matched dual n-channel JFETs *designed for . . .*

■ Differential Amplifiers

Siliconix

Performance Curves NS
See Section 5

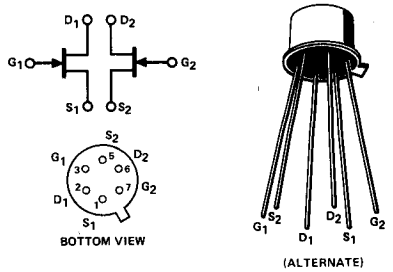
BENEFITS

- Ultra-Low Noise
  $\overline{e}_n$ = 8 nV/√Hz at 10 Hz (Typical)
  $\overline{e}_n$ = 2 nV/√Hz at 1 kHz (Typical)
- Minimum System Error and Calibration
  5 mV Offset Maximum
  CMRR > 100 dB

***ABSOLUTE MAXIMUM RATINGS (25°C)**

Gate-Drain or Gate-Source Voltage . . . . . -40 V
Gate Current . . . . . 50 mA
Device Dissipation (Each Side), T_A = 85°C
(Derate 2.0 mW/°C) . . . . . 250 mW
Total Device Dissipation, T_A = 85°C
(Derate 3.0 mW/°C) . . . . . 375 mW
Storage Temperature Range . . . . . -65 to +150°C
Lead Temperature
(1/16" from case for 30 seconds) . . . . . .300°C

TO-71
See Section 7



***ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)**

		Characteristic		Min	Max	Unit	Test Conditions	
1	STATIC	I_{GSS}	Gate Reverse Current		-250	pA	V_{GS} = -30 V, V_{DS} = 0	
2					-250	nA		150°C
3		BV_{GSS}	Gate-Source Breakdown Voltage	-40		V	I_G = -1 μA, V_{DS} = 0	
4		$V_{GS(off)}$	Gate-Source Cutoff Voltage	-0.7	-4		V_{DS} = 20 V, I_D = 1 nA	
5		V_{GS}	Gate Source Voltage	-0.2	-3.8		V_{DG} = 20 V, I_D = 200 μA	
6		I_G	Gate Operating Current		-100	pA		
					-100	nA		125°C
7		I_{DSS}	Saturation Drain Current (Note 1)	0.5	7.5	mA	V_{DS} = 20 V, V_{GS} = 0	
8	DYNAMIC	g_{fs}	Common-Source Forward Transconductance (Note 1)	1000	4000	μmho	V_{DS} = 20 V, V_{GS} = 0	f = 1 kHz
9		g_{fs}	Common-Source Forward Transconductance (Note 1)	500	1000		V_{DG} = 20 V, I_D = 200 μA	
10		g_{os}	Common-Source Output Conductance		10		V_{DS} = 20 V, V_{GS} = 0	
11		g_{os}	Common-Source Output Conductance		1		V_{DG} = 20 V, I_D = 200 μA	
12		C_{iss}	Common-Source Input Capacitance		25	pF	V_{DS} = 20 V, V_{GS} = 0	f = 1 MHz
13		C_{rss}	Common-Source Reverse Transfer Capacitance		5			
14		$\overline{e}_n$	Equivalent Short Circuit Input Noise Voltage 2N5515-19		30	nV/√Hz	V_{DG} = 20 V, I_D = 200 μA	f = 10 Hz
			2N5520-24		15			f = 1 kHz
			2N5515-24		10			

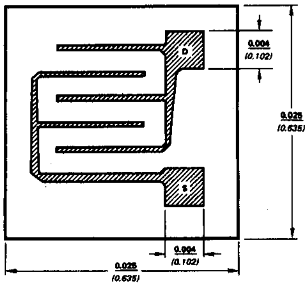
		Characteristic	2N5515,20 Min	2N5515,20 Max	2N5516,21 Min	2N5516,21 Max	2N5517,22 Min	2N5517,22 Max	2N5518,23 Min	2N5518,23 Max	2N5519,24 Min	2N5519,24 Max	Unit	Test Conditions	
15	MATCHING	$\lvert I_{G1}-I_{G2}\rvert$		10		10		10		10		10	nA	V_{DG} = 20 V, I_D = 200 μA	125°C
16		$\frac{I_{DSS1}}{I_{DSS2}}$ Saturation Drain Current Ratio (Notes 1 and 2)	0.95	1	0.95	1	0.95	1	0.95	1	0.90	1	–	V_{DS} = 20 V, V_{GS} = 0	
17		$\lvert V_{GS1}-V_{GS2}\rvert$		5		5		10		15		15	mV	V_{DG} = 20 V, I_D = 200 μA	
18		$\frac{\Delta\lvert V_{GS1}-V_{GS2}\rvert}{\Delta T}$ Gate-Source Voltage Differential Drift (Note 3)		5		10		20		40		80	μV/°C		T_A = 25°C, T_B = 125°C
				5		10		20		40		80			T_A = -55°C, T_B = 25°C
19		$\lvert g_{os1}-g_{os2}\rvert$		0.1		0.1		0.1		0.1		0.1	μmho		f = 1 kHz
20		$\frac{g_{fs1}}{g_{fs2}}$ Transconductance Ratio (Notes 1 and 2)	0.97	1	0.97	1	0.95	1	0.95	1	0.90	1	–		
21		CMRR Common Mode Rejection Ratio (Note 4)	100		100		90						dB	V_{DD} = 10 to 20 V, I_D = 200 μA	

*JEDEC registered data.

NOTES:
1. Pulse test required, pulsewidth = 300 μs, duty cycle ≤ 3%.
2. Assumes smaller value in numerator.
3. Measured at end points, T_A and T_B.
4. $CMRR = 20\log_{10}\left(\frac{\Delta V_{DD}}{\Delta\lvert V_{GS1}-V_{GS2}\rvert}\right)$, ΔV_{DD} = 10 V.

NS

GATE IS BACKSIDE CONTACT
S AND D ARE SYMMETRICAL



ALL DIMENSIONS IN INCHES
(ALL DIMENSIONS IN MILLIMETERS)

n-channel JFET
designed for . . .

Siliconix

- Low Noise Amplifiers
- Single and Differential Amplifiers

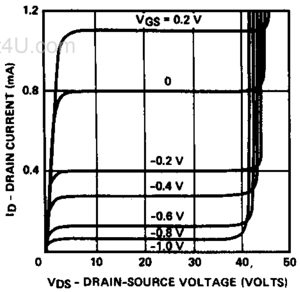
BENEFITS:

- Simplifies Amplifier Design
- Low Output Conductance
- Low 1/f Noise

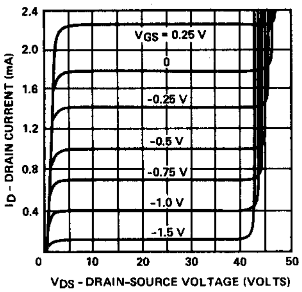
TYPE	PACKAGE	PRINCIPAL DEVICES
Dual	TO-71	2N5515-24
Single	TO-72	2N4867-9, 2N4867A-69A
Single	TO-92	J230-32
Single	TO-92 Lead-form	J230-18 - 232-18
Dual	Chip	2N5518CHP-9CHP, 2N5523CHP-4CHP
Single	Chip	All of the above single devices

PERFORMANCE CURVES (25°C unless otherwise noted)

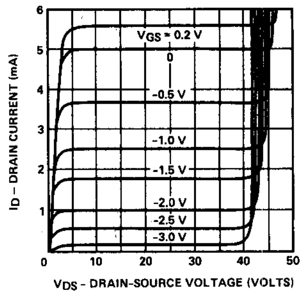
Output Characteristics



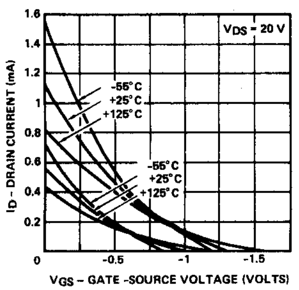
Output Characteristics



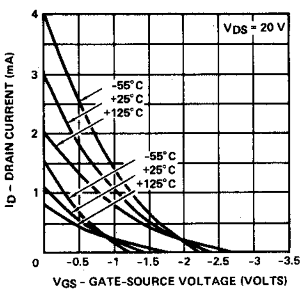
Output Characteristics



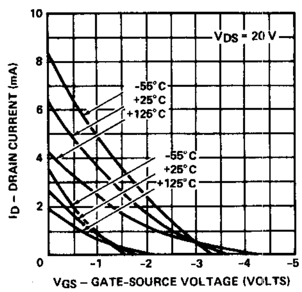
Transfer Characteristics



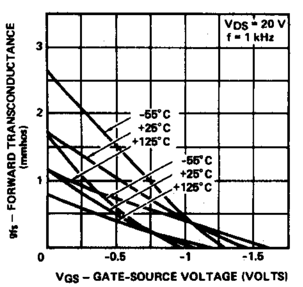
Transfer Characteristics



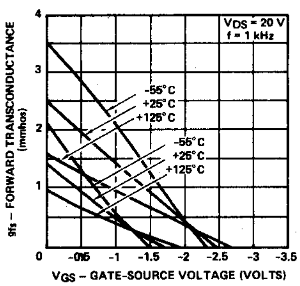
Transfer Characteristics



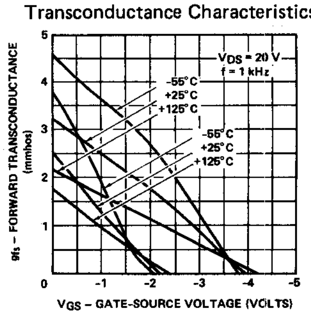
Transconductance Characteristics



Transconductance Characteristics

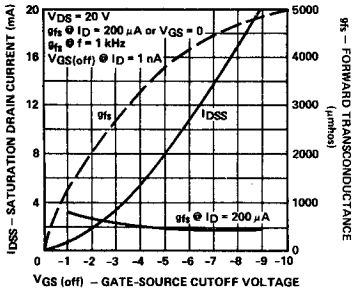


Transconductance Characteristics

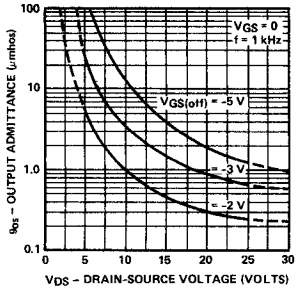


PERFORMANCE CURVES (Cont'd) (25°C unless otherwise noted)

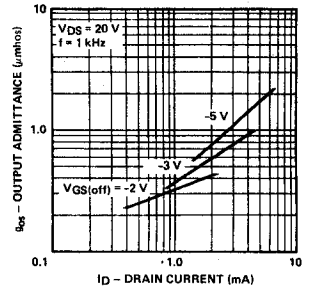
Saturation Drain Current and Forward Transconductance vs. Gate-Source Cutoff Voltage



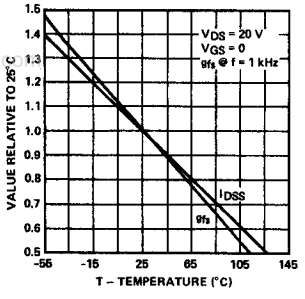
Common-Source Output Conductance vs Drain-Source Voltage



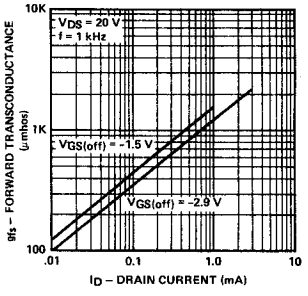
Common-Source Output Conductance vs Drain Current



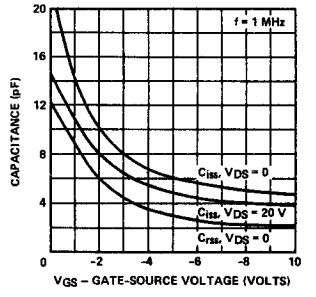
Drain Current & Transconductance vs Ambient Temperature



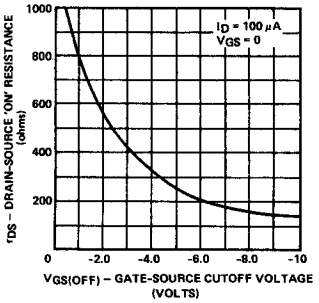
Common-Source Forward Transconductance vs Drain Current



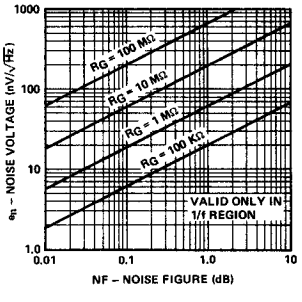
Common-Source Capacitance vs Gate-Source Voltage



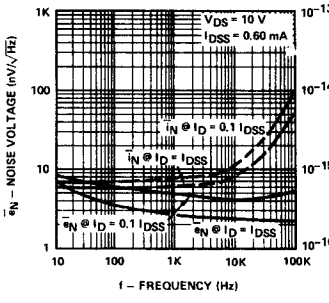
Static Drain-Source 'ON' Resistance vs Gate-Source Cutoff Voltage



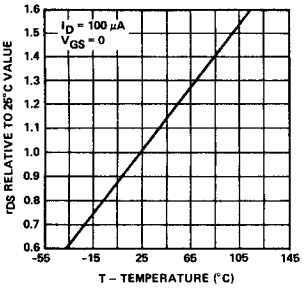
Approximate Noise Figure vs Input Noise Voltage



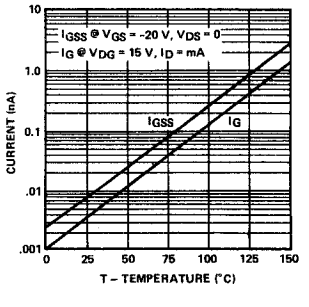
Equivalent Input Noise Voltage and Noise Current vs Frequency



Drain-Source 'ON' Resistance vs Ambient Temperature



Leakage Currents vs Ambient Temperature



Gate Operating Current vs Drain-Gate Voltage