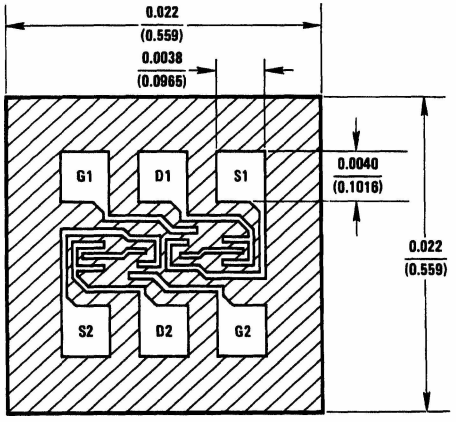
National Semiconductor

Process 84
N-Channel Monolithic Dual JFET



TL/G/10035–20

DESCRIPTION

Process 84 is a monolithic dual JFET with a diode isolated substrate. It is designed for the most critical operational amplifier input stages or electrometer single ended preamp. Ideal for medical applications and instrumentation inputs where sub-picoamp inputs are important. Device design considered high CMRR, sub-picoamp leakage over wide input swings, low capacitance, and tight match over wide current range.

Electrical Characteristics (T_A = 25°C)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
BV_{GSS}	Gate-Source Breakdown Voltage	V_{DS} = 0V, I_G = −1 μA	−40	−60		V
I_{DSS}	Drain Saturation Current	V_{DS} = 15V, V_{GS} = 0V	20	300	1000	μA
g_{fs}	Forward Transconductance	V_{DS} = 15V, V_{GS} = 0V	90	180	300	μmhos
g_{fs}	Forward Transconductance	V_{DS} = 15V, I_D = 30 μA	50	120	150	μmhos
$V_{GS(OFF)}$	Gate Cutoff Voltage	V_{DS} = 15V, I_D = 1 nA	0.5	2	4.5	V
I_{GSS}	Reverse Gate Leakage Current	V_{DS} = 0V, V_{GS} = −20V		1	5	pA
I_G	Gate Leakage Current	V_{DG} = 10V, I_D = 30 μA		0.5	3	pA
C_{rss}	Feedback Capacitance	V_{DS} = 15V, V_{GS} = 0V, f = 1 MHz		0.3	0.4	pF
C_{iss}	Input Capacitance	V_{DS} = 15V, V_{GS} = 0V, f = 1 MHz		2	3	pF
e_n	Noise Voltage	V_{DS} = 15V, I_D = 30 μA, f = 1 kHz		30	50	nV/$\sqrt{Hz}$
e_n	Noise Voltage	V_{DS} = 15V, I_D = 30 μA, f = 10 Hz		180		nV/$\sqrt{Hz}$
g_{os}	Output Conductance	V_{DS} = 10V, I_D = 30 μA		0.01	0.1	μmhos
$\lvert V_{GS1}-V_{GS2}\rvert$	Differential Gate-Source Voltage	V_{DS} = 10V, I_D = 30 μA		12	25	mV
$\Delta V_{GS1-VGS2}$	Differential Gate-Source Voltage Drift	V_{DS} = 10V, I_D = 30 μA		10	50	μV/°C
CMRR	Common-Mode Rejection Ratio	V_{DS} = 10V, I_D = 30 μA		112		dB

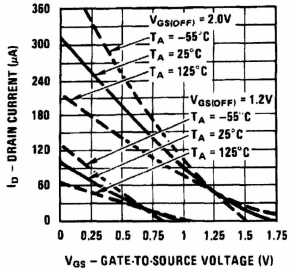
This process is available in the following device types. *Denotes preferred parts.

TO-78 (NS Package 24)

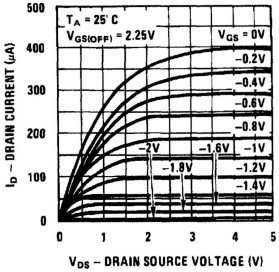
2N5902	*2N5906
2N5903	*2N5907
2N5904	*2N5908
2N5905	*2N5909

Process 84

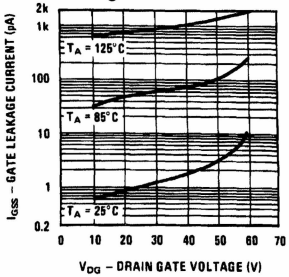
Transfer Characteristics



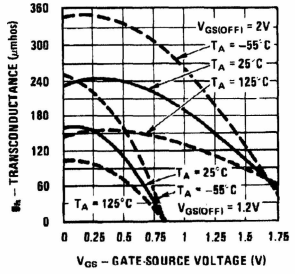
Common Drain-Source Characteristics



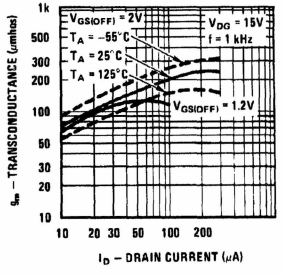
Leakage Current vs Voltage



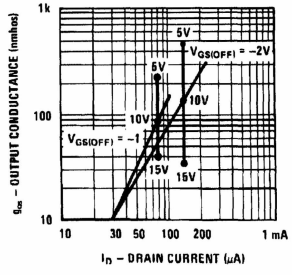
Transfer Characteristics



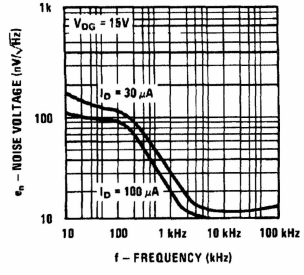
Transconductance vs Drain Current



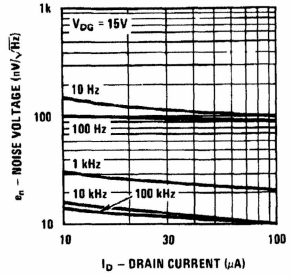
Output Conductance vs Drain Current



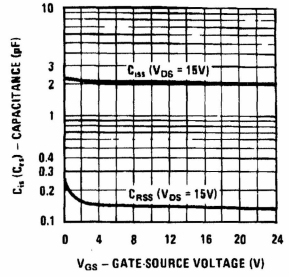
Noise Voltage vs Frequency



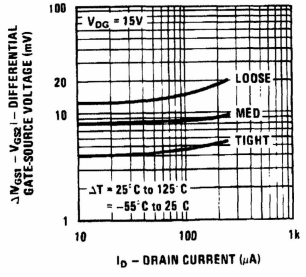
Noise Voltage vs Current



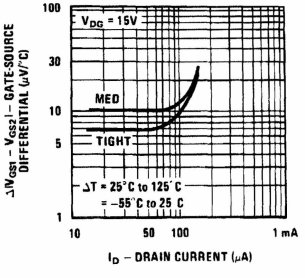
Capacitance vs Voltage



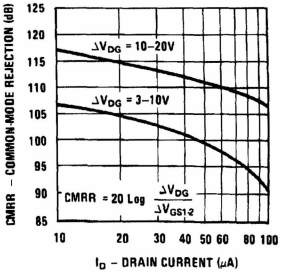
Differential Offset



Differential Drift



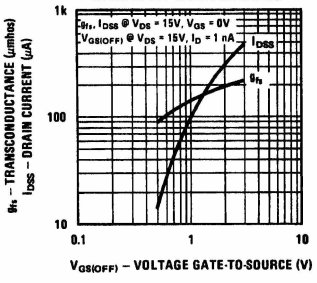
CMRR vs Drain Current



TL/G/10035–23

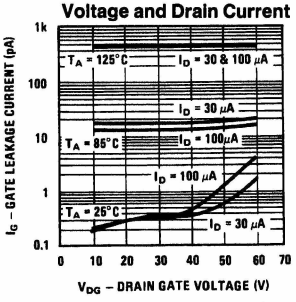
Process 84

Parameter Interactions



TL/G/10035–21

Leakage Current vs Voltage and Drain Current



TL/G/10035–22