



# LSK489

**LOW NOISE, LOW CAPACITANCE  
MONOLITHIC DUAL  
N-CHANNEL JFET**

## FEATURES

ULTRA LOW NOISE	$e_n = 1.5\text{nV}/\sqrt{\text{Hz}}$
LOW INPUT CAPACITANCE	$C_{iss} = 4\text{pF}$

## Features

- Reduced Noise due to process improvement
- Monolithic Design
- High slew rate
- Low offset/drift voltage
- Low gate leakage  $I_{gss}$  &  $I_g$
- High CMRR 102 dB

## Benefits

- Tight differential voltage match vs. current
- Improved op amp speed settling time accuracy
- Minimum Input Error trimming error voltage
- Lower intermodulation distortion

## Applications

- Wide band differential Amps
- High speed temperature compensated single ended input amplifier amps
- High speed comparators
- Impedance Converters

## Description

The LSK 489 series of high performance monolithic dual JFETs features extremely low noise, tight offset voltage and low drift over temperature specifications, and is targeted for use in a wide range of precision instrumentation applications. This series has a wide selection of offset and drift specifications. The SST series SO-8 package provided ease of manufacturing and the symmetrical pinout prevents improper orientation. The SO-8 package is available with tape and reel options for compatibility with automatic assembly methods. (See packaging data)

## ABSOLUTE MAXIMUM RATINGS<sup>1</sup> @ 25 °C (unless otherwise stated)

### Maximum Temperatures

Storage Temperature	-55 to +150°C
Junction Operating Temperature	-55 to +150°C

### Maximum Power Dissipation, $T_A = 25^\circ\text{C}$

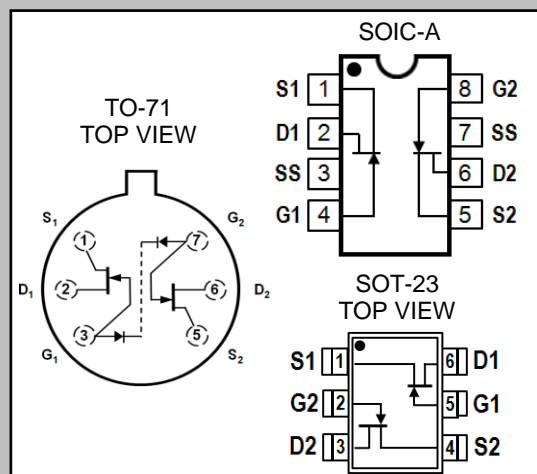
Continuous Power Dissipation, per side <sup>4</sup>	300mW
Power Dissipation, total <sup>5</sup>	500mW

### Maximum Currents

Gate Forward Current	$I_{G(F)} = 10\text{mA}$
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### Maximum Voltages

Gate to Source	$V_{GSO} = 60\text{V}$
Gate to Drain	$V_{GDO} = 60\text{V}$



\* For equivalent single version, see LSK186

**MATCHING CHARACTERISTICS @ 25°C (unless otherwise stated)**

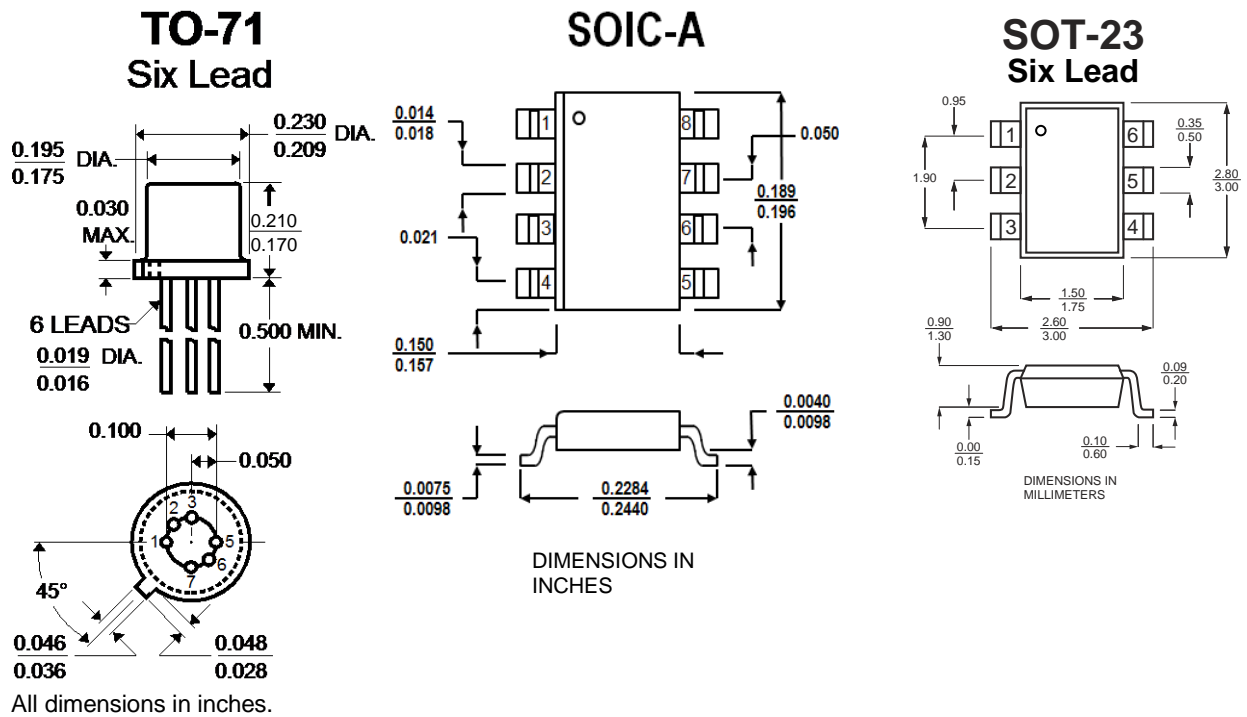
SYMBOL	CHARACTERISTIC	MIN	TYP	MAX	UNITS	CONDITIONS
$ V_{GS1} - V_{GS2} $	Differential Gate to Source Cutoff Voltage			20	mV	$V_{DS} = 10V, I_D = 1mA$
$\frac{I_{DSS1}}{I_{DSS2}}$	Gate to Source Saturation Current Ratio	0.9				$V_{DS} = 10V, V_{GS} = 0V$
CMRR	Common Mode Rejection Ratio	95	102		dB	$V_{DG} = 10V \text{ to } 20V, I_D = 200\mu A$

SYMBOL	CHARACTERISTIC	MIN	TYP	MAX	UNITS	CONDITIONS
$e_n$	Noise Voltage		1.5	2.0	nV/ $\sqrt{Hz}$	$V_{DS} = 15V, I_D = 2.0mA, f = 1kHz, NBW = 1Hz$
$e_n$	Noise Voltage		2.8	3.5	nV/ $\sqrt{Hz}$	$V_{DS} = 15V, I_D = 2.0mA, f = 10Hz, NBW = 1Hz$
$C_{ISS}$	Common Source Input Capacitance		4	8	pF	$V_{DS} = 15V, I_D = 500\mu A, f = 1MHz$
$C_{RSS}$	Common Source Reverse Transfer Capacitance			3	pF	

**ELECTRICAL CHARACTERISTICS @ 25°C (unless otherwise stated)**

SYMBOL	CHARACTERISTIC	MIN	TYP	MAX	UNITS	CONDITIONS
$BV_{GSS}$	Gate to Source Breakdown Voltage	-60			V	$V_{DS} = 0, I_D = -1nA$
$V_{(BR)G1 - G2}$	Gate to Gate Breakdown Voltage	$\pm 30$	$\pm 45$		V	$I_G = \pm 1\mu A, I_D = I_S = 0A$ (Open Circuit)
$V_{GS(OFF)}$	Gate to Source Pinch-off Voltage	-1.5		-3.5	V	$V_{DS} = 15V, I_D = 1nA$
$V_{GS}$	Gate to Source Operating Voltage	-0.5		-3.5	V	$V_{DS} = 15V, I_D = 500\mu A$
$I_{DSS}^2$	Drain to Source Saturation Current	2.5	5	15	mA	$V_{DG} = 15V, V_{GS} = 0$
$I_G$	Gate Operating Current		-2	-25	pA	$V_{DG} = 15V, I_D = 200\mu A$ $T_A = 125^\circ C$
			-0.8	-10	nA	
$I_{GSS}$	Gate to Source Leakage Current			-100	pA	$V_{DG} = -15V, V_{DS} = 0$
$G_{fs}$	Full Conductance Transconductance	1500			$\mu S$	$V_{DG} = 15V, V_{GS} = 0, f = 1kHz$
$G_{fs}$	Transconductance	1000	1500		$\mu S$	$V_{DG} = 15V, I_D = 500\mu A$
$G_{OS}$	Full Output Conductance			35	$\mu S$	$V_{DG} = 15V, V_{GS} = 0$
$G_{OS}$	Output Conductance		0.2	2	$\mu S$	$V_{DG} = 15V, I_D = 200\mu A$
NF	Noise Figure			0.5	dB	$V_{DS} = 15V, V_{GS} = 0, R_G = 10M\Omega, f = 100Hz, NBW = 6Hz$

## PACKAGE DIMENSIONS

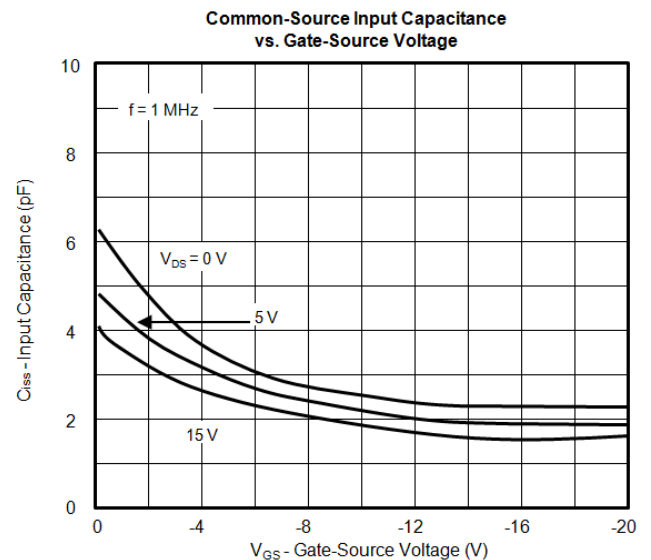
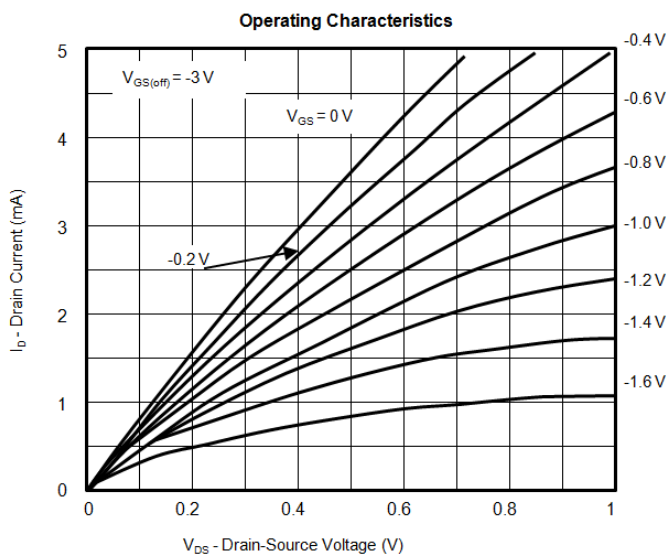
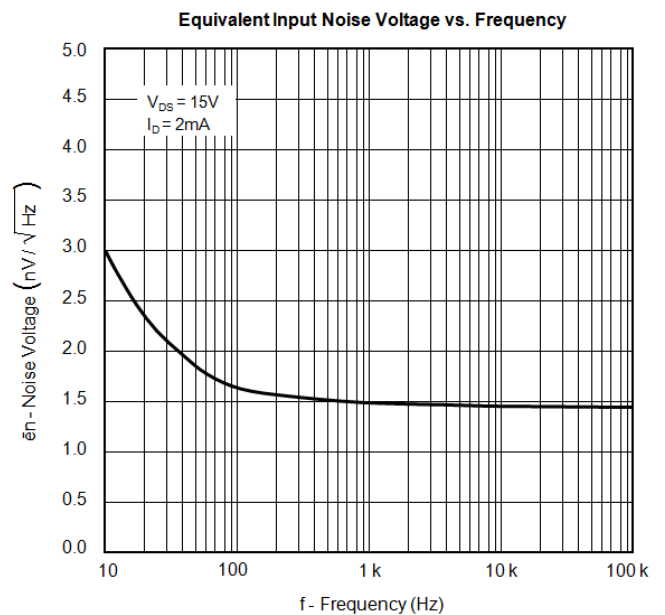
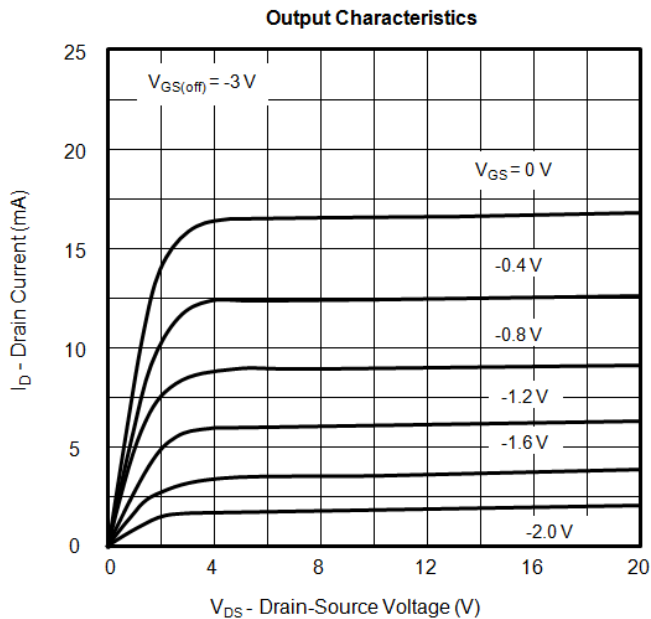
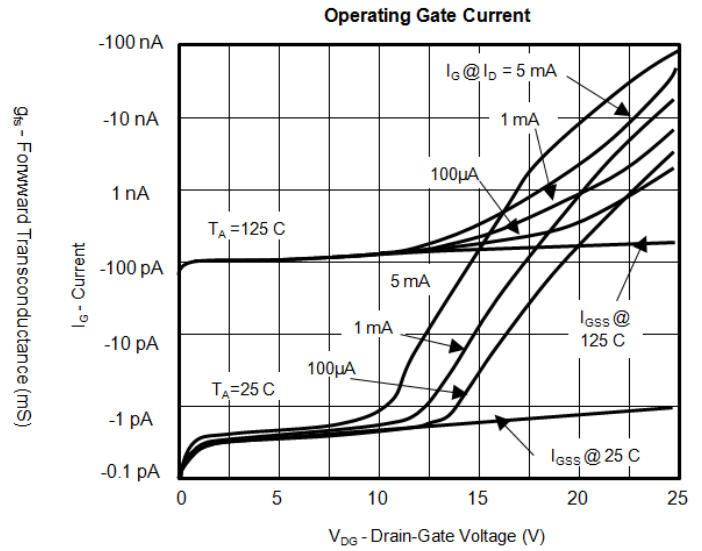
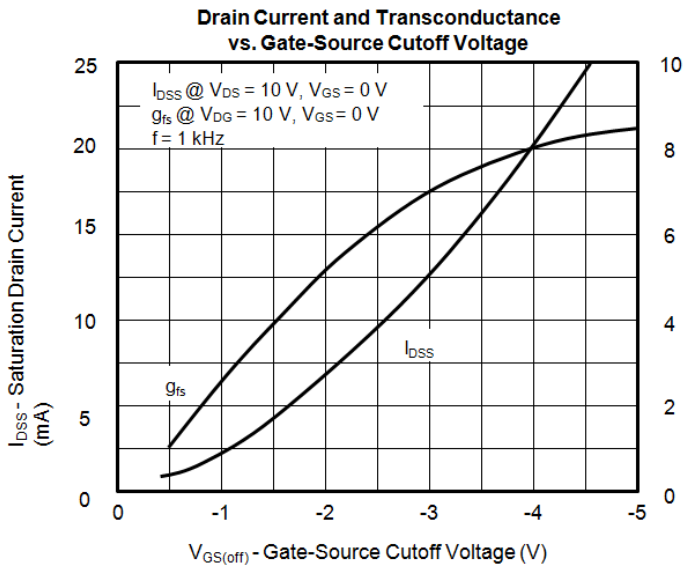


1. Absolute maximum ratings are limiting values above which serviceability may be impaired.
2. Pulse width  $\leq 2_{ms}$ .
3. All MIN/TYP/MAX Limits are absolute values. Negative signs indicate electrical polarity only.
4. Derate 2.4 mW/°C above 25°C.
5. Derate 4 mW/°C above 25°C.

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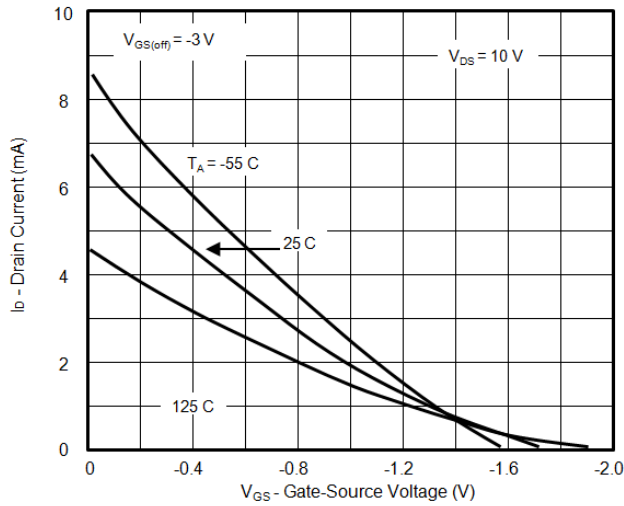
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# Typical Characteristics

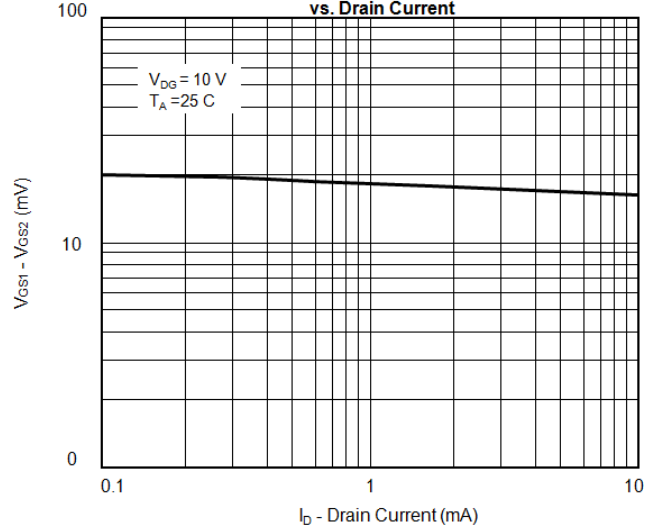


## Typical Characteristics (Cont'd)

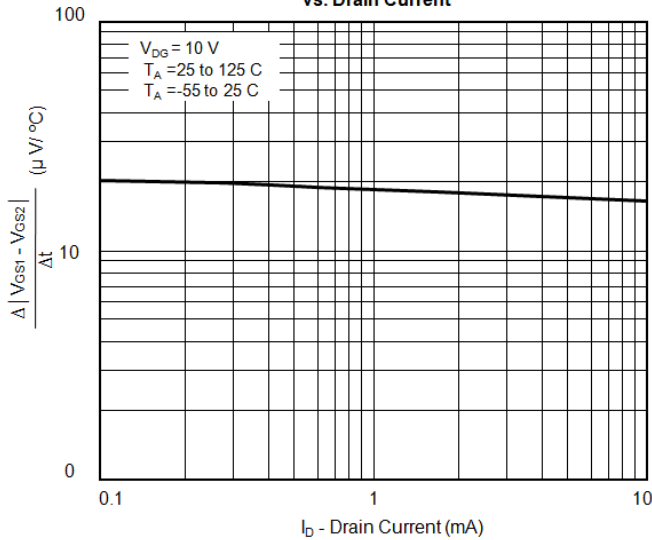
**Transfer Characteristics**



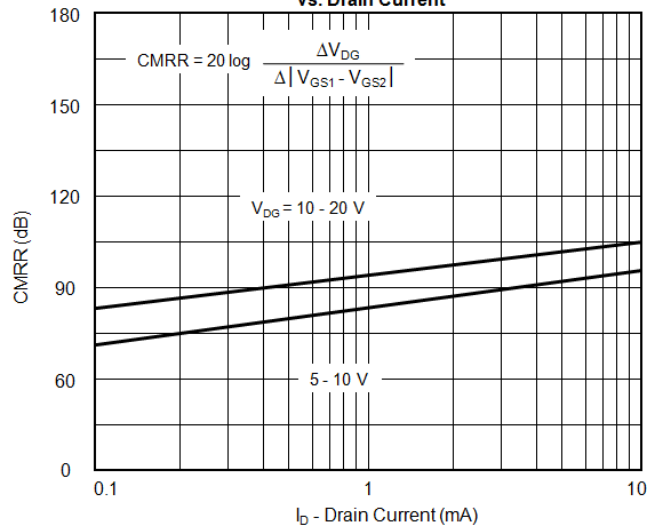
**Gate-Source Differential Voltage vs. Drain Current**



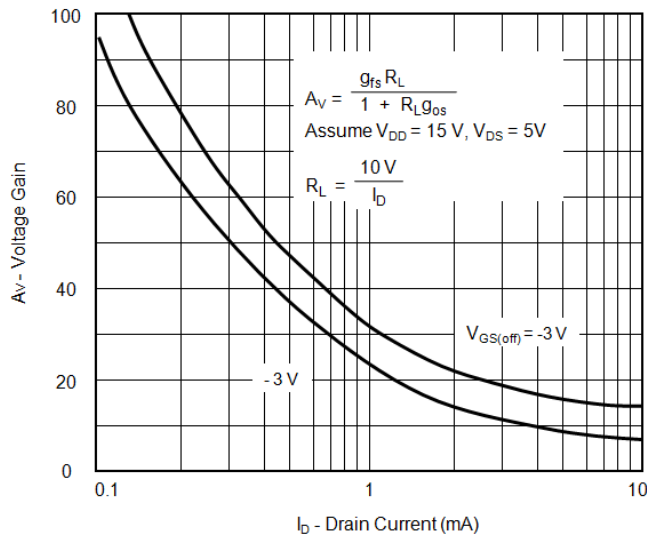
**Voltage Differential with Temperature vs. Drain Current**



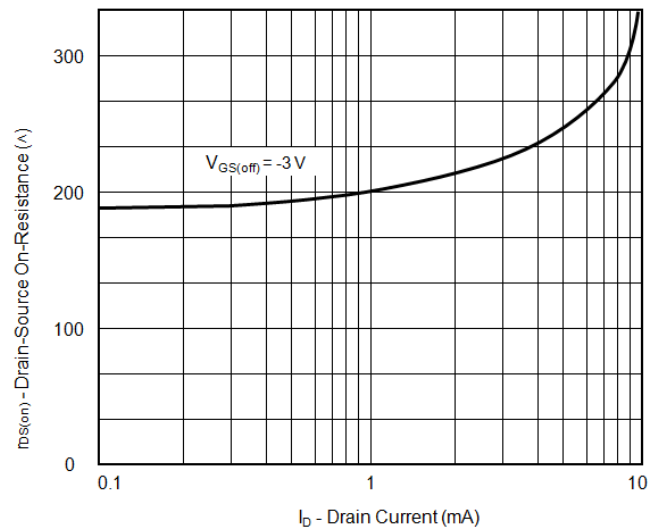
**Common Mode Rejection Ratio vs. Drain Current**



**Circuit Voltage Gain vs. Drain Current**



**On-Resistance vs. Drain Current**



## Typical Characteristics (Cont'd)

