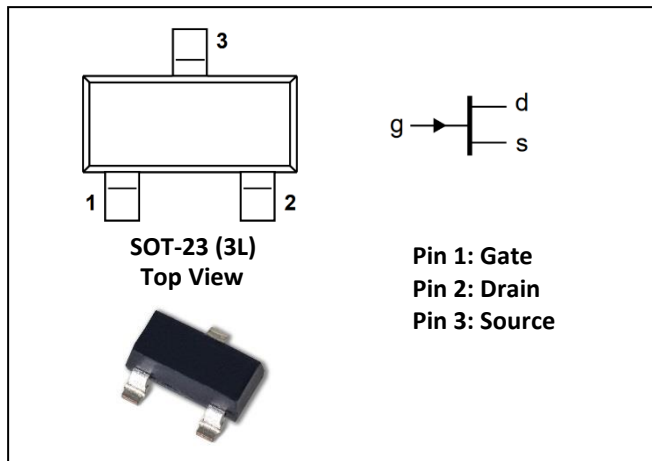


### General Purpose, Low-Noise, Low-Cost, Single N-Channel JFET, Replacement for the BF510

<b>Absolute Maximum Ratings</b>	
@ 25 °C (unless otherwise stated)	
<b>Maximum Temperatures</b>	
Storage Temperature	-65 to +150°C
Junction Operating Temperature	-55 to +150°C
<b>Maximum Power Dissipation</b>	
Continuous Power Dissipation @ +25°C	350mW
<b>Maximum Currents</b>	
Gate Forward Current	$I_{G(F)} = 10\text{mA}$
<b>Maximum Voltages</b>	
Gate to Source	$V_{GSS} = 30\text{V}$
Gate to Drain	$V_{GDS} = 30\text{V}$



### Features

- Low Cutoff Voltage: <2.5V
- High Input Impedance
- Very Low Noise
- High Gain:  $A_V = 80 @ 20 \mu\text{A}$
- Reverse Gate to Source and Drain Voltage  $\geq -30\text{V}$

### Benefits

- Low Cost
- Excellent Low Power Supply Operation
- Power Supply: Down to 2.5V
- Low Signal Loss/System Error
- High System Sensitivity
- High Quality Low-Level Signal

### Applications

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

### Description

The LSBF510 is a low-cost N-Channel JFET. Features include low leakage, very low noise, low cutoff voltage ( $V_{GS(off)} \leq 2.5\text{V}$ ) and high Gain ( $A_V = 80 \text{ V/V}$ ) for use with low-level power supplies. The LSBF510 is excellent for battery powered

equipment and low current amplifiers. The TO-236 (SOT-23) package provides surface-mount capability. The LSBF510 is available in tape-and-reel for automated assembly and in die form for automated assembly.

### Electrical Characteristics @ 25 °C (unless otherwise stated)

SYMBOL	CHARACTERISTIC	MIN	TYP	MAX	UNITS	CONDITIONS
$BV_{GSS}$	Gate to Source Breakdown Voltage	-30			V	$I_G = -1\mu\text{A}, V_{DS} = 0.0\text{V}$
$V_{GS(off)}$	Gate to Source Cutoff Voltage	-0.3		-2.5		$V_{DS} = 15\text{V}, I_D = 10\text{nA}$
$I_{DSS}$	Drain to Source Saturation Current <sup>2</sup>	0.2		3.0	mA	$V_{DS} = 15\text{V}, V_{GS} = 0.0\text{V}$
$I_{GSS}$	Gate Reverse Current			-200		$V_{GS} = -20\text{V}, V_{DS} = 0.0\text{V}$
$I_G$	Gate Operating Current		-2			$V_{DG} = 10\text{V}, I_D = 0.1\text{mA}$
$I_{D(off)}$	Drain Cutoff Current		2		pA	$V_{DS} = 15\text{V}, V_{GS} = 5.0\text{V}$
$g_{fs}$	Forward Transconductance	0.5				mS
$C_{iss}$	Input Capacitance			4.5	pF	$V_{DS} = 15\text{V}, V_{GS} = 0.0\text{V}, f = 1\text{MHz}$
$C_{rss}$	Reverse Transfer Capacitance		1.3			
$e_n$	Noise Voltage		3.0		nV/ $\sqrt{\text{Hz}}$	$V_{DS} = 10\text{V}, I_D = 2\text{mA}, f = 1\text{kHz}$

### Typical Characteristics

Output Characteristic  
( $V_{GS(off)} = -1.1V$ )

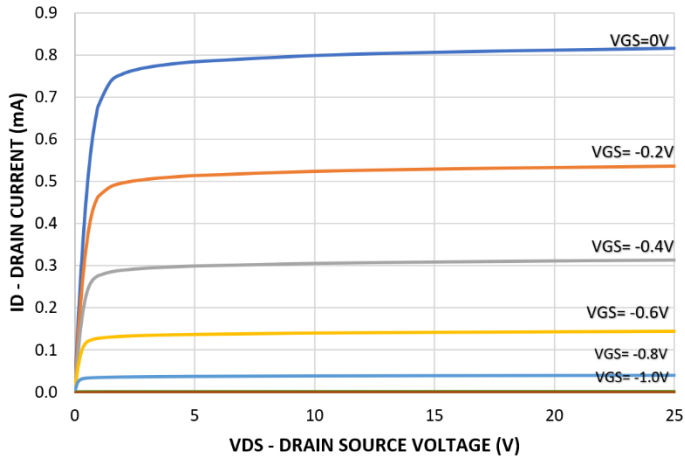


Figure-01

Output Characteristic  
( $V_{GS(off)} = -1.75V$ )

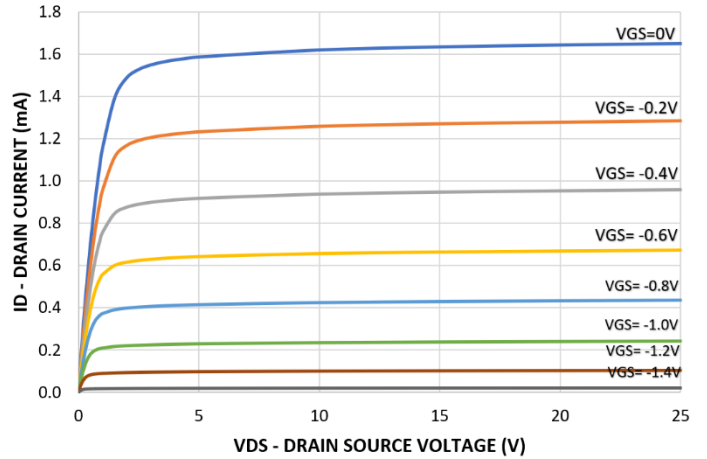


Figure-02

Output Characteristic  
( $V_{GS(off)} = -1.1V$ )

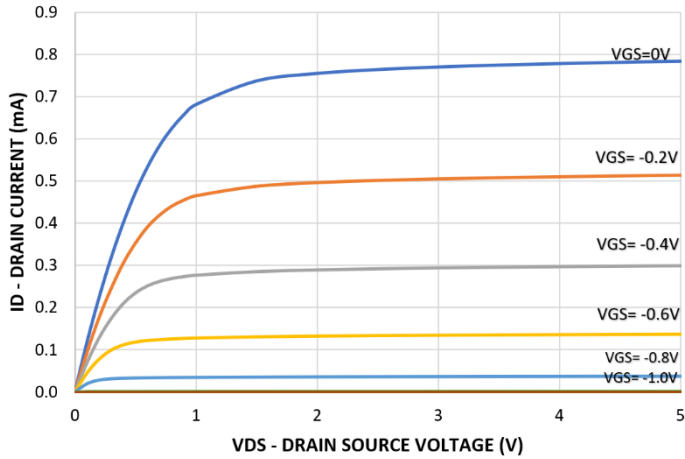


Figure-03

Output Characteristic  
( $V_{GS(off)} = -1.75V$ )

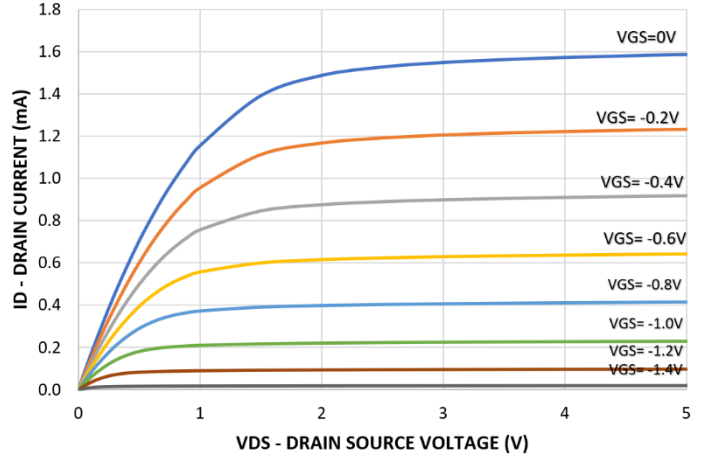
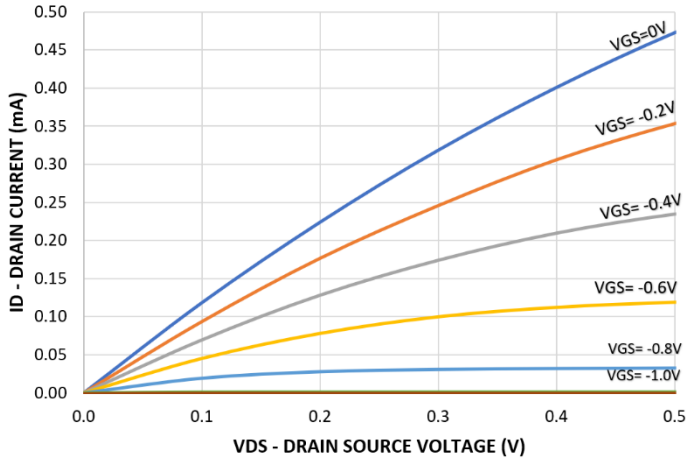


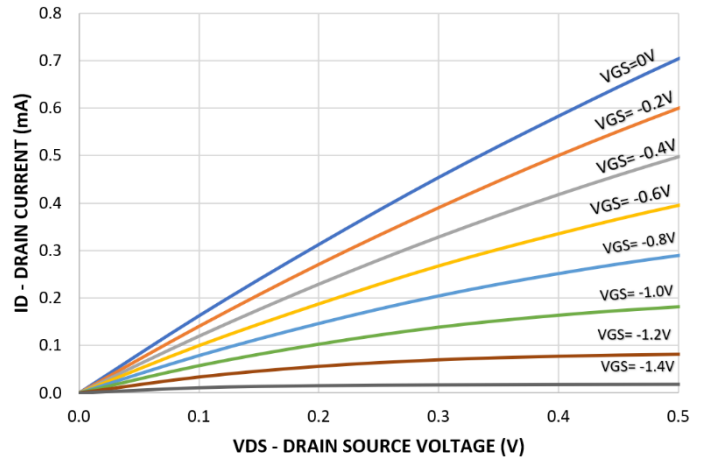
Figure-04

### Typical Characteristics Continued

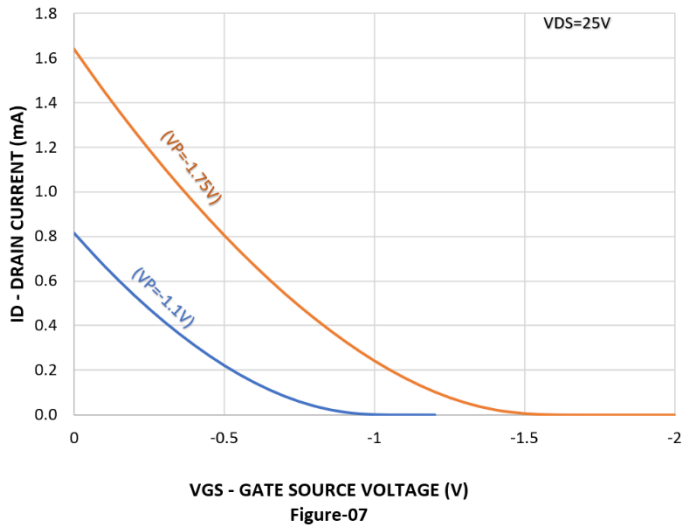
Output Characteristic  
( $V_{GS(off)} = -1.1V$ )



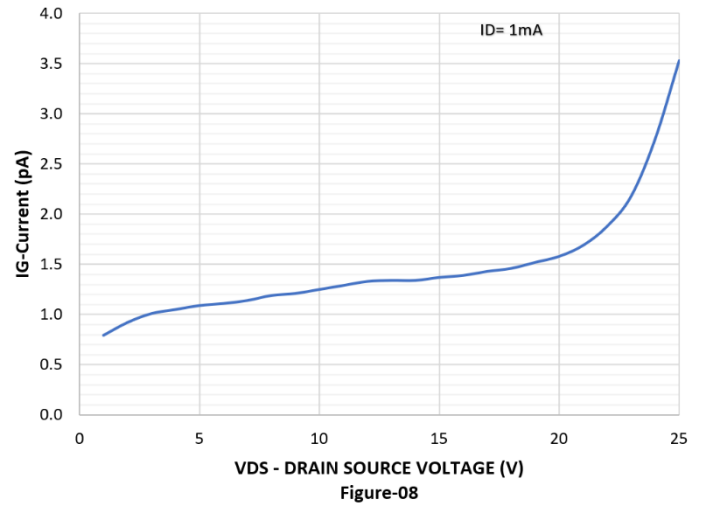
Output Characteristic  
( $V_{GS(off)} = -1.75V$ )



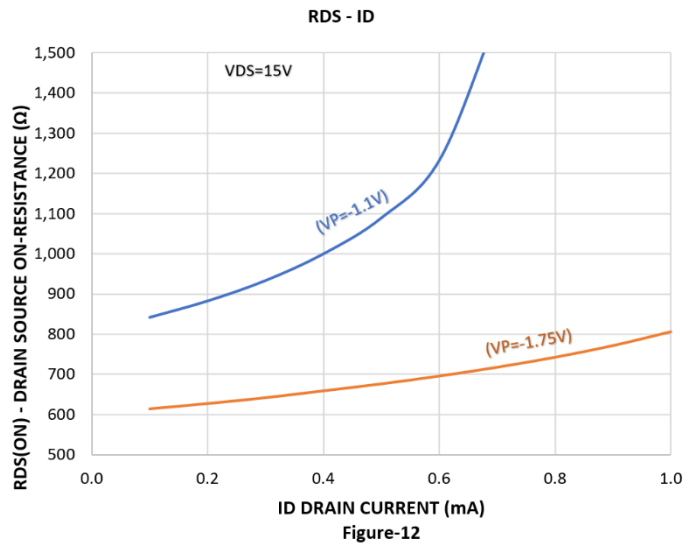
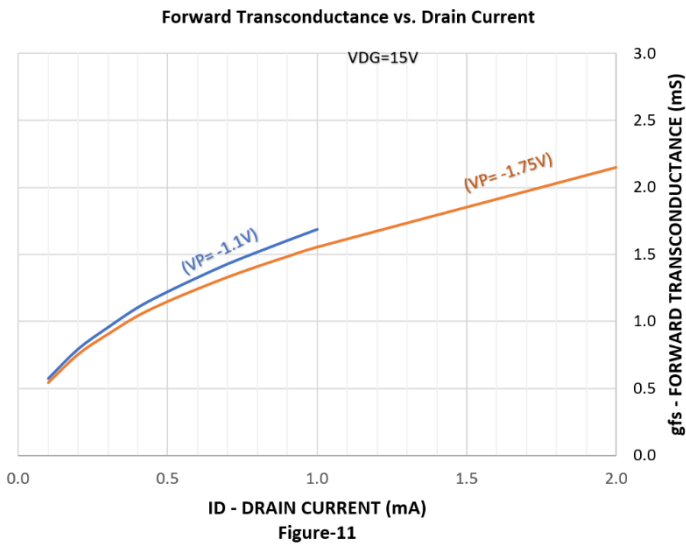
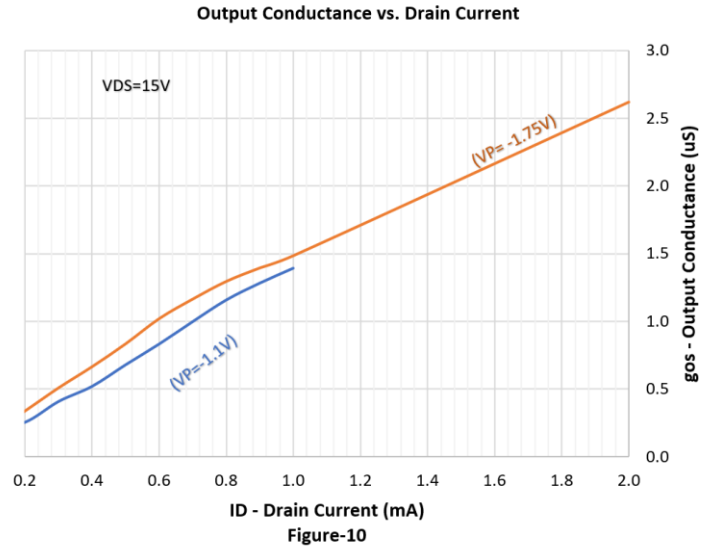
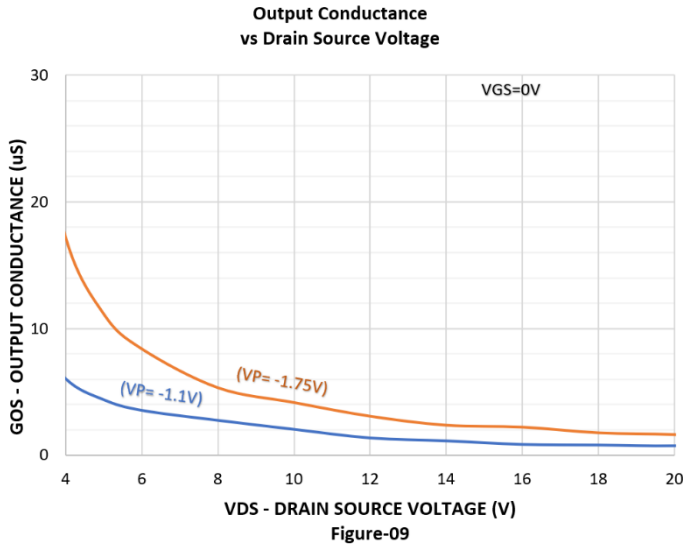
Transfer Characteristics



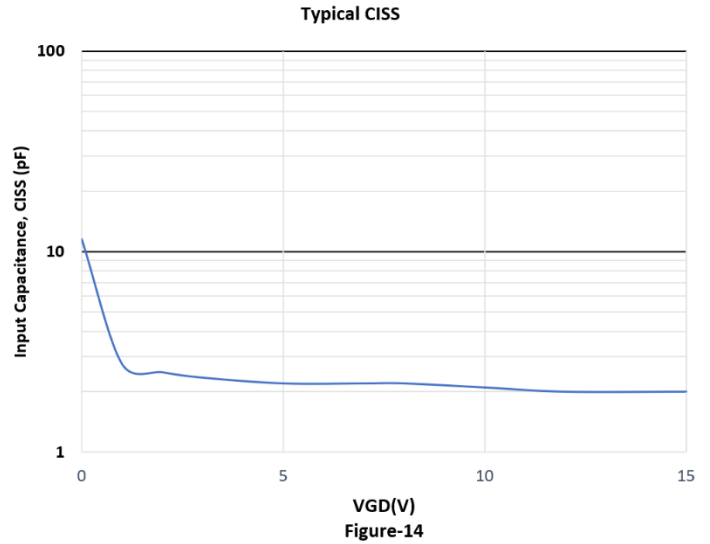
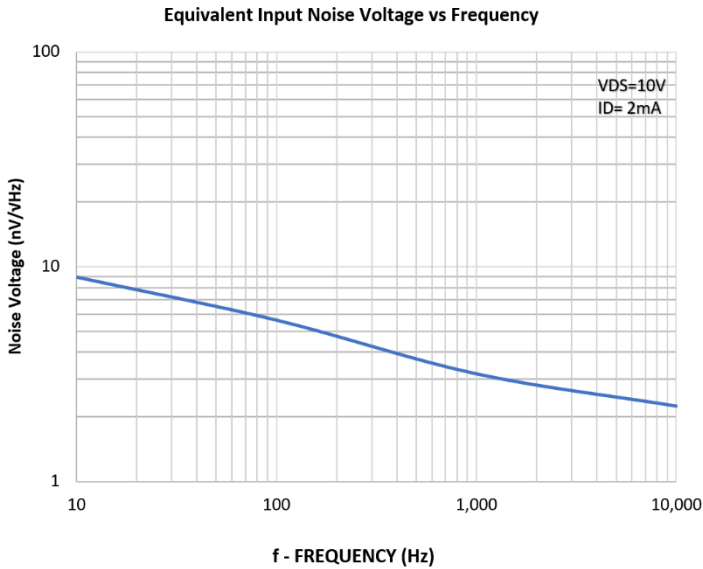
Operating Gate Current



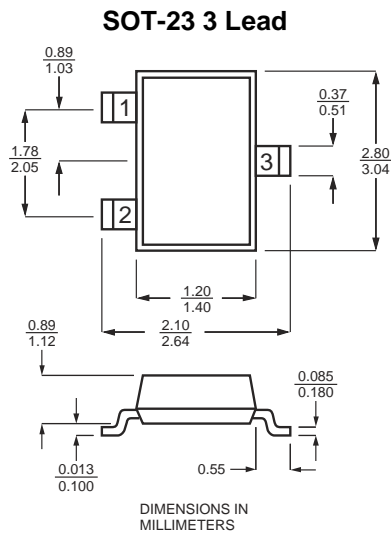
### Typical Characteristics Continued



### Typical Characteristics Continued



### Package Dimensions



### Ordering Information

<b>STANDARD PART CALL-OUT</b>
LSBF510 SOT-23 3L RoHS
<b>CUSTOM PART CALL-OUT</b>
(CUSTOM PARTS INCLUDE SEL + 4 DIGIT NUMERIC CODE)
LSBF510 SOT-23 3L RoHS SELXXXX

### Notes

1. Absolute maximum ratings are limiting values above which serviceability may be impaired.
2. Pulse Test: PW ≤ 300μs, Duty Cycle ≤ 3%
3. All characteristics MIN/TYP/MAX numbers are absolute values. Negative values indicate electrical polarity only.
4. When ordering include the full Linear Systems part number and package type. Linear Systems creates custom parts on a case by case basis. To learn whether Linear Systems can meet your requirements, please send your drawing along with a detailed description of the device specifications to [sales@linearsystems.com](mailto:sales@linearsystems.com). One of our qualified representatives will contact you.
5. All standard parts are RoHS compliant. Contact the factory for availability of non-RoHS parts.
6. Information furnished by Linear Integrated Systems is believed to be accurate and reliable. However, no responsibility is assumed for its use; nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of Linear Integrated Systems.