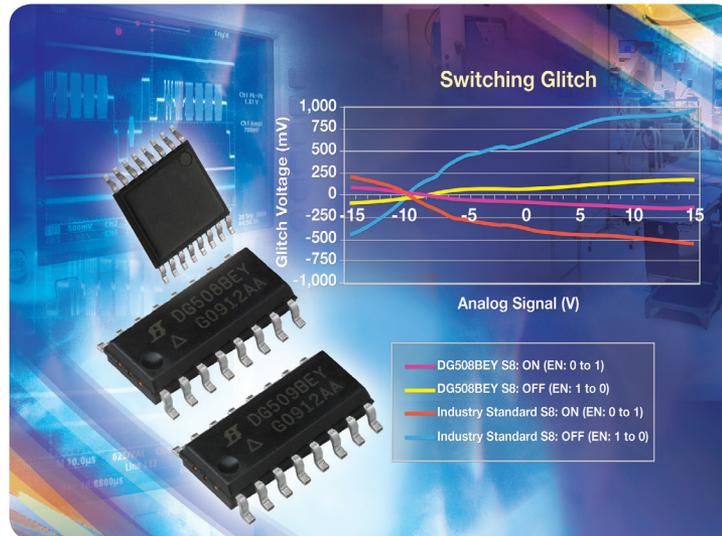


# PRECISION ANALOG IC

## DG508B/DG509B Analog Multiplexers

### Best-in-Class $\pm 15\text{-V}$ , High-precision, 8-Channel/Dual 4-Channel Analog Multiplexers



#### KEY BENEFITS

The 8-channel DG508B and dual 4-channel DG509B analog multiplexers achieve high-precision, low-noise signal switching in data acquisition, industrial process control, test and measurement, and medical systems.

#### FEATURES

- Operate with single or dual power supply
- $V+$  to  $V-$  analog signal swing range
- 44-V power supply maximum rating
- Extended operating temperature range:  $-40\text{ }^{\circ}\text{C}$  to  $+125\text{ }^{\circ}\text{C}$
- Low leakage typically less than 10 pA
- Low charge injection:  $Q = 2\text{ pC}$
- Low power:  $I_{\text{SUPPLY}} = 10\text{ }\mu\text{A}$  /typical
- TTL-compatible logic
- $> 250\text{-mA}$  latch-up current per JESD78
- Available in SOIC-16 and TSSOP-16 packages
- Superior alternative to ADG508A, DG508A, HI-508, ADG509A, DG509A, HI-509

#### APPLICATIONS

- Data acquisition systems
- Audio and video signal routing
- ATE systems
- Medical instrumentation

#### RESOURCES

- DG508B/DG509B datasheet: <http://www.vishay.com/doc?64821>
- Analog Switches and Multiplexers: <http://www.vishay.com/analog-switches/>
- For technical questions, contact [AnalogSwitchtechsupport@vishay.com](mailto:AnalogSwitchtechsupport@vishay.com)



# PRECISION ANALOG IC

## DG508B/DG509B Analog Multiplexers

### ±15-V, High Precision 8-Channel/Dual 4-Channel Analog Multiplexers

#### DESCRIPTION

The 8-channel DG508B and dual 4-channel DG509B CMOS analog multiplexers provide an extended maximum voltage rating to 44 V, with rail-to-rail analog capability, and can be operated in either a dual or single supply configuration.

Fabricated on an enhanced SG-II CMOS process, channel off-leakage is typically less than 3 pA in a wide analog signal range. The source-off parasitic capacitance is minimized to less than 3 pF and charge injection is less than 2 pC. The result is precise, low-glitch switching performance.

Ultra-low power consumption, typically 10  $\mu$ A at 25 °C with a guaranteed maximum of 600  $\mu$ A over temperature, makes the DG508B and DG509B well suited for portable, battery-operated applications.

The enhanced SG-II CMOS process also allows the DG508B and DG509B to achieve a -3dB bandwidth greater than 200 MHz with crosstalk and off-isolation of -40 dB at 100 MHz, making a versatile fit for a wide range of analog signal applications, including video.

#### IMPACT OF CHARGE INJECTION

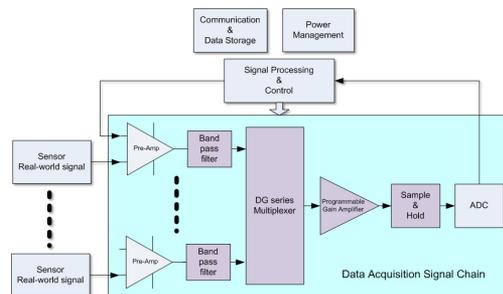
Charge injection is quite likely one of the most critical parameters of any analog switch or multiplexer.

CMOS analog switches and MUX's have as their switching element an n-channel MOSFET in parallel with a p-channel MOSFET. As a consequence of parasitic capacitances,  $C_{gs}$  and  $C_{gd}$ , together with the fast transition of Gate voltage that actuates the MOSFETs, a charge is coupled to the switching element, resulting in voltage spikes. The charge exits the switch or MUX at both its input (S) and output (D).

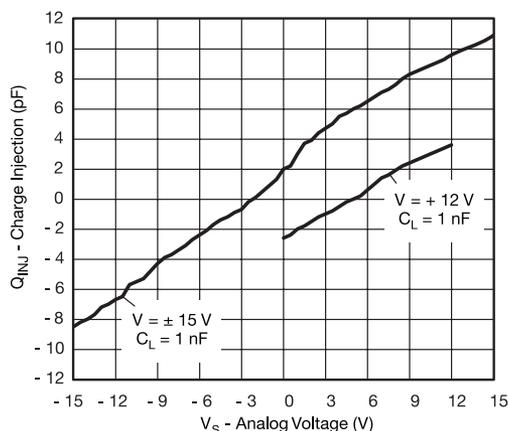
The magnitude of these spikes is dependent on several factors: the speed (frequency) of the gate voltage pulse; and the size of the parasitic gate-to-channel capacitances, and of course the load capacitance,  $C_L$ .

The DG508B and DG509B provide superior low charge injection performance. A specially designed evaluation board (see circuit below) is available to measure the charge injection impact when the channel is ON and OFF.

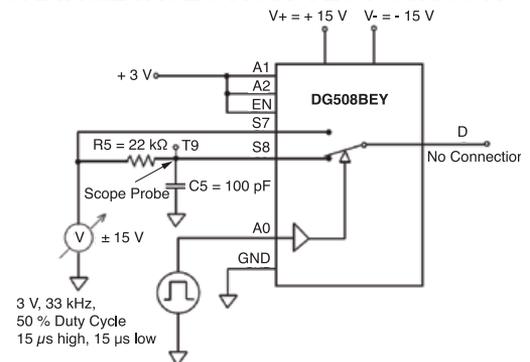
#### TYPICAL DATA ACQUISITION APPLICATION



#### CHARGE INJECTION VS. ANALOG VOLTAGE



#### CHARGE INJECTION TEST CIRCUIT



#### KEY PERFORMANCE PARAMETERS

Parameter	DG508B / DG509B
Max supply operating range (-V to +V)	44 V
On-resistance @ ± 15 V	180 $\Omega$
Leakage current	+ 1 nA /max
Transition time	145 ns /type
Charge Injection	2 pC
Source off capacitance	< 3 pF
Drain off capacitance	13 pF / 8 pF
Drain on capacitance	18 pF / 11 pF
Total harmonic distortion	0.04 %
Temperature range	- 40 °C to + 125 °C
Package option	SOIC-16 & TSSOP-16