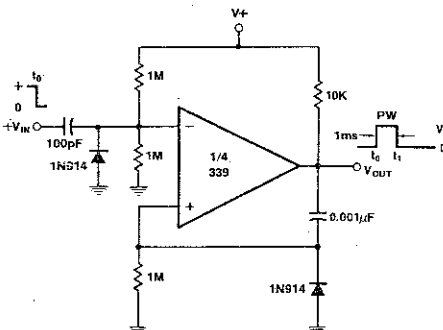
15V GROUP



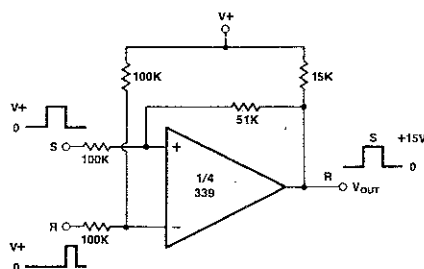
AND Gate



OR Gate



One-Shot Multivibrator



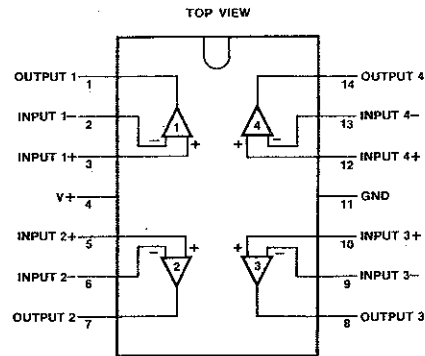
Bi-Stable Multivibrator

324
276-1741

QUAD OP AMP



PIN CONNECTION



GENERAL DESCRIPTION

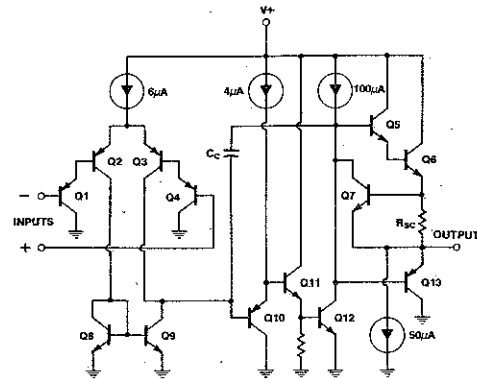
The 324 consists of four independent high-gain internally frequency-compensated operational amplifiers which were designed specifically to operate from a single power supply over a wide range of voltages. Operation from split power supplies is also possible and the low power supply current drain is independent of the magnitude of the power supply voltage.

Applications include transducer amplifiers, dc gain block and all the conventional op amp circuits which now can be more easily implemented in single power supply systems. For example, the 324 can be directly operated off of the standard +5V_{DC} power supply voltage which is used in digital systems and will easily provide the required interface electronics without requiring the additional +15V_{DC} power supplies.

FEATURES

- Internally frequency compensated for unity gain
- Large dc voltage gain 100 dB
- Wide bandwidth (unity gain) 1 MHz (temperature compensated)
- Wide power supply range:
 - Single supply 3 V_{DC} to 30 V_{DC}
 - or dual supplies ±1.5 V_{DC} to ±15 V_{DC}
- Very low supply current drain (800 μA)—essentially independent of supply voltage (1 mW/op amp at +5 V_{DC})
- Low input biasing current 45 nA_{DC} (temperature compensated)
- Low input offset voltage 2 mV_{DC} and offset current 5 nA_{DC}
- Input common-mode voltage range includes ground
- Differential input voltage range equal to the power supply voltage
- Large output voltage swing 0 V_{DC} to V₊ - 1.5 V_{DC}

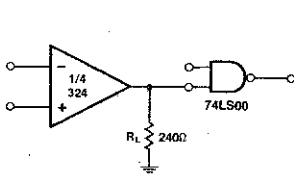
INTERNAL CIRCUIT (Each Amplifier)



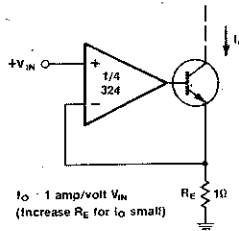
ABSOLUTE MAXIMUM RATINGS

Supply Voltage, V ₊	32 V _{DC} or ±16 V _{DC}
Differential Input Voltage	32 V _{DC}
Input Voltage	-0.3 V _{DC} to +32 V _{DC}
Power Dissipation	
Molded DIP	570 mW
Cavity DIP	900 nW
Output Short-Circuit to GND (One Amplifier)	Continuous
V ₊ ≤ 15 V _{DC} and T _A = 25°C	
Input Current (V _{IN} < -0.3 V _{OL})	50 mA
Operating Temperature Range	0 to +70°C
Storage Temperature Range	-65 to +150°C
Lead Temperature (Soldering, 10 seconds)	300°C

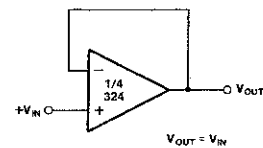
TYPICAL APPLICATIONS



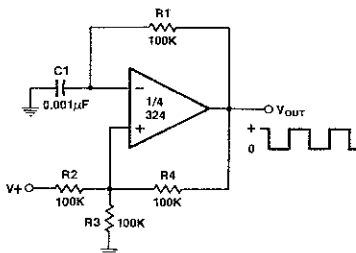
Driving TTL



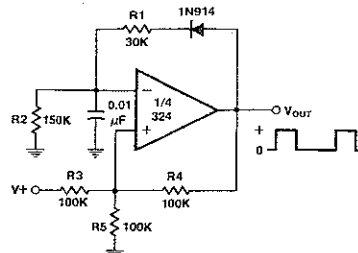
High Compliance Current Sink



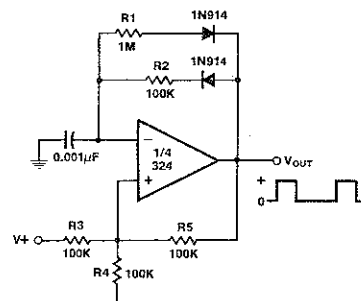
Voltage Follower



Squarewave Oscillator



Pulse Generator



Pulse Generator