



AOS
SEMICONDUCTOR

产品规格说明书

Product Data Sheet

AOS224Xx

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电源管理IC



通信接口芯片



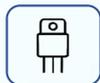
二三极管



LDO稳压器



逻辑器件



MOSFETs



运算放大器



显示驱动



MCU单片机



光电器件



DESCRIPTIONS

The AOS221, AOS222, AOS224, AOS221S, AOS222S 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 (500kHz) and slew rate of 0.18V/us. The op-amps are unity gain stable and feature an ultra-low input bias current. These devices are ideal for sensor interfaces, active filters and portable applications. The AOS221S, AOS222S include a shutdown mode. Under logic control, the amplifiers can be switched from normal operation to a standby current that is less than 1uA. The AOS221, AOS222, AOS224, AOS221S, AOS222S families of operational amplifiers are specified at the full temperature range of -40°C to +125°C under single or dual power supplies of 2.5V to 5.5V.

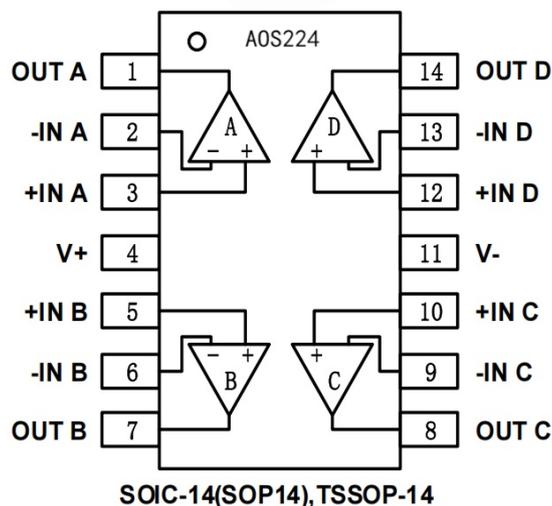
FEATURES

- GAIN BANDWIDTH: 500kHz
- RAIL-TO-RAIL INPUT AND OUTPUT 0.8mV Typical Vos
- INPUT VOLTAGE RANGE: -0.1V to +5.6V with Vs= 5.5V
- SUPPLY RANGE: +2.5V to +5.5V
- SHUTDOWN: AOS221S/AOS224S
- SPECIFIED UP TO +125°C
- Micro SIZE PACKAGES: SOIC-14(SOP14), TSSOP-14

APPLICATIONS

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

PIN CONFIGURATIONS





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
MSOP-10, SOIC-8	150°C/W
SOIC-14, TSSOP-14.....	100°C/W
Lead Temperature (Soldering, 10s)	260°C
ESD Susceptibility	
HBM	5000V
MM	400V



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.

(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.

PACKAGE/ORDERING INFORMATION

PRODUCT	ORDERING NUMBER	TEMPERATURE RANGE	PACKAGE LEAD	PACKAGE MARKING	PACKAGEOPTION
AOS224	AOS224XP	-40 ~125	SOIC-14(SOP14)	AOS224	Tape and Reel , 2500
	AOS224XQ	-40 ~125	TSSOP-14	AOS224	Tape and Reel , 3000



ELECTRICAL CHARACTERISTICS

(At $T_A = +25^\circ\text{C}$, $V_S = 5\text{V}$, $R_L = 200\text{k}$ connected to $V_S/2$, and $V_{OUT} = V_S/2$, unless otherwise noted.)

PARAMETER		CONDITIONS	T_J	AOS224			UNITS
				MIN	TYP	MAX	
POWER SUPPLY							
V_S	Operating Voltage Range		25	2.5		5.5	V
I_Q	Quiescent Current/ Amplifier		25		18	32	μA
PSRR	Power-Supply Rejection Ratio	$V_S = 2.5\text{V to } 5.5\text{V}$, $V_{cm} = (V_-) + 0.5\text{V}$	25	73	90		dB
			-40 to 125	67			
INPUT							
V_{os}	Input Offset Voltage		25		0.8	3.5	mV
V_{osTC}	Input Offset Voltage Average Drift	-40 to 125			2.9		$\mu\text{V/}$
I_B	Input Bias Current		25		1	10	pA
I_{os}	Input Offset Current		25		1	10	pA
V_{cm}	Common-Mode Voltage Range	$V_S = 5.5\text{V}$	25	-0.1		5.6	V
CMRR	Common-Mode Rejection Ratio	$V_S = 5.5\text{V}$, $V_{cm} = -0.1\text{V to } 4\text{V}$	25	74	90		dB
			-40 to 125	70			
		$V_S = 5.5\text{V}$, $V_{cm} = -0.1\text{V to } 5.6\text{V}$	25	62	75		
			-40 to 125	60			
OUTPUT							
AOL	Open-Loop Voltage Gain	$R_L = 2\text{K}$, $V_o = 0.15\text{V to } 4.85\text{V}$	25	88	98		dB
			-40 to 125	82			
		$R_L = 10\text{K}$, $V_o = 0.05\text{V to } 4.95\text{V}$	25	92	110		
			-40 to 125	88			
	Output Swing From Rail	$R_L = 2\text{K}$	25		26		mV
		$R_L = 10\text{K}$			6		
I_{out}	Output Current Source		25		27		mA
FREQUENCY RESPONSE							
SR	Slew Rate		25		0.18		V/ μs
GBP	Gain-Bandwidth Product		25		500		kHz
PM	Phase Margin		25		64		$^\circ$
t_s	Setting Time, 0.1%				14		μs
	Overload Recovery Time	$V_{IN} = \text{Gain} \cdot V_S$			5		μs

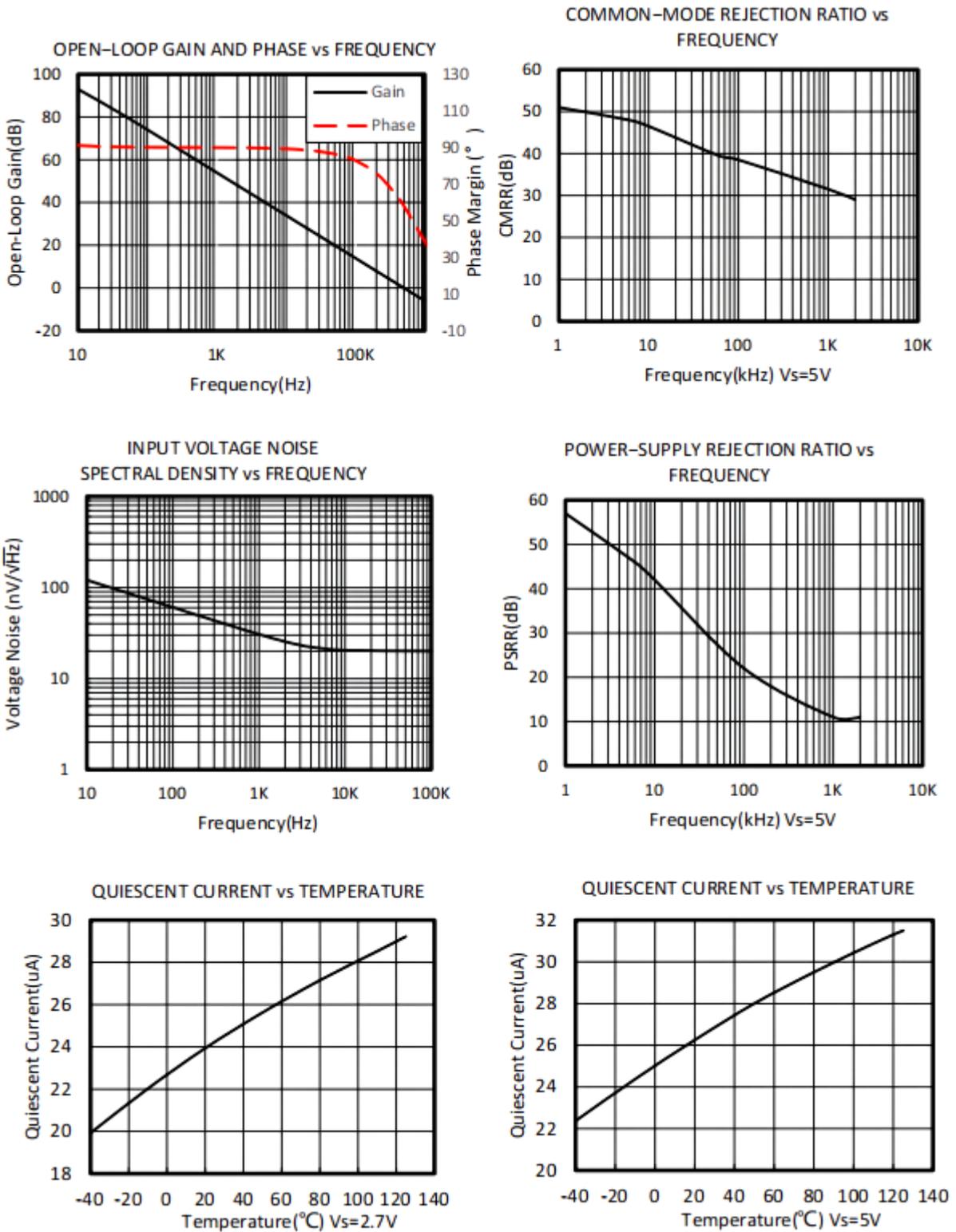


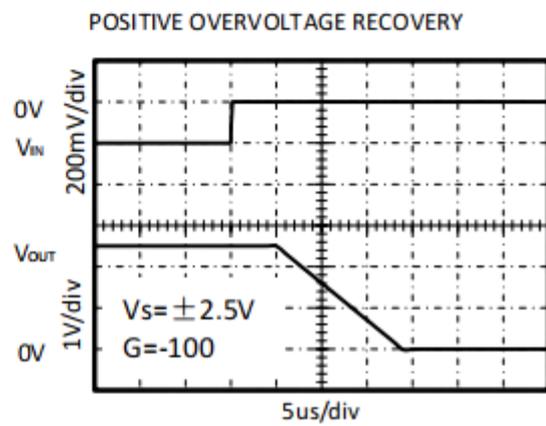
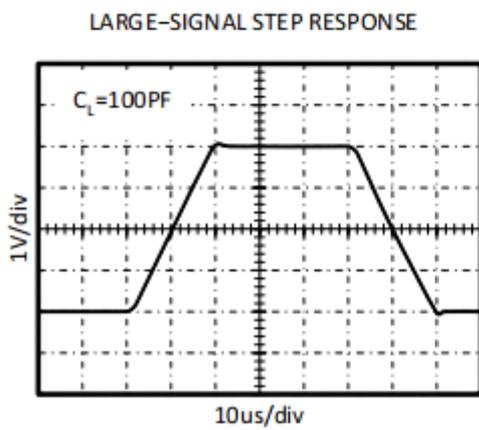
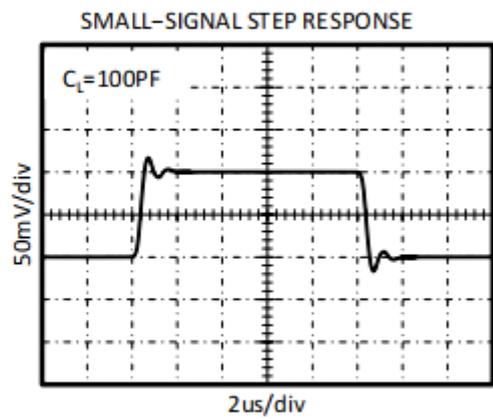
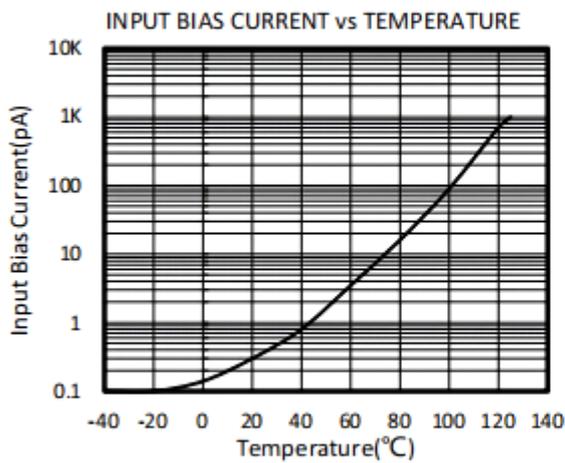
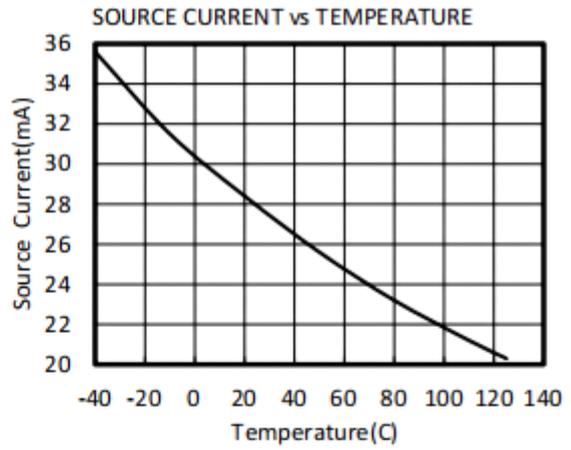
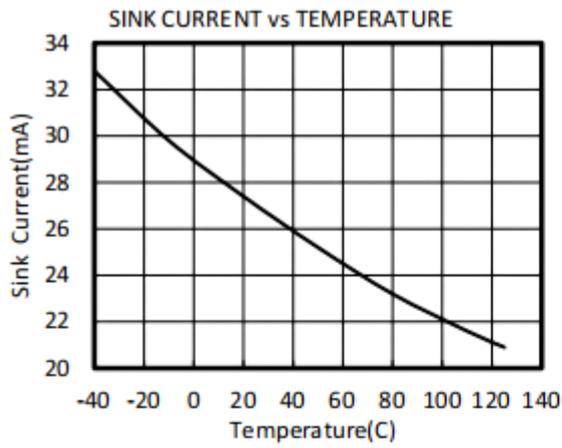
NOISE							
en	Input Voltage Noise Density	f = 1KHz	25		77		nV/ Hz
		f = 10KHz	25		39		nV/ Hz
ENABLE/SHUTDOWN (AOS221S, AOS224S)							
I _{Q(OFF)}	Supply Current in Shutdown		25		<1		uA
t _{OFF}			25		3		us
t _{ON}			25		20		us
V _L	Shut Down		25	V-		(V-) +0.8	V
V _H	Amplifier Is Active		25	(V-) +2		V+	V

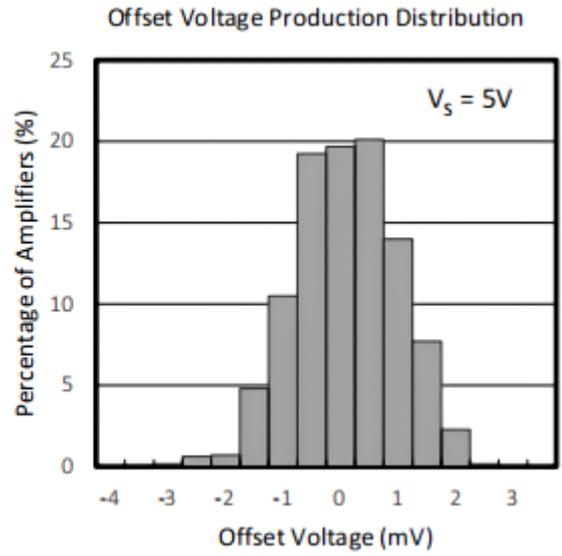
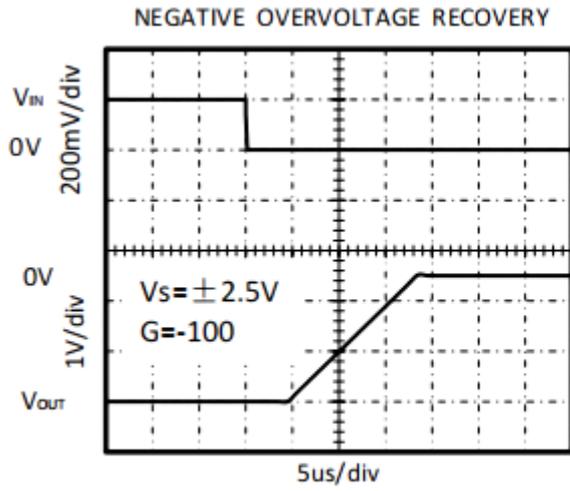


TYPICAL CHARACTERISTICS

At $T_A = +25^\circ\text{C}$, $V_S = 5\text{V}$, $R_L = 200\text{k}$ connected to $V_S/2$, $V_{OUT} = V_S/2$, unless otherwise noted.









APPLICATION NOTES

The AOS221, AOS222, AOS224, AOS221S, AOS222S are high precision, rail-to-rail operational amplifiers that can be run from a single-supply voltage 2.5V to 5.5V(±1.25V 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.

AOS121S/AOS224 ENABLE FUNCTION

The AOS221S/AOS224 includes a shutdown mode.

Under logic control, the amplifiers can be switched from normal mode to a standby current of 1uA.

When the Enable pin is connected to high, the amplifier is active. Connecting Enable low disables the amplifier, and places the amplifier, and place the output in a high-impedance state.

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 Figure 2

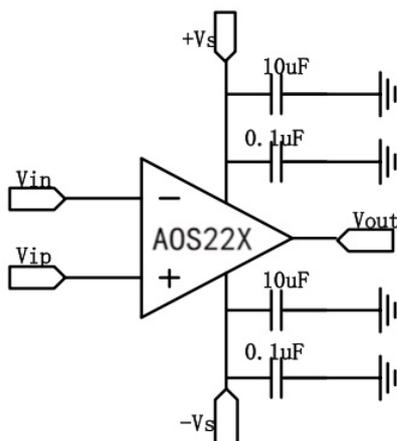


Figure1. Amplifier with Bypass Capacitors

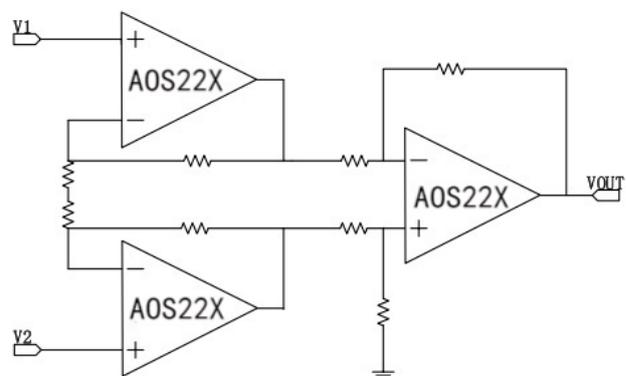
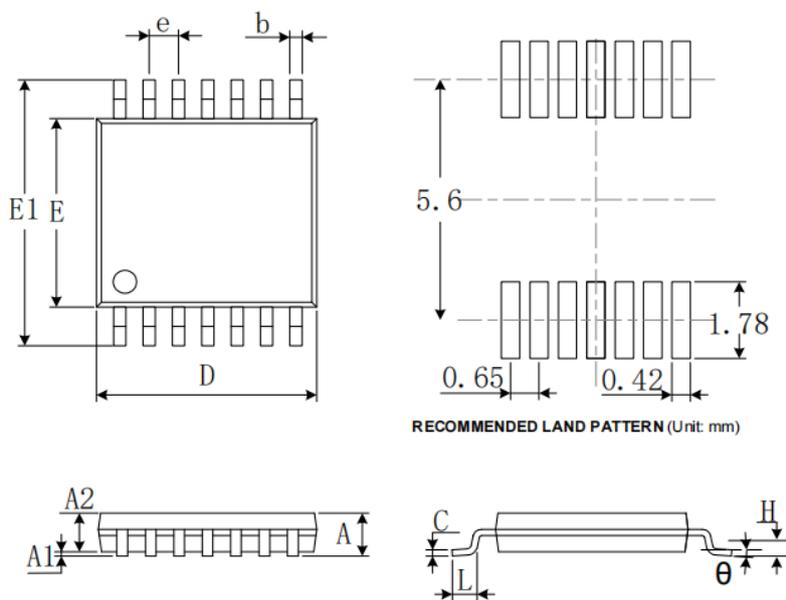


Figure2. Amplifier instrumentation amplifier



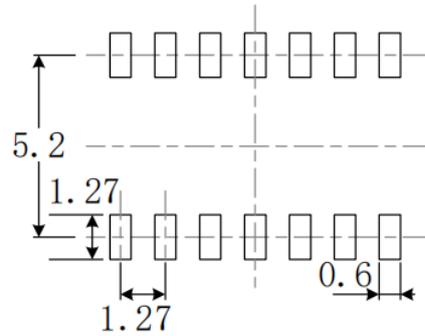
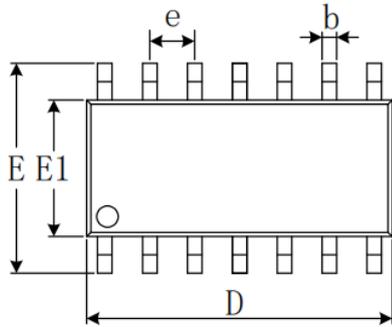
PACKAGE OUTLINE DIMENSIONS
TTSOP14



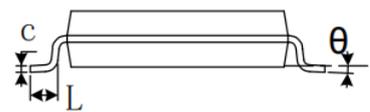
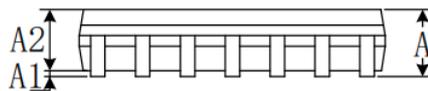
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A		1.200		0.047
A1	0.050	0.150	0.002	0.006
A2	0.800	1.050	0.031	0.041
b	0.190	0.300	0.007	0.012
c	0.090	0.200	0.004	0.008
D	4.860	5.100	0.191	0.201
E	4.300	4.500	0.169	0.177
E1	6.250	6.550	0.246	0.258
e	0.650(BSC)		0.026(BSC)	
L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



S01C-14(SOP14)



RECOMMENDED LAND PATTERN (Unit: mm)



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
	0°	8°	0°	8°