DIO1166

Enhanced Low Voltage SPDT Analog Switch with Power on and Power Off Protection

Features

- Over-Voltage Tolerance (OVT) Features at common port
- Low On Capacitance: 18pF Typical
- Low On Resistance: 10Ω Maximum
- Low Power Consumption: 1uA
  Maximum 10uA Maximum I_{CC} over an Expanded Voltage Range
  (Vin=2.7V, Vcc=4.3V)
- Wide -3dB Bandwidth: >300MHz
- Wide Supply Range: 1.65~5.5V
- Packaged: 5-Lead SC70
- 8kV HBM ESD Rating, 2kV CDM ESD Rating

Descriptions

This single analog switch is designed for 1.65V to 5.5V V_{CC} operation.

The DIO1166 device can handle analog and digital signals. The device permits bidirectional transmission of signals with amplitudes of up to 5.5V(peak). It features power ON/OFF protection on ports effectively protecting device against external signal perturbation. It also offers excellent -3db bandwidth and lower ON resistance, which can be used as analog switch in multiple applications.

Applications

- Cell Phones
- PDAs
- Portable Instrumentation
- Battery Powered Communications
- Computer Peripherals

Ordering Information

Order Part Number	Top Marking		T_A	Package	
DIO1166SC5	YW6J	RoHS/Green	-40 to +85℃	SC70-5	Tape & Reel, 3000

Pin Assignment

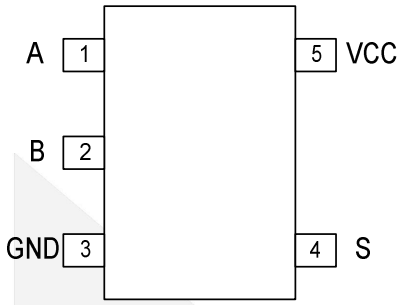

Figure 1 Top View

Pin Descriptions

Pin Name	Description
A	Data Port
B	Data Port
GND	Ground
S	Control Port (L=OFF, H=ON)
Vcc	Power Supply

Absolute Maximum Ratings

Stresses beyond those listed under “Absolute Maximum Rating” may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other condition beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maxim rating conditions for extended periods may affect device reliability.

Symbol	Parameter	Min.	Max.	Unit
V_{CC}	Supply Voltage	-0.5	+6	V
V_S	DC Switch Voltage	-0.5	V_{CC}+0.5	V
V_{IN}	DC Input Voltage	-0.5	+6	V
I_{IK}	DC Input Diode Current	-50		mA
I_{SW}	Switch Current		100	mA
I_{swpeak}	Peak Switch Current (Pulse at 1ms duration, <10% Duty Cycle)		200	mA
P_D	Power Dissipation at 85°C		180	mW
T_{STG}	Strorage Temperature Range	-65	150	°C
Tj	Junction Temperature		150	°C
T_L	Lead Temperature Range		260	°C
ESD	HBM, JEDEC : JESD22-A114		8	kV
	CDM, JEDEC : JESD22-C101		2	

Recommend Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation to ensure optimal performance to the datasheet specifications. DIOO does not recommend exceeding them or designing to Absolute Maximum Ratings.

Symbol	Parameter	Min.	Max.	Unit
V_{CC}	Supply Voltage	1.65	5.5	V
V_{CNTRL}	Control Input Voltage	1.65	5.5	V
V_{SW}	Switch Input Voltage	1.65	5.5	V
T_A	Operating Temperature	-40	85	°C
Θ_{JA}	Thermal Resistance in Still Air		350	°C /W

DC Electrical Characteristics

All typical value are at T_A = 25°C unless otherwise specified.

Symbol	Parameter	Conditions	Vcc(V)	Min.	Typ.	Max.	Unit
V_{IH}	Input voltage high	T_A = -40°C to 85°C	1.8--2.7	1.3			V
			2.7--3.6	1.7			
			4.5--5.5	2.2			
V_{IL}	Input voltage low	T_A = -40°C to 85°C	1.8--2.7			0.6	V
			2.7--3.6			0.7	
			4.5--5.5			1.0	
I_{IN}	Control input leakage	T_A = -40°C to 85°C Vin = 0V to Vcc	2.7--3.6	-1		1	uA
			4.5--5.5	-1		1	
I_{OFF}	Power off leakage current	A=1V, 4.5V, B =4.5, 1V	5.5	-2		2	nA
		T_A=-40°C to 85°C,A=1V, 4.5V, B =4.5, 1V	5.5	-20		20	
$I_{A(ON)}$	On leakage current of Poart A	A=1V, 4.5V, B =4.5, 1V, 4.5V or Floating	5.5	-4		4	nA
		T_A = -40°C to 85°C A=1V, 4.5V, B =4.5, 1V, 4.5V or Floating	5.5	-40		40	
R_{ON}	Switch on Resistance (See figure 2.)	Iout = 30mA, B = 1.5V	2.7		10		Ω
		Iout = 30mA, B = 3.5V	4.5		4		
		T_A = -40°C to 85°C,Iout = 30mA, B = 1.5V	2.7			12	
		T_A = -40°C to 85°C,Iout = 30mA, B = 3.5V	4.5			6	
ΔR_{ON}	On Resistance Matching between Channels	Iout = 30mA, B = 1.5V	4.5			0.2	Ω
		T_A = -40°C to 85°C,Iout = 30mA, B = 1.5V	4.5			0.4	
$R_{FLT(ON)}$	On Resistance Flatness	Iout = 30mA, B = 0V, 0.75V, 1.5V	2.7			5	Ω
		Iout = 30mA, B = 0V, 1V, 2V	4.5			1	
		T_A = -40°C to 85°C Iout = 30mA, B = 0V, 0.75V, 1.5V	2.7			5	
		T_A = -40°C to 85°C Iout = 30mA, B = 0V, 1V, 2V	4.5			1	
I_{CC}	Quiescent supply current	Vin = 0V or Vcc, Iout = 0	3.6		0.1		uA
			5.5		0.1		
		T_A = -40°C to 85°C Vin = 0V or Vcc, Iout = 0	3.6			1	
			5.5			1	
ΔI_{CC}	Icrease in Icc per Input	One input at 2.7V, others at Vcc or GND	4.3		0.2	5	uA
		T_A = -40°C to 85°C, One input at 2.7V, others at Vcc or GND	4.3			10	

AC Electrical Characteristics

All typical value are for Vcc = 3.3V at T_A=25°C unless otherwise specified.

Symbol	Parameter	Conditions	Vcc(V)	Min	Typ	Max	Unit
T_{ON}	Turn-On Time (See figure 3.)	B = 1.5V,R_L = 50Ω, C_L = 35pF	2.7--3.6			35	ns
		B = 1.5V,R_L = 50Ω, C_L = 35pF	4.5--5.5			25	
T_{OFF}	Turn-Off Time (See figure 3.)	B = 1.5V,R_L = 50Ω, C_L = 35pF	2.7--3.6			30	ns
		B = 1.5V,R_L = 50Ω, C_L = 35pF	4.5--5.5			20	
Q	Charge Injection (See figure 4.)	C_L = 1nF, VGE = 0V,RGEN = 0Ω	2.7--3.6		10		pC
			4.5--5.5		20		
OIRR	Off Isolation (See figure 5.)	F = 1MHz, R_L = 50Ω	2.7--3.6		-77		dB
			4.5--5.5		-80		
BW	-3dB bandwidth (See figure 6.)	R_L = 50Ω	2.7--3.6		350		MHz
			4.5--5.5		350		
THD	Total Harmon Distortion (See figure 7.)	R_L = 600Ω, Vin = 0.5V f = 20Hz to 20KHz	2.7--3.6		0.02		%
			4.5--5.5		0.02		

Capacitance

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
C_{IN}	Control Pin input Capacitance	V_{CC}=0V		1		pF
C_{OFF}	B port Off Capacitance (See figure 8.)	Vcc=4.5V, f = 1MHz		5		
C_{ON}	On Capacitance (See figure 9.)			16		

Test Diagrams

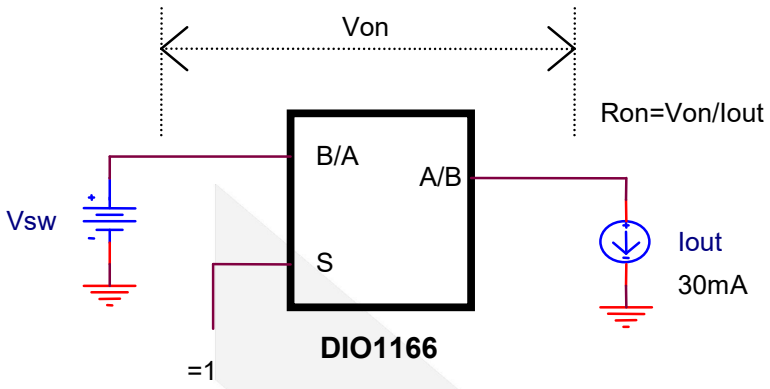

Figure 2. On Resistance

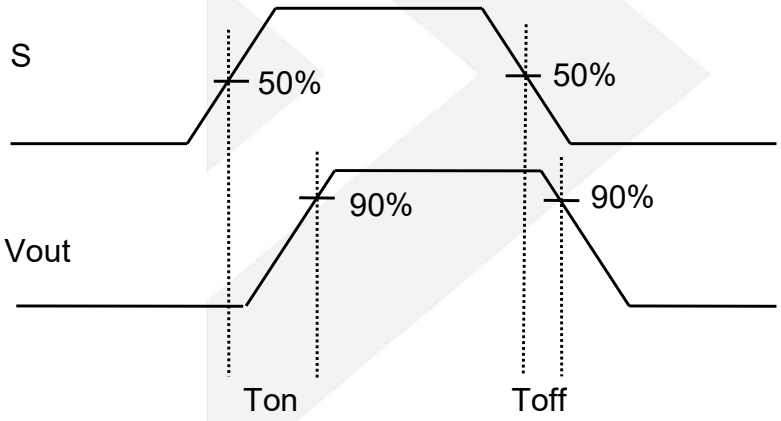

Figure 3. Turn On/Off Time

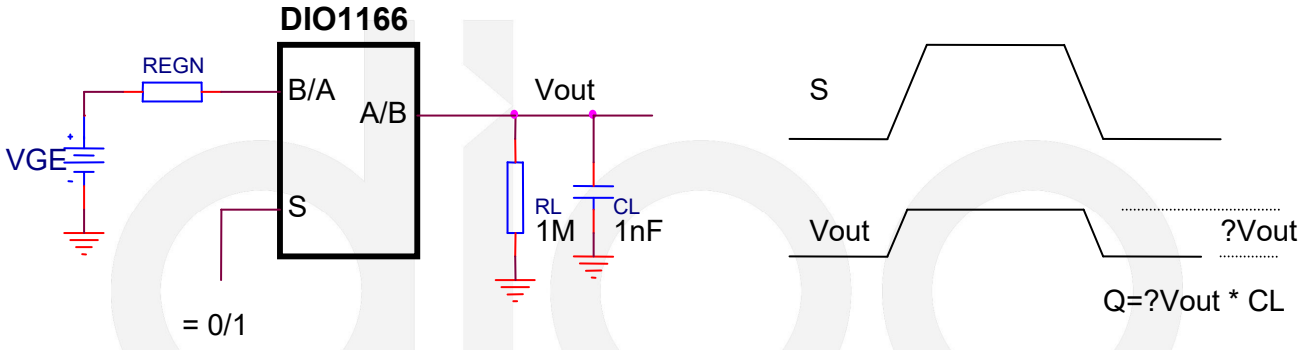

Figure 4. Charge Injection

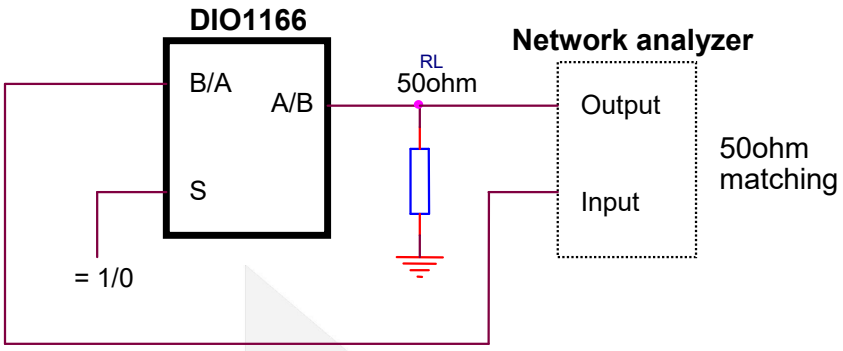

Figure 5. Channel Off Isolation

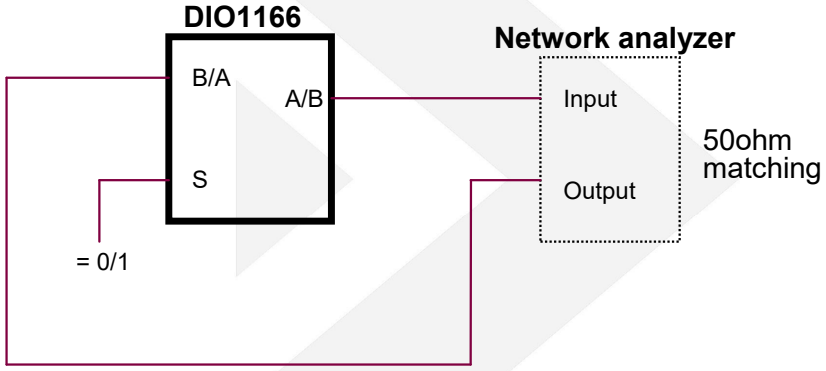

Figure 6. -3dB Bandwidth

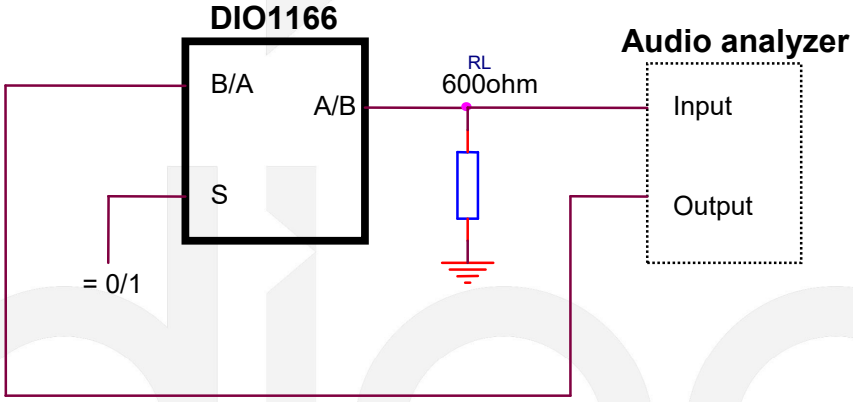

Figure 7. Total Harmon Distortion

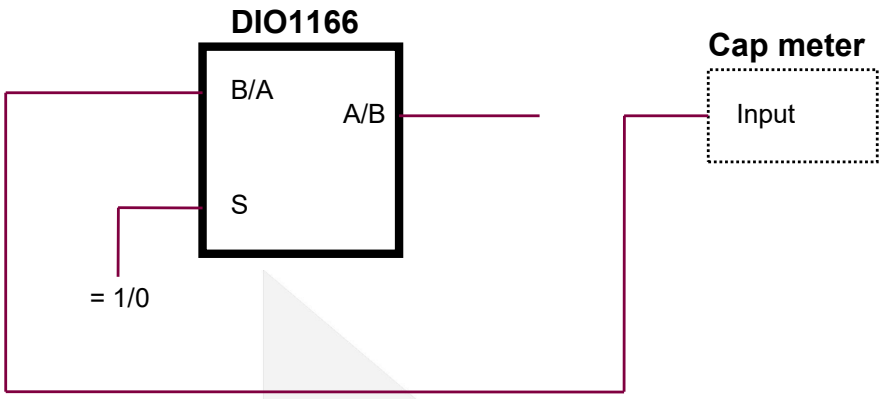

Figure 8. Channel Off Capacitance

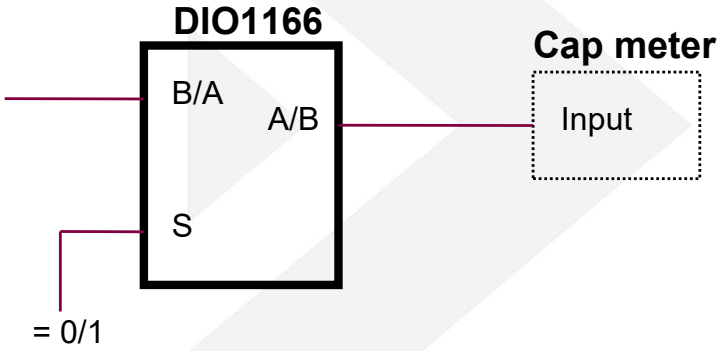

Figure 9. Channel On Capacitance

CONTACT US

Dioo is a professional design and sales corporation for high-quality and performance analog semiconductors. The company focuses on industry markets, such as, cell phone, handheld products, laptop, and medical equipment and so on. Dioo's product families include analog signal processing and amplifying, LED drivers and charger IC. Go to http://www.dioo.com for a complete list of Dioo product families. For additional product information, or full datasheet, please contact with our Sales Department or Representatives.