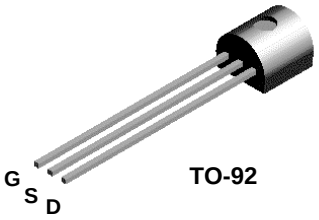
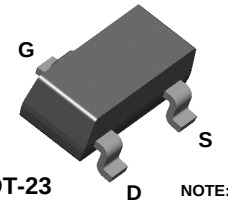
FAIRCHILD
SEMICONDUCTOR TM

**2N5457**
**2N5458**
**2N5459**

**MMBF5457**
**MMBF5458**
**MMBF5459**




TO-92




SOT-23
Mark: 6D / 61S / 6L

NOTE: Source & Drain are interchangeable

## N-Channel General Purpose Amplifier

This device is a low level audio amplifier and switching transistors, and can be used for analog switching applications. Sourced from Process 55.

### Absolute Maximum Ratings* TA = 25°C unless otherwise noted

| Symbol | Parameter | Value | Units |
|---|---|---|---|
| $V_{DG}$ | Drain-Gate Voltage | 25 | V |
| $V_{GS}$ | Gate-Source Voltage | - 25 | V |
| $I_{GF}$ | Forward Gate Current | 10 | 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 |
|---|---|---|---|---|
| | | 2N5457-5459 | *MMBF5457-5459 | |
| $P_D$ | Total Device Dissipation<br>Derate above 25°C | 625<br>5.0 | 350<br>2.8 | 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 General Purpose Amplifier
(continued)

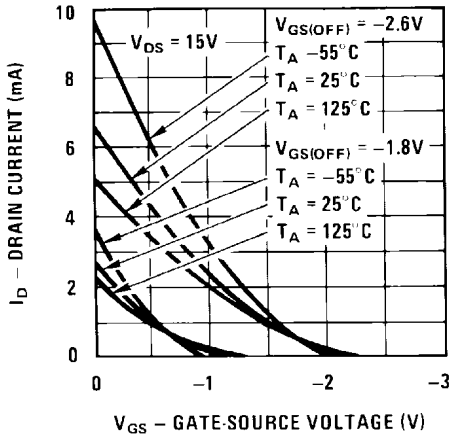
### Electrical Characteristics
TA = 25°C unless otherwise noted

| Symbol | Parameter | Test Conditions | | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | | |
| $V_{(BR)GSS}$ | Gate-Source Breakdown Voltage | $I_G$ = 10 μA, $V_{DS}$ = 0 | | - 25 | | | V |
| $I_{GSS}$ | Gate Reverse Current | $V_{GS}$ = -15 V, $V_{DS}$ = 0 | | | | - 1.0 | nA |
| | | $V_{GS}$ = -15 V, $V_{DS}$ = 0, $T_A$ = 100°C | | | | - 200 | nA |
| $V_{GS(off)}$ | Gate-Source Cutoff Voltage | $V_{DS}$ = 15 V, $I_D$ = 10 nA | **5457** | - 0.5 | | - 6.0 | V |
| | | | **5458** | - 1.0 | | - 7.0 | V |
| | | | **5459** | - 2.0 | | - 8.0 | V |
| $V_{GS}$ | Gate-Source Voltage | $V_{DS}$ = 15 V, $I_D$ = 100 μA | **5457** | | - 2.5 | | V |
| | | $V_{DS}$ = 15 V, $I_D$ = 200 μA | **5458** | | - 3.5 | | V |
| | | $V_{DS}$ = 15 V, $I_D$ = 400 μA | **5459** | | - 4.5 | | V |
| **ON CHARACTERISTICS** | | | | | | | |
| $I_{DSS}$ | Zero-Gate Voltage Drain Current* | $V_{DS}$ = 15 V, $V_{GS}$ = 0 | **5457** | 1.0 | 3.0 | 5.0 | mA |
| | | | **5458** | 2.0 | 6.0 | 9.0 | mA |
| | | | **5459** | 4.0 | 9.0 | 16 | mA |
| **SMALL SIGNAL CHARACTERISTICS** | | | | | | | |
| $g_{fs}$ | Forward Transfer Conductance* | $V_{DS}$ = 15 V, $V_{GS}$ = 0, f = 1.0 kHz | | | | | |
| | | | **5457** | 1000 | | 5000 | μmhos |
| | | | **5458** | 1500 | | 5500 | μmhos |
| | | | **5459** | 2000 | | 6000 | μmhos |
| $g_{os}$ | Output Conductance* | $V_{DS}$ = 15 V, $V_{GS}$ = 0, f = 1.0 kHz | | | 10 | 50 | μmhos |
| $C_{iss}$ | Input Capacitance | $V_{DS}$ = 15 V, $V_{GS}$ = 0, f = 1.0 MHz | | | 4.5 | 7.0 | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | $V_{DS}$ = 15 V, $V_{GS}$ = 0, f = 1.0 MHz | | | 1.5 | 3.0 | pF |
| NF | Noise Figure | $V_{DS}$ = 15 V, $V_{GS}$ = 0, f = 1.0 kHz, $R_G$ = 1.0 megohm, BW = 1.0 Hz | | | | 3.0 | dB |

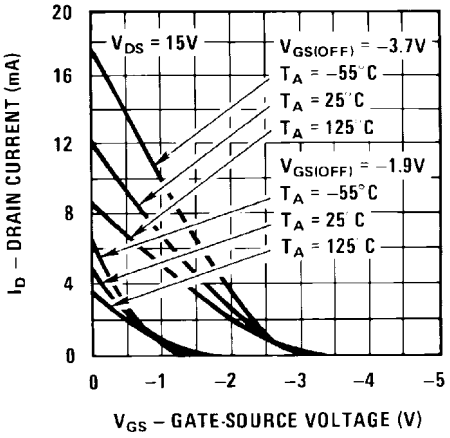
*Pulse Test: Pulse Width ≤ 300 ms, Duty Cycle ≤ 2%

## Typical Characteristics

**Transfer Characteristics**

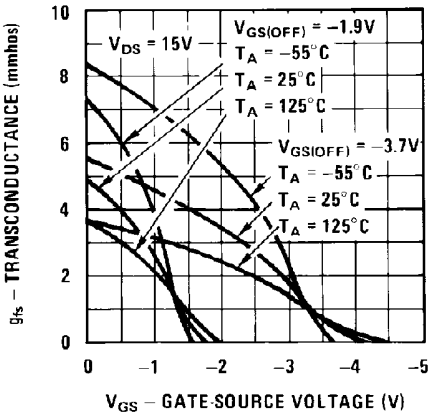



**Transfer Characteristics**

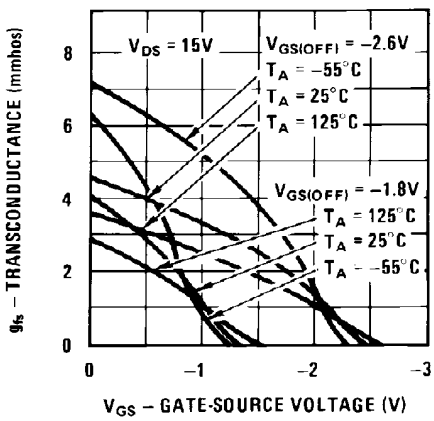


## Typical Characteristics (continued)

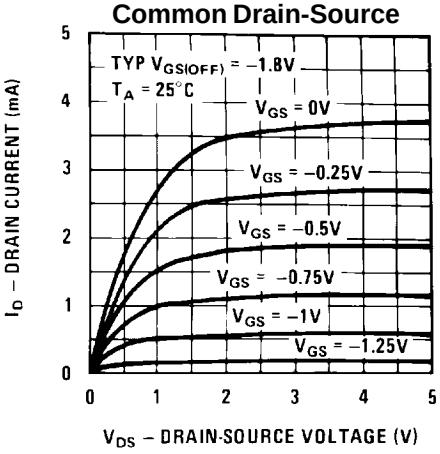
### Transfer Characteristics



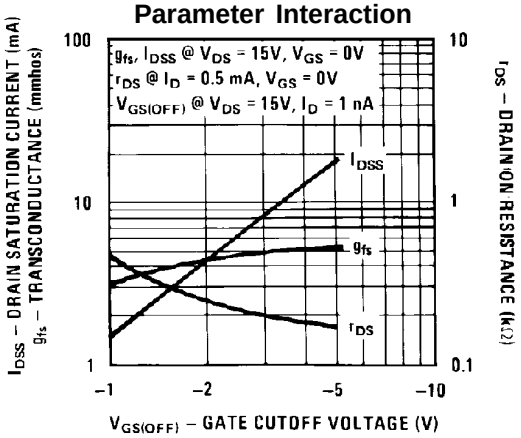

### Transfer Characteristics



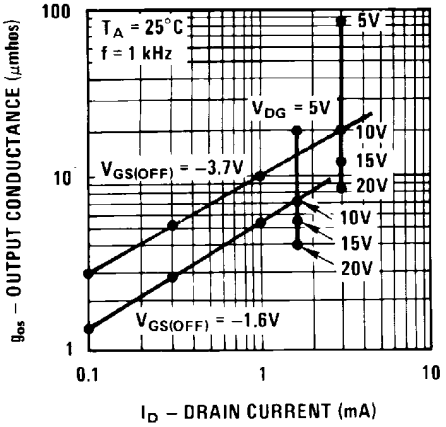

### Common Drain-Source



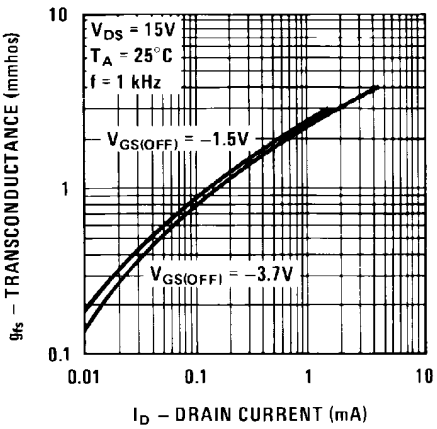

### Parameter Interaction




### Output Conductance vs. Drain Current

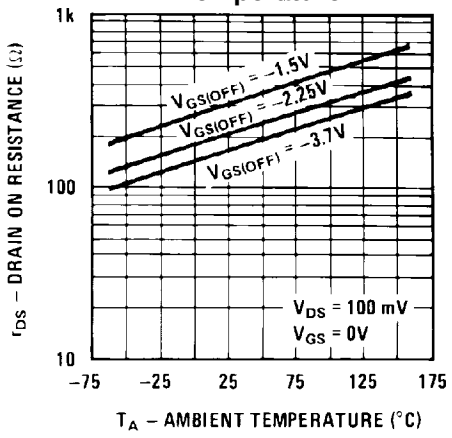



### Transconductance vs. Drain Current

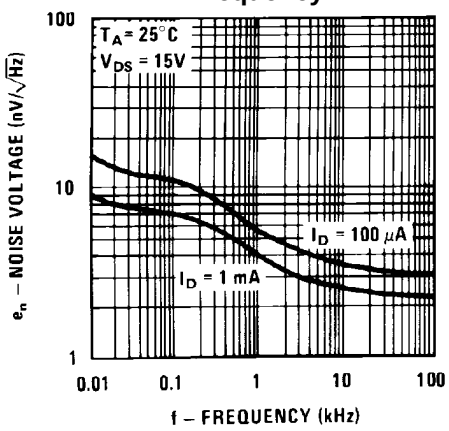


## Typical Characteristics (continued)

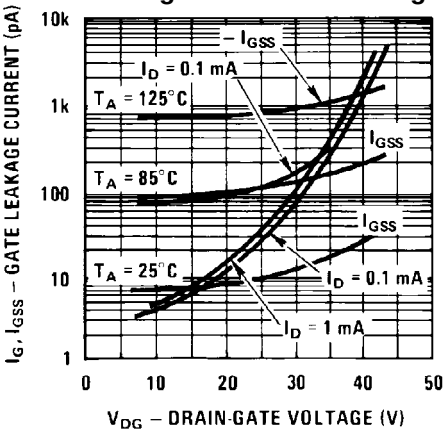
### Channel Resistance vs. Temperature



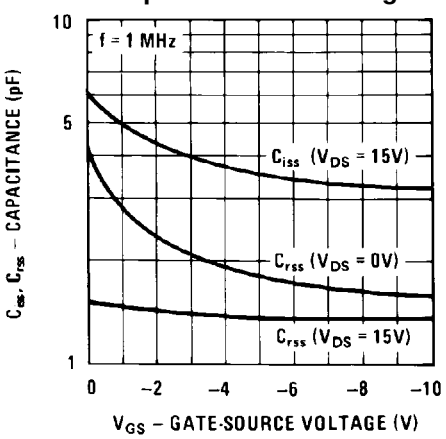

### Noise Voltage vs. Frequency



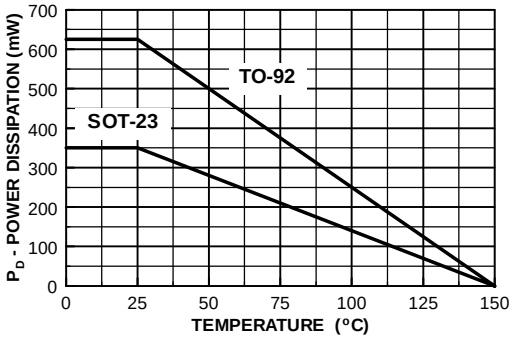

### Leakage Current vs. Voltage




### Capacitance vs. Voltage




### Power Dissipation vs Ambient Temperature



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