

## Linear Systems Ultra Low Leakage Low Drift Monolithic Dual JFET

The LS830 is a high-performance monolithic dual JFET featuring 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. The LS830 features a 5-mV offset and 10- $\mu$ V/ $^{\circ}$ C drift.

The 8 Pin P-DIP and 8 Pin SOIC provide ease of manufacturing, and the symmetrical pinout prevents improper orientation.

(See Packaging Information).

### LS830 Applications:

- Wideband Differential Amps
- High-Speed, Temp-Compensated Single-Ended Input Amps
- High-Speed Comparators
- Impedance Converters and vibrations detectors.

### FEATURES

|                  |                                            |
|------------------|--------------------------------------------|
| ULTRA LOW DRIFT  | $ V_{GS1-2}/T  \leq 5\mu V/^{\circ}C$ TYP. |
| ULTRA LOW LEAKGE | $I_G = 80fA$ TYP.                          |
| LOW NOISE        | $e_n = 70nV/\sqrt{Hz}$ TYP.                |
| LOW CAPACITANCE  | $C_{ISS} = 3pF$ MAX.                       |

### ABSOLUTE MAXIMUM RATINGS @ 25 $^{\circ}$ C (unless otherwise noted)

#### Maximum Temperatures

|                                |                                       |
|--------------------------------|---------------------------------------|
| Storage Temperature            | -65 $^{\circ}$ C to +150 $^{\circ}$ C |
| Operating Junction Temperature | +150 $^{\circ}$ C                     |

#### Maximum Voltage and Current for Each Transistor – Note 1

|                    |                                 |            |
|--------------------|---------------------------------|------------|
| -V <sub>GSS</sub>  | Gate Voltage to Drain or Source | 40V        |
| -V <sub>DSO</sub>  | Drain to Source Voltage         | 40V        |
| -I <sub>G(f)</sub> | Gate Forward Current            | 10mA       |
| -I <sub>G</sub>    | Gate Reverse Current            | 10 $\mu$ A |

#### Maximum Power Dissipation

|                                       |                          |
|---------------------------------------|--------------------------|
| Device Dissipation @ Free Air – Total | 40mW @ +125 $^{\circ}$ C |
|---------------------------------------|--------------------------|

### MATCHING CHARACTERISTICS @ 25 $^{\circ}$ C UNLESS OTHERWISE NOTED

| SYMBOL               | CHARACTERISTICS       | VALUE | UNITS             | CONDITIONS                                                                                                 |
|----------------------|-----------------------|-------|-------------------|------------------------------------------------------------------------------------------------------------|
| $ V_{GS1-2}/T $ max. | DRIFT VS. TEMPERATURE | 5     | $\mu V/^{\circ}C$ | V <sub>DS</sub> =10V, I <sub>D</sub> =30 $\mu$ A<br>T <sub>A</sub> = -55 $^{\circ}$ C to +125 $^{\circ}$ C |
| $ V_{GS1-2} $ max.   | OFFSET VOLTAGE        | 25    | mV                | V <sub>DS</sub> =10V, I <sub>D</sub> =30 $\mu$ A                                                           |

### ELECTRICAL CHARACTERISTICS @ 25 $^{\circ}$ C (unless otherwise noted)

| SYMBOL                                 | CHARACTERISTICS                              | MIN. | TYP. | MAX. | UNITS           | CONDITIONS                                                                                     |
|----------------------------------------|----------------------------------------------|------|------|------|-----------------|------------------------------------------------------------------------------------------------|
| BV <sub>GSS</sub>                      | Breakdown Voltage                            | 40   | 60   | --   | V               | V <sub>DS</sub> = 0 I <sub>D</sub> =1nA                                                        |
| BV <sub>GGO</sub>                      | Gate-To-Gate Breakdown                       | 40   | --   | --   | V               | I <sub>G</sub> = 1nA I <sub>D</sub> = 0 I <sub>S</sub> = 0                                     |
| <b>TRANSCONDUCTANCE</b>                |                                              |      |      |      |                 |                                                                                                |
| Y <sub>FSS</sub>                       | Full Conduction                              | 70   | 300  | 500  | $\mu$ mho       | V <sub>DS</sub> = 10V V <sub>GS</sub> = 0V f = 1kHz                                            |
| Y <sub>FS</sub>                        | Typical Operation                            | 50   | 100  | 200  | $\mu$ mho       | V <sub>DS</sub> = 10V I <sub>D</sub> = 30 $\mu$ A f = 1kHz                                     |
| Y <sub>FSS1-2</sub> /Y <sub>FS</sub>   | Mismatch                                     | --   | 0.6  | 3    | %               |                                                                                                |
| <b>DRAIN CURRENT</b>                   |                                              |      |      |      |                 |                                                                                                |
| I <sub>DSS</sub>                       | Full Conduction                              | 0.5  | --   | 10   | mA              | V <sub>DS</sub> = 10V V <sub>GS</sub> = 0V                                                     |
| I <sub>DSS1-2</sub> /I <sub>DSS</sub>  | Mismatch at Full Conduction                  | --   | 1    | 5    | %               |                                                                                                |
| <b>GATE VOLTAGE</b>                    |                                              |      |      |      |                 |                                                                                                |
| V <sub>GS(off)</sub> or V <sub>p</sub> | Pinchoff voltage                             | 0.6  | 2    | 4.5  | V               | V <sub>DS</sub> = 10V I <sub>D</sub> = 1nA                                                     |
| V <sub>GS(on)</sub>                    | Operating Range                              | --   | --   | 4    | V               | V <sub>DS</sub> =10V I <sub>D</sub> =30 $\mu$ A                                                |
| <b>GATE CURRENT</b>                    |                                              |      |      |      |                 |                                                                                                |
| -I <sub>G</sub> max.                   | Operating                                    | --   | --   | 0.1  | pA              | V <sub>DS</sub> = 10V I <sub>D</sub> = 30 $\mu$ A                                              |
| -I <sub>G</sub> max.                   | High Temperature                             | --   | --   | 0.1  | nA              | T <sub>A</sub> = +125 $^{\circ}$ C                                                             |
| -I <sub>GSS</sub> max.                 | At Full Conduction                           | --   | --   | 0.2  | pA              | V <sub>DS</sub> =0                                                                             |
| -I <sub>GSS</sub> max.                 | High Temperature                             | 5    | 5    | 0.5  | nA              | V <sub>GS</sub> = 0V, V <sub>DS</sub> = -20V, T <sub>A</sub> = +125 $^{\circ}$ C               |
| I <sub>GGO</sub>                       | Gate-to-Gate Leakage                         | --   | 1    | --   | pA              | V <sub>GG</sub> = 20V                                                                          |
| <b>OUTPUT CONDUCTANCE</b>              |                                              |      |      |      |                 |                                                                                                |
| Y <sub>OSS</sub>                       | Full Conduction                              | --   | --   | 5    | $\mu$ mho       | V <sub>DS</sub> = 10V V <sub>GS</sub> = 0V                                                     |
| Y <sub>OS</sub>                        | Operating                                    | --   | --   | 0.5  | $\mu$ mho       | V <sub>DS</sub> = 10V I <sub>D</sub> = 30 $\mu$ A                                              |
| <b>COMMON MODE REJECTION</b>           |                                              |      |      |      |                 |                                                                                                |
| CMR                                    | -20 log  V <sub>GS1-2</sub> /V <sub>DS</sub> | --   | 90   | --   | dB              | $\Delta V_{DS} = 10$ to 20V I <sub>D</sub> =30 $\mu$ A                                         |
|                                        | -20 log  V <sub>GS1-2</sub> /V <sub>DS</sub> | --   | 90   | --   | dB              | $\Delta V_{DS} = 5$ to 10V I <sub>D</sub> =30 $\mu$ A                                          |
| <b>NOISE</b>                           |                                              |      |      |      |                 |                                                                                                |
| NF                                     | Figure                                       | --   | --   | 1    | dB              | V <sub>DS</sub> = 10V V <sub>GS</sub> = 0V R <sub>G</sub> = 10M $\Omega$<br>f = 100Hz NBW= 6Hz |
| e <sub>n</sub>                         | Voltage                                      | --   | 20   | 70   | nV/ $\sqrt{Hz}$ | V <sub>DS</sub> =10V I <sub>D</sub> =30 $\mu$ A f=10Hz NBW=1Hz                                 |
| <b>CAPACITANCE</b>                     |                                              |      |      |      |                 |                                                                                                |
| C <sub>ISS</sub>                       | Input                                        | --   | --   | 3    | pF              | V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V, f= 1MHz                                           |
| C <sub>RSS</sub>                       | Reverse Transfer                             | --   | --   | 1.5  | pF              | V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V, f= 1MHz                                           |
| C <sub>DD</sub>                        | Drain-to-Drain                               | --   | --   | 0.1  | pF              | V <sub>DS</sub> = 10V, I <sub>D</sub> =30 $\mu$ A                                              |

Note 1 – These ratings are limiting values above which the serviceability of any semiconductor may be impaired

### Available Packages:

LS830 / LS830 in PDIP & SOIC  
LS830 / LS830 available as bare die  
Please contact [Micross](http://www.micross.com) for full package and die dimensions

### PDIP & SOIC (Top View)

