

8-Channel, Dual 4-Channel, Triple 2-Channel Multiplexers

DESCRIPTION

The DG9251, DG9252, and DG9253 are high precision single and dual supply CMOS analog multiplexers. DG9251 is an 8-channel multiplexer, the DG9252 is a dual 4-channel multiplexer, and the DG9253 is a triple 2-channel multiplexer or triple SPDT.

Designed to operate from a + 2.7 V to + 16 V single supply or from a ± 2.7 V to ± 5 V dual supplies, the DG9251, DG9252, and DG9253 are fully specified at + 16 V, + 5 V and ± 5 V. All control logic inputs have guaranteed 1.4 V high limit when operating from + 5 V or ± 5 V supplies and 1.65 V when operating from a + 16 V supply.

The DG9251, DG9252, and DG9253 are precision multiplexers of low leakage, low charge injection, and low parasitic capacitance. They conduct equally well in both directions, offer rail to rail analog signal handling and can be used both as multiplexers as well as de-multiplexers. The DG9251, DG9252, and DG9253 operating temperature is specified from - 40 °C to + 85 °C and are available in ultra compact 1.8 mm x 2.6 mm miniQFN16 packages.

FEATURES

- **Halogen-free According to IEC 61249-2-21 Definition**
- + 2.7 V to + 16 V single supply operation
 ± 2.7 V to ± 5 V dual supply operation
- Fully specified at + 16 V, + 5 V, ± 5 V
- Low charge injection (< 4.1 pC typ.)
- High bandwidth: 314 MHz (DG9251)
449 MHz (DG9252)
480 MHz (DG9253)
- Low switch capacitance ($C_{s(off)}$ 2.7 pF typ.)
- Good isolation and crosstalk performance (typ. - 45 dB at 100 MHz)
- MiniQFN16 package (1.8 mm x 2.6 mm)
- **Compliant to RoHS Directive 2002/95/EC**

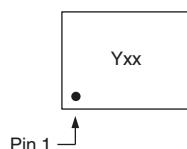
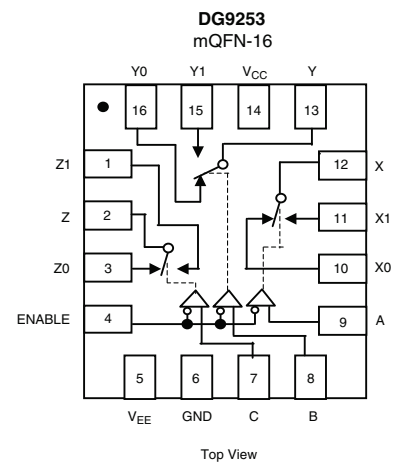
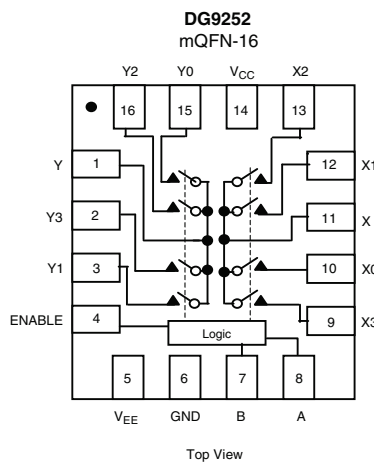
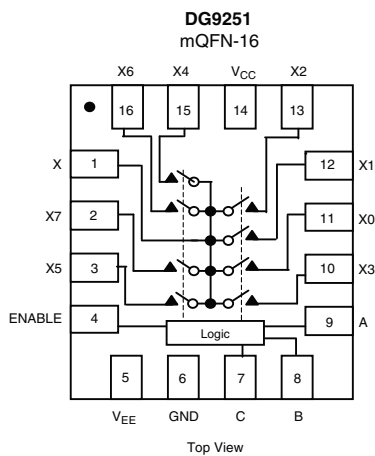


RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- Data acquisition
- Medical and healthcare devices
- Control and automation equipments
- Test instruments
- Touch panels
- Consumer

FUNCTIONAL BLOCK DIAGRAM AND PIN CONFIGURATION



Device Marking: 8xx for DG9251
(miniQFN16) Hxx for DG9252
Jxx for DG9253
xx = Date/Lot Traceability Code

| TRUTH TABLE | | | | | | |
|--------------|---------------|---|---|-------------------|-------------------|---------------------------|
| Enable Input | Select Inputs | | | On Switches | | |
| | C | B | A | DG9251 | DG9252 | DG9253 |
| H | X | X | X | All Switches Open | All Switches Open | All Switches Open |
| L | L | L | L | X to X0 | X to X0, Y to Y0 | X to X0, Y to Y0, Z to Z0 |
| L | L | L | H | X to X1 | X to X1, Y to Y1 | X to X1, Y to Y0, Z to Z0 |
| L | L | H | L | X to X2 | X to X2, Y to Y2 | X to X0, Y to Y1, Z to Z0 |
| L | L | H | H | X to X3 | X to X3, Y to Y3 | X to X1, Y to Y1, Z to Z0 |
| L | H | L | L | X to X4 | X to X0, Y to Y0 | X to X0, Y to Y0, Z to Z1 |
| L | H | L | H | X to X5 | X to X1, Y to Y1 | X to X1, Y to Y0, Z to Z1 |
| L | H | H | L | X to X6 | X to X2, Y to Y2 | X to X0, Y to Y1, Z to Z1 |
| L | H | H | H | X to X7 | X to X3, Y to Y3 | X to X1, Y to Y1, Z to Z1 |

| ORDERING INFORMATION | | |
|--------------------------------|----------------|----------------|
| Temp. Range | Package | Part Number |
| DG9251, DG9252, DG9253 | | |
| - 40 °C to 125 °C ^a | 16-Pin miniQFN | DG9251EN-T1-E4 |
| | | DG9252EN-T1-E4 |
| | | DG9253EN-T1-E4 |

Notes:

a. - 40 °C to 85 °C datasheet limits apply.

| ABSOLUTE MAXIMUM RATINGS (T _A = 25 °C, unless otherwise noted) | | | |
|---|--------------------------------|--|------|
| Parameter | | Limit | Unit |
| V _{CC} to V _{EE} | | 18 | V |
| GND to V- | | 9 | |
| Digital Inputs ^a , V _S , V _D | | (V-) - 0.3 to (V+) + 0.3 or 30 mA, whichever occurs first | |
| Continuous Current (Any terminal) | | 30 | mA |
| Peak Current, S or D (Pulsed 1 ms, 10 % duty cycle) | | 100 | |
| Storage Temperature | | - 65 to 150 | °C |
| Power Dissipation ^b | 16-Pin miniQFN ^{c, d} | 525 | mW |
| Thermal Resistance ^b | 16-Pin miniQFN ^d | 152 | °C/W |
| Latch-up (per JESD78) | | > 300 | mA |

Notes:

a. Signals on SX, DX, or INX 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 6.6 mW/°C above 70 °C.

d. Manual soldering with iron is not recommended for leadless components. The miniQFN-16 is a leadless package. The end of the lead terminal is exposed copper (not plated) as a result of the singulation process in manufacturing. A solder fillet at the exposed copper lip cannot be guaranteed and is not required to ensure adequate bottom side solder interconnection.



| SPECIFICATIONS (for Dual Supplies) | | | | | | | | | |
|--|-----------------|---|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------|
| Parameter | Symbol | Test Conditions Unless Otherwise Specified $V_{CC} = +5\text{ V}$, $V_{EE} = -5\text{ V}$ $V_{IN(A, B, C \text{ and } ENABLE)} = 1.4\text{ V}$, 0.3 V^a | Temp. ^b | Typ. ^c | - 40 °C to 125 °C | | - 40 °C to 85 °C | | Unit |
| | | | | | Min. ^d | Max. ^d | Min. ^d | Max. ^d | |
| Analog Switch | | | | | | | | | |
| Analog Signal Range ^e | V_{ANALOG} | | Full | | - 5 | 5 | - 5 | 5 | V |
| On-Resistance | R_{ON} | $I_S = 1\text{ mA}$, $V_D = -3\text{ V}, 0\text{ V}, +3\text{ V}$ | Room Full | 90 | | 182 252 | | 182 223 | Ω |
| On-Resistance Match | ΔR_{ON} | $I_S = 1\text{ mA}$, $V_D = \pm 3\text{ V}$ | Room Full | 3.1 | | 6 10 | | 6 8 | |
| On-Resistance Flatness | $R_{FLATNESS}$ | $I_S = 1\text{ mA}$, $V_D = -3\text{ V}, 0\text{ V}, +3\text{ V}$ | Room Full | 32.4 | | 44 64 | | 44 61 | |
| Switch Off Leakage Current | $I_{S(off)}$ | $V_{CC} = 5.5\text{ V}$, $V_{EE} = -5.5\text{ V}$, $V_D = \pm 4.5\text{ V}$, $V_S = \pm 4.5\text{ V}$ | Room Full | ± 0.02 | - 1 - 50 | 1 50 | - 1 - 5 | 1 5 | nA |
| | $I_{D(off)}$ | | Room Full | ± 0.02 | - 1 - 50 | 1 50 | - 1 - 5 | 1 5 | |
| Channel On Leakage Current | $I_{D(on)}$ | $V_{CC} = 5.5\text{ V}$, $V_{EE} = -5.5\text{ V}$, $V_S = V_D = \pm 4.5\text{ V}$ | Room Full | ± 0.02 | - 1 - 50 | 1 50 | - 1 - 5 | 1 5 | |
| Digital Control | | | | | | | | | |
| $V_{IN(A, B, C \text{ and } ENABLE)}$ Low | V_{IL} | | Full | | | 0.3 | | 0.3 | V |
| $V_{IN(A, B, C \text{ and } ENABLE)}$ High | V_{IH} | | Full | | 1.4 | | 1.4 | | |
| Input Current, V_{IN} Low | I_{IL} | $V_{IN(A, B, C \text{ and } ENABLE)}$ under test = 0.3 V | Full | 0.01 | - 1 | 1 | - 1 | 1 | μA |
| Input Current, V_{IN} High | I_{IH} | $V_{IN(A, B, C \text{ and } ENABLE)}$ under test = 1.4 V | Full | 0.01 | - 1 | 1 | - 1 | 1 | |
| Input Capacitance ^e | C_{IN} | $f = 1\text{ MHz}$ | Room | 2.4 | | | | | pF |
| Dynamic Characteristics | | | | | | | | | |
| Transition Time | t_{TRANS} | $R_L = 300\ \Omega$, $C_L = 35\text{ pF}$ see figure 1, 2, 3 | Room Full | 88 | | 236 281 | | 236 251 | ns |
| Enable Turn-On Time | t_{ON} | | Room Full | 158 | | 250 455 | | 250 369 | |
| Enable Turn-Off Time | t_{OFF} | | Room Full | 40 | | 125 136 | | 125 131 | |
| Break-Before-Make Time Delay | t_D | | Room Full | 32 | 13 | | 13 | | |
| Off Isolation ^e | OIRR | $R_L = 50\ \Omega$, $C_L = 15\text{ pF}$ | f = 100 kHz | Room | < - 90 | | | | dB |
| | | | f = 10 MHz | Room | - 64 | | | | |
| | | | f = 100 MHz | Room | - 45 | | | | |
| Channel-to-Channel Crosstalk ^e | X_{TALK} | | f = 100 kHz | Room | < - 90 | | | | |
| | | | f = 10 MHz | Room | - 67 | | | | |
| | | | f = 100 MHz | Room | - 48 | | | | |
| Bandwidth, 3 dB | BW | $R_L = 50\ \Omega$ | DG9251 | Room | 314 | | | | MHz |
| | | | DG9252 | Room | 449 | | | | |
| | | | DG9253 | Room | 480 | | | | |
| Charge Injection ^e | Q | $V_g = 0\text{ V}$, $R_g = 0\ \Omega$, $C_L = 1\text{ nF}$ | Room | 4.1 | | | | pC | |
| Source Off Capacitance ^e | $C_{S(off)}$ | f = 1 MHz | DG9251 | Room | 2.7 | | | | pF |
| | | | DG9252 | Room | 2.2 | | | | |
| | | | DG9253 | Room | 2.0 | | | | |
| Drain Off Capacitance ^e | $C_{D(off)}$ | f = 1 MHz | DG9251 | Room | 10.7 | | | | |
| | | | DG9252 | Room | 6.6 | | | | |
| | | | DG9253 | Room | 4.6 | | | | |
| Channel On Capacitance ^e | $C_{D(on)}$ | f = 1 MHz | DG9251 | Room | 14.6 | | | | |
| | | | DG9252 | Room | 9.8 | | | | |
| | | | DG9253 | Room | 8.6 | | | | |
| Total Harmonic Distortion ^e | THD | Signal = 1 V_{RMS} , 20 Hz to 20 kHz, $R_L = 600\ \Omega$ | Room | 0.2 | | | | % | |

| SPECIFICATIONS (for Dual Supplies) | | | | | | | | | |
|------------------------------------|-----------|---|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|---------------|
| Parameter | Symbol | Test Conditions Unless Otherwise Specified $V_{CC} = +5\text{ V}$, $V_{EE} = -5\text{ V}$ $V_{IN(A, B, C \text{ and } ENABLE)} = 1.4\text{ V}$, 0.3 V^a | Temp. ^b | Typ. ^c | - 40 °C to 125 °C | | - 40 °C to 85 °C | | Unit |
| | | | | | Min. ^d | Max. ^d | Min. ^d | Max. ^d | |
| Power Supplies | | | | | | | | | |
| Power Supply Current | I_{CC} | $V_{CC} = +5\text{ V}$, $V_{EE} = -5\text{ V}$ $V_{IN(A, B, C \text{ and } ENABLE)} = 0$ or 5 V | Room Full | 0.05 | | 1 | | 1 | μA |
| Negative Supply Current | I_{EE} | | Room Full | - 0.05 | - 1 | | - 1 | | |
| Ground Current | I_{GND} | | Room Full | - 0.05 | - 1 | | - 1 | | |

| SPECIFICATIONS (for Unipolar Supplies) | | | | | | | | | |
|--|-----------------|--|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|---------------|
| Parameter | Symbol | Test Conditions Unless Otherwise Specified $V_{CC} = +5\text{ V}$, $V_{EE} = 0\text{ V}$ $V_{IN(A, B, C \text{ and } ENABLE)} = 1.4\text{ V}$, 0.3 V^a | Temp. ^b | Typ. ^c | - 40 °C to 125 °C | | - 40 °C to 85 °C | | Unit |
| | | | | | Min. ^d | Max. ^d | Min. ^d | Max. ^d | |
| Analog Switch | | | | | | | | | |
| Analog Signal Range ^e | V_{ANALOG} | | Full | | 0 | 5 | 0 | 5 | V |
| On-Resistance | R_{ON} | $I_S = 1\text{ mA}$, $V_D = 0\text{ V}$, $+3.5\text{ V}$ | Room Full | 145 | | 482 | | 482 | Ω |
| On-Resistance Match | ΔR_{ON} | $I_S = 1\text{ mA}$, $V_D = +3.5\text{ V}$ | Room Full | 3.6 | | 20 | | 20 | |
| On-Resistance Flatness | $R_{FLATNESS}$ | $I_S = 1\text{ mA}$, $V_D = 0\text{ V}$, $+3\text{ V}$ | Room Full | 113 | | 151 | | 151 | |
| Switch Off Leakage Current | $I_{S(off)}$ | $V_{CC} = +5.5\text{ V}$, $V_{EE} = 0\text{ V}$ $V_D = 1\text{ V}/4.5\text{ V}$, $V_S = 4.5\text{ V}/1\text{ V}$ | Room Full | ± 0.02 | - 1 | 1 | - 1 | 1 | nA |
| | $I_{D(off)}$ | | Room Full | ± 0.02 | - 1 | 1 | - 1 | 1 | |
| Channel On Leakage Current | $I_{D(on)}$ | $V_{CC} = +5.5\text{ V}$, $V_{EE} = 0\text{ V}$ $V_D = V_S = 1\text{ V}/4.5\text{ V}$ | Room Full | ± 0.02 | - 1 | 1 | - 1 | 1 | |
| Digital Control | | | | | | | | | |
| $V_{IN(A, B, C \text{ and } ENABLE)}$ Low | V_{IL} | | Full | | | 0.3 | | 0.3 | V |
| $V_{IN(A, B, C \text{ and } ENABLE)}$ High | V_{IH} | | Full | | 1.4 | | 1.4 | | |
| Input Current, V_{IN} Low | I_L | $V_{IN(A, B, C \text{ and } ENABLE)}$ under test = 0.3 V | Full | 0.01 | - 1 | 1 | - 1 | 1 | μA |
| Input Current, V_{IN} High | I_H | $V_{IN(A, B, C \text{ and } ENABLE)}$ under test = 1.4 V | Full | 0.01 | - 1 | 1 | - 1 | 1 | |
| Dynamic Characteristics | | | | | | | | | |
| Transition Time | t_{TRANS} | $R_L = 300\ \Omega$, $C_L = 35\text{ pF}$ see figure 1, 2, 3 | Room Full | 97 | | 230 | | 230 | ns |
| Enable Turn-On Time | t_{ON} | | Room Full | 229 | | 335 | | 335 | |
| Enable Turn-Off Time | t_{OFF} | | Room Full | 64 | | 150 | | 150 | |
| Break-Before-Make Time Delay | t_D | | Room Full | 36 | | 20 | | 20 | |
| Charge Injection ^e | Q | $V_g = 0\text{ V}$, $R_g = 0\ \Omega$, $C_L = 1\text{ nF}$ | Full | 0.44 | | | | | pC |
| Off Isolation ^e | OIRR | $R_L = 50\ \Omega$, $C_L = 15\text{ pF}$ $f = 100\text{ kHz}$ | Room | < - 90 | | | | | dB |
| Channel-to-Channel Crosstalk ^e | X_{TALK} | | Room | < - 90 | | | | | |



| SPECIFICATIONS (for Unipolar Supplies) | | | | | | | | | | |
|--|--------------|--|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------|----|
| Parameter | Symbol | Test Conditions Unless Otherwise Specified $V_{CC} = +5\text{ V}$, $V_{EE} = 0\text{ V}$ $V_{IN(A, B, C \text{ and } ENABLE)} = 1.4\text{ V}$, 0.3 V^a | Temp. ^b | Typ. ^c | - 40 °C to 125 °C | | - 40 °C to 85 °C | | Unit | |
| | | | | | Min. ^d | Max. ^d | Min. ^d | Max. ^d | | |
| Dynamic Characteristics | | | | | | | | | | |
| Source Off Capacitance ^e | $C_{S(off)}$ | $f = 1\text{ MHz}$ | DG9251 | Room | 2.9 | | | | | pF |
| | | | DG9252 | Room | 2.2 | | | | | |
| | | | DG9253 | Room | 2.1 | | | | | |
| Drain Off Capacitance ^e | $C_{D(off)}$ | $f = 1\text{ MHz}$ | DG9251 | Room | 12.4 | | | | | |
| | | | DG9252 | Room | 6.8 | | | | | |
| | | | DG9253 | Room | 4.6 | | | | | |
| Channel On Capacitance ^e | $C_{D(on)}$ | $f = 1\text{ MHz}$ | DG9251 | Room | 16 | | | | | |
| | | | DG9252 | Room | 10.6 | | | | | |
| | | | DG9253 | Room | 8.8 | | | | | |
| Power Supplies | | | | | | | | | | |
| Power Supply Current | I_{CC} | $V_{IN(A, B, C \text{ and } ENABLE)} = 0\text{ V or } 5\text{ V}$ | Room Full | 0.05 | | 1 10 | | 1 10 | μA | |
| Negative Supply Current | I_{EE} | | Room Full | - 0.05 | - 1 - 10 | | - 1 - 10 | | | |
| Ground Current | I_{GND} | | Room Full | - 0.05 | - 1 - 10 | | - 1 - 10 | | | |

| SPECIFICATIONS (for Unipolar Supplies) | | | | | | | | | |
|--|-----------------|---|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------|
| Parameter | Symbol | Test Conditions Unless Otherwise Specified $V_{CC} = +16\text{ V}$, $V_{EE} = 0\text{ V}$ $V_{IN(A, B, C \text{ and } ENABLE)} = 1.6\text{ V}$, 0.5 V^a | Temp. ^b | Typ. ^c | - 40 °C to 125 °C | | - 40 °C to 85 °C | | Unit |
| | | | | | Min. ^d | Max. ^d | Min. ^d | Max. ^d | |
| Analog Switch | | | | | | | | | |
| Analog Signal Range ^e | V_{ANALOG} | | Full | | 0 | 16 | 0 | 16 | V |
| On-Resistance | R_{ON} | $I_S = 1\text{ mA}$, $V_D = 0.7\text{ V}$, 8 V , 15.3 V | Room Full | 69 | | 152 171 | | 152 158 | Ω |
| On-Resistance Match | ΔR_{ON} | $I_S = 1\text{ mA}$, $V_D = +0.7\text{ V}$ | Room Full | 2 | | 7 10 | | 7 8 | |
| On-Resistance Flatness | $R_{FLATNESS}$ | $I_S = 1\text{ mA}$, $V_D = 0.7\text{ V}$, $+15.3\text{ V}$ | Room Full | 32 | | 45 53 | | 45 49 | |
| Switch Off Leakage Current | $I_{S(off)}$ | $V_{CC} = +16\text{ V}$, $V_{EE} = 0\text{ V}$ $V_D = 1\text{ V}/15\text{ V}$, $V_S = 15\text{ V}/1\text{ V}$ | Room Full | ± 0.02 | - 1 - 50 | 1 50 | - 1 - 5 | 1 5 | nA |
| | $I_{D(off)}$ | | Room Full | ± 0.02 | - 1 - 50 | 1 50 | - 1 - 5 | 1 5 | |
| Channel On Leakage Current | $I_{D(on)}$ | $V_{CC} = +16\text{ V}$, $V_{EE} = 0\text{ V}$ $V_D = V_S = 1\text{ V}/15\text{ V}$ | Room Full | ± 0.02 | - 1 - 50 | 1 50 | - 1 - 5 | 1 5 | |
| Digital Control | | | | | | | | | |
| $V_{IN(A, B, C \text{ and } ENABLE)}$ Low | V_{IL} | | Full | | | 0.5 | | 0.5 | V |
| $V_{IN(A, B, C \text{ and } ENABLE)}$ High | V_{IH} | | Full | | 1.6 | | 1.6 | | |
| Input Current, V_{IN} Low | I_L | $V_{IN(A, B, C \text{ and } ENABLE)}$ under test = 0.5 V | Full | 0.01 | - 1 | 1 | - 1 | 1 | μA |
| Input Current, V_{IN} High | I_H | $V_{IN(A, B, C \text{ and } ENABLE)}$ under test = 1.6 V | Full | 0.01 | - 1 | 1 | - 1 | 1 | |
| Dynamic Characteristics | | | | | | | | | |
| Transition Time | t_{TRANS} | $R_L = 300\text{ }\Omega$, $C_L = 35\text{ pF}$ see figure 1, 2, 3 | Room Full | 56 | | 130 160 | | 130 150 | ns |
| Enable Turn-On Time | t_{ON} | | Room Full | 98 | | 175 256 | | 175 221 | |
| Enable Turn-Off Time | t_{OFF} | | Room Full | 37 | | 120 134 | | 120 127 | |
| Break-Before-Make Time Delay | t_D | | Room Full | 31 | 12 | | 12 | | |

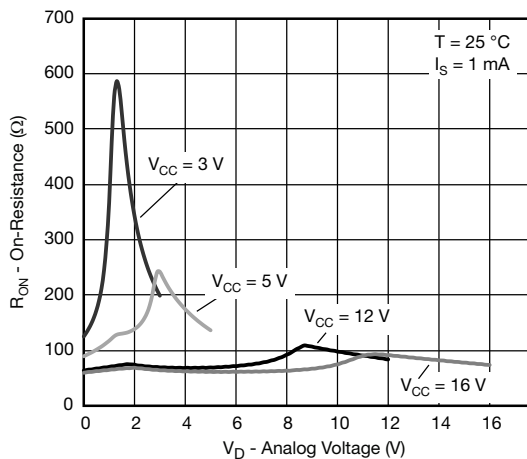
| SPECIFICATIONS (for Unipolar Supplies) | | | | | | | | | |
|---|--------------|---|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|---------------|
| Parameter | Symbol | Test Conditions Unless Otherwise Specified $V_{CC} = +16\text{ V}$, $V_{EE} = 0\text{ V}$ $V_{IN(A, B, C \text{ and } ENABLE)} = 1.6\text{ V}$, 0.5 V^a | Temp. ^b | Typ. ^c | -40 °C to 125 °C | | -40 °C to 85 °C | | Unit |
| | | | | | Min. ^d | Max. ^d | Min. ^d | Max. ^d | |
| Charge Injection ^e | Q | $V_g = 0\text{ V}$, $R_g = 0\ \Omega$, $C_L = 1\text{ nF}$ | Room | 4.5 | | | | | pC |
| Dynamic Characteristics | | | | | | | | | |
| Off Isolation ^e | OIRR | $R_L = 50\ \Omega$, $C_L = 15\text{ pF}$ $f = 100\text{ kHz}$ | Room | < -90 | | | | | dB |
| Channel-to-Channel Crosstalk ^e | X_{TALK} | | Room | < -90 | | | | | |
| Source Off Capacitance ^e | $C_{S(off)}$ | $f = 1\text{ MHz}$ | DG9251 | Room | 2.6 | | | | pF |
| | | | DG9252 | Room | 2.1 | | | | |
| | | | DG9253 | Room | 1.8 | | | | |
| Drain Off Capacitance ^e | $C_{D(off)}$ | $f = 1\text{ MHz}$ | DG9251 | Room | 10.4 | | | | pF |
| | | | DG9252 | Room | 5.8 | | | | |
| | | | DG9253 | Room | 4.2 | | | | |
| Channel On Capacitance ^e | $C_{D(on)}$ | $f = 1\text{ MHz}$ | DG9251 | Room | 15 | | | | pF |
| | | | DG9252 | Room | 9.5 | | | | |
| | | | DG9253 | Room | 8.2 | | | | |
| Power Supplies | | | | | | | | | |
| Power Supply Current | I_{CC} | $V_{IN(A, B, C \text{ and } ENABLE)} = 0\text{ V}$ or 16 V | Room Full | 0.05 | | 1 10 | | 1 10 | μA |
| Negative Supply Current | I_{EE} | | Room Full | -0.05 | -1 -10 | | -1 -10 | | |
| Ground Current | I_{GND} | | Room Full | -0.05 | -1 -10 | | -1 -10 | | |

Notes:

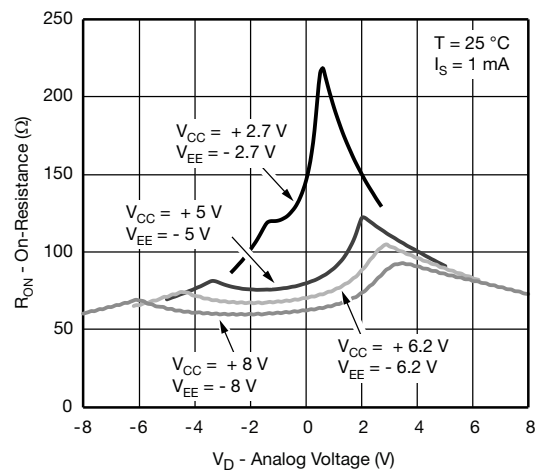
- a. V_{IN} = input voltage to perform proper function.
- b. Room - 25 °C, full = as determined by the operating temperature suffix.
- c. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
- d. The algebraic convention whereby the most negative value is a minimum and the most positive a maximum, is used in this datasheet.
- e. Guaranteed by design, not subject to production test.

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)

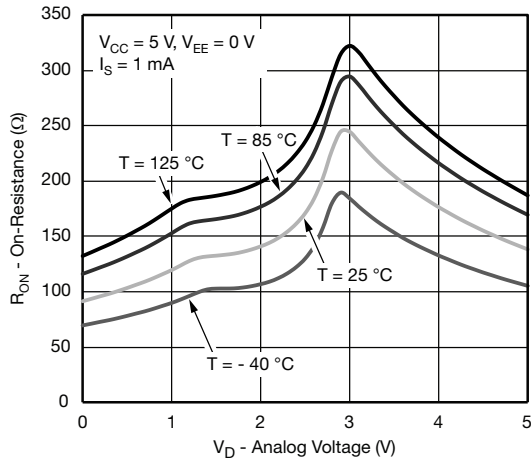


RON vs. V_D and Single Supply Voltage

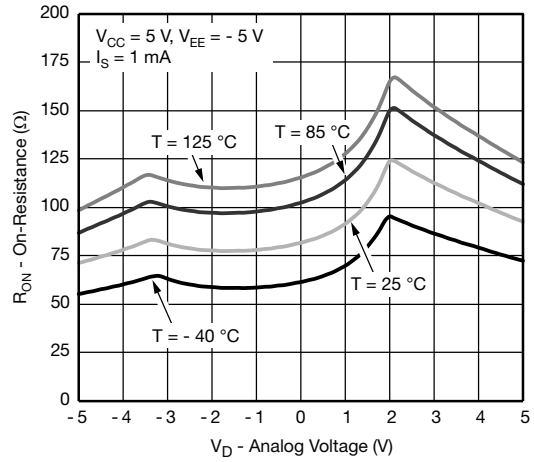


RON vs. V_D and Dual Supply Voltage

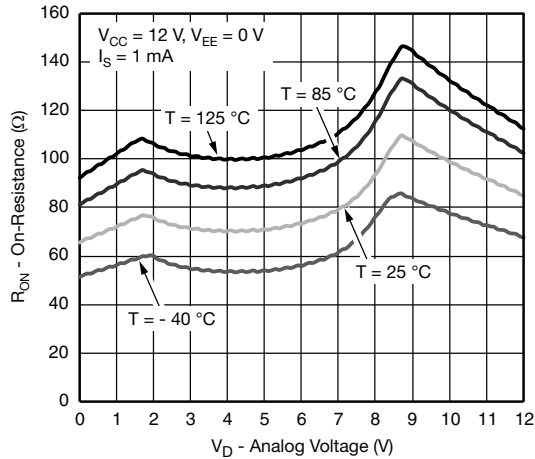
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



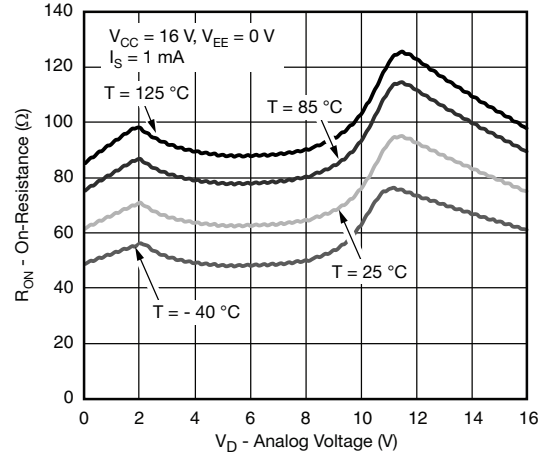
R_{ON} vs. Analog Voltage and Temperature



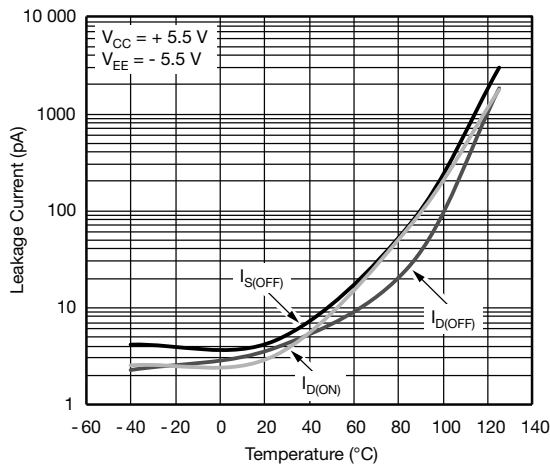
R_{ON} vs. Analog Voltage and Temperature



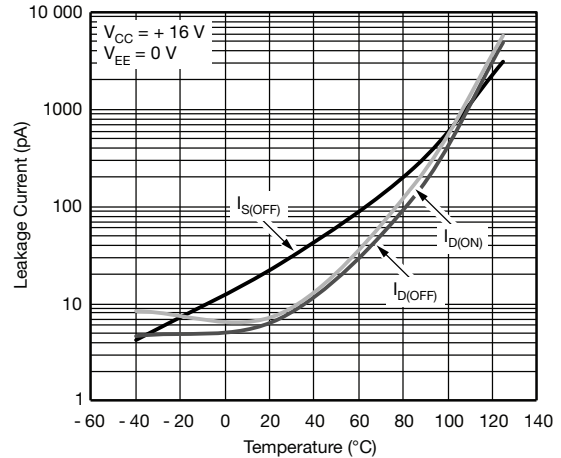
R_{ON} vs. Analog Voltage and Temperature



R_{ON} vs. Analog Voltage and Temperature

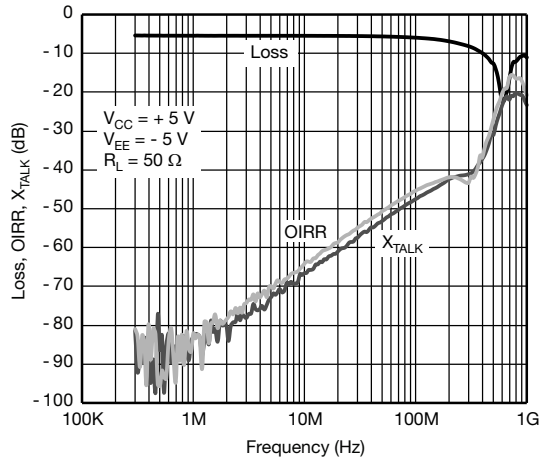


Leakage Current vs. Temperature

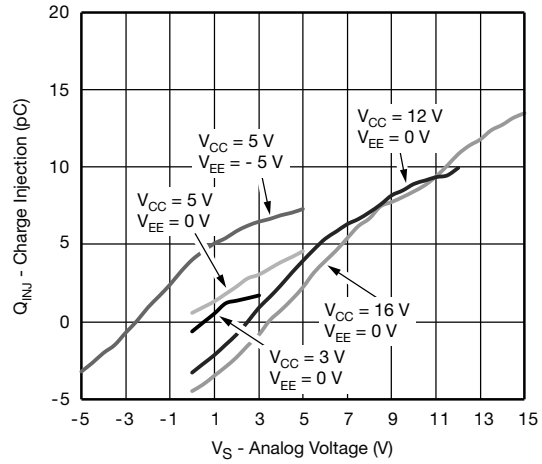


Leakage Current vs. Temperature

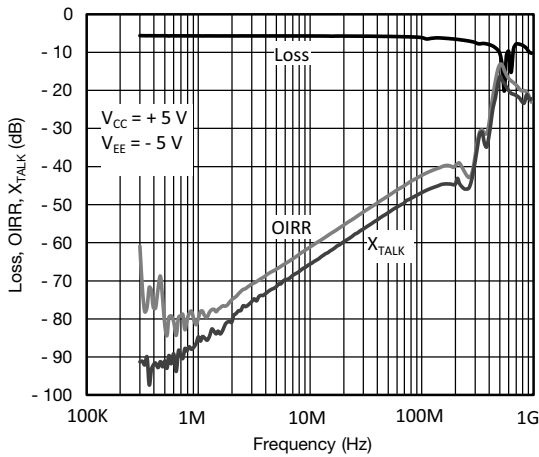
TYPICAL CHARACTERISTICS



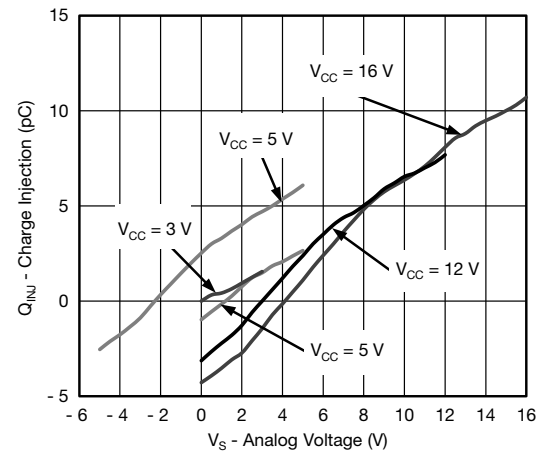
DG9251 Insertion Loss, Off-Isolation, Crosstalk vs. Frequency



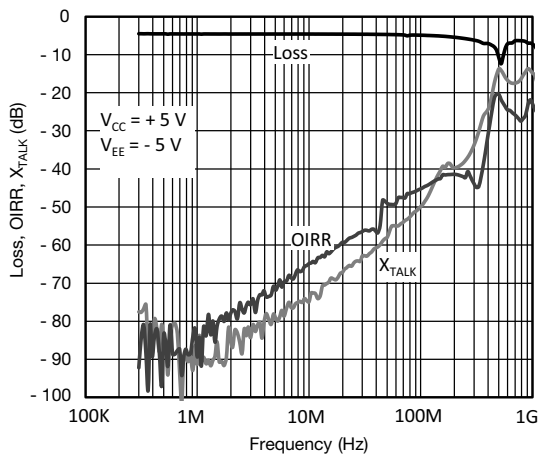
DG9251 Charge Injection vs. Analog Voltage



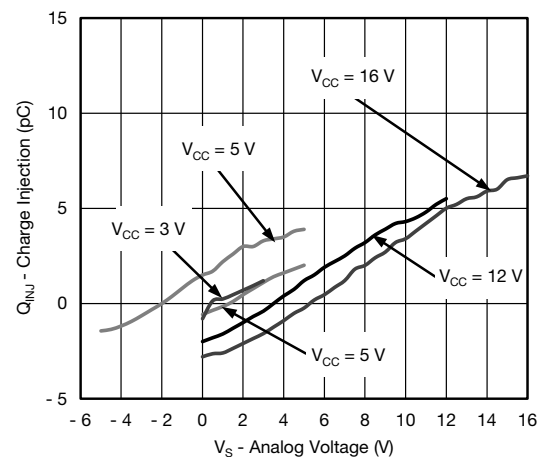
DG9252 Insertion Loss, Off-Isolation, Crosstalk vs. Frequency



DG9252 Charge Injection vs. Analog Voltage

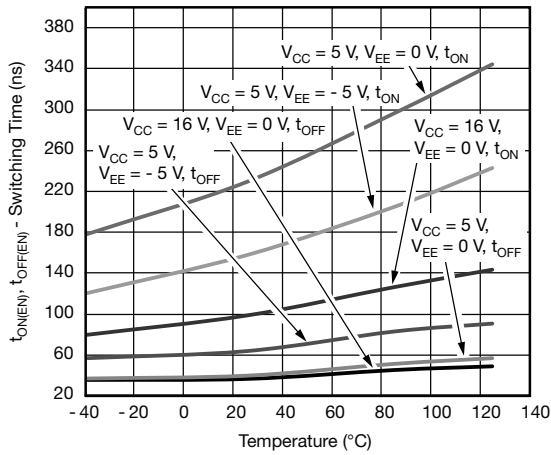


DG9253 Insertion Loss, Off-Isolation, Crosstalk vs. Frequency

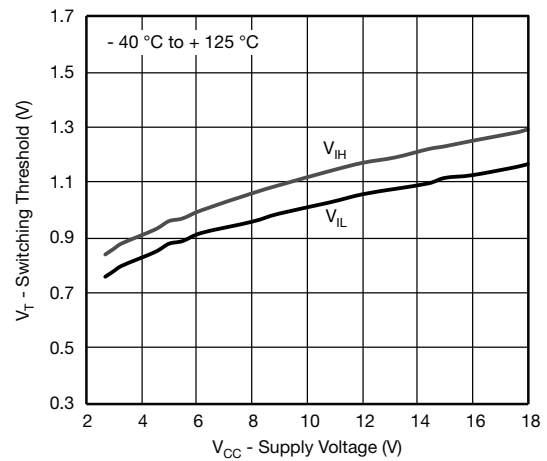


DG9253 Charge Injection vs. Analog Voltage

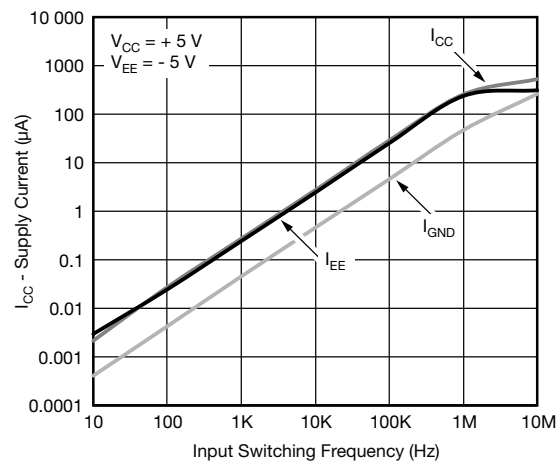
TYPICAL CHARACTERISTICS



Switching Time vs. Temperature



Switching Threshold vs. Supply Voltage



Supply Current vs. Input Switching Frequency

TEST CIRCUITS

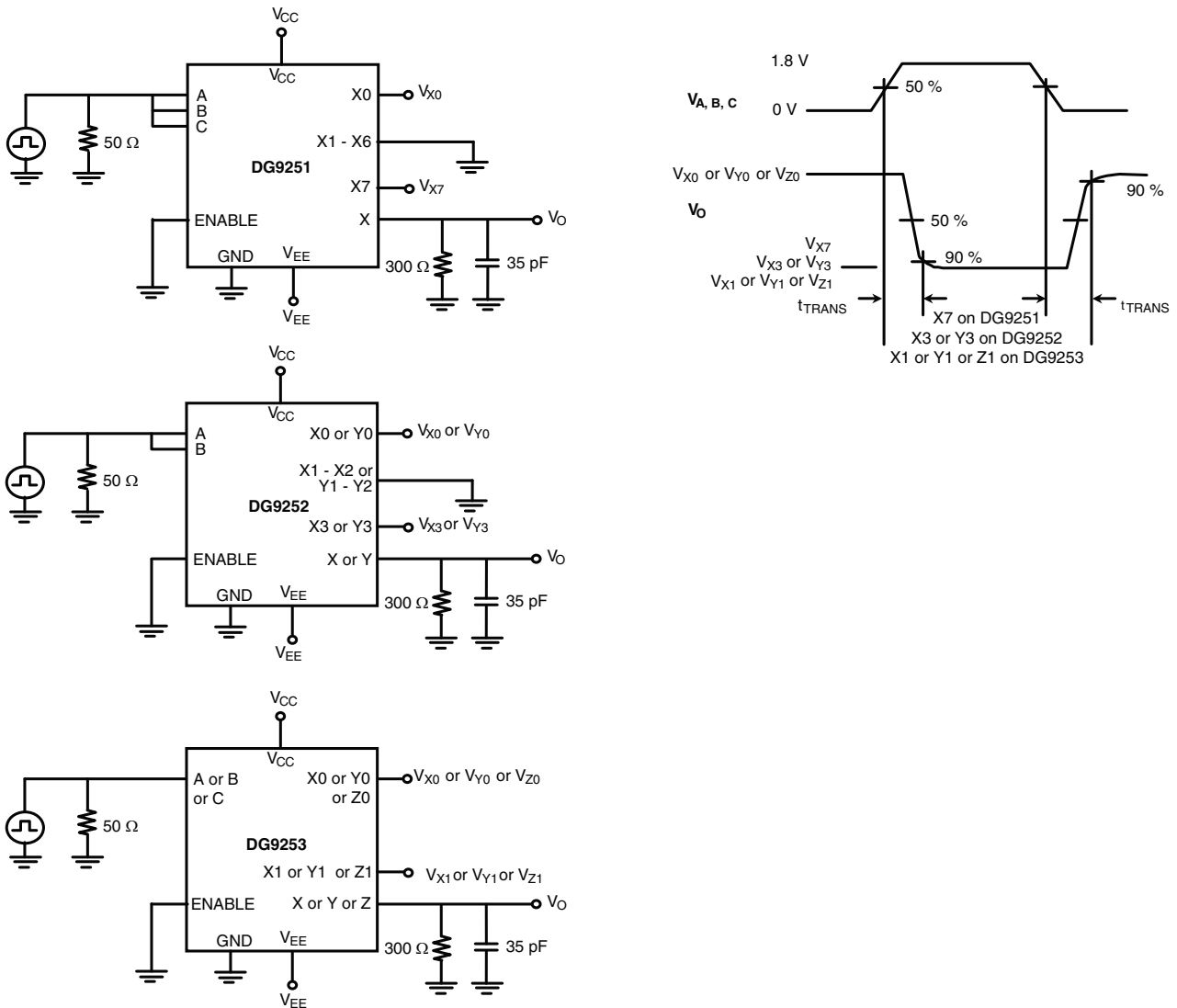


Figure 1. Transition Time

TEST CIRCUITS

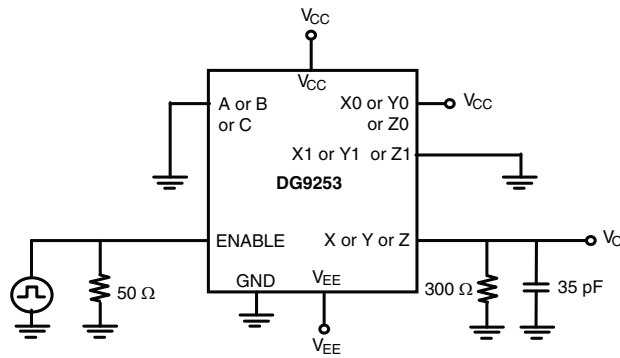
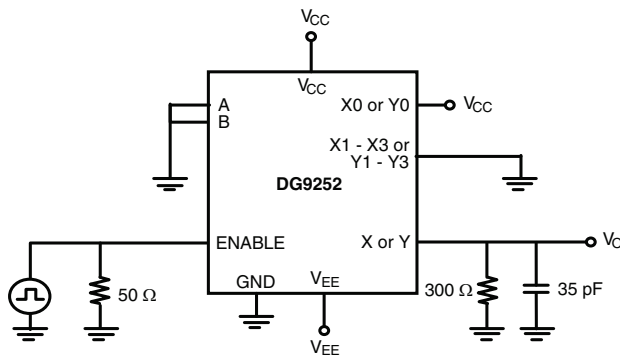
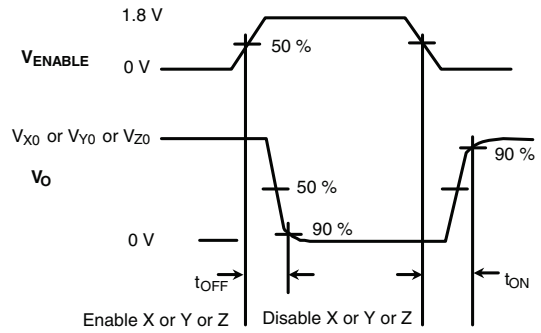
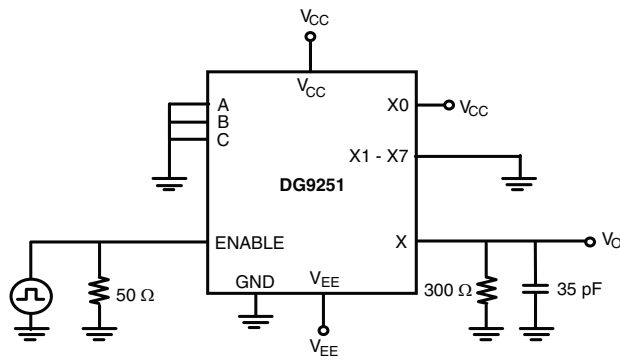


Figure 2. Enable Switching Time

TEST CIRCUITS

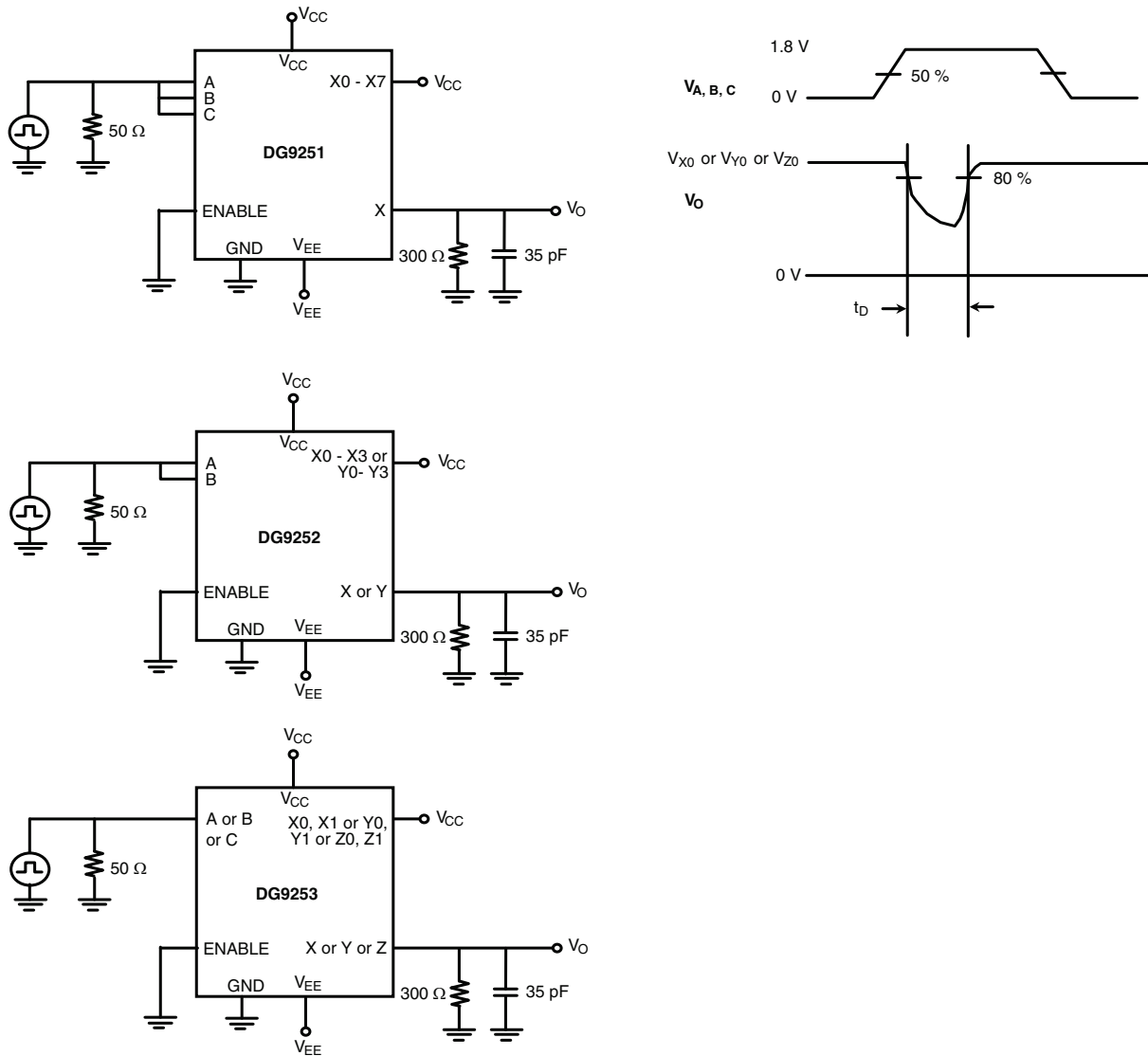


Figure 3. Break-Before-Make

TEST CIRCUITS

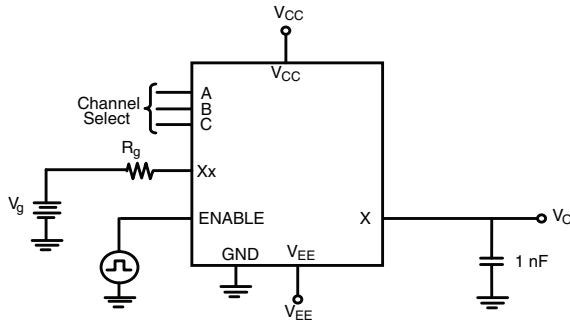


Figure 4. Charge Injection

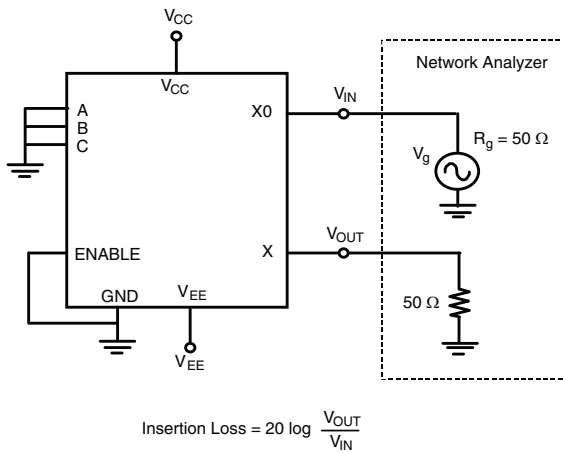
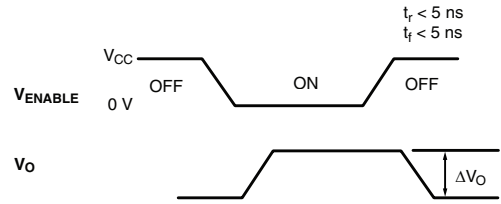


Figure 5. Insertion Loss

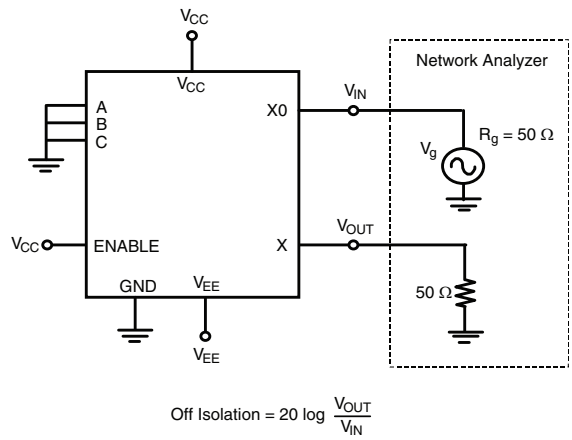


Figure 6. Off Isolation

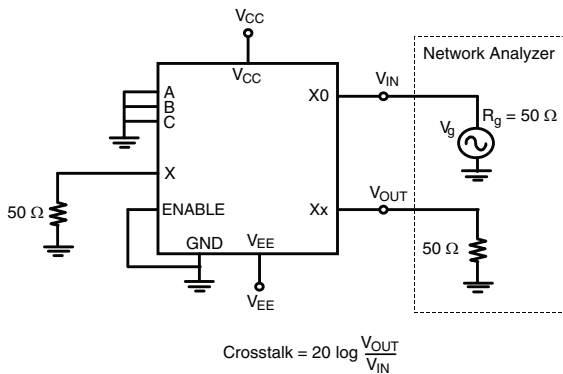


Figure 7. Crosstalk

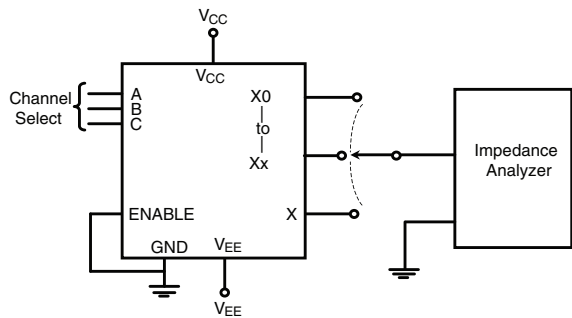
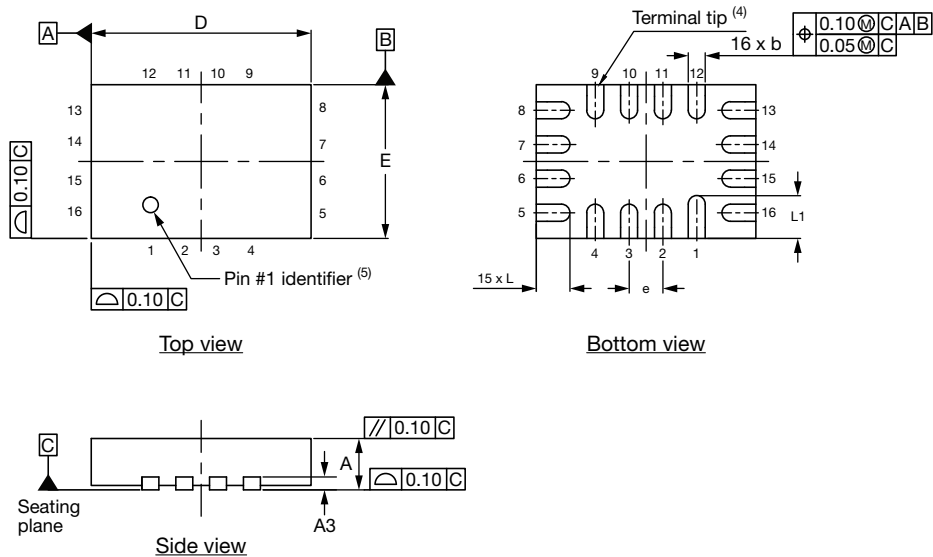


Figure 8. Source, Drain Capacitance

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 www.vishay.com/ppg?267075.

Thin miniQFN16 Case Outline



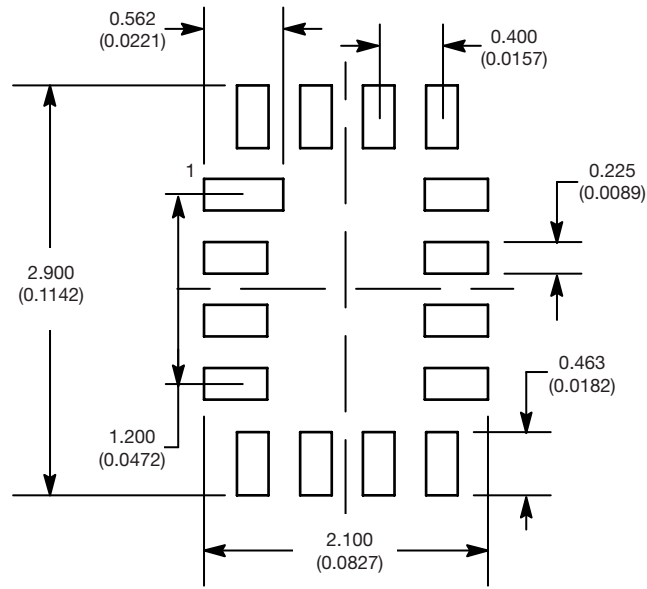
| DIMENSIONS | MILLIMETERS ⁽¹⁾ | | | INCHES | | |
|-------------------|----------------------------|------|------|------------|-------|-------|
| | MIN. | NOM. | MAX. | MIN. | NOM. | MAX. |
| A | 0.50 | 0.55 | 0.60 | 0.020 | 0.022 | 0.024 |
| A1 | 0 | - | 0.05 | 0 | - | 0.002 |
| A3 | 0.15 ref. | | | 0.006 ref. | | |
| b | 0.15 | 0.20 | 0.25 | 0.006 | 0.008 | 0.010 |
| D | 2.50 | 2.60 | 2.70 | 0.098 | 0.102 | 0.106 |
| e | 0.40 BSC | | | 0.016 BSC | | |
| E | 1.70 | 1.80 | 1.90 | 0.067 | 0.071 | 0.075 |
| L | 0.35 | 0.40 | 0.45 | 0.014 | 0.016 | 0.018 |
| L1 | 0.45 | 0.50 | 0.55 | 0.018 | 0.020 | 0.022 |
| N ⁽³⁾ | 16 | | | 16 | | |
| Nd ⁽³⁾ | 4 | | | 4 | | |
| Ne ⁽³⁾ | 4 | | | 4 | | |

Notes

- (1) Use millimeters as the primary measurement.
- (2) Dimensioning and tolerances conform to ASME Y14.5M. - 1994.
- (3) N is the number of terminals. Nd and Ne is the number of terminals in each D and E site respectively.
- (4) Dimensions b applies to plated terminal and is measured between 0.15 mm and 0.30 mm from terminal tip.
- (5) The pin 1 identifier must be existed on the top surface of the package by using identification mark or other feature of package body.
- (6) Package warpage max. 0.05 mm.

ECN: T16-0226-Rev. B, 09-May-16
DWG: 6023

RECOMMENDED MINIMUM PADS FOR MINI QFN 16L



Mounting Footprint
Dimensions in mm (inch)



Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.