

## Linear Systems replaces discontinued Siliconix U404 with LSU404

The U404/ LSU404 is a Low Noise, Low Drift, Monolithic Dual N-Channel JFET

The LSU404 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 LSU404 features a 5-mV offset and 10- $\mu\text{V}/^\circ\text{C}$  drift. The LSU404 is a direct replacement for discontinued Siliconix U404.

The hermetically sealed TO-71 & TO-78 packages are well suited for military applications.

(See Packaging Information).

### U404 / LSU404 Applications:

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

### FEATURES

|              |                                                     |
|--------------|-----------------------------------------------------|
| LOW DRIFT    | $ V_{GS1-2}/T  = 10\mu\text{V}/^\circ\text{C}$ TYP. |
| LOW NOISE    | $e_n = 6\text{nV}/\text{Hz}$ @ 10Hz TYP.            |
| LOW PINCHOFF | $V_p = 2.5\text{V}$ TYP.                            |

### ABSOLUTE MAXIMUM RATINGS @ 25°C (unless otherwise noted)

#### Maximum Temperatures

|                                |                 |
|--------------------------------|-----------------|
| Storage Temperature            | -65°C to +150°C |
| Operating Junction Temperature | +150°C          |

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

|             |                                 |      |
|-------------|---------------------------------|------|
| $-V_{GSS}$  | Gate Voltage to Drain or Source | 50V  |
| $-V_{DSO}$  | Drain to Source Voltage         | 50V  |
| $-I_{G(f)}$ | Gate Forward Current            | 10mA |

#### Maximum Power Dissipation

|                                       |       |
|---------------------------------------|-------|
| Device Dissipation @ Free Air – Total | 300mW |
|---------------------------------------|-------|

### MATCHING CHARACTERISTICS @ 25°C UNLESS OTHERWISE NOTED

| SYMBOL               | CHARACTERISTICS       | VALUE | UNITS                        | CONDITIONS                                                                                    |
|----------------------|-----------------------|-------|------------------------------|-----------------------------------------------------------------------------------------------|
| $ V_{GS1-2}/T $ max. | DRIFT VS. TEMPERATURE | 25    | $\mu\text{V}/^\circ\text{C}$ | $V_{DG}=10\text{V}$ , $I_D=200\mu\text{A}$<br>$T_A=-55^\circ\text{C}$ to $+125^\circ\text{C}$ |
| $ V_{GS1-2} $ max.   | OFFSET VOLTAGE        | 15    | mV                           | $V_{DG}=10\text{V}$ , $I_D=200\mu\text{A}$                                                    |

### ELECTRICAL CHARACTERISTICS @ 25°C (unless otherwise noted)

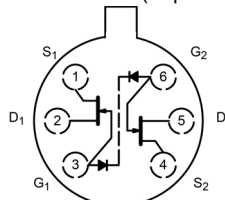
| SYMBOL                       | CHARACTERISTICS               | MIN.     | TYP. | MAX. | UNITS                  | CONDITIONS                                                                                          |
|------------------------------|-------------------------------|----------|------|------|------------------------|-----------------------------------------------------------------------------------------------------|
| $BV_{GSS}$                   | Breakdown Voltage             | 50       | 60   | --   | V                      | $V_{DS}=0$ $I_D=1\text{nA}$                                                                         |
| $BV_{GGO}$                   | Gate-To-Gate Breakdown        | $\pm 50$ | --   | --   | V                      | $I_G=1\text{nA}$ $I_D=0$ $I_S=0$                                                                    |
| <b>TRANSCONDUCTANCE</b>      |                               |          |      |      |                        |                                                                                                     |
| $Y_{fss}$                    | Full Conduction               | 2000     | --   | 7000 | $\mu\text{mho}$        | $V_{DG}=10\text{V}$ $V_{GS}=0\text{V}$ $f=1\text{kHz}$                                              |
| $Y_{fs}$                     | Typical Operation             | 1000     | --   | 2000 | $\mu\text{mho}$        | $V_{DG}=15\text{V}$ $I_D=200\mu\text{A}$ $f=1\text{kHz}$                                            |
| $ Y_{FS1-2}/Y_{FS} $         | Mismatch                      | --       | 0.6  | 3    | %                      |                                                                                                     |
| <b>DRAIN CURRENT</b>         |                               |          |      |      |                        |                                                                                                     |
| $I_{DSS}$                    | Full Conduction               | 0.5      | --   | 10   | mA                     | $V_{DG}=10\text{V}$ $V_{GS}=0\text{V}$                                                              |
| $ I_{DSS1-2}/I_{DSS} $       | Mismatch at Full Conduction   | --       | 1    | 5    | %                      |                                                                                                     |
| <b>GATE VOLTAGE</b>          |                               |          |      |      |                        |                                                                                                     |
| $V_{GS(off)}$ or $V_p$       | Pinchoff voltage              | -0.5     | --   | -2.5 | V                      | $V_{DS}=15\text{V}$ $I_D=1\text{nA}$                                                                |
| $V_{GS(on)}$                 | Operating Range               | --       | --   | -2.3 | V                      | $V_{DS}=15\text{V}$ $I_D=200\mu\text{A}$                                                            |
| <b>GATE CURRENT</b>          |                               |          |      |      |                        |                                                                                                     |
| $-I_{Gmax.}$                 | Operating                     | --       | -4   | -15  | pA                     | $V_{DG}=15\text{V}$ $I_D=200\mu\text{A}$                                                            |
| $-I_{Gmax.}$                 | High Temperature              | --       | --   | -10  | nA                     | $T_A=+125^\circ\text{C}$                                                                            |
| $-I_{GSSmax.}$               | At Full Conduction            | --       | --   | 100  | pA                     | $V_{DS}=0$                                                                                          |
| $-I_{GSSmax.}$               | High Temperature              | 5        | 5    | 5    | pA                     | $V_{DG}=15\text{V}$ $T_A=+125^\circ\text{C}$                                                        |
| <b>OUTPUT CONDUCTANCE</b>    |                               |          |      |      |                        |                                                                                                     |
| $Y_{OSS}$                    | Full Conduction               | --       | --   | 20   | $\mu\text{mho}$        | $V_{DG}=10\text{V}$ $V_{GS}=0\text{V}$                                                              |
| $Y_{OS}$                     | Operating                     | --       | 0.2  | 2    | $\mu\text{mho}$        | $V_{DG}=15\text{V}$ $I_D=500\mu\text{A}$                                                            |
| <b>COMMON MODE REJECTION</b> |                               |          |      |      |                        |                                                                                                     |
| CMR                          | $-20 \log  V_{GS1-2}/V_{DS} $ | 95       | --   | --   | dB                     | $V_{DS}=10$ to $20\text{V}$ $I_D=30\mu\text{A}$                                                     |
| <b>NOISE</b>                 |                               |          |      |      |                        |                                                                                                     |
| NF                           | Figure                        | --       | --   | 0.5  | dB                     | $V_{DS}=15\text{V}$ $V_{GS}=0\text{V}$ $R_G=10\text{M}$<br>$f=100\text{Hz}$ $\text{NBW}=6\text{Hz}$ |
| $e_n$                        | Voltage                       | --       | 20   | --   | nV/ $\sqrt{\text{Hz}}$ | $V_{DS}=15\text{V}$ $I_D=200\mu\text{A}$ $f=10\text{Hz}$ $\text{NBW}=1\text{Hz}$                    |
| <b>CAPACITANCE</b>           |                               |          |      |      |                        |                                                                                                     |
| $C_{ISS}$                    | Input                         | --       | --   | 8    | pF                     | $V_{DS}=15\text{V}$ $I_D=200\mu\text{A}$ $f=1\text{MHz}$                                            |
| $C_{RSS}$                    | Reverse Transfer              | --       | --   | 1.5  | pF                     |                                                                                                     |

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

### Available Packages:

U404 / LSU404 in TO-71 & TO-78  
U404 / LSU404 available as bare die  
Please contact [Micross](http://www.micross.com) for full package and die dimensions

### TO-71 / TO-78 (Top View)



### Micross Components Europe



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