



AOS
SEMICONDUCTOR

产品规格说明书

Product Data Sheet

AOS1G386XC6

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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



AOS1G386 Single 3-Input Positive-XOR Gate

DESCRIPTION

The AOS1G386 single 3-input positive-XOR gate is designed for 1.65V to 5.5V_{cc} operation. The AOS1G386 device performs the Boolean function $Y=A\oplus B\oplus C$ in positive logic. The device is fully specified for partial-power-down applications using Ioff. The Ioff circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down. The AOS1G386 is available in Green SOT23-6 and SOT363(SC70-6) packages. It operates over an ambient temperature range of -40°C to +125°C.

FEATURES

Operating Voltage Range: 1.65V to 5.5V
Low Power Consumption: 1μA (Max)
Operating Temperature Range: -40°C to 125°C
Inputs Accept Voltage to 5.5V
High Output Drive: ±24mA at V_{cc}=3.0V
Micro SIZE PACKAGES: SOT23-6, SOT363(SC70-6)

APPLICATIONS

Active Noise Elimination
Bar Code Scanner
Blood Pressure Monitor
CPAP Machine
Fingerprint Identification
Network Attached Storage (NAS)

LOGIC SYMBOL

Device Information⁽¹⁾

PART NUMBER	PACKAGE	BODY SIZE (NOM)
AOS1G386	SOT23-6(6)	2.92mm × 1.60mm
	SOT363 (SC70-6)(6)	2.10mm × 1.25mm

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

FUNCTION TABLE

INPUTS			OUTPUT
A	B	C	Y
L	L	L	L
L	L	H	H
L	H	L	H
L	H	H	L
H	L	L	H
H	L	H	L
H	H	L	L
H	H	H	H

H=High Voltage Level

L=Low Voltage Level

$Y=A\oplus B\oplus C$



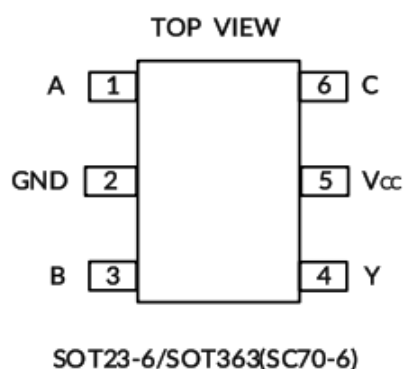
PACKAGE/ORDERING INFORMATION

PRODUCT	ORDERING NUMBER	TEMPERATURE RANGE	PACKAGE LEAD	PACKAGE MARKING ⁽²⁾	PACKAGE OPTION
AOS1G386	AOS1G386XH6	-40℃~+125℃	SOT23-6	1G386	Tape and Reel ,3000
	AOS1G386XC5	-40℃~+125℃	SC70-6(SOT363)	1G386	Tape and Reel ,3000

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 CONFIGURATIONS



PIN DESCRIPTION

PIN	NAME	I/O TYPE ⁽¹⁾	FUNCTION
SOT23-6/SOT363(SC70-6)			
1	A	I	Input
2	GND	P	Ground
3	B	I	Input
4	Y	O	Output
5	V _{cc}	P	Power Pin
6	C	I	Input

(1) I=input, O=output, P=power.

**Specifications****Absolute Maximum Ratings⁽¹⁾**Over operating free-air temperature range (unless otherwise noted)⁽¹⁾⁽²⁾

			MIN	MAX	UNIT
V _{CC}	Supply voltage range		-0.5	6.5	V
V _I	Input voltage range ⁽²⁾		-0.5	6.5	
V _O	Voltage range applied to any output in the high-impedance or power-off state ⁽²⁾		-0.5	6.5	
V _O	Voltage range applied to any output in the high or low state ⁽²⁾⁽³⁾		-0.5	V _{CC} +0.5	
I _{IK}	Input clamp current	V _I <0		-50	mA
I _{OK}	Output clamp current	V _O <0		-50	
I _O	Continuous output current			± 50	
	Continuous current through V _{CC} or GND			± 100	
θ _{JA}	Package thermal impedance ⁽⁴⁾	SOT23-6		230	°C/W
		SOT363/(SC70-6)		265	
T _J	Junction temperature ⁽⁵⁾		-65	150	°C
T _{stg}	Storage temperature		-65	150	

- (1) Stresses beyond 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-rated conditions for extended periods may affect device reliability.
- (2) The input and output negative-voltage ratings may be exceeded if the input and output current ratings are observed.
- (3) The value of V_{CC} is provided in the *Recommended Operating Conditions* table.
- (4) The package thermal impedance is calculated in accordance with JESD-51.
- (5) The maximum power dissipation is a function of T_{J(MAX)}, R_{θJA}, and T_A. The maximum allowable power dissipation at any ambient temperature is P_D = (T_{J(MAX)} - T_A) / R_{θJA}. 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), MIL-STD-883K METHOD 3015.9	± 2000	V
		Charged-device model (CDM), ANSI/ESDA/JEDEC JS-002-2018	± 1000	
		Machine Model (MM), JESD22-A115C (2010)	± 200	



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.



ELECTRICAL CHARACTERISTICS

over recommended operating free-air temperature range (TYP values are at $T_A=+25^{\circ}\text{C}$, Full= -40°C to 125°C , unless otherwise noted.) ⁽¹⁾

Recommended Operating Conditions

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	MAX	UNIT
Supply Voltage	V_{CC}	Operating	1.65	5.5	V
		Data retention only	1.5		
High-Level Input Voltage	V_{IH}	$V_{CC}=1.65\text{V to }1.95\text{V}$	$0.75 \times V_{CC}$		
		$V_{CC}=2.3\text{V to }2.7\text{V}$	1.7		
		$V_{CC}=3\text{V to }3.6\text{V}$	2		
		$V_{CC}=4.5\text{V to }5.5\text{V}$	$0.7 \times V_{CC}$		
Low-Level Input Voltage	V_{IL}	$V_{CC}=1.65\text{V to }1.95\text{V}$		$0.25 \times V_{CC}$	
		$V_{CC}=2.3\text{V to }2.7\text{V}$		0.7	
		$V_{CC}=3\text{V to }3.6\text{V}$		0.8	
		$V_{CC}=4.5\text{V to }5.5\text{V}$		$0.3 \times V_{CC}$	
Input Voltage	V_I		0	5.5	
Output Voltage	V_O		0	V_{CC}	
High-Level Output Voltage	I_{OH}	$V_{CC}=1.65\text{V}$		-4	mA
		$V_{CC}=2.3\text{V}$		-8	
		$V_{CC}=3\text{V}$		-16	
				-24	
Low-Level Output Voltage	I_{OL}	$V_{CC}=4.5\text{V}$		-32	
		$V_{CC}=1.65\text{V}$		4	
		$V_{CC}=2.3\text{V}$		8	
		$V_{CC}=3\text{V}$		16	
				24	
Input transition rise or fall	$\Delta t / \Delta v$	$V_{CC}=4.5\text{V}$		32	
		$V_{CC}=1.8\text{V} \pm 0.15\text{V}, 2.5\text{V} \pm 0.2\text{V}$		20	ns/V
		$V_{CC}=3.3\text{V} \pm 0.3\text{V}$		10	
Operating Temperature	T_A	$V_{CC}=5\text{V} \pm 0.5\text{V}$		5	
			-40	125	$^{\circ}\text{C}$

(1) All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation.



DC Characteristics

PARAMETER		CONDITIONS	V _{CC}	TEMP	MIN	TYP	MAX	UNIT
V _{OH}		I _{OH} =-100 μ A	1.65V to 5.5V	Full	V _{CC} -0.1			V
		I _{OH} =-4mA	1.65V		1.2			
		I _{OH} =-8mA	2.3V		1.9			
		I _{OH} =-16mA	3V		2.4			
		I _{OH} =-24mA			2.3			
		I _{OH} =-32mA	4.5V		3.8			
V _{OL}		I _{OH} =100 μ A	1.65V to 5.5V				0.1	
		I _{OH} =4mA	1.65V				0.45	
		I _{OH} =8mA	2.3V				0.3	
		I _{OH} =16mA	3V				0.4	
		I _{OH} =24mA					0.55	
		I _{OH} =32mA	4.5V				0.55	
I _I	All inputs	V _I =5.5V or GND	0V to 5.5V	+25℃		± 0.1	± 1	μ A
				Full			± 5	
I _{off}		V _I or V _O =5.5V	0	+25℃		± 0.1	± 1	
				Full			± 10	
I _{CC}		V _I =5.5V or GND, I _O =0	1.65V to 5.5V	+25℃		0.1	1	
				Full			10	
Δ I _{CC}		One input at V _{CC} -0.6V, Other inputs at V _{CC} or GND	3V to 5.5V	Full			500	
C _i (Input Capacitance)		V _I =V _{CC} or GND	3.3V	+25℃		4		

- (1) All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation.
- (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.



Switching Characteristics

over recommended operating free-air temperature range ($T_A = +25^\circ\text{C}$, unless otherwise noted) ⁽¹⁾

PARAMETER	SYMBOL	TEST CONDITIONS		TEMP	MIN ⁽²⁾	TYP ⁽³⁾	MAX ⁽²⁾	UNIT
Propagation Delay	t_{pd}	$V_{CC}=1.8V \pm 0.15V$	$C_L=30pF, R_L=1k\Omega$	Full	6	18.5	30	ns
		$V_{CC}=2.5V \pm 0.2V$	$C_L=30pF, R_L=500\Omega$		3	9	15	
		$V_{CC}=3.3V \pm 0.3V$	$C_L=50pF, R_L=500\Omega$		2.6	8	13	
		$V_{CC}=5V \pm 0.5V$	$C_L=50pF, R_L=500\Omega$		1.6	6	10	

- (1) All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation.
- (2) This parameter is ensured by design and/or characterization and is not tested in production.
- (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.

Operating Characteristics

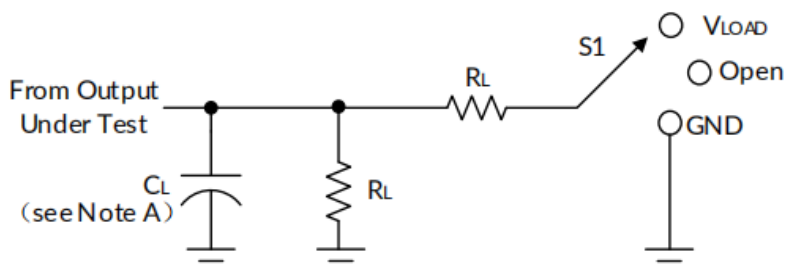
$T_A=+25^\circ\text{C}$

PARAMETER		TEST CONDITIONS	$V_{CC}=1.8V$	$V_{CC}=2.5V$	$V_{CC}=3.3V$	$V_{CC}=5V$	UNIT
			TYP	TYP	TYP	TYP	
$C_{pd}^{(1)}$	Power dissipation capacitance	$f = 10 \text{ MHz}$	11	15	18	21	pF

- (1) This parameter is ensured by design and/or characterization and is not tested in production.

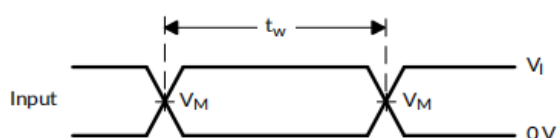


Parameter Measurement Information

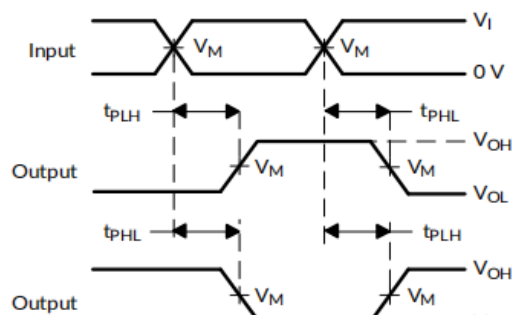


TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	V_{LOAD}
t_{PHZ}/t_{PZH}	GND

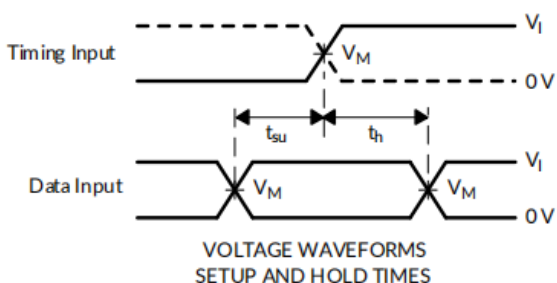
V_{CC}	INPUTS		V_M	V_{LOAD}	C_L	R_L	V_{Δ}
	V_I	t_r/t_f					
$1.8V \pm 0.15V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	30pF	1k Ω	0.15V
$2.5V \pm 0.2V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	30pF	500 Ω	0.15V
$3.3V \pm 0.3V$	3V	$\leq 2.5ns$	1.5V	6V	50pF	500 Ω	0.3V
$5V \pm 0.5V$	V_{CC}	$\leq 2.5ns$	$V_{CC}/2$	$2 \times V_{CC}$	50pF	500 Ω	0.3V



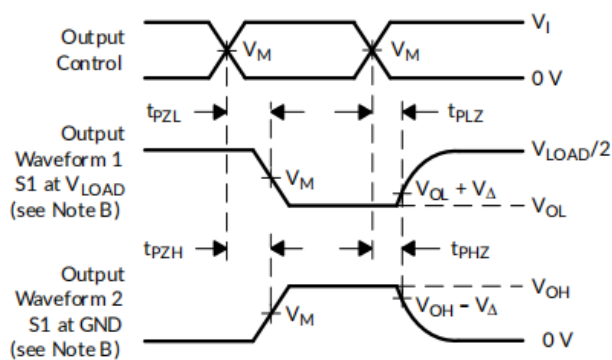
VOLTAGE WAVEFORMS
PULSE DURATION



VOLTAGE WAVEFORMS PROPAGATION DELAY
TIMES INVERTING AND NONINVERTING OUTPUTS



VOLTAGE WAVEFORMS
SETUP AND HOLD TIMES



VOLTAGE WAVEFORMS ENABLE AND DISABLE TIMES
LOW-AND HIGH-LEVEL ENABLING

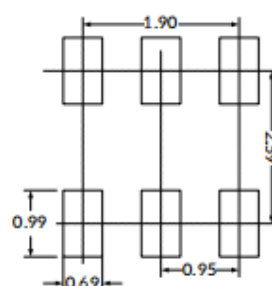
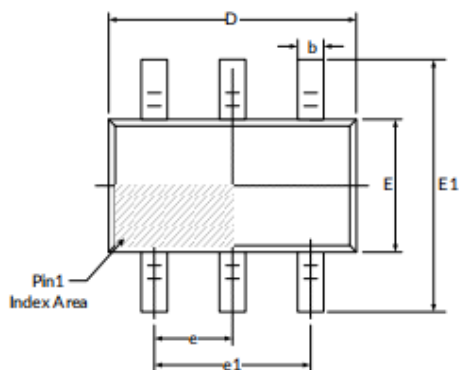


- NOTES:
- A. C_L includes probe and jig capacitance.
 - B. Waveform 1 is for an output with internal conditions such that the output is low, except when disabled by the output control.
Waveform 2 is for an output with internal conditions such that the output is high, except when disabled by the output control.
 - C. All input pulses are supplied by generators having the following characteristics: $PRR \leq 10 \text{ MHz}$, $Z_o = 50 \Omega$.
 - D. The outputs are measured one at a time, with one transition per measurement.
 - E. t_{PLZ} and t_{PHZ} are the same as t_{dis} .
 - F. t_{PZL} and t_{PZH} are the same as t_{en} .
 - G. t_{PLH} and t_{PHL} are the same as t_{pd} .
 - H. All parameters and waveforms are not applicable to all devices.

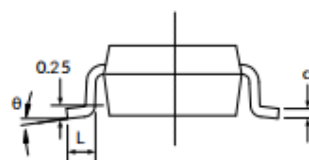
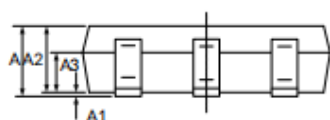
Figure 1. Load Circuit and Voltage Waveforms



PACKAGE OUTLINE DIMENSIONS
SOT23-6⁽²⁾



RECOMMENDED LAND PATTERN (Unit: mm)



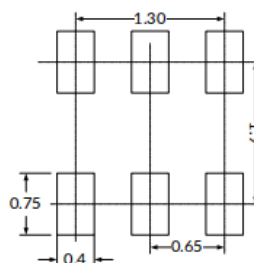
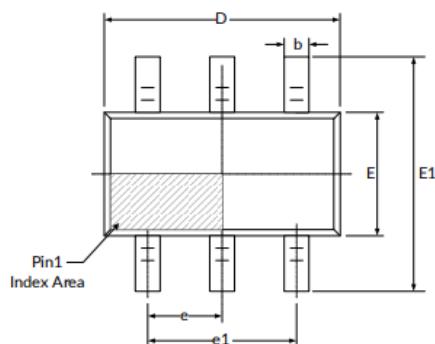
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A ⁽¹⁾		1.250		0.049
A1	0.000	0.150	0.000	0.006
A2	1.000	1.200	0.039	0.047
A3	0.600	0.700	0.024	0.028
b	0.340	0.450	0.013	0.018
c	0.100	0.200	0.004	0.008
D ⁽¹⁾	2.820	3.020	0.111	0.119
E ⁽¹⁾	1.500	1.700	0.059	0.067
E1	2.600	3.000	0.102	0.118
e	0.900	1.000	0.035	0.039
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0 °	8 °	0 °	8 °

NOTE:

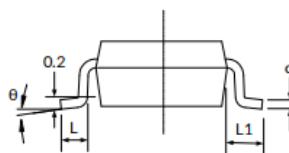
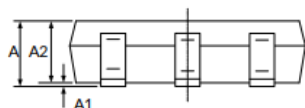
1. Plastic or metal protrusions of 0.15mm maximum per side are not included.
2. This drawing is subject to change without notice.



SOT363(SC70-6)⁽³⁾



RECOMMENDED LAND PATTERN (Unit: mm)



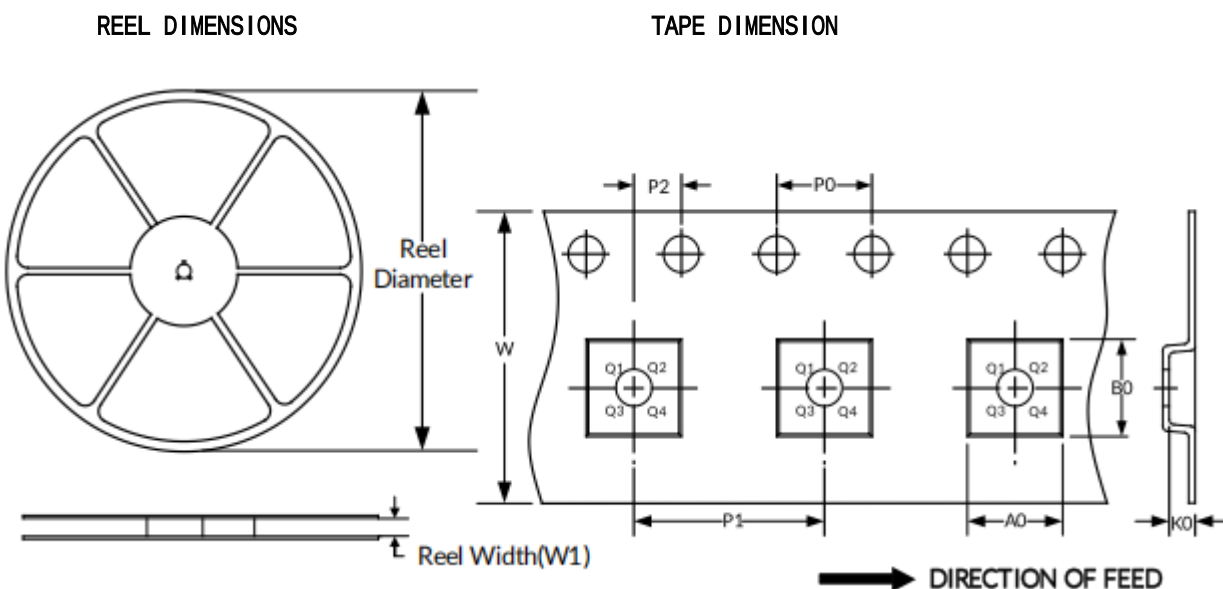
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A ⁽¹⁾	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
c	0.110	0.150	0.004	0.007
D ⁽¹⁾	2.000	2.200	0.079	0.087
E ⁽¹⁾	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650(TYP)		0.026(TYP)	
e1	1.200	1.400	0.047	0.055
L	0.260	0.460	0.010	0.018
L1	0.525(REF) ⁽²⁾		0.021(REF) ⁽²⁾	
θ	0 °	8 °	0 °	8 °

NOTE:

1. Plastic or metal protrusions of 0.15mm maximum per side are not included.
2. This drawing is subject to change without notice.
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
SOT363(SC70-6)	7''	9.5	2.40	2.50	1.20	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

NOTE:

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