N-Channel JFETs

Product Summary

<table>
<thead>
<tr>
<th>Part Number</th>
<th>$V_{GS(Off)}$ (V)</th>
<th>$V_{BR/GSS}$ Min (V)</th>
<th>$g_m$ Min (mS)</th>
<th>$I_{DSS}$ Min (mA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>J/SST201</td>
<td>-0.3 to -1.5</td>
<td>-40</td>
<td>0.5</td>
<td>0.2</td>
</tr>
<tr>
<td>J/SST202</td>
<td>-0.8 to -4</td>
<td>-40</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td>J/SST204</td>
<td>-0.3 to -2</td>
<td>-25</td>
<td>0.5</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Features
- Low Cutoff Voltage: $J201 < 1.5$ V
- High Input Impedance
- Very Low Noise
- High Gain: $A_V = 80 @ 20 \mu A$

Benefits
- Full Performance from Low Voltage Power Supply: Down to 1.5 V
- Low Signal Loss/System Error
- High System Sensitivity
- High Quality Low-Level Signal Amplification

Applications
- High-Gain, Low-Noise Amplifiers
- Low-Current, Low-Voltage Battery-Powered Amplifiers
- Infrared Detector Amplifiers
- Ultra High Input Impedance Pre-Amplifiers

Description
The J/SST201 series features low leakage, very low noise, and low cutoff voltage for use with low-level power supplies. The J/SST201 is excellent for battery powered equipment and low current amplifiers.

For similar products in TO-206AA (TO-18) packaging, see the 2N4338/4339/4340/4341 data sheet.

The J series, TO-226 (TO-92) plastic package, provides low cost, while the SST series, TO-236 (SOT-23) package, provides surface-mount capability. Both the J and SST series are available in tape-and-reel for automated assembly (see Packaging Information).

Updates to this data sheet may be obtained via facsimile by calling Siliconix FaxBack, 1-408-970-5600. Please request FaxBack document #70233. Applications information may also be obtained via FaxBack, request document #70595 and document #70599.

Siliconix
P-37995—Rev. D. 11-Aug-94
# J/SST201 Series

## Absolute Maximum Ratings

- Gate-Drain, Gate-Source Voltage: -40 V
- Gate Current: 50 mA
- Lead Temperature (t_{ref} from case for 10 sec.): 300°C
- Storage Temperature: -55 to 150°C
- Operating Junction Temperature: -55 to 150°C
- Power Dissipation: 350 mW

**Notes**
- a. Derate 2.8 mW/°C above 25°C

## Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Type Condition</th>
<th>Typ&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Min</td>
<td>Max</td>
</tr>
<tr>
<td><strong>Static</strong></td>
<td></td>
<td></td>
<td>J/SST201</td>
<td>J/SST202</td>
</tr>
<tr>
<td>Gate-Source Breakdown Voltage</td>
<td>(V_{BRGS})</td>
<td>(I_G = -1 \mu A), (V_{DS} = 0 ) V</td>
<td>-40</td>
<td>-40</td>
</tr>
<tr>
<td>Gate-Source Cutoff Voltage</td>
<td>(V_{GS(off)})</td>
<td>(V_{DS} = 15 ) V, (I_D = 10 ) nA</td>
<td>-0.3</td>
<td>-1.5</td>
</tr>
<tr>
<td>Saturation Drain Current&lt;sup&gt;c&lt;/sup&gt;</td>
<td>(I_{DS})</td>
<td>(V_{DS} = 15 ) V, (V_{GS} = 0 ) V</td>
<td>0.2</td>
<td>1</td>
</tr>
<tr>
<td>Gate Reverse Current</td>
<td>(I_{GSS})</td>
<td>(V_{GS} = -20 ) V, (V_{DS} = 0 ) V</td>
<td>-2</td>
<td>-100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(T_A = 125^{\circ}C)</td>
<td>-1</td>
<td></td>
</tr>
<tr>
<td>Gate Operating Current</td>
<td>(I_G)</td>
<td>(V_{DG} = 10 ) V, (I_D = 0.1 ) mA</td>
<td>-2</td>
<td></td>
</tr>
<tr>
<td>Drain Cutoff Current</td>
<td>(I_{D(off)})</td>
<td>(V_{DS} = 15 ) V, (V_{GS} = -5 ) V</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Gate-Source Forward Voltage</td>
<td>(V_{GS(F)})</td>
<td>(I_G = 1 ) mA, (V_{DS} = 0 ) V</td>
<td>0.7</td>
<td></td>
</tr>
<tr>
<td><strong>Dynamic</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Common-Source Forward Transconductance</td>
<td>(g_f)</td>
<td>(V_{DS} = 15 ) V, (V_{GS} = 0 ) V (f = 1 ) kHz</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>Common-Source Input Capacitance</td>
<td>(C_{iss})</td>
<td>(V_{DS} = 15 ) V, (V_{GS} = 0 ) V (f = 1 ) MHz</td>
<td>4.5</td>
<td></td>
</tr>
<tr>
<td>Common-Source Reverse Transfer Capacitance</td>
<td>(C_{rss})</td>
<td>(V_{DS} = 15 ) V, (V_{GS} = 0 ) V (f = 1 ) kHz</td>
<td>1.3</td>
<td></td>
</tr>
<tr>
<td>Equivalent Input Noise Voltage</td>
<td>(\Sigma_n)</td>
<td>(V_{DS} = 10 ) V, (V_{GS} = 0 ) V (f = 1 ) kHz</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

**Notes**
- a. \(T_A = 25^{\circ}C\) unless otherwise noted.
- b. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
- c. Pulse test: \(PW \leq 300 \mu s\) duty cycle \(\leq 3\%\).
- d. See 2N/SST5484 Series for J204 typical characteristic curves.
Typical Characteristics (25°C Unless Noted)

Drain Current and Transconductance vs. Gate-Source Cutoff Voltage

Gate Leakage Current

On-Resistance and Output Conductance vs. Gate-Source Cutoff Voltage

Common-Source Forward Transconductance vs. Drain Current

Output Characteristics

Output Characteristics
J/SST201 Series

Typical Characteristics (25°C Unless Noted)

Transfer Characteristics

\[ V_{GS_{off}} = -0.7 \text{ V} \]

\[ V_{DS} = 10 \text{ V} \]

Transfer Characteristics

\[ V_{GS_{off}} = -1.5 \text{ V} \]

\[ V_{DS} = 10 \text{ V} \]

Transconductance vs. Gate-Source Voltage

\[ V_{GS_{off}} = -0.7 \text{ V} \]

\[ V_{DS} = 10 \text{ V} \]

\[ f = 1 \text{ kHz} \]

Transductance vs. Gate-Source Voltage

\[ V_{GS_{off}} = -1.5 \text{ V} \]

\[ V_{DS} = 10 \text{ V} \]

\[ f = 1 \text{ kHz} \]

Circuit Voltage Gain vs. Drain Current

\[ A_V = \frac{g_m R_L}{1 + R_L g_{ds}} \]

Assume \[ V_{DD} = 15 \text{ V}, V_{DS} = 5 \text{ V} \]

\[ R_L = 10 \text{ V} \]

\[ I_D \] Drain Current (mA)

On-Resistance vs. Drain Current

\[ V_{GS_{off}} = -0.7 \text{ V} \]

\[ V_{GS_{off}} = -1.5 \text{ V} \]

\[ I_D \] Drain Current (mA)

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Typical Characteristics (25°C Unless Noted)

Common-Source Input Capacitance vs. Gate-Source Voltage

Common-Source Reverse Feedback Capacitance vs. Gate-Source Voltage

Output Conductance vs. Drain Current

Equivalent Input Noise Voltage vs. Frequency

Output Characteristics

Output Characteristics

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J/SST201 Series
Siliconix

N-Channel JFETs

J201  SST201
J202  SST202
J204  SST204

Product Summary

<table>
<thead>
<tr>
<th>Part Number</th>
<th>V(Drain) (V)</th>
<th>V(SD/GS) Min (V)</th>
<th>g_m Min (mS)</th>
<th>I_DSS Min (mA)</th>
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<tbody>
<tr>
<td>J201</td>
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For applications information see AN102, page 12-6, and AN106, page 12-28.

Features
- Low-Cutoff Voltage: J201 = 1.5 V
- High Input Impedance
- Very Low Noise
- High Gain: Av = 80 @ 20 mA

Benefits
- Full Performance from Low Voltage
- Power Supply: Down to 1.5 V
- Low Signal Line/Slew Rate Error
- High-Slew Sensitivity
- High Quality Low-Level Signal Amplification

Applications
- High-Gain, Low-Noise Amplifiers
- Low-Current, Low-Voltage
- Battery-Powered Amplifiers
- Infrared Detector Amplifiers
- Ultra High Input Impedance Pre-Amplifiers

Description
The J/SST201 series features low noise, very low noise, and low cutoff voltage for use with low-level power supplies. The J/2ST201 is excellent for battery powered equipment and low current amplifiers.

The J series, TO-226 (TO-92) plastic package, provides low cost, while the SST series, TO-236 (SOT-23) package, provides surface-mount capability. Both the J and SST series are available in tape-and-reel for automated assembly (see Packaging Information).

For similar products in TO-206AA (TO-18) packaging, see the 2N4358, 4359, 4340, 4341 data sheet.

Absolute Maximum Ratings
- Gate-Drain, Gate-Source Voltage: -40 V
- Gate Current: 20 mA
- Lead Temperature (t;5) from case to air: 300°C
- Storage Temperature: -5 to 150°C

Operating Temperature: -55 to 150°C
Power Dissipation: 500 mW

Typical Characteristics

Typical Applications

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J/SST201 Series

Specifications*

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<tr>
<th>Parameter</th>
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<th>Limits</th>
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<td></td>
<td></td>
<td>J201</td>
<td>J202</td>
</tr>
<tr>
<td>Drain-Source Breakdown Voltage</td>
<td>V(DSmax)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gate-Source Voltage</td>
<td>V(GS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drain Current</td>
<td>I(D)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gate Reverse Current</td>
<td>I(Rs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gate Operating Current</td>
<td>I(O)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drain Current</td>
<td>I(D)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drain-Source Forward Voltage</td>
<td>V(DS)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dynamic

Common-Source Forward Transconductance | g_m | | | |
Common-Source Input Capacitance | C_I | | | |
Common-Source Reverse Transfer Capacitance | C_RS | | | |
Equivalent Input Noise Voltage | V(IN) | | | |

Note
a. TA = 25°C unless otherwise noted.
b. Typical values are for J/SST201 only; not guaranteed nor subject to production testing.
c. Pulse test: 300 µs duty cycle 10%.
d. See 2N38358 Series for J201 typical characteristic curves.

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Top View

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J/SST201 Series

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