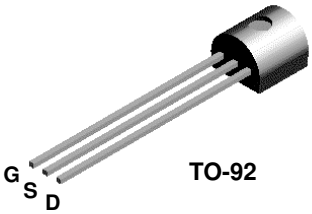
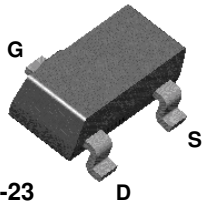
FAIRCHILD
SEMICONDUCTOR™

# PN4117
# PN4118
# PN4119

# MMBF4117
# MMBF4118
# MMBF4119




TO-92




SOT-23 D

**Mark: 61A / 61C / 61E**

**NOTE: Source & Drain are interchangeable**

## N-Channel Switch

This device is designed for low current DC and audio applications. These devices provide excellent performance as input stages for sub-picoamp instrumentation or any high impedance signal sources. Sourced from Process 53.

## Absolute Maximum Ratings*

TA = 25°C unless otherwise noted

| Symbol | Parameter | Value | Units |
|---|---|---|---|
| $V_{DG}$ | Drain-Gate Voltage | 40 | V |
| $V_{GS}$ | Gate-Source Voltage | - 40 | V |
| $I_{GF}$ | Forward Gate Current | 50 | mA |
| $T_J$ ,$T_{stg}$ | Operating and Storage Junction Temperature Range | -55 to +150 | °C |

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

**NOTES**:
**1)** These ratings are based on a maximum junction temperature of 150 degrees C.
**2)** These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

## Thermal Characteristics

TA = 25°C unless otherwise noted

| Symbol | Characteristic | Max | | Units |
|---|---|---|---|---|
| | | PN4117-4119 | *MMBF4117-4119 | |
| $P_D$ | Total Device Dissipation<br>Derate above 25°C | 350<br>2.8 | 225<br>1.8 | mW<br>mW/°C |
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case | 125 | | °C/W |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | 357 | 556 | °C/W |

*Device mounted on FR-4 PCB 1.6" X 1.6" X 0.06."

## N-Channel Switch
(continued)

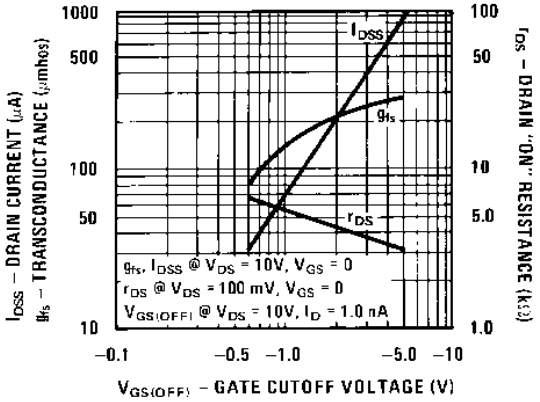
### Electrical Characteristics
TA = 25°C unless otherwise noted

| Symbol | Parameter | Test Conditions | | Min | Max | Units |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | |
| $V_{(BR)GSS}$ | Gate-Source Breakdown Voltage | $I_G$ = - 1.0 µA, $V_{DS}$ = 0 | | - 40 | | V |
| $I_{GSS}$ | Gate Reverse Current | $V_{GS}$ = - 20 V, $V_{DS}$ = 0 | | | - 10 | pA |
| | | $V_{GS}$ = - 20 V, $V_{DS}$ = 0, $T_A$ = 150°C | | | - 25 | nA |
| $V_{GS(off)}$ | Gate-Source Cutoff Voltage | $V_{DS}$ = - 10 V, $I_D$ = 1.0 nA | **4117** | - 0.6 | - 1.8 | V |
| | | | **4118** | - 1.0 | - 3.0 | V |
| | | | **4119** | - 2.0 | - 6.0 | V |
| **ON CHARACTERISTICS** | | | | | | |
| $I_{DSS}$ | Zero-Gate Voltage Drain Current* | $V_{DS}$ = 10 V, $V_{GS}$ = 0 | **4117** | 30 | 90 | µA |
| | | | **4118** | 80 | 240 | µA |
| | | | **4119** | 200 | 600 | µA |
| **SMALL-SIGNAL CHARACTERISTICS** | | | | | | |
| $g_{fs}$ | Common-Source Forward Transconductance | $V_{DS}$ = 10 V $V_{GS}$ = 0, f= 1.0 kHz | | | | |
| | | | **4117** | 70 | 210 | µmhos |
| | | | **4118** | 80 | 250 | µmhos |
| | | | **4119** | 100 | 330 | µmhos |
| $g_{oss}$ | Common-Source Output Conductance | $V_{DS}$ = 10 V $V_{GS}$ = 0, f= 1.0 kHz | | | | |
| | | | **4117** | | 3.0 | µmhos |
| | | | **4118** | | 5.0 | µmhos |
| | | | **4119** | | 10 | µmhos |
| $R_{e(yfs)}$ | Common-Source Forwad Transconductance | $V_{DS}$ = 10 V, $V_{GS}$ = 0, f= 30 MHz | | | | |
| | | | **4117** | 60 | | µmhos |
| | | | **4118** | 70 | | µmhos |
| | | | **4119** | 90 | | µmhos |
| $C_{iss}$ | Input Capacitance | $V_{DS}$ = 10 V, $V_{GS}$ = 0, f= 1.0 kHz | | | 3.0 | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | $V_{DS}$ = 10 V, $V_{GS}$ = 0, f= 1.0 MHz, | | | 1.5 | pF |

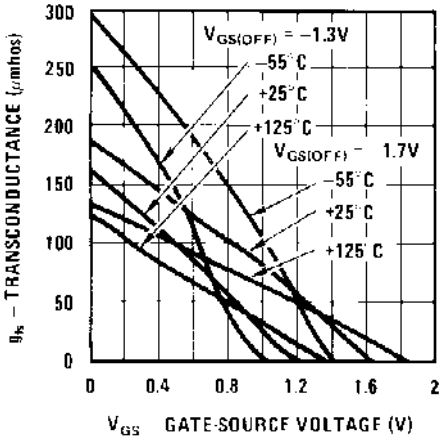
*Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 1.0%

## Typical Characteristics

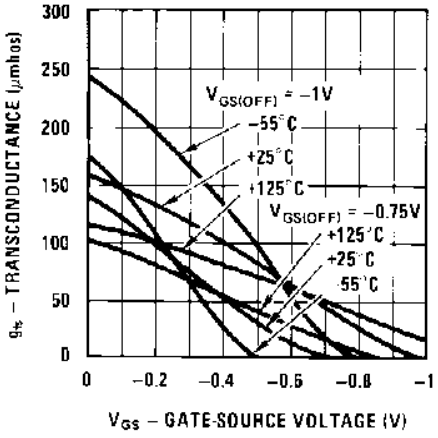
### Parameter Interactions



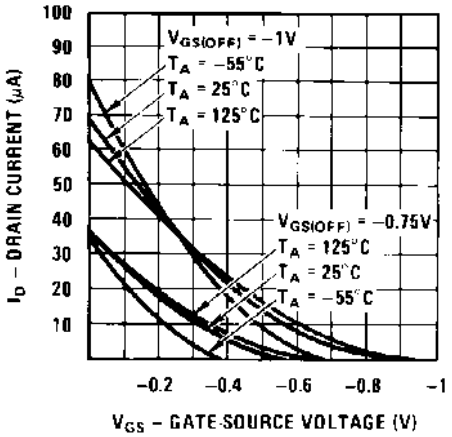

### Transfer Characteristics



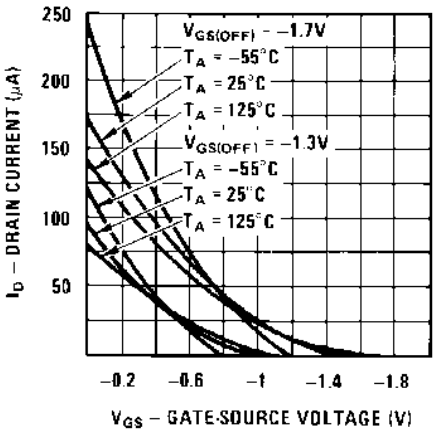

### Transfer Characteristics



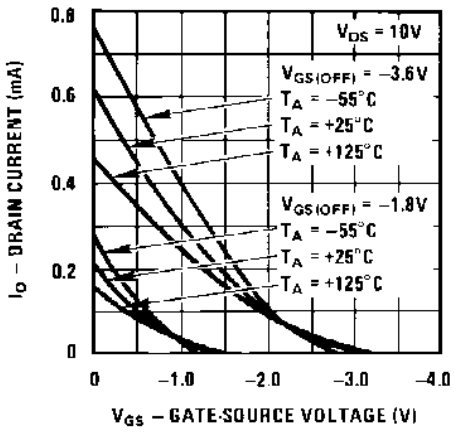

### Transfer Characteristics




### Transfer Characteristics

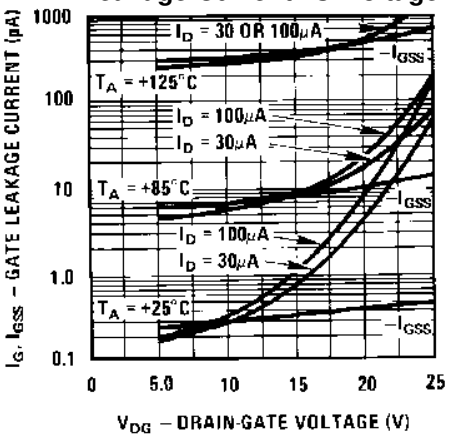



### Transfer Characteristics

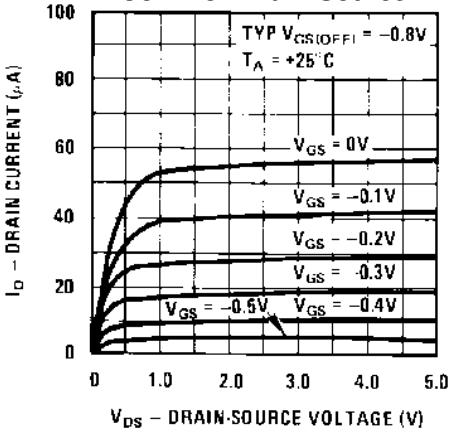


## Typical Characteristics (continued)

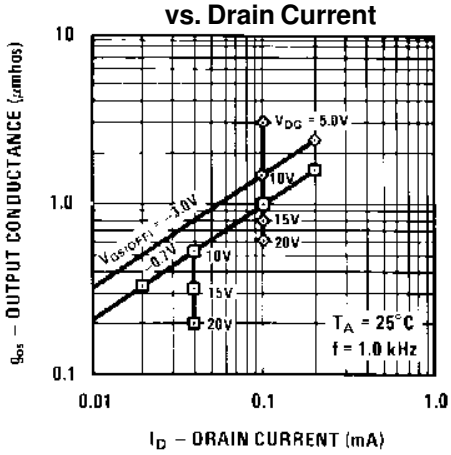
### Leakage Current vs. Voltage



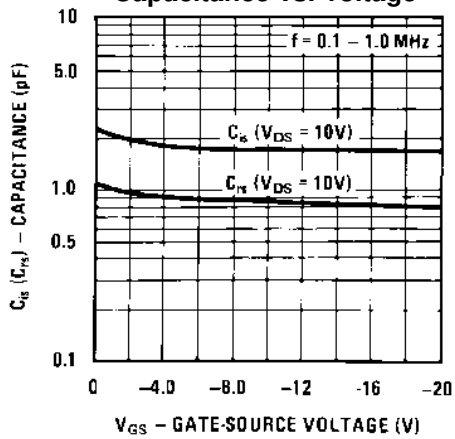

### Common Drain-Source



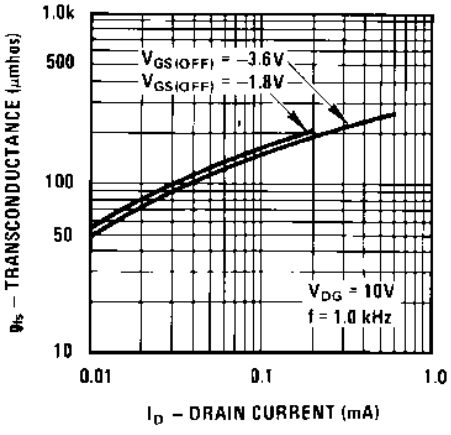

### Output Conductance vs. Drain Current



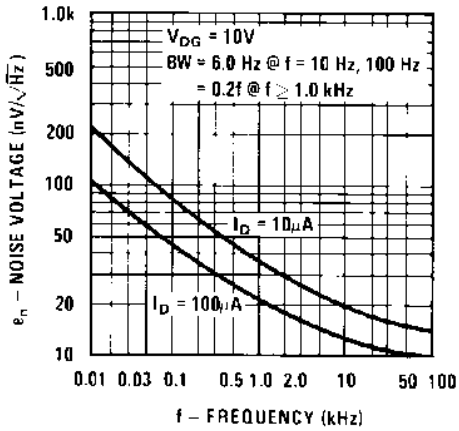

### Capacitance vs. Voltage




### Transconductance vs. Drain Current




### Noise Voltage vs. Frequency



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