



AOS
SEMICONDUCTOR

产品规格说明书

Product Data Sheet

AOS841xx

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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 AOS841X families of products offer high voltage (36V) operation and rail-to-rail output, as well as excellent speed/power consumption ratio, providing an excellent bandwidth (1.2MHz) and slew rate of 0.67V/us. The op-amps are unity gain stable and feature an ultra-low input bias current.

The devices are stable at capacitance up to 300pF. The input can operate normally within 100mV below of the negative power rail to 2V below of the positive power rail. The AOS841X families of operational amplifiers are specified at the full temperature range of -40°C to +125°C under single power supplies of 3V to 36V or dual power supplies of ±1.5V to ±18V.

FEATURES

GAIN BANDWIDTH: 15kHz
RAIL-TO-RAIL INPUT AND OUTPUT ±0.8mV Typical Vos
INPUT VOLTAGE RANGE: -0.1V to +5.6V with Vs = 5.5V
SUPPLY RANGE: +1.4V to +5.5V
SPECIFIED UP TO +125°C
Micro SIZE PACKAGES: SOT23-5

APPLICATIONS

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

Device Information⁽¹⁾

PART NUMBER	PACKAGE	BODY SIZE(NOM)
AOS8411	SOT23-5	2.90mm x 1.60mm
AOS8412	SOP8	4.90mm x 3.90mm
	MSOP8	3.00mm x 3.00mm
AOS8414	SOP14	8.65mm x 3.90mm
	TSSOP14	5.00mm x 4.40mm

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

**PACKAGE/ORDERING INFORMATION**

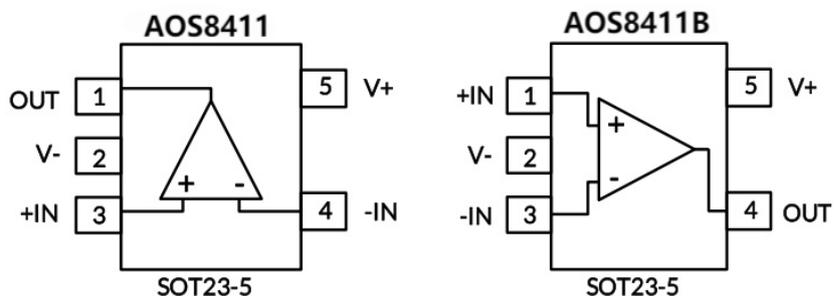
Orderable Device	Package Type	Pin	Channel	Op Temp()	Device Marking ⁽²⁾	MSL ⁽³⁾	Package Qty
AOS8411XF	SOT23-5	5	1	-40 ~125	8411	MSL3	Tape and Reel , 3000
AOS8411BXF	SOT23-5	5	1	-40 ~125	8411B	MSL3	Tape and Reel , 3000
AOS8412XK	SOP8	8	2	-40 ~125	AOS8412	MSL3	Tape and Reel , 4000
AOS8412XM	MSOP8	8	2	-40 ~125	AOS8412	MSL3	Tape and Reel , 4000
AOS8414XP	SOP14	14	4	-40 ~125	AOS8414	MSL3	Tape and Reel , 4000
AOS8414XQ	TSSOP14	14	4	-40 ~125	AOS8414	MSL3	Tape and Reel , 4000

NOTE:

- (1) This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the right-hand navigation.
- (2) 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.
- (3) MSL, The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications.



Pin Configuration and Functions (Top View)



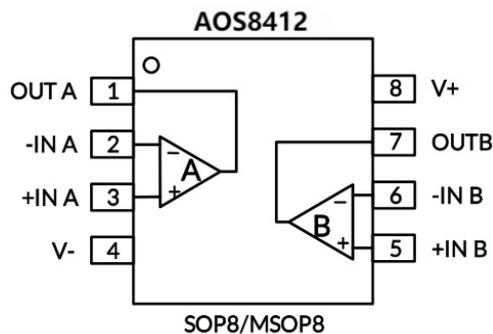
Pin Description

NAME	PIN		I/O ⁽¹⁾	DESCRIPTION
	AOS8411	AOS8411B		
+IN	3	1	I	Positive (noninverting) input
V-	2	2	-	Negative (lowest) power supply or ground (for single supply operation)
-IN	4	3	I	Negative (inverting) input
OUT	1	4	O	Output
V+	5	5	-	Positive (highest) power supply

(1) I = Input, O = Output.



Pin Configuration and Functions (Top View)



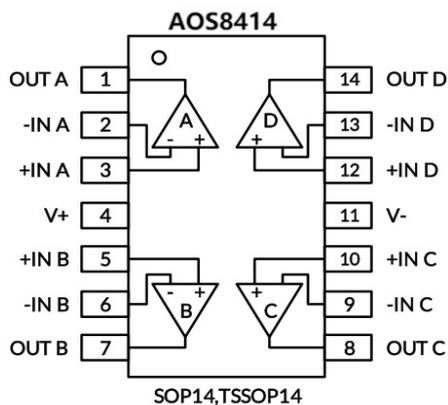
Pin Description

NAME	PIN	I/O ⁽¹⁾	DESCRIPTION
	SOP8/MSOP8		
-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
OUTA	1	O	Output, channel A
OUTB	7	O	Output, channel B
V-	4	-	Negative (lowest) power supply or ground (for single supply operation)
V+	8	-	Positive (highest) power supply

(1) I = Input, O = Output.



Pin Configuration and Functions (Top View)



Pin Description

NAME	PIN	I/O ⁽¹⁾	DESCRIPTION
	SOP14/TSSOP14		
-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 or ground (for single supply operation)
V+	4	-	Positive (highest) power supply

(1) I = Input, O = Output.



SPECIFICATIONS

Absolute Maximum Ratings

Over operating free-air temperature range(unless otherwise noted)⁽¹⁾

		MIN	MAX	UNIT	
Voltage	Supply, $V_S=(V_+) - (V_-)$	-0.7	36	V	
	Signal input pin ⁽²⁾	(V ₋)-0.2	(V ₊) +0.2		
	Signal output pin ⁽³⁾	(V ₋)-0.2	(V ₊) +0.2		
Current	Signal input pin ⁽²⁾	-10	10	mA	
	Signal output pin ⁽³⁾	-100	100	mA	
	Output short-circuits ⁽⁴⁾	Continuous			
J _A	Package thermal impedance ⁽⁵⁾	SOT23-5		230	/W
		SOP8		110	
		MSOP8		170	
		SOP14		105	
		TSSOP14		90	
Temperature	Operating range, T _A	-40	125		
	Junction, T _J ⁽⁶⁾	-40	150		
	Storage, T _{stg}	-55	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.
- (5) The package thermal impedance is calculated in accordance with JESD-51.
- (6) The maximum power dissipation is a function of T_{J(MAX)}, R_{JA}, and T_A. The maximum allowable power dissipation at any ambient temperature is $P_D = (T_{J(MAX)} - T_A) / R_{JA}$. All numbers apply for packages soldered directly onto a PCB.



ESD Ratings

The following ESD information is provided for handling of ESD-sensitive devices in an ESD protected area only.

			VALUE	UNIT
V _(ESD)	Electrostatic discharge	Human-body model (HBM)	± 5000	V
		Machine Model (MM)	± 200	

(1)JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.



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.

Recommended Operating Conditions

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

		MIN	NOM	MAX	UNIT
Supply voltage , V _s =(V ₊) -(V ₋)	Single-supply	3		36	V
	Dual-supply	± 1.5		± 18	



ELECTRICAL CHARACTERISTICS

(At $T_A = +25^\circ\text{C}$, $V_S = 3\text{V}$ to 36V , $R_L = 10\text{k}\Omega$, connected to $V_S/2$, and $V_{OUT} = V_S/2$, Full $I^{(9)} = -40^\circ\text{C}$ to 125°C , unless otherwise noted.)⁽¹⁾

PARAMETER		CONDITIONS	T _J	AOS841X			UNITS
				MIN ⁽²⁾	TYP ⁽³⁾	MAX ⁽²⁾	
POWER SUPPLY							
V _S	Operating Voltage Range		25	3		36	V
I _Q	Quiescent Current Per Amplifier	V _S = ± 2.5V, I _O = 0mA	25		150	350	μA
		V _S = ± 18V, I _O = 0mA			200	450	
PSRR	Power-Supply Rejection Ratio	V _S = 5V to 36V	25	95	120		dB
INPUT							
V _{OS}	Input Offset Voltage	V _{CM} = V _S /2	25	-4	± 0.5	4	mV
			Full I		± 1.1		
V _{OS} Tc	Input Offset Voltage Average Drift		Full I		3		μV/
I _B	Input Bias Current ^{(4) (5)}	V _{CM} = 0V	25		10	60	pA
			Full I		600		
I _{OS}	Input Offset Current ⁽⁵⁾	V _{CM} = 0V	25		10	60	pA
			Full I		600		
V _{CM}	Common-Mode Voltage Range	V _S = ± 18V	25	(V ₋) - 0.1		(V ₊) - 2	V
CMRR	Common-Mode Rejection Ratio	V _S = ± 2.5V, V _{CM} = (V ₋) - 0.1V to (V ₊) - 2V	25	70	110		dB
		V _S = ± 18V, V _{CM} = (V ₋) - 0.1V to (V ₊) - 2V	25	70			
OUTPUT							
A _{OL}	Open-Loop Voltage Gain	R _L = 10K, V _O = (V ₋) + 0.6V to (V ₊) - 0.6V	25	83	115		dB
V _{OH}	Output Swing	V _S = ± 18V, R _L = 10K	25	17.85			V
V _{OL}						-17.85	V
I _{SC}	Short-circuit current ^{(6) (7)}		25	± 35	± 80		mA
C _{LOAD}	Capacitive load drive		25		100		pF



FREQUENCY RESPONSE							
SR	Slew Rate(8)	G=+1, C _L =100pF	25		0.67		V/ μ s
GBW	Gain-Bandwidth Product		25		1.2		MHz
t _s	Setting Time, 0.01%	V _S = \pm 2.5V, G=+1, C _L =100pF, Step=2V	25		5		μ s
t _{OR}	Overload Recovery Time	V _{IN} Gain V _S , G=11	25		5		μ s
t _{ON}	Turn On Time		25		10		μ s
NOISE							
En	Input Voltage Noise	f = 0.1Hz to 10Hz, V _S = \pm 2.5V	25		16		μ Vpp
en	Input Voltage Noise Density	f = 1KHz	25		45		nV/ Hz

NOTE:

- (1) Electrical table values apply only for factory testing conditions at the temperature indicated. Factory testing conditions result in very limited self-heating of the device.
- (2) Limits are 100% production tested at 25°C. Limits over the operating temperature range are ensured through correlations using statistical quality control (SQC) method.
- (3) Typical values represent the most likely parametric norm as determined at the time of characterization. Actual typical values may vary over time and will also depend on the application and configuration.
- (4) Positive current corresponds to current flowing into the device.
- (5) This parameter is ensured by design and/or characterization and is not tested in production.
- (6) The maximum power dissipation is a function of T_{J(MAX)}, R_{JA}, and T_A. The maximum allowable powerdissipation at any ambient temperature is P_D = (T_{J(MAX)}-T_A) / R_{JA}. All numbers apply for packages soldered directly onto a PCB.
- (7) Short circuit test is a momentary test.
- (8) Number specified is the slower of positive and negative slew rates.
- (9) Specified by characterization only.



TYPICAL CHARACTERISTICS

NOTE: The graphs and tables provided following this note are a statistical summary based on a limited number of samples and are provided for informational purposes only. At $T_A = +25^{\circ}\text{C}$, $V_S = \pm 18\text{V}$, $R_L = 10\text{k}$ connected to $V_S/2$, $V_{OUT} = V_S/2$, unless otherwise noted.

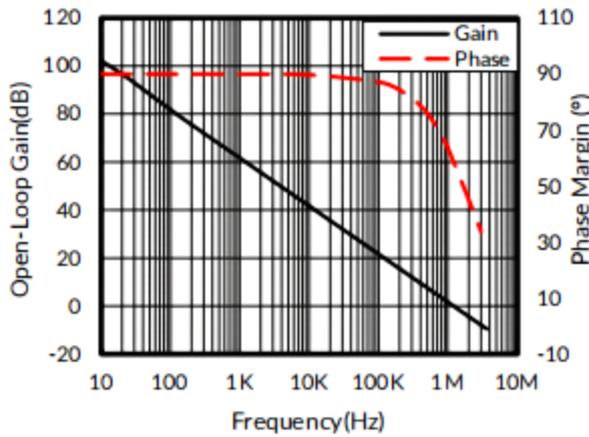


Figure 1. OPEN-LOOP GAIN AND PHASE vs FREQUENCY

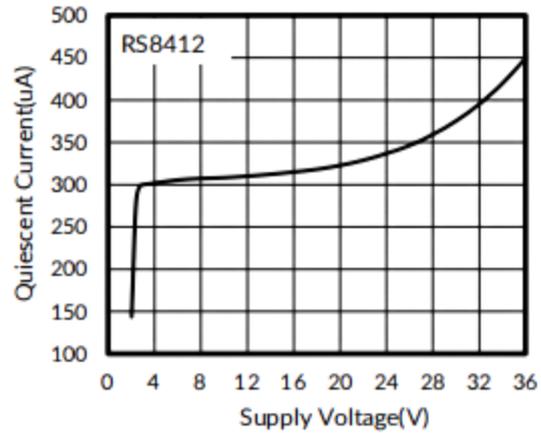


Figure 2. SUPPLY VOLTAGE vs QUIESCENT CURRENT

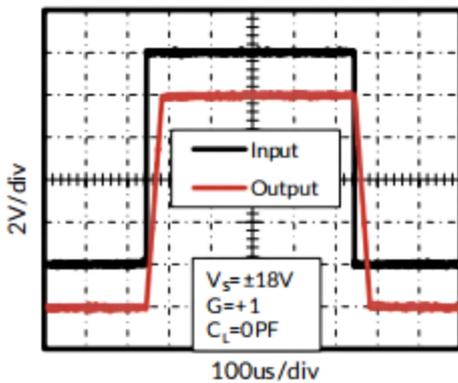


Figure 3. LARGE SIGNAL STEP RESPONSE

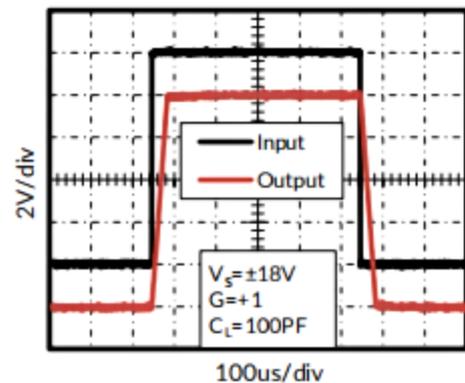


Figure 4. LARGE SIGNAL STEP RESPONSE

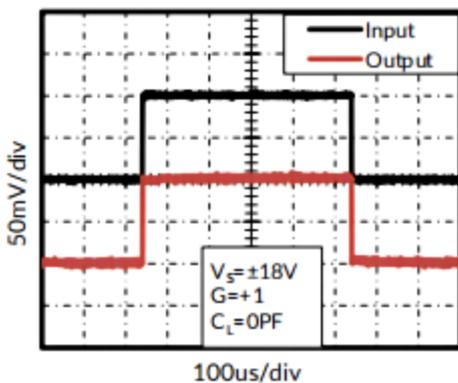


Figure 5. SMALL SIGNAL STEP RESPONSE

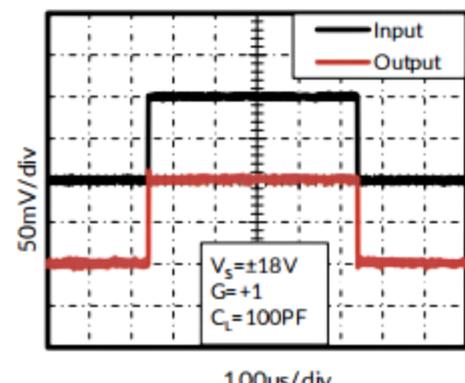


Figure 6. SMALL SIGNAL STEP RESPONSE

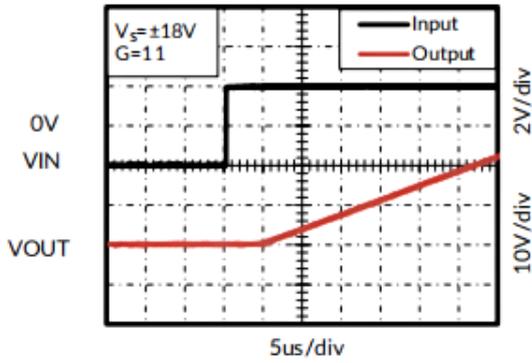


Figure 7. POSITIVE OVERVOLTAGE RECOVERY

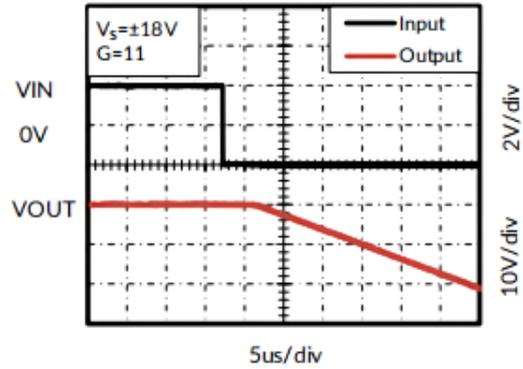


Figure 8. NEGATIVE OVERVOLTAGE RECOVERY

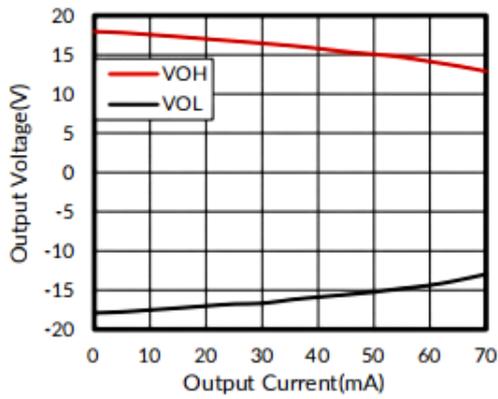


Figure 9. Output Voltage Swing vs Output Current

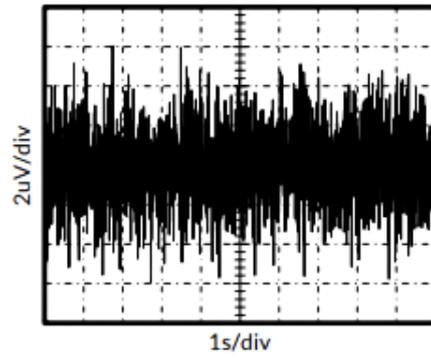
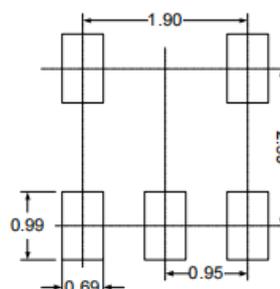
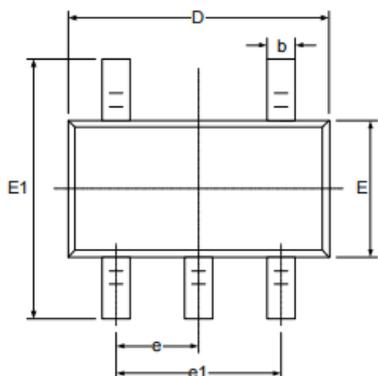


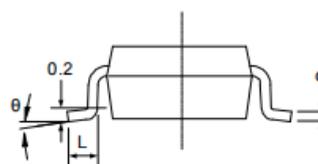
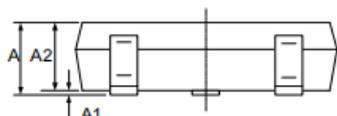
Figure 10. 0.1Hz TO 10Hz NOISE AT Vs=5V



PACKAGE OUTLINE DIMENSIONS
SOT23-5⁽³⁾



RECOMMENDED LAND PATTERN (Unit: mm)



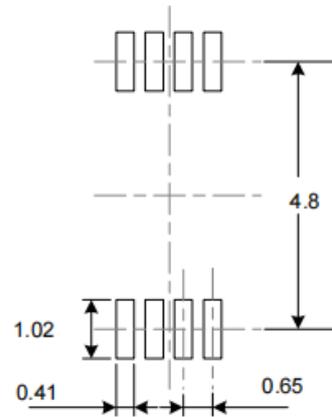
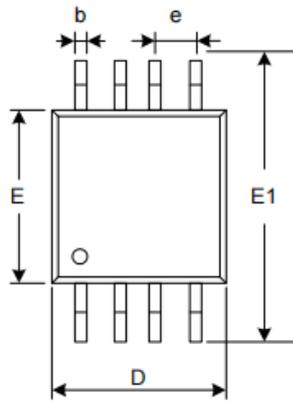
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A ⁽¹⁾	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D ⁽¹⁾	2.820	3.020	0.111	0.119
E ⁽¹⁾	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC) ⁽²⁾		0.037(BSC) ⁽²⁾	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
	0°	8°	0°	8°

NOTE:

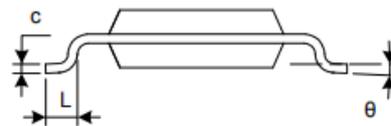
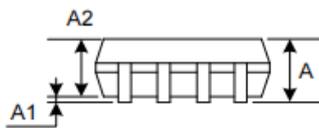
1. Plastic or metal protrusions of 0.15mm maximum per side are not included.
2. BSC (Basic Spacing between Centers), "Basic" spacing is nominal.
3. This drawing is subject to change without notice.



MSOP-8⁽³⁾



RECOMMENDED LAND PATTERN (Unit: mm)



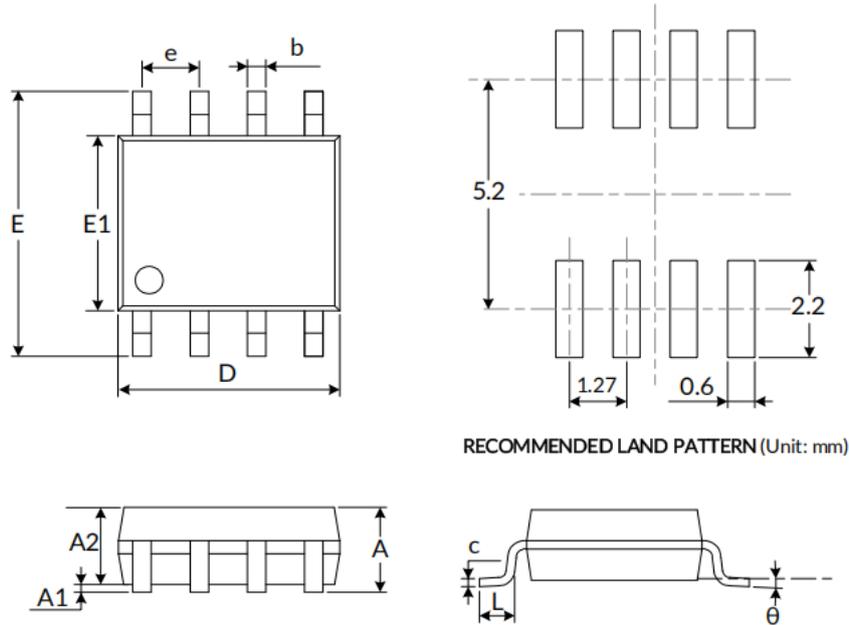
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A ⁽¹⁾	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.250	0.380	0.010	0.015
c	0.090	0.230	0.004	0.009
D ⁽¹⁾	2.900	3.100	0.114	0.122
e	0.650(BSC) ⁽²⁾		0.026(BSC) ⁽²⁾	
E ⁽¹⁾	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
L	0.400	0.800	0.016	0.031
	0°	6°	0°	6°

NOTE:

1. Plastic or metal protrusions of 0.15mm maximum per side are not included.
2. BSC (Basic Spacing between Centers), "Basic" spacing is nominal.
3. This drawing is subject to change without notice.



SOP-8⁽³⁾



RECOMMENDED LAND PATTERN (Unit: mm)

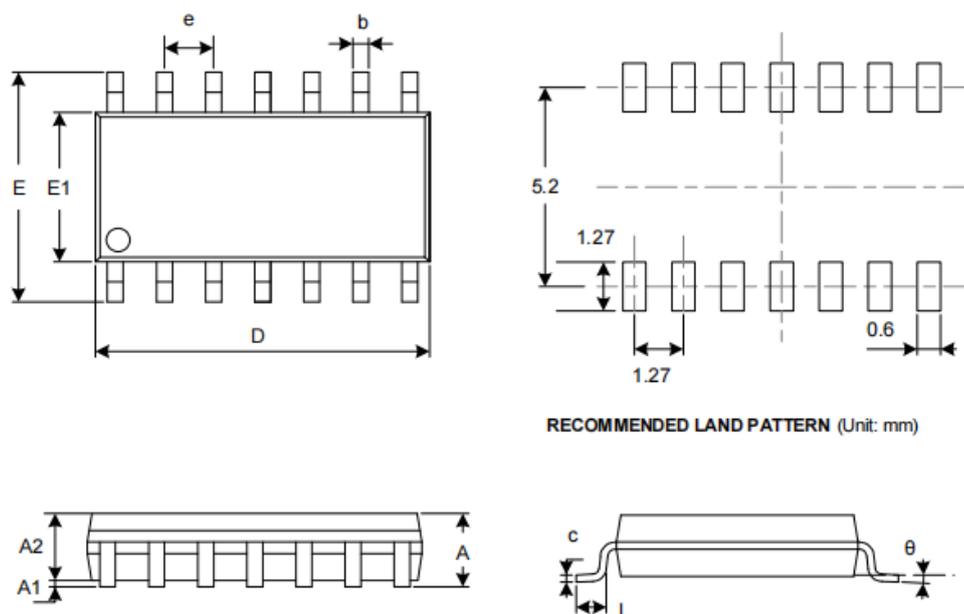
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A ⁽¹⁾	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D ⁽¹⁾	4.800	5.000	0.189	0.197
e	1.270(BSC) ⁽²⁾		0.050(BSC) ⁽²⁾	
E	5.800	6.200	0.228	0.244
E1 ⁽¹⁾	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
	0°	8°	0°	8°

NOTE:

1. Plastic or metal protrusions of 0.15mm maximum per side are not included.
2. BSC (Basic Spacing between Centers), "Basic" spacing is nominal.
3. This drawing is subject to change without notice.



SOP14⁽³⁾



RECOMMENDED LAND PATTERN (Unit: mm)

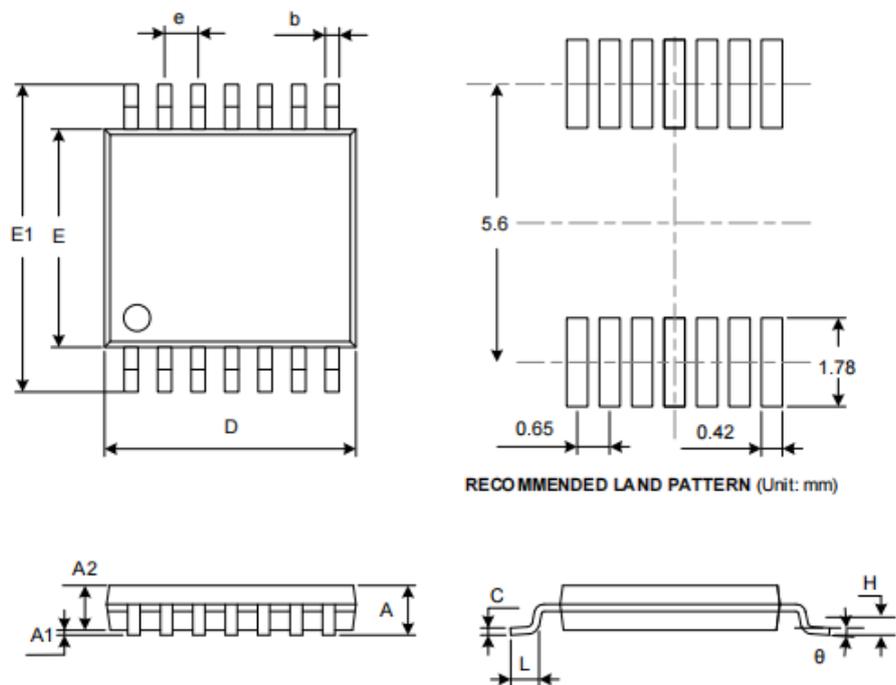
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A ⁽¹⁾	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.310	0.510	0.012	0.020
c	0.100	0.250	0.004	0.010
D ⁽¹⁾	8.450	8.850	0.333	0.348
e	1.270(BSC) ⁽²⁾		0.050(BSC) ⁽²⁾	
E	5.800	6.200	0.228	0.244
E1 ⁽¹⁾	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
	0°	8°	0°	8°

NOTE:

1. Plastic or metal protrusions of 0.15mm maximum per side are not included.
2. BSC (Basic Spacing between Centers), "Basic" spacing is nominal.
3. This drawing is subject to change without notice.



TSSOP-14⁽³⁾



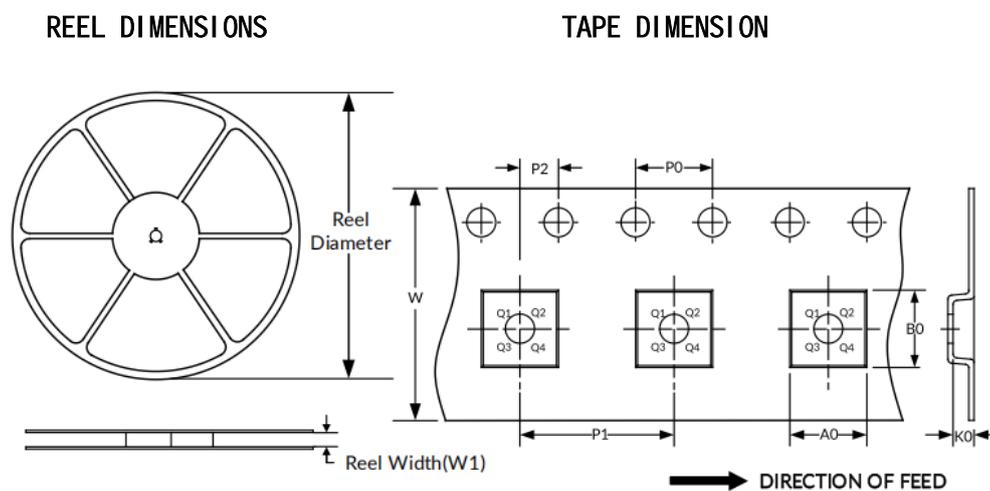
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A		1.200		0.047
A1	0.050	0.150	0.002	0.006
A2	0.800	1.050	0.031	0.041
b	0.190	0.300	0.007	0.012
c	0.090	0.200	0.004	0.008
D	4.860	5.100	0.191	0.201
E	4.300	4.500	0.169	0.177
E1	6.250	6.550	0.246	0.258
e	0.650 (BSC)		0.026 (BSC)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

NOTE:

1. Plastic or metal protrusions of 0.15mm maximum per side are not included.
2. BSC (Basic Spacing between Centers), "Basic" spacing is nominal.
3. This drawing is subject to change without notice.



TAPE AND REEL INFORMATION



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
SOP8	13''	12.4	6.40	5.40	2.10	4.0	8.0	2.0	12.0	Q1
MSOP8	13''	12.4	5.20	3.30	1.50	4.0	8.0	2.0	12.0	Q1
SOP14	13''	16.4	6.60	9.30	2.10	4.0	8.0	2.0	16.0	Q1
TSSOP14	13''	12.4	6.95	5.60	1.20	4.0	8.0	2.0	12.0	Q1

NOTE:

1. All dimensions are nominal.
2. Plastic or metal protrusions of 0.15mm maximum per side are not included.