

Low-Voltage Dual SPST Analog Switch

FEATURES

- Low Voltage Operation (+2.7 to +5 V)
- Low On-Resistance - $r_{DS(on)}$: 40 Ω
- Fast Switching - t_{ON} : 35 ns, t_{OFF} : 20 ns
- Low Leakage - $I_{COM(on)}$: 200-pA max
- Low Charge Injection - Q_{INJ} : 1 pC
- Low Power Consumption
- TTL/CMOS Compatible
- ESD Protection > 2000 V (Method 3015.7)
- Available in MSOP-8 and SOIC-8

BENEFITS

- Reduced Power Consumption
- Simple Logic Interface
- High Accuracy
- Reduce Board Space

APPLICATIONS

- Battery Operated Systems
- Portable Test Equipment
- Sample and Hold Circuits
- Cellular Phones
- Communication Systems
- Military Radio
- PBX, PABX Guidance and Control Systems

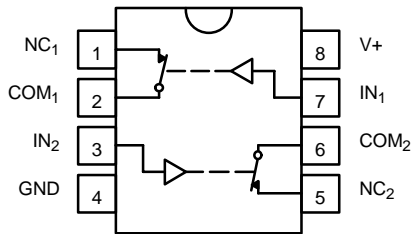
DESCRIPTION

The DG9262/9263 is a single-pole/single-throw monolithic CMOS analog device designed for high performance switching of analog signals. Combining low power, high speed (t_{ON} : 35 ns, t_{OFF} : 20 ns), low on-resistance ($r_{DS(on)}$: 40 Ω) and small physical size, the DG9262/9263 is ideal for portable and battery powered applications requiring high performance and efficient use of board space.

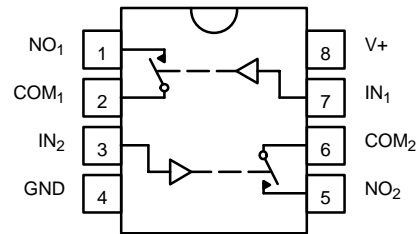
The DG9262/9263 is built on Vishay Siliconix's low voltage BCD-15 process. Minimum ESD protection, per Method 3015.7 is 2000 V. An epitaxial layer prevents latchup. Break-before -make is guaranteed for DG9262/9263.

Each switch conducts equally well in both directions when on, and blocks up to the power supply level when off.

FUNCTIONAL BLOCK DIAGRAM AND PIN CONFIGURATION



Top View



Top View

TRUTH TABLE - DG9262	
Logic	Switch
0	On
1	Off

Logic "0" \leq 0.8 V
Logic "1" \geq 2.4 V

TRUTH TABLE - DG9263	
Logic	Switch
0	Off
1	On

Logic "0" \leq 0.8 V
Logic "1" \geq 2.4 V

ORDERING INFORMATION		
Temp Range	Package	Part Number
-40 to 85°C	SOIC-8	DG9262DY
		DG9263DY
	MSOP-8	DG9262DQ
		DG9263DQ



ABSOLUTE MAXIMUM RATINGS

Reference to GND

V+	-0.3 to +13 V
IN, COM, NC, NO ^a	-0.3 to (V+ + 0.3 V)
Continuous Current (Any terminal)	±20 mA
Peak Current (Pulsed at 1ms, 10% duty cycle)	±40 mA
ESD (Method 3015.7)	> 2000 V

Storage Temperature (D Suffix)	-65 to 125°C
Power Dissipation (Packages) ^b	
8-Pin Narrow Body SOIC ^c	400 mW

- Notes:
- Signals on S_X, D_X, or IN_X exceeding V+ or V- will be clamped by internal diodes. Limit forward diode current to maximum current ratings.
 - All leads welded or soldered to PC Board.
 - Derate 6.5 mW/°C above 75°C

SPECIFICATIONS (V+ = 3 V)							
Parameter	Symbol	Test Conditions Otherwise Unless Specified V+ = 3 V, ±10%, V _{IN} = 0.8 or 2.4 V ^e	Temp ^a	D Suffix -40 to 85°C			Unit
				Min ^b	Typ ^c	Max ^b	
Analog Switch							
Analog Signal Range ^d	V _{ANALOG}		Full	0		3	V
Drain-Source On-Resistance	r _{DS(on)}	V _{NO} or V _{NC} = 1.5 V, V+ = 2.7 V I _{COM} = 5 mA	Room Full		50	80 140	Ω
r _{DS(on)} Match ^d	Δr _{DS(on)}	V _{NO} or V _{NC} = 1.5 V	Room		0.4	2	
r _{DS(on)} Flatness ^d	r _{DS(on)} Flatness	V _{NO} or V _{NC} = 1 and 2 V	Room		4	8	
NO or NC Off Leakage Current ^g	I _{NO/NC(off)}	V _{NO} or V _{NC} = 1 V / 2 V, V _{COM} = 2 V / 1 V	Room Full	-100 -5000	5	100 5000	pA
COM Off Leakage Current ^g	I _{COM(off)}	V _{COM} = 1 V / 2 V, V _{NO} or V _{NC} = 2 V / 1 V	Room Full	-100 -5000	5	100 5000	
Channel-On Leakage Current ^g	I _{COM(on)}	V _{COM} = V _{NO} or V _{NC} = 1 V / 2 V	Room Full	-200 -10000	10	200 10000	
Digital Control							
Input Current	I _{INL} or I _{INH}		Full		1		μA
Dynamic Characteristics							
Turn-On Time	t _{ON}	V _{NO} or V _{NC} = 1.5 V	Room Full		50	120 200	ns
Turn-Off Time	t _{OFF}		Room Full		20	50 120	
Charge Injection ^d	Q _{INJ}	C _L = 1 nF, V _{GEN} = 0 V, R _{GEN} = 0 Ω	Room		1	5	pC
Off-Isolation	OIRR	R _L = 50 Ω, C _L = 5 pF, f = 1 MHz	Room		-74		dB
Crosstalk	X _{TALK}		Room		-90		
NC and NO Capacitance	C _(off)	f = 1 MHz	Room		7		pF
Channel-On Capacitance	C _{COM(on)}		Room		20		
Com-Off Capacitance	C _{COM(off)}		Room		13		
Power Supply							
Power Supply Range	V+			2.7		12	V
Power Supply Current	I+	V+ = 3.3 V, V _{IN} = 0 or 3.3 V				1	μA

Notes:

- Room = 25°C, Full = as determined by the operating suffix.
- The algebraic convention whereby the most negative value is a minimum and the most positive a maximum, is used in this data sheet.
- Typical values are for design aid only, not guaranteed nor subject to production testing.
- Guarantee by design, nor subjected to production test.
- V_{IN} = input voltage to perform proper function.
- Difference of min and max values.
- Guaranteed by 5-V leakage test, not production tested.



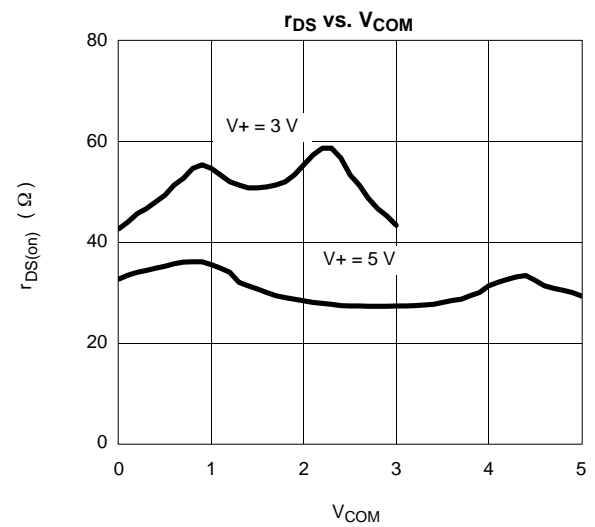
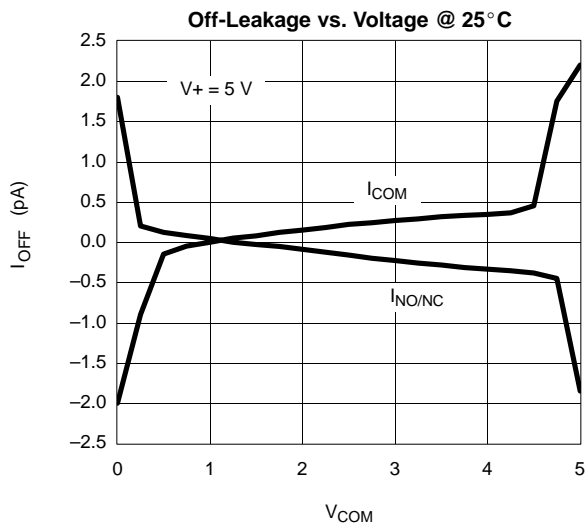
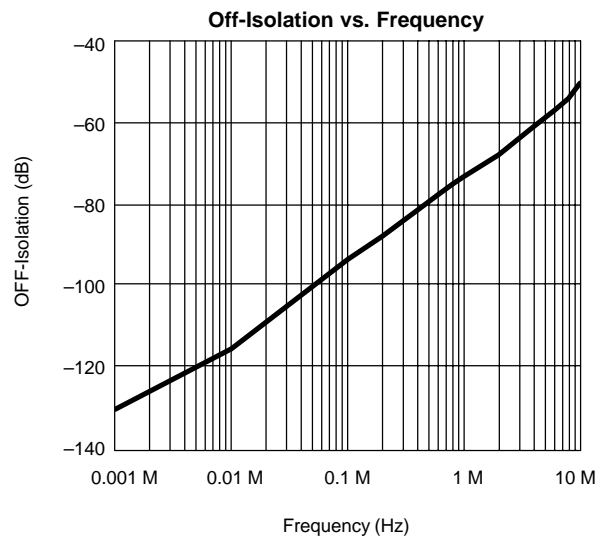
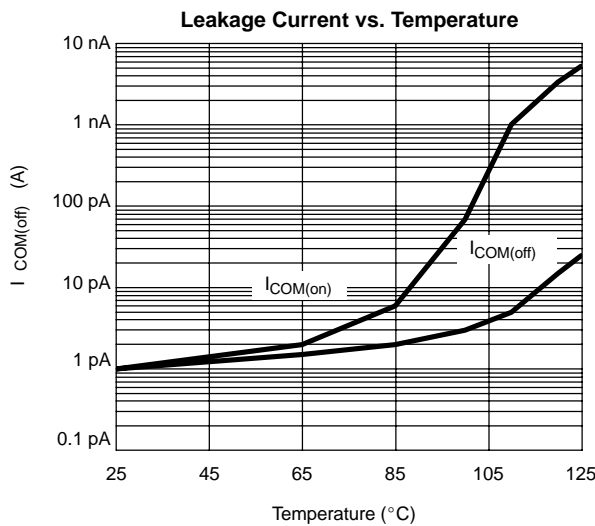
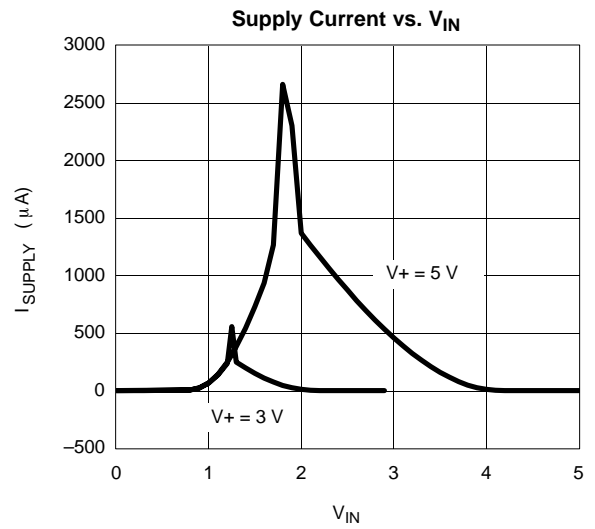
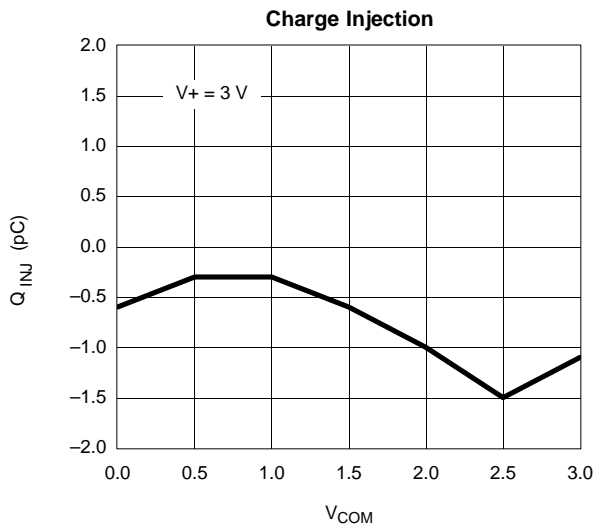
SPECIFICATIONS (V+ = 5 V)							
Parameter	Symbol	Test Conditions Otherwise Unless Specified V+ = 5 V, ± 10%, VIN = 0.8 or 2.4 V ^e	Temp ^a	D Suffix –40 to 85°C			Unit
				Min ^b	Typ ^c	Max ^b	
Analog Switch							
Analog Signal Range ^d	V _{ANALOG}		Full	0		5	V
Drain-Source On-Resistance	r _{DS(on)}	V _{NO} or V _{NC} = 3.5 V, V+ = 4.5 V I _{COM} = 5 mA	Room Full		30	60 75	Ω
r _{DS(on)} Match ^d	Δr _{DS(on)}	V _{NO} or V _{NC} = 3.5 V	Room		0.4	2	
r _{DS(on)} Flatness ^f	r _{DS(on)} Flatness	V _{NO} or V _{NC} = 1, 2, and 3 V	Room		2	6	
NO or NC Off Leakage Current	I _{NO/NC(off)}	V _{NO} or V _{NC} = 1 V / 4 V, V _{COM} = 4 V / 1 V	Room Full	-100 –5000	10	100 5000	pA
COM Off Leakage Current	I _{COM(off)}	V _{COM} = 1 V / 4 V, V _{NO} or V _{NC} = 4 V / 1 V	Room Full	-100 –5000	10	100 5000	
Channel-On Leakage Current	I _{COM(on)}	V _{COM} = V _{NO} or V _{NC} = 1 V / 4 V	Room Full	-200 –10000		200 10000	
Digital Control							
Input Current	I _{INL} or I _{INH}		Full		1		μA
Dynamic Characteristics							
Turn-On Time	t _{ON}	V _{NO} or V _{NC} = 3.0 V	Room Full		35	75 150	ns
Turn-Off Time	t _{OFF}		Room Full		20	50 100	
Charge Injection ^d	Q _{INJ}	C _L = 1 nF, V _{GEN} = 0 V, R _{GEN} = 0 Ω	Room		2	5	pC
Off-Isolation	OIRR	R _L = 50 Ω, C _L = 5 pF, f = 1 MHz	Room		–74		dB
Crosstalk	X _{TALK}		Room		–90		
NC and NO Capacitance	C _(off)	f = 1 MHz	Room		7		pF
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Power Supply							
Power Supply Range	V+			2.7		12	V
Power Supply Current	I+	V+ = 5.5 V, VIN = 0 or 5.5 V				1	μA

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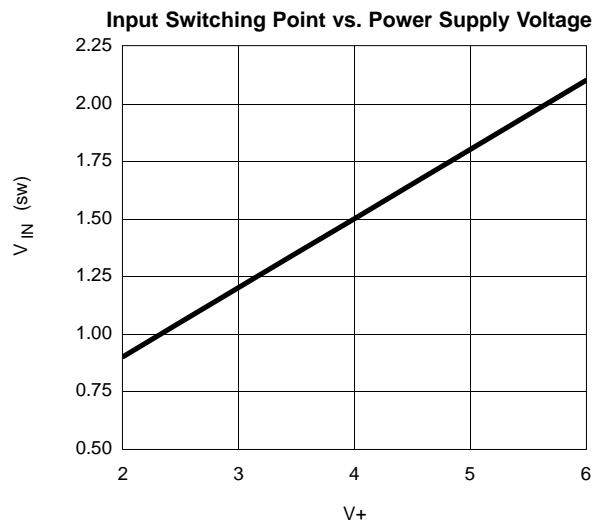
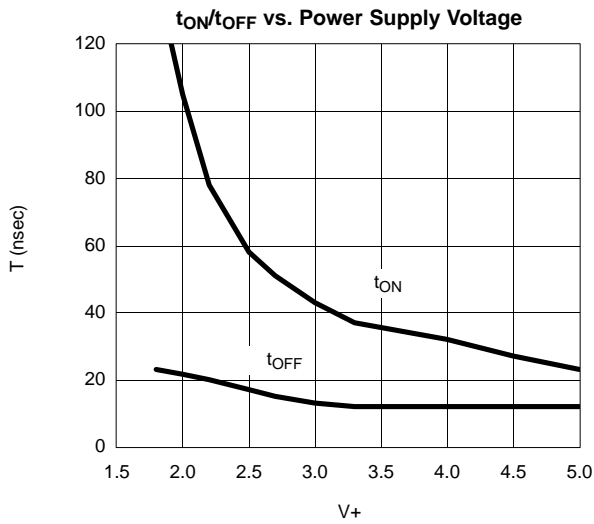
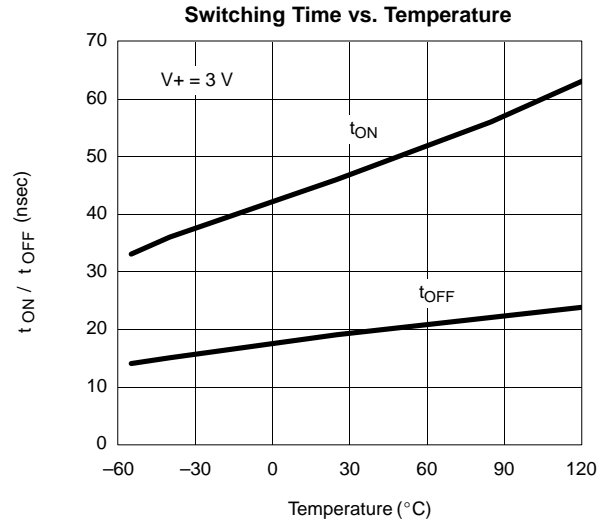
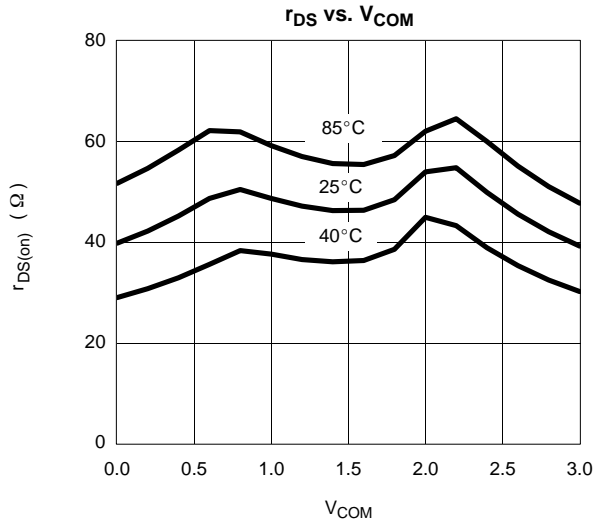


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

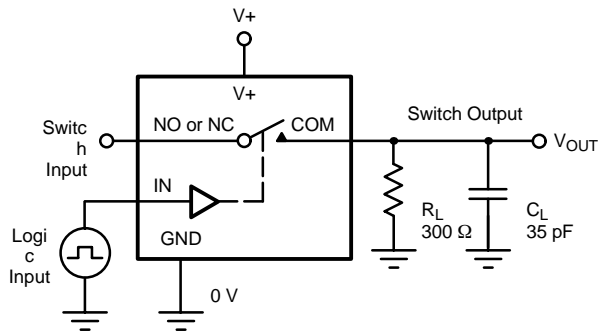




TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

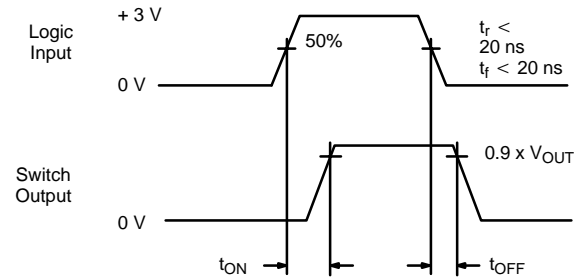


TEST CIRCUITS



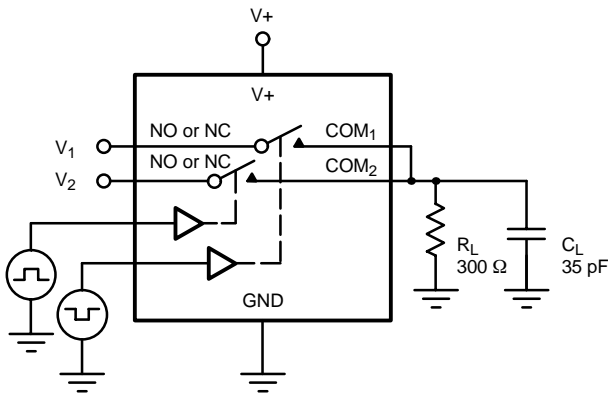
C_L (includes fixture and stray capacitance)

$$V_{OUT} = V_{COM} \left(\frac{R_L}{R_L + R_{ON}} \right)$$



Logic "1" = Switch On
Logic input waveforms inverted for switches that have the opposite logic sense.

FIGURE 1. Switching Time



C_L (includes fixture and stray capacitance)

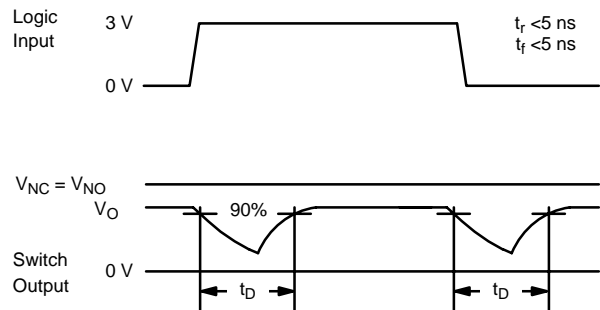
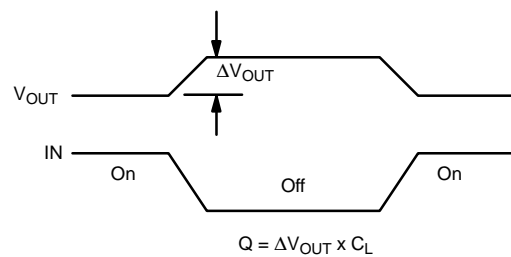
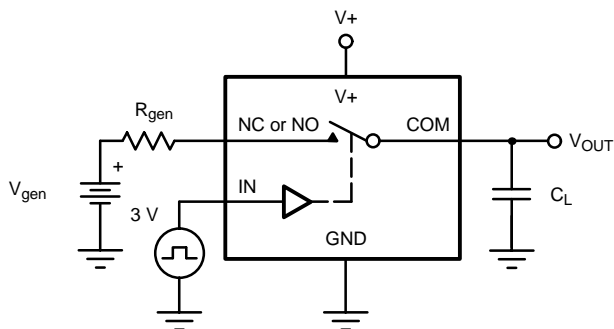


FIGURE 2. Break-Before-Make Interval



IN depends on switch configuration: input polarity determined by sense of switch.

FIGURE 3. Charge Injection

TEST CIRCUITS

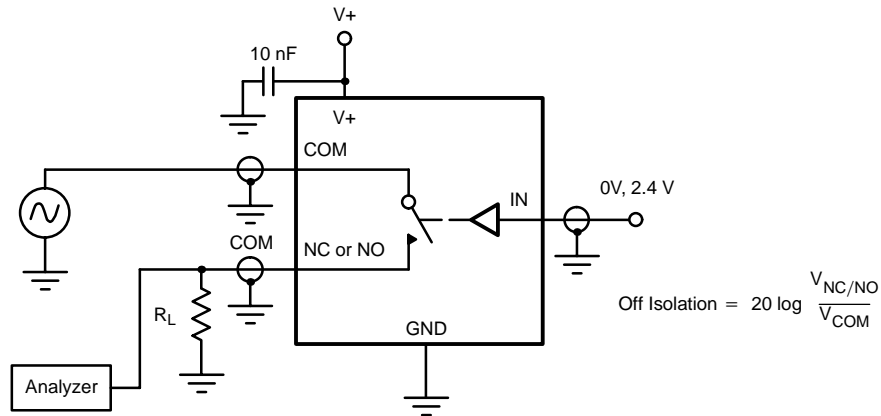


FIGURE 4. Off-Isolation

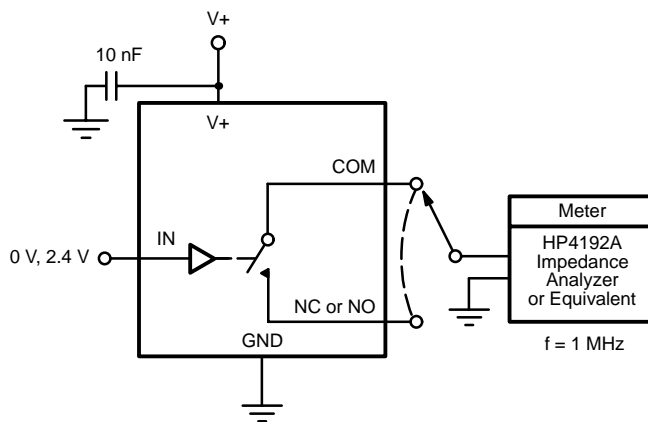


FIGURE 5. Channel Off/On Capacitance



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