

Low-Voltage Dual SPST Analog Switch

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.

BENEFITS

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

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

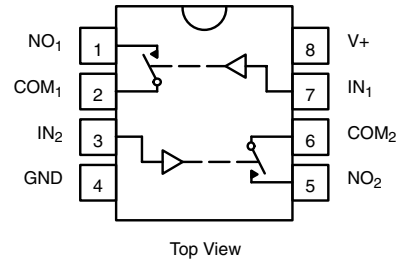
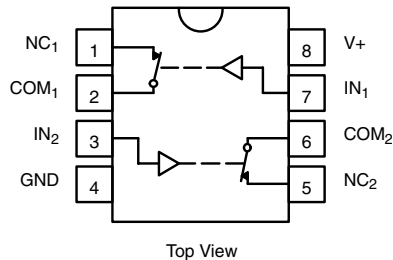


RoHS*
COMPLIANT

APPLICATIONS

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

FUNCTIONAL BLOCK DIAGRAM AND PIN CONFIGURATION



TRUTH TABLE - DG9262

Logic	Switch
0	On
1	Off

Logic "0" ≤ 0.8 V

Logic "1" ≥ 2.4 V

TRUTH TABLE - DG9263

Logic	Switch
0	Off
1	On

Logic "0" ≤ 0.8 V

Logic "1" ≥ 2.4 V

ORDERING INFORMATION

Temp Range	Package	Part Number
- 40 to 85 °C	SOIC-8	DG9262DY
		DG9262DY-E3
		DG9262DY-T1
		DG9262DY-T1-E3
	MSOP-8	DG9263DY
		DG9263DY-E3
		DG9263DY-T1
		DG9263DY-T1-E3
		DG9262DQ-T1-E3
		DG9263DQ-T1-E3

* Pb containing terminations are not RoHS compliant, exemptions may apply

ABSOLUTE MAXIMUM RATINGS

Parameter	Limit	Unit
Reference V ₊ to GND	- 0.3 to + 13	V
IN, COM, NC, NO ^a	- 0.3 to (V ₊ + 0.3)	
Continuous Current (Any Terminal)	± 20	mA
Peak Current (Pulsed at 1 ms, 10 % duty cycle)	± 40	
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:

a. 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.

b. All leads welded or soldered to PC Board.

c. Derate 6.5 mW/°C above 75 °C.

SPECIFICATIONS (V₊ = 3 V)

Parameter	Symbol	Test Conditions Unless Otherwise Specified V+ = 3 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		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, VIN = 0 or 3.3 V				1	μA

Notes:

a. Room = 25 °C, Full = as determined by the operating suffix.

b. The algebraic convention whereby the most negative value is a minimum and the most positive a maximum, is used in this data sheet.

c. Typical values are for design aid only, not guaranteed nor subject to production testing.

d. Guarantee by design, nor subjected to production test.

e. V_{IN} = input voltage to perform proper function.

f. Difference of min and max values.

g. Guraranteed by 5 V leakage testing, not production tested.



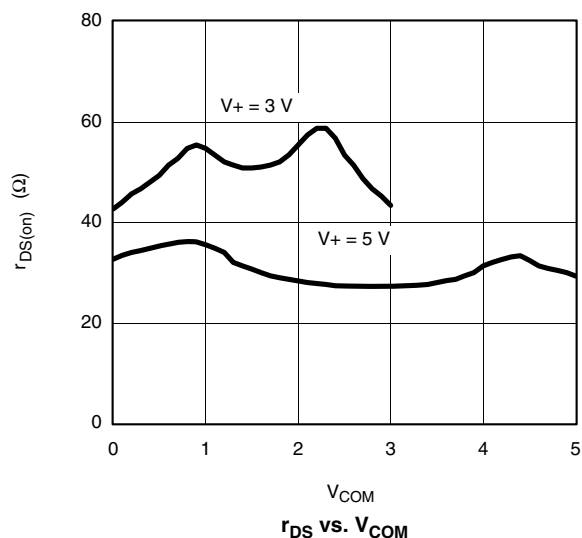
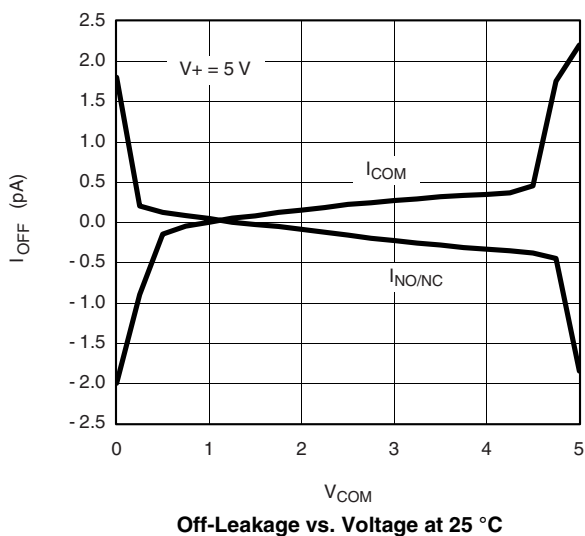
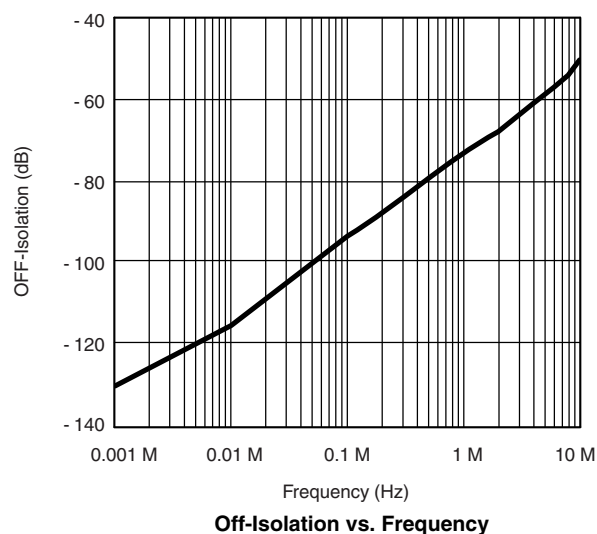
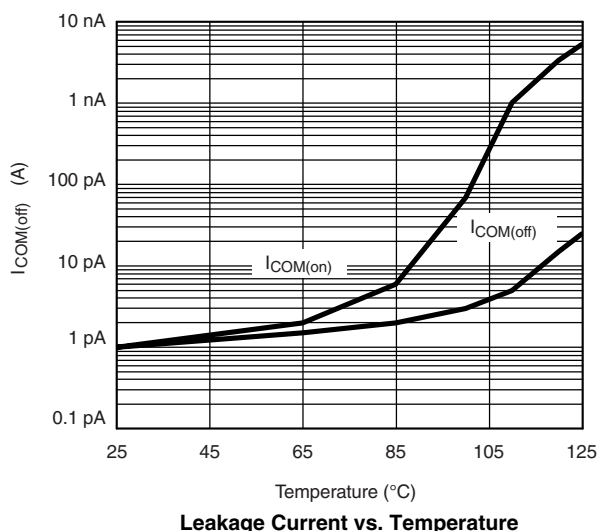
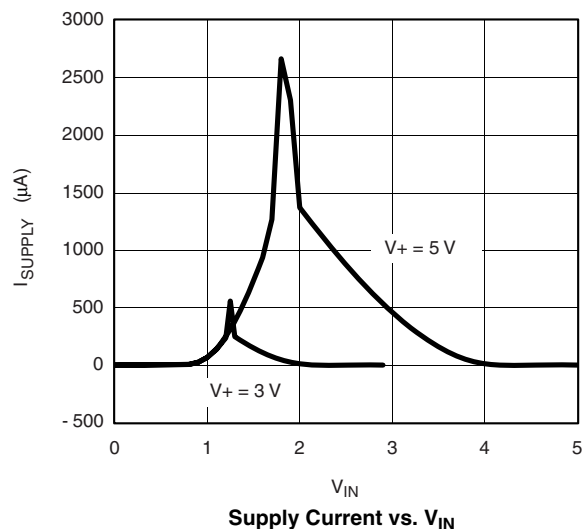
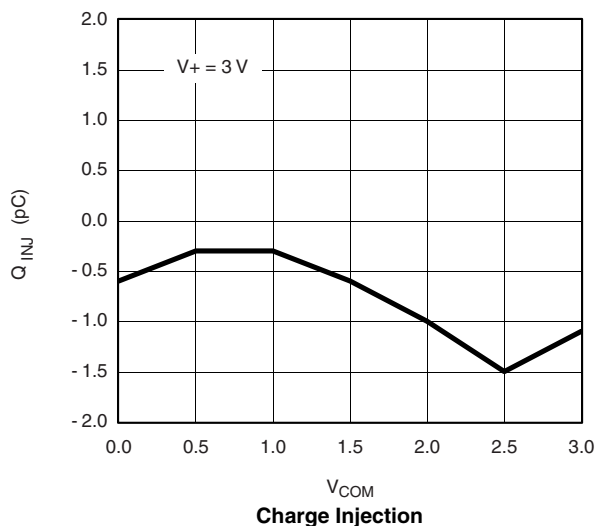
SPECIFICATIONS (V+ = 5 V)							
Parameter	Symbol	Test Conditions Unless Otherwise Specified V+ = 5 V, ± 10 %, V _{IN} = 0.8 or 2.4 V ^e	Temp ^a	D Suffix - 40 to 85 °C			Unit
				Min ^b	Typ ^c	Max ^b	
Analog Switch							
Analog Signal Range ^d	V _{ANALOG}		Full	0		5	V
Drain-Source On-Resistance	r _{DS(on)}	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)} ^{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
Channel-On Capacitance	C _{D(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+ = 5.5 V, V _{IN} = 0 or 5.5 V				1	μA

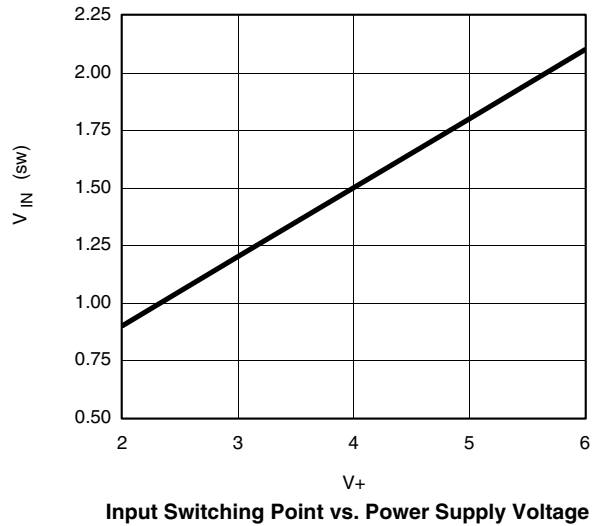
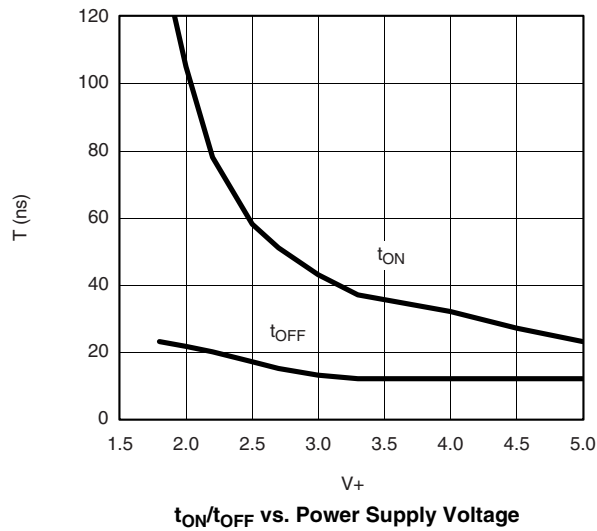
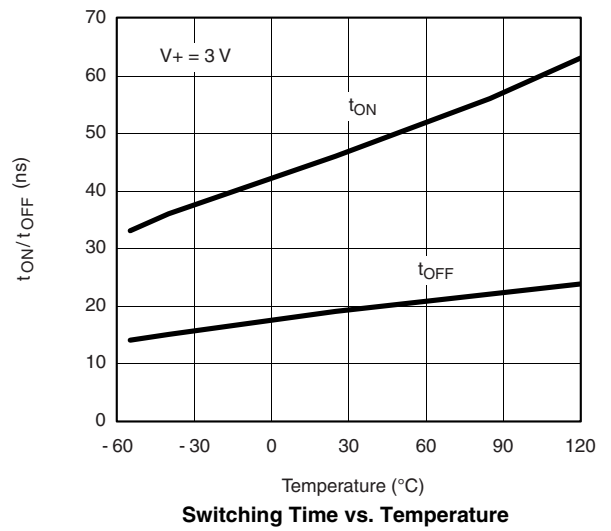
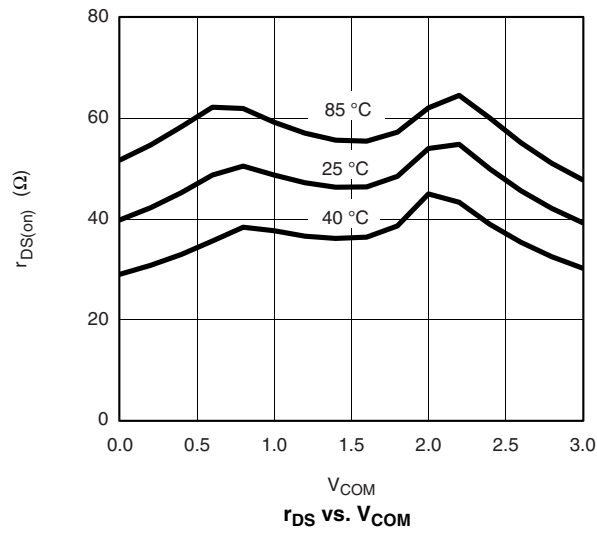
Notes:

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- 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.

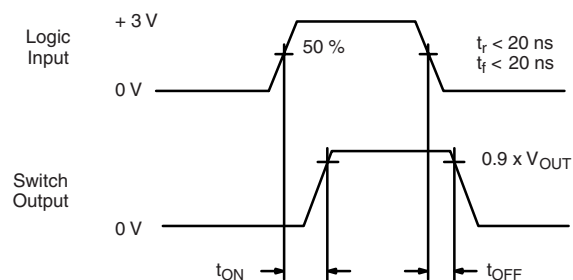
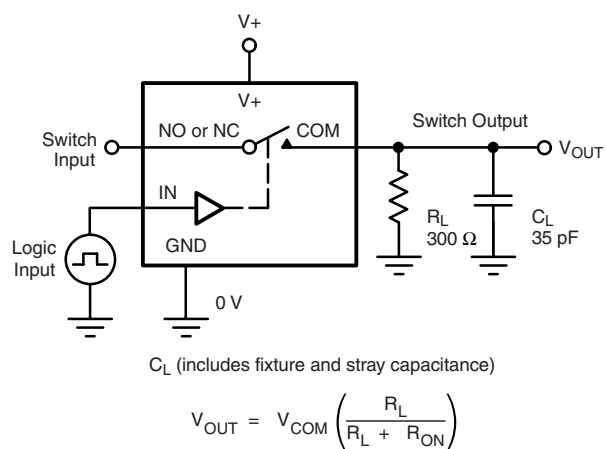
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

TYPICAL CHARACTERISTICS 25°C, unless otherwise noted



TYPICAL CHARACTERISTICS 25°C, unless otherwise noted


TEST CIRCUITS



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

Figure 1. Switching Time

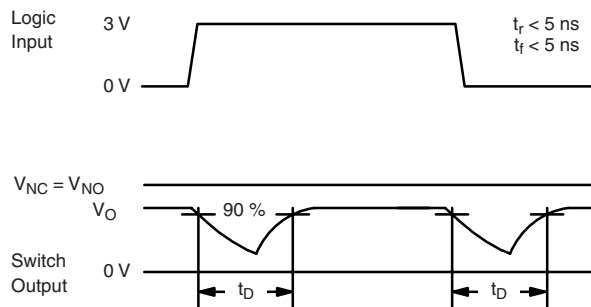
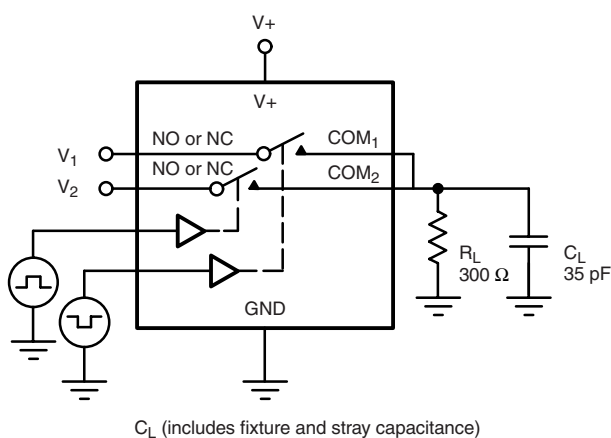
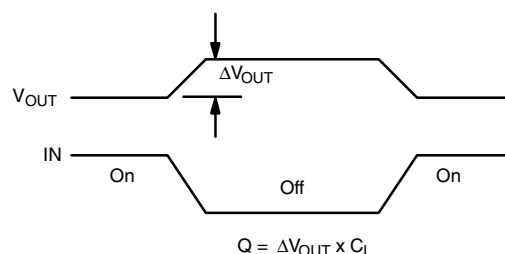
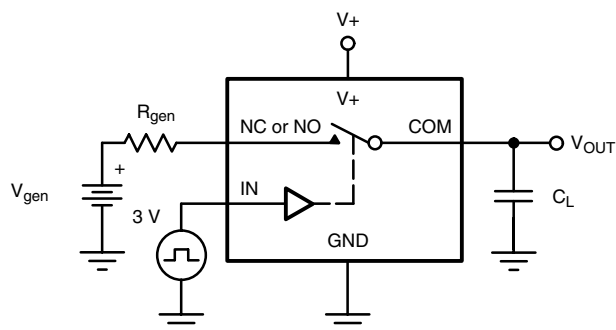
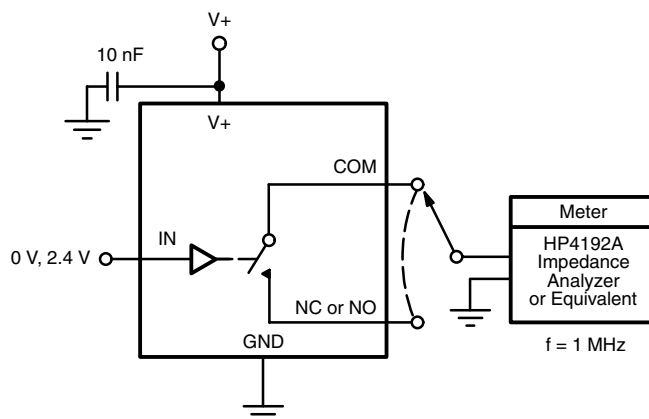
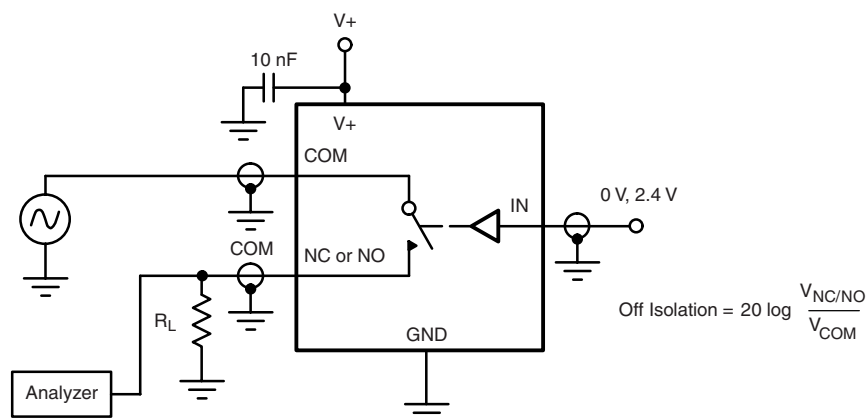


Figure 2. Break-Before-Make Interval



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

Figure 3. Charge Injection

TEST CIRCUITS


Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see <http://www.vishay.com/ppg?70862>.



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