

Monolithic 6-Channel Enhancement-type MOSFET Switch

FEATURES

- Integrated MOSFET for Each Gate to Provide "Pull-UP" Current for Gate-Driver Circuit
- Internal Zener Diode Protects the Gate
- Six Switches Per Chip
- Low $r_{DS(ON)}$ (100 Ω)

BENEFITS

- Reduces External Component Requirements

APPLICATIONS

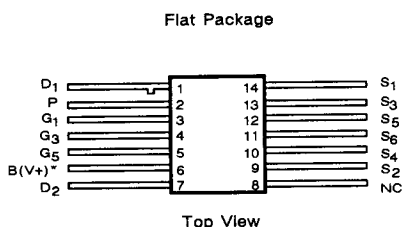
- Differential Input Analog Signal Switching
- Multiplexing
- Designed to Operate with D125, D129 and D139

DESCRIPTION

The G119 contains six enhancement-mode P-channel MOSFETs designed to function as analog switches. In the ON state each switch will conduct current equally well in either direction, and in the OFF state each switch will block voltages up to 30 V peak-to-peak. The switches are integrated onto a silicon substrate (body) and are internally connected into two groups of three switches per group. This arrangement facilitates the switching or multiplexing of differential analog signals. Each

group has a common drain terminal (D_1 and D_2) which will function equally well as a common source. Each gate terminal (G) controls a pair of switches and is provided with a normally-OFF "pull-up" MOSFET which may be turned ON to provide a current source to the gate-driving circuit. The pull-ups are turned ON or OFF by connecting the "P" terminal to a negative supply or to the "B" terminal respectively.

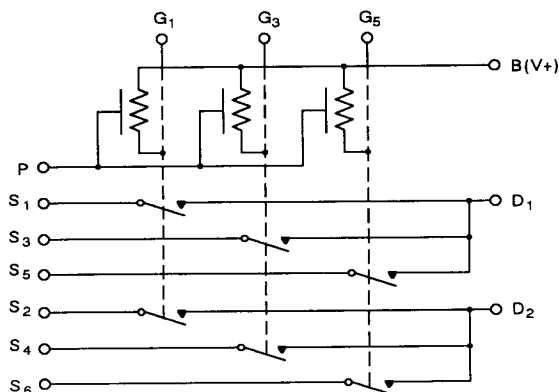
PIN CONFIGURATION



Order Numbers:
G119AL or G119BL

* Common to Substrate and Base of Package

FUNCTIONAL BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

| | |
|---------------------------------------|------------|
| V_B to V_S | -2 to 30 V |
| V_B to V_D | -2 to 30 V |
| V_D to V_S | ± 30 V |
| V_B to V_G , V_B to V_P | 35 V |
| I_S , I_D | 100 mA |
| I_G | 5 mA |

| | |
|--|--------------|
| I_P | 100 μ A |
| Storage Temperature | -65 to 150°C |
| Operating Temperature (A Suffix) | -55 to 125°C |
| (B Suffix) | -25 to 85°C |
| Power Dissipation* | 750 mW |

* All leads soldered or welded to PC board.
Derate 10 mW/°C above 75°C.

| ELECTRICAL CHARACTERISTICS ^a | | | | | | | | | | |
|---|---------------|--|--|------------------|-----------------------------|------------------|----------------------------|------------------|------------|----------|
| PARAMETER | SYMBOL | Test Conditions Unless Otherwise Specified: $V_{DB} = 0\text{ V}$ $V_{PB} = 0\text{ V}$ | LIMITS | | | | | | UNIT | |
| | | | 1=25°C 2=125, 85°C 3=-55, -25°C | | A SUFFIX -55 to 125°C | | B SUFFIX -25 to 85°C | | | |
| | | | TEMP | TYP ^d | MIN ^b | MAX ^b | MIN ^b | MAX ^b | | |
| STATIC | | | | | | | | | | |
| Drain-Source ON Resistance | $r_{DS(ON)}$ | $I_S = -1\text{ mA}$ | $V_{DB} = 0\text{ V}$ $V_{GD} = -30\text{ V}$ | 1,3 2 | | | 100 125 | | 125 150 | Ω |
| | | | $V_{DB} = -10\text{ V}$ $V_{GD} = -20\text{ V}$ | 1,3 2 | | | 200 250 | | 250 300 | |
| | | | $V_{DB} = -20\text{ V}$ $V_{GD} = -10\text{ V}$ | 1,3 2 | | | 450 600 | | 500 600 | |
| Source OFF Leakage Current | $I_{S(OFF)}$ | $V_{SD} = -20\text{ V}$ $V_{GD} = 0\text{ V}$ | 1 2 | | -0.5 -500 | | -5 -500 | | nA | |
| Drain OFF Leakage Current | $I_{D(OFF)}$ | $V_{DS} = -20\text{ V}$, $V_{GD} = 0\text{ V}$ $V_{SB} = 0\text{ V}$ | 1 2 | | -1.5 -1500 | | -10 -1000 | | | |
| Gate ON Currents | $I_{G(ON)}$ | $V_{GB} = -30\text{ V}$ $V_{PB} = -30\text{ V}$ | 1 | | -2.4 | -0.8 | -2.4 | -0.8 | mA | |
| Gate-Channel Leakage Current | I_{GSS} | $V_{GB} = -20\text{ V}$ | 1 2 | | -0.5 -500 | | -5 -500 | | nA | |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | $I_D = -10\text{ }\mu\text{A}$, $V_{DG} = 0\text{ V}$ $V_{SB} = 0\text{ V}$ | 1,2,3 | | -4 | -1.5 | -4 | -1.5 | V | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $I_D = -50\text{ }\mu\text{A}$, $V_{GS} = 0\text{ V}$ $V_{SB} = 0\text{ V}$ | 1,2,3 | | | -30 | | -30 | | |
| Source-Drain Breakdown Voltage | $V_{(BR)SDS}$ | $I_S = -10\text{ }\mu\text{A}$, $V_{GD} = 0\text{ V}$ | 1,2,3 | | | -30 | | -30 | | |
| Gate-Body Breakdown Voltage | $V_{(BR)GBS}$ | $I_G = -10\text{ }\mu\text{A}$ | 1,2,3 | | -90 | -35 | -90 | -35 | | |
| Pull-Up Gate-Body Breakdown Voltage | $V_{(BR)PBS}$ | $I_P = -10\text{ }\mu\text{A}$ $V_{GB} = 0\text{ V}$ | 1,2,3 | | -90 | -35 | -90 | -35 | | |

5
Not Recommended for New Designs

5-423

| ELECTRICAL CHARACTERISTICS ^a | | | | | | | | | | | |
|---|----------------------|--|-------------------------------------|------------------|-----------------------------|----------------------------|------------------|------------------|------|----|--|
| PARAMETER | SYMBOL | Test Conditions Unless Otherwise Specified: V _{DB} = 0 V V _{PB} = 0 V | LIMITS | | | | | | UNIT | | |
| | | | 1=25°C 2=125,85°C 3=-55,-25°C | | A SUFFIX -55 to 125°C | B SUFFIX -25 to 85°C | | | | | |
| | | | TEMP | TYP ^d | MIN ^b | MAX ^b | MIN ^b | MAX ^b | | | |
| DYNAMIC ^e | | | | | | | | | | | |
| Gate-Source Capacitance | C _{gs} | V _{GB} = 0 V f = 1 MHz V _{DB} = V _{SB} = 0 Body Guarded | Drain Guarded | 1 | 1.8 | | | | | pF | |
| Gate-Drain Capacitance | C _{gd} | | Source Guarded | 1 | 1.8 | | | | | | |
| Drain-Source OFF Capacitance | C _{ds(off)} | | Gate Guarded | 1 | 0.4 | | | | | | |
| Source-Body Capacitance | C _{sb} | V _{DB} = 0, V _{SB} = -5 V Drain and Gate Guarded | 1 | 2.0 | | | | | | | |
| Drain-Body Capacitance | C _{db} | V _{SB} = 0, V _{DB} = -5V Gate and Source Guarded | 1 | 6.0 | | | | | | | |

NOTES:

- a. Refer to PROCESS OPTION FLOWCHART for additional information.
b. The algebraic convention whereby the most negative value is a minimum and the most positive a maximum, is used in this data sheet.
c. Guaranteed by design, not subject to production test.
d. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
e. $V_{GB} = 0\text{ V}$, $f = 1\text{ MHz}$.