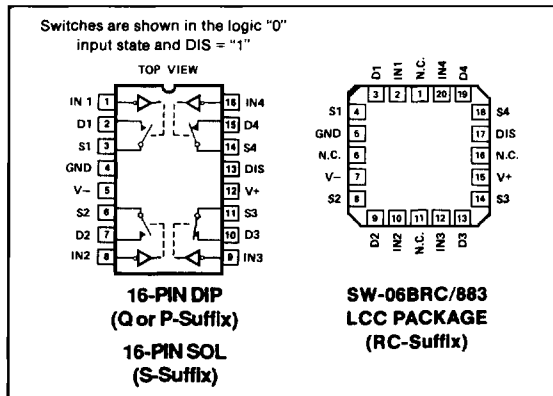


FEATURES

- Two Normally Open and Two Normally Closed SPST Switches with Disable
- Switches can be Easily Configured as a Dual SPDT or a DPDT
- Highly Resistant to Static Discharge Destruction
- Higher Resistance to Radiation Than Analog Switches Designed with MOS Devices
- Guaranteed R_{ON} Matching 10% Max
- Guaranteed Switching Speeds $T_{ON} = 500ns$ Max
 $T_{OFF} = 400ns$ Max
- Guaranteed Break-Before-Make Switching
- Low "ON" Resistance 80Ω Max
- Low R_{ON} Variation from Analog Input Voltage 5%
- Low Total Harmonic Distortion 0.01%
- Low Leakage Currents at High Temperature:
 - $T_A = 125^\circ C$ 100nA Max
 - $T_A = 85^\circ C$ 30nA Max
- Digital Inputs TTL/CMOS Compatible and Independent of $V+$
- Improved Specifications and Pin Compatible to LF-11333/13333
- Dual or Single Power Supply Operation
- Available in Die Form

PIN CONNECTIONS



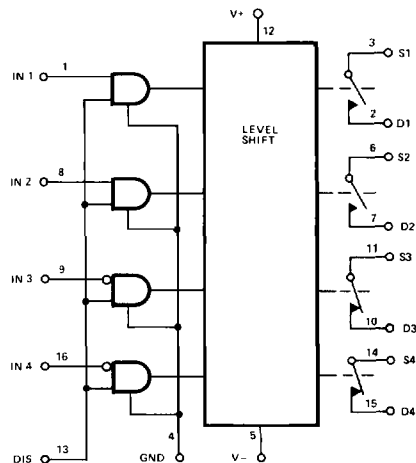
GENERAL DESCRIPTION

The SW-06 is a four channel single-pole, single-throw analog switch that employs both bipolar and ion-implanted FET devices. The SW-06 FET switches use bipolar digital logic inputs which are more resistant to static electricity than CMOS devices. Ruggedness and reliability are inherent in the SW-06 design and construction technology.

Increased reliability is complemented by excellent electrical specifications. Potential error sources are reduced by minimizing "ON" resistance and controlling leakage currents at high temperatures. The switching FET exhibits minimal R_{ON} variation over a 20V analog signal range and with power supply voltage changes. Operation from a single positive power supply voltage is possible. With $V+ = 36V$, $V- = 0V$, the analog signal range will extend from ground to +32V.

PNP logic inputs are TTL and CMOS compatible to allow the SW-06 to upgrade existing designs. The logic "0" and logic "1" input currents are at micro-ampere levels reducing loading on CMOS and TTL logic.

FUNCTIONAL DIAGRAM



TRUTH TABLE

| DISABLE INPUT | LOGIC INPUT | SWITCH STATE | |
|---------------|-------------|----------------|----------------|
| | | CHANNELS 1 & 2 | CHANNELS 3 & 4 |
| 0 | X | OFF | OFF |
| 1 or NC | 0 | OFF | ON |
| 1 or NC | 1 | ON | OFF |

ORDERING INFORMATION †

| PLASTIC 16-PIN | CERDIP 16-PIN | LCC 20-CONTACT | OPERATING TEMPERATURE RANGE |
|----------------|---------------|----------------|-----------------------------|
| — | SW06BQ* | SW06BRC/883 | MIL |
| SW06GP | SW06FQ | — | XIND |
| SW06GS | — | — | XIND |

* For devices processed in total compliance to MIL-STD-883, add /883 after part number. Consult factory for 883 data sheet.

† Burn-in is available on commercial and industrial temperature range parts in CerDIP, plastic DIP, and TO-can packages.

This is an abridged data sheet. To obtain the most recent version or complete data sheet, call our fax retrieval system at 1-800-446-6212.

ABSOLUTE MAXIMUM RATINGS (Note 1)

| | |
|--------------------------------------|-----------------------------|
| Operating Temperature Range | |
| SW-06BQ, BRC | -55°C to +125°C |
| SW-06FQ | -40°C to +85°C |
| SW-06GP, GS | -40°C to +85°C |
| Storage Temperature Range | -65°C to +150°C |
| Lead Temperature (Soldering, 60 sec) | 300°C |
| Maximum Junction Temperature | 150°C |
| V+ Supply To V- Supply | 36V |
| V+ Supply to Ground | 36V |
| Logic Input Voltage | (-4V or V-) to V+ Supply |
| Analog Input Voltage Range | |
| Continuous | V- Supply to V+ Supply +20V |

Maximum Current Through

Any Pin Including Switch 30mA

| PACKAGE TYPE | θ_{JA} (Note 2) | θ_{JC} | UNITS |
|-------------------------|------------------------|---------------|-------|
| 16-Pin Hermetic DIP (Q) | 100 | 16 | °C/W |
| 16-Pin Plastic DIP (P) | 82 | 39 | °C/W |
| 20-Contact LCC (RC) | 98 | 38 | °C/W |
| 16-Pin SOL (S) | 98 | 30 | °C/W |

NOTES:

1. Absolute maximum ratings apply to both DICE and packaged parts, unless otherwise noted.
2. θ_{JA} is specified for worst case mounting conditions, i.e., θ_{JA} is specified for device in socket for CerDIP, P-DIP, and LCC packages; θ_{JA} is specified for device soldered to printed circuit board for SO package.

ELECTRICAL CHARACTERISTICS at V+ = 15V, V- = -15V and T_A = 25°C, unless otherwise noted.

| PARAMETER | SYMBOL | CONDITIONS | SW-06B | | | SW-06F | | | SW-06G | | | UNITS |
|--|---|--|--------|-----|-----|--------|-----|-----|--------|-----|------|-------|
| | | | MIN | TYP | MAX | MIN | TYP | MAX | MIN | TYP | MAX | |
| "ON" Resistance | R _{ON} | V _S = 0V, I _S = 1mA V _S = ±10V, I _S = 1mA | — | 60 | 80 | — | 60 | 100 | — | 100 | 150 | Ω |
| R _{ON} Match Between Switches | R _{ON Match} | V _S = 0V, I _S = 100μA (Note 1) | — | 5 | 10 | — | 5 | 20 | — | — | 20 | % |
| Analog Voltage Range | V _A | I _S = 1mA (Note 8) I _S = 1mA | +10 | +11 | — | +10 | +11 | — | +10 | +11 | — | V |
| Analog Current Range | I _A | V _S = ±10V | 10 | 15 | — | 7 | 12 | — | 5 | 10 | — | mA |
| ΔR _{ON} vs Applied Voltage | ΔR _{ON} | -10V ≤ V _S ≤ 10V, I _S = 1.0mA | — | 5 | 15 | — | 10 | 20 | — | 10 | 20 | % |
| Source Current in "OFF" Condition | I _{S(OFF)} | V _S = 10V, V _D = -10V (Note 5) | — | 0.3 | 2.0 | — | 0.3 | 2.0 | — | 0.3 | 10 | nA |
| Drain Current in "OFF" Condition | I _{D(OFF)} | V _S = 10V, V _D = -10V (Note 5) | — | 0.3 | 2.0 | — | 0.3 | 2.0 | — | 0.3 | 10 | nA |
| Source Current in "ON" Condition | I _{S(ON)+} I _{D(ON)} | V _S = V _D = ±10V (Note 5) | — | 0.3 | 2.0 | — | 0.3 | 2.0 | — | 0.3 | 10 | nA |
| Logical "1" Input Voltage | V _{INH} | Full Temperature Range (Notes 6, 8) | 2.0 | — | — | 2.0 | — | — | 2.0 | — | — | V |
| Logical "0" Input Voltage | V _{INL} | Full Temperature Range (Notes 6, 8) | — | — | 0.8 | — | — | 0.8 | — | — | 0.8 | V |
| Logical "1" Input Current | I _{INH} | V _{IN} = 2.0V to 15.0V (Note 4) | — | — | 5 | — | — | 5 | — | — | 10 | μA |
| Logical "0" Input | I _{INL} | V _{IN} = 0.8V | — | 1.5 | 5.0 | — | 1.5 | 5.0 | — | 1.5 | 10.0 | μA |
| Turn-On-Time | t _{ON} | See Switching Time Test Circuit (Notes 6, 9) | — | 340 | 500 | — | 340 | 600 | — | 340 | 700 | ns |
| Turn-Off-Time | t _{OFF} | See Switching Time Test Circuit (Notes 6, 9) | — | 200 | 400 | — | 200 | 400 | — | 200 | 500 | ns |
| Break-Before-Make Time | t _{ON} -t _{OFF} | (Note 3) | 50 | 140 | — | 50 | 140 | — | 50 | 140 | — | ns |
| Source Capacitance | C _{S(OFF)} | V _S = 0V (Note 5) | — | 7.0 | — | — | 7.0 | — | — | 7.0 | — | pF |
| Drain Capacitance | C _{D(OFF)} | V _S = 0V (Note 5) | — | 5.5 | — | — | 5.5 | — | — | 5.5 | — | pF |
| Channel "ON" Capacitance | C _{D(ON)+} C _{S(ON)} | V _S = V _D = 0V (Note 5) | — | 15 | — | — | 15 | — | — | 15 | — | pF |
| "OFF" Isolation | I _{SO(OFF)} | V _S = 5V _{RMS} , R _L = 680Ω, C _L = 7pF, f = 500kHz (Note 5) | — | 58 | — | — | 58 | — | — | 58 | — | dB |
| Crosstalk | C _T | V _S = 5V _{RMS} , R _L = 680Ω, C _L = 7pF, f = 500kHz (Note 5) | — | 70 | — | — | 70 | — | — | 70 | — | dB |

ELECTRICAL CHARACTERISTICS at $V_+ = 15V$, $V_- = -15V$ and $T_A = 25^\circ C$, unless otherwise noted. *Continued*

| PARAMETER | SYMBOL | CONDITIONS | SW-06B | | | SW-06F | | | SW-06G | | | UNITS |
|-------------------------|--------|---|--------|-----|-----|--------|-----|-----|--------|-----|-----|-------|
| | | | MIN | TYP | MAX | MIN | TYP | MAX | MIN | TYP | MAX | |
| Positive Supply Current | I_+ | All Channels "OFF", DIS = "0" (Note 5) | — | 5.0 | 6.0 | — | 5.0 | 9.0 | — | 6.0 | 9.0 | mA |
| Negative Supply Current | I_- | All Channels "OFF", DIS = "0" (Note 5) | — | 3.0 | 5.0 | — | 4.0 | 7.0 | — | 4.0 | 7.0 | mA |
| Ground Current | I_G | All Channels "ON" or "OFF" (Note 5) | — | 3.0 | 4.0 | — | 3.0 | 4.0 | — | 3.0 | 5.0 | mA |

ELECTRICAL CHARACTERISTICS at $V_+ = 15V$, $V_- = -15V$, $-55^\circ C \leq T_A \leq +125^\circ C$ for SW-06BQ, $-40^\circ C \leq T_A \leq +85^\circ C$ for SW-06FQ and $-40^\circ C \leq T_A \leq +85^\circ C$ for SW-06GP/GS, unless otherwise noted.

| PARAMETER | SYMBOL | CONDITIONS | SW-06B | | | SW-06F | | | SW-06G | | | UNITS |
|--------------------------------------|-----------------------------|--|--------|-----|-----|--------|-----|------|--------|-----|------|------------|
| | | | MIN | TYP | MAX | MIN | TYP | MAX | MIN | TYP | MAX | |
| Temperature Range | T_A | Operating | -55 | — | 125 | -25 | — | 85 | 0 | — | 70 | $^\circ C$ |
| "ON" Resistance | R_{ON} | $V_S = 0V, I_S = 1.0mA$ | — | 75 | 110 | — | 75 | 125 | — | 75 | 175 | Ω |
| | | $V_S = \pm 10V, I_S = 1.0mA$ | — | 80 | 110 | — | 80 | 125 | — | 80 | 175 | |
| R_{ON} Match Between Switches | R_{ON} Match | $V_S = 0V, I_S = 100\mu A$ (Note 1) | — | 6 | 20 | — | 6 | 25 | — | 10 | — | % |
| Analog Voltage Range | V_A | $I_S = 1.0mA$ (Note 8) | +10 | +11 | — | +10 | +11 | — | +10 | +11 | — | V |
| | | $I_S = 1.0mA$ | -10 | -15 | — | -10 | -15 | — | -10 | -15 | — | |
| Analog Current Range | I_A | $V_S = \pm 10.0V$ | 7 | 12 | — | 5 | 11 | — | — | 11 | — | mA |
| ΔR_{ON} With Applied Voltage | ΔR_{ON} | $-10V \leq V_S \leq +10V$, $I_S = 1.0mA$ | — | 10 | — | — | 12 | — | — | 15 | — | % |
| Source Current in "OFF" Condition | $I_{S(OFF)}$ | $V_S = 10V, V_D = -10V$, $T_A = \text{Max. Operating Temp.}$ (Notes 5, 7) | — | — | 60 | — | — | 30 | — | — | 60 | nA |
| Drain Current in "OFF" Condition | $I_{D(OFF)}$ | $V_S = 10V, V_D = -10V$, $T_A = \text{Max. Operating Temp.}$ (Notes 5, 7) | — | — | 60 | — | — | 30 | — | — | 60 | nA |
| Leakage Current in "ON" Condition | $I_{S(ON)+}$ $I_{D(ON)}$ | $V_S = V_D = \pm 10V$, $T_A = \text{Max. Operating Temp.}$ (Notes 5, 7) | — | — | 100 | — | — | 30 | — | — | 60 | nA |
| | | | | | | | | | | | | |
| Logical "1" Input Current | I_{INH} | $V_{IN} = 2.0V$ to $15.0V$ (Note 4) | — | — | 10 | — | — | 10 | — | — | 15 | μA |
| Logical "0" Input Current | I_{INL} | $V_{IN} = 0.8V$ | — | 4 | 10 | — | 4 | 10 | — | 5 | 15 | μA |
| Turn-On-Time | t_{ON} | See Switching Time Test Circuit (Notes 2, 6) | — | 440 | 900 | — | 500 | 900 | — | — | 1000 | ns |
| Turn-Off-Time | t_{OFF} | See Switching Time Test Circuit (Notes 2, 6) | — | 300 | 500 | — | 330 | 500 | — | — | 500 | ns |
| Break-Before-Make Time | $t_{ON}^{-}t_{OFF}$ | (Note 3) | — | 70 | — | — | 70 | — | — | 50 | — | ns |
| Positive Supply Current | I_+ | All Channels "OFF" DIS = "0" (Note 5) | — | — | 9.0 | — | — | 13.5 | — | — | 13.5 | mA |
| Negative Supply Current | I_- | All Channels "OFF" DIS = "0" (Note 5) | — | — | 7.5 | — | — | 10.5 | — | — | 10.5 | mA |
| Ground Current | I_G | All Channels "ON" or "OFF" (Note 5) | — | — | 6.0 | — | — | 7.5 | — | — | 7.5 | mA |

NOTES:

- $V_S = 0V, I_S = 100\mu A$. Specified as a percentage of $R_{AVERAGE}$ where:

$$R_{AVERAGE} = \frac{R_{ON1} + R_{ON2} + R_{ON3} + R_{ON4}}{4}$$
- Guaranteed by design.
- Switch is guaranteed by design to provide break-before-make operation.

- Current tested at $V_{IN} = 2.0V$. This is worst case condition.
- Switch being tested ON or OFF as indicated. $V_{INH} = 2.0V$ or $V_{INL} = 0.8V$, per logic truth table.
- Also applies to disable pin.
- Parameter tested only at $T_A = +125^\circ C$ for military grade device.
- Guaranteed by R_{ON} and leakage tests. For normal operation maximum analog signal voltages should be restricted to less than $(V_+) - 4V$.
- Sample tested.