LINEAR SYSTEMS

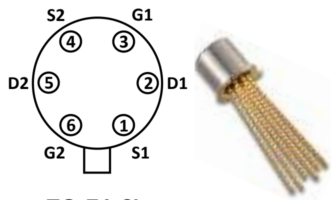
Over 30 Years of Quality Through Innovation

LS844 Series

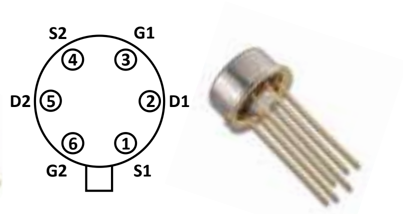
Low Noise, Monolithic Dual N-Channel JFET Amplifier

LOW INPUT CAPACITANCE MONOLITHIC DUAL N-CHANNEL JFET

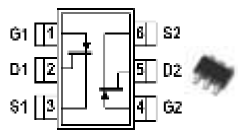
FEATURES		
Ultra-Low Noise	e_n=2.5nV/Hz @1kHz TYP.	
Low Leakage	I_G=15pA TYPs.	
Low Drift	I V_{GS1-2}/TI=5µV/ºC max.	
Ultra-Low Offset Voltage	IV_{GS1-2}I=1mV max.	
ABSOLUTE MAXIMUM RATINGS[1] @ 25°C (unless otherwise noted)		
Maximum Temperatures		
Storage Temperature		-55º to +150°C
Operating Junction Temperature		-55º to +150°C
Maximum Voltage and Current for Each Transistor[1]		
$-V_{GSS}$	Gate Voltage to Drain or Source	60V
$I_{G(f)}$	Gate Forward Current	50mA
Maximum Power Dissipation[2]		
Device Dissipation[2] @ Free Air - Total		400mW T_A=+25°C



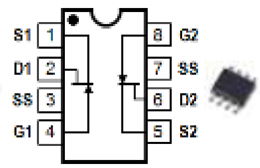
TO-71 6L
Top View



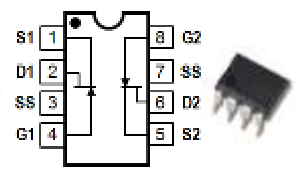
TO-78 6L
Top View



SOT-23 6L
Top View



SOIC-A 8L
Top View



PDIP 8L
Top View

* For equivalent single version, see LSK189

Features

- Low Noise: e_n = 2.5nV/√Hz (typ), *f* = 1kHz, NBW = 1Hz
- Very Low Common Source Input Capacitance of C_{ISS} = 3pF – typ and 8pF- max
- High Slew Rate
- Low Offset/Drift Voltage
- Low Gate Leakage I_{GSS} and 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

- Wideband Differential Amplifiers
- High Speed Temperature Compensated Single Ended Input Amplifier Amps
- High Speed Comparators
- Impedance Converters
- Sonobouys and Hydrophones
- Acoustic Sensors

Description

The LS844 Series is the industry's lowest input capacitance and low-noise monolithic dual N-Channel JFET. Low input capacitance substantially reduces intermodulation distortion. In addition, these dual JFETs feature tight offset voltage and low drift over temperature range, and are targeted for use in a wide range of precision instrumentation and sensor applications.

The LS844 Series is available in surface mount plastic SOIC 8L, PDIP 8L and SOT-23 6L packages. Additionally, it is offered in thru-hole metal cans; the TO-71 6L and TO-78 6L package.

For an equivalent single N-Channel version refer to the LSK189 datasheet. LS844 Series TO-71 6L and SOIC 8L are fit, form and pin compatible to the same LSK389 product.

The LS844 Series provides an increase in capabilities for a wide range of low-noise applications.

The most significant aspect of the LS844 Series is how it combines a noise level comparable with the LSK389 while having much lower gate-to-drain capacitance, 4pF versus the 25pF. The slightly higher noise of the LS844 Series, versus the LSK389, is not significant in most instances, while the much lower capacitance enables designers to produce simpler, more elegant circuit designs with fewer devices that cost less in production.

Like the Linear Systems LSK389, the LS844 Series features a unique design construction of interleaving both JFETs on the same piece of silicon to provide excellent matching and thermal tracking, as well a low-noise profile having nearly zero popcorn noise.

Electrical Characteristics @ 25ºC (unless otherwise noted)

SYMBOL	CHARACTERISTIC	LS843	LS844	LS845	UNITS	CONDITIONS
I V_{GS1-2} / TI max.	Drift vs. Temperature	5	10	25	µV/ºC	V_{DG}= 10V I_D= 500µA T_A= -55ºC to +125ºC
IV_{GS1-2}I max.	Offset Voltage	1	5	15	mV	V_{GS}= 10V I_D= 500µA

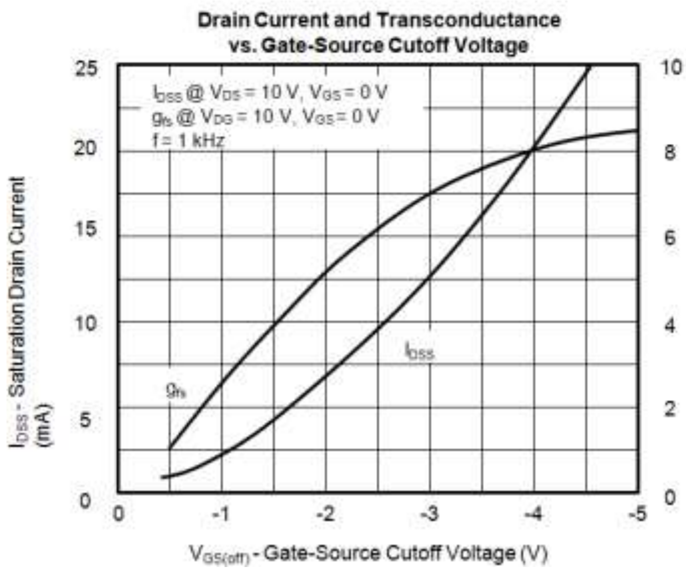
SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNITS	CONDITIONS
BV_{GSS}	Breakdown Voltage	-60	--	--	V	V_{DS}= 0 I_D= -1nA
BV_{GGO}	Gate-to-Gate Breakdown	±60	--	--	V	I_{GGO}= ±1µA I_D= 0 I_S= 0
G_{fss}	**TRANSCONDUCTANCE** Full Conduction	1500	--	--	µS	V_{DS}= 15V V_{GS}= 0 f = 1kHz
G_{fs}	Typical Conduction	1000	1500	--	µS	V_{DS}= 15V I_D= 500µA
$\lvert G_{fs1-2}/G_{fs1} \rvert$	Mismatch	--	0.6	3	%	V_{DS}= 15V I_D= 500µA
I_{DSS}	**DRAIN CURRENT** Full Conduction	1.5	5	15	mA	V_{DS}= 15V V_{GS}= 0
$\lvert I_{DSS1-2}/I_{DSS} \rvert$	Mismatch at Full Conduction	--	1	5	%	V_{DS}= 15V V_{GS}= 0
V_{GS}(off)	**GATE VOLTAGE** Pinchoff Voltage	-1	--	-3.5	V	V_{DS}= 15V I_D= 1nA
V_{GS}	Operating Range	-0.5	--	-3.5	V	V_{DS}= 15V I_D= 500µA
$-I_G$	**GATE CURRENT** Operating	--	15	50	pA	V_{DG}= 15V I_D= 500µA
$-I_G$	High Temperature	--	--	50	nA	V_{DG}= 15V I_D= 500µA T_A=+125ºC
$-I_G$	Reduced VDG	--	5	30	pA	V_{DG}= 3V I_D= 500µA
$-I_{GSS}$	At Full Conduction	--	--	100	pA	V_{GS}= 15V V_{GS}= 0
G_{OSS}	**OUTPUT CONDUCTANCE** Full Conduction	--	--	40	µS	V_{DS}= 15V V_{GS}= 0
G_{OS}	Operating	--	2.0	2.7	µS	V_{DS}= 15V I_D= 200µA
$\lvert G_{OS\ 1-2} \rvert$	Differential	--	0.02	0.2	µS	V_{DS}= 15V I_D= 200µA

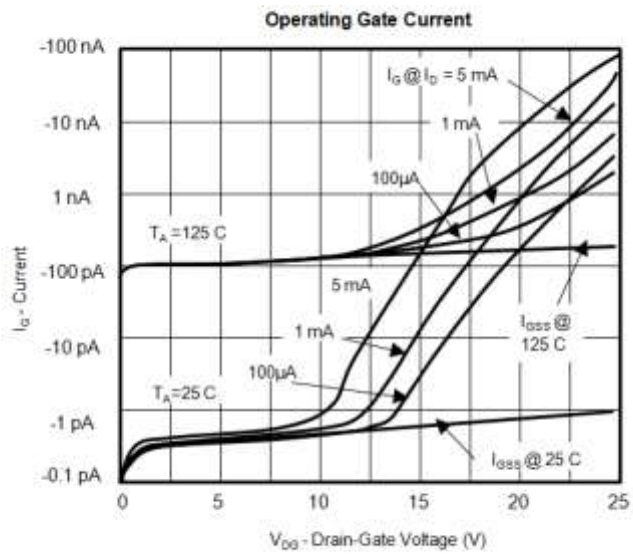
SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNITS	CONDITIONS
	COMMON MODE REJECTION					
CMRR	$-20 \log \lvert \Delta V_{GS1-2} / \Delta V_{DS} \rvert$	90	100	--	dB	V_{DS}= 10 to 20V I_D= 500µA
CMRR		--	85	--	dB	V_{DS}= 5 to 10V I_D= 500µA
e_n	Voltage	--	--	3.0	nV/Hz	V_{DS}= 15V I_D= 2.0mA f= 1kHz NBW= 1Hz
e_n	Voltage	--	--	7.0	nV/Hz	V_{DS}= 15V I_D= 2.0mA f= 10Hz NBW= 1Hz
C_{ISS}	**CAPACITANCE** Input	--	--	8	pF	V_{DS}= 15V I_D= 500µA f= 1mHz
C_{RSS}	Reverse Transfer	--	--	3	pF	
C_{DD}	Drain-to-Drain	--	0.5	--	pF	V_{DD}= 15V I_D= 500µA f= 1mHz

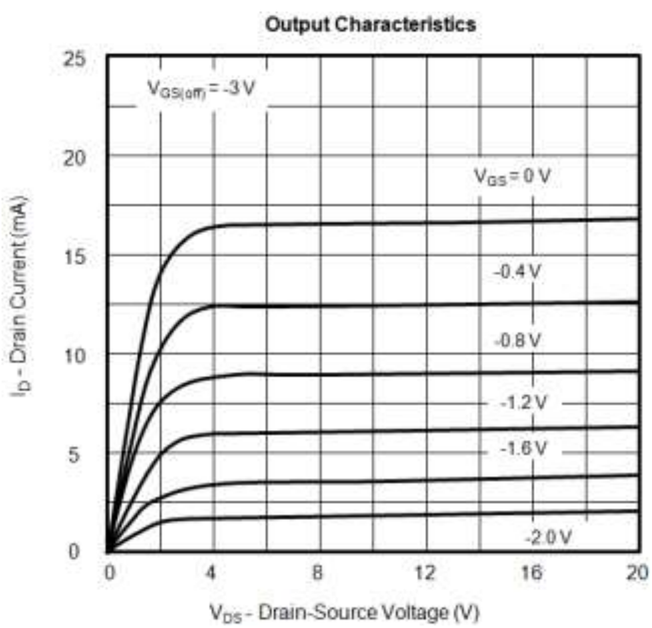
Notes:

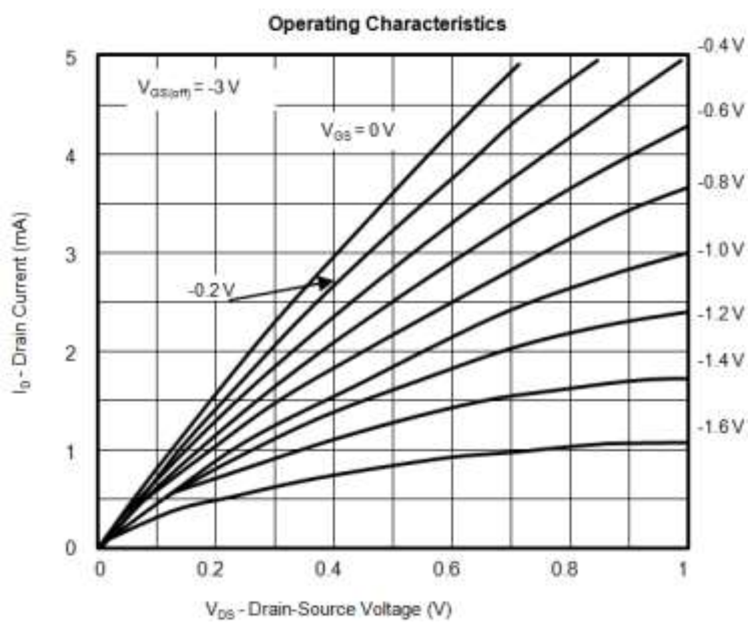
1. Absolute maximum ratings are limiting values above which serviceability may be impaired.
2. Pulse width ≤2ms.
3. All MIN/TYP/MAX Limits are absolute values. Negative signs indicate electrical polarity only.
4. Derate 2.4 mW/°C above 25°C.
5. Derate 4 mW/°C above 25°C.

Typical Characteristics

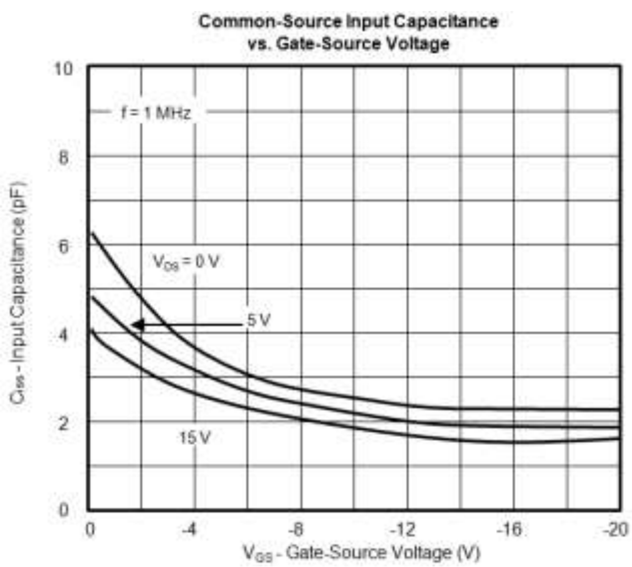


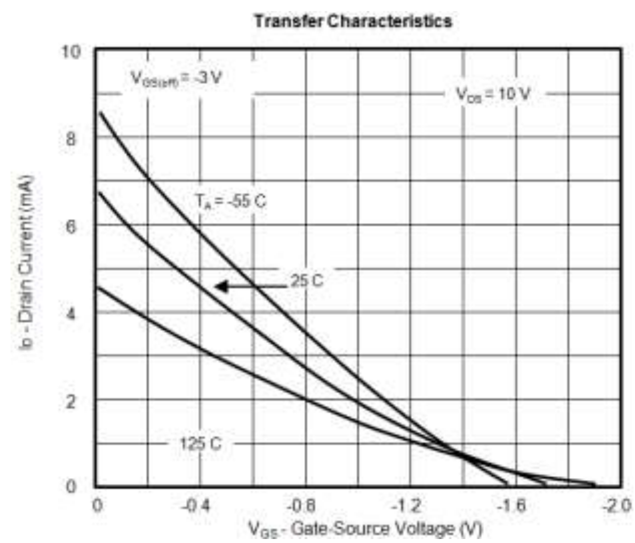


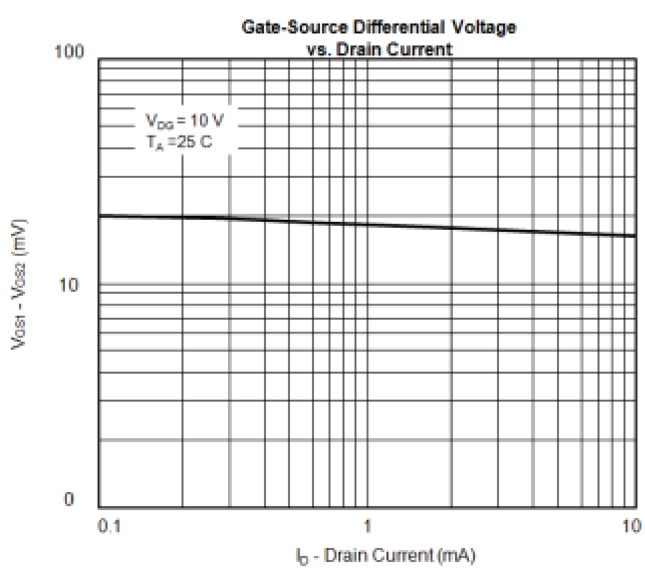


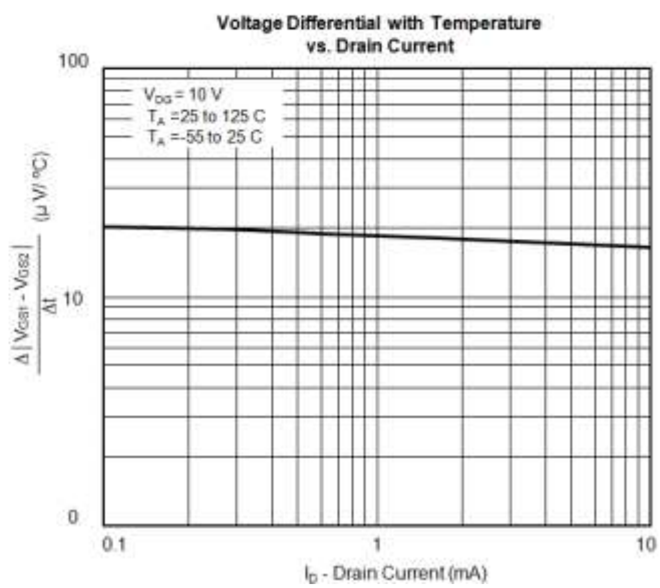


Typical Characteristics Continued

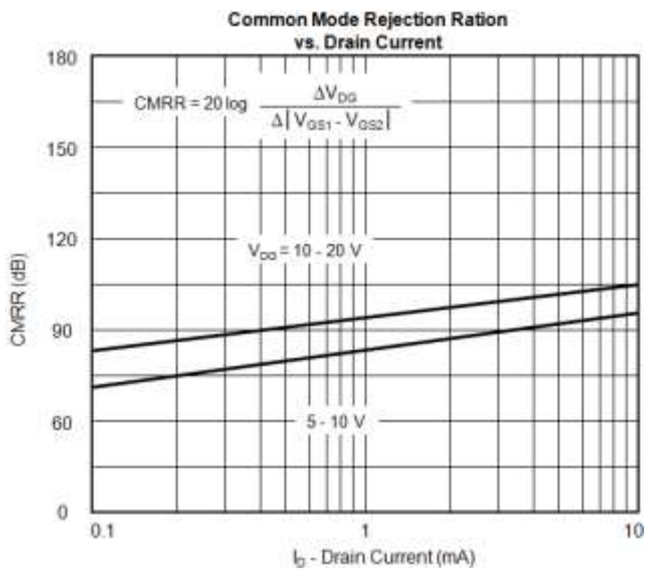


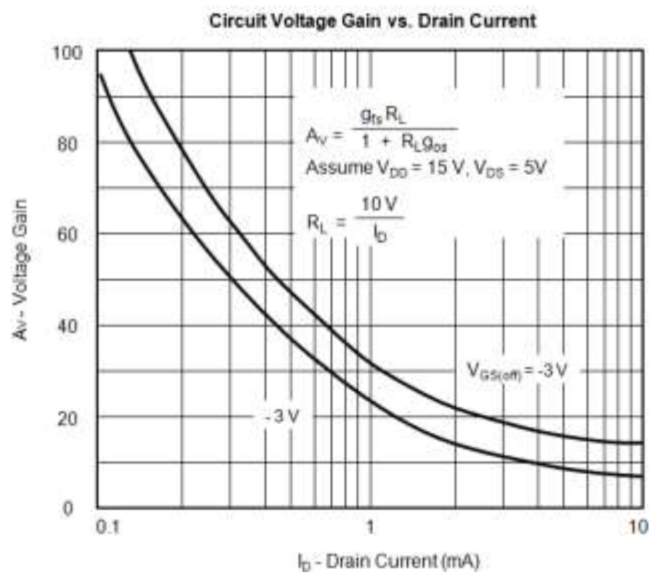


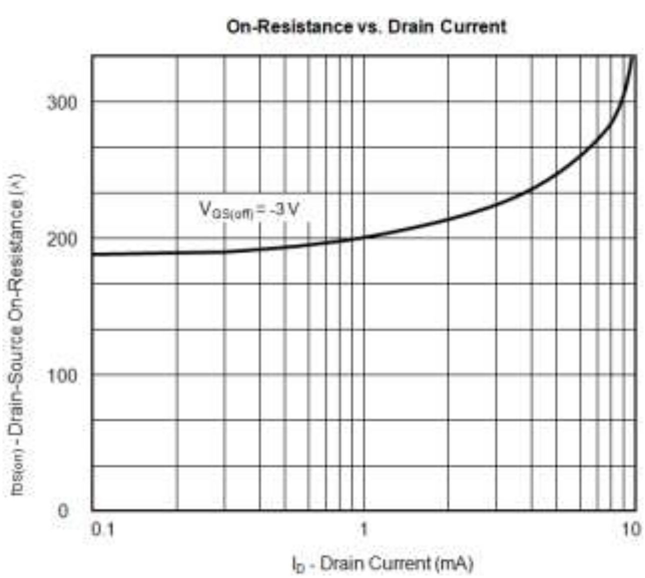


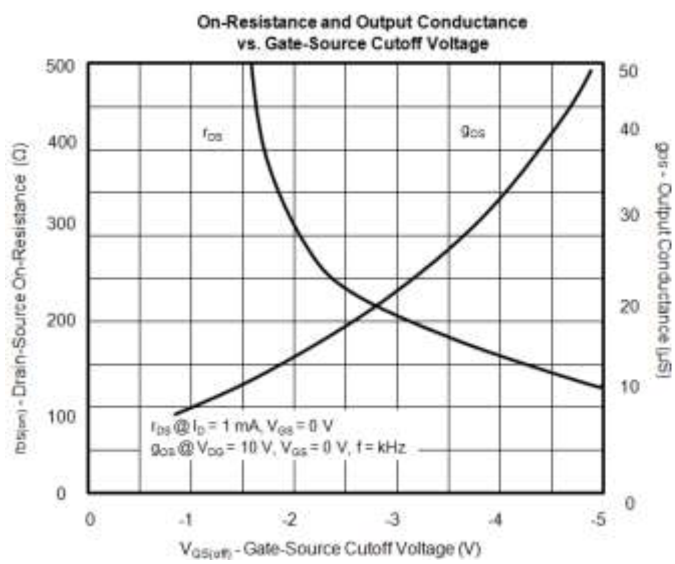


Typical Characteristics Continued

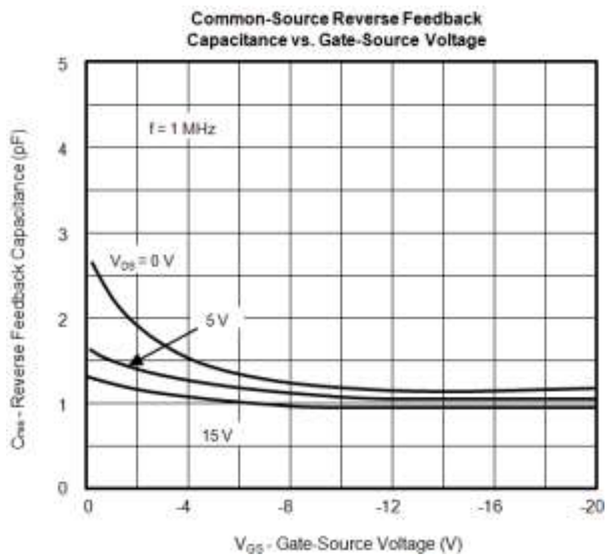


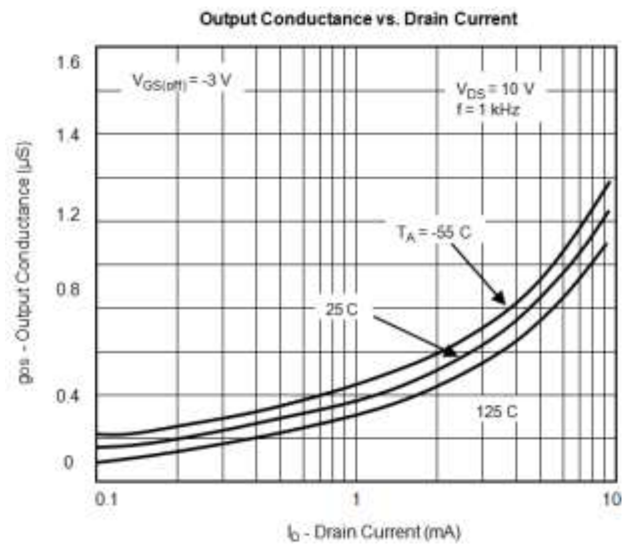


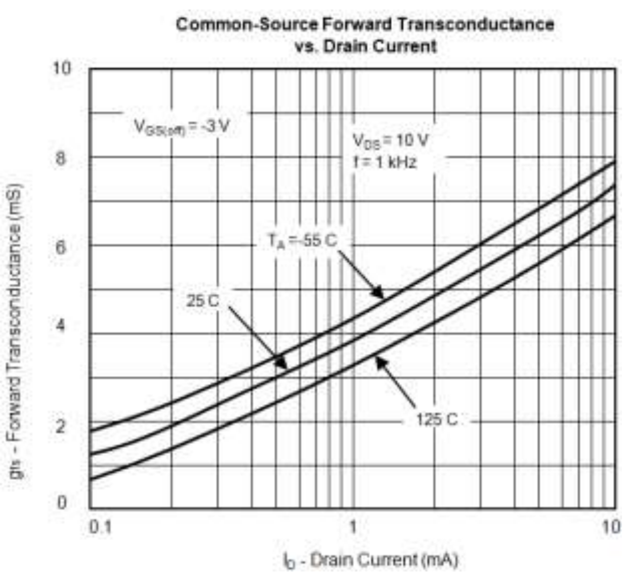


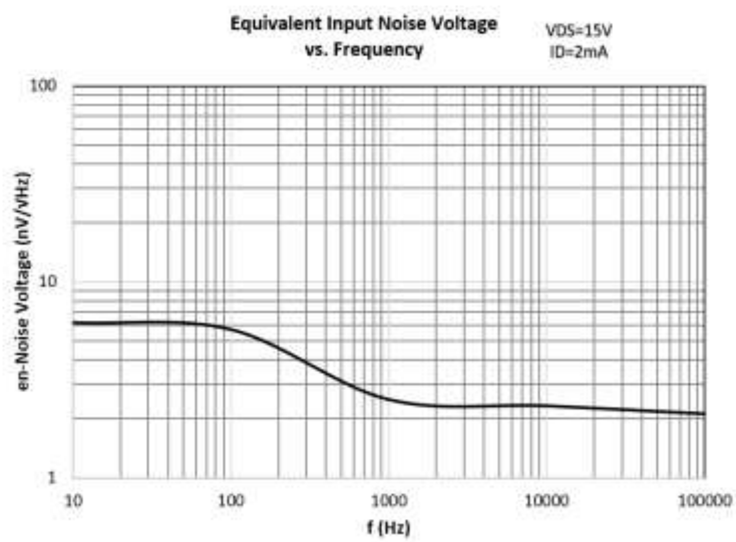


Typical Characteristics Continued



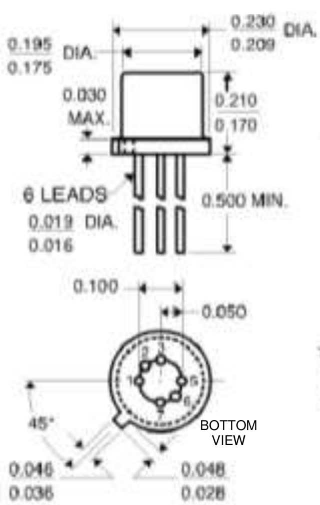




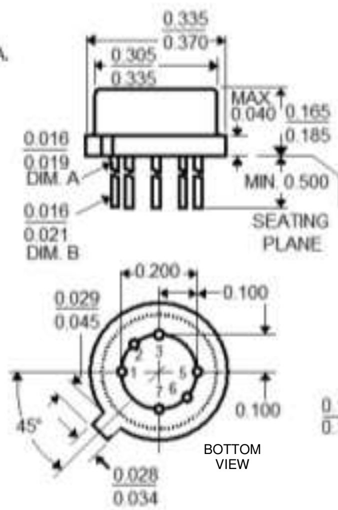


Package Dimensions:

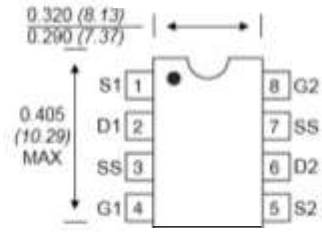
TO-71
6 Lead



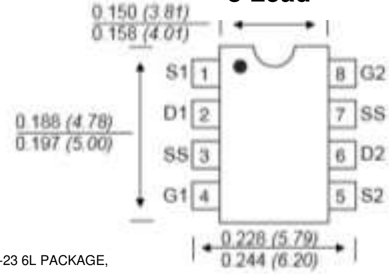
TO-78
6 Lead



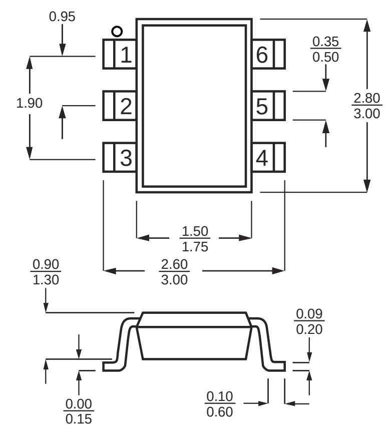
PDIP
8 Lead



SOIC
8 Lead



SOT-23
6 Lead



*All DIMENSIONS IN INCHES EXCEPT FOR THE SOT-23 6L PACKAGE, WHICH IS IN MILLIMETERS

Ordering Information:

Standard Part Call-Out		
LS843 TO-71 6L RoHS	LS844 TO-71 6L RoHS	LS845 TO-71 6L RoHS
LS843 TO-78 6L RoHS	LS844 TO-78 6L RoHS	LS845 TO-78 6L RoHS
LS843 SOT-23 6L RoHS	LS844 SOT-23 6L RoHS	LS845 SOT-23 6L RoHS
LS843 SOIC 8L RoHS	LS844 SOIC 8L RoHS	LS845 SOIC 8L RoHS
LS843 PDIP 8L RoHS	LS844 PDIP 8L RoHS	LS845 PDIP 8L RoHS
Custom Part Call-Out (Custom Parts Include SEL + 4 Digit Numeric Code)		
LS843 TO-71 6L RoHS SELXXXX	LS844 TO-71 6L RoHS SELXXXX	LS845 TO-71 6L RoHS SELXXXX
LS843 TO-78 6L RoHS SELXXXX	LS844 TO-78 6L RoHS SELXXXX	LS845 TO-78 6L RoHS SELXXXX
LS843 SOT-23 6L RoHS SELXXXX	LS844 SOT-23 6L RoHS SELXXXX	LS845 SOT-23 6L RoHS SELXXXX
LS843 SOIC 8L RoHS SELXXXX	LS844 SOIC 8L RoHS SELXXXX	LS845 SOIC 8L RoHS SELXXXX
LS843 PDIP 8L RoHS SELXXXX	LS844 PDIP 8L RoHS SELXXXX	LS845 PDIP 8L RoHS SELXXXX