DIO3712

High-bandwidth and Low on-resistance Analog switch

Features

- Over-Voltage Tolerance (OVT)
- Voltage Operation: 1.8V to 5.5V
- Low On Resistance: 4.5Ω typ at 4.5Vcc
- High Off-Isolation
- Low Crosstalk
- Low leakage current
- Low power consumption
- Wide -3dB Bandwidth: >300MHz
- Low Distortion
- Packaged: DQFN-10, MSOP-10
- 8kV HBM; 1.5kV CDM ESD Rating

Applications

- Cell Phones
- PDAs and MP3s
- Portable Instrumentation
- Battery Powered Communications
- Computer Peripherals

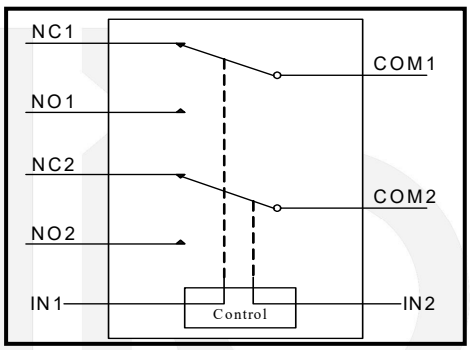
Descriptions

DIO3712 is a dual, bidirectional, single-pole/double-throw (SPDT) CMOS analog switch, which is designed to operate from a single 1.8V to 5.5V supply. It features high-bandwidth (300MHz) and low on-resistance, targeted applications for full speed USB and audio switching.

DIO3712 features power ON/OFF protection 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.

It operates under wide Vcc supply from 1.8V to 5.5V, consuming very low quiescent current even when the voltage of S pin is lower than V_{CC} supply. This new feature services the mobile handset applications very well allowing for the direct interface with baseband processor general purpose I/Os with no need of level translator.

Block Diagram

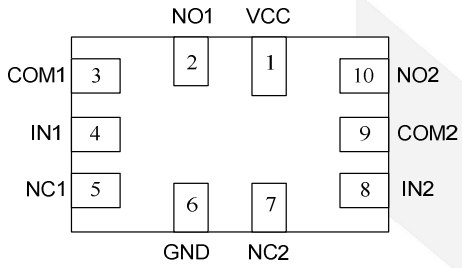


Ordering Information

Order Part Number	Top Marking	Green	T_A	Package	
DIO3712LP10	YWGM	Yes	-40 to 85℃	DQFN-10	Tape & Reel, 3000
DIO3712MP10	DIO3712	Yes	-40 to 85℃	MSOP-10	Tape & Reel, 3000

Pin Assignment

DQFN-10



MSOP-10

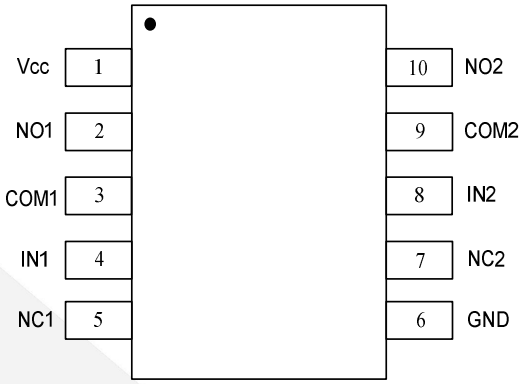


Figure 1 Top View

Pin Descriptions

Pin Name	Description
Vcc	Power Supply
GND	Ground
COM1, COM2	Common Port
NO1, NO2	Data Port
NC1,NC2	Data Port
IN1, IN2	Control Port

Truth Table

IN	Function
1	COM Connected to NO
0	COM Connected to NC

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	-0.3	6	V
Vs	DC Switch Voltage	-0.3	V_{CC}+0.3	V
V_{IN}	DC Input Voltage	-0.3	V_{CC}+0.3	V
Isw	Switch Current		±50	mA
Iswpeak	Peak Switch Current (Pulse at 1ms duration, <10% Duty Cycle)		±80	mA
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		1.5	

Recommend Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended Operating conditions are specified 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	1.8	5.5	V
V_{CNTRL}	Control Input Voltage	0	5.5	V
Vsw	Switch Input Voltage	0	5.5	V
T_A	Operating Temperature	-40	85	°C

DC Electrical Characteristics

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

Symbol	Parameter	Conditions	Temp.	Min.	Typ.	Max.	Unit
V_{IH}	Input voltage high	Vcc=5.0V	-40 to 85°C	1.9			V
		Vcc=3.0V		1.3			
V_{IL}	Input voltage low	Vcc=5.0V	-40 to 85°C			0.9	V
		Vcc=3.0V				0.6	
I_{IN}	Control input leakage	Vcc=1.8V to 5.5V, V_{IN}=0V or 5.5V or 3.6V	-40 to 85°C			1	μA
$I_{NC(OFF)}$ $I_{NO(OFF)}$	Source off leakage current	Vcc=1.8V to 5.5V, V_{NO} or V_{NC}=1.0V, 4.5V, V_{COM}=4.5V, 1.0V, See Figure 3	-40 to 85°C			2	μA
$I_{NC(ON)}$ $I_{NO(ON)}$ $I_{COM(ON)}$	On leakage current	Vcc=1.8V to 5.5V, V_{NO} or V_{NC}=1.0V, 4.5V, V_{COM}=1.0V, 4.5V, or floating	-40 to 85°C			2	μA
R_{ON}	Switch on Resistance	Vcc=2.7V, V_{NO} or V_{NC}=1.2V, I_{COM}=-10mA, See Figure 2	25°C		12		Ω
			-40 to 85°C			15	
		Vcc=4.5V, V_{NO} or V_{NC}=3.5V, I_{COM}=-10mA, See Figure 2	25°C		4.5		Ω
			-40 to 85°C			5.0	
ΔR_{ON}	On Resistance Matching between Channels	Vcc=2.7V, V_{NO} or V_{NC}=1.5V, I_{COM}=-10mA	25°C			0.3	Ω
			-40 to 85°C			0.8	
		Vcc=4.5V, V_{NO} or V_{NC}=3.5V, I_{COM}=-10mA	25°C			0.2	Ω
			-40 to 85°C			0.8	
$R_{FLT(ON)}$	On Resistance Flatness	Vcc=2.7V, V_{NO} or V_{NC}=1.0V, 1.5V, 2.0V, I_{COM}=-10mA	-40 to 85°C		5.0		Ω
		Vcc=4.5V, V_{NO} or V_{NC}=1.0V, 2.0V, 3.5V, I_{COM}=-10mA	-40 to 85°C		1.6		
I_{CC}	Power Supply Current	Vcc=1.8V to 5.5V, V_{IN}=0V or Vcc	-40 to 85°C			5	μA

AC Electrical Characteristics

All typical value are at Vcc=1.8 to 5.5V, T_A=25°C unless otherwise specified

Symbol	Parameter	Conditions		Temp.	Min.	Typ.	Max.	Unit
T_{ON}	Turn-On Time	V_{NO} or V_{NC}=1.5V,R_L = 300Ω, C_L = 35pF,See Figure 9		25°C			23	ns
T_{OFF}	Turn-Off Time	V_{NO} or V_{NC}=1.5V,RL = 300Ω, C_L = 35pF,See Figure 9		25°C			20	ns
Tbbm	Break-Before -Make Time	V_{NO1} or V_{NC1}= V_{NO2} or V_{NC2}= 1.5V, R_L = 300Ω, C_L = 35Pf,See Figure 8		25°C			6	ns
OIRR	Off Isolation	R_L = 50Ω, Signal=0dBm C_L = 5pF See Figure 7	f=10MHz	25°C		-57		dB
			f=1MHz	25°C		-75		
Xtalk	Crosstalk	R_L = 50Ω, Signal=0dBm, C_L = 5pF See Figure 6	f=10MHz	25°C		-96		dB
			f=1MHz	25°C		-100		
BW	-3dB bandwidth	R_L = 50Ω, Signal=0dBm, C_L = 5pF, See Figure 5		25°C		300		MHz

AC Electrical Characteristics(continued)

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

Symbol	Parameter	Conditions	Temp.	Min.	Typ.	Max.	Unit
C_{ON}	On Capacitance, See Figure 4	f=1MHz	25°C		10		pF

Test Diagrams

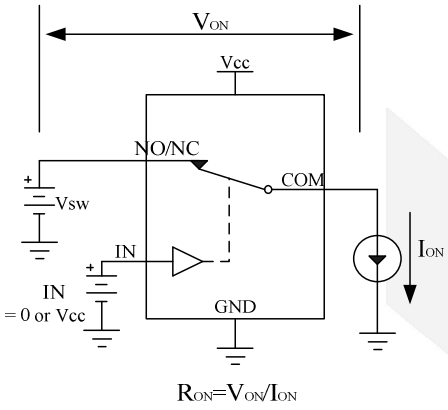


Figure 2 Switch on resistor

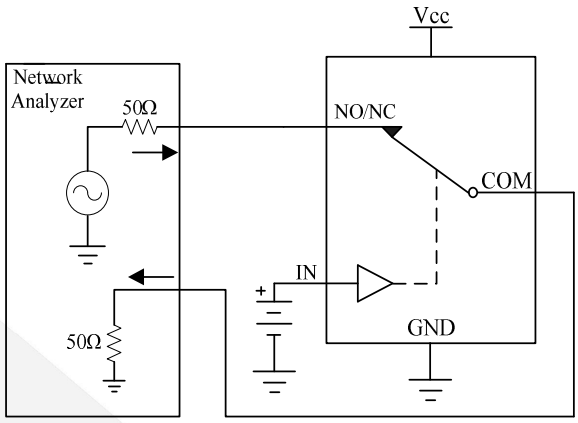


Figure 5 Bandwidth

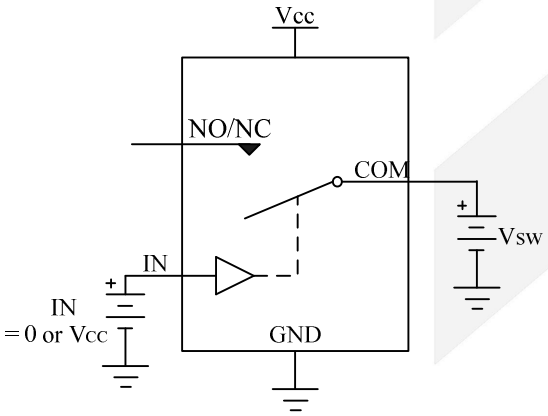


Figure 3 Switch Off Leakage

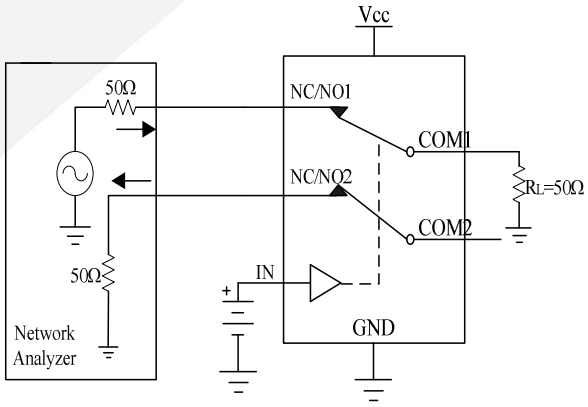


Figure 6 Channel-to-channel crosstalk

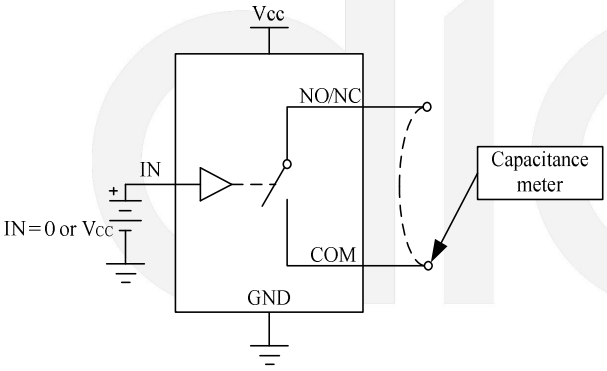


Figure 4 On/off Capacitance test

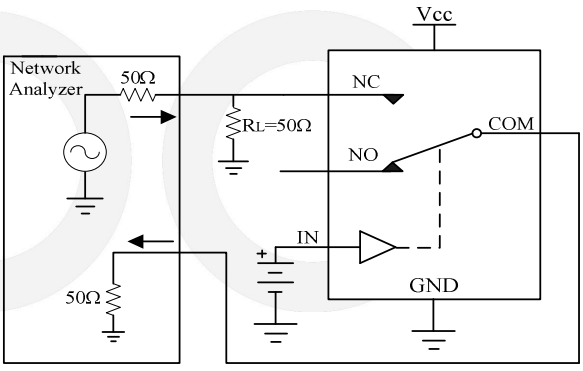
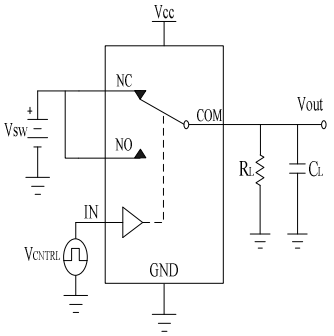


Figure 7 Off-isolation



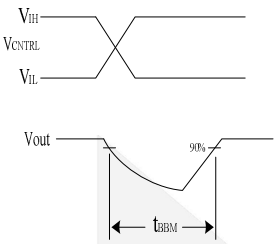
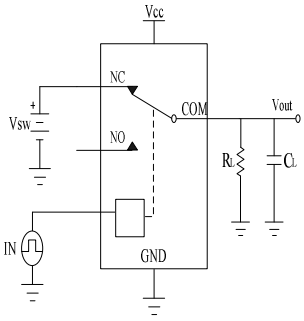


Figure 8 Break-Before-Make



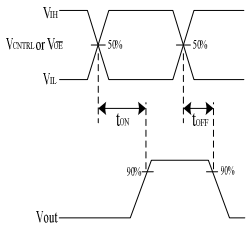


Figure 9 Turn-On/Turn-Off

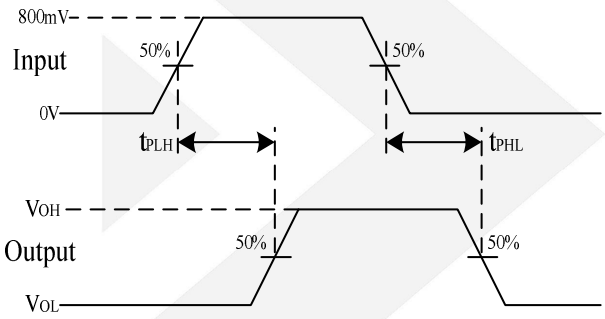
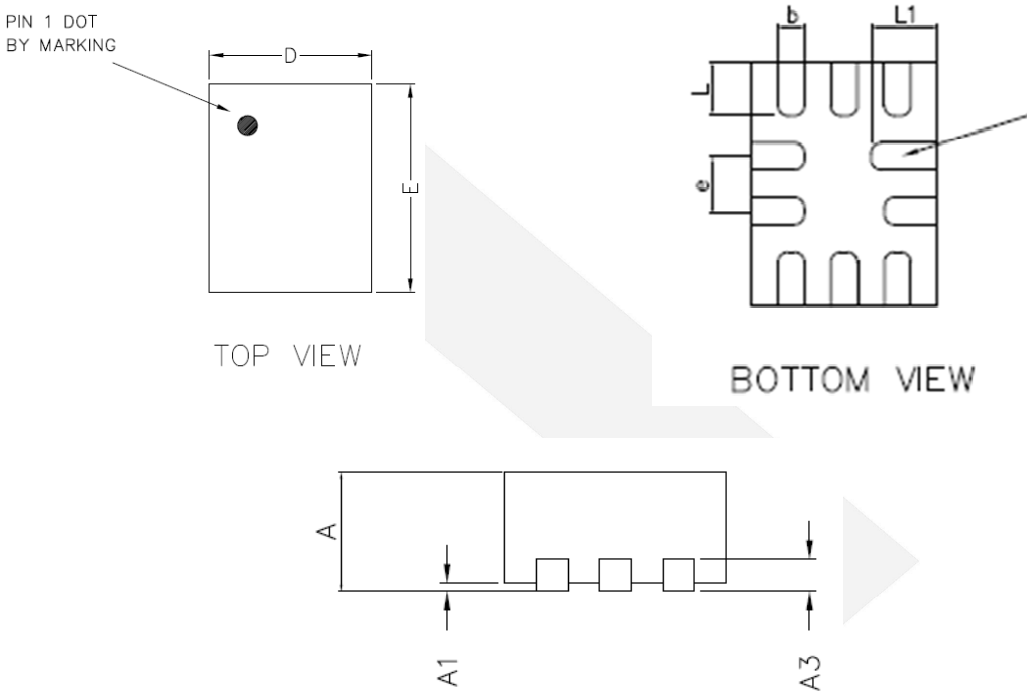


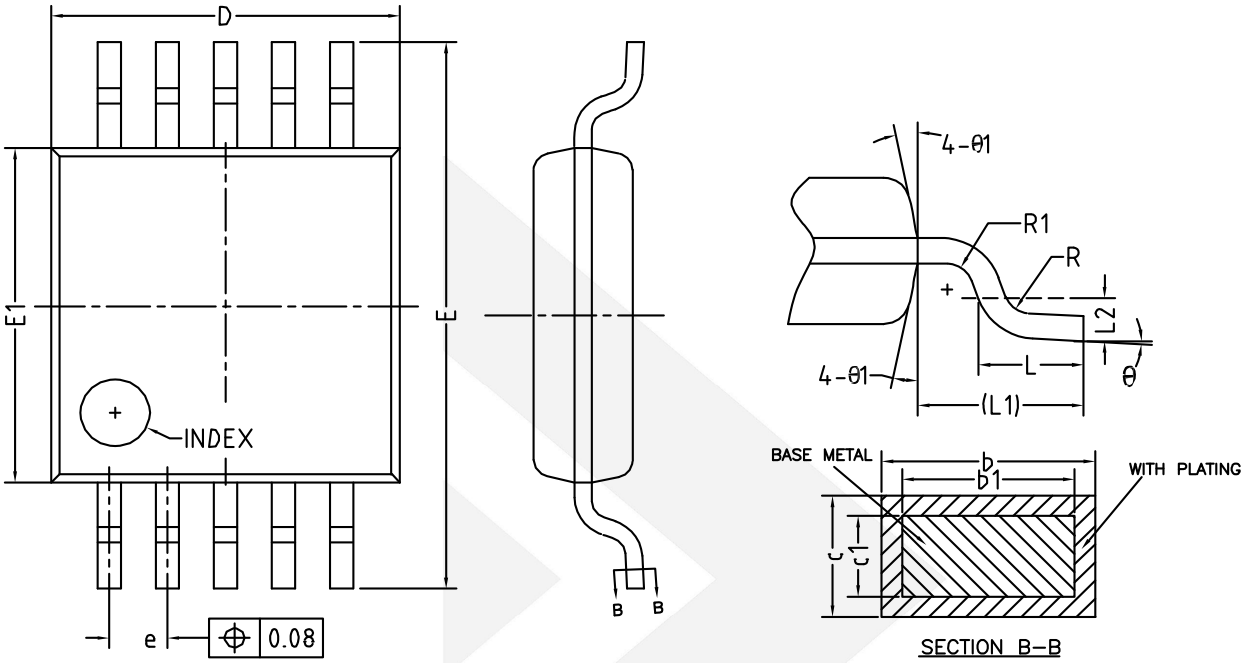
Figure 10 Propagation delay

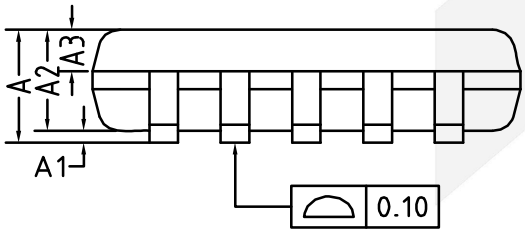
Physical Dimensions: DQFN-10



COMMON DIMENSIONS(MM)			
PKG.	UT:ULTRA THIN		
REF.	MIN.	NOM	MAX
A	0.5	0.55	0.6
A1	0		0.05
A3	0.15REF.		
D	1.35	1.4	1.45
E	1.75	1.8	1.85
b	0.15	0.2	0.25
L	0.3	0.4	0.5
L1	0.4	0.5	0.6
e	0.4BSC		

Physical Dimensions: MSOP-10





COMMON DIMENSIONS (UNITS OF MEASURE=MILLIMETER)			
Symbol	**MIN**	**NOM**	**MAX**
A	-	-	1.10
A1	0	-	0.15
A2	0.75	0.85	0.95
A3	0.25	0.35	0.39
b	0.18	-	0.27
b1	0.17	0.20	0.23
c	0.15	-	0.20
c1	0.14	0.15	0.16
D	2.90	3.00	3.10
E	4.70	4.90	5.10
E1	2.90	3.00	3.10
e	0.40	0.50	0.60
L	0.45	0.60	0.80
L1	0.95REF		
L2	0.25BSC		
R	0.07	-	-
R1	0.07	-	-
Θ	0°	-	8°
Θ1	9°	12°	15°

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.

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