AOS SEMICONDUCTOR

产品规格说明书

Product Data Sheet

AOS633xP

WEB | www.aossemi.cn

1.1MHz, Precision, Rail-to-Rail I/O CMOS Operational Amplifier

DESCRIPTIONS

The AOS6331P, AOS6332P, AOS6334P families of products offer low voltage operation and rail-to-rail input and output, as well as excellent speed/power consumption ratio, providing an excellent bandwidth (1.1MHz) and slew rate of 0.5V/us. The op-amps are unity gain stable and feature an ultra-low input bias current.

The AOS6331P, AOS6332P and AOS6334P has loweroffset, which is guaranteed not upper than ±0.5mV(AOS6331P, AOS6332P) / ±0.8mV (AOS6334P) at 25℃ with Vs = 5V, V_{CM} = Vs/2.

The devices are ideal for sensor interfaces, active filters and portable applications.

The AOS6331P, AOS6332P, AOS6334P families of operational amplifiers are specified at the full temperature range of −40℃ to +125℃ under single supplies of 2.1V to 5.5V or dual power supplies of ±1.05V to ±2.75V.

FEATURES

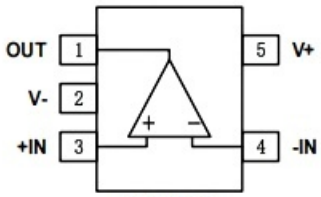
★ HIGH GAIN BANDWIDTH:1.1MHz
★ RAIL-TO-RAIL INPUT AND OUTPUT
  ±0.5mV Max Vos (AOS6331P, AOS6332P)
  ±0.8mV Max Vos (AOS6334P)
★ INPUT VOLTAGE RANGE: -0.1V to +5.6V with Vs = 5.5V
★ SUPPLY RANGE: +2.1V to +5.5V
★ SPECIFIED UP TO +125℃
★ Micro SIZE PACKAGES: SOT23-5, SOT353(SC70-5)

APPLICATIONS

★ SENSORS
★ PHOTODIODE AMPLIFICATION
★ ACTIVE FILTERS
★ TEST EQUIPMENT
★ DRIVING A/D CONVERTERS

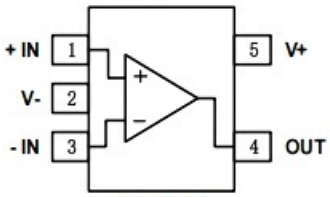
PIN CONFIGURATIONS

AOS6331P



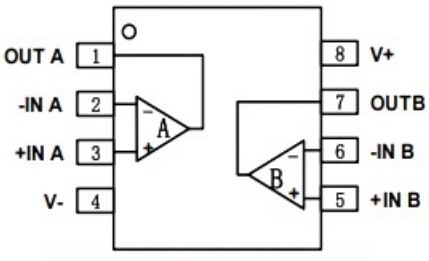
SOT23-5/
SOT353(SC70-5)

AOS6331BP



SOT23-5/
SOT353(SC70-5)

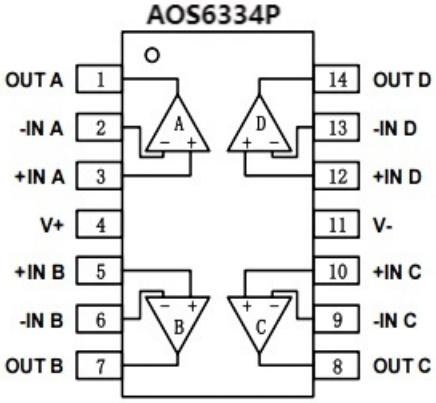
AOS6332P



SOIC-8(SOP8),MSOP-8,TSSOP-8

Note: NC indicates no internal connection

AOS6334P



SOIC-14(SOP14),TSSOP-14

ABSOLUTE MAXIMUM RATINGS (1)

Supply Voltage, V+ to V-	7.0V
Input Terminals, Voltage (2)	– 0.5 to (V+) + 0.5V
Current (2)	±10mA
Storage Temperature	−65°C to +150°C
Operating Temperature	−40°C to +125°C
Junction Temperature	150°C
Package Thermal Resistance @ T_A = +25°C	
SOT23-5, SOT23-6	200°C/W
SOT353(SC70-5)	250°C/W
MSOP-8, SOIC-8, TSSOP-8	150°C/W
SOIC-14, TSSOP-14	100°C/W
Lead Temperature (Soldering, 10s)	260°C
ESD Susceptibility	
HBM	3000V
MM	200V

(1) Stresses above these ratings may cause permanent damage. Exposure to absolute maximum conditions for extended periods may degrade device reliability. These are stress ratings only , and functional operation of the device at these or any other conditions beyond those specified is not implied.
(2) Input terminals are diode-clamped to the power-supply rails. Input signals that can swing more than 0.5V beyond the supply rails should be current-limited to 10mA or less.

ESD SENSITIVITY CAUTION

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

PACKAGE/ORDERING INFORMATION

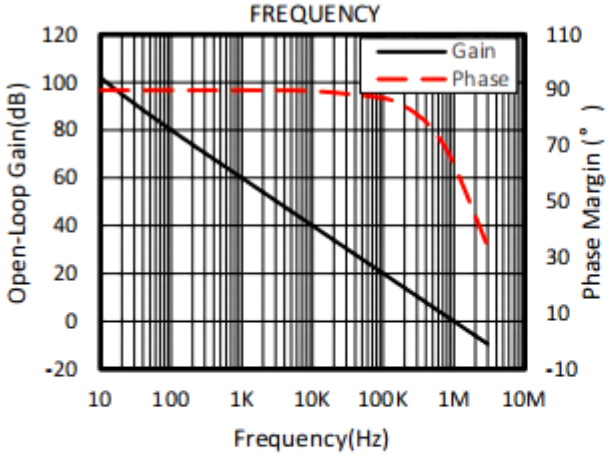
PRODUCT	ORDERING NUMBER	TEMPERATURE RANGE	PACKAGE LEAD	PACKAGE MARKING	PACKAGEOPTION
AOS6331P	AOS6331PXF	-40°C~125°C	SOT23-5	6331P	Tape and Reel,3000
	AOS6331BPXF	-40°C~125°C	SOT23-5	6331BP	Tape and Reel,3000
	AOS6331PXC5	-40°C~125°C	SOT353(SC70-5)	6331P	Tape and Reel,3000
	AOS6331BPXC5	-40°C~125°C	SOT353(SC70-5)	6331BP	Tape and Reel,3000
AOS6332P	AOS6332PXK	-40°C~125°C	SOIC-8(SOP8)	AOS6332P	Tape and Reel,2500
	AOS6332PXM	-40°C~125°C	MSOP-8	AOS6332P	Tape and Reel,3000
	AOS6332PXQ	-40°C~125°C	TSSOP-8	AOS6332P	Tape and Reel,3000
AOS6334P	AOS6334PXP	-40°C~125°C	SOIC-14(SOP14)	AOS6334P	Tape and Reel,2500
	AOS6334PXQ	-40°C~125°C	TSSOP-14	AOS6334P	Tape and Reel,3000

ELECTRICAL CHARACTERISTICS

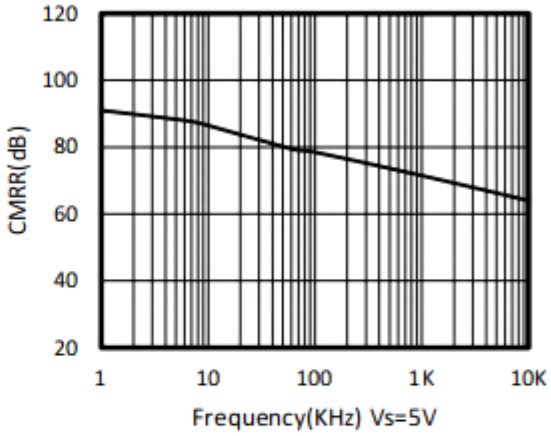
(At T_A= +25℃, V_S=5V, R_L= 10kΩ connected to V_S/2, and V_{OUT}= V_S/2, unless otherwise noted.)

PARAMETER		CONDITIONS	T_J	AOS6331P,AOS6332P, AOS6334P			UNITS
				MIN	TYP	MAX	
POWER SUPPLY							
Vs	Operating Voltage Range		25°C	2.1		5.5	V
IQ	Quiescent Current/ Amplifier		25°C		85	145	uA
PSRR	Power-Supply Rejection Ratio	Vs=2.1V to 5.5V, Vcm=(V-)+0.5V	25°C	75	92		dB
			-40°C to 125°C	65			
INPUT							
Vos	Input Offset Voltage	AOS6331P	25°C		±0.2	±0.5	mV
		AOS6332P	25°C		±0.2	±0.5	
		AOS6334P	25°C		±0.3	±0.8	
Vos TC	Input Offset Voltage Average Drift	-40°C to 125°C			2		uV/°C
IB	Input Bias Current		25°C		10	50	pA
Ios	Input Offset Current		25°C		10	50	pA
Vcm	Common-Mode Voltage Range	Vs= 5.5V	25°C	-0.1		5.6	V
CMRR	Common-Mode Rejection Ratio	Vs= 5.5V, Vcm=-0.1V to 4V	25°C	75	95		dB
			-40°C to 125°C	68			
		Vs= 5.5V, Vcm=-0.1V to 5.6V	25°C	63	85		
			-40°C to 125°C	57			
OUTPUT							
AOL	Open-Loop Voltage Gain	R_L=2KΩ,Vo= 0.15V to 4.85V	25°C	95	110		dB
			-40°C to 125°C	85			
		R_L=10KΩ, Vo=0.05V to 4.95V	25°C	100	120		
			-40°C to 125°C	92			
	Output Swing From Rail	R_L=2KΩ	25°C		25		mV
		R_L=10KΩ			8		
Iout	Output Current Source		25°C		120		mA
FREQUENCY RESPONSE							
SR	Slew Rate		25°C		0.5		V/us
GBP	Gain-Bandwidth Product		25°C		1.1		MHz
PM	Phase Margin		25°C		64		°
ts	Setting Time,0.1%				1.3		us
	Overload Recovery Time	V_{IN} · Gain≥V_S			4.7		us
	Turn-on time	Vs= 5V			20		us
NOISE							
en	Input Voltage Noise Density	f = 1KHz	25°C		22		nV/√Hz
		f = 10KHz	25°C		20		nV/√Hz

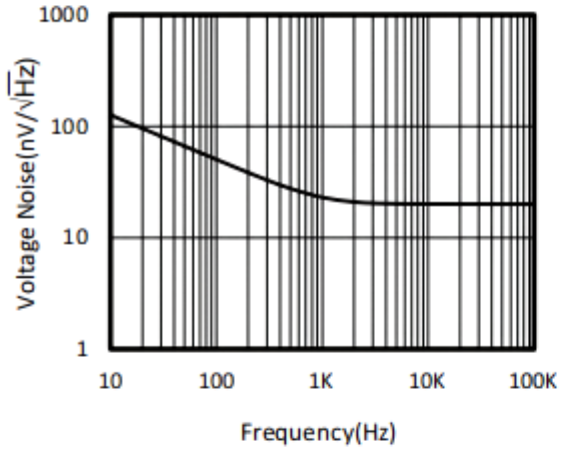
OPEN-LOOP GAIN AND PHASE vs FREQUENCY



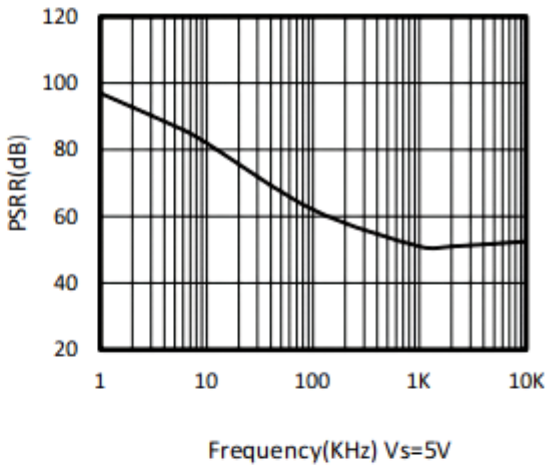
COMMON-MODE REJECTION RATIO vs FREQUENCY



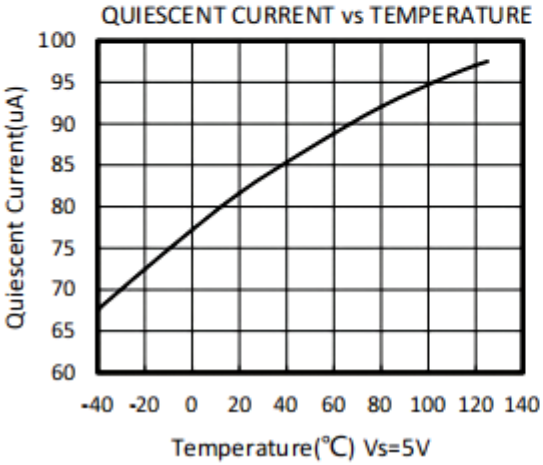
INPUT VOLTAGE NOISE SPECTRAL DENSITY vs FREQUENCY



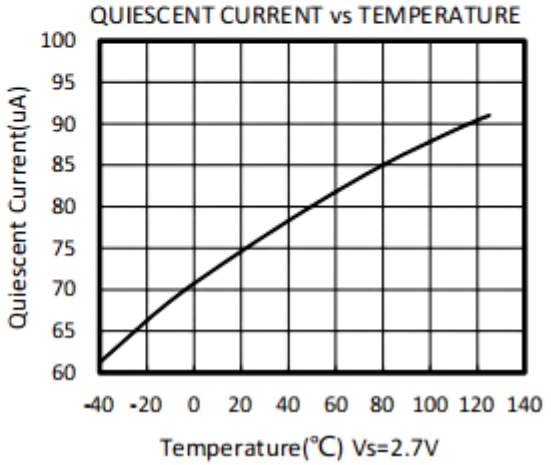
POWER-SUPPLY REJECTION RATIO vs FREQUENCY



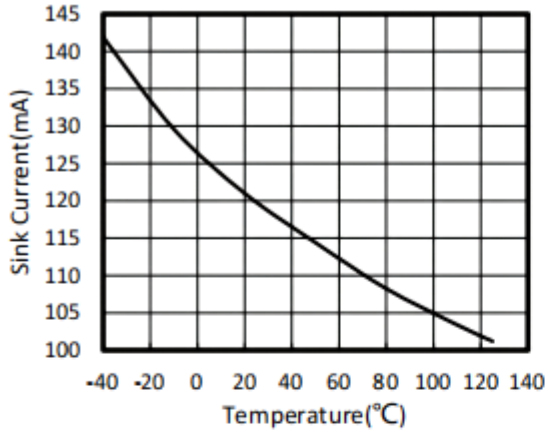
QUIESCENT CURRENT vs TEMPERATURE



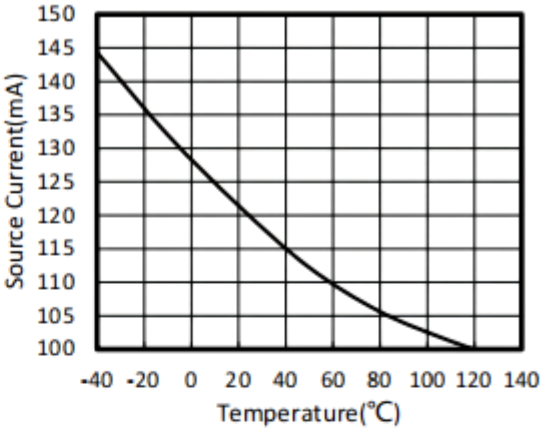
QUIESCENT CURRENT vs TEMPERATURE



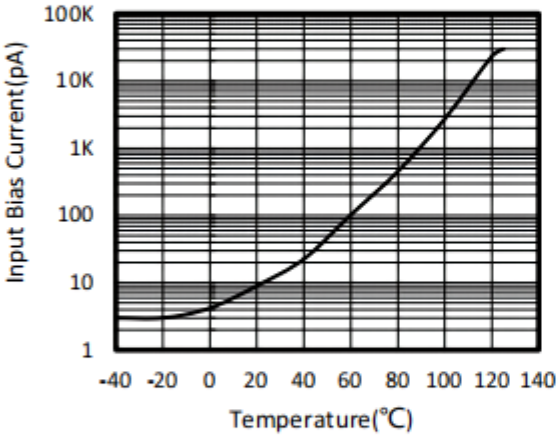
SINK CURRENT vs TEMPERATURE



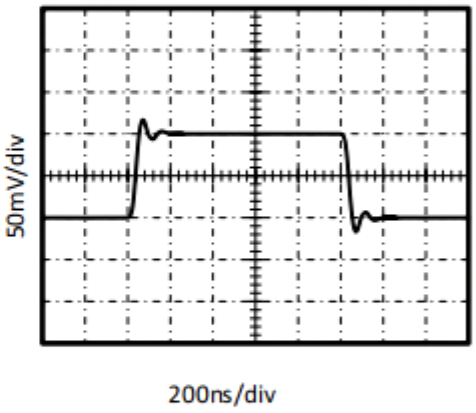
SOURCE CURRENT vs TEMPERATURE



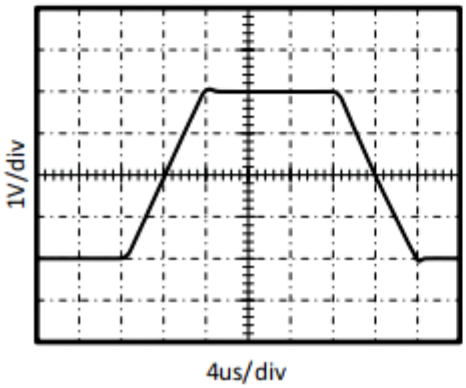
INPUT BIAS CURRENT vs TEMPERATURE



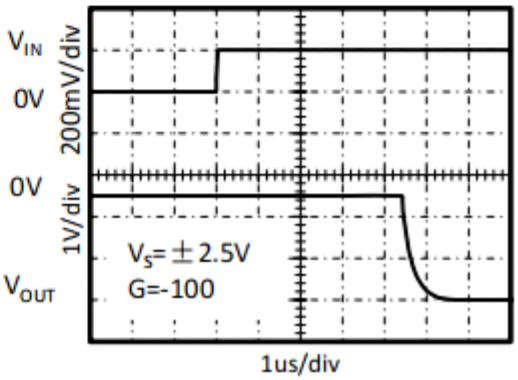
SMALL-SIGNAL STEP RESPONSE

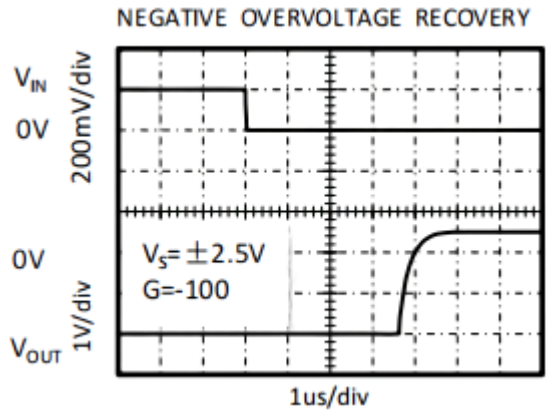


LARGE-SIGNAL STEP RESPONSE



POSITIVE OVERVOLTAGE RECOVERY




NEGATIVE OVERVOLTAGE RECOVERY
V_{IN}
0V
200mV/div
0V
V_{OUT}
1V/div
V_S=±2.5V
G=-100
1us/div

APPLICATION NOTES

The AOS6331P, AOS6332P, AOS6334P, are high precision, rail-to-rail operational amplifiers that can be run from a single-supply voltage 2.1V to 5.5V(±1.05V to ±2.75V). Supply voltages higher than 7V (absolute maximum) can permanently damage the amplifier.
Rail-to-rail input and output swing significantly increases dynamic range, especially in low-supply applications.
Good layout practice mandates use of a 0.1uF capacitor place closely across the supply pins.

LAYOUT GUIDELINS

Attention to good layout practices is always recommended. Keep traces short. When possible, use a PCB ground plane with surface-mount components placed as close to the device pins as possible. Place a 0.1uF capacitor closely across the supply pins.
These guidelines should be applied throughout the analog circuit to improve performance and provide benefits such as reducing the EMI susceptibility.

INSTRUMENTATION AMPLIFIER

In the three-op amp, instrumentation amplifier configuration shown in Figure2

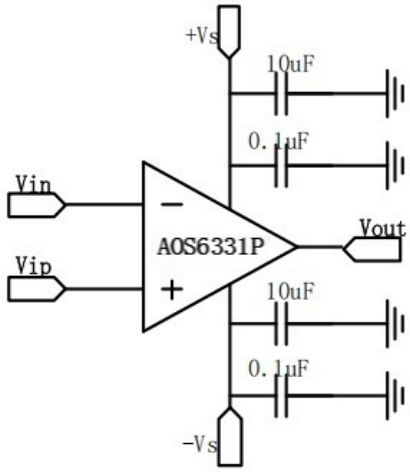


Figure1. Amplifier with Bypass Capacitors

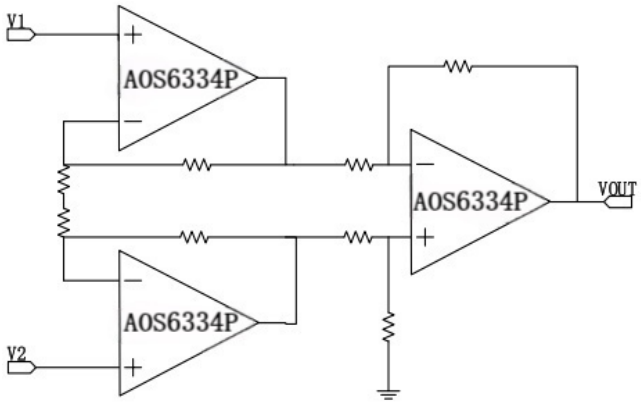
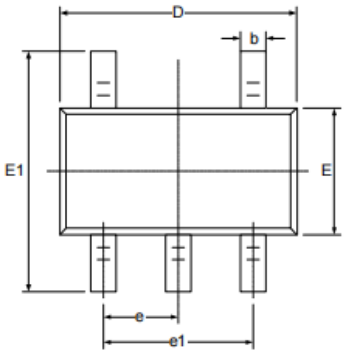
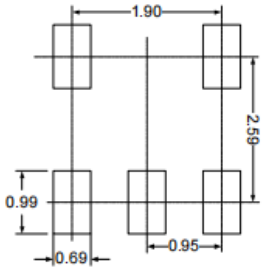


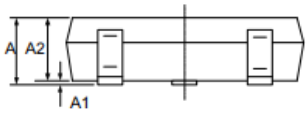
Figure2. Amplifier instrumentation amplifier

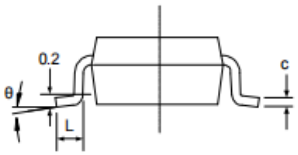
PACKAGE OUTLINE DIMENSIONS
SOT23-5





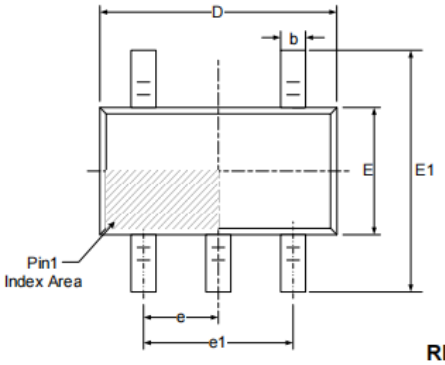
RECOMMENDED LAND PATTERN (Unit: mm)

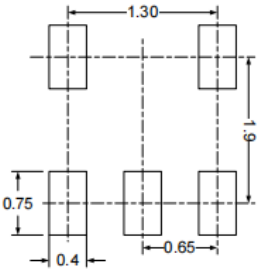




Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0 °	8 °	0 °	8 °

SOT353(SC70-5)





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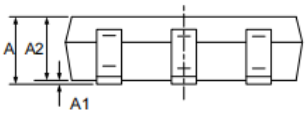
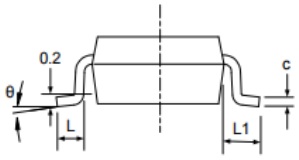
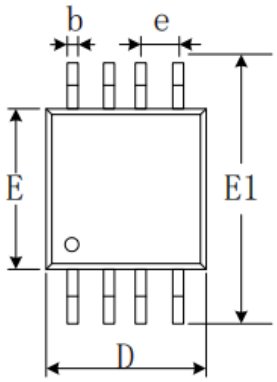
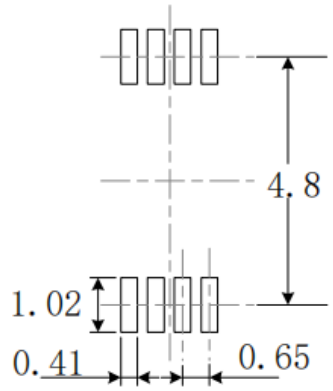




Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
c	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650(BSC)		0.026(BSC)	
e1	1.300(BSC)		0.051(BSC)	
L	0.260	0.460	0.010	0.018
L1	0.525		0.021	
θ	0 °	8 °	0 °	8 °

MSOP-8





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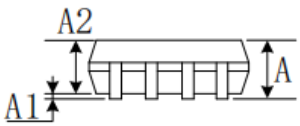
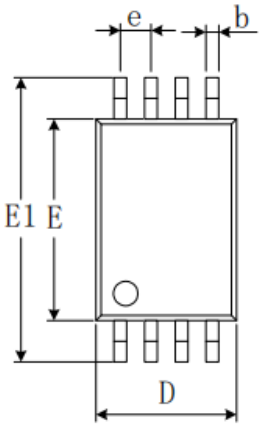
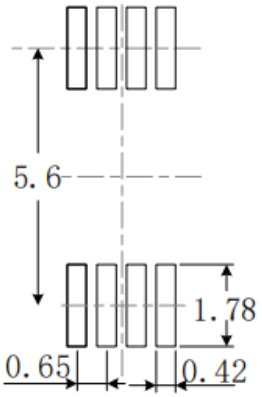


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.250	0.380	0.010	0.015
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
e	0.650(BSC)		0.026(BSC)	
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
L	0.400	0.800	0.016	0.031
θ	0°	6°	0°	6°

TSSOP-8





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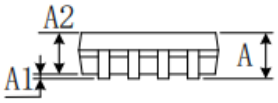
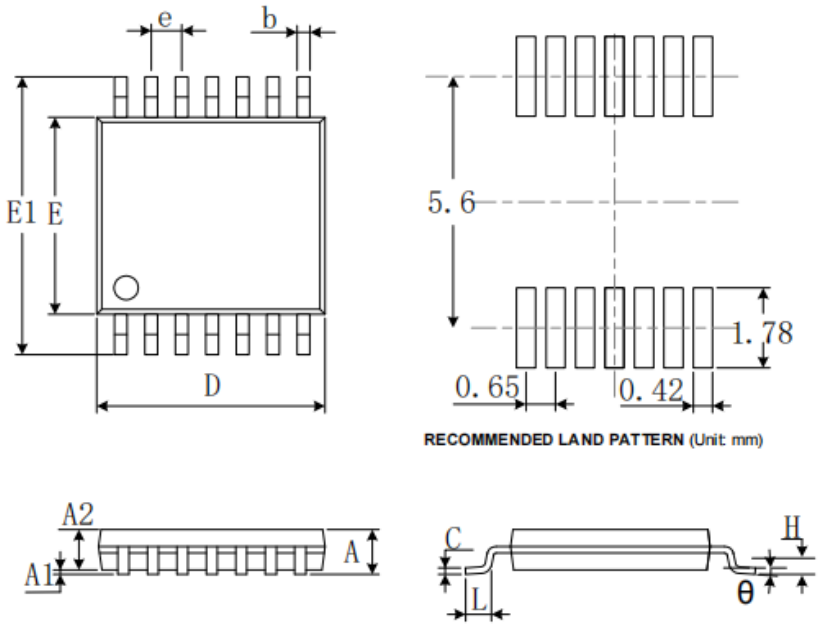


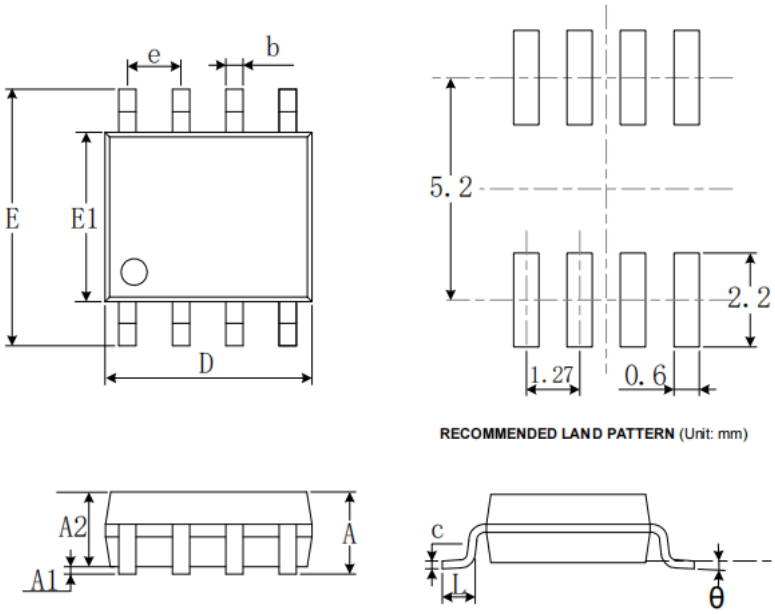
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A		1.200		0.047
A1	0.050	0.150	0.002	0.006
A2	0.800	1.050	0.031	0.041
b	0.190	0.300	0.007	0.012
c	0.090	0.200	0.004	0.008
D	2.900	3.100	0.114	0.122
E	4.300	4.500	0.169	0.177
E1	6.250	6.550	0.246	0.258
e	0.650(BSC)		0.026(BSC)	
L	0.500	0.700	0.020	0.028
H	0.25(TYP)		0.01(TYP)	
θ	1°	7°	1°	7°

TSSOP-14



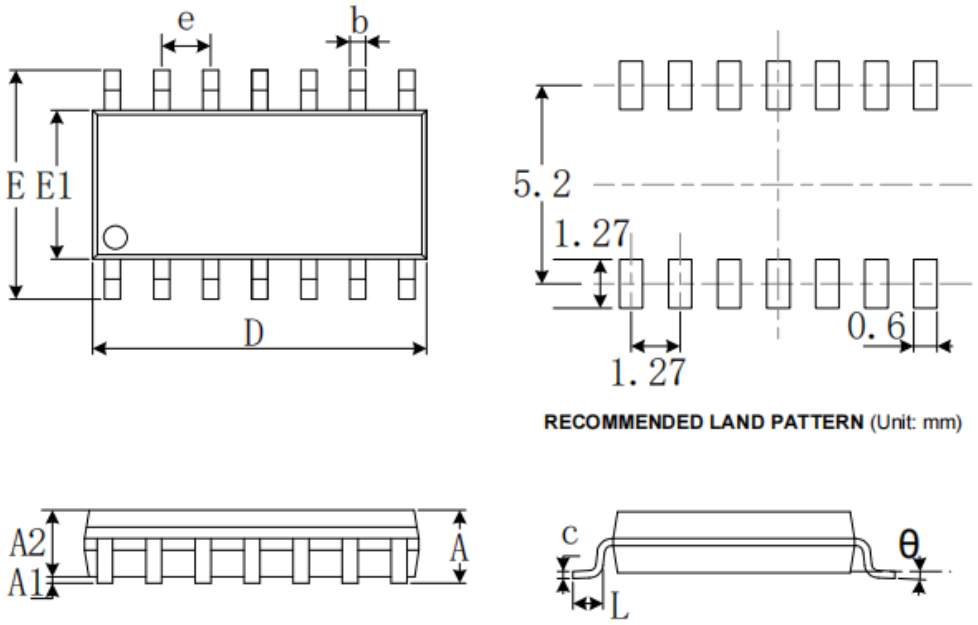
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A		1.200		0.047
A1	0.050	0.150	0.002	0.006
A2	0.800	1.050	0.031	0.041
b	0.190	0.300	0.007	0.012
c	0.090	0.200	0.004	0.008
D	4.860	5.100	0.191	0.201
E	4.300	4.500	0.169	0.177
E1	6.250	6.550	0.246	0.258
e	0.650(BSC)		0.026(BSC)	
L	0.500	0.700	0.020	0.028
H	0.25(TYP)		0.01(TYP)	
θ	1°	7°	1°	7°

SOIC-8(SOP8)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.800	5.000	0.189	0.197
e	1.270(BSC)		0.050(BSC)	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0 °	8 °	0 °	8 °

SOIC-14(SOP14)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.310	0.510	0.012	0.020
c	0.100	0.250	0.004	0.010
D	8.450	8.850	0.333	0.348
e	1.270(BSC)		0.050(BSC)	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0 °	8 °	0 °	8 °