MB339

LOW POWER LOW OFFSET VOLTAGE QUAD COMPARATORS

General Description

The MB339 consist of four independent precision voltage comparators with an offset voltage specification as low as 2.0 mV max for two 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. These comparators also have a unique characteristic in that the input common-mode voltage range includes ground, even though operated from a single power supply voltage.

Application areas include limit comparators, simple analog to digital converters; pulse, square wave and time delay generators; wide range VCO; MOS clock timers; multi vibrators and high voltage digital logic gates. The MB339 was designed to directly interface with TTL and CMOS. When operated from both plus and minus power supplies, the MB339 will directly interface with MOS logic where their low power drain is a distinct advantage over standard comparators.

The MB339 is available in standard DIP-14 and SOP-14 packages.

Features

- Wide Power Supply Voltage:
  Single Supply: 3V to 36V
  Dual Supplies: ±1.5V to ±18V
- Very low supply current drain (0.9 mA) — independent of supply voltage
- Low input biasing current: 25 nA
- Low input offset current:: ±5 nA
- Maximum offset voltage: 5 mV
- Input common-mode voltage range includes ground
- Differential input voltage range equal to the power supply voltage
- Low output saturation voltage: 200 mV at 4 mA
  Output voltage compatible with TTL, DTL, ECL, MOS and CMOS logic systems

Applications

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

CBC Microelectronics
http://www.cbcv.net


DIP-14

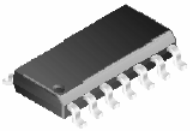

SOP-14

Figure 1: Package Types of MB339

Pin Configuration
(DIP-14 / SOP-14)

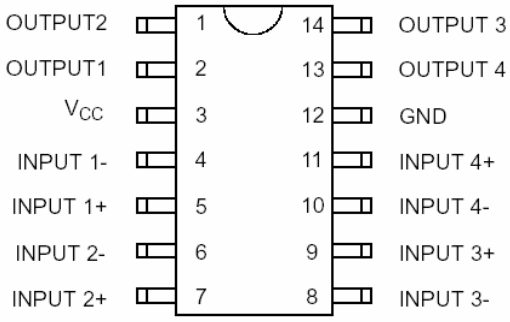
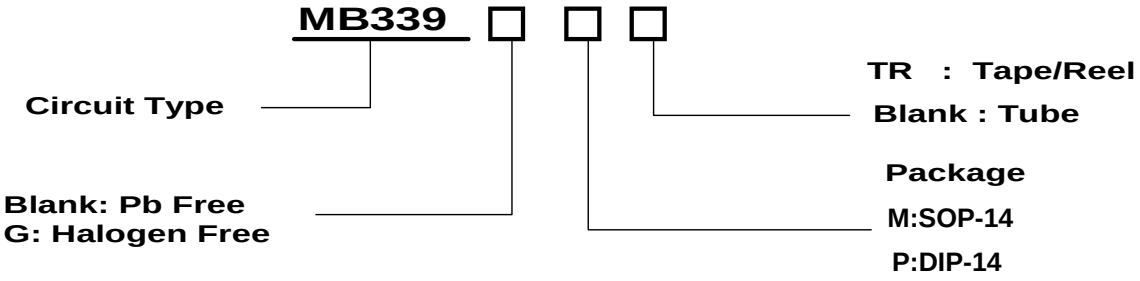


Figure 2: Pin Configuration of MB339 (Top View)

Ordering Information



Package	Part Number		Marking ID		Packing Type
	Pb-free	Halogen-Free	Pb-free	Halogen-Free	
SOP-14	MB339M	MB339GM	MB339M	MB339GM	Tube
	MB339MTR	MB339GMTR	MB339M	MB339GM	Tape & Reel
DIP-14	MB339P	MB339GP	MB339P	MB339GP	Tube

Typical Application

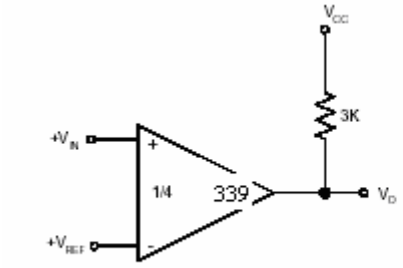


Figure 3: Basic Comparator

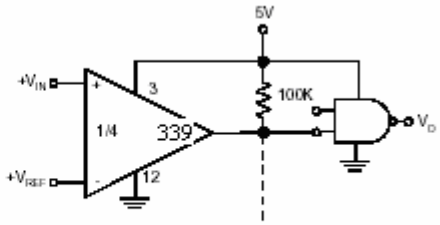


Figure 4: Driving CMOS

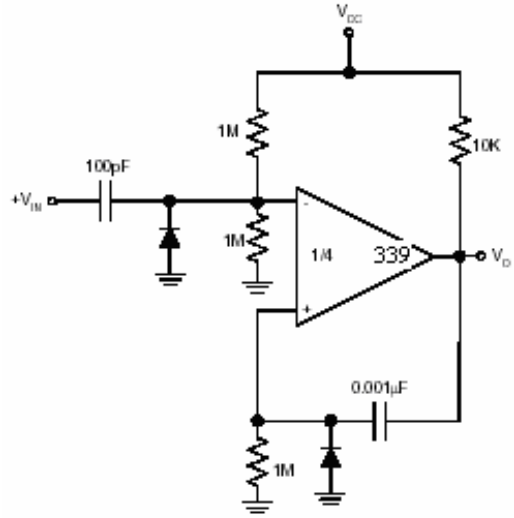


Figure 5: One Shot Multivibrator

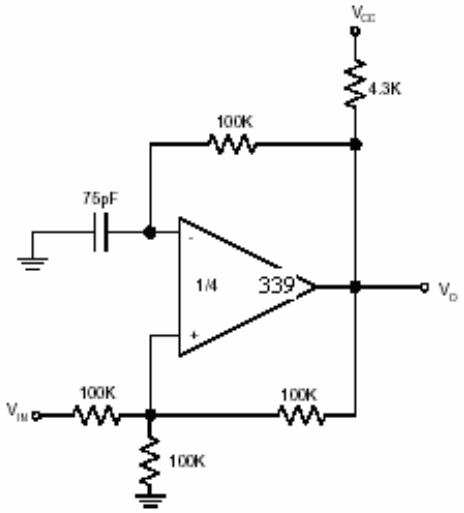


Figure 6: Squarewave Oscillator

Functional Block Diagram

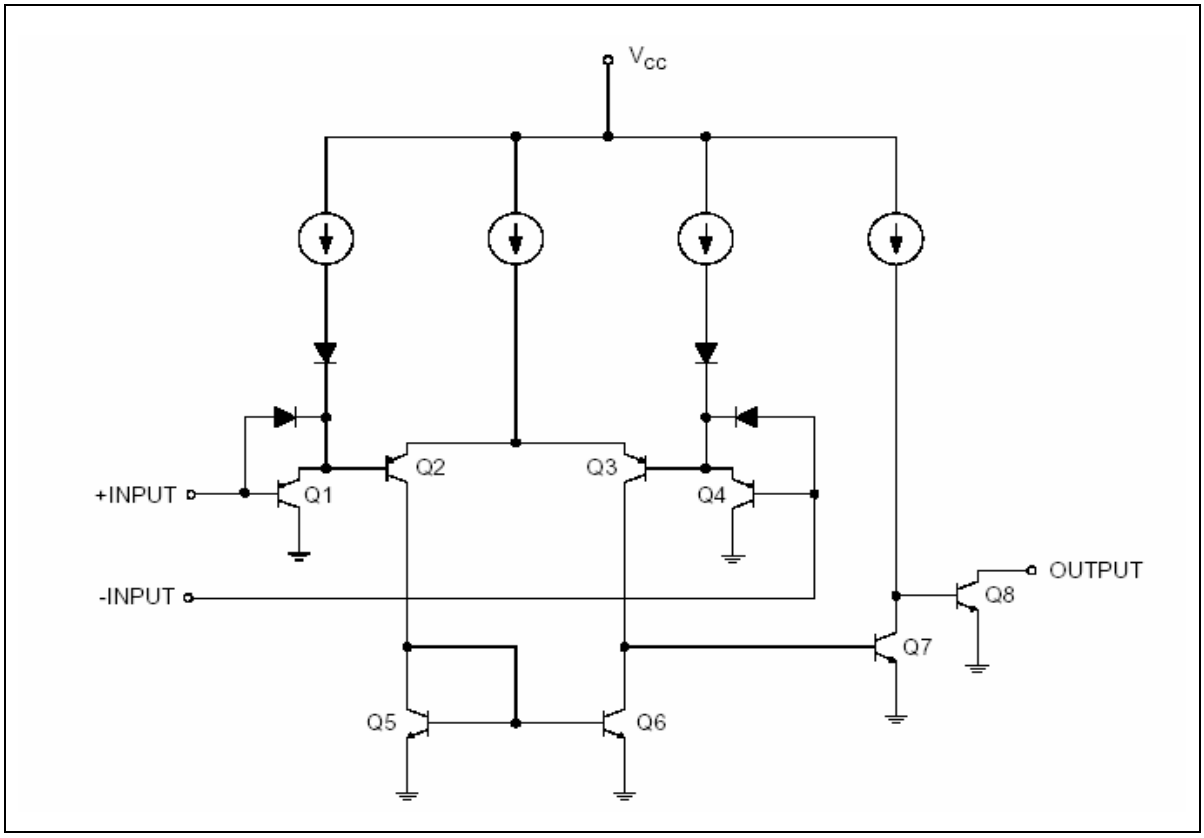


Figure 7: Functional Block Diagram of MB339 (Each Amplifier)

Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Value	Unit
Power Supply Voltage	V_{CC}	40	V
Differential Input Voltage	V_{ID}	40	V
Input Voltage	V_{IC}	-0.3 to 40	V
Input Current (V_{IN} < -0.3V)	I_{IN}	50	mA
Power Dissipation	P_D	DIP-14: 1050	mW
		SOP-14: 890	mW
Storage Temperature Range	Tstg	-55 to 150	°C
Lead Temperature (Soldering,10 Seconds)		260	°C

Note1: 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 Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Supply Voltage	V_{CC}	3	36	V
Ambient Operating Temperature	T_A	-20	+85	℃

Electrical Characteristics

V_{CC} = 5V, GND = 0V, T_A = 25℃ unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Input Offset Voltage	V_{IO}	V_O=1.4V,R_S=0 V_{CC}=5V to 30V		2	5	mV
Input Bias Current	I_{BIAS}	I_{IN}+ or I_{IN}-, V_{CM}=0V		25	250	nA
Input Offset Current	I_{IO}	I_{IN}+ - I_{IN}-, V_{CM}=0V		5	50	nA
Input Common Mode Voltage Range	V_{IR}	V_{CC}=30V	0		V_{CC}-1.5	V
Supply Current	I_{CC}	V_{CC}=30V		1.2	2.5	mA
		V_{CC}=5V		0.9	2.0	mA
Large Signal Voltage Gain	G_V	V_{CC}=15V,V_O=1V to 11V R_L≥15KΩ	50	200		V/mV
Large Signal Response Time	t	VIN = TTL Logic Swing, VREF = 1.4V, VRL = 5V, RL = 5.1k		200		ns
Response Time		VRL = 5V, RL = 5.1K		1.3		us
Output Sink Current	I_{SINK}	V+=0V, V-=1V, V_O=1.5V	6	16		mA
Saturation Voltage	V_{SAT}	V+=0V, V-=1V, ISINK ≤ 4mA		200	400	mV
Output Leakage Current	I_{LEAK}	V+=1V, V-=0V, V_O=1.5V		0.1		nA

Typical Performance Characteristics

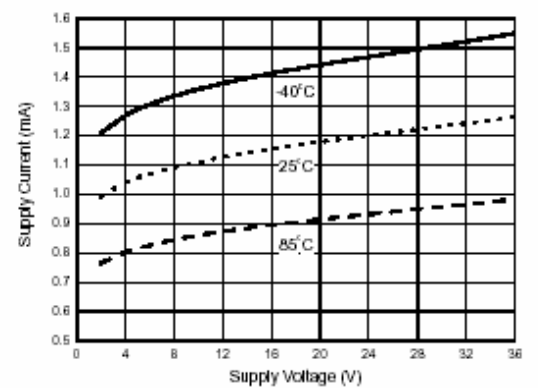


Figure 8: Supply Voltage vs. Supply Current

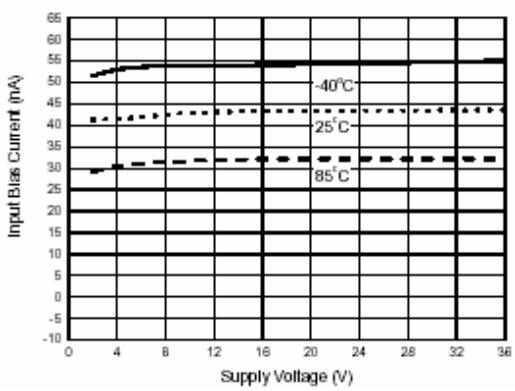


Figure 9: Supply Voltage vs. Input Bias Current

Typical Performance Characteristics (Continued)

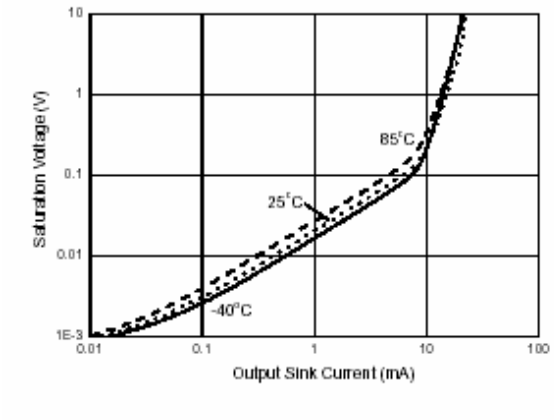


Figure 10: output Sink Current Saturation Voltage

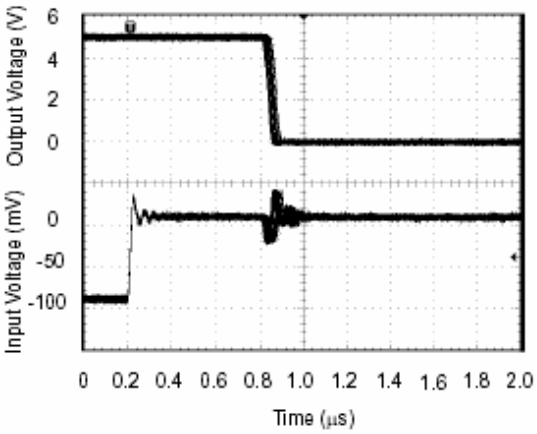


Figure 11: Response Time for 5mV Input Overdrive-Negative Transition

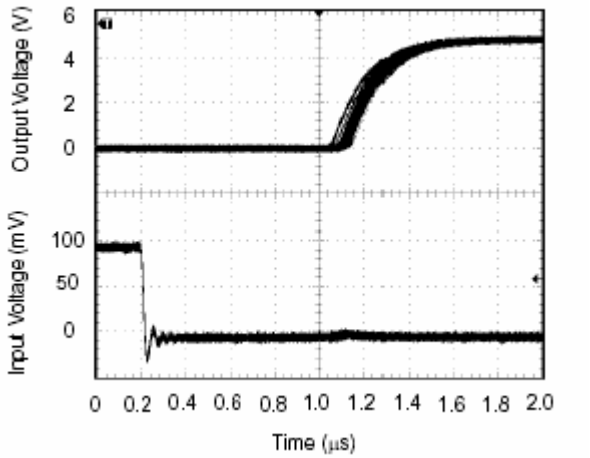
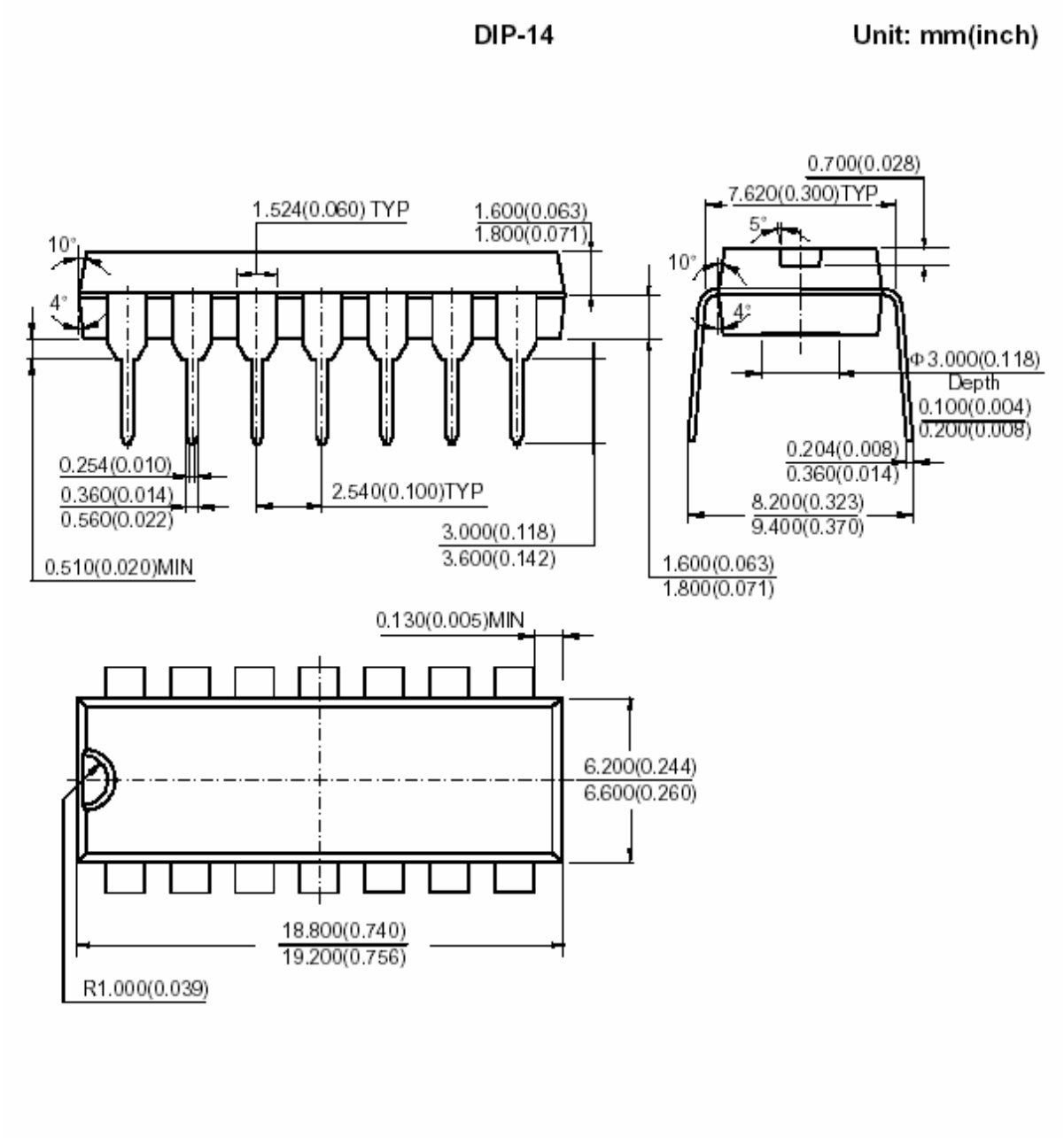
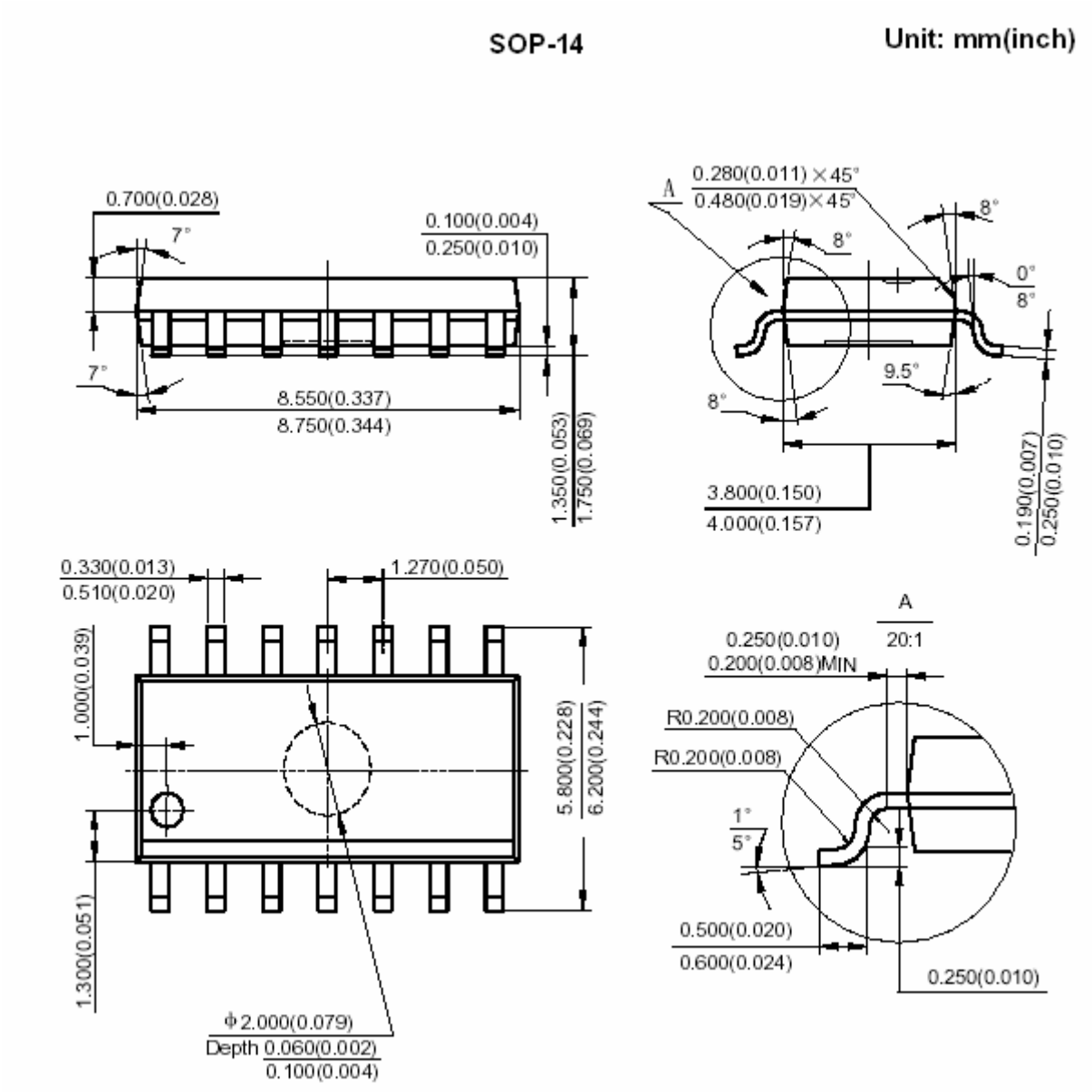


Figure 12: Response Time for 5mV Input Overdrive-Positive Transition

Mechanical Dimensions



Mechanical Dimensions (Continued)



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