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| LTR | DESCRIPTION | DATE | APPROVED |
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Prepared in accordance with ASME Y14.24

Vendor item drawing

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|---|---|---|
| **PMIC N/A** | **PREPARED BY**<br>Phu H. Nguyen | **DLA LAND AND MARITIME**<br>**COLUMBUS, OHIO 43218-3990**<br>**http://www.landandmaritime.dla.mil/** |
| Original date of drawing<br>YY MM DD<br>16-04-18 | **CHECKED BY**<br>Phu H. Nguyen | **TITLE**<br>MICROCIRCUIT, LINEAR-DIGITAL, FAULT PROTECTION AND DETECTION, 10 Ω $R_{ON}$ , QUAD SPST SWITCHES, MONOLITHIC SILICON |
| | **APPROVED BY**<br>Muhammad A. Akbar | |
| | **SIZE** A / **CODE IDENT. NO.** 16236 | **DWG NO.** **V62/16608** |
| | **REV** | **PAGE** 1 **OF** 29 |

AMSC N/A

5962-V046-16

1. SCOPE

1.1 Scope. This drawing documents the general requirements of a high performance Fault Protection and Detection, 10 Ω RON, Quad SPST Switches microcircuit, with an operating temperature range of -55°C to +125°C.

1.2 Vendor Item Drawing Administrative Control Number. The manufacturer's PIN is the item of identification. The vendor item drawing establishes an administrative control number for identifying the item on the engineering documentation:

| V62/16608 | - | 01 | X | E |
|---|---|---|---|---|
| Drawing number | | Device type (See 1.2.1) | Case outline (See 1.2.2) | Lead finish (See 1.2.3) |

1.2.1 Device type(s).

| Device type | Generic | Circuit function 1/ |
|---|---|---|
| 01 | ADG5412F –EP | Fault Protection and Detection, 10 Ω RON Quad SPST Switches |

1.2.2 Case outline(s). The case outlines are as specified herein.

| Outline letter | Number of pins | Package style |
|---|---|---|
| X | 16 | 16-Lead Thin Shrink Small Outline Package |

1.2.3 Lead finishes. The lead finishes are as specified below or other lead finishes as provided by the device manufacturer:

| Finish designator | Material |
|---|---|
| A | Hot solder dip |
| B | Tin-lead plate |
| C | Gold plate |
| D | Palladium |
| E | Gold flash palladium |
| Z | Other |

1/ This device has 4 different supply ranges (See table I or manufacturer data sheet). It can be powered in either dual supply or single supply. For dual supply $V_{SS}$ = -16.5 V and for single supply $V_{SS}$ = 0 V.

1.3 Absolute maximum ratings. 2/

| | |
|---|---|
| $V_{DD}$ to $V_{SS}$ | 48 V |
| $V_{DD}$ to GND | -0.3 V to +48 V |
| $V_{SS}$ to GND | -48 V to +0.3 V |
| $S_X$ Pins to GND | -55 V to +55 V |
| $S_X$ to $V_{DD}$ or $V_{SS}$ | 80 V |
| $V_S$ to $V_D$ | 80 V |
| Dx Pins 3/ | $V_{SS}$ – 0.7 V to $V_{DD}$ + 0.7 V or 30 mA, whichever occurs first |
| Digital Inputs | GND – 0.3 V to +48 V |
| Peak Current, Sx or Dx Pins | 288 mA (pulsed at 1 ms, 10% duty cycle maximum) |
| Continuous Current, Sx or Dx Pins | Data + 15% 4/ |
| Digital Output | GND – 0.3 V to 6 V 0r 30 mA, whichever occurs first |
| Operating temperature range: | -55°C to +125°C |
| Storage temperature range | -65°C to 150°C |
| Junction temperature | 150°C |
| Thermal Impedance, $\theta_{JA}$ | |
| 16-Lead TSSOP, $\theta_{JA}$ Thermal Impedance (4-Layer Board) | 112.6°C/W |
| Reflow Soldering Peak: Temperature, PB Free | As per JEDEC J-STD 020 |
| ESD (HBM: ANSI/ESD STM5.1 – 2007) | |
| Input/Output Port to Supplies | 5.5 kV |
| Input/Output Port to Input/Output Port | 5.5 kV |
| All Other Pins | 5.5 kV |

2. APPLICABLE DOCUMENTS

JEDEC – SOLID STATE TECHNOLOGY ASSOCIATION (JEDEC)

JEP95 – Registered and Standard Outlines for Semiconductor Devices

(Copies of these documents are available online at http:/www.jedec.org or from JEDEC – Solid State Technology Association, 3103 North 10th Street, Suite 240–S, Arlington, VA 22201-2107).

3. REQUIREMENTS

3.1 Marking. Parts shall be permanently and legibly marked with the manufacturer's part number as shown in 6.3 herein and as follows:

A. Manufacturer's name, CAGE code, or logo
B. Pin 1 identifier
C. ESDS identification (optional)

3.2 Unit container. The unit container shall be marked with the manufacturer's part number and with items A and C (if applicable) above.

3.3 Electrical characteristics. The maximum and recommended operating conditions and electrical performance characteristics are as specified in 1.3, 1.4, and table I herein.

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2/ 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 under "recommended operating conditions" is not implied. Exposure to absolute maximum rated conditions for extended periods may affect device reliability.
3/ Over voltages at the Dx pins are clamped by internal diodes. Limit current to the maximum ratings given.
4/ See Table I – Continuous Current Per Channel, Sx or Dx.

3.4 Design, construction, and physical dimension. The design, construction, and physical dimensions are as specified herein.

3.5 Diagrams.

3.5.1 Case outline. The case outline shall be as shown in 1.2.2 and figure 1.

3.5.2 Terminal connections. The terminal connections shall be as shown in figure 2.

3.5.3 Terminal function. The terminal function shall be as shown in figure 3.

3.5.4 Truth table. The truth table shall be as shown in figure 4.

3.5.5 Functional block diagram. The functional block diagram shall be as shown in figure 5.

3.5.6 On Resistance. The On Resistance shall be as shown in figure 6.

3.5.7 Off Leakage. The Off leakage shall be as shown in figure 7.

3.5.8 On Leakage. The On leakage shall be as shown in figure 8.

3.5.9 Off Isolation. The Off Isolation shall be as shown in figure 9.

3.5.10 Channel-to-Channel Crosstalk. The Channel-to-Channel Crosstalk shall be as shown in figure 10.

3.5.11 Switch Overvoltage Leakage. The Switch Overvoltage Leakage shall be as shown in figure 11.

3.5.12 Switch Unpower Leakage. The Switch Unpower Leakage shall be as shown in figure 12.

3.5.13 Bandwidth. The Bandwidth shall be as shown in figure 13.

3.5.14 THD + N. The THD + N shall be as shown in figure 14.

3.5.15 Overvoltage Response Time, $t_{RESPONGE}$. The Overvoltage Response Time, $t_{RESPONGE}$ shall be as shown in figure 15.

3.5.16 Overvoltage Recovery Time, $t_{RECOVERY}$. The Overvoltage Recovery Time, $t_{RECOVERY}$ shall be as shown in figure 16.

3.5.17 Interrupt Flag Response Time, $t_{DIGRESP}$. The Interrupt Flag Response Time, $t_{DIGRESP}$ shall be as shown in figure 17.

3.5.18 Interrupt Flag Recovery Time, $t_{DIGREC}$. The Interrupt Flag Response Time, $t_{DIGREC}$ shall be as shown in figure 18.

3.5.19 Interrupt Flag Recovery Time, $t_{DIGREC}$, with a 1 kΩ Pull-Up Resistor. The Interrupt Flag Response Time, $t_{DIGREC}$, with a 1 kΩ Pull-Up Resistor shall be as shown in figure 19.

3.5.20 Switching Times, $t_{ON}$ and $t_{OFF}$. The Switching Times, $t_{ON}$ and $t_{OFF}$. shall be as shown in figure 20.

3.5.21 Charge Injection, $Q_{INJ}$. The Charge Injection, $Q_{INJ}$ shall be as shown in figure 21.

3.5.22 Threshold Voltage ($V_T$) vs. Temperature. The Threshold Voltage ($V_T$) vs. Temperature shall be as shown in figure 22.

TABLE I. Electrical performance characteristics. 1/

| Test | Symbol | Test conditions<br>**± 15 V Dual Supply** 2/ | Temperature<br>$T_A$ | Limits | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min | Typ | Max | |
| **ANALOG SWITCH** ($V_{DD}$ = 13.5 V, $V_{SS}$ = -13.5 V, See Figure 6) | | | | | | | |
| Analog Signal Range | | | -55°C to 125°C | | | $V_{DD}$ to $V_{SS}$ | V |
| On Resistance | $R_{ON}$ | $V_S$ = ± 10 V, $I_S$ = -10 mA | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 10 | 11.2<br>14<br>16.5 | Ω |
| | | $V_S$ = ± 9 V, $I_S$ = -10 mA | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 9.5 | 10.7<br>13.5<br>16 | Ω |
| On-Resistance Match Between Channels, | $\Delta R_{ON}$ | $V_S$ = ± 10 V, $I_S$ = -10 mA | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 0.05 | 0.5<br>0.6<br>0.7 | Ω |
| | | $V_S$ = ± 9 V, $I_S$ = -10 mA | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 0.05 | 0.35<br>0.5<br>0.5 | Ω |
| On-Resistance Flatness, | $R_{FLAT(ON)}$ | $V_S$ = ± 10 V, $I_S$ = -10 mA | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 0.6 | 0.9<br>1.1<br>1.1 | Ω |
| | | $V_S$ = ± 9 V, $I_S$ = -10 mA | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 0.1 | 0.4<br>0.5<br>0.5 | Ω |
| Threshold Voltage | $V_T$ | See Figure 22 | 25°C | | 0.7 | | V |
| **LEAKAGE CURRENTS** ($V_{DD}$ = 16.5 V, $V_{SS}$ = -16.5 V) | | | | | | | |
| Source Off Leakage | $I_S$ (Off) | $V_S$ = ±10 V, $V_D$ = ∓10 V,<br>See Figure 7 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | ±0.1 | ±1.5<br>±5.0<br>±21.0 | nA |
| Drain Off Leakage | $I_D$ (Off) | $V_S$ = ±10 V, $V_D$ = ∓10 V,<br>See Figure 7 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | ±0.1 | ±1.5<br>±5.0<br>±18.0 | nA |
| Channel On Leakage | $I_D$ (On),<br>$I_S$ (Off) | $V_S$ = $V_D$ = ±10 V,<br>See Figure 8 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | ±0.3 | ±1.5<br>±2.0<br>±4.5 | nA |
| **FAULT** | | | | | | | |
| Source Leakage Current<br>With Overvoltage | $I_S$ | $V_{DD}$ = 16.5 V, $V_{SS}$ = -16.5 V,<br>GND = 0 V, $V_S$ = ±55 V,<br>See Figure 11 | -55°C to 125°C | | ±78 | | µA |
| Power Supplies Grounded or Floating | | $V_{DD}$ = 0 V or floating,<br>$V_{SS}$ = 0 V or floating,<br>GND = 0 V, INx = 0 V or floating, $V_S$ = ±55 V,<br>See Figure 12 | -55°C to 125°C | | ±40 | | µA |

See footnote at end of table.

TABLE I. Electrical performance characteristics - Continued. 1/

| Test | Symbol | Test conditions<br>**± 15 V Dual Supply** 2/ | Temperature<br>$T_A$ | Limits | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min | Typ | Max | |
| **FAULT**-Continued | | | | | | | |
| Drain Leakage Current,<br>With Overvoltage | $I_D$ | $V_{DD}$ = 16.5 V, $V_{SS}$ = -16.5 V,<br>GND = 0 V, $V_S$ = ±55 V,<br>See Figure 11 | 25°C | | ±2.0 | | nA |
| Power Supplies Grounded | | $V_{DD}$ = 0 V, $V_{SS}$ = 0 V,<br>GND = 0 V, $V_S$ = ±55 V,<br>INx = 0 V, See Figure 12 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | ±10 | ±8.0<br>±15.0<br>±49.0 | nA |
| Power Supplies Floating | | $V_{DD}$ = floating, $V_{SS}$ = floating,<br>GND = 0 V, $V_S$ = ±55 V,<br>INx = 0 V, See Figure 36 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | ±10<br>±10<br>±10 | | nA |
| | | | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | | ±30<br>±50<br>±100 | µA |
| **DIGITAL INPUTS/OUTPUTS** | | | | | | | |
| Input Voltage High | $V_{INH}$ | | -55°C to 125°C | 2.0 | | | V |
| Input Voltage Low, | $V_{INL}$ | | -55°C to 125°C | | | 0.8 | V |
| Input Current | $I_{INL}$ or $I_{INH}$ | $V_{IN}$ = $V_{GND}$ or $V_{DD}$ | 25°C<br>-55°C to 125°C | | ±0.7 | <br>±1.2 | µA |
| Digital Input Capacitance | $C_{IN}$ | | 25°C | | 5.0 | | pF |
| Output Voltage High | $V_{OH}$ | | 25°C | 2.0 | | | V |
| Output Voltage Low | $V_{OL}$ | | 25°C | | | 0.8 | V |
| **DYNAMIC CHARACTERISTICS** 3/ | | | | | | | |
| $t_{ON}$ | | $R_L$ = 300 Ω, $C_L$ = 35 pF<br>$V_S$ = 10 V,<br>See Figure 20 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 400 | 495<br>525<br>550 | ns |
| $t_{OFF}$ | | $R_L$ = 300 Ω, $C_L$ = 35 pF<br>$V_S$ = 10 V, $V_{S1}$ = $V_{S2}$ = 10 V,<br>See Figure 20 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | <br><br>185 | 410 | 510<br>545<br>555 | ns |
| Overvoltage Response Time | $t_{RESPONSE}$ | $R_L$ = 1 kΩ, $C_L$ = 2 pF,<br>See Figure 15 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 460 | 585<br>615<br>630 | ns |
| Overvoltage Recovery Time | $t_{RECOVERY}$ | $R_L$ = 1 kΩ, $C_L$ = 2 pF,<br>See Figure 16 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 720 | 930<br>1050<br>1100 | ns |
| Interrupt Flag Response Time | $t_{DIGRESP}$ | $C_L$ = 10 pF,<br>See Figure 17 | 25°C<br>-55°C to 125°C | | 85<br>115 | | ns |
| Interrupt Flag Recovery Time | $t_{DIGREC}$ | $C_L$ = 10 pF, See Figure 18 | 25°C<br>-55°C to 125°C | | 60<br>85 | | µs |
| | | $C_L$ = 10 pF, $R_{PULLUP}$ = 1 kΩ,<br>See Figure 19 | 25°C | | 600 | | ns |

See footnote at end of table.

TABLE I. Electrical performance characteristics - Continued. 1/

| Test | Symbol | Test conditions<br>**± 15 V Dual Supply** 2/ | Temperature<br>$T_A$ | Limits | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min | Typ | Max | |
| **DYNAMIC CHARACTERISTICS – Continued** 3/ | | | | | | | |
| Charge Injection | $Q_{INJ}$ | $V_S$ = 0 V, $R_S$ = 0 Ω, $C_L$ = 1 nF, See Figure 21 | 25°C | | 680 | | pC |
| Off Isolation | | $R_L$ = 50 Ω, $C_L$ = 5 pF, f = 1 MHz, See Figure 9 | 25°C | | -70 | | dB |
| Channel-to-Channel Crosstalk | | $R_L$ = 50 Ω, $C_L$ = 5 pF, f = 1 MHz, See Figure 10 | 25°C | | -90 | | dB |
| Total Harmonic Distortion Plus Noise | THD + N | $R_L$ = 10 kΩ, $V_S$ = 15 V p-p, f = 20 Hz to 20 kHz, See Figure 14 | 25°C | | 0.0015 | | % |
| −3 dB Bandwidth | | $R_L$ = 50 Ω, $C_L$ = 5 pF, See Figure 13 | 25°C | | 270 | | MHz |
| Insertion Loss | | $R_L$ = 50 Ω, $C_L$ = 5 pF, f = 1 MHz, See Figure 13 | | | -0.72 | | dB |
| $C_S$ (Off) | | $V_S$ = 0 V, f = 1 MHz | 25°C | | 13 | | pF |
| $C_D$ (Off) | | $V_S$ = 0 V, f = 1 MHz | 25°C | | 12 | | pF |
| $C_D$ (On), $C_S$ (On) | | $V_S$ = 0 V, f = 1 MHz | 25°C | | 14 | | pF |
| **POWER REQUIREMENTS** ( $V_{DD}$ = 16.5 V, $V_{SS}$ = −16.5 V, GND = 0 V, digital inputs = 0 V, 5 V, or $V_{DD}$ ) | | | | | | | |
| Normal Mode | | | | | | | |
| $I_{DD}$ | | | 25°C<br>-55°C to 125°C | | 0.9 | 1.2<br>1.3 | mA |
| $I_{GND}$ | | | 25°C<br>-55°C to 125°C | | 0.4 | 0.55<br>0.6 | |
| $I_{SS}$ | | | 25°C<br>-55°C to 125°C | | 0.5 | 0.65<br>0.7 | |
| Fault Mode | | $V_S$ = ±55 V | | | | | |
| $I_{DD}$ | | | 25°C<br>-55°C to 125°C | | 1.2 | 1.6<br>1.8 | mA |
| $I_{GND}$ | | | 25°C<br>-55°C to 125°C | | 0.8 | 1.0<br>1.1 | |
| $I_{SS}$ | | | 25°C<br>-55°C to 125°C | | 0.5 | 1.0<br>1.8 | |
| $V_{DD}/V_{SS}$ | | GND = 0 V | -55°C to 125°C | ±5 | | ±22 | V |

See footnote at end of table.

TABLE I. Electrical performance characteristics - Continued. 1/

| Test | Symbol | Test conditions<br>**± 20 V Dual Supply** 4/ | Temperature<br>$T_A$ | Limits | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min | Typ | Max | |
| **ANALOG SWITCH** ($V_{DD}$ = 18 V, $V_{SS}$ = -18 V, See figure 6) | | | | | | | |
| Analog Signal Range | | | -55°C to 125°C | | | $V_{DD}$ to $V_{SS}$ | V |
| On Resistance | $R_{ON}$ | $V_S$ = ± 15 V, $I_S$ = -10 mA | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 10 | 11.5<br>14.5<br>16.5 | Ω |
| | | $V_S$ = ± 13.5 V, $I_S$ = -10 mA | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 9.5 | 11<br>14<br>16.5 | Ω |
| On-Resistance Match Between Channels, | $\Delta R_{ON}$ | $V_S$ = ± 15 V, $I_S$ = -10 mA | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 0.05 | 0.35<br>0.5<br>0.5 | Ω |
| | | $V_S$ = ± 13.5 V, $I_S$ = -10 mA | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 0.05 | 0.35<br>0.5<br>0.5 | Ω |
| On-Resistance Flatness, | $R_{FLAT(ON)}$ | $V_S$ = ± 15 V, $I_S$ = -10 mA | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 1.0 | 1.4<br>1.5<br>1.5 | Ω |
| | | $V_S$ = ± 13.5 V, $I_S$ = -10 mA | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 0.1 | 0.4<br>0.5<br>0.5 | Ω |
| Threshold Voltage | $V_T$ | See Figure 22 | 25°C | | 0.7 | | V |
| **LEAKAGE CURRENTS** ($V_{DD}$ = 22 V, $V_{SS}$ = -22 V) | | | | | | | |
| Source Off Leakage | $I_S$ (Off) | $V_S$ = ±15 V, $V_D$ = ∓15 V,<br>See Figure 7 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | ±0.1 | ±1.5<br>±5.0<br>±21.0 | nA |
| Drain Off Leakage | $I_D$ (Off) | $V_S$ = ±15 V, $V_D$ = ∓15 V,<br>See Figure 7 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | ±0.1 | ±1.5<br>±5.0<br>±18.0 | nA |
| Channel On Leakage | $I_D$ (On),<br>$I_S$ (Off) | $V_S$ = $V_D$ = ±15 V,<br>See Figure 8 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | ±0.3 | ±1.5<br>±2.0<br>±4.5 | nA |
| **FAULT** | | | | | | | |
| Source Leakage Current<br>With Overvoltage | $I_S$ | $V_{DD}$ = 22 V, $V_{SS}$ = -22 V,<br>GND = 0 V, $V_S$ = ±55 V,<br>See Figure 11 | -55°C to 125°C | | ±78 | | µA |
| Power Supplies Grounded or Floating | | $V_{DD}$ = 0 V or floating,<br>$V_{SS}$ = 0 V or floating,<br>GND = 0 V, INx = 0 V or floating, $V_S$ = ±55 V,<br>See Figure 12 | -55°C to 125°C | | ±40 | | µA |

See footnote at end of table.

TABLE I. Electrical performance characteristics - Continued. 1/

| Test | Symbol | Test conditions<br>**± 20 V Dual Supply** 4/ | Temperature<br>$T_A$ | Limits | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min | Typ | Max | |
| **FAULT**-Continued | | | | | | | |
| Drain Leakage Current, With Overvoltage | $I_D$ | $V_{DD}$ = 22 V, $V_{SS}$ = -22 V, GND = 0 V, $V_S$ = ±55 V, See Figure 11 | 25°C | | ±5.0 | | nA |
| Power Supplies Grounded | | $V_{DD}$ = 0 V, $V_{SS}$ = 0 V, GND = 0 V, $V_S$ = ±55 V, INx = 0 V, See Figure 12 | 25°C | | ±10 | | nA |
| | | | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | | ±1.0<br>±1.0<br>±1.0 | µA |
| Power Supplies Floating | | $V_{DD}$ = floating, $V_{SS}$ = floating, GND = 0 V, $V_S$ = ±55 V, INx = 0 V, See Figure 12 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | | ±30<br>±50<br>±100 | nA |
| | | | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | ±10<br>±10<br>±10 | | µA |
| **DIGITAL INPUTS** | | | | | | | |
| Input Voltage High | $V_{INH}$ | | -55°C to 125°C | 2.0 | | | V |
| Input Voltage Low, | $V_{INL}$ | | -55°C to 125°C | | | 0.8 | V |
| Input Current | $I_{INL}$ or $I_{INH}$ | $V_{IN}$ = $V_{GND}$ or $V_{DD}$ | 25°C<br>-55°C to 125°C | | ±0.7 | <br>±1.2 | µA |
| Digital Input Capacitance | $C_{IN}$ | | 25°C | | 5.0 | | pF |
| Output Voltage High | $V_{OH}$ | | 25°C | 2.0 | | | V |
| Output Voltage Low | $V_{OL}$ | | 25°C | | | 0.8 | V |
| **DYNAMIC CHARACTERISTICS** 3/ | | | | | | | |
| $t_{ON}$ | | $R_L$ = 300 Ω, $C_L$ = 35 pF<br>$V_S$ = 10 V,<br>See Figure 20 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 400 | 500<br>530<br>550 | ns |
| $t_{OFF}$ | | $R_L$ = 300 Ω, $C_L$ = 35 pF<br>$V_S$ = 10 V, $V_{S1}$ = $V_{S2}$ = 10 V,<br>See Figure 20 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | <br><br>200 | 415 | 515<br>550<br>565 | ns |
| Overvoltage Response Time | $t_{RESPONSE}$ | $R_L$ = 1 kΩ, $C_L$ = 2 pF,<br>See Figure 15 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 370 | 480<br>500<br>515 | ns |
| Overvoltage Recovery Time | $t_{RECOVERY}$ | $R_L$ = 1 kΩ, $C_L$ = 2 pF,<br>See Figure 16 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 840 | 1200<br>1400<br>1700 | ns |
| Interrupt Flag Response Time | $t_{DIGRESP}$ | $C_L$ = 10 pF,<br>See Figure 17 | 25°C<br>-55°C to 125°C | | 85<br>115 | | ns |

See footnote at end of table.

TABLE I. Electrical performance characteristics - Continued. 1/

| Test | Symbol | Test conditions<br>**± 20 V Dual Supply** 4/ | Temperature<br>$T_A$ | Limits | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min | Typ | Max | |
| **DYNAMIC CHARACTERISTICS – Continued** 3/ | | | | | | | |
| Interrupt Flag Recovery Time | $t_{DIGREC}$ | $C_L$ = 10 pF, See Figure 18 | 25°C<br>-55°C to 125°C | | 60<br>85 | | µs |
| | | $C_L$ = 10 pF, $R_{PULLUP}$ = 1 kΩ, See Figure 19 | 25°C | | 600 | | ns |
| Charge Injection | $Q_{INJ}$ | $V_S$ = 0 V, $R_S$ = 0 Ω, $C_L$ = 1 nF, See Figure 21 | 25°C | | 640 | | pC |
| Off Isolation | | $R_L$ = 50 Ω, $C_L$ = 5 pF, f = 1 MHz, See Figure 9 | 25°C | | -70 | | dB |
| Channel-to-Channel Crosstalk | | $R_L$ = 50 Ω, $C_L$ = 5 pF, f = 1 MHz, See Figure 10 | 25°C | | -90 | | dB |
| Total Harmonic Distortion Plus Noise | THD + N | $R_L$ = 10 kΩ, $V_S$ = 15 V p-p, f = 20 Hz to 20 kHz, See Figure 14 | 25°C | | 0.001 | | % |
| −3 dB Bandwidth | | $R_L$ = 50 Ω, $C_L$ = 5 pF, See Figure 13 | 25°C | | 270 | | MHz |
| Insertion Loss | | $R_L$ = 50 Ω, $C_L$ = 5 pF, f = 1 MHz, See Figure 13 | | | -0.73 | | dB |
| $C_S$ (Off) | | $V_S$ = 0 V, f = 1 MHz | 25°C | | 12 | | pF |
| $C_D$ (Off) | | $V_S$ = 0 V, f = 1 MHz | 25°C | | 11 | | pF |
| $C_D$ (On), $C_S$ (On) | | $V_S$ = 0 V, f = 1 MHz | 25°C | | 23 | | pF |
| **POWER REQUIREMENTS** ( $V_{DD}$ = 22 V, $V_{SS}$ = −22 V, GND = 0 V, digital inputs = 0 V, 5 V, or $V_{DD}$ ) | | | | | | | |
| Normal Mode | | | | | | | |
| $I_{DD}$ | | | 25°C<br>-55°C to 125°C | | 0.9 | 1.2<br>1.3 | mA |
| $I_{GND}$ | | | 25°C<br>-55°C to 125°C | | 0.4 | 0.55<br>0.6 | |
| $I_{SS}$ | | | 25°C<br>-55°C to 125°C | | 0.5 | 0.65<br>0.7 | |
| Fault Mode | | $V_S$ = ±55 V | | | | | |
| $I_{DD}$ | | | 25°C<br>-55°C to 125°C | | 1.2 | 1.6<br>1.8 | mA |
| $I_{GND}$ | | | 25°C<br>-55°C to 125°C | | 0.8 | 1.0<br>1.1 | |
| $I_{SS}$ | | | 25°C<br>-55°C to 125°C | | 0.5 | 1.0<br>1.8 | |
| $V_{DD}/V_{SS}$ | | GND = 0 V | -55°C to 125°C | ±5 | | ±22 | V |

See footnote at end of table.

TABLE I. Electrical performance characteristics - Continued. 1/

| Test | Symbol | Test conditions<br>**± 12 V Single Supply** 5/ | Temperature<br>$T_A$ | Limits | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min | Typ | Max | |
| **ANALOG SWITCH** ($V_{DD}$ = 10.8 V, $V_{SS}$ = 0 V, See figure 6) | | | | | | | |
| Analog Signal Range | | | -55°C to 125°C | | | 0 V to $V_{DD}$ | V |
| On Resistance | $R_{ON}$ | $V_S$ = 0 to 10 V, $I_S$ = -10 mA | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 22 | 24.5<br>31<br>37 | Ω |
| | | $V_S$ = 3.5 V to 8.5 V,<br>$I_S$ = -10 mA | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 10 | 11.2<br>14<br>16.5 | Ω |
| On-Resistance Match Between Channels, | $\Delta R_{ON}$ | $V_S$ = 0 V to 10 V,<br>$I_S$ = -10 mA | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 0.05 | 0.5<br>0.6<br>0.7 | Ω |
| | | $V_S$ = 3.5 V to 8.5 V,<br>$I_S$ = -10 mA | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 0.05 | 0.5<br>0.6<br>0.7 | Ω |
| On-Resistance Flatness, | $R_{FLAT(ON)}$ | $V_S$ = 0 V to 10 V,<br>$I_S$ = -10 mA | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 12.5 | 14.5<br>19<br>23 | Ω |
| | | $V_S$ = 3.5 V to 8.5 V,<br>$I_S$ = -10 mA | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 0.6 | 0.9<br>1.1<br>1.3 | Ω |
| Threshold Voltage | $V_T$ | See Figure 22 | 25°C | | 0.7 | | V |
| **LEAKAGE CURRENTS** ($V_{DD}$ = 13.2 V, $V_{SS}$ = 0 V) | | | | | | | |
| Source Off Leakage | $I_S$ (Off) | $V_S$ = 1 V/10 V, $V_D$ = 10 V/1 V,<br>See Figure 7 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | ±0.1 | ±1.5<br>±5.0<br>±21.0 | nA |
| Drain Off Leakage | $I_D$ (Off) | $V_S$ = 1 V/10 V, $V_D$ = 10 V/1 V,<br>See Figure 7 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | ±0.1 | ±1.5<br>±5.0<br>±18.0 | nA |
| Channel On Leakage | $I_D$ (On),<br>$I_S$ (Off) | $V_S$ = $V_D$ = 1 V/10 V,<br>See Figure 8 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | ±0.3 | ±1.5<br>±2.0<br>±4.5 | nA |
| **FAULT** | | | | | | | |
| Source Leakage Current<br>With Overvoltage | $I_S$ | $V_{DD}$ = 13.2 V, $V_{SS}$ = 0 V,<br>GND = 0 V, $V_S$ = ±55 V,<br>See Figure 11 | -55°C to 125°C | | ±78 | | µA |
| Power Supplies Grounded or Floating | | $V_{DD}$ = 0 V or floating,<br>$V_{SS}$ = 0 V or floating,<br>GND = 0 V, INx = 0 V or floating, $V_S$ = ±55 V,<br>See Figure 12 | -55°C to 125°C | | ±40 | | µA |

See footnote at end of table.

TABLE I. Electrical performance characteristics - Continued. 1/

| Test | Symbol | Test conditions<br>**± 12 V Single Supply** 5/ | Temperature<br>$T_A$ | Limits | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min | Typ | Max | |
| **FAULT**-Continued | | | | | | | |
| Drain Leakage Current,<br>With Overvoltage | $I_D$ | $V_{DD}$ = 13.2 V, $V_{SS}$ = 0 V,<br>GND = 0 V, $V_S$ = ±55 V,<br>See Figure 11 | 25°C | | ±2.0 | | nA |
| Power Supplies Grounded | | $V_{DD}$ = 0 V, $V_{SS}$ = 0 V,<br>GND = 0 V, $V_S$ = ±55 V,<br>INx = 0 V, See Figure 12 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | ±10 | ±8.0<br>±15.0<br>±49.0 | nA |
| Power Supplies Floating | | $V_{DD}$ = floating, $V_{SS}$ = floating,<br>GND = 0 V, $V_S$ = ±55 V,<br>INx = 0 V, See Figure 12 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | ±10<br>±10<br>±10 | | µA |
| | | | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | | ±30<br>±50<br>±100 | nA |
| **DIGITAL INPUTS** | | | | | | | |
| Input Voltage High | $V_{INH}$ | | -55°C to 125°C | 2.0 | | | V |
| Input Voltage Low, | $V_{INL}$ | | -55°C to 125°C | | | 0.8 | V |
| Input Current | $I_{INL}$ or $I_{INH}$ | $V_{IN}$ = $V_{GND}$ or $V_{DD}$ | 25°C<br>-55°C to 125°C | | ±0.7 | <br>±1.2 | µA |
| Digital Input Capacitance | $C_{IN}$ | | 25°C | | 5.0 | | pF |
| Output Voltage High | $V_{OH}$ | | 25°C | 2.0 | | | V |
| Output Voltage Low | $V_{OL}$ | | 25°C | | | 0.8 | V |
| **DYNAMIC CHARACTERISTICS** 3/ | | | | | | | |
| $t_{ON}$ | | $R_L$ = 300 Ω, $C_L$ = 35 pF<br>$V_S$ = 8 V,<br>See Figure 20 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 400 | 485<br>515<br>540 | ns |
| $t_{OFF}$ | | $R_L$ = 300 Ω, $C_L$ = 35 pF<br>$V_S$ = 8 V, $V_{S1}$ = $V_{S2}$ = 8 V,<br>See Figure 20 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | <br><br>170 | 375 | 460<br>495<br>520 | ns |
| Overvoltage Response Time | $t_{RESPONSE}$ | $R_L$ = 1 kΩ, $C_L$ = 2 pF,<br>See Figure 15 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 560 | 660<br>700<br>720 | ns |
| Overvoltage Recovery Time | $t_{RECOVERY}$ | $R_L$ = 1 kΩ, $C_L$ = 2 pF,<br>See Figure 16 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 640 | 800<br>865<br>960 | ns |
| Interrupt Flag Response Time | $t_{DIGRESP}$ | $C_L$ = 10 pF,<br>See Figure 17 | 25°C<br>-55°C to 125°C | | 85<br>115 | | ns |

See footnote at end of table.

TABLE I. Electrical performance characteristics - Continued. 1/

| Test | Symbol | Test conditions<br>**± 12 V Single Supply** 5/ | Temperature<br>$T_A$ | Limits | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min | Typ | Max | |
| **DYNAMIC CHARACTERISTICS – Continued** 3/ | | | | | | | |
| Interrupt Flag Recovery Time | $t_{DIGREC}$ | $C_L$ = 10 pF, See Figure 18 | 25°C<br>-55°C to 125°C | | 60<br>85 | | µs |
| | | $C_L$ = 10 pF, $R_{PULLUP}$ = 1 kΩ, See Figure 19 | 25°C | | 600 | | ns |
| Charge Injection | $Q_{INJ}$ | $V_S$ = 6 V, $R_S$ = 0 Ω, $C_L$ = 1 nF, See Figure 21 | 25°C | | 340 | | pC |
| Off Isolation | | $R_L$ = 50 Ω, $C_L$ = 5 pF, f = 1 MHz, See Figure 9 | 25°C | | -65 | | dB |
| Channel-to-Channel Crosstalk | | $R_L$ = 50 Ω, $C_L$ = 5 pF, f = 1 MHz, See Figure 10 | 25°C | | -90 | | dB |
| Total Harmonic Distortion Plus Noise | THD + N | $R_L$ = 10 kΩ, $V_S$ = 6 Vp-p, f = 20 Hz to 20 kHz, See Figure 14 | 25°C | | 0.007 | | % |
| −3 dB Bandwidth | | $R_L$ = 50 Ω, $C_L$ = 5 pF, See Figure 13 | 25°C | | 270 | | MHz |
| Insertion Loss | | $R_L$ = 50 Ω, $C_L$ = 5 pF, f = 1 MHz, See Figure 13 | | | -0.74 | | dB |
| $C_S$ (Off) | | $V_S$ = 6 V, f = 1 MHz | 25°C | | 16 | | pF |
| $C_D$ (Off) | | $V_S$ = 6 V, f = 1 MHz | 25°C | | 15 | | pF |
| $C_D$ (On), $C_S$ (On) | | $V_S$ = 6 V, f = 1 MHz | 25°C | | 25 | | pF |
| **POWER REQUIREMENTS** ( $V_{DD}$ = 13.2 V, $V_{SS}$ = 0 V, Digital inputs = 0 V, 5 V, or $V_{DD}$ ) | | | | | | | |
| Normal Mode | | | | | | | |
| $I_{DD}$ | | | 25°C<br>-55°C to 125°C | | 0.9 | 1.2<br>1.3 | mA |
| $I_{GND}$ | | | 25°C<br>-55°C to 125°C | | 0.4 | 0.55<br>0.6 | |
| $I_{SS}$ | | | 25°C<br>-55°C to 125°C | | 0.5 | 0.65<br>0.7 | |
| Fault Mode | | $V_S$ = ±55 V | | | | | |
| $I_{DD}$ | | | 25°C<br>-55°C to 125°C | | 1.2 | 1.6<br>1.8 | mA |
| $I_{GND}$ | | | 25°C<br>-55°C to 125°C | | 0.8 | 1.0<br>1.1 | |
| $I_{SS}$ | | Digital inputs = 5 V<br>$V_S$ = ±55 V, $V_D$ = 0 V | 25°C<br>-55°C to 125°C | | 0.5 | 1.0<br>1.8 | |
| $V_{DD}$ | | | -55°C to 125°C | 8 | | 44 | V |

See footnote at end of table.

TABLE I. Electrical performance characteristics - Continued. 1/

| Test | Symbol | Test conditions<br>**± 36 V Single Supply** 6/ | Temperature<br>$T_A$ | Limits | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min | Typ | Max | |
| **ANALOG SWITCH** ($V_{DD}$ = 32.4 V, $V_{SS}$ = 0 V, See figure 6) | | | | | | | |
| Analog Signal Range | | | -55°C to 125°C | | | 0 V to $V_{DD}$ | V |
| On Resistance | $R_{ON}$ | $V_S$ = 0 to 30 V, $I_S$ = -10 mA | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 22 | 24.5<br>31<br>37 | Ω |
| | | $V_S$ = 4.5 V to 28 V,<br>$I_S$ = -10 mA | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 10 | 11<br>14<br>16.5 | Ω |
| On-Resistance Match Between Channels, | $\Delta R_{ON}$ | $V_S$ = 0 V to 30 V,<br>$I_S$ = -10 mA | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 0.05 | 0.5<br>0.6<br>0.7 | Ω |
| | | $V_S$ = 4.5 V to 28 V,<br>$I_S$ = -10 mA | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 0.05 | 0.35<br>0.5<br>0.5 | Ω |
| On-Resistance Flatness, | $R_{FLAT(ON)}$ | $V_S$ = 0 V to 30 V,<br>$I_S$ = -10 mA | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 12.5 | 14.5<br>19<br>23 | Ω |
| | | $V_S$ = 4.5 V to 28 V,<br>$I_S$ = -10 mA | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 0.4 | 0.5<br>0.5<br>0.5 | Ω |
| Threshold Voltage | $V_T$ | See Figure 22 | 25°C | | 0.7 | | V |
| **LEAKAGE CURRENTS** ($V_{DD}$ = 39.6 V, $V_{SS}$ = 0 V) | | | | | | | |
| Source Off Leakage | $I_S$ (Off) | $V_S$ = 1 V/30 V, $V_D$ = 30 V/1 V,<br>See Figure 7 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | ±0.1 | ±1.5<br>±5.0<br>±21.0 | nA |
| Drain Off Leakage | $I_D$ (Off) | $V_S$ = 1 V/30 V, $V_D$ = 30 V/1 V,<br>See Figure 7 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | ±0.1 | ±1.5<br>±5.0<br>±18.0 | nA |
| Channel On Leakage | $I_D$ (On),<br>$I_S$ (Off) | $V_S$ = $V_D$ = 1 V/30 V,<br>See Figure 8 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | ±0.3 | ±1.5<br>±2.0<br>±4.5 | nA |
| **FAULT** | | | | | | | |
| Source Leakage Current<br>With Overvoltage | $I_S$ | $V_{DD}$ = 39.6 V, $V_{SS}$ = 0 V,<br>GND = 0 V, $V_S$ = ±55 V, -40 V<br>See Figure 11 | -55°C to 125°C | | ±78 | | µA |
| Power Supplies Grounded or Floating | | $V_{DD}$ = 0 V or floating,<br>$V_{SS}$ = 0 V or floating,<br>GND = 0 V, INx = 0 V or floating, $V_S$ = ±55 V, -40 V<br>See Figure 12 | -55°C to 125°C | | ±40 | | µA |

See footnote at end of table.

TABLE I. Electrical performance characteristics - Continued. 1/

| Test | Symbol | Test conditions<br>**± 36 V Single Supply** 6/ | Temperature<br>$T_A$ | Limits | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min | Typ | Max | |
| **FAULT**-Continued | | | | | | | |
| Drain Leakage Current,<br>With Overvoltage | $I_D$ | $V_{DD}$ = 39.6 V, $V_{SS}$ = 0 V,<br>GND = 0 V, $V_S$ = ±55 V, -40 V<br>See Figure 11 | 25°C | | ±2.0 | | nA |
| Power Supplies Grounded | | $V_{DD}$ = 0 V, $V_{SS}$ = 0 V,<br>GND = 0 V, $V_S$ = ±55 V,<br>INx = 0 V, See Figure 12 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | ±10 | ±8.0<br>±15.0<br>±49.0 | nA |
| Power Supplies Floating | | $V_{DD}$ = floating, $V_{SS}$ = floating,<br>GND = 0 V, $V_S$ = ±55 V, -40 V<br>INx = 0 V, See Figure 12 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | ±10<br>±10<br>±10 | | µA |
| | | | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | | ±30<br>±50<br>±100 | nA |
| **DIGITAL INPUTS** | | | | | | | |
| Input Voltage High | $V_{INH}$ | | -55°C to 125°C | 2.0 | | | V |
| Input Voltage Low, | $V_{INL}$ | | -55°C to 125°C | | | 0.8 | V |
| Input Current | $I_{INL}$ or $I_{INH}$ | $V_{IN}$ = $V_{GND}$ or $V_{DD}$ | 25°C<br>-55°C to 125°C | | ±0.7 | <br>±1.2 | µA |
| Digital Input Capacitance | $C_{IN}$ | | 25°C | | 5.0 | | pF |
| Output Voltage High | $V_{OH}$ | | 25°C | 2.0 | | | V |
| Output Voltage Low | $V_{OL}$ | | 25°C | | | 0.8 | V |
| **DYNAMIC CHARACTERISTICS** 3/ | | | | | | | |
| $t_{ON}$ | | $R_L$ = 300 Ω, $C_L$ = 35 pF<br>$V_S$ = 18 V,<br>See Figure 20 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 400 | 490<br>520<br>545 | ns |
| $t_{OFF}$ | | $R_L$ = 300 Ω, $C_L$ = 35 pF<br>$V_S$ = 18 V, $V_{S1}$ = $V_{S2}$ = 18 V,<br>See Figure 20 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | <br><br>195 | 375 | 460<br>485<br>510 | ns |
| Overvoltage Response Time | $t_{RESPONSE}$ | $R_L$ = 1 kΩ, $C_L$ = 2 pF,<br>See Figure 15 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 250 | 350<br>360<br>375 | ns |
| Overvoltage Recovery Time | $t_{RECOVERY}$ | $R_L$ = 1 kΩ, $C_L$ = 2 pF,<br>See Figure 16 | 25°C<br>-40°C to 125°C<br>-55°C to 125°C | | 1500 | 2000<br>2300<br>2700 | ns |
| Interrupt Flag Response Time | $t_{DIGRESP}$ | $C_L$ = 10 pF,<br>See Figure 17 | 25°C<br>-55°C to 125°C | | 85<br>115 | | ns |

See footnote at end of table.

TABLE I. Electrical performance characteristics - Continued. 1/

| Test | Symbol | Test conditions<br>**± 36 V Single Supply** 6/ | Temperature<br>$T_A$ | Limits | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min | Typ | Max | |
| **DYNAMIC CHARACTERISTICS – Continued** 3/ | | | | | | | |
| Interrupt Flag Recovery Time | $t_{DIGREC}$ | $C_L$ = 10 pF, See Figure 18 | 25°C<br>-55°C to 125°C | | 60<br>85 | | µs |
| | | $C_L$ = 10 pF, $R_{PULLUP}$ = 1 kΩ, See Figure 19 | 25°C | | 600 | | ns |
| Charge Injection | $Q_{INJ}$ | $V_S$ = 18 V, $R_S$ = 0 Ω, $C_L$ = 1 nF, See Figure 21 | 25°C | | 610 | | pC |
| Off Isolation | | $R_L$ = 50 Ω, $C_L$ = 5 pF, f = 1 MHz, See Figure 9 | 25°C | | -70 | | dB |
| Channel-to-Channel Crosstalk | | $R_L$ = 50 Ω, $C_L$ = 5 pF, f = 1 MHz, See Figure 10 | 25°C | | -90 | | dB |
| Total Harmonic Distortion Plus Noise | THD + N | $R_L$ = 10 kΩ, $V_S$ = 6 Vp-p, f = 20 Hz to 20 kHz, See Figure 14 | 25°C | | 0.001 | | % |
| −3 dB Bandwidth | | $R_L$ = 50 Ω, $C_L$ = 5 pF, See Figure 13 | 25°C | | 270 | | MHz |
| Insertion Loss | | $R_L$ = 50 Ω, $C_L$ = 5 pF, f = 1 MHz, See Figure 13 | | | -0.75 | | dB |
| $C_S$ (Off) | | $V_S$ = 18 V, f = 1 MHz | 25°C | | 12 | | pF |
| $C_D$ (Off) | | $V_S$ = 18 V, f = 1 MHz | 25°C | | 11 | | pF |
| $C_D$ (On), $C_S$ (On) | | $V_S$ = 18 V, f = 1 MHz | 25°C | | 23 | | pF |
| **POWER REQUIREMENTS** ( $V_{DD}$ = 39.6 V, $V_{SS}$ = 0 V, Digital inputs = 0 V, 5 V, or $V_{DD}$ ) | | | | | | | |
| Normal Mode | | | | | | | |
| $I_{DD}$ | | | 25°C<br>-55°C to 125°C | | 0.9 | 1.2<br>1.3 | mA |
| $I_{GND}$ | | | 25°C<br>-55°C to 125°C | | 0.4 | 0.55<br>0.6 | |
| $I_{SS}$ | | | 25°C<br>-55°C to 125°C | | 0.5 | 0.65<br>0.7 | |
| Fault Mode | | $V_S$ = ±55 V | | | | | |
| $I_{DD}$ | | | 25°C<br>-55°C to 125°C | | 1.2 | 1.6<br>1.8 | mA |
| $I_{GND}$ | | | 25°C<br>-55°C to 125°C | | 0.8 | 1.0<br>1.1 | |
| $I_{SS}$ | | Digital inputs = 5 V<br>$V_S$ = ±55 V, $V_D$ = 0 V | 25°C<br>-55°C to 125°C | | 0.5 | 1.0<br>1.8 | |
| $V_{DD}$ | | | -55°C to 125°C | 8 | | 44 | V |

See footnote at end of table.

TABLE I. Electrical performance characteristics - Continued. 1/

| Test | Symbol | Test conditions | Temperature $T_A$ | Limits | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min | Typ | Max | |
| **CONTINUOUS CURRENT PER CHANNEL, Sx OR Dx** | | | | | | | |
| 16-LEAD TSSOP<br>$\theta_{JA}$ = 112.6°C/W | | $V_S = V_{SS} + 4.5$ V to $V_{DD} - 4.5$ V | 25°C | | | 83 | mA |
| | | | 85°C | | | 59 | |
| | | | 125°C | | | 39 | |
| | | $V_S = V_{SS}$ to $V_{DD}$ | 25°C | | | 64 | |
| | | | 85°C | | | 48 | |
| | | | 125°C | | | 29 | |

1/ Testing and other quality control techniques are used to the extent deemed necessary to assure product performance over the specified temperature range. Product may not necessarily be tested across the full temperature range and all parameters may not necessarily be tested. In the absence of specific parametric testing, product performance is assured by characterization and/or design.

2/ $V_{DD}$ = 15 V ±10%, $V_{SS}$ = - 15 V ±10%, GND = 0 V, $C_{DECOUPLING}$ = 0.1 µF, unless otherwise noted.

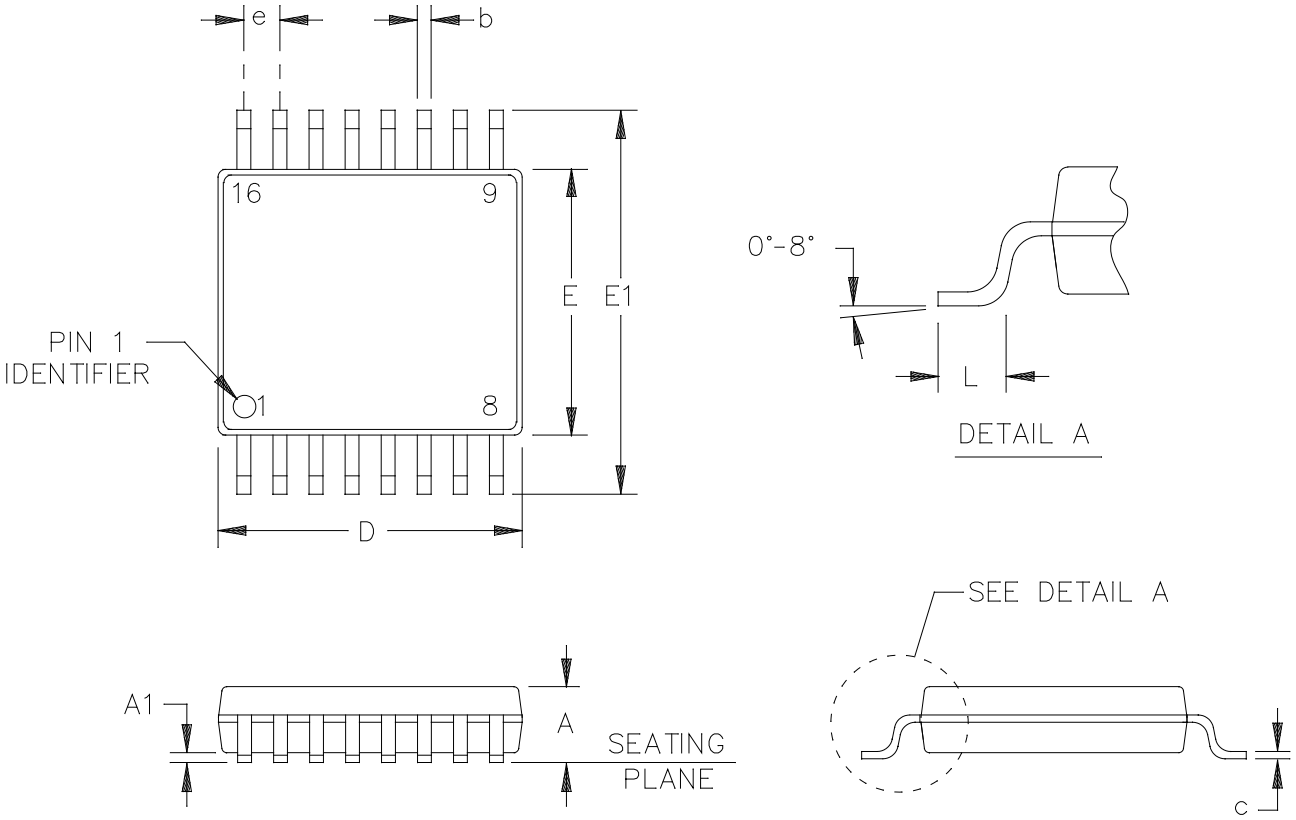
3/ Guaranteed by design, not subject to production test.

4/ $V_{DD}$ = 20 V ±10%, $V_{SS}$ = - 20 V ±10%, GND = 0 V, $C_{DECOUPLING}$ = 0.1 µF, unless otherwise noted.

5/ $V_{DD}$ = 12 V ±10%, $V_{SS}$ = 0 V, GND = 0 V, $C_{DECOUPLING}$ = 0.1 µF, unless otherwise noted.

6/ $V_{DD}$ = 36 V ±10%, $V_{SS}$ = 0 V, GND = 0 V, $C_{DECOUPLING}$ = 0.1 µF, unless otherwise noted.

Case X




| Dimensions | | | | | |
|---|---|---|---|---|---|
| Symbol | Millimeters | | Symbol | Millimeters | |
| | Min | Max | | Min | Max |
| A | | 1.20 | E | 4.30 | 4.50 |
| A1 | 0.05 | 0.15 | E1 | 6.40 BSC | |
| b | 0.19 | 0.30 | e | 0.65 BSC | |
| c | 0.09 | 0.20 | L | 0.45 | 0.75 |
| D | 4.90 | 5.10 | | | |

NOTES:

1. All linear dimensions are in millimeters.

FIGURE 1. Case outline.

| Case outline X | | | |
|---|---|---|---|
| Terminal number | Terminal symbol | Terminal number | Terminal symbol |
| | | | |
| 1 | IN1 | 16 | IN2 |
| 2 | D1 | 15 | D2 |
| 3 | S1 | 14 | S2 |
| 4 | VSS | 13 | VDD |
| 5 | GND | 12 | FF |
| 6 | S4 | 11 | S3 |
| 7 | D4 | 10 | D3 |
| 8 | IN4 | 9 | IN3 |

FIGURE 2. Terminal connections.

| Terminal number | Terminal symbol | Description |
|---|---|---|
| 1 | IN1 | Logic Control Input. |
| 2 | D1 | Drain Terminal. This pin can be an input or an output |
| 3 | S1 | Overvoltage Protected Source Terminal. This pin can be an input or an output. |
| 4 | VSS | Most Negative Power Supply Potential. |
| 5 | GND | Ground (0 V) Reference. |
| 6 | S4 | Overvoltage Protected Source Terminal. This pin can be an input or an output. |
| 7 | D4 | Drain Terminal. This pin can be an input or an output. |
| 8 | IN4 | Logic Control Input. |
| 9 | IN3 | Logic Control Input. |
| 10 | D3 | Drain Terminal. This pin can be an input or an output. |
| 11 | S3 | Overvoltage Protected Source Terminal. This pin can be an input or an output. |
| 12 | FF | Fault Flag Digital Output. This pin has a high output when the device is in normal operation or a low output when a fault condition occurs on any of the Sx inputs. |
| 13 | VDD | Most Positive Power Supply Potential. |
| 14 | S2 | Overvoltage Protected Source Terminal. This pin can be an input or an output. |
| 15 | D2 | Drain Terminal. This pin can be an input or an output. |
| 16 | IN2 | Logic Control Input. |

FIGURE 3. Terminal function.

| INx | Switch Condition (S1 to S4) |
|---|---|
| 1 | On |
| 0 | Off |

FIGURE 4. Truth table.

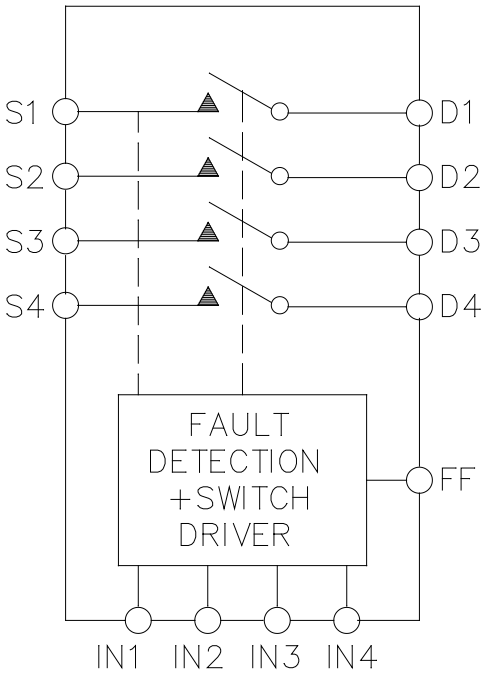



FIGURE 5. Functional block diagram.

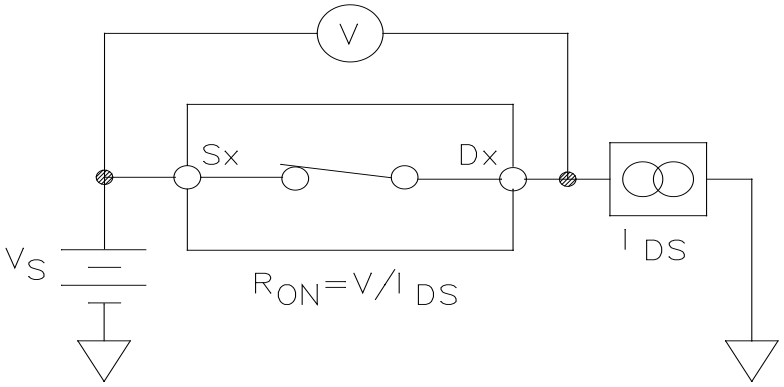



FIGURE 6. On Resistance.

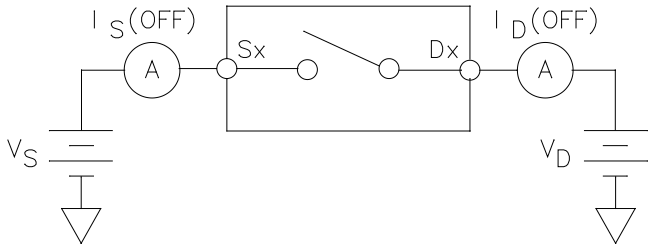



FIGURE 7. Off Leakage.

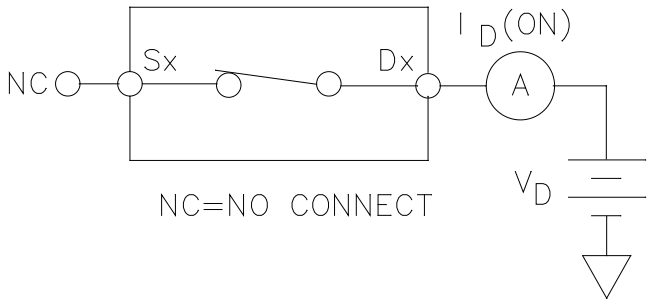



FIGURE 8. On Leakage.

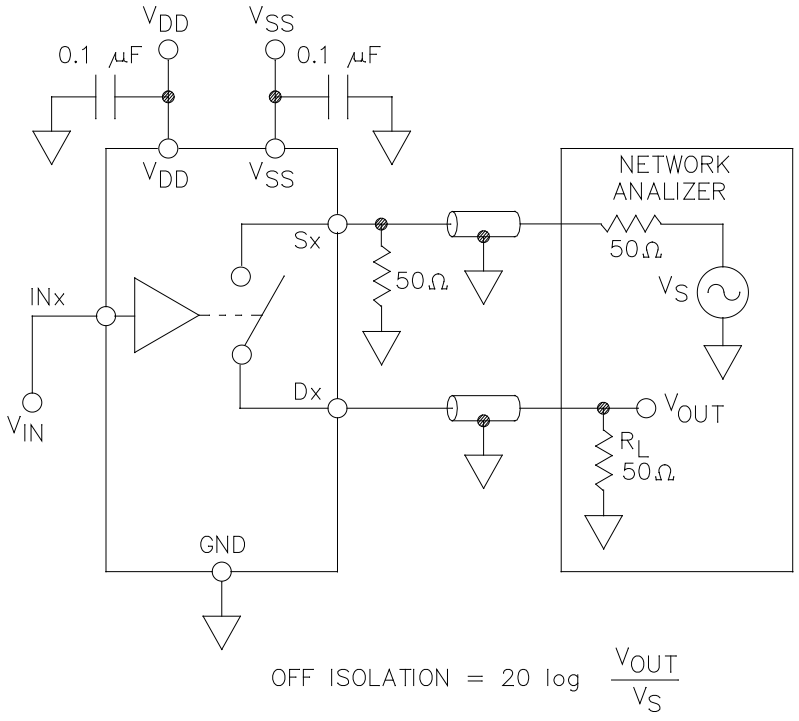



FIGURE 9. Off Isolation.

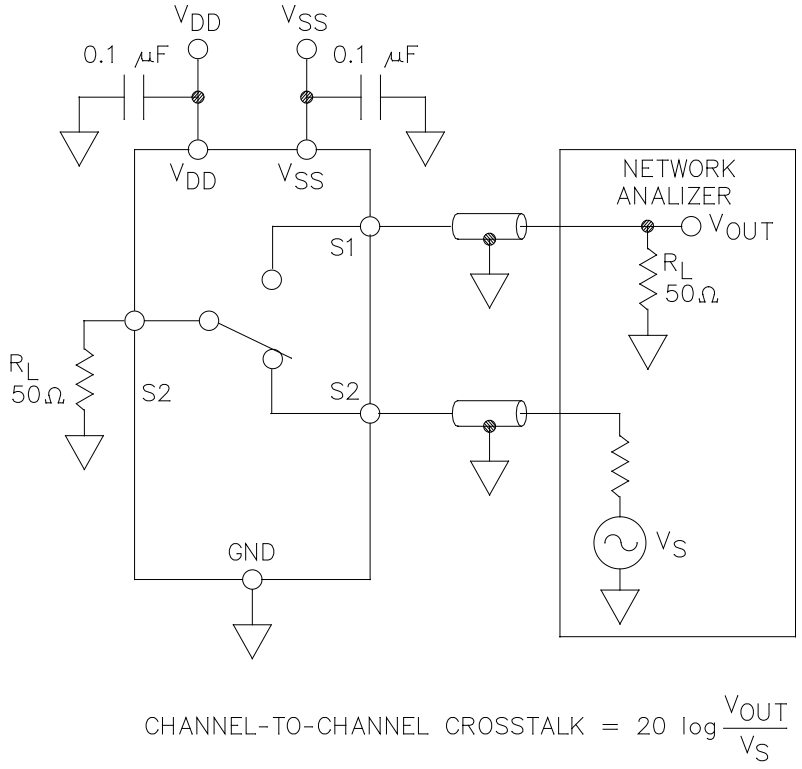



FIGURE 10. Channel-to-Channel Crosstalk.

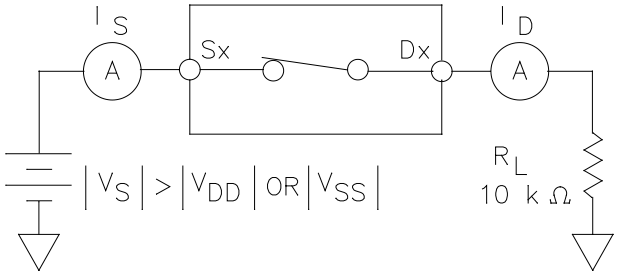



FIGURE 11. Switch Overvoltage Leakage.

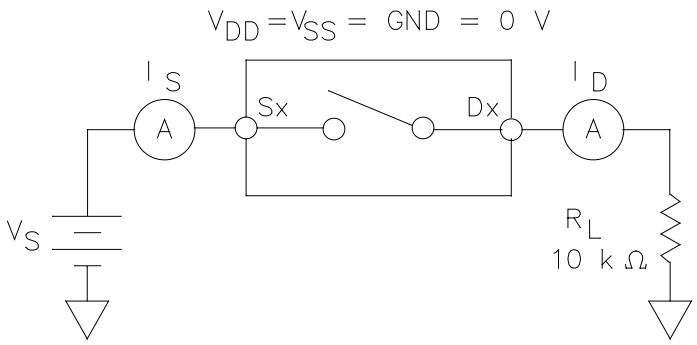



FIGURE 12. Switch Unpowered Leakage.

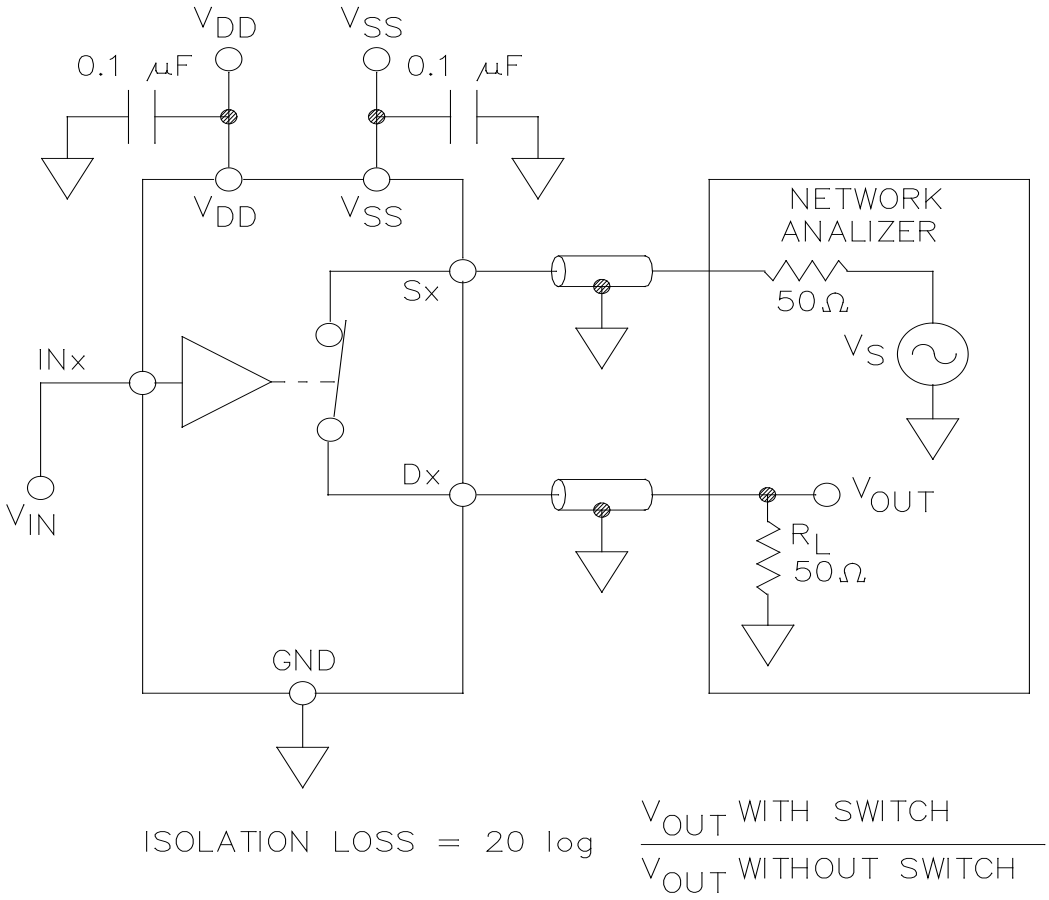



FIGURE 13. Bandwidth.

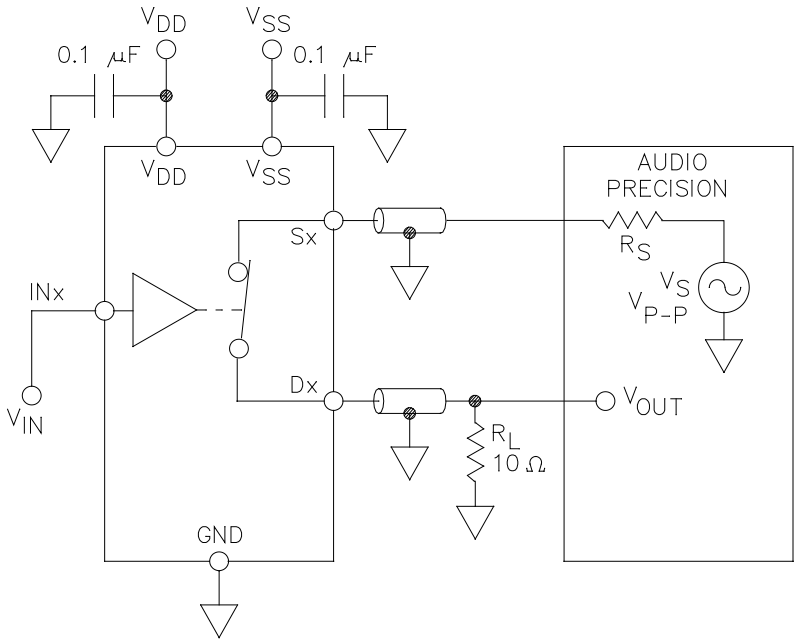



FIGURE 14. THD + N.

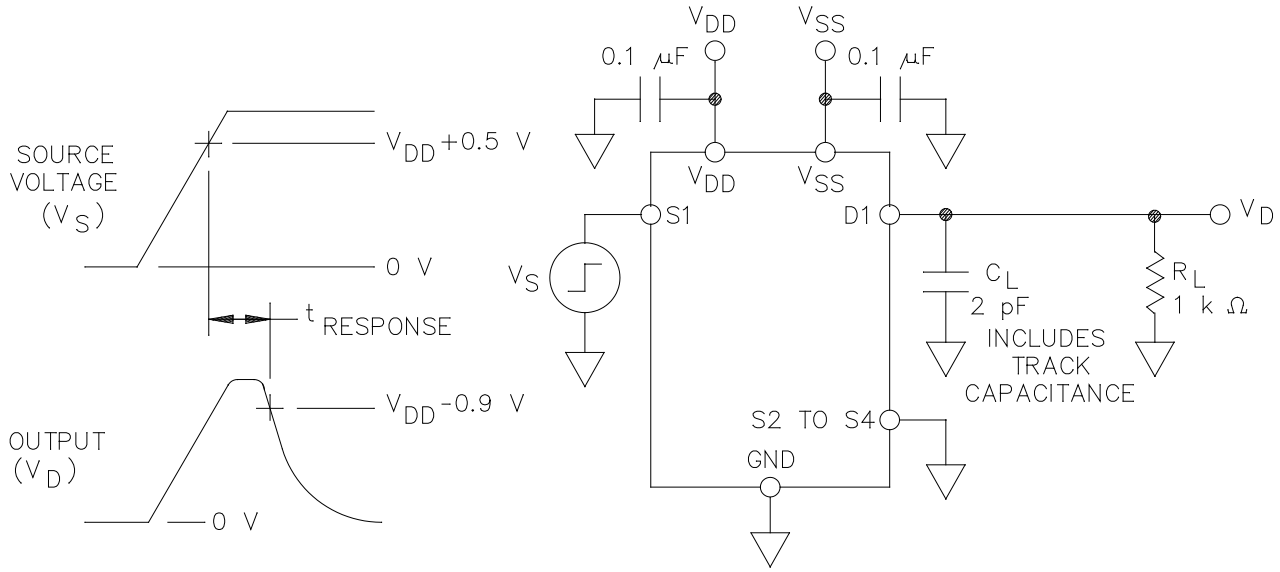



FIGURE 15. Overvoltage Response Time, $t_{RESPONSE}$.

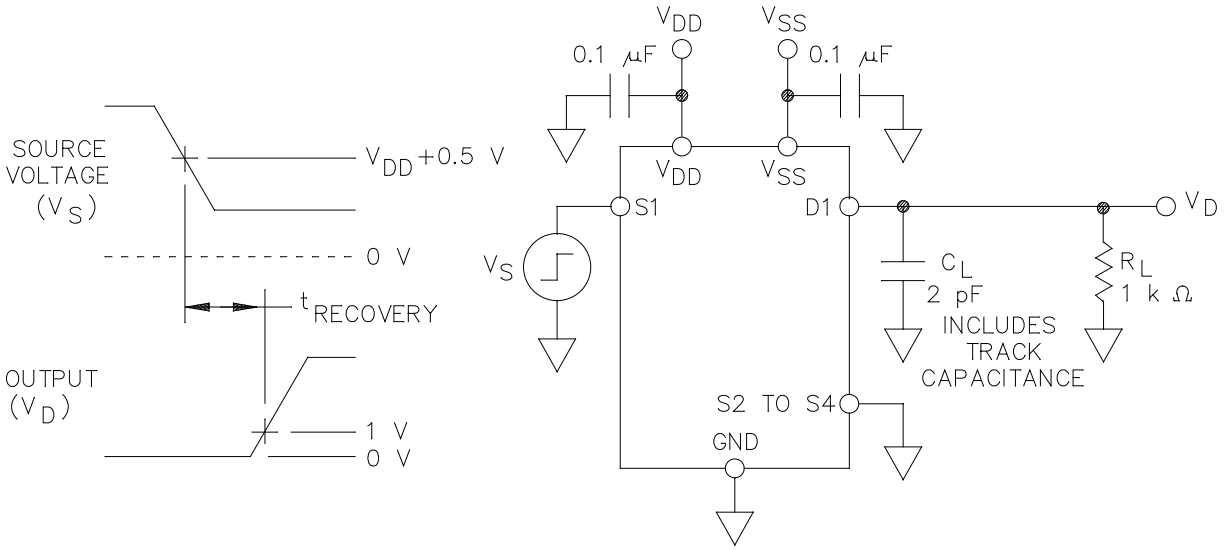



FIGURE 16. Overvoltage Recovery Time, $t_{RECOVERY}$.

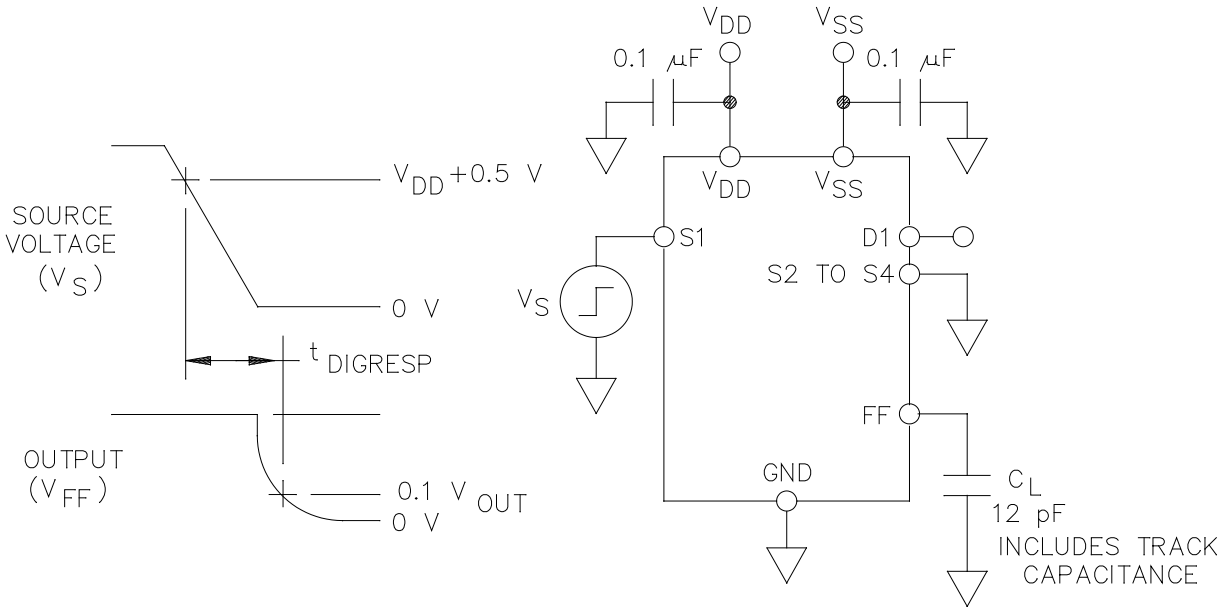



FIGURE 17. Interrupt Flag Response Time, $t_{DIGRESP}$.

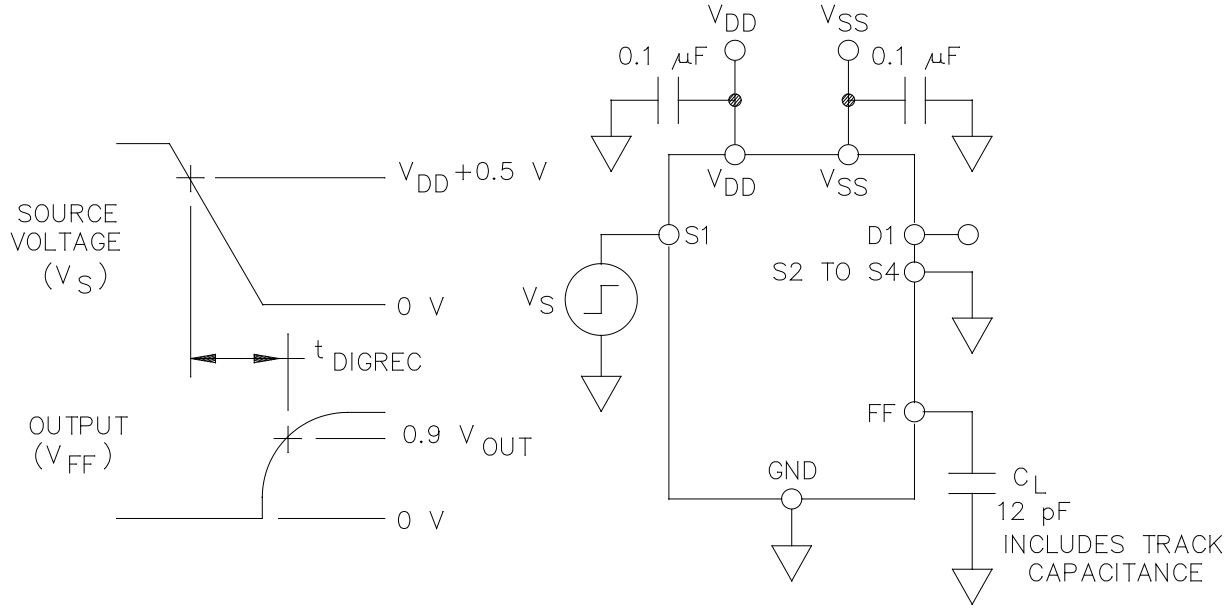



FIGURE 18. Interrupt Flag Recovery Time, $t_{DIGREC}$.

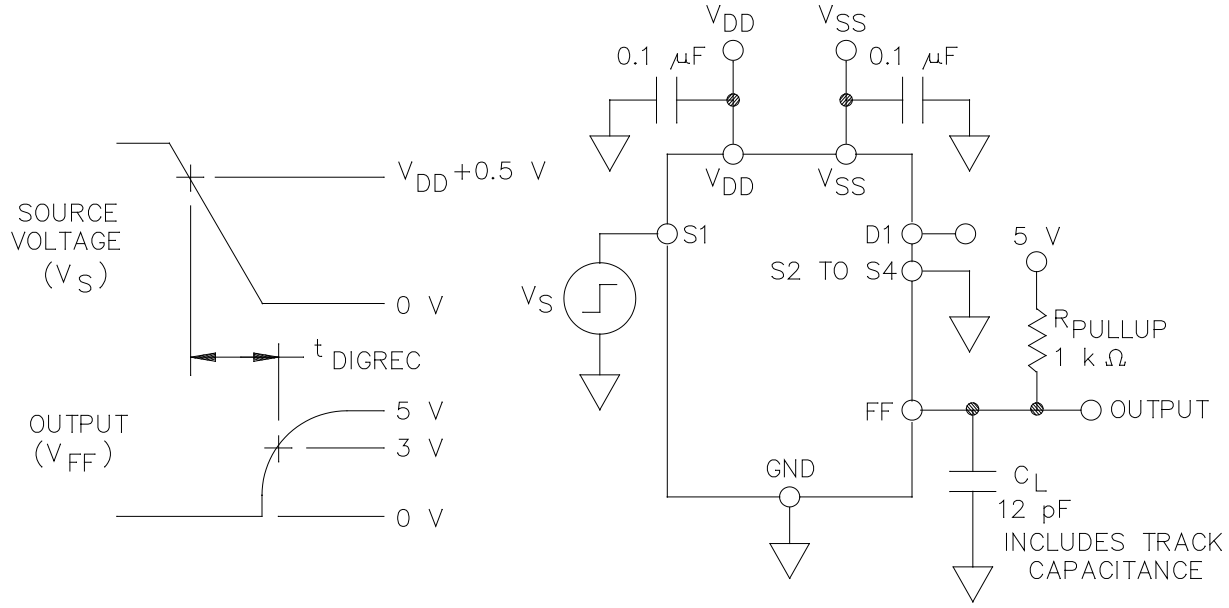



FIGURE 19. Interrupt Flag Recovery Time, $t_{DIGREC}$, with a 1 kΩ Pull-Up Resistor.

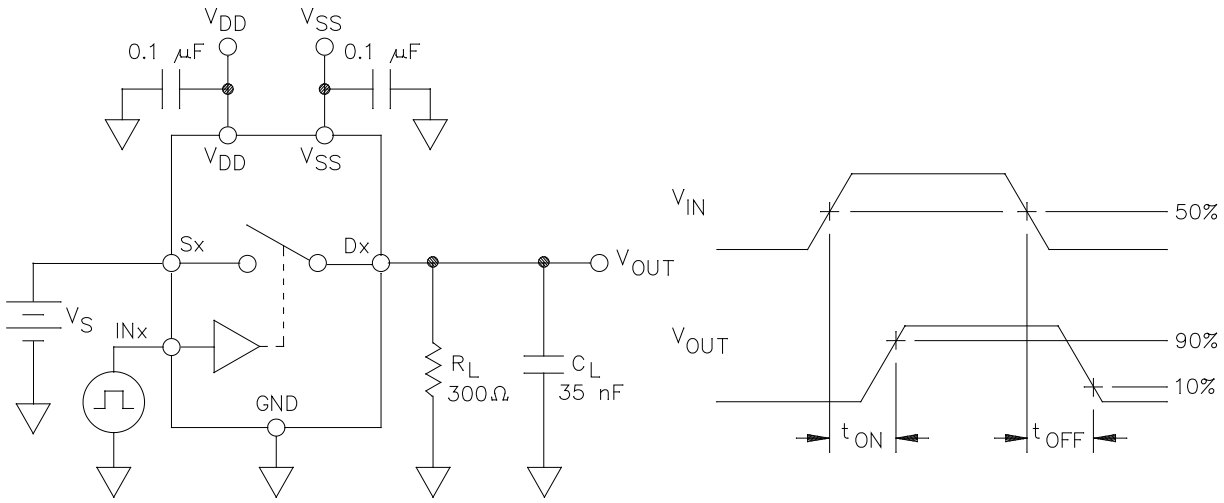



FIGURE 20. Switching Times, $t_{ON}$ and $t_{OFF}$.

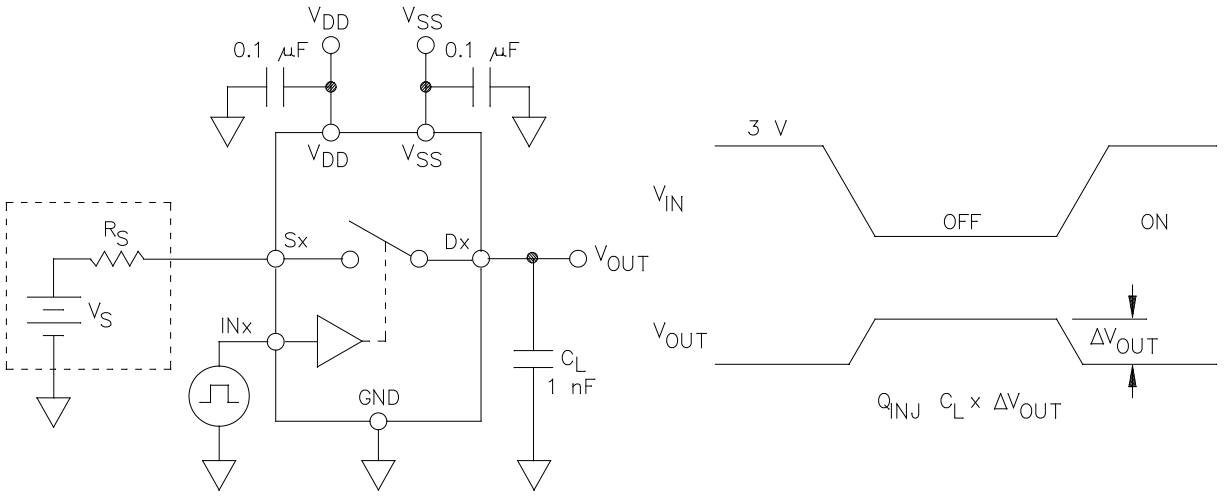



FIGURE 21. Charge Injection, $Q_{INJ}$.

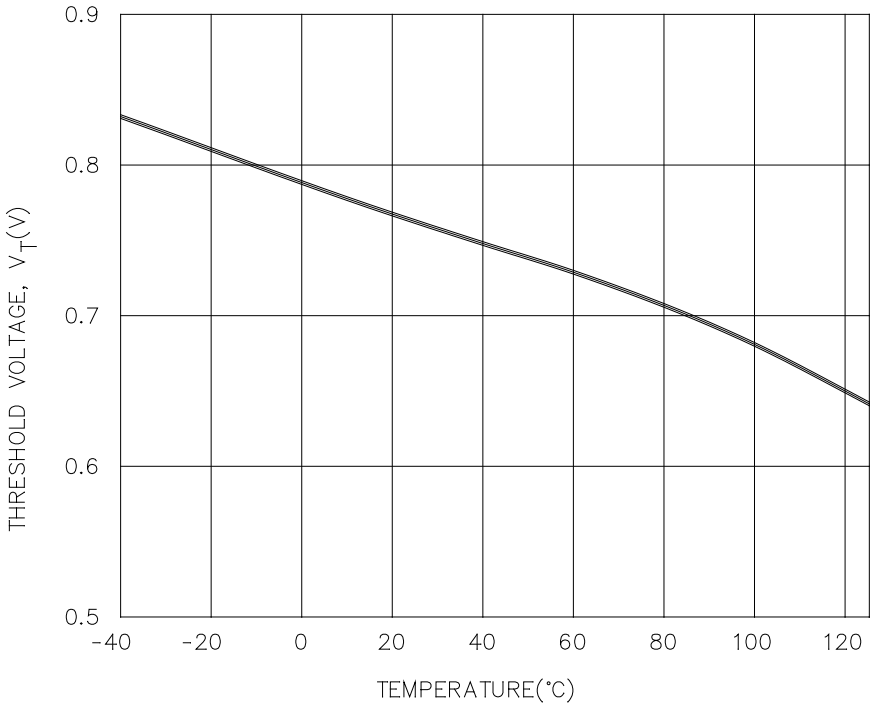



FIGURE 22. Threshold Voltage ($V_T$) vs, Temperature.

4. VERIFICATION

4.1 Product assurance requirements. The manufacturer is responsible for performing all inspection and test requirements as indicated in their internal documentation. Such procedures should include proper handling of electrostatic sensitive devices, classification, packaging, and labeling of moisture sensitive devices, as applicable.

5. PREPARATION FOR DELIVERY

5.1 Packaging. Preservation, packaging, labeling, and marking shall be in accordance with the manufacturer's standard commercial practices for electrostatic discharge sensitive devices.

6. NOTES

6.1 ESDS. Devices are electrostatic discharge sensitive and are classified as ESDS class 1 minimum.

6.2 Configuration control. The data contained herein is based on the salient characteristics of the device manufacturer's data book. The device manufacturer reserves the right to make changes without notice. This drawing will be modified as changes are provided.

6.3 Suggested source(s) of supply. Identification of the suggested source(s) of supply herein is not to be construed as a guarantee of present or continued availability as a source of supply for the item. DLA Land and Maritime maintains an online database of all current sources of supply at http://www.landandmaritime.dla.mil/Programs/Smcr/.

| Vendor item drawing administrative control number 1/ | Device manufacturer CAGE code | Mode of transportation and quantity | Vendor part number |
|---|---|---|---|
| V62/16608-01XE | 24355 | Tube, 98 units | ADG5412FTRUZ-EP |
| V62/16608-01XE | 24355 | Reel, 1,000 units | ADG5412FTRUZ-EP-R7 |

1/ The vendor item drawing establishes an administrative control number for identifying the item on the engineering documentation.

| CAGE code | Source of supply |
|---|---|
| 24355 | Analog Devices<br>1 Technology Way<br>P.O. Box 9106<br>Norwood, MA 02062-9106 |