

## N-Channel JFETs

### Product Summary

Part Number	V <sub>GS(off)</sub> (V)	V <sub>(BR)GSS</sub> Min (V)	g <sub>fs</sub> Min (mS)	I <sub>DSS</sub> Min (mA)
J304	-2 to -6	-30	4.5	5
J305	-0.5 to -3	-30	3	1

### Features

- Excellent High Frequency Gain: J304, Gps 11 dB (typ) @ 400 MHz
- Very Low Noise: 3.8 dB (typ) @ 400 MHz
- Very Low Distortion
- High ac/dc Switch Off-Isolation
- High Gain: A<sub>V</sub> = 60 @ 100 μA

### Benefits

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

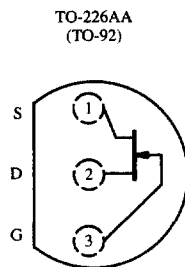
### Applications

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

### Description

The J304/305 n-channel JFETs provide high-performance amplification, especially at high-frequency. These products are available in tape and reel for automated assembly (see Package Information).

For similar products in TO-236 (SOT-23) packages, see the 2N/SST5484 series data sheet, or in TO-206AF (TO-72) packages, see the 2N/SST4416 series data sheet.



Top View

### Absolute Maximum Ratings

Gate-Source/Gate-Drain Voltage	-30 V	Lead Temperature ( <sup>1</sup> / <sub>16</sub> " from case for 10 sec.)	300°C
Forward Gate Current	10 mA	Power Dissipation <sup>a</sup>	350 mW
Storage Temperature	-55 to 150°C	Notes	
Operating Junction Temperature	-55 to 150°C	a. Derate 2.8 mW/°C above 25°C	

Updates to this data sheet may be obtained via facsimile by calling Siliconix FaxBack, 1-408-970-5600. Please request FaxBack document #70236.

**Specifications<sup>a</sup>**

Parameter	Symbol	Test Conditions	Typ <sup>b</sup>	Limits				Unit
				J304		J305		
				Min	Max	Min	Max	
<b>Static</b>								
Gate-Source Breakdown Voltage	$V_{(BR)GSS}$	$I_G = -1 \mu A, V_{DS} = 0 V$	-35	-30		-30		V
Gate-Source Cutoff Voltage	$V_{GS(off)}$	$V_{DS} = 15 V, I_D = 1 nA$		-2	-6	-0.5	-3	V
Saturation Drain Current <sup>c</sup>	$I_{DSS}$	$V_{DS} = 15 V, V_{GS} = 0 V$		5	15	1	8	mA
Gate Reverse Current	$I_{GSS}$	$V_{GS} = -20 V, V_{DS} = 0 V$	-2		-100		-100	pA
		$T_A = 100^\circ C$	-0.2					nA
Gate Operating Current <sup>c</sup>	$I_G$	$V_{DG} = 10 V, I_D = 1 mA$	-20					pA
Drain Cutoff Current	$I_{D(off)}$	$V_{DS} = 10 V, V_{GS} = -6 V$	2					pA
Drain-Source On-Resistance	$r_{DS(on)}$	$V_{GS} = 0 V, I_D = 1 mA$	200					$\Omega$
Gate-Source Forward Voltage	$V_{GS(F)}$	$I_G = 1 mA, V_{DS} = 0 V$	0.7					V
<b>Dynamic</b>								
Common-Source Forward Transconductance	$g_{fs}$	$V_{DS} = 15 V, V_{GS} = 0 V, f = 1 kHz$		4.5	7.5	3		mS
Common-Source Output Conductance	$g_{os}$					50		50
Common-Source Input Capacitance	$C_{iss}$	$V_{DS} = 15 V, V_{GS} = 0 V, f = 1 MHz$	2.2					pF
Common-Source Reverse Transfer Capacitance	$C_{rss}$		0.7					
Common-Source Output Capacitance	$C_{oss}$		1					
Equivalent Input Noise Voltage	$\bar{e}_n$	$V_{DS} = 10 V, V_{GS} = 0 V, f = 100 Hz$	10					$nV/\sqrt{Hz}$

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**Typical High-Frequency Specifications<sup>a</sup>**

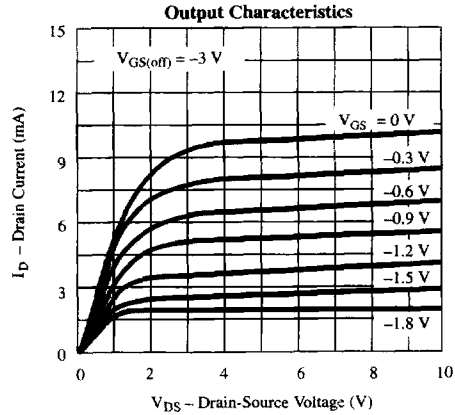
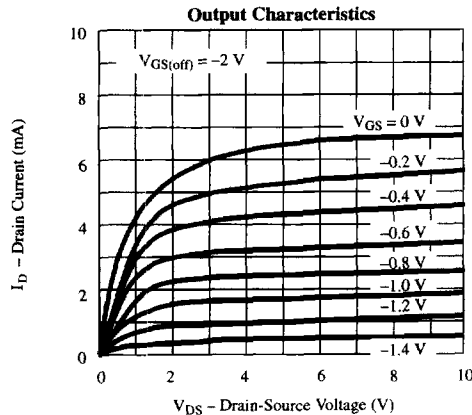
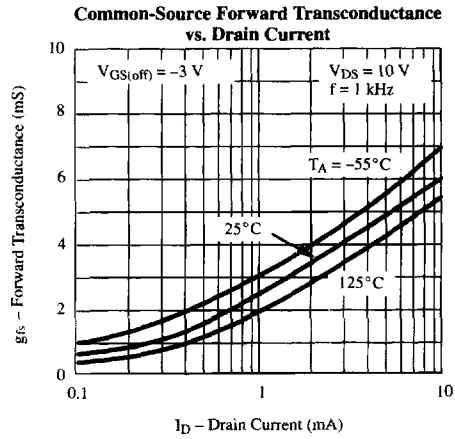
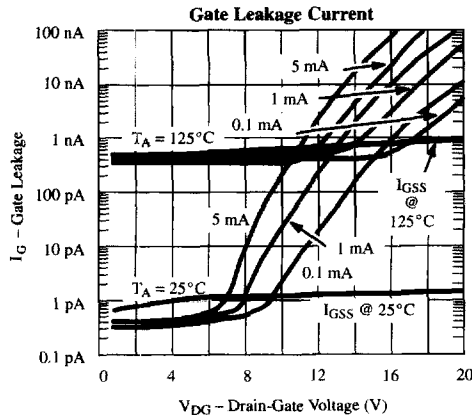
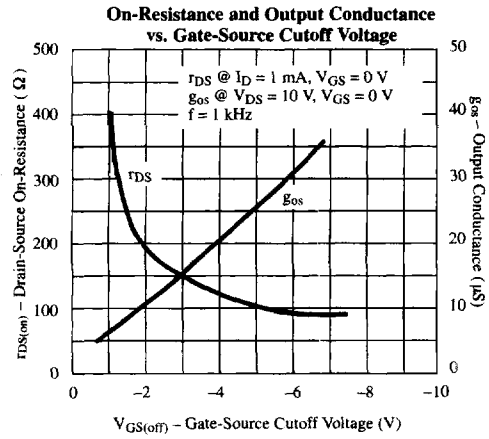
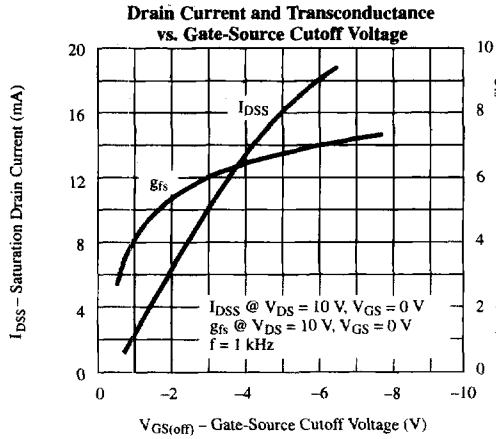
Parameter	Symbol	Test Conditions	Limits (Typ)				Unit
			J304		J305		
			100 MHz	400 MHz	100 MHz	400 MHz	
<b>High-Frequency</b>							
Common-Source Input Conductance	$g_{iss}$	$V_{DS} = 15 V, V_{GS} = 0 V$	80	800	80		$\mu S$
Common-Source Input Susceptance	$b_{iss}$		2	7.5	2		mS
Common-Source Output Conductance	$g_{oss}$		60	80	60		$\mu S$
Common-Source Output Susceptance	$b_{oss}$		0.8	3.6	0.8		mS
Common-Source Forward Transconductance	$g_{fs}$		4.4	4.2	3		
Common-Source Power Gain	$G_{ps}$		20	11			dB
Noise Figure	NF	$R_G = 1 k\Omega$	1.7	3.8			

Notes

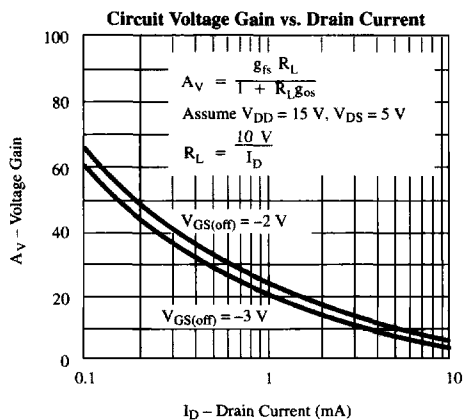
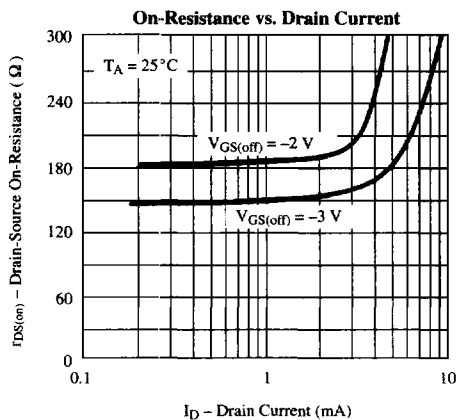
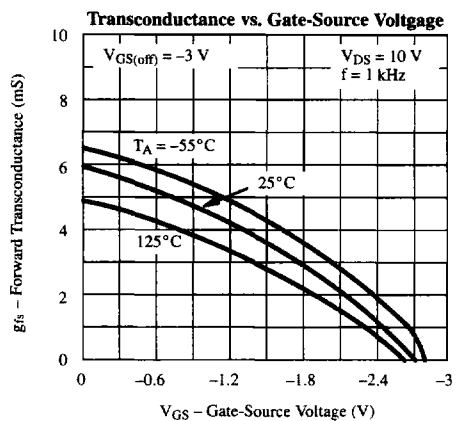
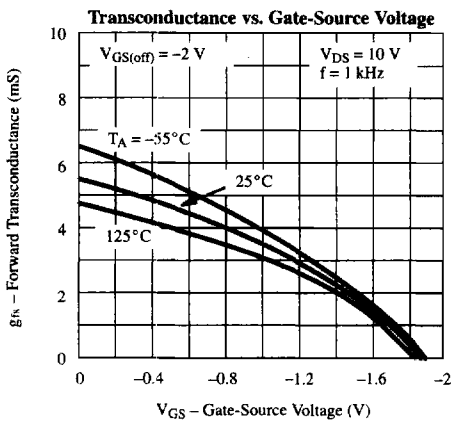
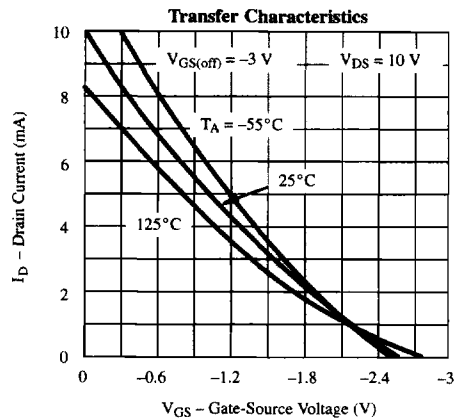
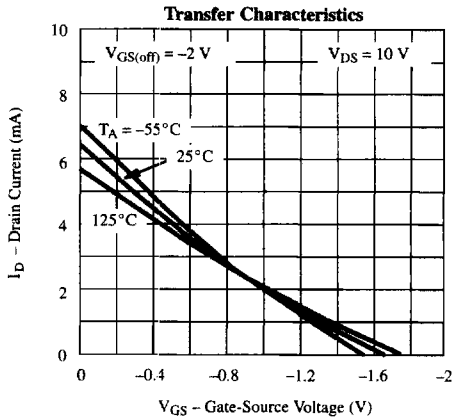
- a.  $T_A = 25^\circ C$  unless otherwise noted.
- b. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
- c. Pulse test:  $PW \leq 300 \mu s$ , duty cycle  $\leq 2\%$ .

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## Typical Characteristics



**Typical Characteristics (Cont'd)**

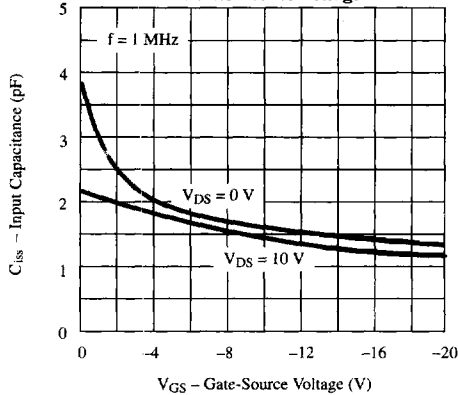


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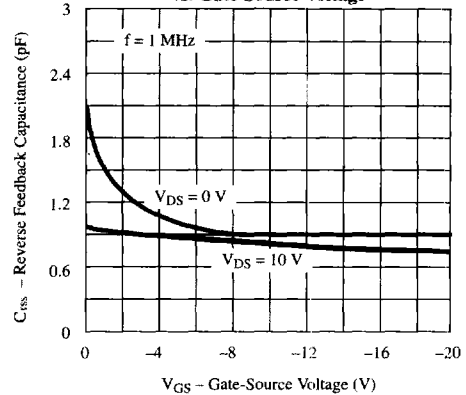
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## Typical Characteristics (Cont'd)

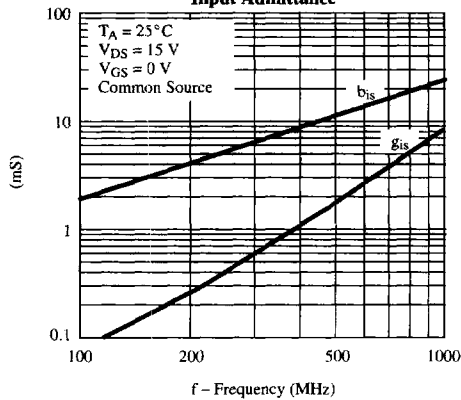
**Common-Source Input Capacitance vs. Gate-Source Voltage**



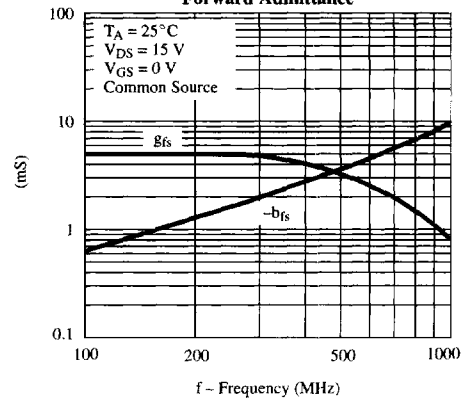
**Common-Source Reverse Feedback Capacitance vs. Gate-Source Voltage**



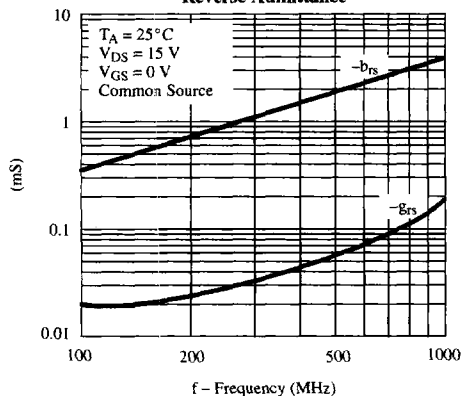
**Input Admittance**



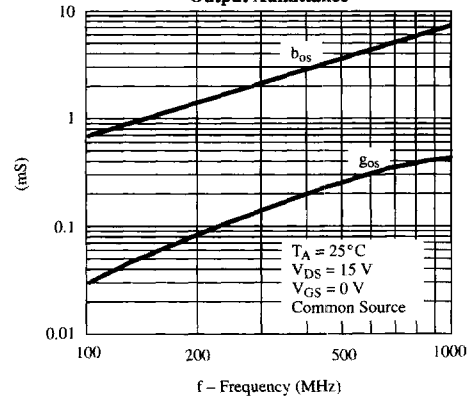
**Forward Admittance**



**Reverse Admittance**



**Output Admittance**



**Typical Characteristics (Cont'd)**

