

N-Channel JFETs

Product Summary

| Part Number | V _{GS(off)} (V) | V _{(BR)GSS} Min (V) | g _m Min (mS) | I _{DSS} Min (mA) |
|-------------|--------------------------|------------------------------|-------------------------|---------------------------|
| 2N4416 | - ≤ 6 | -30 | 4.5 | 5 |
| 2N4416A | -2.5 to -6 | -35 | 4.5 | 5 |
| SST4416 | - ≤ 6 | -30 | 4.5 | 5 |

Features

- Excellent High-Frequency Gain: 2N4416/A, G_{ps} 13 dB (typ) @ 400 MHz
- Very Low Noise: 3 dB (typ) @ 400 MHz
- Very Low Distortion
- High AC/DC Switch Off-Isolation

Benefits

- Wideband High Gain
- Very High System Sensitivity
- High Quality of Amplification
- High-Speed Switching Capability
- High Low-Level Signal Amplification

Applications

- High-Frequency Amplifier/Mixer
- Oscillator
- Sample-and-Hold
- Very Low Capacitance Switches

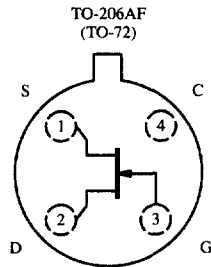
Description

The 2N4416/2N4416A/SST4416 n-channel JFETs are designed to provide high-performance amplification at high frequencies.

The TO-206AF (TO-72) hermetically-sealed package is available with full military processing (see Military Information.) The TO-236 (SOT-23) package provides a low-cost option and is available with tape-and-reel options (see Packaging Information). For similar products in the TO-226AA (TO-92) package, see the J304/305 data sheet.

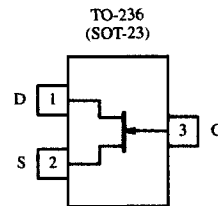
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N-Channel JFETs



Top View

2N4416
2N4416A



Top View

SST4416 (H1)*

*Marking Code for TO-236

Updates to this data sheet may be obtained via facsimile by calling Siliconix FaxBack, 1-408-970-5600. Please request FaxBack document #70242. Applications information may also be obtained via FaxBack, request document #70597.

2N4416/2N4416A/SST4416

TEMIC
Semiconductors

Absolute Maximum Ratings

| | | |
|-----------------------------------|--------------------------------------|--------------------------------|
| Gate-Drain, Gate-Source Voltage : | Operating Junction Temperature | -55 to 150 °C |
| (2N/SST4416) | Power Dissipation : | (2N Prefix) ^a |
| (2N4416A) | (SST Prefix) ^b | 300 mW |
| Gate Current | | 350 mW |
| Lead Temperature | Notes | |
| Storage Temperature : | a. Derate 2.4 mW/°C above 25°C | |
| (2N Prefix) | b. Derate 2.8 mW/°C above 25°C | |
| (SST Prefix) | | |

Specifications^a

| Parameter | Symbol | Test Conditions | Typ ^b | Limits | | | | | | Unit |
|---|---------------|--|------------------|--------|------|---------|------|---------|-----|-----------------|
| | | | | 2N4416 | | 2N4416A | | SST4416 | | |
| | | | | Min | Max | Min | Max | Min | Max | |
| Static | | | | | | | | | | |
| Gate-Source Breakdown Voltage | $V_{(BR)GSS}$ | $I_G = -1 \mu A, V_{DS} = 0 V$ | -36 | -30 | | -35 | | -30 | | V |
| Gate-Source Cutoff Voltage | $V_{GS(off)}$ | $V_{DS} = 15 V, I_D = 1 nA$ | -3 | | -6 | -2.5 | -6 | | -6 | |
| Saturation Drain Current ^c | I_{DSS} | $V_{DS} = 15 V, V_{GS} = 0 V$ | 10 | 5 | 15 | 5 | 15 | 5 | 15 | mA |
| Gate Reverse Current | I_{GSS} | $V_{GS} = -20 V, V_{DS} = 0 V$ (2N) | -2 | | -100 | | -100 | | | pA |
| | | $T_A = 150^\circ C$ | -4 | | -100 | | -100 | | | |
| | | $V_{GS} = -15 V, V_{DS} = 0 V$ (SST) | -0.002 | | | | | | -1 | nA |
| $T_A = 125^\circ C$ | -0.6 | | | | | | | | | |
| Gate Operating Current | I_G | $V_{DG} = 10 V, I_D = 1 mA$ | -20 | | | | | | | pA |
| Drain Cutoff Current ^d | $I_{D(off)}$ | $V_{DS} = 10 V, V_{GS} = -6 V$ | 2 | | | | | | | |
| Drain-Source On-Resistance ^d | $r_{DS(on)}$ | $V_{GS} = 0 V, I_D = 1 mA$ | 150 | | | | | | | Ω |
| Gate-Source Forward Voltage ^d | $V_{GS(F)}$ | $I_G = 1 mA, V_{DS} = 0 V$ | 0.7 | | | | | | | V |
| Dynamic | | | | | | | | | | |
| Common-Source Forward Transconductance ^c | g_{fs} | $V_{DS} = 15 V, V_{GS} = 0 V$ $f = 1 kHz$ | 6 | 4.5 | 7.5 | 4.5 | 7.5 | 4.5 | 7.5 | mS |
| Common-Source Output Conductance ^c | g_{os} | | 15 | | 50 | | 50 | | 50 | μS |
| Common-Source Input Capacitance | C_{iss} | $V_{DS} = 15 V, V_{GS} = 0 V$ $f = 1 MHz$ | 2.2 | | 4 | | 4 | | | pF |
| Common-Source Reverse Transfer Capacitance | C_{rss} | | 0.7 | | 0.8 | | 0.8 | | | |
| Common-Source Output Capacitance | C_{oss} | | 1 | | 2 | | 2 | | | |
| Equivalent Input Noise Voltage ^c | \bar{e}_n | $V_{DS} = 10 V, V_{GS} = 0 V$ $f = 1 kHz$ | 6 | | | | | | | nV/ \sqrt{Hz} |

High-Frequency Specifications^{a, b} for 2N4416 and 2N4416A

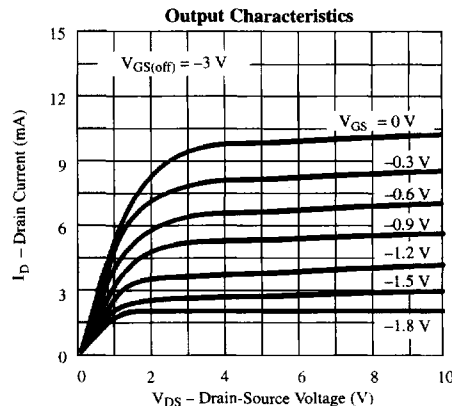
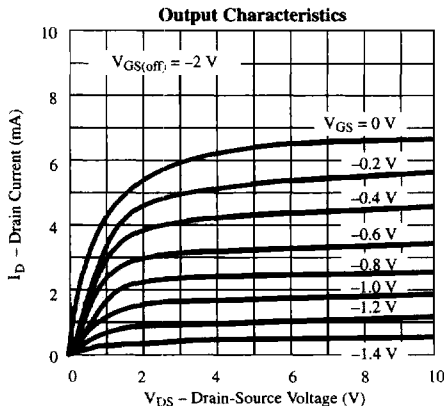
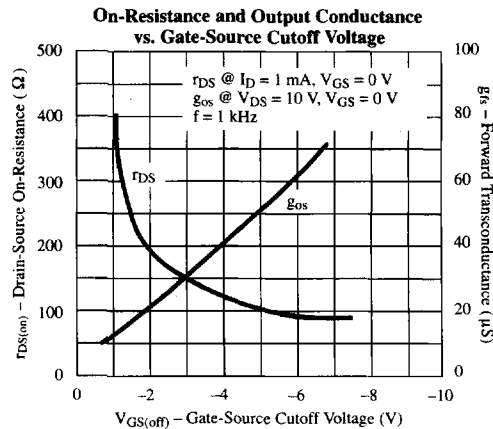
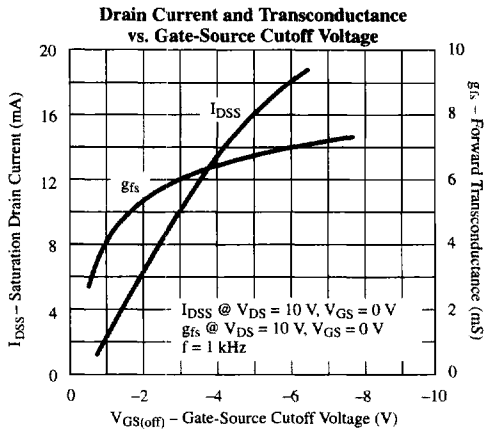
| Parameter | Symbol | Test Conditions | Limits | | | | Unit |
|--|-----------|---|---------|-------|---------|--------|---------------|
| | | | 100 MHz | | 400 MHz | | |
| | | | Min | Max | Min | Max | |
| Common Source Input Conductance | g_{iss} | $V_{DS} = 15 \text{ V}, V_{GS} = 0 \text{ V}$ | | 100 | | 1,000 | μS |
| Common Source Input Susceptance | b_{iss} | | | 2,500 | | 10,000 | |
| Common Source Output Conductance | g_{oss} | | | 75 | | 100 | |
| Common Source Output Susceptance | b_{oss} | | | 1,000 | | 4,000 | |
| Common Source Forward Transconductance | g_{fs} | | | | 4,000 | | |
| Common-Source Power Gain | G_{ps} | $V_{DS} = 15 \text{ V}, I_D = 5 \text{ mA}$ | 18 | | 10 | | dB |
| Noise Figure | NF | $R_G = 1 \text{ k}\Omega$ | | 2 | | 4 | |

Notes

- $T_A = 25^\circ\text{C}$ unless otherwise noted.
- Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
- Pulse test: $PW \leq 300 \mu\text{s}$ duty cycle $\leq 3\%$.
- This parameter not registered with JEDEC.

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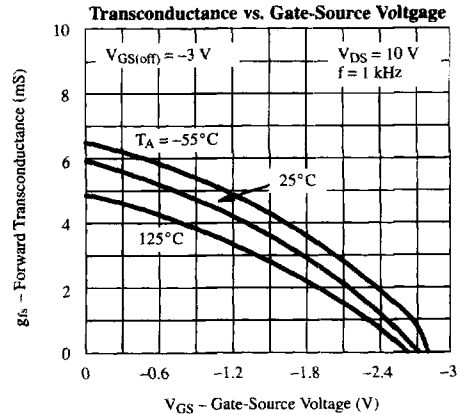
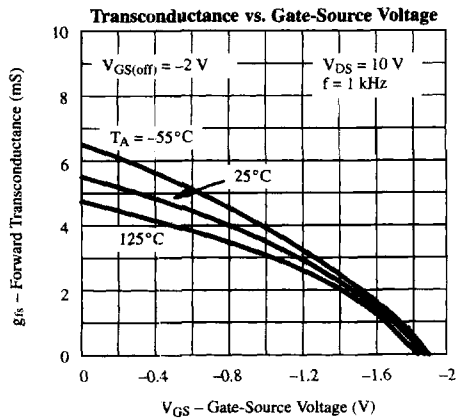
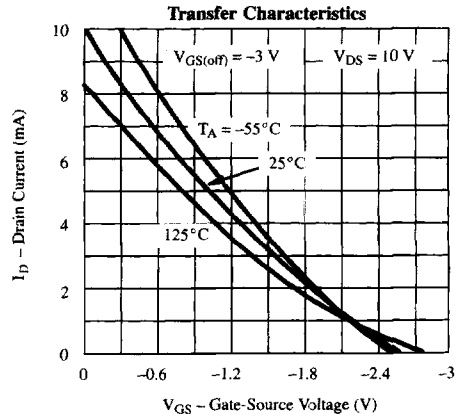
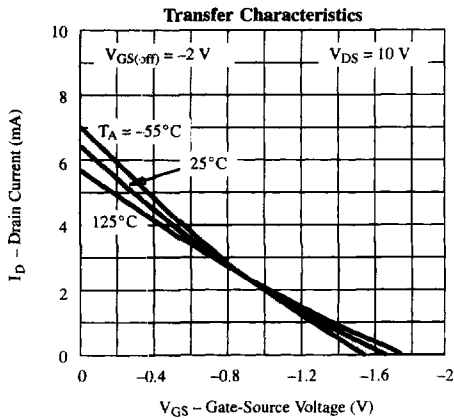
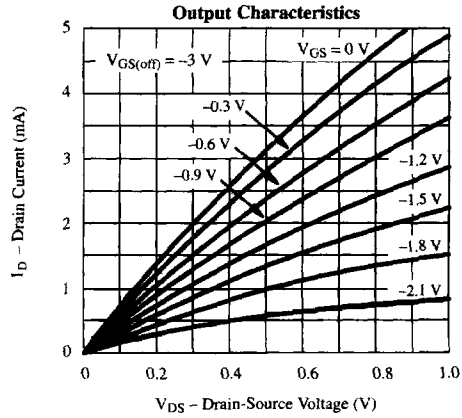
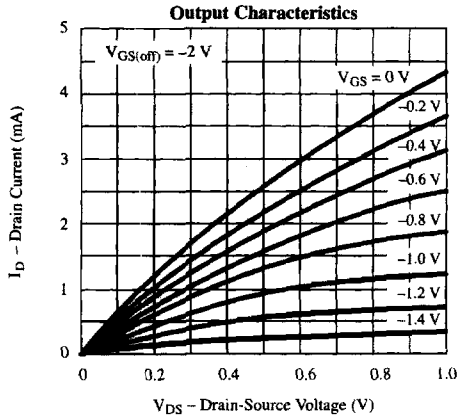
Typical Characteristics



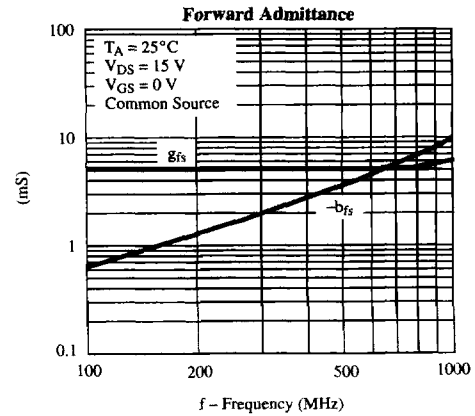
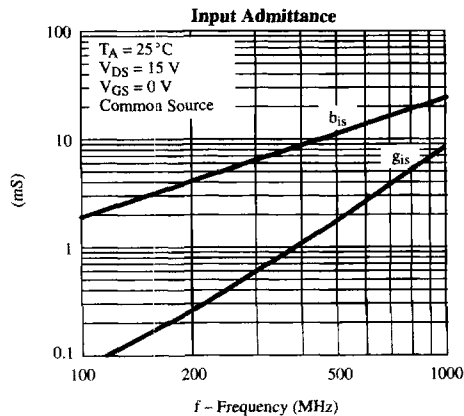
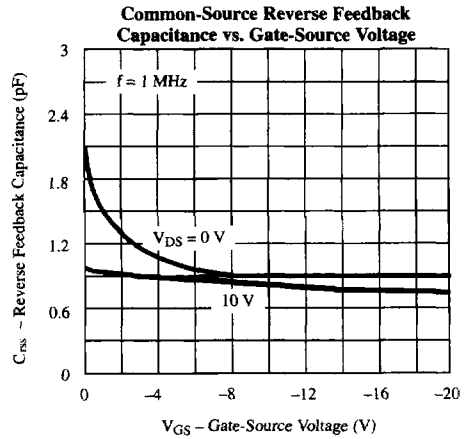
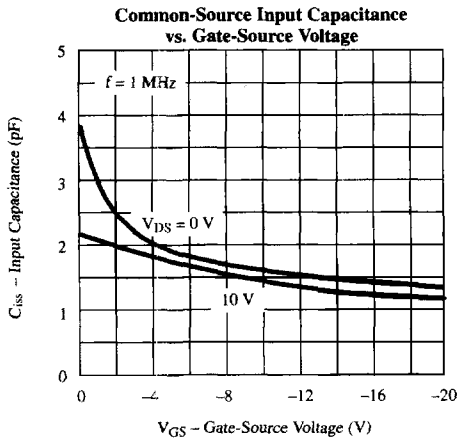
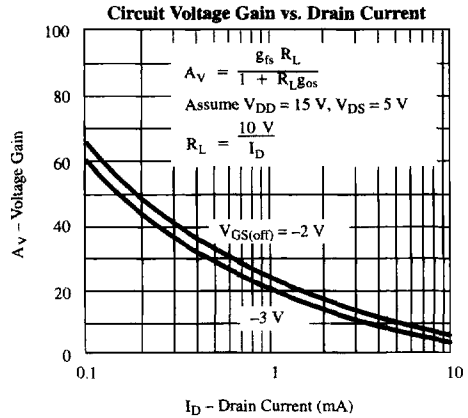
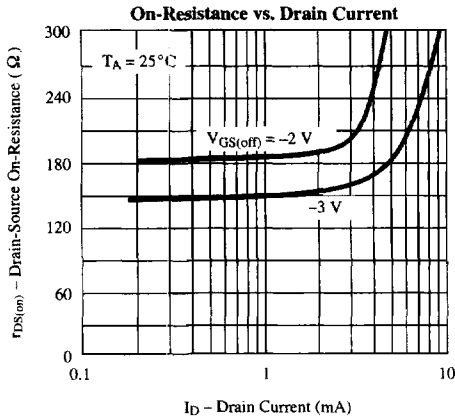
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N-Channel JFETs

Typical Characteristics (Cont'd)



Typical Characteristics (Cont'd)



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Typical Characteristics (Cont'd)

