| **ABSOLUTE MAXIMUM RATINGS** ($T_A$ = 25 °C, unless otherwise noted) | | | |
|---|---|---|---|
| **PARAMETER** | | **LIMIT** | **UNIT** |
| V+ to V- | | 44 | V |
| GND to V- | | 25 | |
| $V_L$ | | (GND - 0.3) to (V+) +0.3 | |
| Digital Inputs [a], $V_S$, $V_D$ | | (V-) -2 to (V+) +2<br>or 30 mA, whichever occurs first | |
| Continuous Current (Any Terminal) | | 30 | mA |
| Current, S or D (Pulsed at 1 ms, 10 % Duty Cycle ) | | 100 | |
| Storage Temperature | | -65 to 125 | °C |
| Power Dissipation (Package) [b] | 16-Pin Plastic DIP [c] | 450 | mW |
| | 16-Pin Narrow Body SOIC [d] | 640 | |

**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 mW/°C above 75 °C.
d. Derate 8 mW/°C above 75 °C.

| **SPECIFICATIONS** for Dual Supplies | | | | | | | |
|---|---|---|---|---|---|---|---|
| **PARAMETER** | **SYMBOL** | **TEST CONDITIONS UNLESS OTHERWISE SPECIFIED** V+ = 15 V, V- = -15 V $V_L$ = 5 V, $V_{IN}$ = 2.4 V, 0.8 V [e] | **TEMP.** [a] | **D SUFFIX** -40 °C TO 85 °C | | | **UNIT** |
| | | | | **MIN.** [b] | **TYP.** [c] | **MAX.** [b] | |
| **Analog Switch** | | | | | | | |
| Analog Signal Range [d] | $V_{ANALOG}$ | | Full | -15 | - | 15 | V |
| Drain-Source On-Resistanc [e] | $R_{DS(on)}$ | $I_S$ = -10 mA, $V_D$ = ± 8.5 V<br>V+ = 13.5 V, V- = -13.5 V | Room | - | 50 | 85 | Ω |
| | | | Full | - | - | 100 | |
| Switch Off Leakage Current | $I_{S(off)}$ | V+ = 16.5, V- = -16.5 V<br>$V_D$ = ± 15.5 V, $V_S$ = ± 15.5 V | Room | -0.5 | ± 0.01 | 0.5 | nA |
| | | | Full | -5 | ± 0.01 | 5 | |
| | $I_{D(off)}$ | | Room | -0.5 | ± 0.01 | 0.5 | |
| | | | Full | -5 | ± 0.01 | 5 | |
| Channel On Leakage Current | $I_{D(on)}$ | V+ = 16.5 V, V- = -16.5 V<br>$V_S$ = $V_D$ = ± 15.5 V | Room | -0.5 | ± 0.08 | 0.5 | |
| | | | Full | -10 | ± 0.08 | 10 | |
| **Digital Control** | | | | | | | |
| Input Current $V_{IN}$ Low | $I_{IL}$ | $V_{IN}$ under test = 0.8 V<br>All Other = 2.4 V | Full | -500 | -0.01 | 500 | nA |
| Input Current $V_{IN}$ High | $I_{IH}$ | $V_{IN}$ under test = 2.4 V<br>All Other = 0.8 V | Full | -500 | 0.01 | 500 | |
| **Dynamic Characteristics** | | | | | | | |
| Turn-On Time | $t_{ON}$ | $R_L$ = 1 kΩ, $C_L$ = 35 pF<br>$V_S$ = ± 10 V, See Figure 2 | Room | - | 120 | 250 | ns |
| Turn-Off Time | $t_{OFF}$ | DG444 | Room | - | 110 | 140 | |
| | | DG445 | Room | - | 160 | 210 | |
| Charge Injection [e] | Q | $C_L$ = 1 nF, $V_S$ = 0 V<br>$V_{gen}$ = 0 V, $R_{gen}$ = 0 Ω | Room | - | -1 | - | pC |
| Off Isolation [e] | OIRR | $R_L$ = 50 Ω , $C_L$ = 5 pF, f =1 MHz | Room | - | 60 | - | dB |
| Crosstalk (Channel-to-Channel) [d] | $X_{TALK}$ | | Room | - | 100 | - | |
| Source Off Capacitance | $C_{S(off)}$ | f = 1 MHz | Room | - | 4 | - | pF |
| Drain Off Capacitance | $C_{D(off)}$ | | Room | - | 4 | - | |
| Channel On Capacitance | $C_{D(on)}$ | $V_{ANALOG}$ = 0 V | Room | - | 16 | - | |

| **SPECIFICATIONS** for Dual Supplies | | | | | | | |
|---|---|---|---|---|---|---|---|
| **PARAMETER** | **SYMBOL** | **TEST CONDITIONS UNLESS OTHERWISE SPECIFIED** V+ = 15 V, V- = -15 V $V_L$ = 5 V, $V_{IN}$ = 2.4 V, 0.8 V [e] | **TEMP.** [a] | **D SUFFIX** -40 °C TO 85 °C | | | **UNIT** |
| | | | | **MIN.** [b] | **TYP.** [c] | **MAX.** [b] | |
| **Power Supplies** | | | | | | | |
| Positive Supply Current | I+ | V+ = 16.5 V, V- = -16.5 V $V_{IN}$ = 0 V or 5 V | Room | - | 0.001 | 1 | µA |
| | | | Full | - | - | 5 | |
| Negative Supply Current | I- | | Room | -1 | -0.0001 | - | |
| | | | Full | -5 | - | - | |
| Logic Supply Current | $I_L$ | | Room | - | 0.001 | 1 | |
| | | | Full | - | 0.001 | 5 | |
| Ground Current | $I_{GND}$ | | Room | -1 | -0.001 | - | |
| | | | Full | -5 | -0.001 | - | |

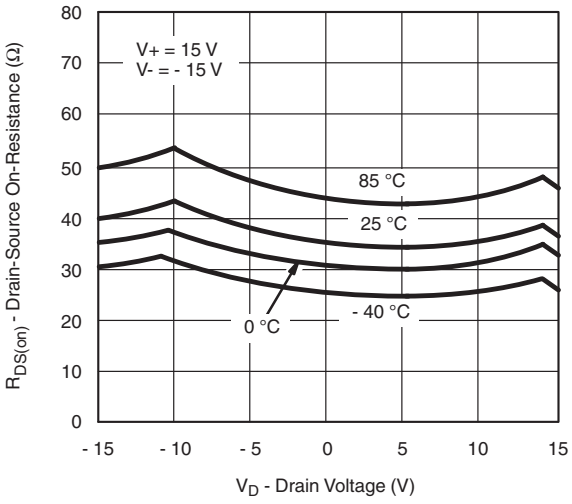
| **SPECIFICATIONS** for Unipolar Supplies | | | | | | | |
|---|---|---|---|---|---|---|---|
| **PARAMETER** | **SYMBOL** | **TEST CONDITIONS UNLESS OTHERWISE SPECIFIED** V+ = 12 V, V- = 0 V $V_L$ = 5 V, $V_{IN}$ = 2.4 V, 0.8 V [e] | **TEMP.** [a] | **LIMITS** -40 °C °C TO 85 °C | | | **UNIT** |
| | | | | **MIN.** [b] | **TYP.** [c] | **MAX.** [b] | |
| **Analog Switch** | | | | | | | |
| Analog Signal Range [d] | $V_{ANALOG}$ | | Full | 0 | - | 12 | V |
| Drain-Source On-Resistance [d] | $R_{DS(on)}$ | $I_S$ = -10 mA, $V_D$ = 3 V, 8 V V+ = 10.8 V, $V_L$ = 5.25 V | Room | - | 100 | 160 | Ω |
| | | | Full | - | - | 200 | |
| **Dynamic Characteristics** | | | | | | | |
| Turn-On Time | $t_{ON}$ | $R_L$ = 1 kΩ, $C_L$ = 35 pF, $V_S$ = 8 V See Figure 2 | Room | - | 300 | 450 | ns |
| Turn-Off Time | $t_{OFF}$ | | Room | - | 60 | 200 | |
| Charge Injection | Q | $C_L$ = 1 nF, $V_{gen}$ = 6 V, $R_{gen}$ = 0 Ω | Room | - | 2 | - | pC |
| **Power Supplies** | | | | | | | |
| Positive Supply Current | I+ | V+ = 13.2 V, $V_{IN}$ = 0 V or 5 V | Room | - | 0.001 | 1 | µA |
| | | | Full | - | - | 5 | |
| Negative Supply Current | I- | $V_{IN}$ = 0 V or 5 V | Room | -1 | -0.0001 | - | |
| | | | Full | -5 | - | - | |
| Logic Supply Current | $I_L$ | $V_L$ = 5.25 V, $V_{IN}$ = 0 V or 5 V | Room | - | 0.001 | 1 | |
| | | | Full | - | - | 5 | |
| Ground Current | $I_{GND}$ | $V_{IN}$ = 0 V or 5 V | Room | -1 | -0.001 | - | |
| | | | Full | -5 | - | - | |

**Notes**

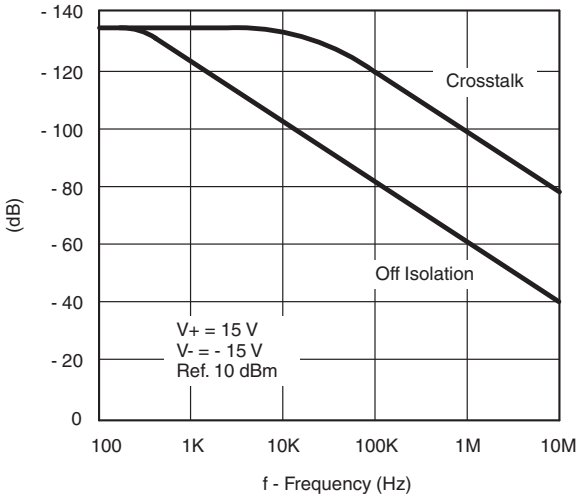
a. Room = 25 °C, Full = as determined by the operating temperature suffix.
b. The algebraic convention whereby the most negative value is a minimum and the most positive a maximum, is used in this datasheet.
c. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.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

*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.*

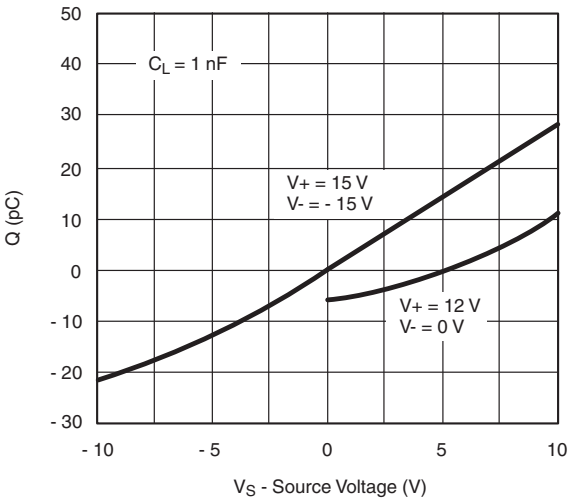
## TYPICAL CHARACTERISTICS ($T_A$ = 25 °C, unless otherwise noted)



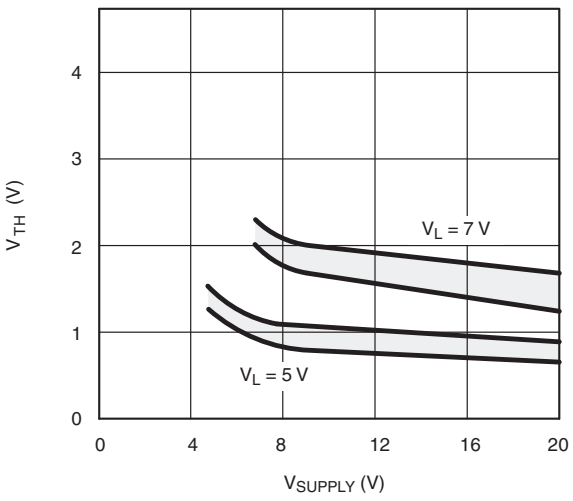

**$R_{DS(on)}$ vs. $V_D$ and Temperature**



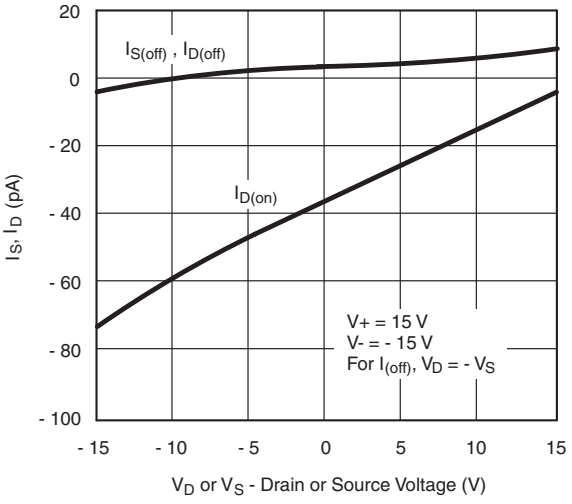

**Crosstalk and Off Isolation vs. Frequency**



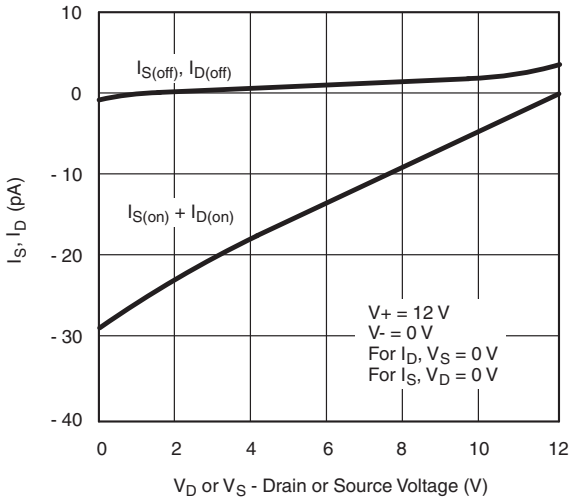

**Charge Injection vs. Source Voltage**




**Switching Threshold vs. Supply Voltage**

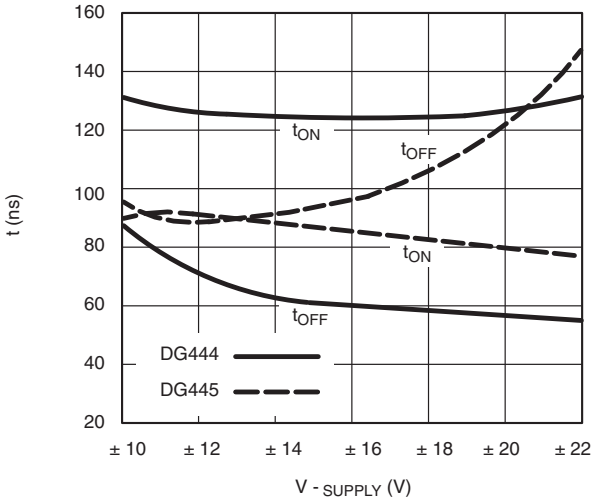



**Source/Drain Leakage Currents**

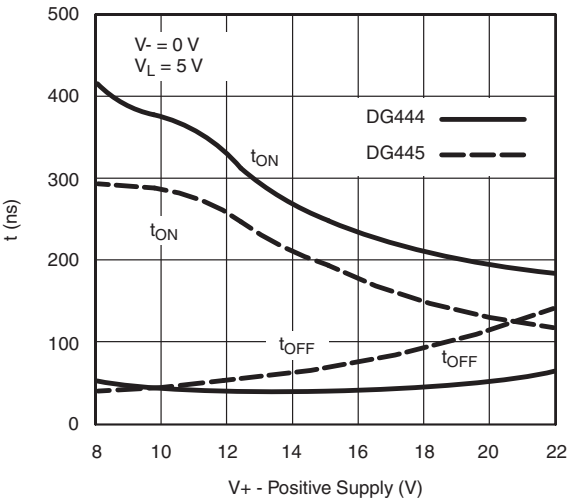



**Source/Drain Leakage Currents (Single 12-V Supply)**

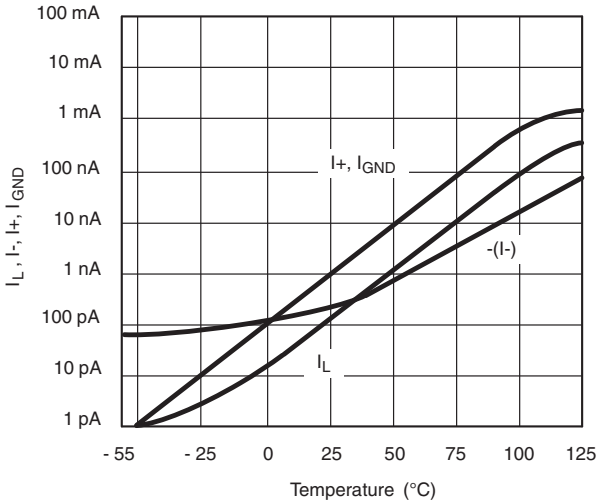
## TYPICAL CHARACTERISTICS ($T_A$ = 25 °C, unless otherwise noted)



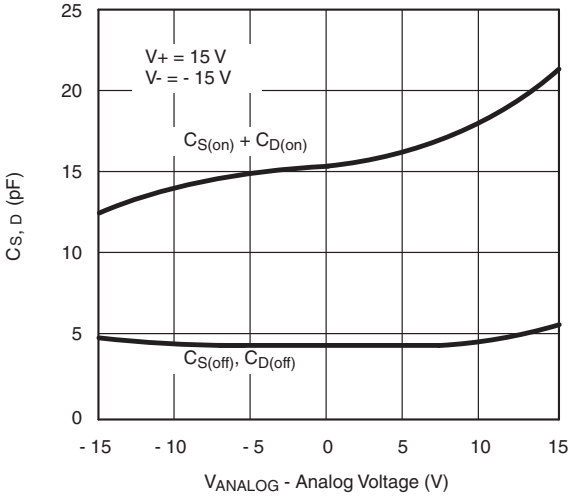

**Switching Time vs. Power Supply Voltage**



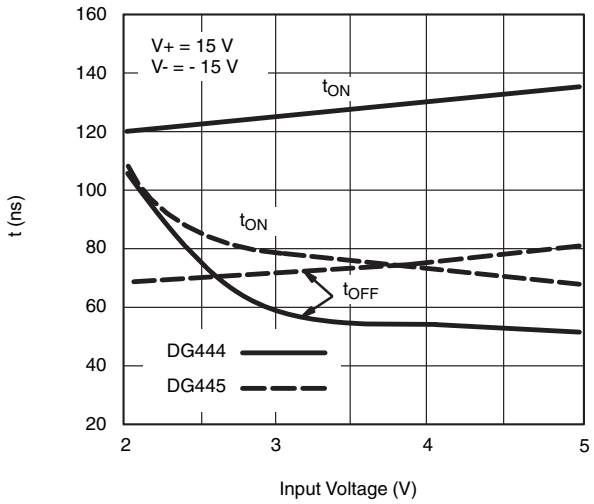

**Switching Times vs. Power Supply Voltage**




**Supply Current vs. Temperature**




**Source/Drain Capacitance vs. Analog Voltage**




**Switching Time vs. Input Voltage**

## SCHEMATIC DIAGRAM TYPICAL CHANNEL

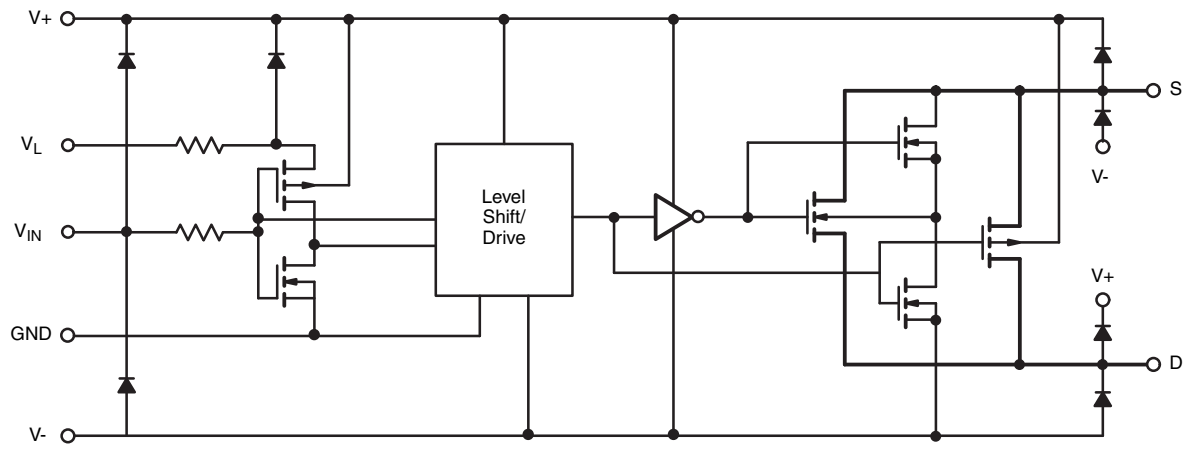
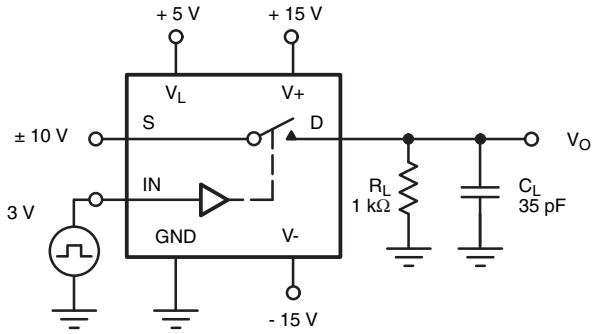
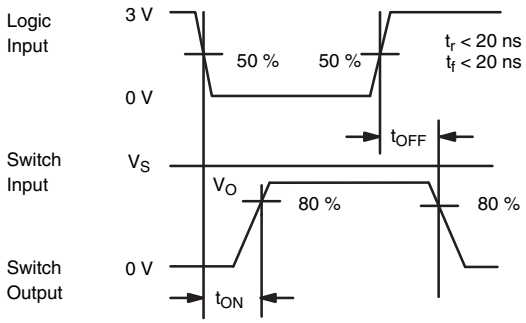



**Fig. 1**

## TEST CIRCUITS

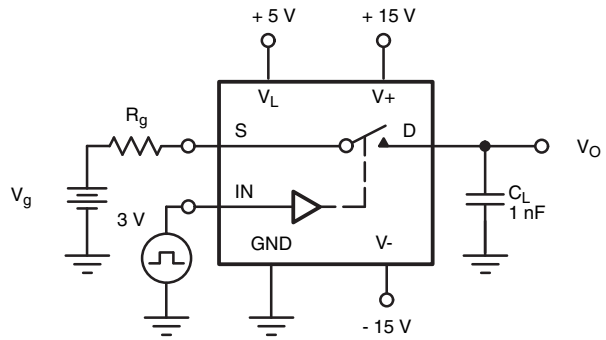



CL (includes fixture and stray capacitance)




Note: Logic input waveform is inverted for DG445.

**Fig. 2 - Switching Time**



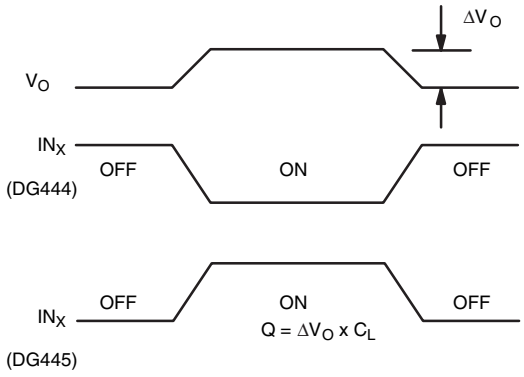




**Fig. 3 - Charge Injection**

## TEST CIRCUITS

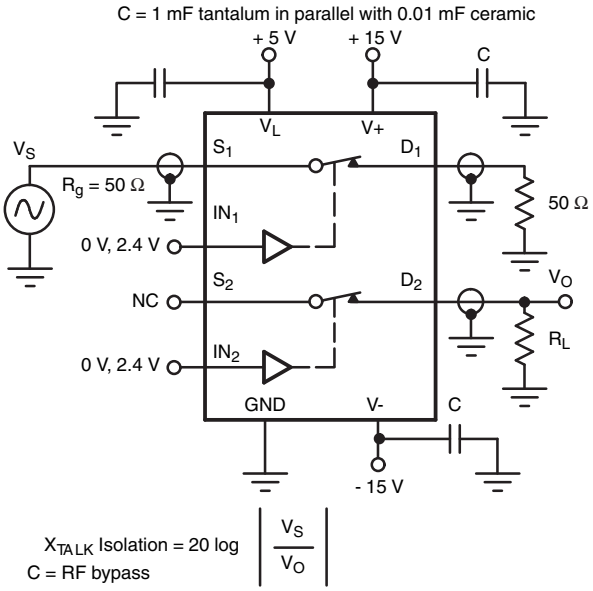



**Fig. 4 - Crosstalk**

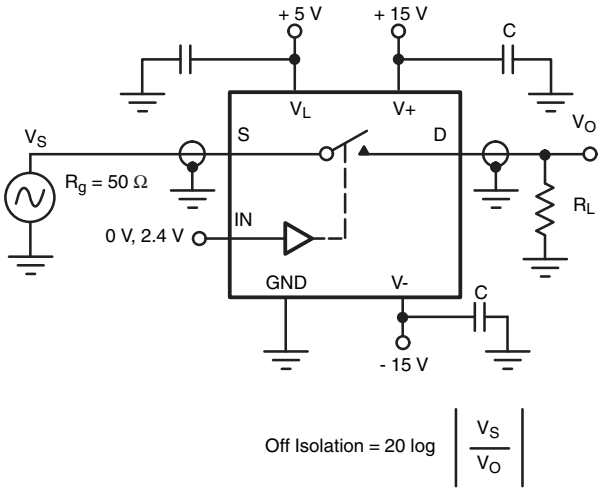



**Fig. 5 - Off Isolation**

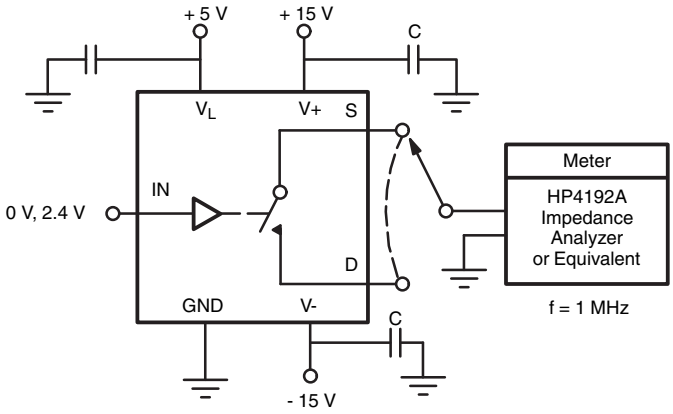



**Fig. 6 - Source/Drain Capacitances**

## APPLICATIONS

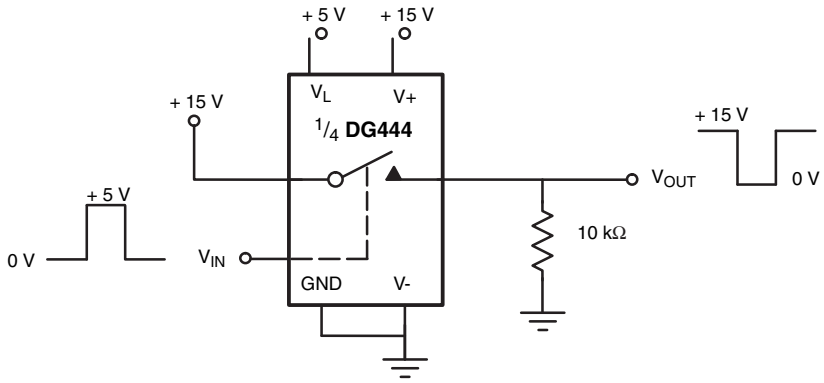



**Fig. 7 - Level Shifter**

## APPLICATIONS

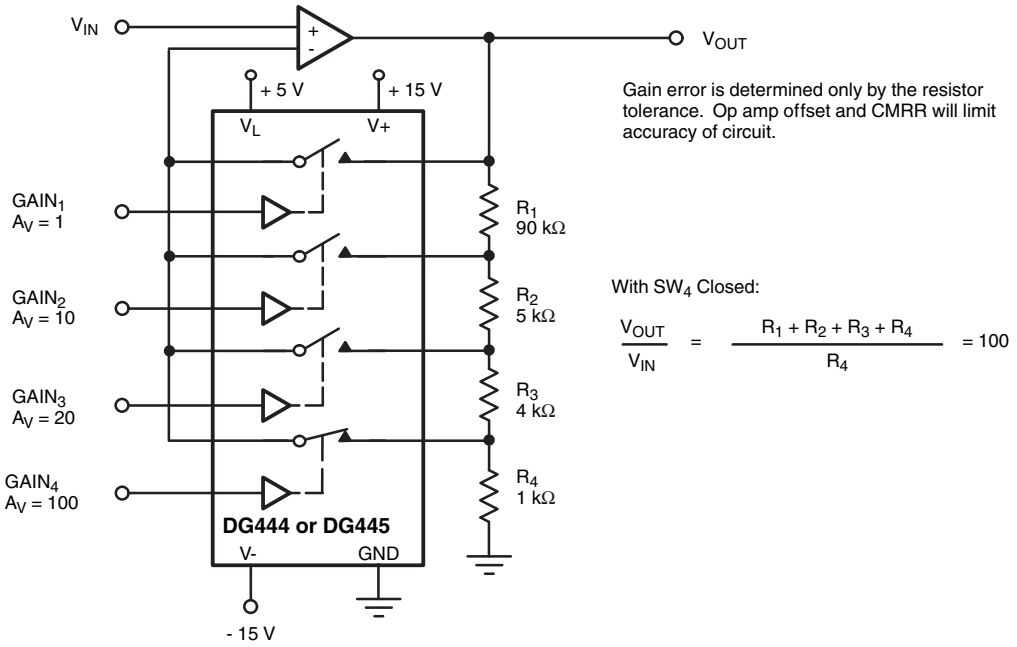



**Fig. 8 - Precision-Weighted Resistor Programmable-Gain Amplifier**

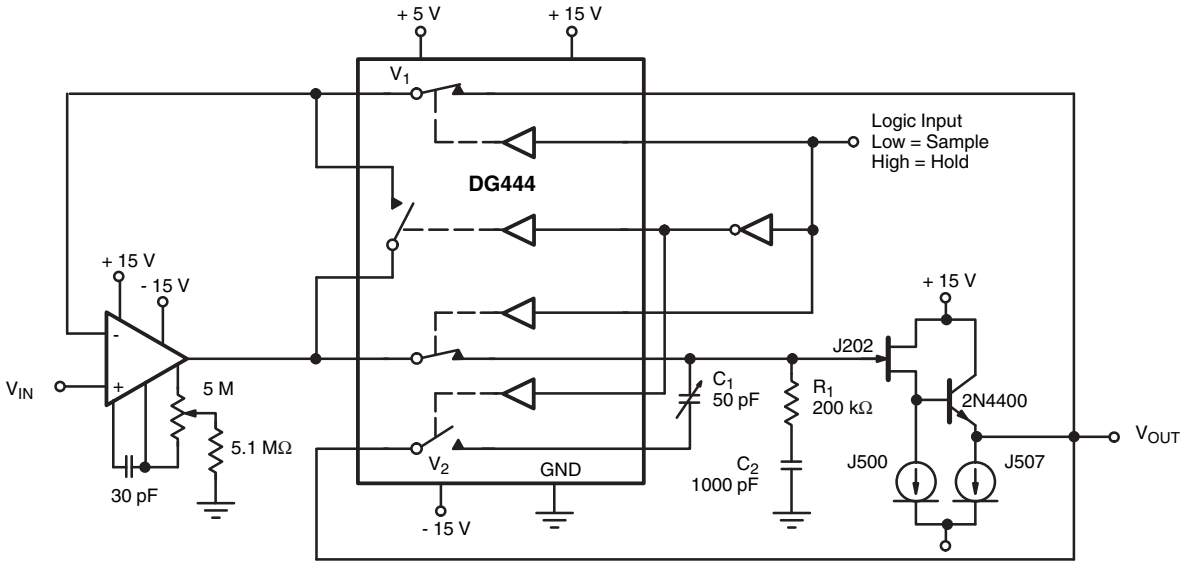



**Fig. 9 - Precision Sample-and-Hold**

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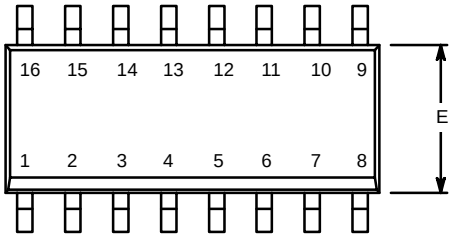
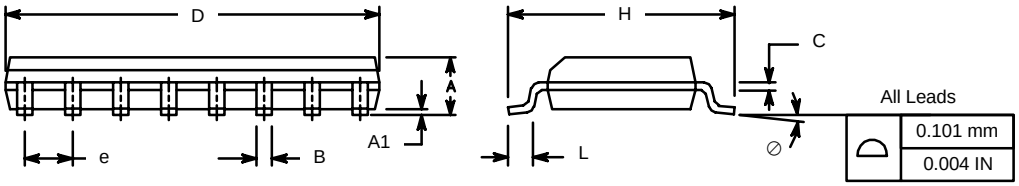
## SOIC (NARROW): 16-LEAD

**JEDEC Part Number: MS-012**

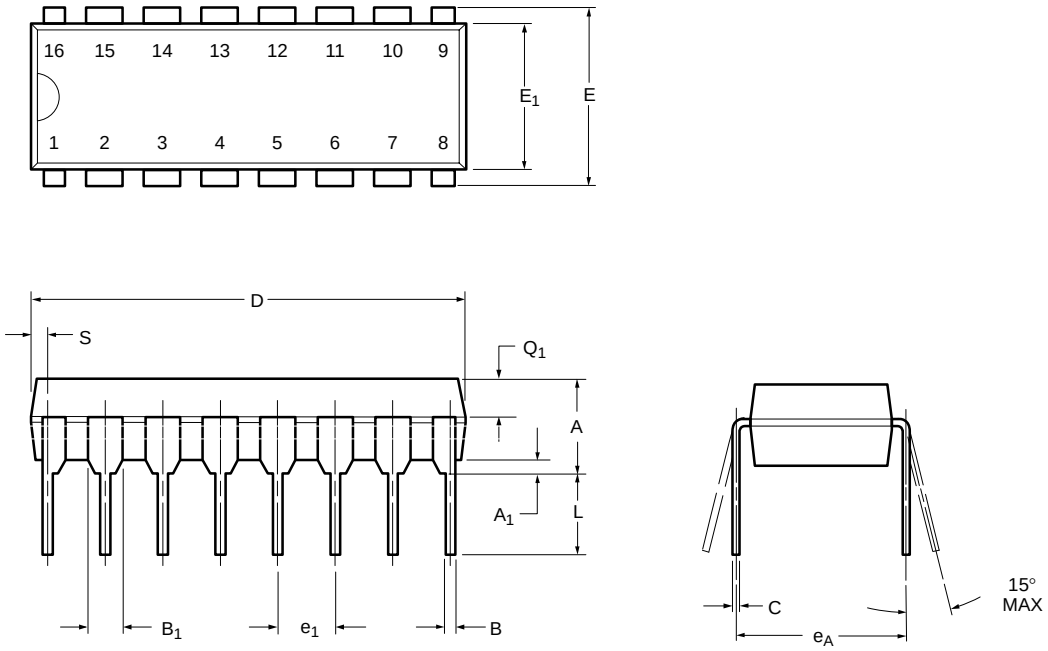



| Dim | MILLIMETERS | | INCHES | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 1.35 | 1.75 | 0.053 | 0.069 |
| $A_1$ | 0.10 | 0.20 | 0.004 | 0.008 |
| B | 0.38 | 0.51 | 0.015 | 0.020 |
| C | 0.18 | 0.23 | 0.007 | 0.009 |
| D | 9.80 | 10.00 | 0.385 | 0.393 |
| E | 3.80 | 4.00 | 0.149 | 0.157 |
| e | 1.27 BSC | | 0.050 BSC | |
| H | 5.80 | 6.20 | 0.228 | 0.244 |
| L | 0.50 | 0.93 | 0.020 | 0.037 |
| ⊘ | 0° | 8° | 0° | 8° |

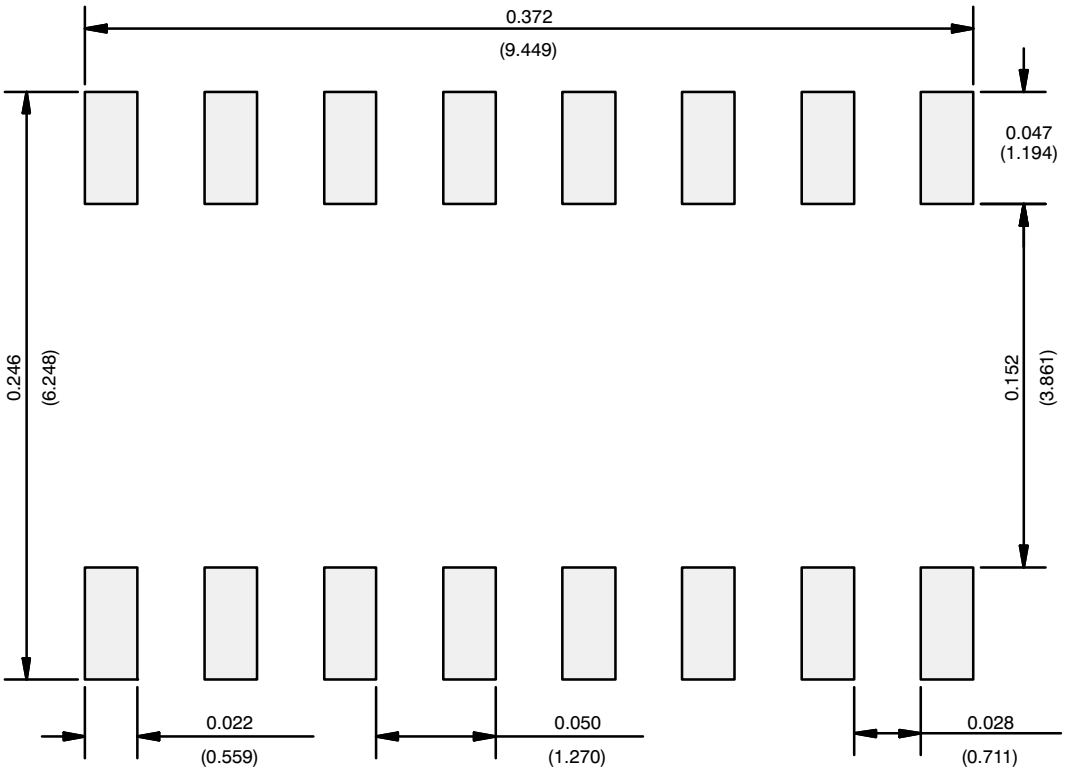
ECN: S-03946—Rev. F, 09-Jul-01
DWG: 5300

## PDIP: 16-LEAD




| Dim | MILLIMETERS | | INCHES | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| **A** | 3.81 | 5.08 | 0.150 | 0.200 |
| **$A_1$** | 0.38 | 1.27 | 0.015 | 0.050 |
| **B** | 0.38 | 0.51 | 0.015 | 0.020 |
| **$B_1$** | 0.89 | 1.65 | 0.035 | 0.065 |
| **C** | 0.20 | 0.30 | 0.008 | 0.012 |
| **D** | 18.93 | 21.33 | 0.745 | 0.840 |
| **E** | 7.62 | 8.26 | 0.300 | 0.325 |
| **$E_1$** | 5.59 | 7.11 | 0.220 | 0.280 |
| **$e_1$** | 2.29 | 2.79 | 0.090 | 0.110 |
| **$e_A$** | 7.37 | 7.87 | 0.290 | 0.310 |
| **L** | 2.79 | 3.81 | 0.110 | 0.150 |
| **$Q_1$** | 1.27 | 2.03 | 0.050 | 0.080 |
| **S** | 0.38 | 1.52 | .015 | 0.060 |
| ECN: S-03946—Rev. D, 09-Jul-01<br>DWG: 5482 | | | | |

## RECOMMENDED MINIMUM PADS FOR SO-16




Recommended Minimum Pads
Dimensions in Inches/(mm)

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