Pin Configuration

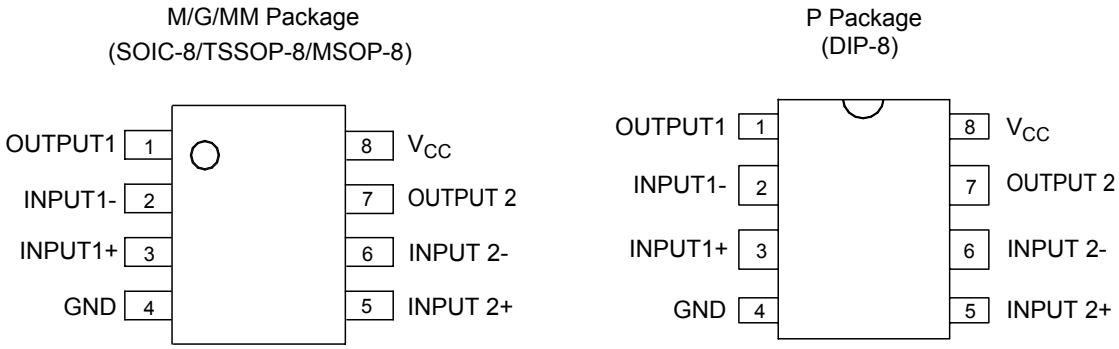


Figure 2. Pin Configuration of AS393/393A (Top View)

Functional Block Diagram

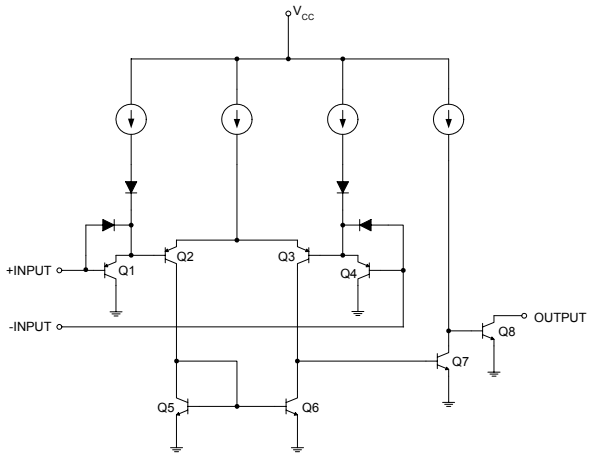
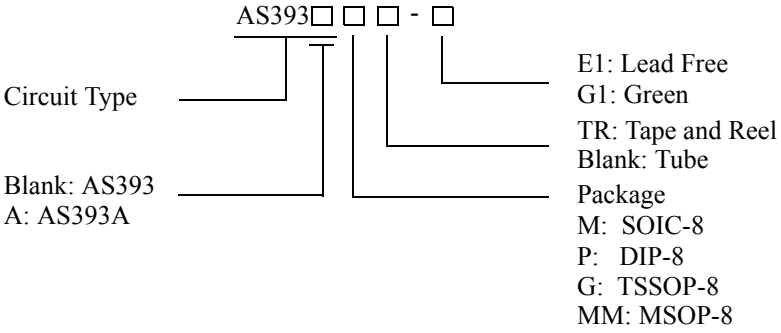


Figure 3. Functional Block Diagram of AS393/393A (Each comparator)

Ordering Information



Package	Temperature Range	Part Number		Marking ID		Packing Type
		Lead Free	Green	Lead Free	Green	
SOIC-8	-40 to 85°C	AS393M-E1	AS393M-G1	AS393M-E1	AS393M-G1	Tube
		AS393MTR-E1	AS393MTR-G1	AS393M-E1	AS393M-G1	Tape & Reel
		AS393AM-E1	AS393AM-G1	AS393AM-E1	AS393AM-G1	Tube
		AS393AMTR-E1	AS393AMTR-G1	AS393AM-E1	AS393AM-G1	Tape & Reel
DIP-8	-40 to 85°C	AS393P-E1	AS393P-G1	AS393P-E1	AS393P-G1	Tube
		AS393AP-E1	AS393AP-G1	AS393AP-E1	AS393AP-G1	Tube
TSSOP-8	-40 to 85°C	AS393G-E1	AS393G-G1	EG3C	GG3C	Tube
		AS393GTR-E1	AS393GTR-G1	EG3C	GG3C	Tape & Reel
MSOP-8	-40 to 85°C		AS393MM-G1		AS393MM-G1	Tube
			AS393MMTR-G1		AS393MM-G1	Tape & Reel

BCD Semiconductor's Pb-free products, as designated with "E1" suffix in the part number, are RoHS compliant. Products with "G1" suffix are available in green packages.

Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Value		Unit
Supply Voltage	V_{CC}	40		V
Differential Input Voltage	V_{ID}	40		V
Input Voltage	V_{IN}	-0.3 to 40		V
Input Current (V_{IN} < -0.3V) (Note 2)	I_{IN}	50		mA
Output Short-Circuit Current to Ground		Continuous		
Power Dissipation (T_A=25°C)	P_D	DIP-8	780	mW
		SOIC-8	660	
		TSSOP-8	570	
		MSOP-8	450	
Operating Junction Temperature	T_J	150		°C
Storage Temperature	T_{STG}	-65 to 150		°C
Lead Temperature (Soldering, 10 sec)	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 Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

Note 2: 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	Min	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°C, **bold** typeface applies over T_A=-40°C to 85°C (Note 3), V_{CC}=5V, GND=0V, unless otherwise specified.

Parameter	Conditions		Min	Typ	Max	Unit
Input Offset Voltage	V_O=1.4V, R_S=0Ω, V_{CC}=5V to 30V	AS393		1.0	5.0	mV
					7	
		AS393A		1.0	3.0	
					5	
Input Bias Current	I_{IN}+ or I_{IN}- with output in Linear Range, V_{CM}=0V			25	250	nA
					400	
Input Offset Current	I_{IN}+-I_{IN} -, V_{CM}=0V			5.0	50	nA
					200	
Input Common Mode Voltage Range (Note 4)	V_{CC}=30V		0		V_{CC} -1.5	V
Supply Current	$R_{L=\infty}$	V_{CC}=5V		0.6	1.0	mA
					2	
		V_{CC}=30V		0.7	1.7	
					3	
Voltage Gain	V_{CC}=15V, R_L≥15kΩ, V_O=1V to 11V		50	200		V/mV
Large Signal Response Time	V_{IN} =TTL Logic Swing, V_{REF}=1.4V, V_{RL}=5V, R_L=5.1k			200		ns
Response Time	V_{RL}=5V, R_L=5.1K			1.3		μs
Output Sink Current	V_{IN}-=1V, V_{IN}+=0, V_O=1.5V		6.0	16		mA
Output LeackageCurrent	V_{IN}-=0V, V_{IN}+=1V, V_O=5V			0.1		nA
	V_{IN}-=0V, V_{IN}+=1V, V_O=30V				**1**	μA
Saturation Voltage	V_{IN}-=1V, V_{IN}+=0, I_{SINK}≤4mA			200	400	mV
					500	
Thermal Resistance (Junction to Case)	DIP-8			93		°C/W
	SOIC-8			138		

Note 3: These specifications are limited to -40°C≤ T_A ≤85°C. Limits over temperature are guaranteed by design, but not tested in production.

Note 4: 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}-1.5V (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

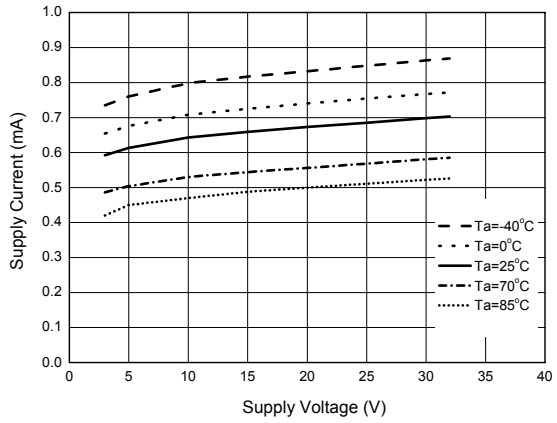


Figure 4. Supply Voltage vs. Supply Current

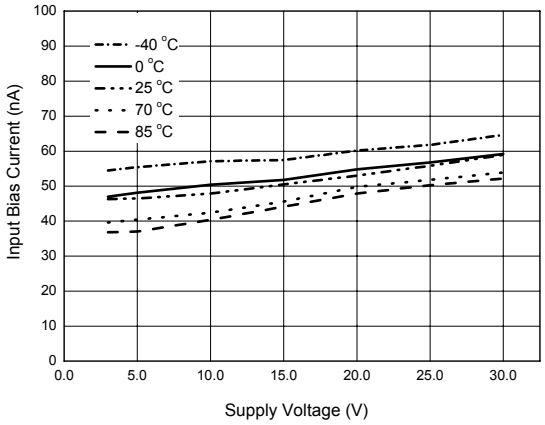


Figure 5. Supply Voltage vs. Input Bias Current

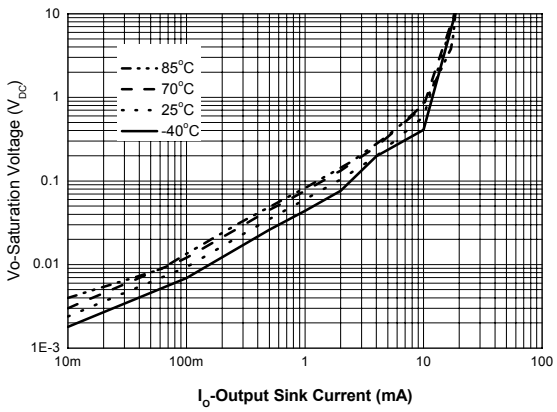


Figure 6. Output Sink Current vs. Saturation Voltage

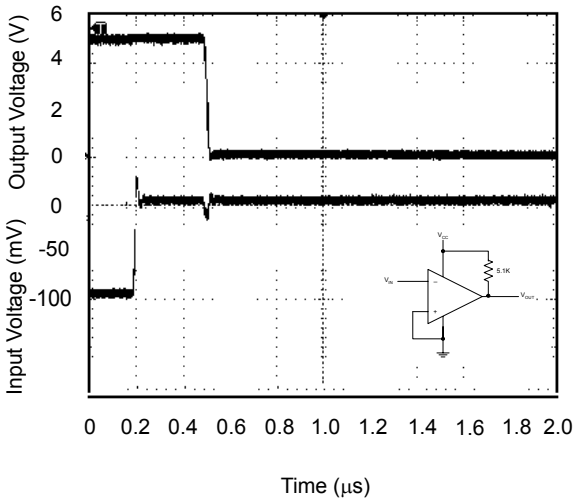


Figure 7. Response Time for 5mV Input Overdrive - Negative Transition

Typical Performance Characteristics (Continued)

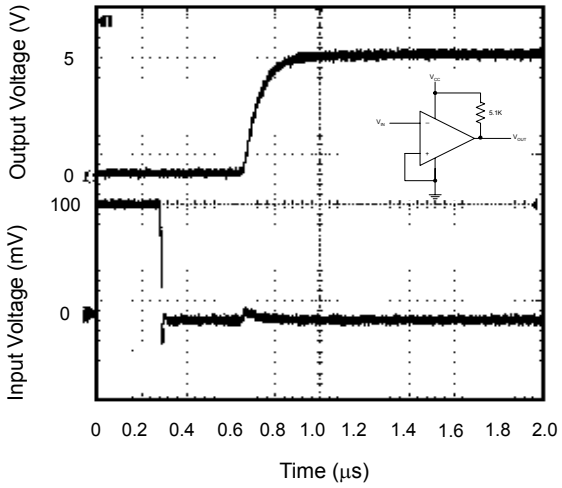


Figure 8. Response Time for 5mV Input Overdrive - Positive Transition

Typical Applications

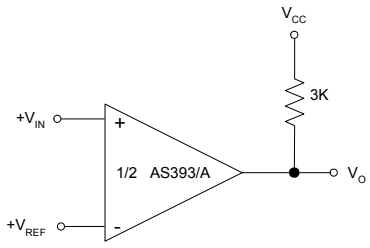


Figure 9. Basic Comparator

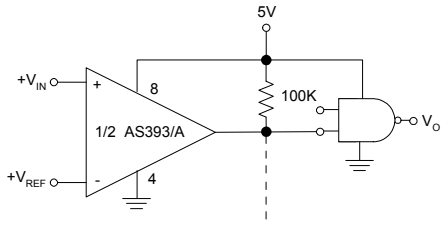


Figure 10. Driving CMOS

Typical Applications (Continued)

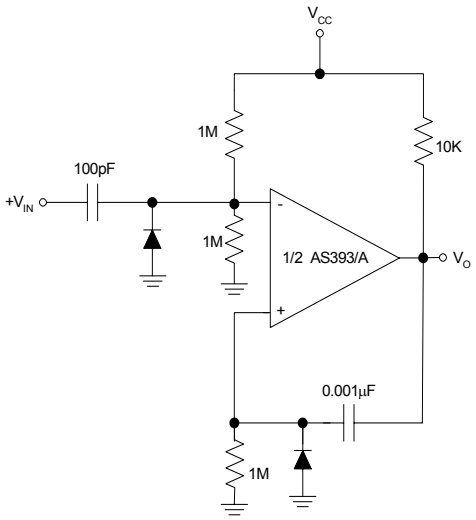


Figure 11. One Shot Multivibrator

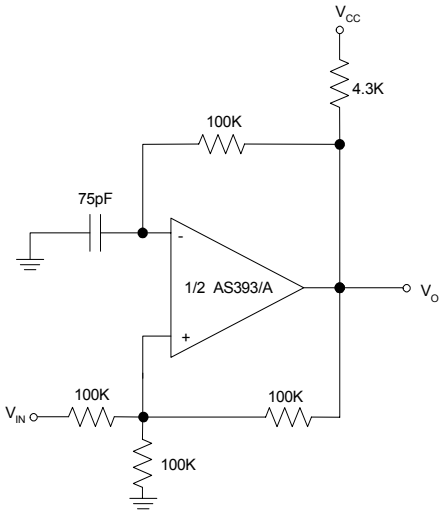
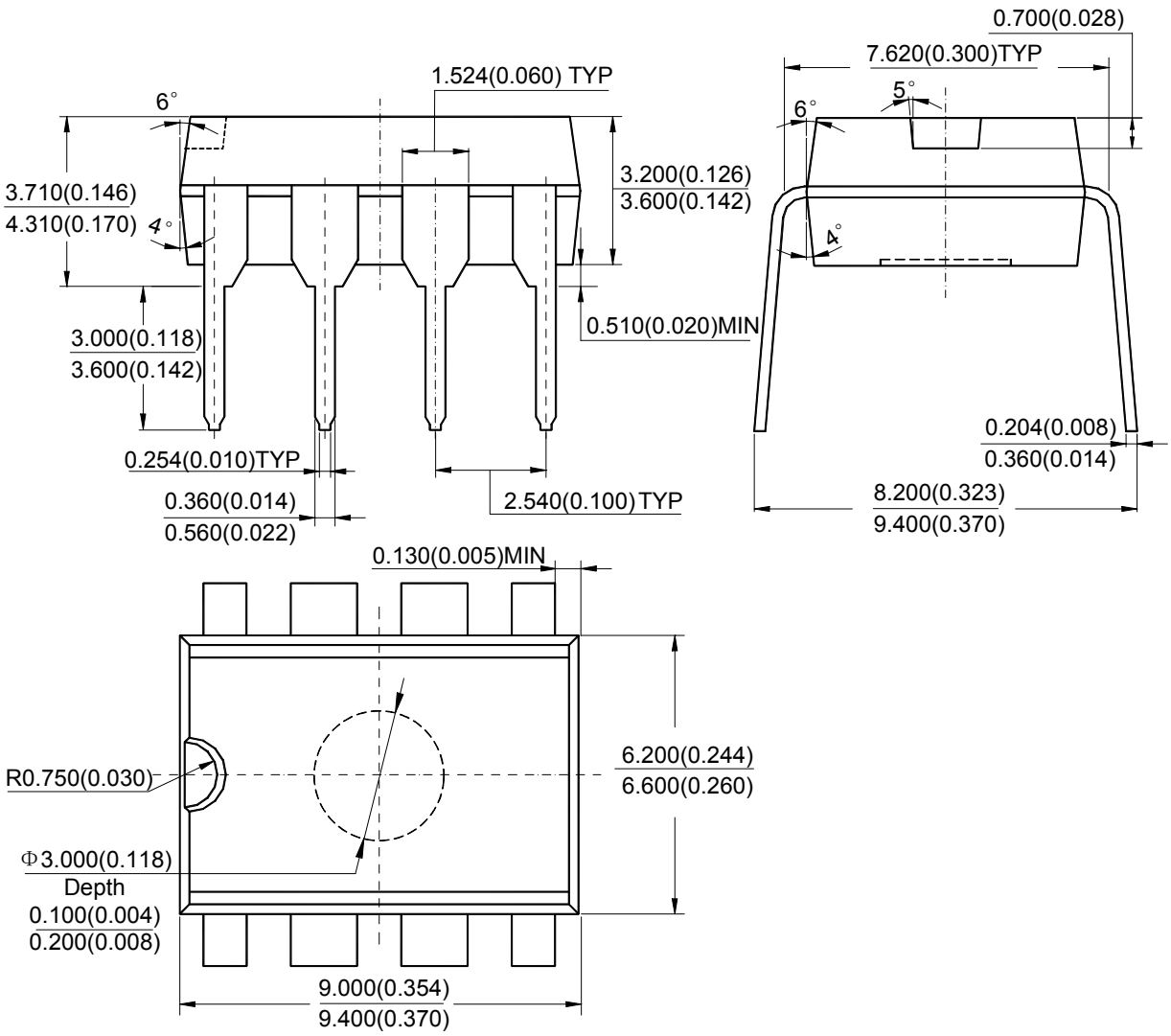


Figure 12. Squarewave Oscillator

Mechanical Dimensions

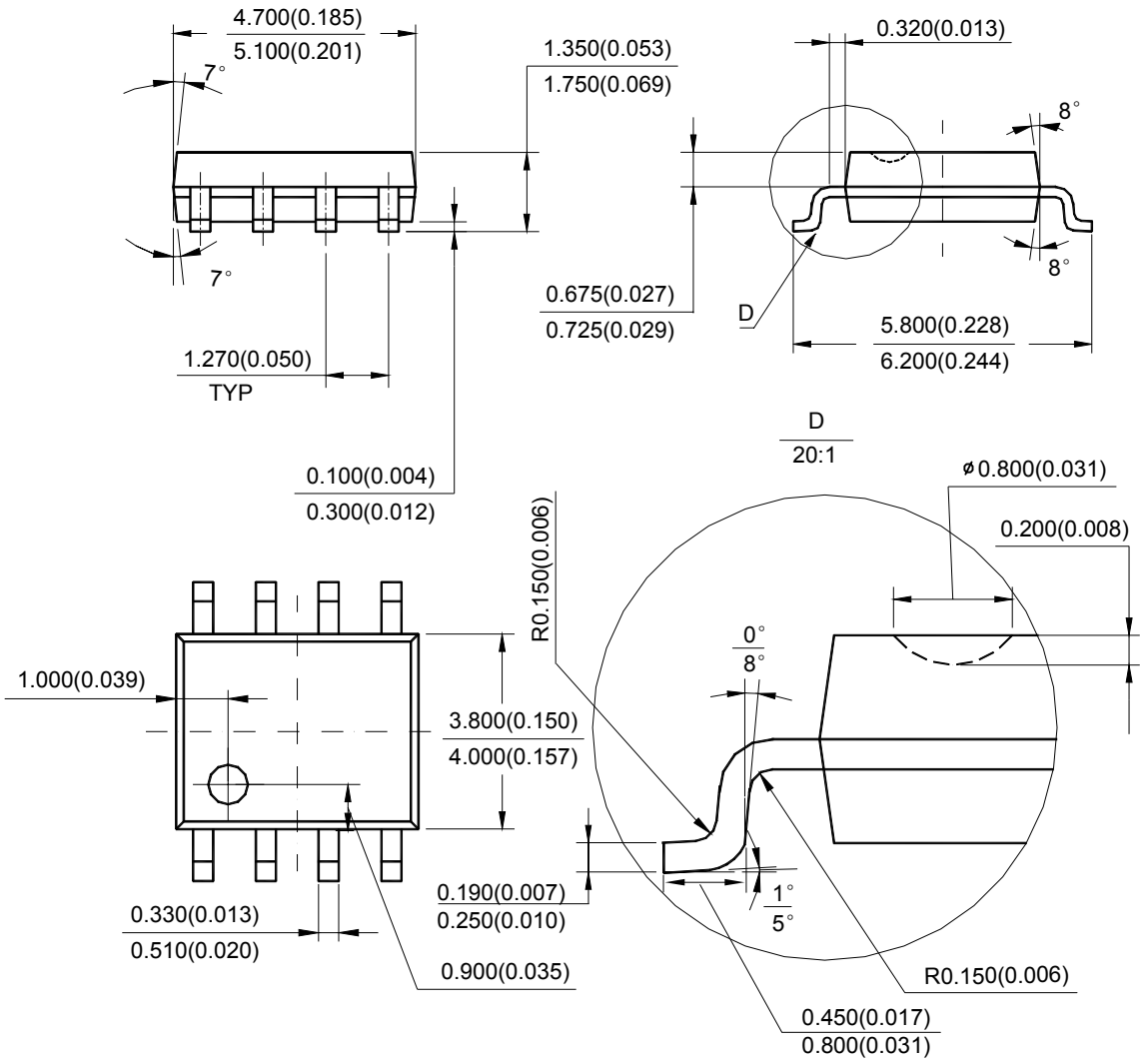
DIP-8 **Unit: mm(inch)**



Note: Eject hole, oriented hole and mold mark is optional.

Mechanical Dimensions (Continued)

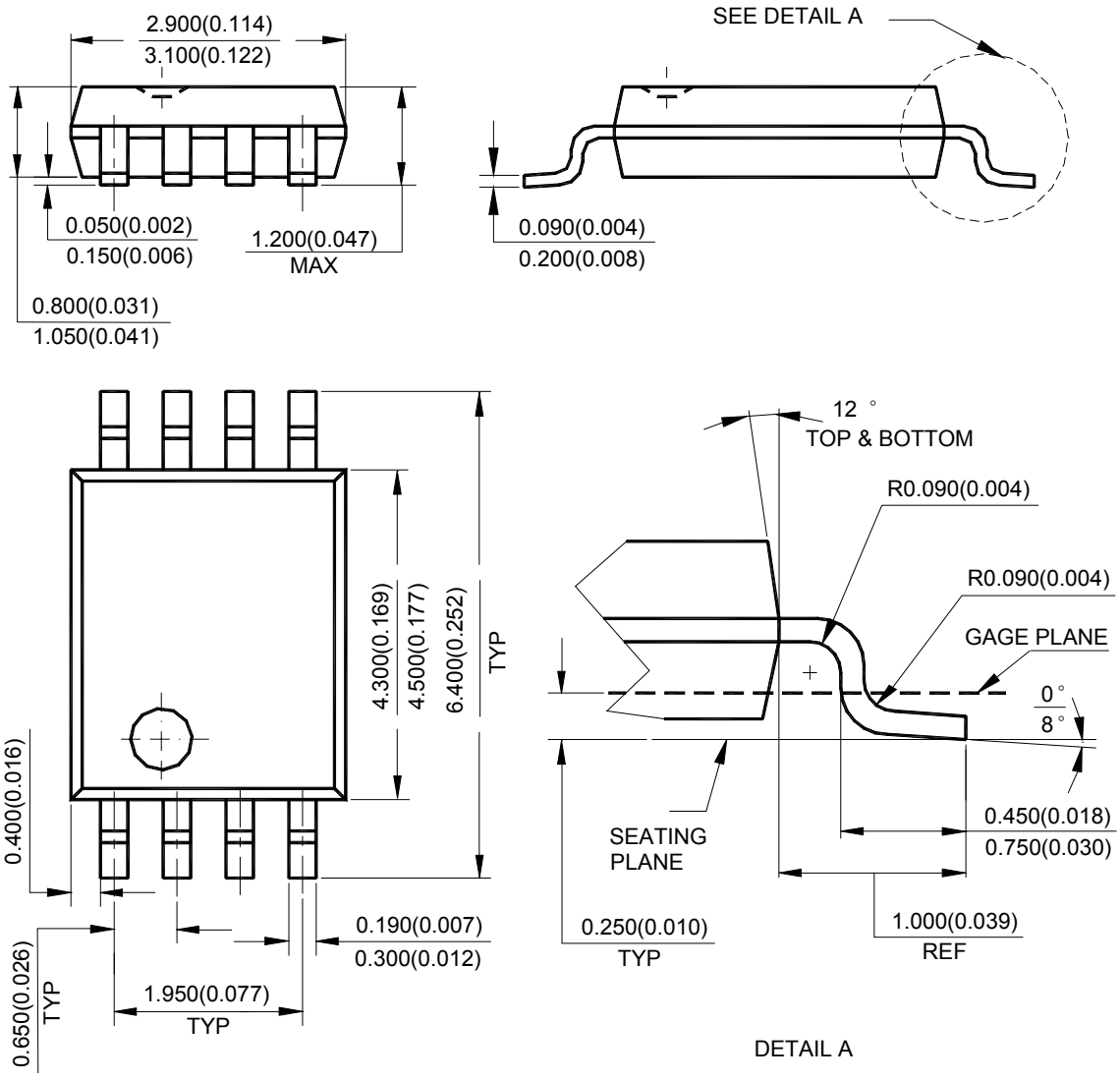
SOIC-8 **Unit: mm(inch)**



Note: Eject hole, oriented hole and mold mark is optional.

Mechanical Dimensions (Continued)

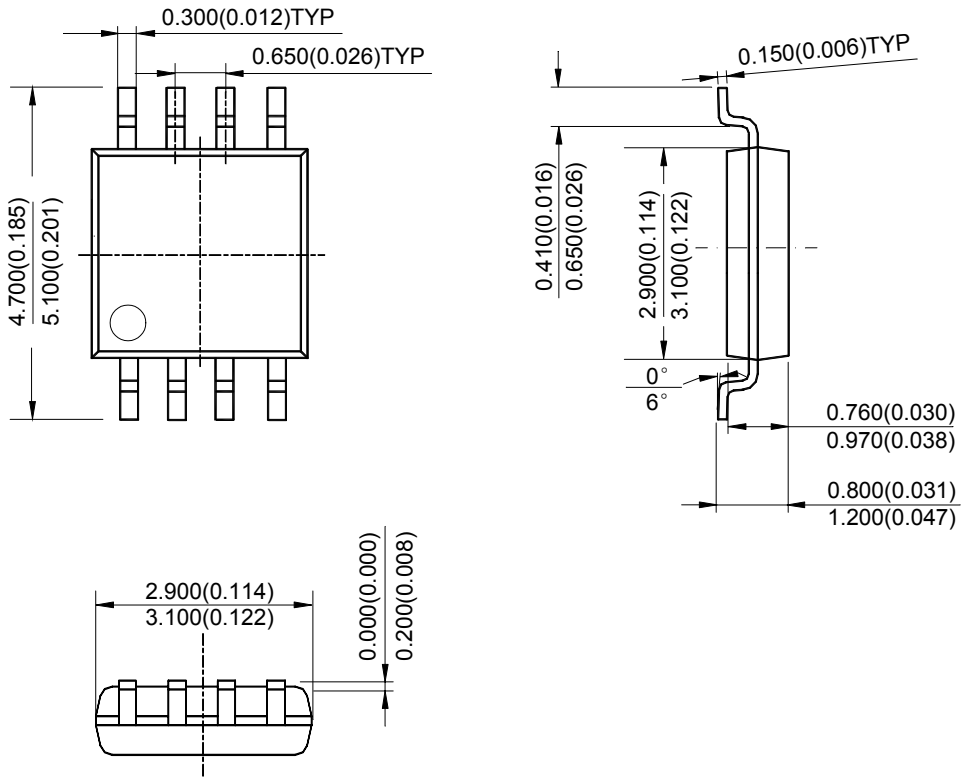
TSSOP-8 **Unit: mm(inch)**



Note: Eject hole, oriented hole and mold mark is optional.

Mechanical Dimensions (Continued)

MSOP-8 **Unit: mm(inch)**



Note: Eject hole, oriented hole and mold mark is optional.

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