DIO1269

Low-Voltage Dual-SPDT (1Ω) Analog Switch with Negative Swing Audio Capability

Features

- 1Ω Typical On Resistance (R_{ON}) for 3.0V Supply
- 0.5Ω R_{ON} Flatness for 3.0V Supply
- -3dB Bandwidth: 180MHz
- Low-I_{CCT} Current Over an Expanded Control Input Range
- Green Packaged in DQFN-10
- Power-Off Protection on Common Ports
- Broad VCC Operating Range: 2.7V to 5V

Applications

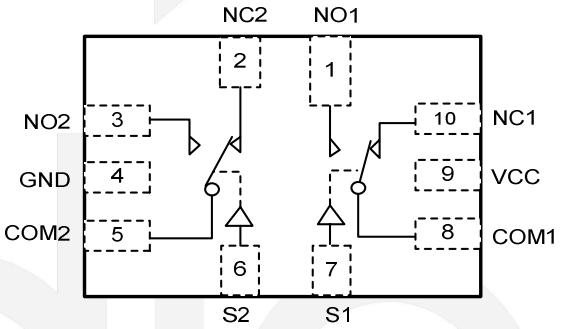
- Cell Phone, and Digital Camera
- PDA , and Notebook
- LCD Monitor
- TV, and Set-Top Box

Descriptions

The DIO1269 is a high-performance, dual Single-Pole Double-Throw (SPDT) analog switch with negative swing audio capability. The DIO1269 features ultra-low R_{ON} of 1Ω (typical) at 3.0V VCC. The DIO1269 operates over a wide VCC range of 2.7V to 5V, is fabricated with sub-micron CMOS technology to achieve fast switching speeds, and is designed for break-before-make operation. The select input is TTL-level compatible.

The DIO1269 features very low quiescent current even when the control voltage is lower than the VCC supply. This feature suits mobile handset applications by allowing direct interface with baseband processor general-purpose I/Os with minimal battery consumption.

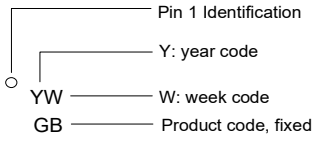
Block Diagram



Ordering Information

Order Part Number	Top Marking		T_A	Package	
DIO1269LP10	YW GB	Green	-40 to 85°C	DQFN-10	Tape & Reel, 3000

Marking Definition



Pin Assignments

DQFN-10(TOP VIEW)

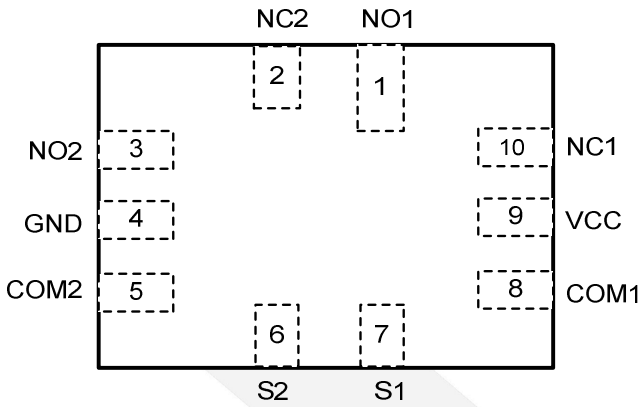


Figure 1 Pin Assignment

Pin Description

Pin Name	Description
NO1	Data Ports
NC2	Data Ports
NO2	Data Ports
GND	Ground
COM2	Data Ports
S2	Switch Select Pins
S1	Switch Select Pins
COM1	Data Ports
VCC	Supply Voltage
NC1	Data Ports

Truth Table

Control Input, Sn	Function
Low Logic Level	NC connected to COM
High Logic Level	NO connected to COM

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 maximum rating conditions for extended periods may affect device reliability.

Parameter		Rating	Unit
Supply Voltage (VCC)		-0.5 to 5.5	V
Switch I/O Voltage (NC, NO, COM Pins)		-2 to 5.5	V
Control Input Voltage (S1,S2 Pins)		-0.5 to (V_+)+0.3	V
Switch I/O Current (Continuous)		350	mA
Peak Switch Current (Pulsed at 1ms Duration,<10 Duty Circle)		500	mA
Storage Temperature Range (T_{STG})		-65 to 150	°C
Junction Temperature		150	°C
Lead Temperature Range		260	°C
MSL (Moisture Sensitivity Level, JEDEC J-STD-020A)		1	
ESD	HBM, JEDEC: JESD22-A114	8	kV
	CDM, JEDEC : JESD22-C101	2	

Note: Input and output negative ratings may be exceeded if input and output diode current ratings are observed.

Recommended 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.

Parameter	Rating	Unit
Supply Voltage	2.7 to 5.25	V
Control Input Voltage (S1,S2 Pins)	0 to VCC	V
Switch I/O Voltage (NC, NO, COM Pins)	-2 to VCC	V
Operating Temperature Range	-40 to 85	°C

Note: For 5V operation, SEL frequency (pins S1 & S2) should not exceed 100Hz and 50ns edge rate.

Electrical Characteristics

Typical value: VCC=2.7V to 5.0V, T_A=25°C, unless otherwise specified.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
ANALOG SWITCH						
Vsw	Switch I/O voltage	2.5≤ VCC ≤3.5V	-2		V_+	V
		3.5≤ VCC ≤5.0V				
R_{ON}	Switch On Resistance	I_{ON} =100mA, NO/NC =5V; VCC =5V		0.8	0.95	Ω
		I_{ON} =100mA, NO/NC =0.7, 3.6, 4.5V; VCC =4.5V		1		
		I_{ON} =100mA, NO/NC =0.7, 3.6V; VCC =3V				
		I_{ON} =100mA, NO/NC =0, 0.7, 1.6, 2.3V; VCC =2.7V				
ΔR_{ON}	On resistance matching between channels	I_{ON} =100mA, NO/NC =0.7V, VCC =4.5V		0.04	0.13	Ω
		I_{ON} =100mA, NO/NC =0.7V, VCC =3V		0.06	0.13	
		I_{ON} =100mA, NO/NC =0.7V, VCC =2.7V		0.12		
$R_{FLAT(ON)}$	On resistance flatness	I_{OUT} =100mA, NO/NC =0 to VCC, VCC =4.5V			1	Ω
		I_{OUT} =100mA, NO/NC =0 to VCC, VCC =3V				
		I_{OUT} =100mA, NO/NC =0 to VCC, VCC =2.7V				
$I_{B(OFF)}$	Source off leakage current	COM =0.5, VCC -0.5V, NO/NC =VCC -0.5, 0.5V, floating VCC =2.7 to 4.5V	-50		50	nA
$I_{A(ON)}$	Channel ON leakage current	COM =0.5, VCC -0.5V, NO/NC = VCC -0.5, 0.5V, floating VCC =2.7 to 4.5V	-20		20	nA
I_{OFF}	Power off leakage current	VCC =0V, NO/NC floating, COM =4.5V	-1		1	μA
I_{CC}	Quiescent supply current	V_{IN} =0 or V_{CC}, Iout=0, VCC =4.5V		32		μA
I_{CCT}	Increase in I_{CC} per input	Input at 2.6V, VCC =4.5V		3	10	μA
		Input at 1.8V, VCC =4.5V		7	15	
DIGITAL INPUT						
V_{IH}	Input voltage high	VCC =4.6V		1.42		V
		VCC =4.2V		1.38		
		VCC =3.6V		1.30		
		VCC =3.2V		1.26		
		VCC =2.8V		1.21		
V_{IL}	Input voltage low	VCC =4.6V		0.64		V
		VCC =4.2V		0.6		
		VCC =3.6V		0.54		
		VCC =3.2V		0.49		
		VCC =2.8V		0.38		
I_{IN}	Input leakage	V_{IN}= 0 to VCC	-0.5		0.5	μA

Electrical Characteristics (continued)

DYNAMIC CHARACTERISTICS						
ton	Turn on time	NO/NC =1.5V, R_L =50Ω, C_L =35pF, VCC =2.7 to 4.5V		3		μs
toff	Turn off time	NO/NC =1.5V, R_L =50Ω, C_L =35pF, VCC =2.7 to 4.5V		0.7		μs
t_{BBM}	Break before make time	NO/NC =1.5V, R_L =50Ω, C_L =35pF, VCC =3.6 to 4.5V		3		μs
		NO/NC =1.5V, R_L =50Ω, C_L =35pF, VCC =2.7to 3.6V		5		
Q	Charge Injection	C_L =1.0nF, V_S=0V, R_S=0Ω, VCC =2.7 to 4.5V		25		pC
O_{IRR}	Off Isolation	f =100kHz, R_L =50Ω, C_L =0pF, VCC =2.7 to 4.5V		-70		dB
X_{TALK}	Crosstalk	f =100kHz, R_L =50Ω, C_L =0pF, VCC =2.7 to 4.5V		-70		dB
BW	-3dB bandwidth	R_L =50Ω, C_L =0pF, VCC =2.7 to 4.5V		180		MHz
THD	Total Harmonic Distortion	f =20Hz to 20kHz, R_L =32Ω, V_{IN} =2Vpp,V_{BIAS} =0V VCC =2.7 to 5V		0.006		%
C_{IN}	Control input capacitance	f =1MHz, VCC =0V		2.5		pF
C_{OFF}	Off capacitance	f =1MHz, VCC =3.3V		30		pF
C_{ON}	On capacitance	f =1MHz, VCC =3.3V		120		pF

Specifications subject to change without notice.

Test Diagrams

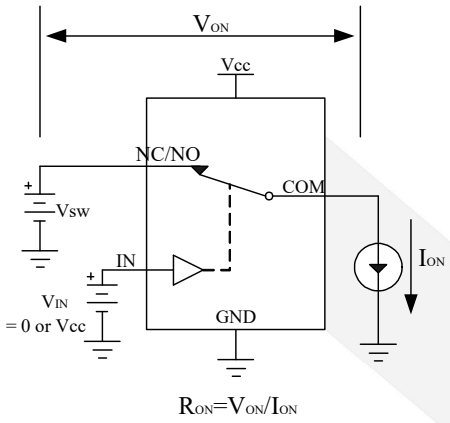


Figure 2 Switch on resistor

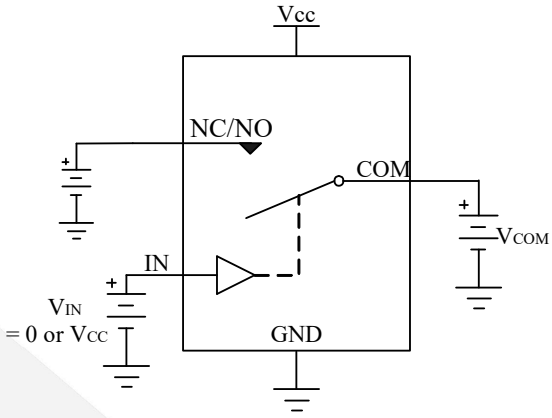


Figure 3 Switch Off Leakage

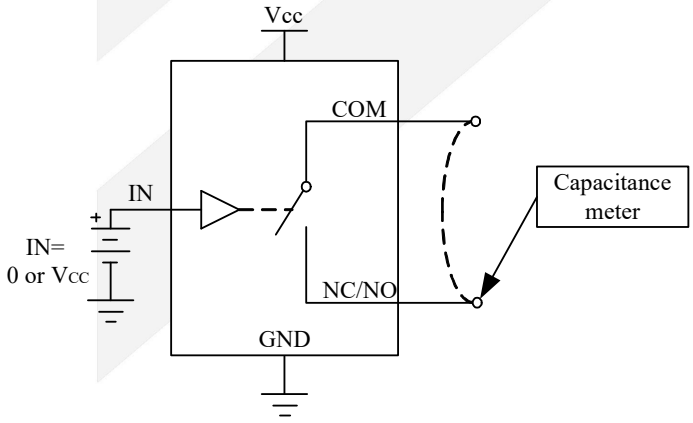


Figure 4 On/off Capacitance test

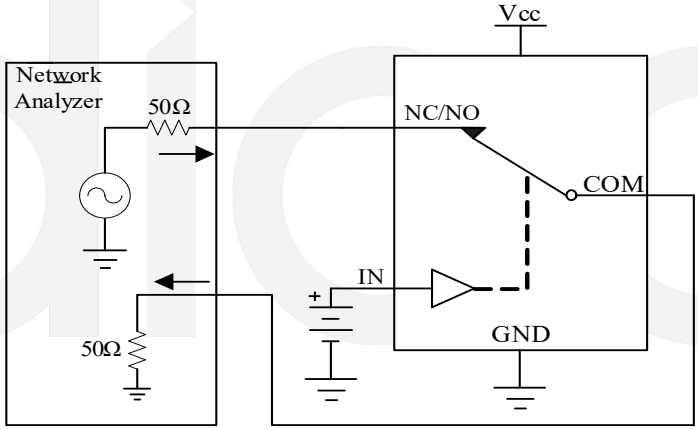


Figure 5 Bandwidth

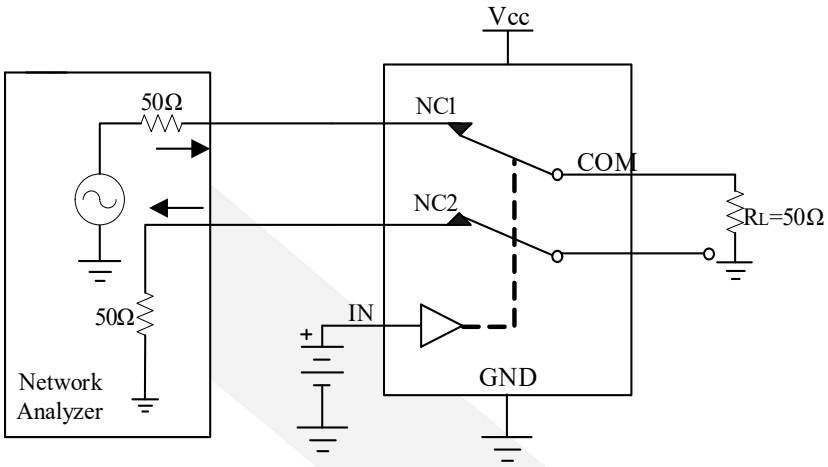


Figure 6 Channel-to-channel crosstalk

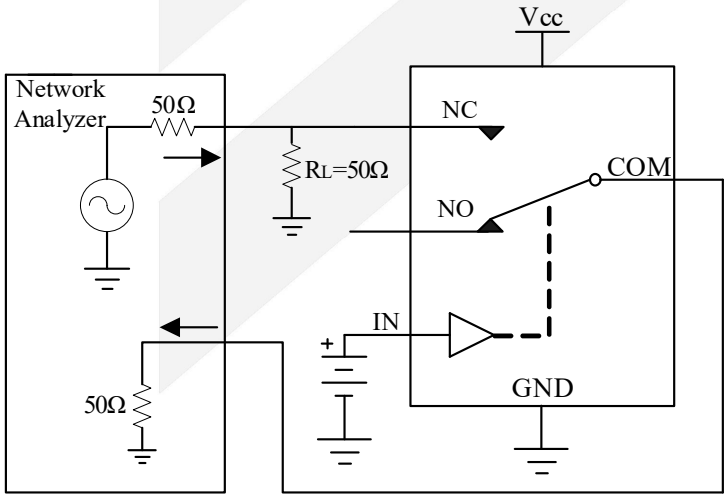


Figure 7 Off-isolation

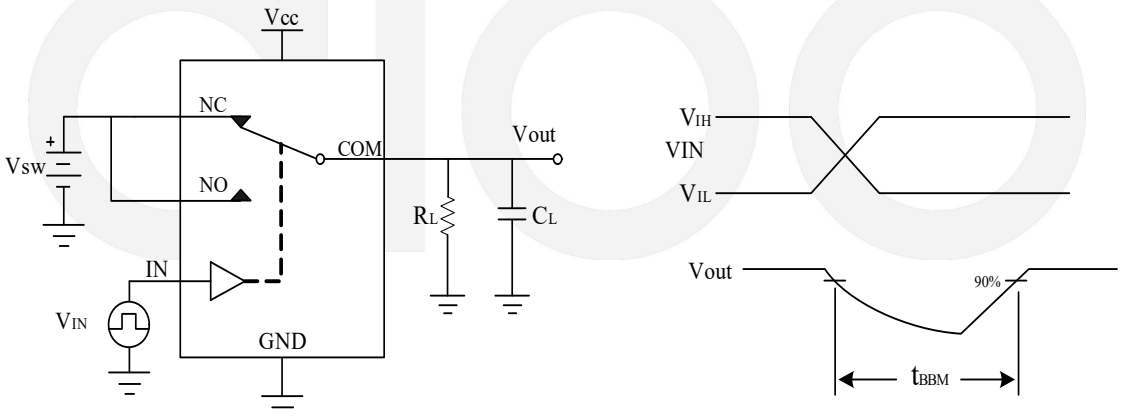


Figure 8 Break-Before-Make

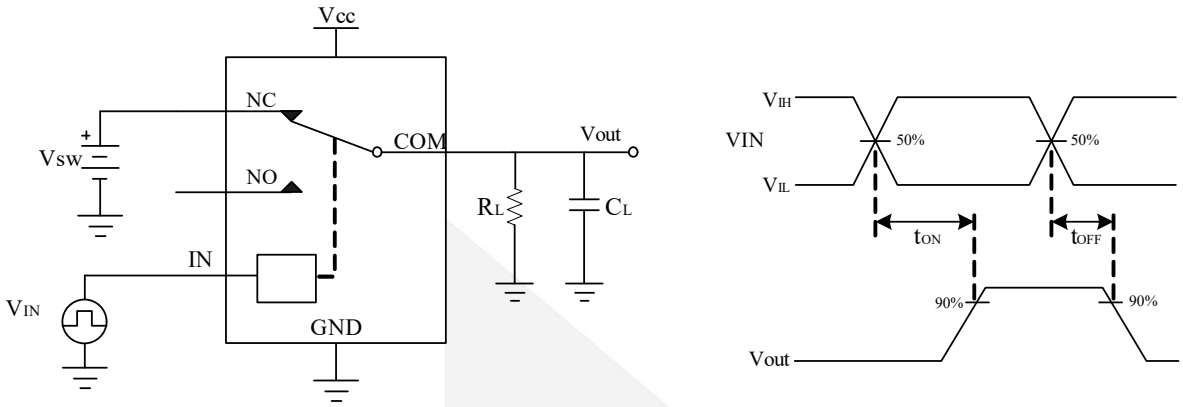
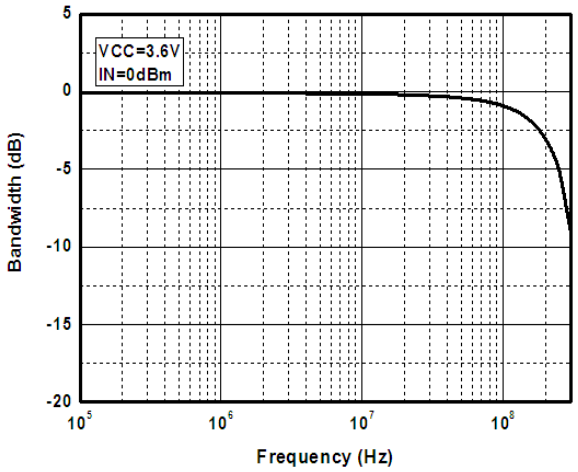


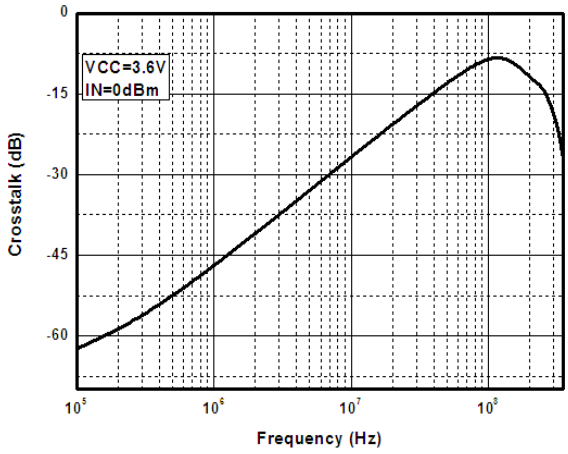
Figure 9 Turn-On/Turn-Off

Typical Performance Characteristics

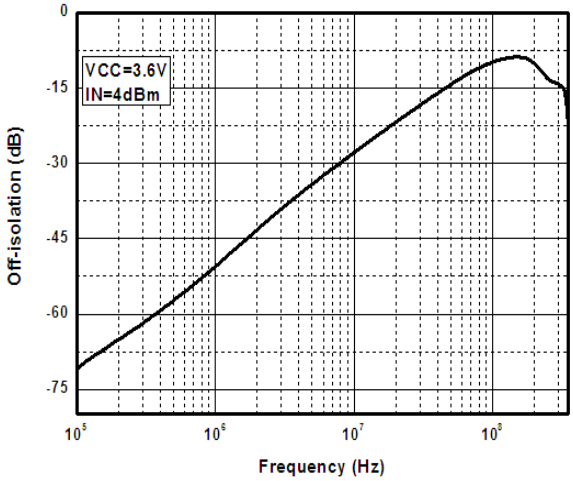
Bandwidth vs.Frequency



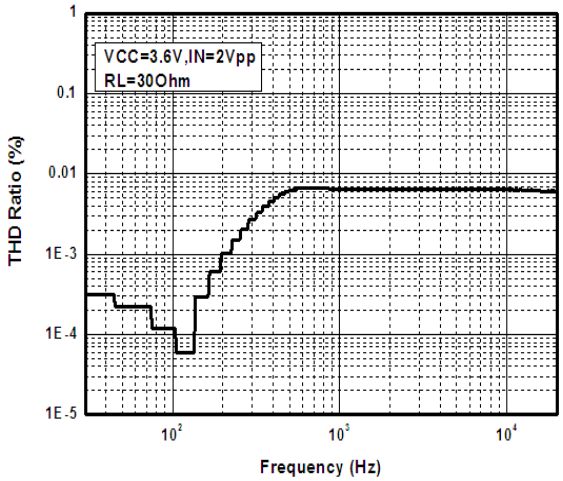
Crosstalk vs.Frequency



Off-isolation vs.Frequency



THD Ratio vs.Frequency



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 equipments 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.

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