



AOS
SEMICONDUCTOR

产品规格说明书

Product Data Sheet

AOS72xx

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电源管理IC



通信接口芯片



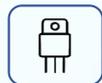
二三极管



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 AOS72X 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 (10MHz) and slew rate of 7V/us. The op-amps are unity gain stable and feature an ultra-low input bias current.

The devices are ideal for sensor interfaces, active filters and portable applications. The AOS721S, AOS722S 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 AOS72X 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

- HIGH GAIN BANDWIDTH: 10MHz
- RAIL-TO-RAIL INPUT AND OUTPUT $\pm 0.5\text{mV}$ Typical V_{os}
- INPUT VOLTAGE RANGE: -0.1V to +5.6V with $V_s = 5.5\text{V}$
- SUPPLY RANGE: +2.5V to +5.5V
- SHUTDOWN: AOS721S/AOS722S
- SPECIFIED UP TO +125°C
- Micro SIZE PACKAGES: SOT23-5, SOT23-6

APPLICATIONS

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

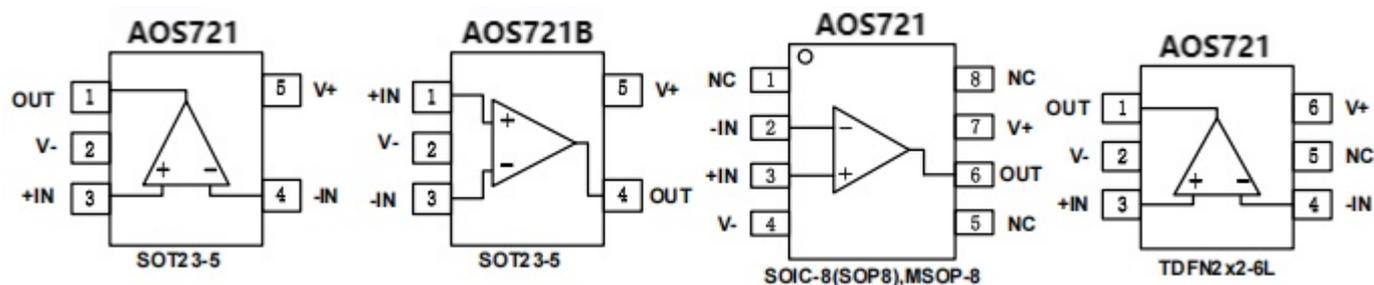
Device Information⁽¹⁾

PART NUMBER	PACKAGE	BODY SIZE (NOM)
AOS721	SOT23-5	2.90mm × 1.60mm
	SOT23-6	2.90mm × 1.60mm
	TDFN2 × 2-6L	2.00mm × 2.00mm
	SOIC-8(SOP8)	4.90mm × 3.90mm
	MSOP-8	3.00mm × 3.00mm
AOS722	SOIC-8(SOP8)	4.90mm × 3.90mm
	MSOP-8	3.00mm × 3.00mm
	MSOP-10	3.00mm × 3.00mm
	TDFN2 × 2-8L	2.00mm × 2.00mm
	TDFN3 × 3-8L (0303x0.75-0.65)	3.00mm × 3.00mm
	TDFN3 × 3-8L (0303x0.75-0.5)	3.00mm × 3.00mm
AOS724	SOIC-14(SOP14)	8.65mm × 3.90mm
	TSSOP-14	5.00mm × 4.40mm

(1)For all available packages, see the orderable addendum at the end of the data sheet.



Pin Configuration and Functions (Top View)

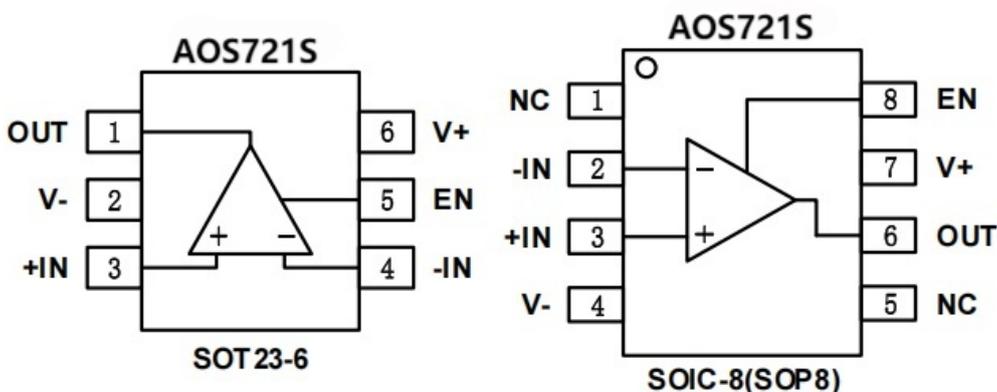


Pin Description

NAME	PIN				I/O	DESCRIPTION
	AOS721	AOS721B	AOS721	AOS721		
	SOT23-5	SOT23-5	SOIC-8(SOP8)/MSOP8	TDFN2x2-6L		
-IN	4	3	2	4	I	Negative (inverting) input
+IN	3	1	3	3	I	Positive (noninverting) input
NC	-	-	1, 5, 8	5	-	No internal connection (can be left floating)
OUT	1	4	6	1	O	Output
V-	2	2	4	2	-	Negative (lowest) power supply
V+	5	5	7	6	-	Positive (highest) power supply



Pin Configuration and Functions (Top View)

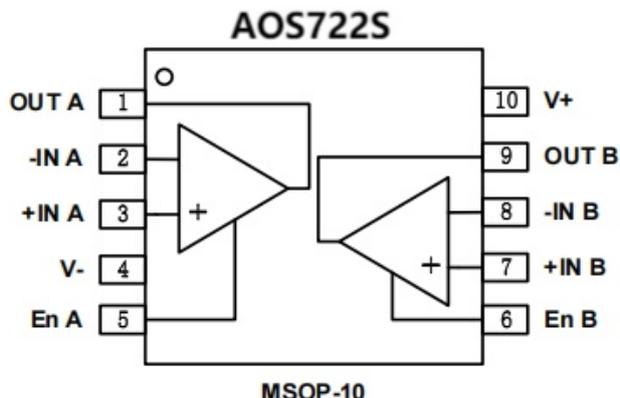
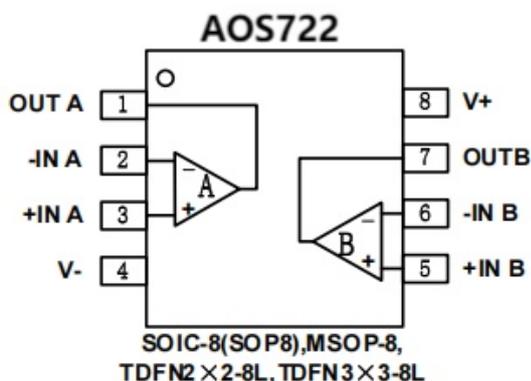


Pin Description

NAME	PIN		I/O	DESCRIPTION
	AOS722	AOS722S		
	SOIC-8(SOP8)/MSOP-8/ TDFN2×2-8L/TDFN3×3-8L	MSOP-10		
-INA	2	2	I	Inverting input, channel A
+INA	3	3	I	Noninverting input, channel A
-INB	6	8	I	Inverting input, channel B
+INB	5	7	I	Noninverting input, channel B
OUTA	1	1	O	Output, channel A
OUTB	7	9	O	Output, channel B
EnA	-	5	I	Enable pin, channel A. This pin turns the regulator on or off. Low = disabled, high = normal operation (pin must be driven)
EnB	-	6	I	Enable pin, channel B. This pin turns the regulator on or off. Low = disabled, high = normal operation (pin must be driven)
V-	4	4	-	Negative (lowest) power supply
V+	8	10	-	Positive (highest) power supply



Pin Configuration and Functions (Top View)

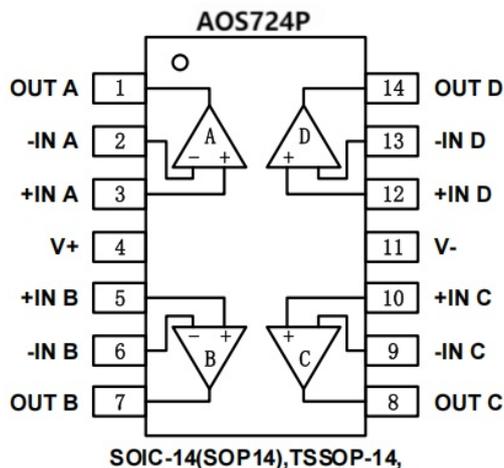


Pin Description

NAME	PIN		I/O	DESCRIPTION
	AOS722	AOS722S		
	SOIC-8(SOP8)/MSOP-8/ TDFN2x2-8L/TDFN3x3-8L	MSOP-10		
-INA	2	2	I	Inverting input, channel A
+INA	3	3	I	Noninverting input, channel A
-INB	6	8	I	Inverting input, channel B
+INB	5	7	I	Noninverting input, channel B
OUTA	1	1	O	Output, channel A
OUTB	7	9	O	Output, channel B
EnA	-	5	I	Enable pin, channel A. This pin turns the regulator on or off. Low = disabled, high = normal operation (pin must be driven)
EnB	-	6	I	Enable pin, channel B. This pin turns the regulator on or off. Low = disabled, high = normal operation (pin must be driven)
V-	4	4	-	Negative (lowest) power supply
V+	8	10	-	Positive (highest) power supply



Pin Configuration and Functions (Top View)



Pin Description

NAME	PIN	I/O	DESCRIPTION
	SOIC-14(SOP14)/TSSOP-14		
-INA	2	I	Inverting input, channel A
+INA	3	I	Noninverting input, channel A
-INB	6	I	Inverting input, channel B
+INB	5	I	Noninverting input, channel B
-INC	9	I	Inverting input, channel C
+INC	10	I	Noninverting input, channel C
-IND	13	I	Inverting input, channel D
+IND	12	I	Noninverting input, channel D
OUTA	1	O	Output, channel A
OUTB	7	O	Output, channel B
OUTC	8	O	Output, channel C
OUTD	14	O	Output, channel D
V-	11	-	Negative (lowest) power supply
V+	4	-	Positive (highest) power supply

**SPECIFICATIONS****Absolute Maximum Ratings**Over operating free-air temperature range(unless otherwise noted)⁽¹⁾

		MIN	MAX	UNIT
Voltage	Supply, $V_S=(V_+) - (V_-)$		7	V
	Signal input pin ⁽²⁾	(V ₋)-0.5	(V ₊) +0.5	
	Signal output pin ⁽³⁾	(V ₋)-0.5	(V ₊) +0.5	
Current	Signal input pin ⁽²⁾	-10	10	mA
	Signal output pin ⁽³⁾	-100	100	mA
	Output short-circuits ⁽⁴⁾	Continuous		
Temperature	Operating range, T_A	-40	125	
	Junction, T_J		150	
	Storage, T_{stg}	-65	150	

- (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.
- (3) Output terminals are diode-clamped to the power-supply rails. Output signals that can swing more than 0.5V beyond the supply rails should be current-limited to ± 100 mA or less.
- (4) Short-circuit to ground, one amplifier per package.



ESD Ratings

			VALUE	UNIT
V _(ESD)	Electrostatic discharge	Human-body model (HBM)	± 5000	V
		Machine Model (MM)	± 400	

Recommended Operating Conditions

Over operating free-air temperature range(unless otherwise noted)

		MIN	NOM	MAX	UNIT
Supply voltage , V _s =(V ₊) -(V ₋)	Single-supply	2.5		5.5	V
	Dual-supply	± 1.25		± 2.75	

Thermal Information: AOS721

THERMAL METRIC		AOS721				UNIT
		5PINS	6PINS	8PINS		
		SOT23-5	SOT23-6	SOIC-8	MSOP8	
R _{JA}	Junction-to-ambient thermal resistance	273.8	187.3	116	165	/W
R _{JC(top)}	Junction-to-case(top) thermal resistance	126.8	126.5	60	53	/W
R _{JB}	Junction-to-board thermal resistance	85.9	32.6	56	87	/W
J _T	Junction-to-top characterization parameter	10.9	24.1	12.8	4.9	/W
J _B	Junction-to-board characterization parameter	84.9	32.1	98.3	85	/W
R _{JC(bot)}	Junction-to-case(bottom) thermal resistance	N/A	N/A	N/A	N/A	/W



Thermal Information: AOS722

THERMAL METRIC		AOS722					UNIT
		8PINS					
		SOIC-8	MSOP-8	MSOP-10	TDFN2×2-8L	TDFN3×3-8L	
R _{JA}	Junction-to-ambient thermal resistance	116	165	169.5	80.1	66.9	/W
R _{JC(top)}	Junction-to-case(top) thermal resistance	60	53	84.1	100	54.5	/W
R _{JB}	Junction-to-board thermal resistance	56	87	113	45	40.4	/W
J _T	Junction-to-top characterization parameter	12.8	4.9	15.8	6.8	1.9	/W
J _B	Junction-to-board characterization parameter	98.3	85	111.6	45.2	40.4	/W
R _{JC(bot)}	Junction-to-case(bottom) thermal resistance	N/A	N/A	N/A	22.7	10.8	/W

Thermal Information: AOS724

THERMAL METRIC		AOS724		UNIT
		14PINS		
		SOIC-14	TSSOP-14	
R _{JA}	Junction-to-ambient thermal resistance	83.8	120.8	/W
R _{JC(top)}	Junction-to-case(top) thermal resistance	70.7	34.3	/W
R _{JB}	Junction-to-board thermal resistance	59.5	62.8	/W
J _T	Junction-to-top characterization parameter	11.6	1	/W
J _B	Junction-to-board characterization parameter	37.7	56.5	/W
R _{JC(bot)}	Junction-to-case(bottom) thermal resistance	N/A	N/A	/W



PACKAGE/ORDERING INFORMATION

Orderable Device	Package Type	Pin	Channel	Op Temp()	Device Marking ⁽¹⁾	Package Qty
AOS721XF	SOT23-5	5	1	-40 ~125	721	Tape and Reel , 3000
AOS721BXF	SOT23-5	5	1	-40 ~125	721B	Tape and Reel , 3000
AOS721XK	S01C-8(SOP8)	8	1	-40 ~125	AOS721	Tape and Reel , 4000
AOS721XM	MSOP-8	8	1	-40 ~125	AOS721	Tape and Reel , 4000
AOS721XTDE6	TDFN2X2-6L	6	1	-40 ~125	721	Tape and Reel , 3000
AOS721SXK	S01C-8(SOP8)	8	1	-40 ~125	AOS721S	Tape and Reel , 4000
AOS721SXH	SOT23-6	6	1	-40 ~125	721S	Tape and Reel , 3000
AOS722XK	S01C-8(SOP8)	8	2	-40 ~125	AOS722	Tape and Reel , 4000
AOS722XM	MSOP-8	8	2	-40 ~125	AOS722	Tape and Reel , 4000
AOS722XTDE8	TDFN2x2-8L	8	2	-40 ~125	722	Tape and Reel , 3000
AOS722XTDC8	TDFN3x3-8L (0303X0.75-0.65)	8	2	-40 ~125	AOS722	Tape and Reel , 5000
AOS722XTDC8-B	TDFN3x3-8L (0303X0.75-0.5)	8	2	-40 ~125	AOS722B	Tape and Reel , 5000
AOS722SXN	MSOP-10	10	2	-40 ~125	AOS722S	Tape and Reel , 4000
AOS724XP	S01C-14(SOP14)	14	4	-40 ~125	AOS724	Tape and Reel , 4000
AOS724XQ	TSSOP-14	14	4	-40 ~125	AOS724	Tape and Reel , 4000

NOTE:

(1)There may be additional marking, which relates to the lot trace code information(data code and vendor code) , the logo or the environmental category on the device.



ELECTRICAL CHARACTERISTICS

(At $T_A = +25^{\circ}\text{C}$, $V_S = 5\text{V}$, $R_L = 10\text{k}$, connected to $V_S/2$, and $V_{OUT} = V_S/2$, unless otherwise noted.)

PARAMETER		CONDITIONS	T_J	AOS721S, AOS722S, AOS721, AOS722, AOS724			
				MIN	TYP	MAX	UNIT
POWER SUPPLY							
V_S	Operating Voltage Range		25	2.5		5.5	V
I_Q	Quiescent Current/ Amplifier		25		1.15	1.4	mA
PSRR	Power-Supply Rejection Ratio	$V_S = 2.5\text{V to } 5.5\text{V}$, $V_{CM} = (V_-) + 0.5\text{V}$	25	75	85		dB
			-40 to 125	65			
INPUT							
V_{os}	Input Offset Voltage		25	-2.5	± 0.5	2.5	mV
$V_{os\ TC}$	Input Offset Voltage Average Drift	-40 to 125			± 2.6		$\mu\text{V/}$
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	73	85		dB
			-40 to 125	67			
		$V_S = 5.5\text{V}$, $V_{CM} = -0.1\text{V to } 5.6\text{V}$	25	60	75		
			-40 to 125	57			
OUTPUT							
AOL	Open-Loop Voltage Gain	$R_L = 2\text{K}$, $V_O =$ 0.15V to 4.85V	25	86	95		dB
			-40 to 125	65			
		$R_L = 10\text{K}$, $V_O = 0.05\text{V to } 4.95\text{V}$	25	90	96		
			-40 to 125	66			
	Output Swing from Rail	$R_L = 2\text{K}$	25		52		mV
		$R_L = 10\text{K}$			7		
I_{out}	Output Short-Circuit Current		25		70		mA
FREQUENCY RESPONSE							
SR	Slew Rate		25		7		V/ μs
GBP	Gain-Bandwidth Product		25		10		MHz
PM	Phase Margin		25		62		$^{\circ}$
t_s	Setting Time, 0.1%				0.2		μs
	Overload Recovery Time	$V_{IN} = \text{Gain } V_S$			0.35		μs

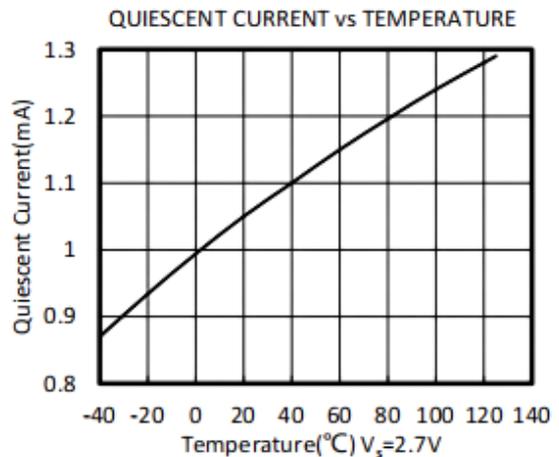
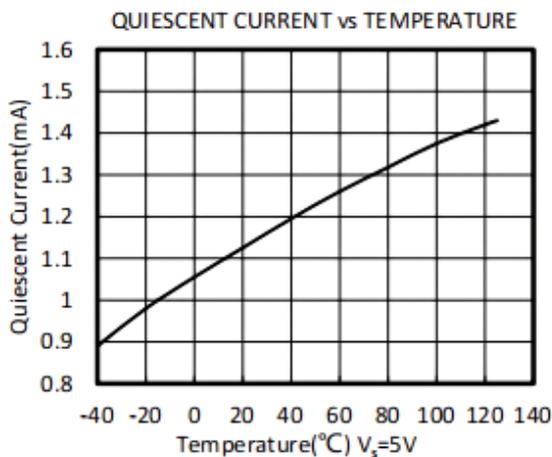
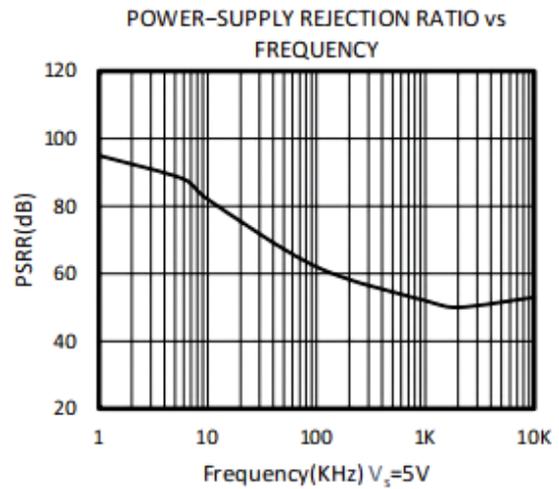
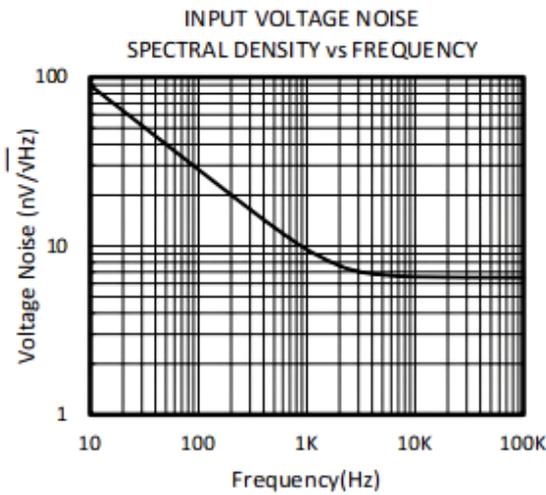
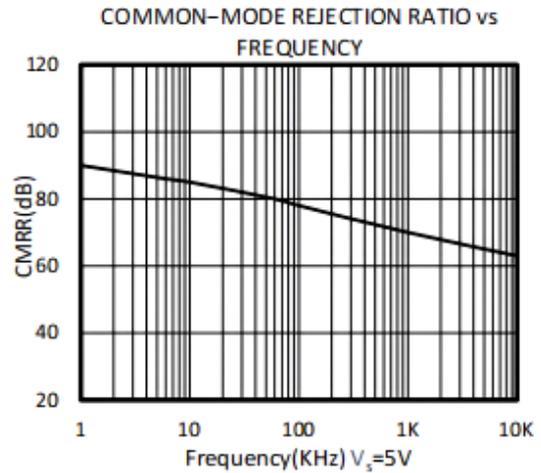
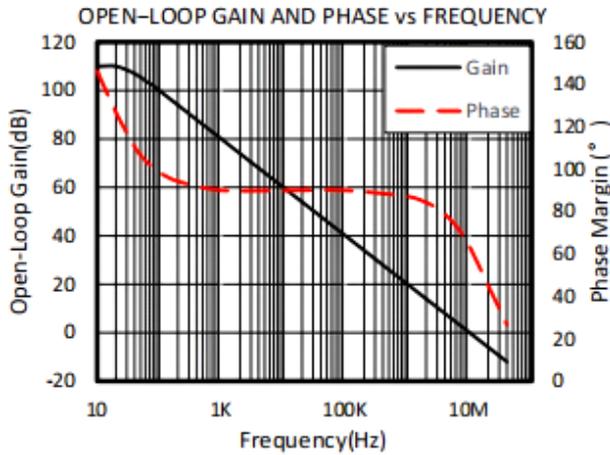


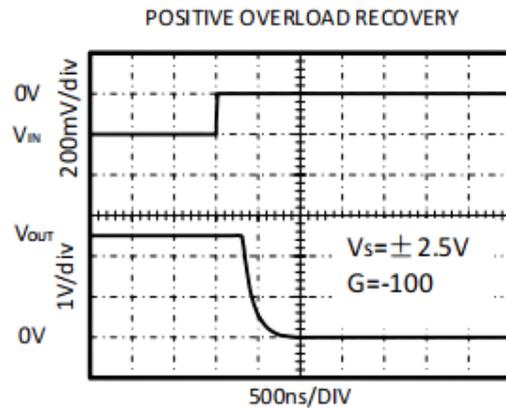
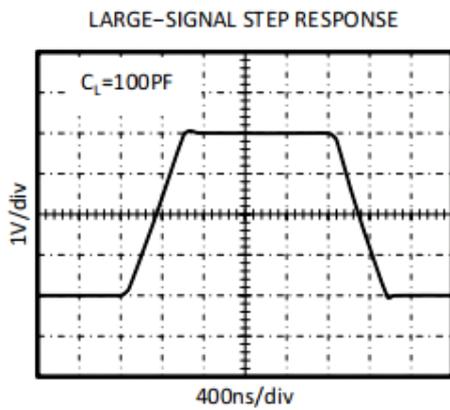
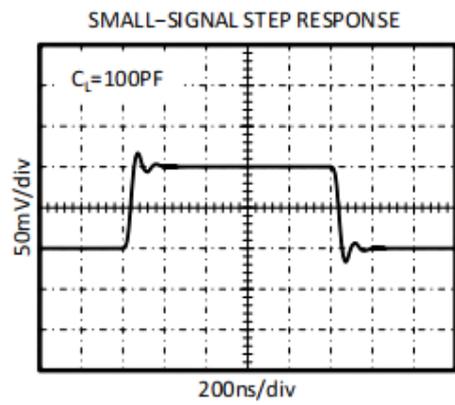
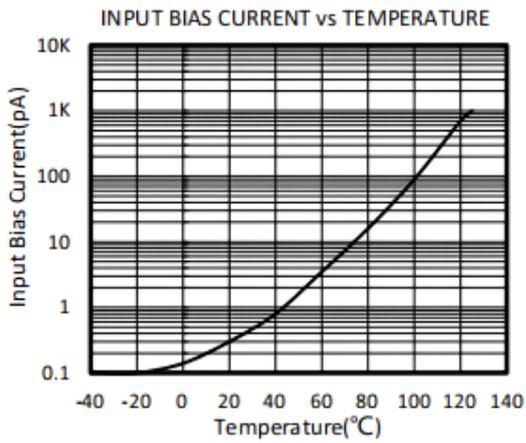
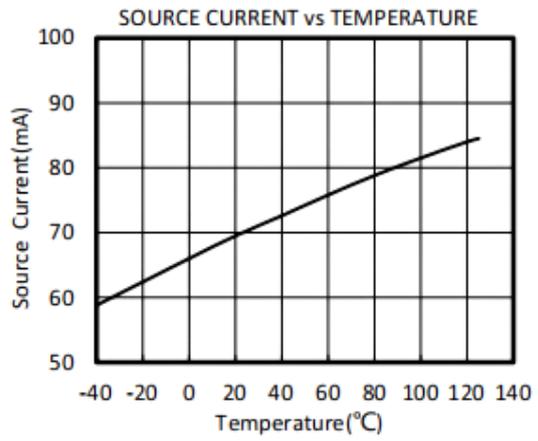
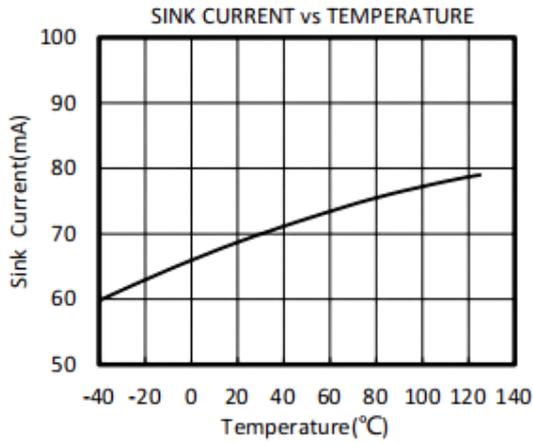
NOISE							
en	Input Voltage Noise Density	f = 1KHz	25		9.5		nV/ Hz
		f = 10KHz	25		6.5		nV/ Hz
ENABLE/SHUTDOWN (AOS721S, AOS722S)							
I _{Q(OFF)}	Supply Current in Shutdown		25		<1		uA
t _{OFF}			25		3		us
t _{ON}			25		20		us
V _L	Shut Down		25	V-		(V-) +0.8	V
V _H	Amplifier Is Active		25	(V-) +2		V+	V

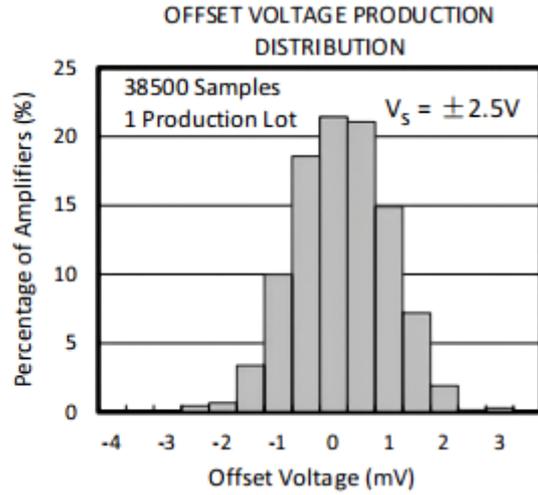
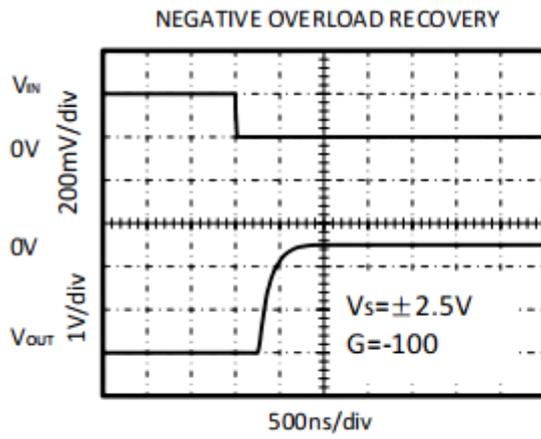


TYPICAL CHARACTERISTICS

At $T_A = +25^\circ\text{C}$, $V_s = 5\text{V}$, $R_L = 10\text{k}$ connected to $V_s/2$, $V_{out} = V_s/2$, unless otherwise noted.









Detailed Description

Overview

The AOS721, AOS722, AOS724, AOS721S, AOS722S are high precision, rail-to-rail operational amplifiers that can be run from a single-supply voltage 2.5V to 5.5V ($\pm 1.25V$ to $\pm 2.75V$). 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 0.1 μ F capacitor placed closely across the supply pins.

Phase Reversal Protection

The AOS72X family has internal phase-reversal protection. Many op amps exhibit phase reversal when the input is driven beyond the linear common-mode range. This condition is most often encountered in noninverting circuits when the input is driven beyond the specified common-mode voltage range, causing the output to reverse into the opposite rail. The input of the AOS72X prevents phase reversal with excessive common-mode voltage. Instead, the appropriate rail limits the output voltage. This performance is shown in figure 1.



Figure 1. Output Waveform Devoid of Phase Reversal During an Input Overdrive Condition

EMI Rejection Ratio (EMIRR)

The electromagnetic interference (EMI) rejection ratio, or EMIRR, describes the EMI immunity of operational amplifiers. An adverse effect that is common to many operational amplifiers is a change in the offset voltage as a result of RF signal rectification. An operational amplifier that is more efficient at rejecting this change in offset as a result of EMI has a higher EMIRR and is quantified by a decibel value. Measuring EMIRR can be performed in many ways, but this document provides the EMIRR IN+, which specifically describes the EMIRR performance when the RF signal is applied to the noninverting input pin of the operational amplifier. In general, only the noninverting input is tested for EMIRR for the following three reasons:

- Operational amplifier input pins are known to be the most sensitive to EMI, and typically rectify RF signals better than the supply or output pins.
- The noninverting and inverting operational amplifier inputs have symmetrical physical layouts and exhibit nearly matching EMIRR performance.
- EMIRR is easier to measure on noninverting pins than on other pins because the noninverting input pin can be isolated on a printed-circuit-board (PCB). This isolation allows the RF signal to be applied directly to the noninverting input pin with no complex interactions from other components or connecting PCB traces.



Detailed Description (continued)

The EMIRR IN+ of the AOS72X is plotted versus frequency in Figure 2. If available, any dual and quad operational amplifier device versions have approximately identical EMIRR IN+ performance. The AOS72X unity-gain bandwidth is 10MHz. EMIRR performance below this frequency denotes interfering signals that fall within the operational amplifier bandwidth.

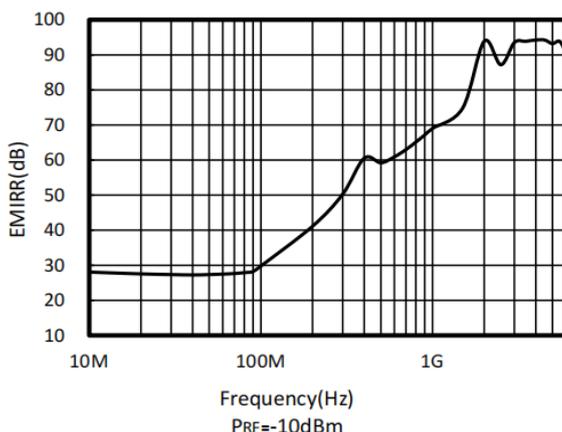


Figure 2. RS72X EMIRR vs Frequency

EMIRR IN+ Test Configuration

Figure 3 shows the circuit configuration for testing the EMIRR IN+. An RF source is connected to the operational amplifier noninverting input pin using a transmission line. The operational amplifier is configured in a unity-gain buffer topology with the output connected to a low-pass filter (LPF) and a digital multimeter (DMM). A large impedance mismatch at the operational amplifier input causes a voltage reflection; however, this effect is characterized and accounted for when determining the EMIRR IN+. The resulting dc offset voltage is sampled and measured by the multimeter. The LPF isolates the multimeter from residual RF signals that can interfere with multimeter accuracy.

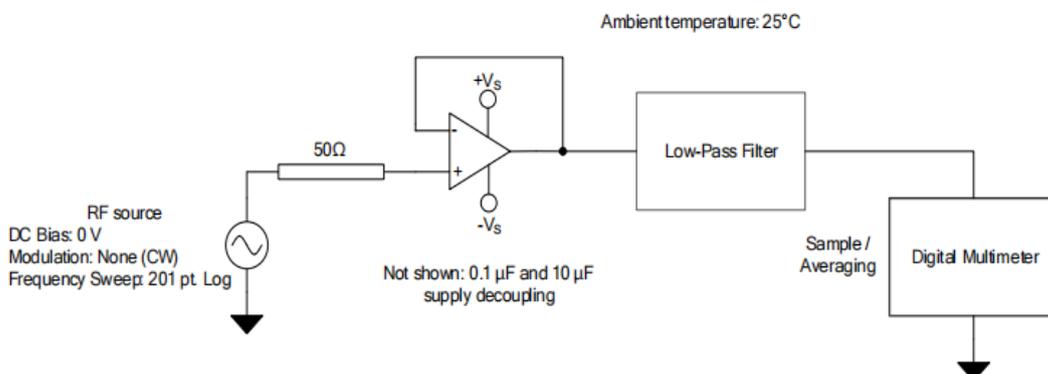


Figure 3. EMIRR IN+ Test Configuration Schematic



APPLICATION NOTE

The AOS72X 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.

Typical Applications
25-kHz Low-pass Filter

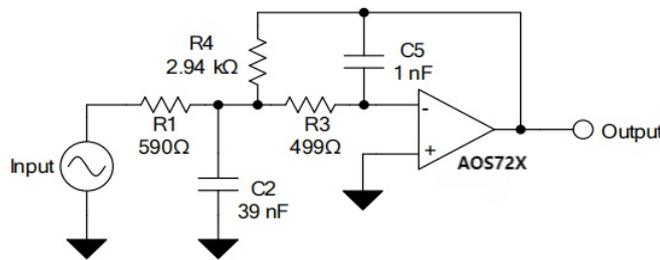


Figure 4. 25-kHz Low-Pass Filter

Design Requirements

Low-pass filters are commonly employed in signal processing applications to reduce noise and prevent aliasing.

The AOS72XP devices are ideally suited to construct high-speed, high-precision active filters. Figure 25 shows a second-order, low-pass filter commonly encountered in signal processing applications.

Use the following parameters for this design example:

- Gain = 5 V/V (inverting gain)
• Low-pass cutoff frequency = 25 kHz
• Second-order Chebyshev filter response with 3-dB gain peaking in the passband

Detailed Design Procedure

The infinite-gain multiple-feedback circuit for a low-pass network function is shown in Figure 25. Use Equation 1 to calculate the voltage transfer function.

Output/Input (s) = (-1/R1R3C2C5) / (s^2 + (s/C2)(1/R1 + 1/R3 + 1/R4) + 1/R3R4C2C5) (1)

This circuit produces a signal inversion. For this circuit, the gain at dc and the low-pass cutoff frequency are calculated by Equation 2:

Gain = R4/R1
fc = 1/(2*pi*sqrt(1/R3R4C2C5)) (2)



Application Curve

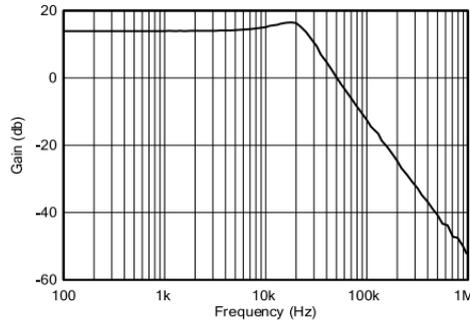


Figure 26. Low-pass filter transfer function

LAYOUT

Layout Guideline

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 0.1 μ F 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.

Layout Example

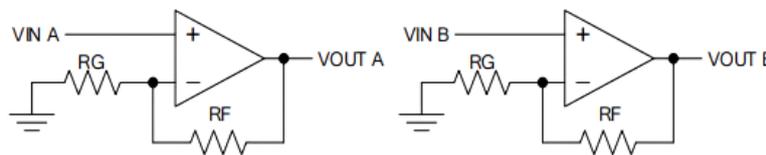


Figure 27. Schematic Representation

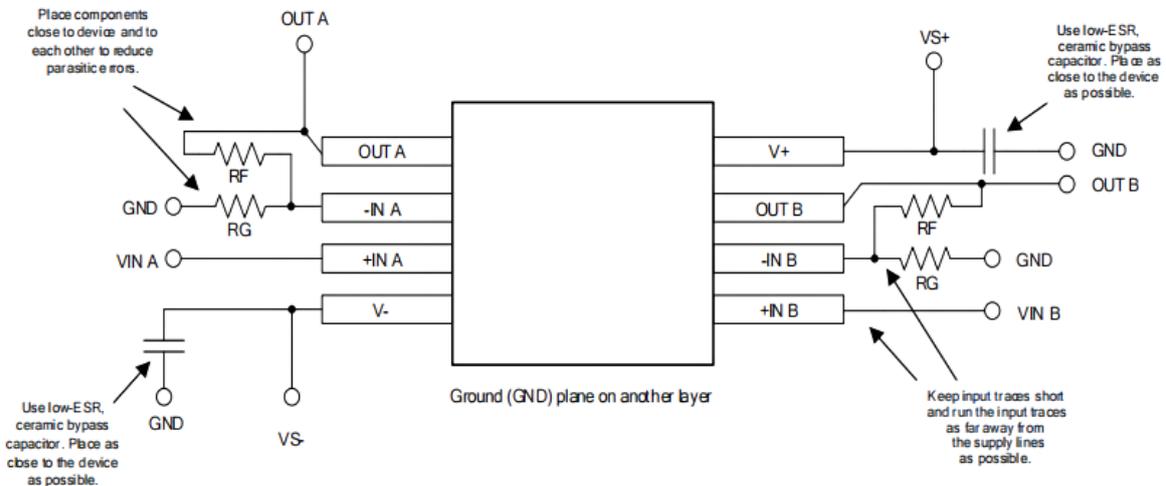
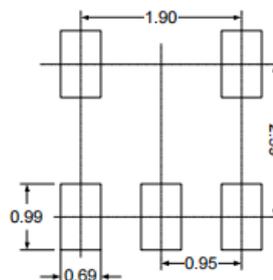
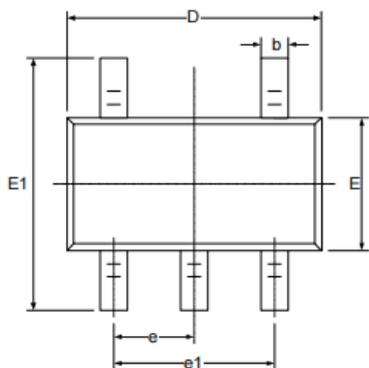


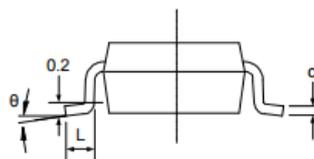
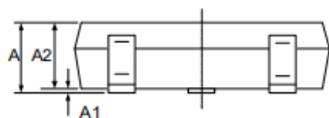
Figure 28. Layout Example



PACKAGE OUTLINE DIMENSIONS
SOT23-5



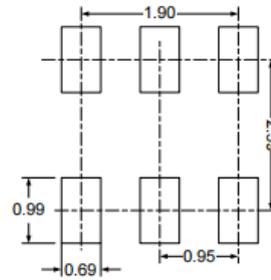
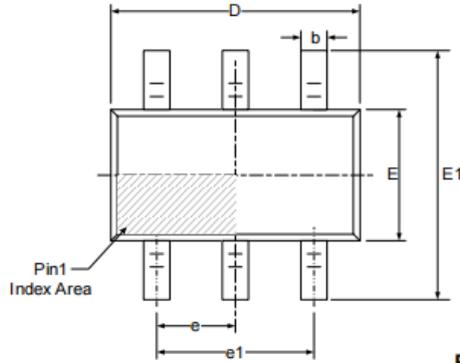
RECOMMENDED LAND PATTERN (Unit: mm)



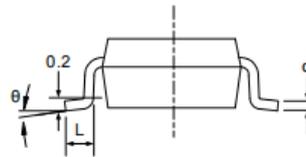
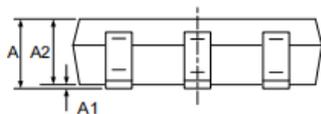
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)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



SOT23-6



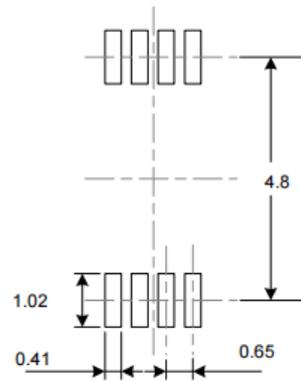
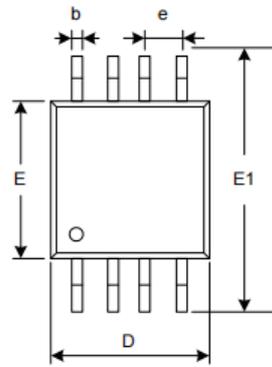
RECOMMENDED LAND PATTERN (Unit: mm)



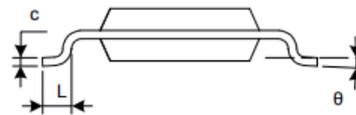
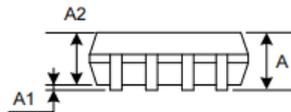
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)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



MSOP8



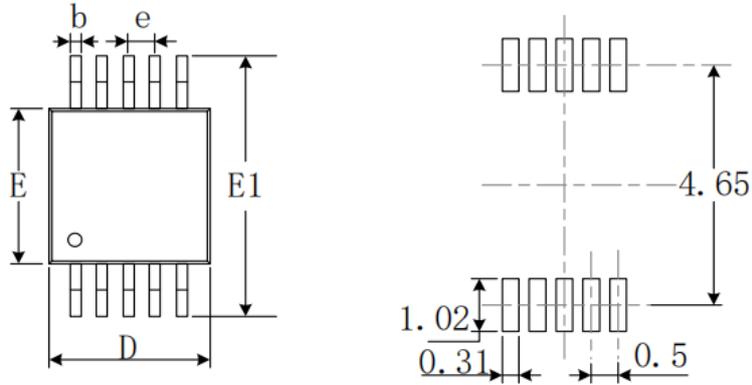
RECOMMENDED LAND PATTERN (Unit: mm)



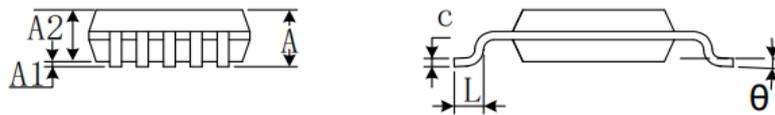
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.250	0.380	0.010	0.015
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
e	0.650(BSC)		0.026(BSC)	
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187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



MSOP10



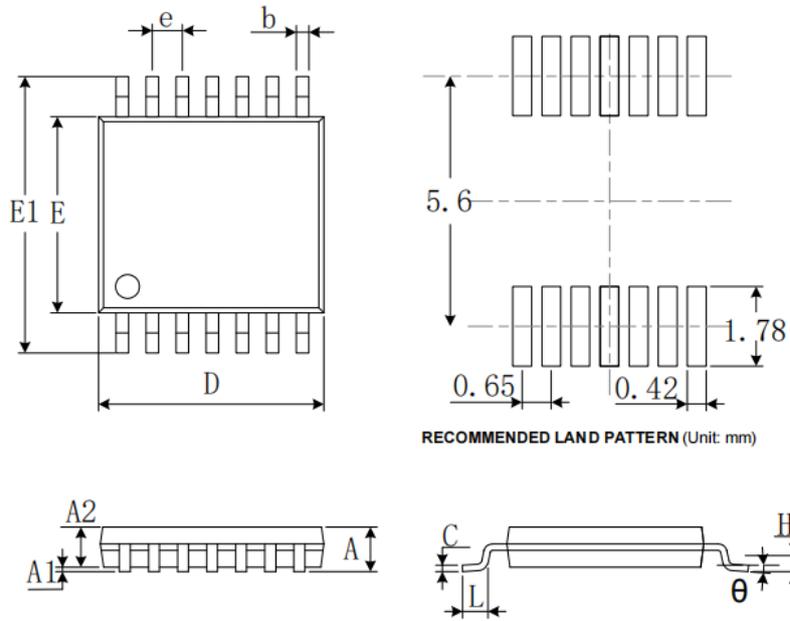
RECOMMENDED LAND PATTERN (Unit: mm)



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	0.180	0.280	0.007	0.011
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
e	0.50(BSC)		0.020(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
	0°	6°	0°	6°



TSSOP-14

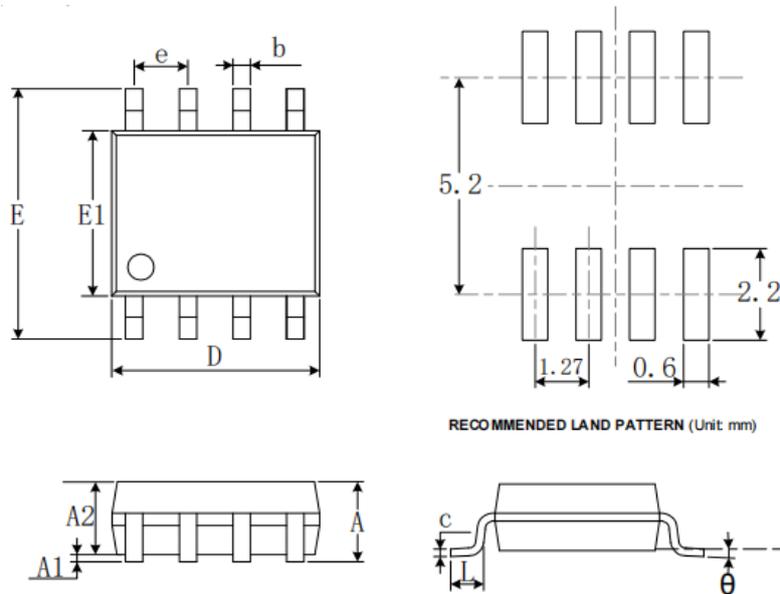


RECOMMENDED LAND PATTERN (Unit: mm)

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°



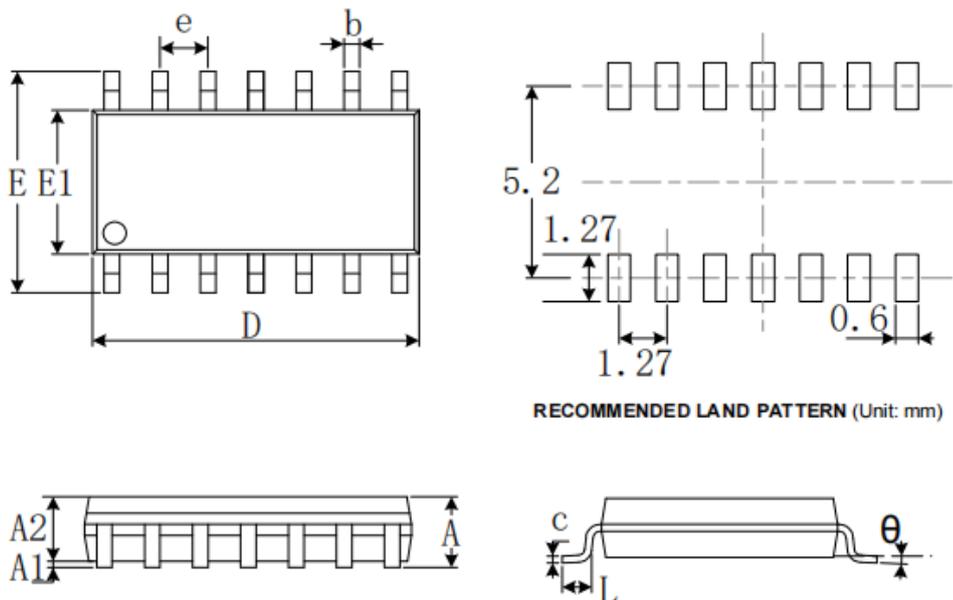
S01C-8(S0P8)



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
	0°	8°	0°	8°



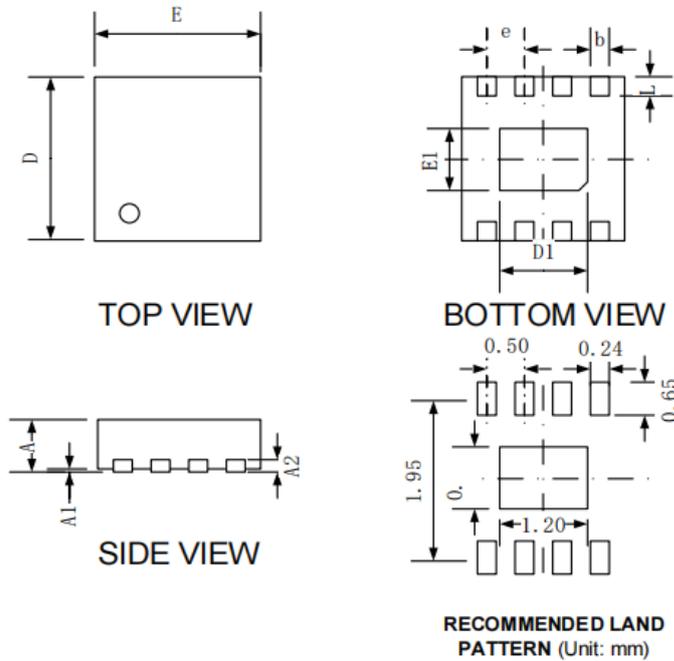
S01C-14(S0P14)



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°



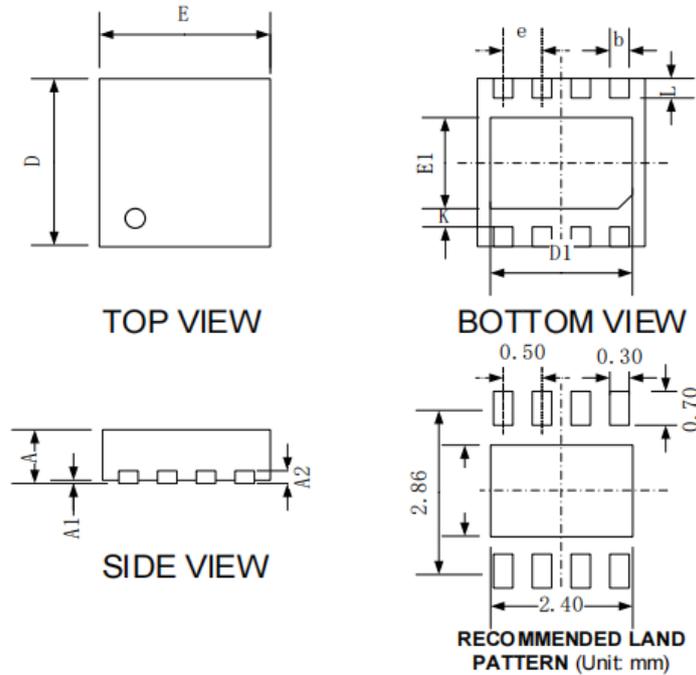
TDFN2X2-8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A2	0.203(TYP)		0.008(TYP)	
b	0.180	0.300	0.007	0.012
D	1.900	2.100	0.075	0.083
D1	1.100	1.300	0.043	0.051
E	1.900	2.100	0.075	0.083
E1	0.600	0.800	0.024	0.031
e	0.500(TYP)		0.020(TYP)	
L	0.250	0.450	0.010	0.018



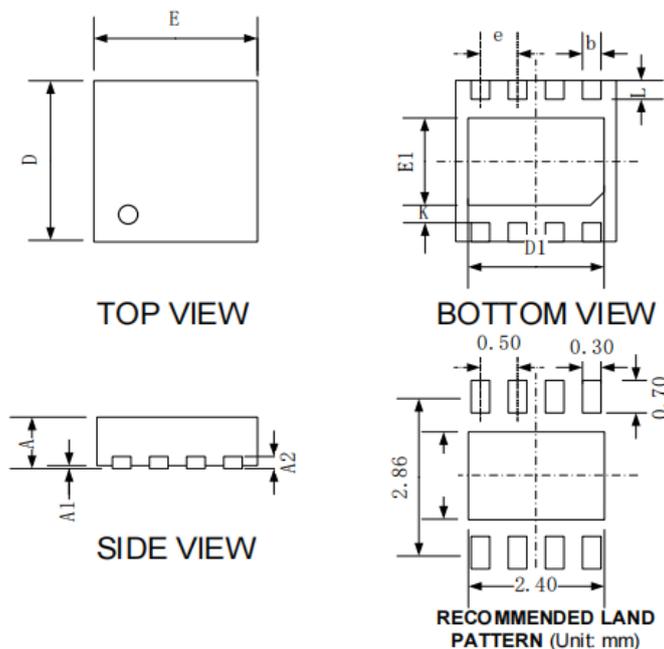
TDFN-3x3-8L (0303x0.75-0.5)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A2	0.203REF		0.008REF	
b	0.200	0.300	0.008	0.012
D	2.900	3.100	0.114	0.122
D1	2.350	2.550	0.093	0.100
E	2.900	3.100	0.114	0.122
E1	1.500	1.700	0.059	0.067
e	0.500 TYP		0.020TYP	
L	0.350	0.450	0.014	0.018
K	0.300 REF		0.012 REF	



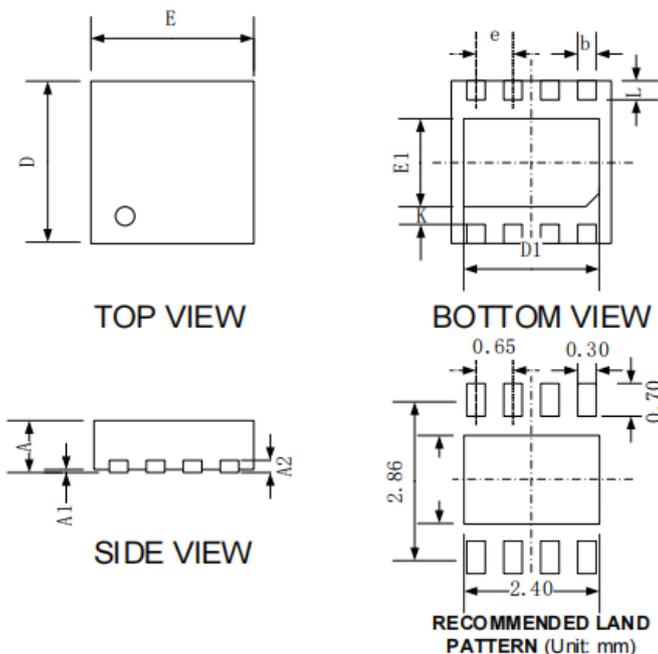
TDFN-3x3-8L (0303x0.75-0.65)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A2	0.203REF		0.008REF	
b	0.200	0.300	0.008	0.012
D	2.900	3.100	0.114	0.122
D1	2.350	2.550	0.093	0.100
E	2.900	3.100	0.114	0.122
E1	1.500	1.700	0.059	0.067
e	0.500 TYP		0.020TYP	
L	0.350	0.450	0.014	0.018
K	0.300 REF		0.012 REF	



TDFN-3x3-8L (0303x0.75-0.65)



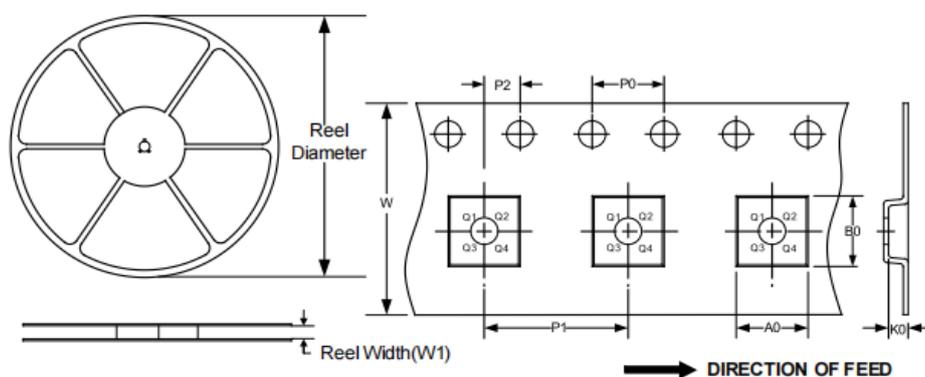
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A2	0.203REF		0.008REF	
b	0.200	0.300	0.008	0.012
D	2.900	3.100	0.114	0.122
D1	2.250	2.350	0.089	0.093
E	2.900	3.100	0.114	0.122
E1	1.450	1.550	0.057	0.061
e	0.650 TYP		0.026 TYP	
L	0.425	0.525	0.017	0.021
K	0.200 REF		0.008 REF	



TAPE AND REEL INFORMATION

REEL DIMENSIONS

TAPE DIMENSION



NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
SOT23-5	7''	9.5	3.20	3.20	1.40	4.0	4.0	2.0	8.0	Q3
SOT23-6	7''	9.5	3.17	3.23	1.37	4.0	4.0	2.0	8.0	Q3
SOIC-8(SOP8)	13''	12.4	6.40	5.40	2.10	4.0	8.0	2.0	12.0	Q1
MSOP-8	13''	12.4	5.20	3.30	1.50	4.0	8.0	2.0	12.0	Q1
MSOP-10	13''	12.4	5.20	3.30	1.20	4.0	8.0	2.0	12.0	Q1
SOIC-14(SOP14)	13''	16.4	6.60	9.30	2.10	4.0	8.0	2.0	16.0	Q1
TSSOP-14	13''	12.4	6.95	5.60	1.20	4.0	8.0	2.0	14.0	Q1
TDFN2x2-6L	7''	9.5	2.30	2.30	1.10	4.0	4.0	2.0	8.0	Q1
TDFN2x2-8	7''	9.5	2.30	2.30	1.10	4.0	4.0	2.0	8.0	Q2
TDFN-3x3-8L (0303x0.75-0.5)	13''	12.4	3.35	3.35	1.13	4.0	8.0	2.0	12.0	Q1
TDFN-3x3-8L (0303x0.75-0.65)	13''	12.4	3.35	3.35	1.13	4.0	8.0	2.0	12.0	Q1