

Precision Monolithic Quad SPST CMOS Analog Switches

FEATURES

- 44-V Supply Max Rating
- ± 15 -V Analog Signal Range
- On-Resistance- $r_{DS(ON)}$: 25Ω
- Fast Switching- t_{ON} : 110ns
- Ultra Low Power- P_D : $0.35\mu W$
- TTL/CMOS Compatible
- Single Supply Capability

BENEFITS

- Widest Dynamic Range
- Low Signal Errors and Distortion
- Break-Before-Make Switching Action
- Simple Interfacing

APPLICATIONS

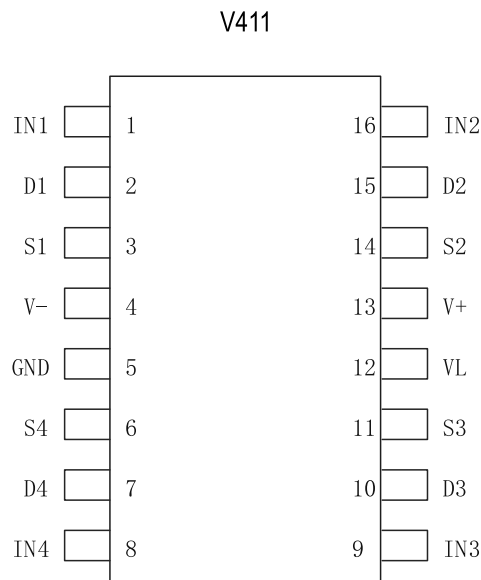
- Precision Automatic Test Equipment
- Precision Data Acquisition
- Communication Systems
- Battery Powered Systems
- Computer Peripherals

DESCRIPTION

The V411 series of monolithic quad analog switches was designed to provide high speed, low error switching of precision analog signals.

Widely used in precision data acquisition and communication systems. Combining low power with high speed. Encapsulation with SOP16.

FUNCTIONAL BLOCK DIAGRAM AND PIN CONFIGURATION



TRUTH TABLE	
Logic	V411
0	ON
1	OFF

Logic "0" $\leq 0.8V$

Logic "1" $\geq 2.4V$

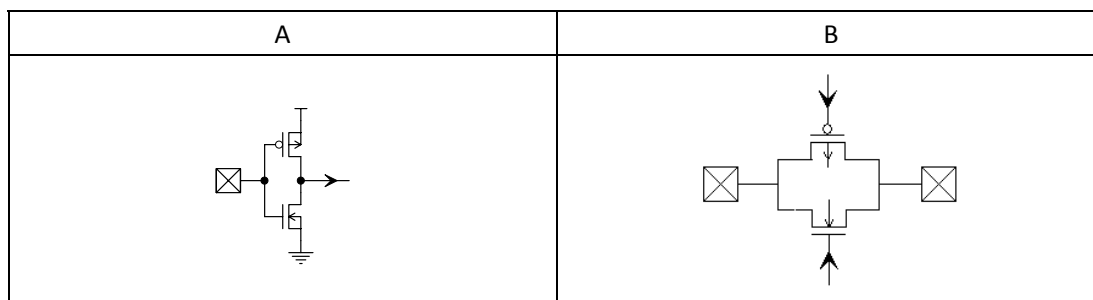
Four CMOS analog switches included

Capability of voltage control circuit

Symbol	Test Conditions	Status
IN1	0	S1& D1 on
	1	S1&D1 off
IN2	0	S2&D2 on
	1	S2&D2 off
IN3	0	S3&D3 on
	1	S3&D3 off
IN4	0	S4&D4 on
	1	S4&D4 off

PIN DESCRIPTION AND STRUCTURE SCHEME

Pin	Symbol	Function	Attribute	Structure Scheme
1	IN1	Logic control port of the first switch	I	A
2	D1	Output of D of the first switch	I/O	B
3	S1	Output of S of the first switch	I/O	B
4	V-	Negative power supply		
5	GND	GND		
6	S4	Output of S of the forth switch	I/O	B
7	D4	Output of D of the forth switch	I/O	B
8	IN4	Logic control port of the forth switch	I	A
9	IN3	Logic control port of the third switch	I	A
10	D3	Output of D of the third switch	I/O	B
11	S3	Output of S of the third switch	I/O	B
12	VL	Digital power supply		
13	V+	Positive power supply		
14	S2	Output of S of the second switch	I/O	B
15	D2	Output of D of the second switch	I/O	B
16	IN2	Logic control port of the second switch	I	A



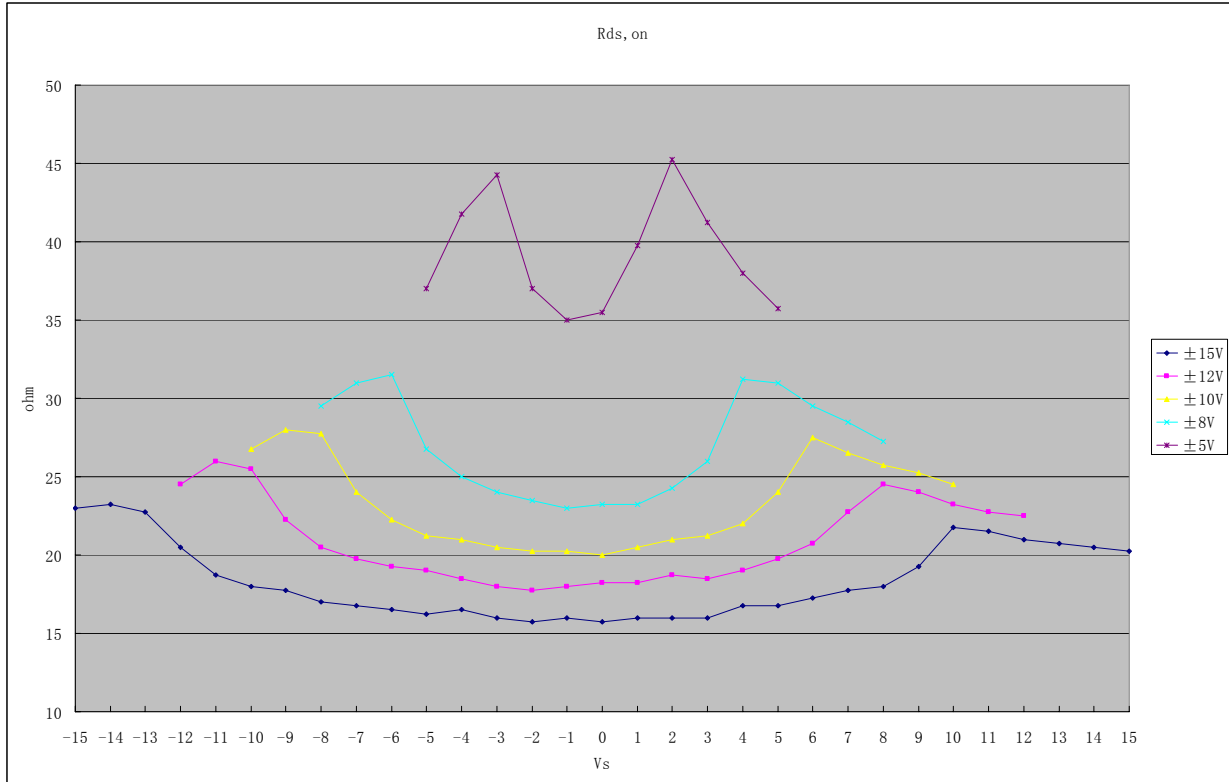
ABSOLUTE MAXIMUM RATINGSSupply Voltage (V_{DD}) -20~20VInput Voltage (V_{IN}) 0~6VOutput Voltage (V_{OUT}) -20~20VOperating Temperature (T_{amb}) -40~85°CStorage Temperature (T_{stg}) -65~150°C**Note:** Unless otherwise specified, $T_{amb}=25^{\circ}\text{C}$.**ELECTRICAL CHARACTERISTICS**

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Analog Switch						
Analog signal range	V _{analog}	V ₊ =15V, V ₋ = -15V	-15		15	V
Logical input -High voltage	V _{inH}	V _L =5V	2.8		5	V
Logical input -low voltage	V _{inL}	V _L =5V	0		0.6	V
Switch On Resistance 1	R _{dson1}	V ₊ =13.5V, V ₋ = -13.5V I _s = -10mA, V _d =8.5V	15	25	35	Ω
Switch Off Resistance 2	R _{dson2}	V ₊ =12V, V ₋ =0V I _s = -10mA, V _d =3, 8V	18	40	80	Ω
Dynamic Characteristics						
Turn-on Time1	T _{on1}	V ₊ =15V, V ₋ = -15V, R _L =300Ω		110	175	ns
Turn-off Time1	T _{off1}	C _L =35pf, V _s =±10V		100	145	ns
Turn-on Time2	T _{on2}	V ₊ =12V, V ₋ =0V, R _L =300Ω		175	250	ns
Turn-off Time2	T _{off2}	C _L =35pf, V _s =8V		95	125	ns
Power Supplies						
Positive Supply Current	I ₊	V ₊ =16.5V, V ₋ = -16.5V		0.001	1	μA
Negative Supply Crrent	I ₋	V _{IN} =0V or 5V		0.001	1	μA

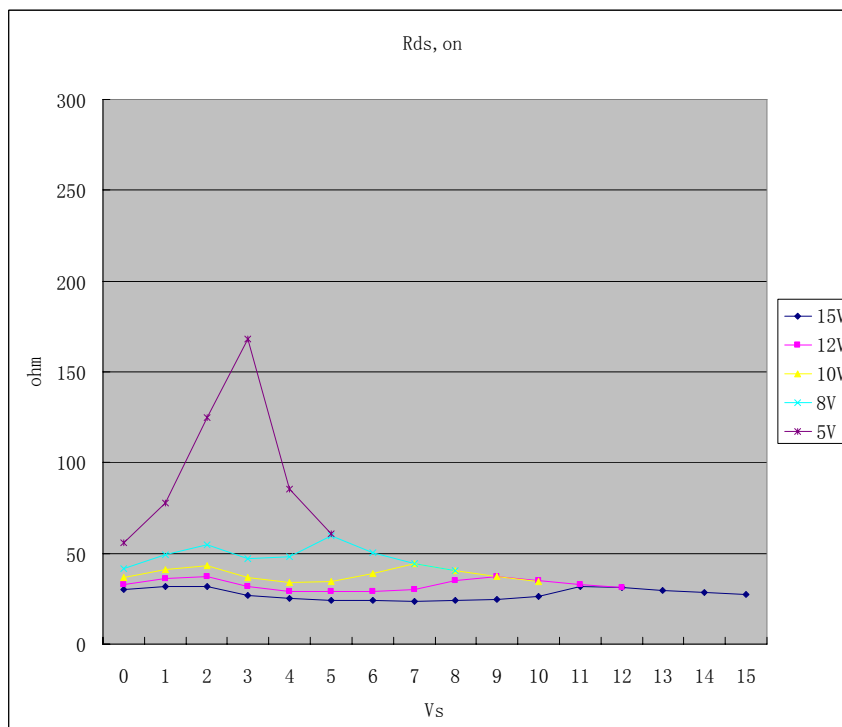
Note: Unless otherwise specified, $T_{amb}=25^{\circ}\text{C}$, $V_L=5\text{V}$, $V_{IN}=2.8\text{V}$, 0.6V

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

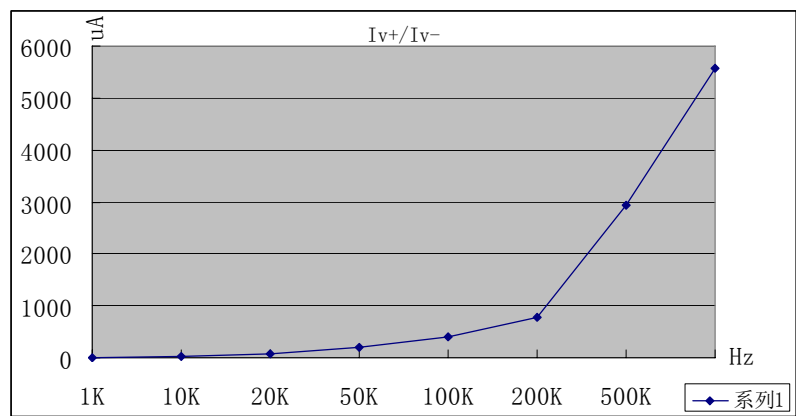
● $R_{DS,ON}$ TYPICAL CHARACTERISTICS (ROOM TEMPERATURE)



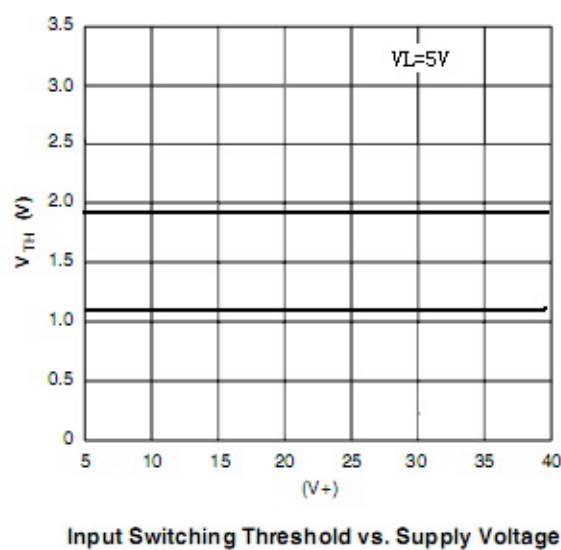
● $R_{DS,ON}$ TYPICAL CHARACTERISTICS WITH UNIPOLAR SUPPLY (ROOM TEMPERATURE)



● SWITCHING TIME VS. INPUT SWITCHING FREQUENCY

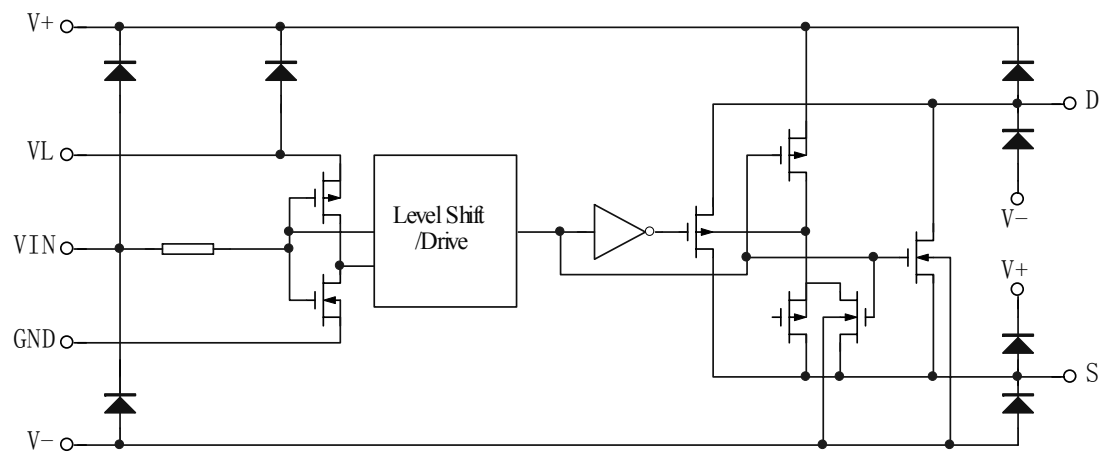


● INPUT SWITCHING THRESHOLD VS. SUPPLY VOLTAGE

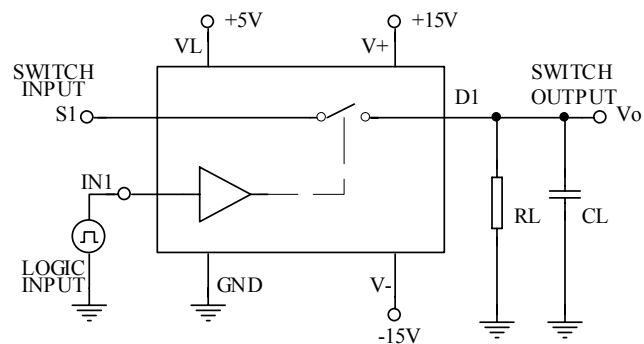


Input Switching Threshold vs. Supply Voltage

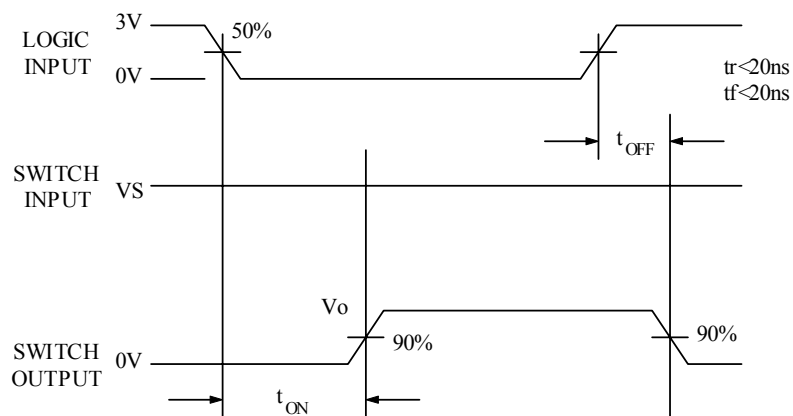
SCHEMATIC DIAGRAM (TYPICAL CHANNEL)



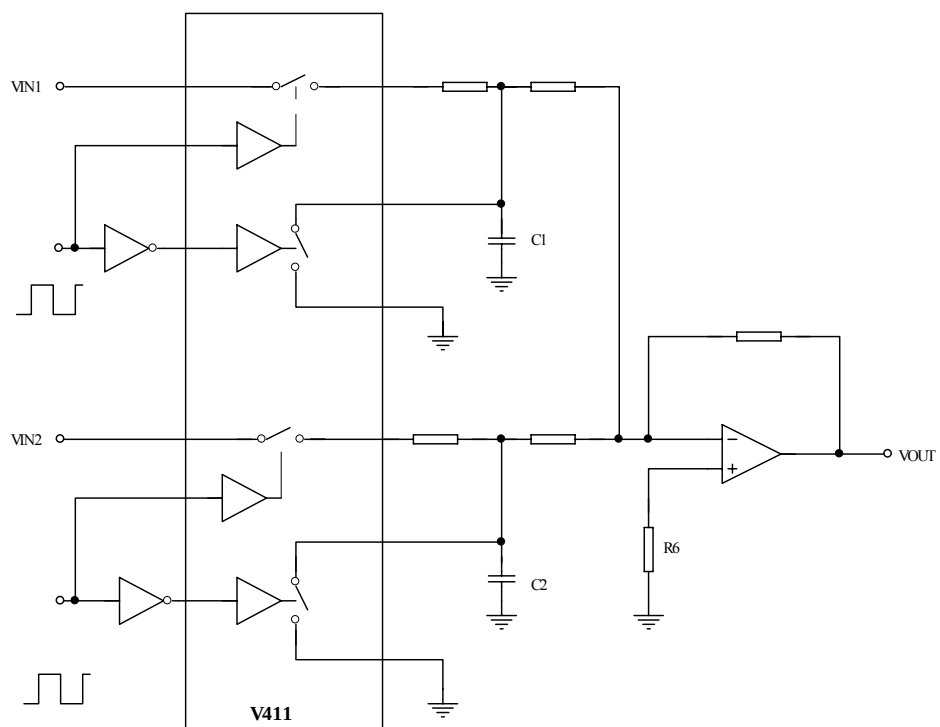
TEST CIRCUITS



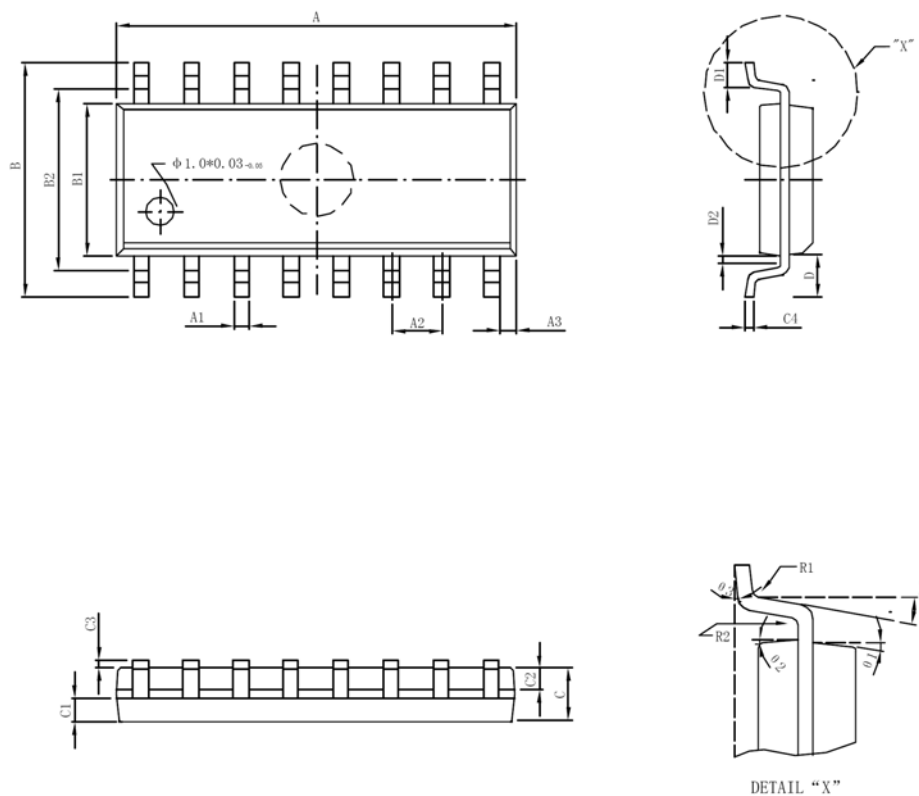
$$V_o = V_s \frac{R_L}{R_L + r_{DS(ON)}}$$



APPLICATIONS



Package Dimensions



Symbol	Min. (mm)	Max (mm)	Symbol	Min. (mm)	Max (mm)
A	9.9	10.10	C4	0.2TYP	
A1	0.356	0.456	D	1.05TYP	
A2	1.27TYP		D1	0.40	0.70
A3	0.35TYP		D2	0.22	0.42
B	5.84	6.24	R1	0.15TYP	
B1	3.84	4.04	R2	0.15TYP	
B2	5.0TYP		$\theta 1$	8°TYP	
C	1.35	1.55	$\theta 2$	8°TYP	
C1	0.61	0.71	$\theta 3$	4°TYP	
C2	0.54	0.64	$\theta 4$	15°TYP	
C3*	0.10	0.30			