LOW POWER LOW OFFSET VOLTAGE QUAD COMPARATORS AZ339

General Description

The AZ339 series consists of four independent precision voltage comparators with an offset voltage specification as low as 2mV. The input common mode voltage range of these comparators includes ground, even when operated from a single power supply voltage. 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 AZ339 series is designed to directly interface with TTL and CMOS.

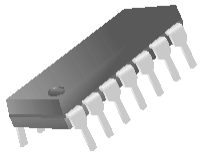
The AZ339 series can be widely used in such applications as battery charger, cordless telephone, switching power supply, DC-DC module and PC motherboard.

Features

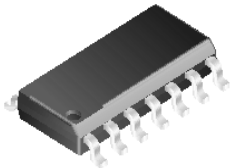
- Wide supply
  - Voltage range: 2.0V to 18V
  - Single or dual supplies: ±1.0V to ± 9V
- Very low supply current drain: 0.8mA
  - independent of supply voltage
- Low input bias current: 25nA
- Low input offset current: ±5nA
- Low input offset: ±2mV
- Input common mode voltage range includes ground
- Differential input voltage range equals to the power supply voltage
- Low output saturation voltage: 250mV at 4mA
- Open-collector output

Applications

- Battery Charger
- Cordless Telephone
- Switching Power Supply
- DC-DC Module
- PC Motherboard
- Communication Equipment



DIP-14



SOIC-14

Figure 1. Package Types of AZ339

Pin Configuration

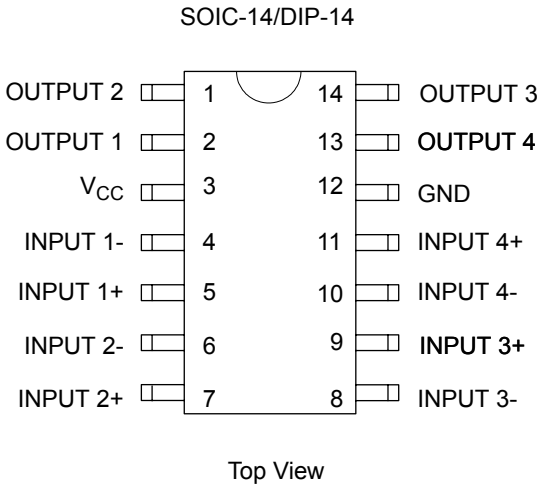


Figure 2. Pin Configuration of AZ339

Functional Block Diagram

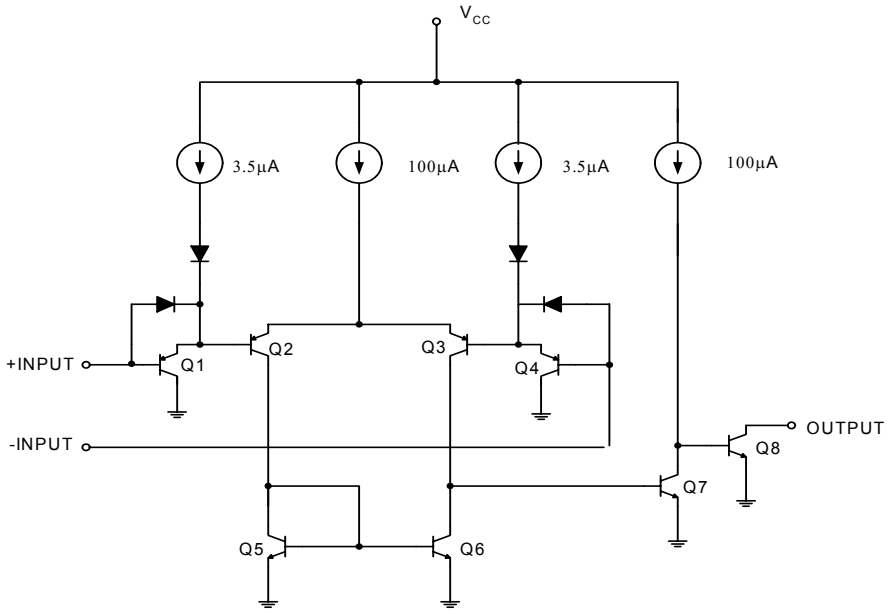


Figure 3. Functional Block Diagram of AZ339
(Each Comparator)

Ordering Information

Package	Temperature Range	Part Number	Marking ID	Packing Type
SOIC-14	-40°C ~ 85°C	AZ339M	AZ339M	Tube / Reel
DIP-14		AZ339P	AZ339P	Tube

Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Min	Max	Unit
Supply Voltage	V_{CC}		20	V
Differential Input Voltage	V_{ID}		20	V
Input Voltage	V_{IN}	-0.3	20	V
Input Current (V_{IN} < -0.3V)	I_{IN}		50	mA
Power Dissipation	P_D		1050	mW
Output Short -Circuit to Ground		Continuous		
Operating Temperature Range	T_A	-40	85	°C
Storage Temperature Range	T_{STG}	-65	165	°C
Lead Temperature (Soldering, 10 seconds)	T_{LEAD}		260	°C

Note 1: Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operation Ratings " is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

Recommended Operating Conditions

Parameter	Min	Max	Unit
Supply Voltage		18	V
Operating Temperature Range	-40	85	°C

Electrical Characteristics

V_{CC} = +5V, T_A = 25°C, unless otherwise specified.

Parameter	Conditions	Min	Typ	Max	Unit
Input Offset Voltage	(Note 2)		2.0	5.0	mV
Input Bias Current	$I_{IN(+)}$ or $I_{IN(-)}$ with output in linear range, V_{CM} = 0V (Note 3)		25	250	nA
Input Offset Current	$I_{IN(+)}$ - $I_{IN(-)}$, V_{CM} = 0V		5.0	50	nA
Input Common Mode Voltage Range	V_{CC} = 15V (Note 4)	0		V_{CC}-1.5	V
Supply Current	R_L=∞ on all comparators		0.8	2.0	mA
	R_L=∞, V_{CC} = 18V		1.0	2.5	
Voltage Gain	$R_L \geq 15K\Omega$, V_{CC} = 8V, V_O = 1V to 6V	50	200		V/mV
Large Signal Response Time	V_{IN} = TTL logic swing, V_{REF} = 1.4V, V_{RL} = 5V, R_L = 5.1KΩ		300		ns
Response Time	V_{RL} = 5V, R_L = 5.1KΩ (Note 5)		1.3		μs
Output Sink Current	$V_{IN(-)}$ = 1V, $V_{IN(+)}$ = 0, $V_O \leq 1.5V$	6.0	16		mA
Saturation Voltage	$V_{IN(-)}$ = 1V, $V_{IN(+)}$ = 0, $I_{SINK} \leq 4mA$		250	400	mV
Output Leakage Current	$V_{IN(-)}$ = 0, $V_{IN(+)}$ = 0, V_O = 5V		0.1		nA

Note 2: At output switch point, V_O=1.4V, R_S=0 with V_{CC} from 5V to 15V, and over the full common-mode range (0V to V_{CC} - 1.5V), at 25°C.

Note 3: The direction of the input current is out of the PNP input stage. This current is essentially constant, independent of the state of the output, so no loading charge exists on the reference of input lines.

Note 4: The input common-mode voltage of either input signal voltage 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 +18V without damage, independent of the magnitude of V_{CC}.

Note 5: The response time specified is a 100mV input step with 5mV overdrive. For large overdrive signals 300ns can be obtained.

Typical Characteristics

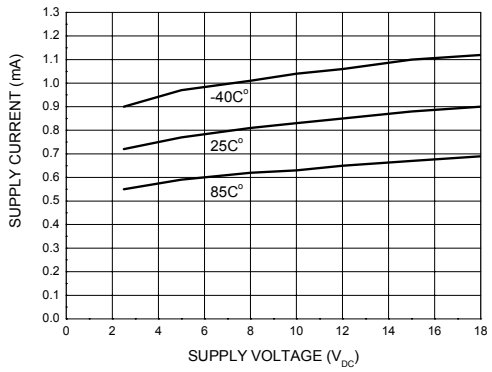


Figure 4. Supply Voltage vs. Supply Current

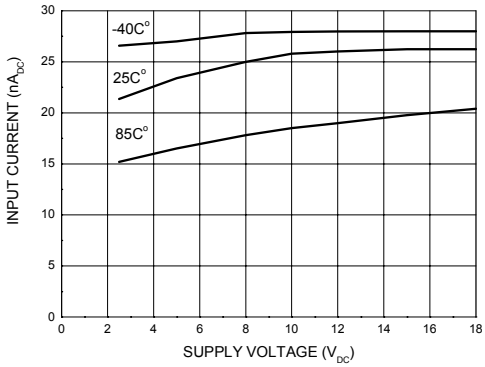


Figure 5. Supply Voltage vs. Input Current

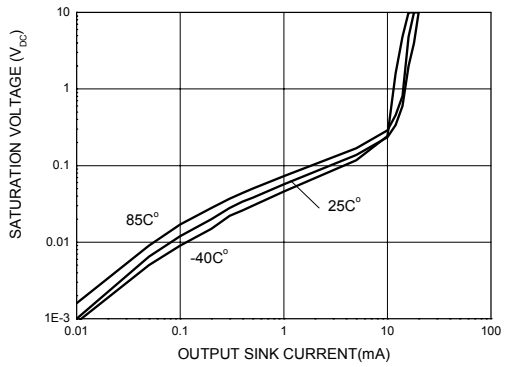


Figure 6. Output Sink Current vs. Saturation Voltage

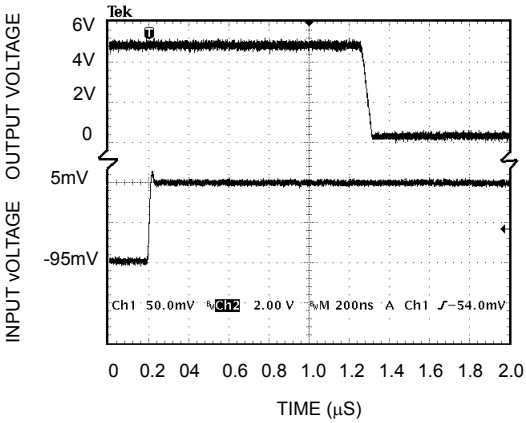


Figure 7. Response Time for 5mV Input Overdrive - Negative Transition

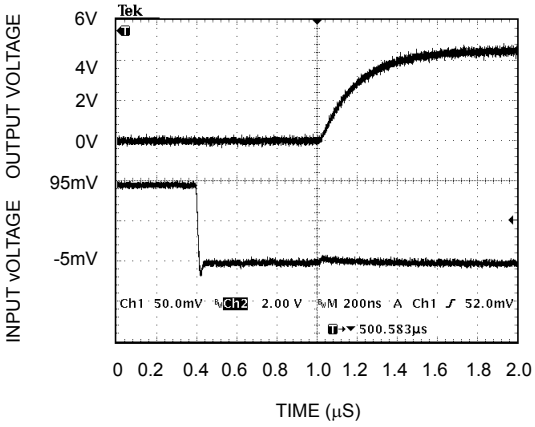


Figure 8. Response Time for 5mV Input Overdrive - Positive Transition

Typical Applications

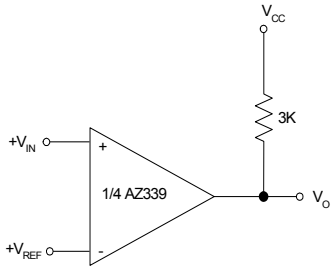


Figure 9. Basic Comparator

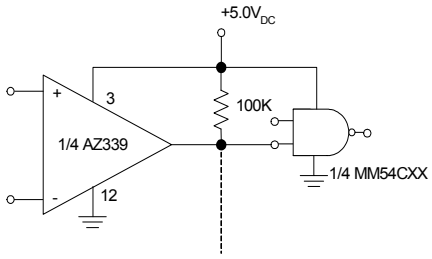


Figure 10. Driving CMOS/TTL

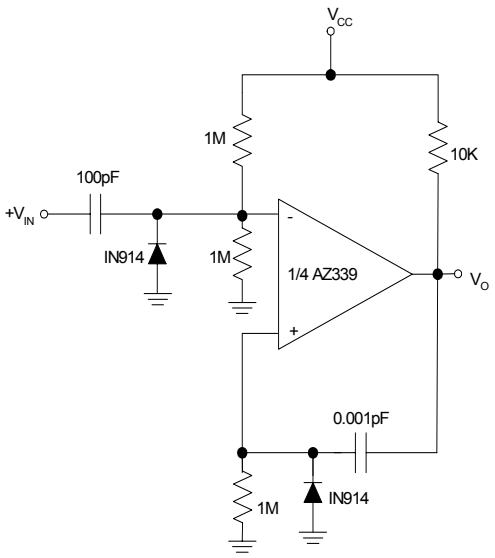


Figure 11. One Shot Multivibrator

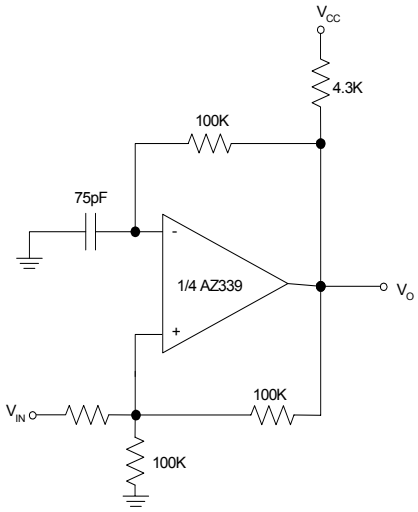
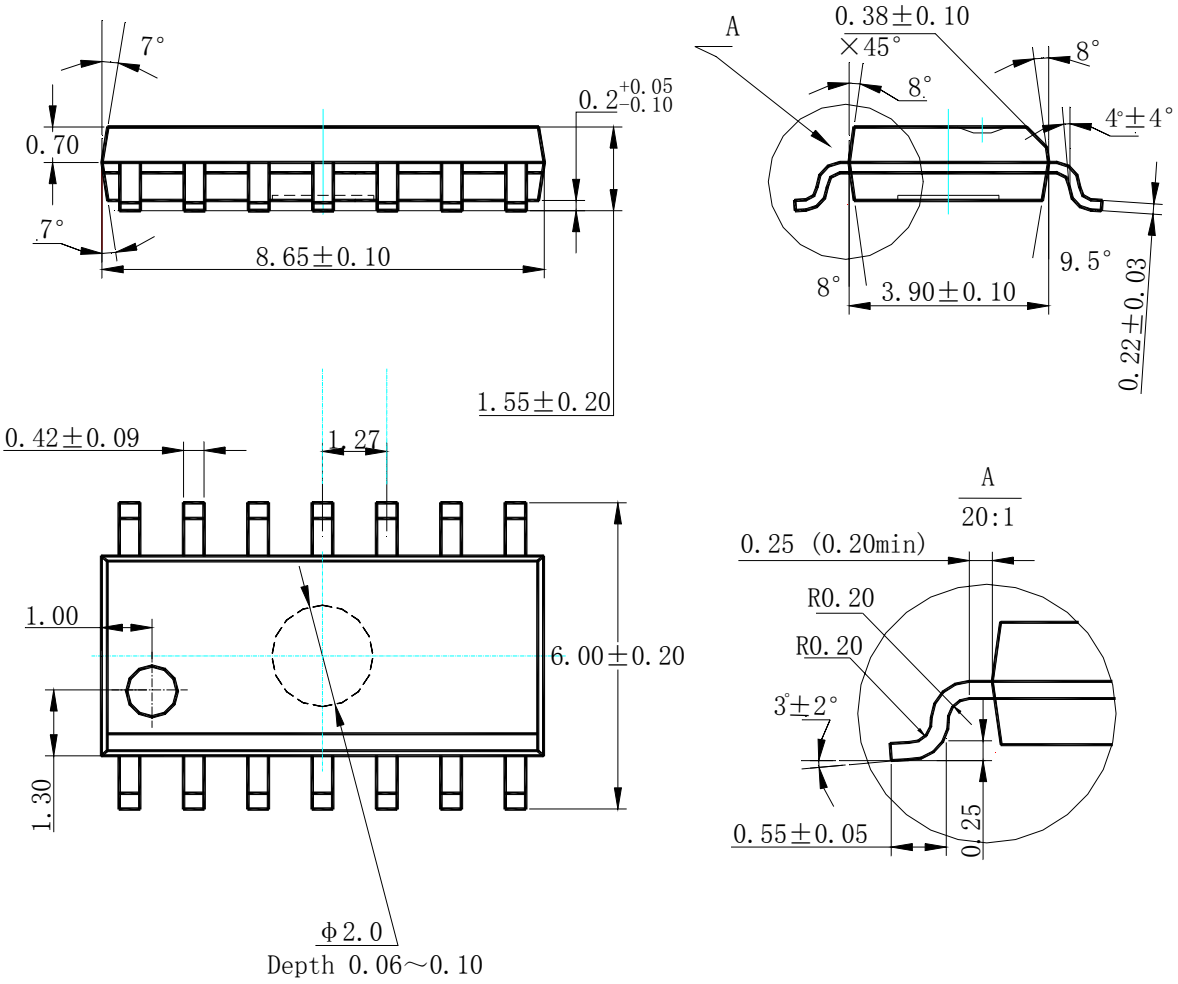


Figure 12. Squarewave Osillator

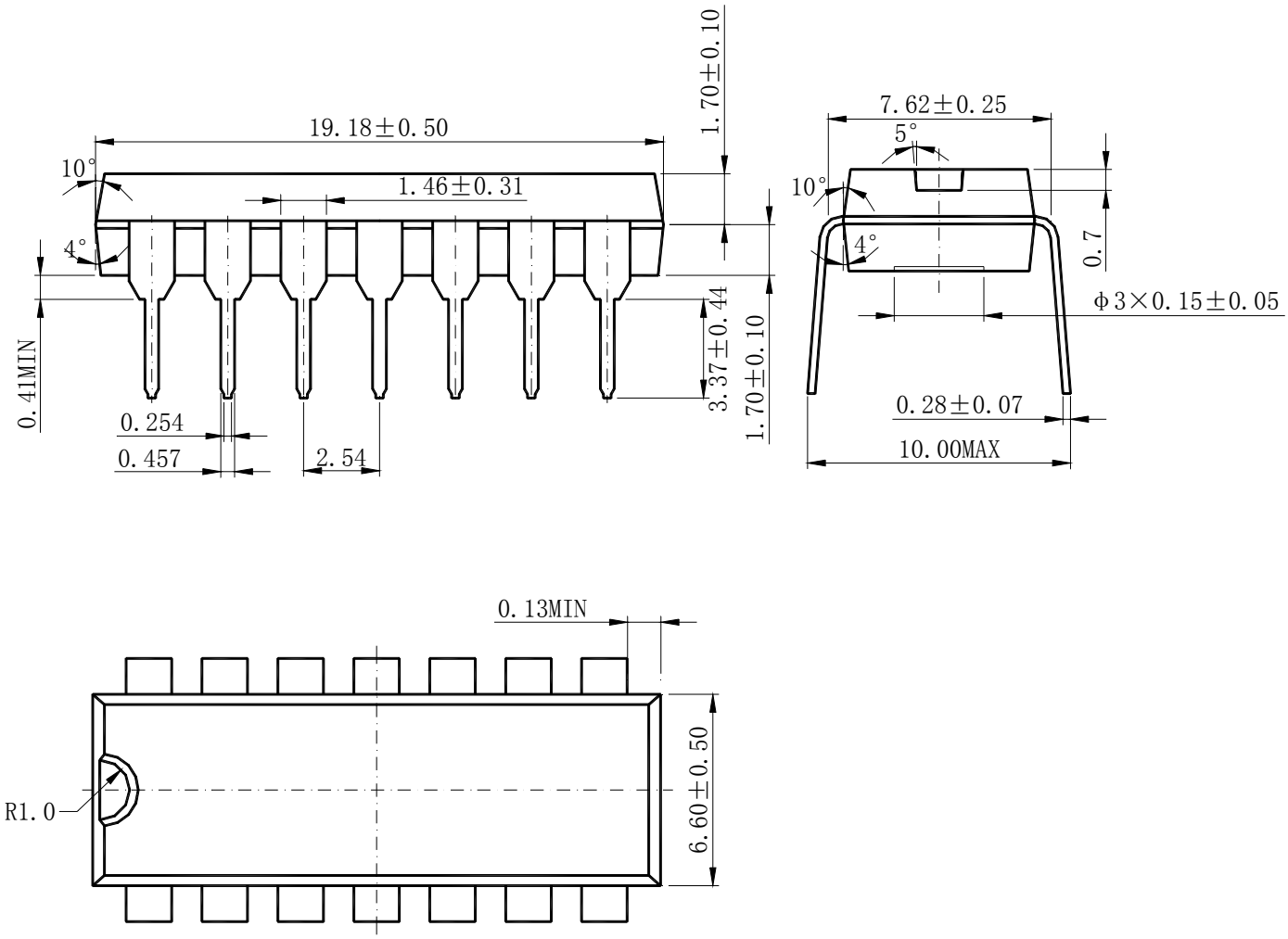
Mechanical Dimensions

SOIC - 14



Mechanical Dimensions(Continued)

DIP- 14





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