



DESCRIPTION

The AO339V consist of four independent precision voltage comparators with a typical offset voltage of 2.0mV and high gain. They are specifically designed to operate from a single power supply over wide range of voltages.

Operation from split power supply is also possible and the low power supply current drain is independent of the magnitude of the power supply voltage.

The AO339V is available in SOP14 and TSSOP14 packages.

ORDERING INFORMATION

Package Type	Part Number	
SOP14 SPQ: 2,500pcs/Reel	M14	AO339VM14R
		AO339VM14VR
TSSOP14 SPQ: 3,000pcs/Reel	TMX14	AO339VTMX14R
		AO339VTMX14VR
Note	V: Halogen free Package R: Tape & Reel	
AiT provides all RoHS products		

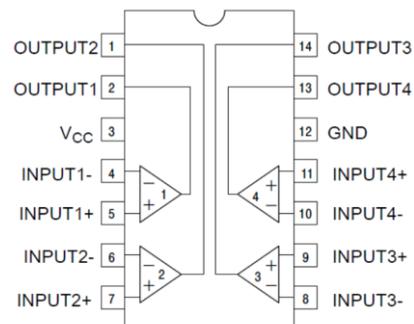
FEATURES

- Wide Supply Voltage Range
- Single Supply: 2.0V to 36V
- Dual Supplies: $\pm 1.0V$ to $\pm 18V$
- Low Supply Current Drain: 0.9mA
- Low Input Bias Current: 25nA (Typical)
- Low Input Offset Current: $\pm 5.0nA$ (Typical)
- Low Input Offset Voltage: 2.0mV (Typical)
- Input Common Mode Voltage Range Includes Ground
- Differential Input Voltage Range Equals to the Power Supply Voltage
- Low Output Saturation Voltage: 200mV at 4mA
- Open Collector Output
- Available in SOP14 and TSSOP14 packages

APPLICATION

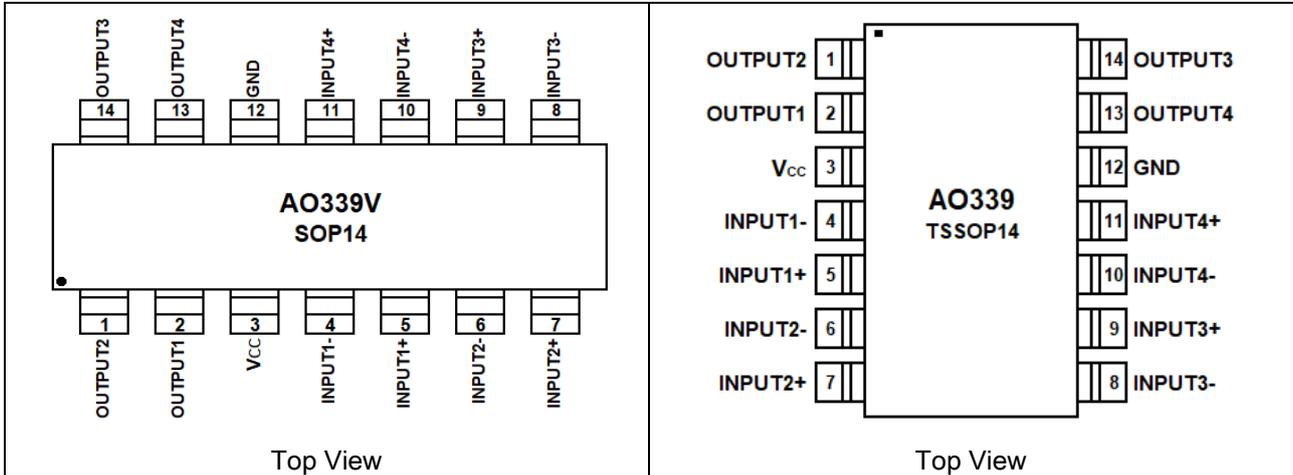
- Battery Charger
- Cordless Telephone
- Switching Power Supply
- DC-DC Module
- PC Motherboard
- Communication Equipment

TYPICAL APPLICATION





PIN DESCRIPTION



Pin #		Symbol	Function
SOP14	TSSOP14		
1	1	OUTPUT2	Output 2
2	2	OUTPUT1	Output 1
3	3	V _{cc}	Positive Power Supply Input
4	4	INPUT1-	Analog Inverting Input 1
5	5	INPUT1+	Analog Positive Input 1
6	6	INPUT2-	Analog Inverting Input 2
7	7	INPUT2+	Analog Positive Input 2
8	8	INPUT3-	Analog Inverting Input 3
9	9	INPUT3+	Analog Positive Input 3
10	10	INPUT4-	Analog Inverting Input 4
11	11	INPUT4+	Analog Positive Input 4
12	12	GND	Ground
13	13	OUTPUT4	Output 4
14	14	OUTPUT3	Output 3



ABSOLUTE MAXIMUM RATINGS

V _{CC} , Power Supply Voltage	±20V or 40V
V _{I(DIFF)} , Differential input voltage	40V
V _I , Input Voltage	-0.3V ~ 40V
T _{OPR} , Operating Temperature Range	-25°C ~ 125°C
T _{STG} , Storage Temperature Range	-65°C ~ 150°C

Stress beyond above listed "Absolute Maximum Ratings" may lead permanent damage to the device. These are stress ratings only and operations of the device at these or any other conditions beyond those indicated in the operational sections of the specifications are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

NOTE1: This input current will only exist when the voltage at any of the input leads is driven negative. It is due to the collector-base junction of the input PNP transistors becoming forward biased and thereby acting as input diode clamps. In addition to this diode action, there is also lateral NPN parasitic transistor action on the IC chip. This transistor action can cause the output voltages of the comparators to go to the V₊ voltage level (or to ground for a large overdrive) for the time duration that an input is driven negative. This is not destructive and normal output states will re-establish when the input voltage, which was negative, again returns to a value greater than -0.3 V_{DC} at 25°C).

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Supply Voltage	V _{CC}		2	-	36	V
Operating Temperature Range	T _A		-40	-	85	°C



ELECTRICAL CHARACTERISTICS

Limits in standard typeface are for $T_A=25^\circ\text{C}$, bold typeface applies over $T_A=-40^\circ\text{C}$ to 85°C ^{NOTE2}, $V_{CC}=5\text{V}$, $\text{GND}=0\text{V}$, unless otherwise specified.

Parameter	Conditions	Min	Typ	Max	Unit	
Input Offset Voltage	$V_O=1.4\text{V}$, $R_S=0\Omega$, V_{CC} from 5V to 30V	-	2	5	mV	
		-	-	7		
Input Bias Current	I_{IN+} or I_{IN-} with output in Linear Range, $V_{CM}=0\text{V}$	-	25	250	nA	
		-	-	400		
Input Offset Current	$I_{IN+} - I_{IN-}$, $V_{CM}=0\text{V}$	-	5.0	50	nA	
		-	-	200		
Input Common-Mode Voltage Range ^{NOTE3}	$V_{CC} = 30\text{V}$	0	-	$V_{CC}-1.5$	V	
Supply Current	$R_L=\infty$	$V_{CC} = 5\text{V}$	-	0.9	2.0	mA
			-	-	3.0	
		$V_{CC} = 30\text{V}$	-	1.2	2.5	
			-	-	3.5	
Voltage Gain	$V_{CC}=15\text{V}$, $R_L \geq 15\text{k}\Omega$, $V_O=1\text{V}$ to 11V	50	200	-	V/mV	
Large Signal Response Time	$V_{IN}=\text{TTL Logic Swing}$, $V_{REF}=1.4\text{V}$, $V_{RL}=5\text{V}$, $R_L=5.1\text{k}\Omega$	-	200	-	ns	
Response Time	$V_{RL}=5\text{V}$, $R_L=5.1\text{k}\Omega$	-	1.3	-	μs	
Output Sink Current	$V_{IN-}=1\text{V}$, $V_{IN+}=0$, $V_O=1.5\text{V}$	6.0	16	-	mA	
Output Leakage Current	$V_{IN-}=0\text{V}$, $V_{IN+}=1\text{V}$, $V_O=5\text{V}$	-	0.1	-	nA	
	$V_{IN-}=0\text{V}$, $V_{IN+}=1\text{V}$, $V_O=30\text{V}$	-	-	1	μA	
Saturation Voltage	$V_{IN-}=1\text{V}$, $V_{IN+}=0$, $I_{SINK} \leq 4\text{mA}$	-	200	400	mV	
		-	-	500		
Thermal Resistance (Junction to Case)	SOP14	-	15	-	$^\circ\text{C/W}$	
	TSSOP14	-	6	-		
Thermal Resistance (Junction to Ambient)	SOP14	-	89	-	$^\circ\text{C/W}$	
	TSSOP14	-	125	-		

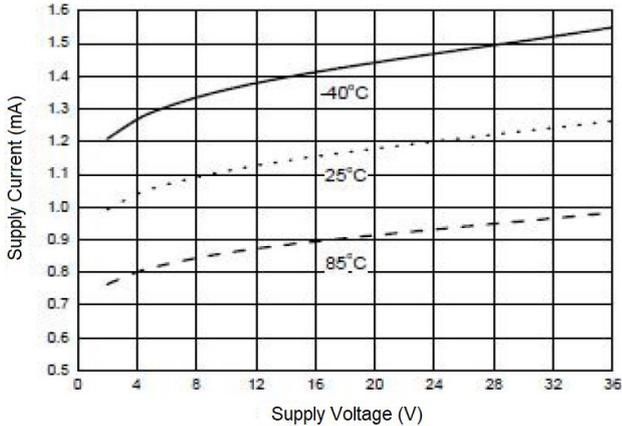
NOTE2: These specifications are limited to $-40^\circ\text{C} \leq T_A \leq 85^\circ\text{C}$. Limits over temperature are guaranteed by design, but not tested in production.

NOTE3: The input common-mode voltage of either input signal voltage should not be allowed to go negatively by more than 0.3V (at 25°C). The upper end of the common-mode voltage range is $V_{CC}-1.5\text{V}$ (at 25°C), but either or both inputs can go to +36V without damages, independent of the magnitude of the V_{CC} .

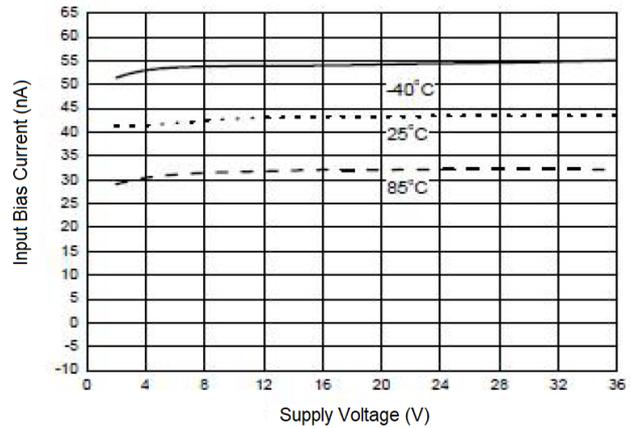


TYPICAL PERFORMANCE CHARACTERISTICS

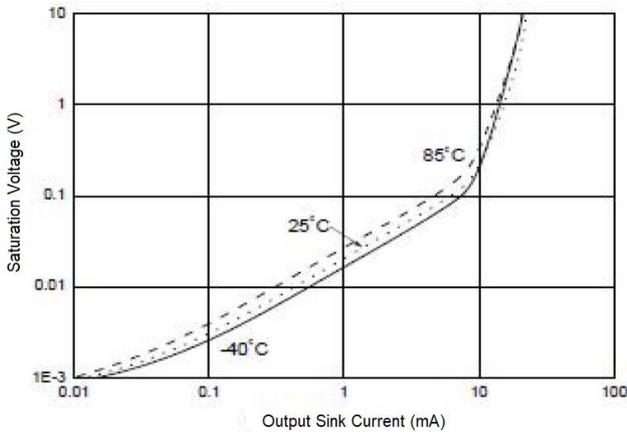
1. Supply Voltage vs. Supply Current



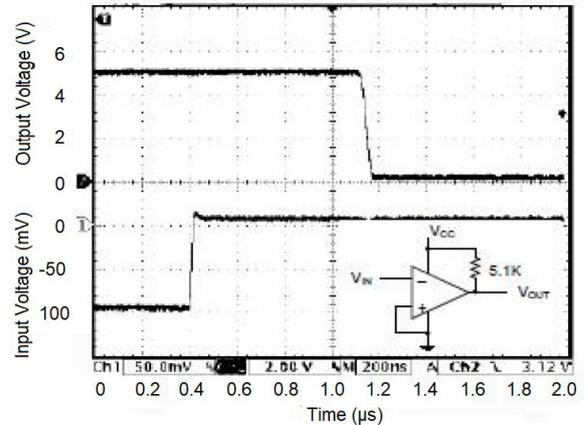
2. Supply Voltage vs. Input Bias Current



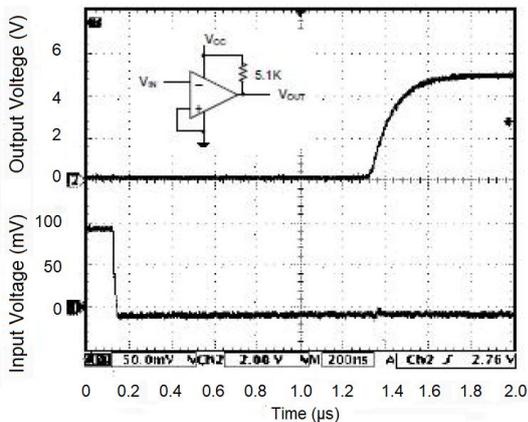
3. Output Sink Current vs. Saturation Voltage



4. Response Time for 5mV Input Overdrive -Negative Transition



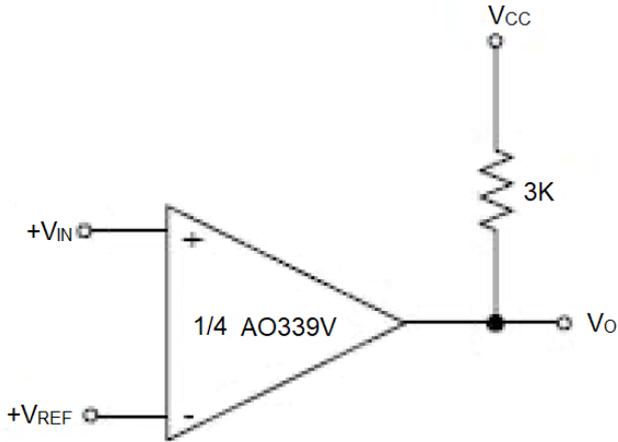
5. Response Time for 5mV Input Overdrive -Positive Transition



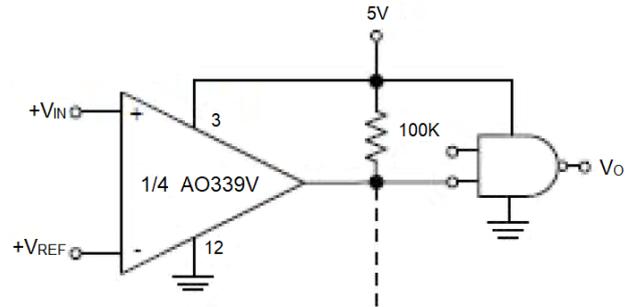


TYPICAL APPLICATIONS

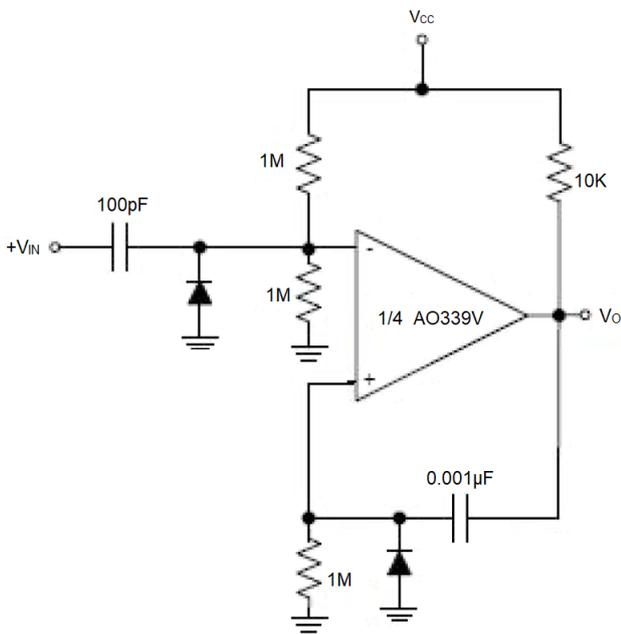
1. Basic Comparator



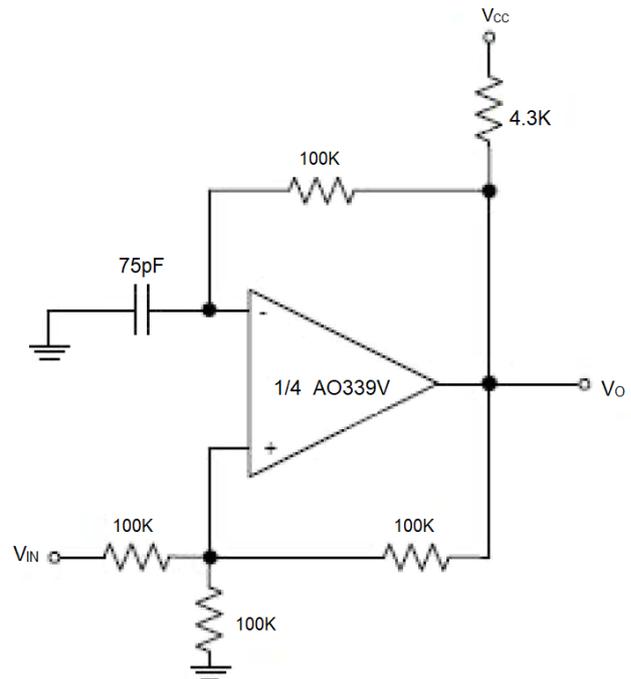
2. Driving CMOS



3. One Shot Multivibrator



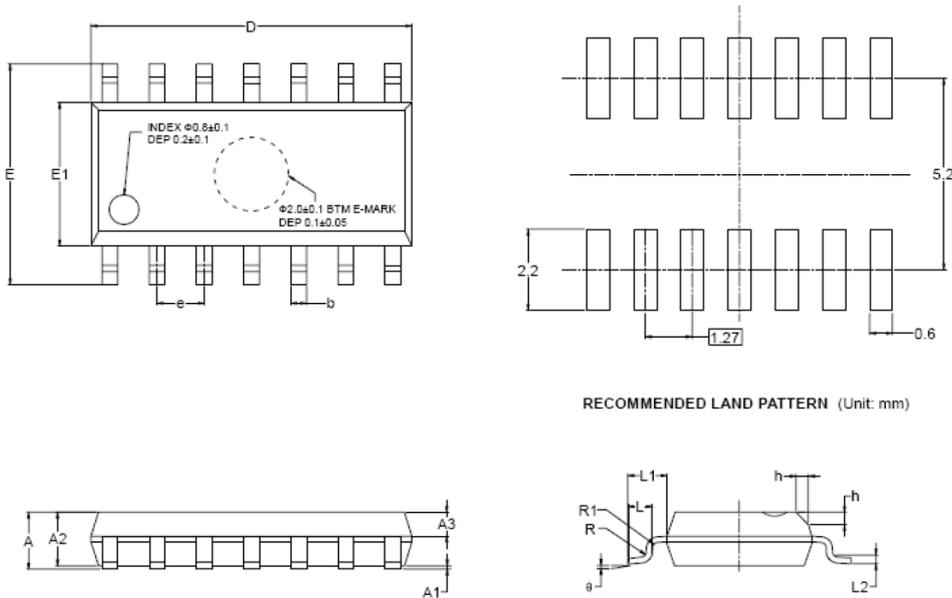
4. Square wave Oscillator





PACKAGE INFORMATION

Dimension in SOP14 (Unit: mm)

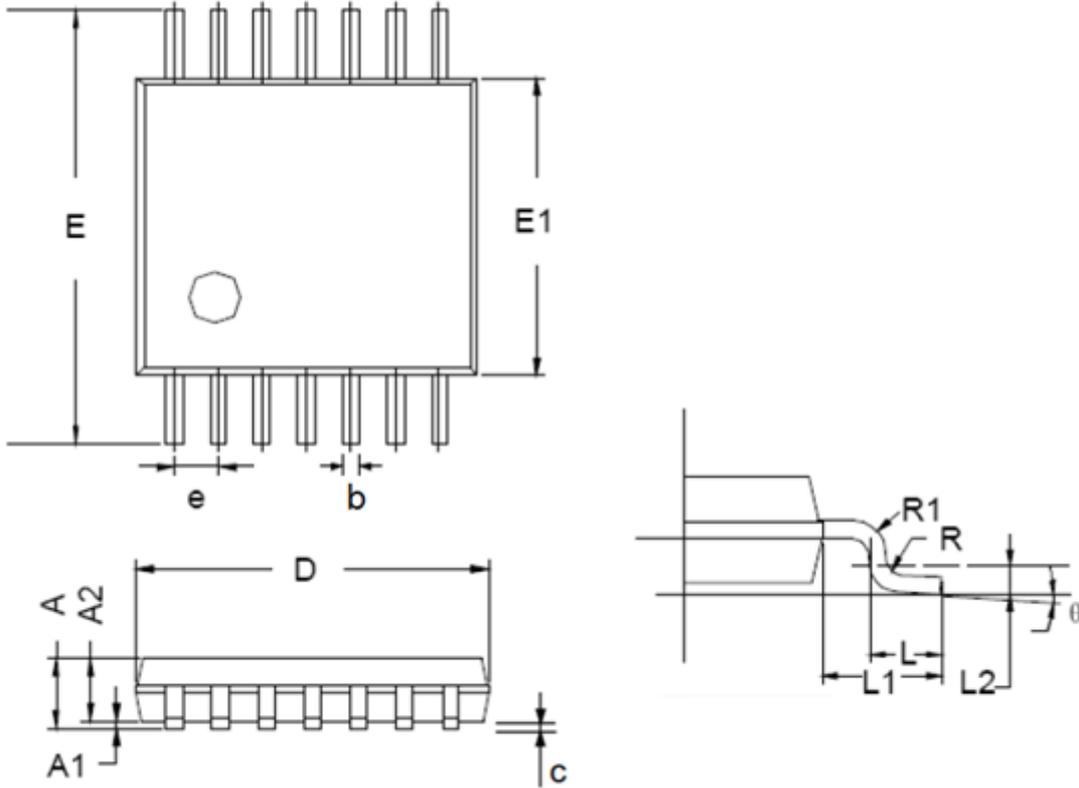


RECOMMENDED LAND PATTERN (Unit: mm)

Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
A2	1.25	1.65	0.049	0.065
A3	0.55	0.75	0.022	0.030
b	0.36	0.49	0.014	0.019
D	8.53	8.73	0.336	0.344
E	5.80	6.20	0.228	0.244
E1	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
L	0.45	0.80	0.018	0.032
L1	1.04 REF		0.040 REF	
L2	0.25 BSC		0.010 BSC	
R	0.07	-	0.003	-
R1	0.07	-	0.003	-
h	0.30	0.50	0.012	0.020
θ	0°	8°	0°	8°



Dimension in TSSOP14 (Unit: mm)



Symbol	Min.	Max.
A	-	1.20
A1	0.05	0.15
A2	0.90	1.05
b	0.20	0.28
c	0.10	0.19
D	4.86	5.06
E	6.20	6.60
E1	4.30	4.50
e	0.65 BSC	
L	0.45	0.75
L1	1.00 REF	
L2	0.25 BSC	
R	0.09	-
R1	0.09	-
θ	0°	8°



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