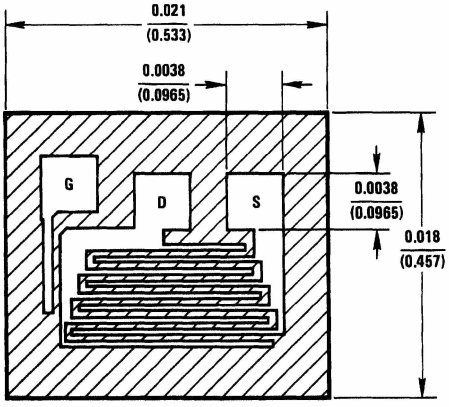
National Semiconductor

Process 51
N-Channel JFET



TL/G/10035–4

Gate is also backside contact

DESCRIPTION

Process 51 is designed primarily for electronic switching applications such as low ON resistance analog switching. It features excellent C_{ISS} $R_{DS(ON)}$ time constant. The inherent zero offset voltage and low leakage current make these devices excellent for chopper stabilized amplifiers, sample and hold circuits, and reset switches. Low feed-through capacitance also allows them to handle video signals to 100 MHz.

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	−30	−45		V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 20V, V_{GS} = 0V Pulse Test	5.0	65	170	mA
I_{GSS}	Reverse Gate Leakage	V_{GS} = −20V, V_{DS} = 0V		−15	−200	pA
$r_{DS(ON)}$	ON Resistance	V_{DS} = 100 mV, V_{GS} = 0V	20	35	100	Ω
g_{fs}	Forward Transconductance	V_{DG} = 15V, I_D = 2 mA			8.5	mmhos
$V_{GS(OFF)}$	Pinch Off Voltage	V_{DS} = 20V, I_D = 1 nA	−0.5	−4.5	−9.0	V
$I_{D(OFF)}$	Drain OFF Current	V_{DS} = 20V, V_{GS} = −10V		15	200	pA
C_{rss}	Feedback Capacitance	V_{DG} = 15V, I_D = 5 mA, f = 1 MHz		3.5	4.0	pF
C_{iss}	Input Capacitance	V_{DG} = 15V, I_D = 5 mA, f = 1 MHz		10	16	pF
e_n	Noise Voltage	V_{DG} = 15V, I_D = 1 mA, f = 100 Hz		6.0		nV/√Hz
t_{on}	Turn-On Time	V_{DD} = 10V, I_D = 6.6 mA		12	20	ns
t_{off}	Turn-Off Time	V_{DD} = 10V, I_D = 6.6 mA		40	80	ns

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

TO-18 (NS Package 02)

2N3970
2N3971
2N3972
*2N4091
*2N4092
*2N4093
*2N4391
*2N4392
*2N4393
*2N4856
2N4856A
*2N4857
2N4857A
*2N4858
2N4858A
*2N4859
2N4859A
2N4860
2N4860A
2N4861
2N4861A

TO-92 (NS Package 92)

*2N5638
*2N5639
*2N5640
2N5653
2N5654
*J111
*J112
*J113
*PF5101
*PF5102
*PF5103
*PN4091
*PN4092
*PN4093
*PN4391
*PN4392
*PN4393
*PN4856
*PN4857
*PN4858
*PN4859
*PN4860
*PN4861
U1897
U1898
U1899
MPF820

TO-92 (NS Package 94)

BF246A
BF246B
BF246C

TO-92 (NS Package 97)

BF247A
BF247B
BF247C
TIS73
TIS74
TIS75

Source and drain interchangeable.

TO-236/SOT23 (NS Package 48/49)

MMBFJ111
MMBFJ112
MMBFJ113
MMBF4391
MMBF4392
MMBF4393

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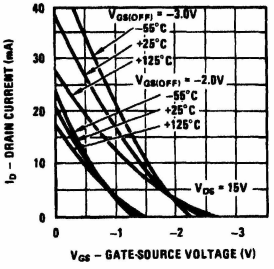
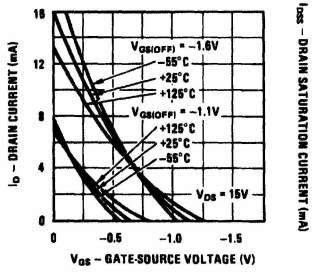
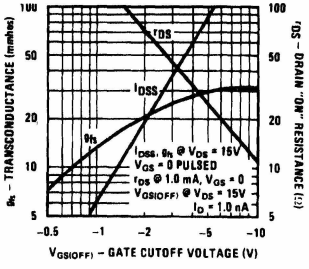
Transfer Characteristics



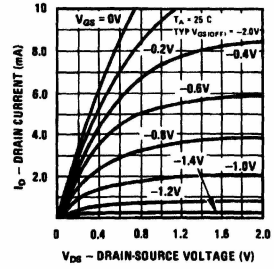
Transfer Characteristics



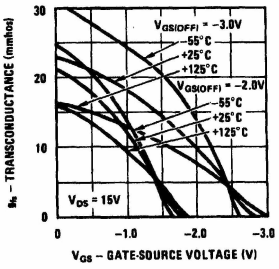
Parameter Interactions



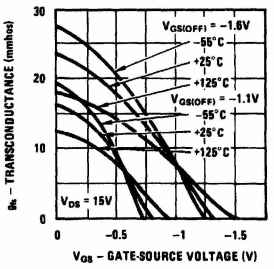
Common Drain-Source Characteristics



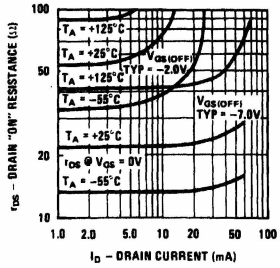
Transfer Characteristics



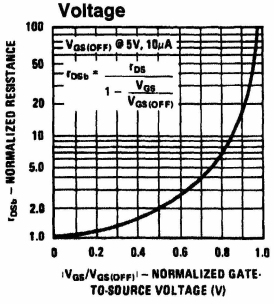
Transfer Characteristics



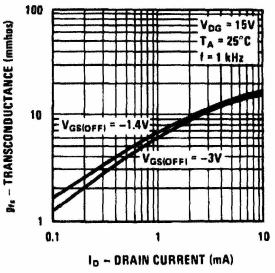
Resistance vs Drain Current



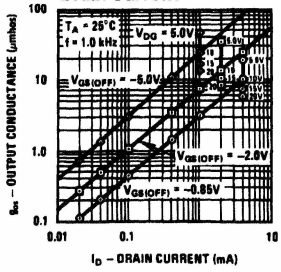
Normalized Drain Resistance vs Bias Voltage



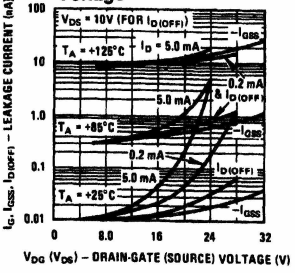
Transconductance vs Drain Current



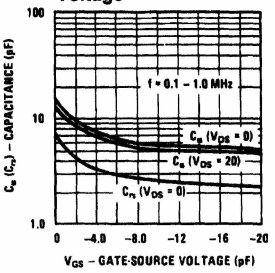
Output Conductance vs Drain Current



Leakage Current vs Voltage



Capacitance vs Voltage



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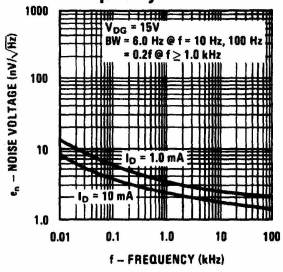
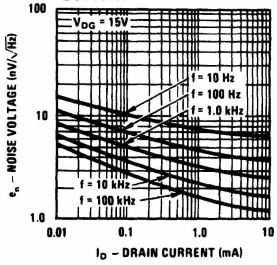
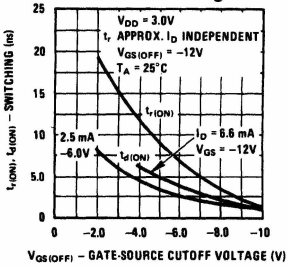
Noise Voltage vs Frequency



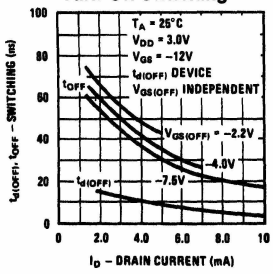
Noise Voltage vs Current



Turn-On Switching



Turn-Off Switching



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