

## N-CHANNEL J-FET DEPLETION MODE

Equivalent to MIL-PRF-19500/375

### DEVICES

|               |                 |
|---------------|-----------------|
| <b>2N3821</b> | <b>2N3821UB</b> |
| <b>2N3822</b> | <b>2N3822UB</b> |
| <b>2N3823</b> | <b>2N3823UB</b> |

### LEVELS

**MQ = JAN Equivalent**  
**MX = JANTX Equivalent**  
**MV = JANTXV Equivalent**

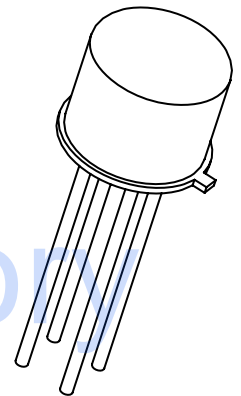
### ABSOLUTE MAXIMUM RATINGS ( $T_C = +25^\circ\text{C}$ unless otherwise noted)

| Parameters / Test Conditions                      | Symbol         | 2N3821, UB<br>2N3822, UB | 2N3823, UB | Unit             |
|---|----------------|--------------------------|------------|------------------|
| Gate-Source Voltage                               | $V_{GSR}$      | 50                       | 30         | V                |
| Drain-Source Voltage                              | $V_{DS}$       | 50                       | 30         | V                |
| Drain-Gate Voltage                                | $V_{DG}$       | 50                       | 30         | V                |
| Gate Current                                      | $I_{GF}$       | 10                       |            | mA               |
| Power Dissipation $T_A = +25^\circ\text{C}^{(1)}$ | $P_T$          | 300                      |            | mW               |
| Operating Junction & Storage Temperature Range    | $T_j, T_{stg}$ | -55 to +200              |            | $^\circ\text{C}$ |

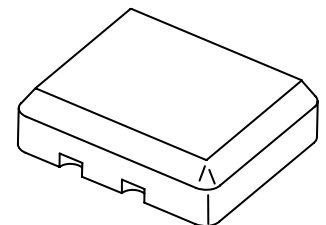
**Note:** (1) Derate linearly 1.7mW/ $^\circ\text{C}$  for  $T_A > +25^\circ\text{C}$ .

### ELECTRICAL CHARACTERISTICS ( $T_A = +25^\circ\text{C}$ , unless otherwise noted)

| Parameters / Test Conditions  | Symbol                                    | Min.           | Max.              | Unit                     |
|---|---|----------------|-------------------|--------------------------|
| <b>OFF CHARACTERISTICS</b>  |   |                |                   |                          |
| Gate-Source Breakdown Voltage<br>$V_{DS} = 0, I_G = 1.0\mu\text{A dc}$  | 2N3821 / UB<br>2N3822 / UB<br>2N3823 / UB | $V_{(BR)GSSR}$ | 50<br>50<br>30    | Vdc                      |
| Gate Reverse Current<br>$V_{DS} = 0, V_{GS} = 30\text{V dc}$<br>$V_{DS} = 0, V_{GS} = 30\text{V dc}$<br>$V_{DS} = 0, V_{GS} = 20\text{V dc}$                                      | 2N3821 / UB<br>2N3822 / UB<br>2N3823 / UB | $I_{GSSR}$     | 0.1<br>0.1<br>0.5 | $\eta\text{A}$           |
| Zero-Gate-Voltage Drain Current<br>$V_{GS} = 0, V_{DS} = 15\text{V dc}$   | 2N3821 / UB<br>2N3822 / UB<br>2N3823 / UB | $I_{DSS}$      | 0.5<br>2.0<br>4.0 | 2.5<br>10<br>20<br>mA    |
| Gate-Source Voltage<br>$V_{DS} = 15\text{V dc}, I_D = 50\mu\text{A dc}$<br>$V_{DS} = 15\text{V dc}, I_D = 200\mu\text{A dc}$<br>$V_{DS} = 15\text{V dc}, I_D = 400\mu\text{A dc}$ | 2N3821 / UB<br>2N3822 / UB<br>2N3823 / UB | $V_{GS}$       | 0.5<br>1.0<br>1.0 | 2.0<br>4.0<br>7.5<br>Vdc |
| Gate-Source Cutoff Voltage<br>$V_{DS} = 15\text{V dc}, I_D = 0.5\eta\text{A dc}$  | 2N3821 / UB<br>2N3822 / UB<br>2N3823 / UB | $V_{GS(off)}$  | 4.0<br>6.0<br>8.0 | Vdc                      |



**TO-72 (TO-206AF)**

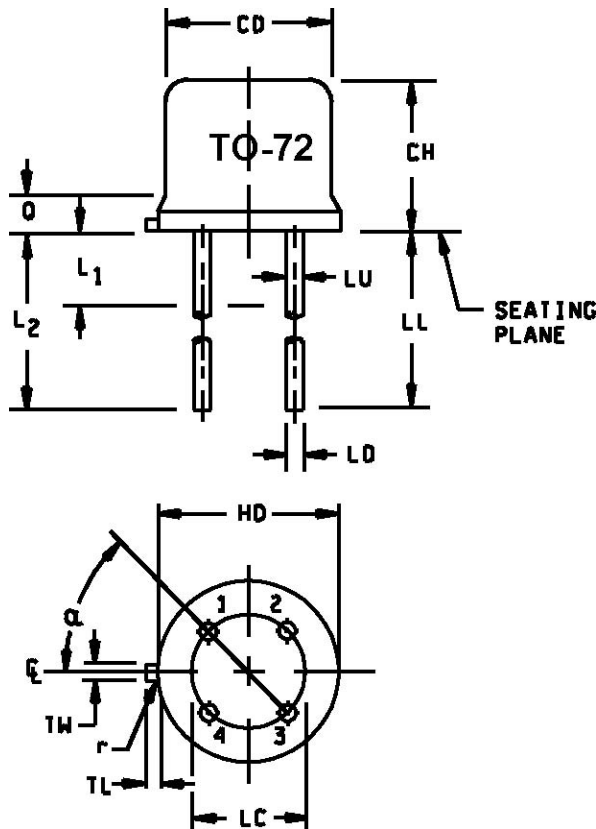


**UB - Package**

## DYNAMIC CHARACTERISTICS

| Parameters / Test Conditions   | Symbol          | Min.                 | Max.                 | Unit    |
|--|-----------------|----------------------|----------------------|---------|
| Small-Signal Common Source, Short-Circuit Forward Transfer Admittance<br>$V_{GS} = 0, V_{DS} = 15V$ dc, $f = 1.0kHz$<br>2N3821 / UB<br>2N3822 / UB<br>2N3823 / UB                                  | $ y_{fs} ^1$    | 1500<br>3000<br>3500 | 4500<br>6500<br>6500 | $\mu S$ |
| Small-Signal, Common Source, Short-Circuit Output Admittance<br>$V_{GS} = 0, V_{DS} = 15V$ dc, $f = 1.0kHz$<br>2N3821 / UB<br>2N3822 / UB<br>2N3823 / UB   | $ y_{os} $      |                      | 10<br>20<br>35       | $\mu S$ |
| Small-Signal, Common-Source Short-Circuit Input Capacitance<br>$V_{GS} = 0V$ dc, $V_{DS} = 15V$ dc, $100kHz \leq f \leq 1.0MHz$  | $C_{iss}$       |                      | 6.0                  | pF      |
| Small-Signal, Common-Source Reverse Transfer Capacitance<br>$V_{DS} = 15V$ dc, $V_{GS} = 0$ , $100kHz \leq f \leq 1.0MHz$<br>2N3821 / UB<br>2N3822 / UB<br>2N3823 / UB                             | $C_{rss}$       |                      | 3.0<br>3.0<br>2.0    | pF      |
| Small-Signal, Common-Source, Short-Circuit Forward Transfer Admittance<br>$V_{GS} = 0, V_{DS} = 15V$ dc, $f = 100MHz$<br>$f = 100MHz$<br>$f = 200MHz$<br>2N3821 / UB<br>2N3822 / UB<br>2N3823 / UB | $ y_{fs} ^3$    | 1500<br>3000<br>3200 |                      | $\mu S$ |
| Small-Signal, Common-Source Short-Circuit Input Conductance<br>$V_{GS} = 0, V_{DS} = 15V$ dc, $f = 200MHz$<br>2N3823 (only)  | $g_{is}$        |                      | 800                  | $\mu S$ |
| Small-Signal, Common-Source Short-Circuit Output Conductance<br>$V_{GS} = 0, V_{DS} = 15V$ dc, $f = 200MHz$<br>2N3823 (only)   | $g_{os}$        |                      | 200                  | $\mu S$ |
| Common Source Spot Noise Figure<br>$V_{GS} = 0, V_{DS} = 15V$ dc, $R_G = 1M\Omega$<br>$f = 10Hz$<br>$f = 1.0kHz$<br>2N382, 2N3822 / UB<br>2N3821, 2N3822, 2N3823 / UB                              | NF <sup>1</sup> |                      | 5.0<br>2.0           | dB      |
| Common Source Spot Noise Figure<br>$V_{GS} = 0, V_{DS} = 15V$ dc, $R_G = 1k\Omega$<br>$f = 105MHz$<br>2N3823 / UB (only)   | NF <sup>2</sup> |                      | 2.5                  | dB      |

## PACKAGE DIMENSIONS

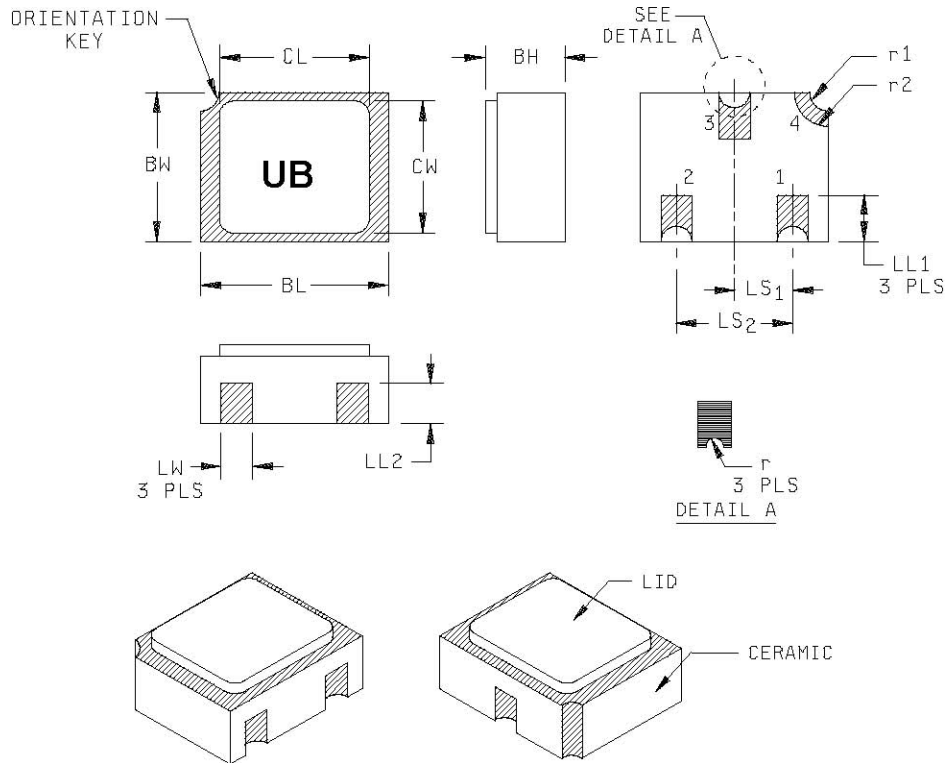


| Ltr | Dimensions |      |             |       | Notes |
|-----|------------|------|-------------|-------|-------|
|     | Inches     |      | Millimeters |       |       |
|     | Min        | Max  | Min         | Max   |       |
| CD  | .178       | .195 | 4.52        | 4.95  |       |
| CH  | .170       | .210 | 4.32        | 5.33  |       |
| HD  | .209       | .230 | 5.31        | 5.84  |       |
| L1  |            | .050 |             | 1.27  |       |
| L2  | .250       |      | 6.35        |       |       |
| LC  | .100 TP    |      | 2.54 TP     |       |       |
| LD  | .016       | .021 | 0.41        | 0.53  | 2, 6  |
| LL  | .500       | .750 | 12.70       | 19.05 | 6     |
| LU  | .016       | .019 | 0.41        | 0.48  | 3, 6  |
| Q   |            | .040 |             | 1.02  |       |
| r   |            | .007 |             | 0.18  |       |
| TL  | .028       | .048 | 0.71        | 1.22  | 8     |
| TW  | .036       | .046 | 0.91        | 1.17  |       |
| α   | 45° TP     |      |             |       |       |

**NOTE:**

- \* 1 Dimensions are in inches. Millimeters are given for general information only.
- 2 Measured in the zone beyond .250 (6.35 mm) from the seating plane.
- 3 Measured in the zone .050 (1.27 mm) and .250 (6.35 mm) from the seating plane.
- 4 When measured in a gauging plane .054 +.001, -.000 (1.37 +.3, -.00 mm) before the seating plane of the transistor, maximum diameter leads shall be within .007 (.18 mm) of their true location relative to a maximum width tab. Smaller diameter leads shall fall within the outline of the maximum diameter lead tolerance.
- 5 The active elements are electrically insulated from the case.
- 6 All 4 leads.
- 7 Lead 1 is the source, lead 2 is the drain, lead 3 is the gate, and lead 4 is the case.
- 8 Symbol TL is measured from HD maximum.
- 9 In accordance with ASME Y14.5M, diameters are equivalent to φx symbology.

**\*FIGURE 1** Physical dimensions (similar to TO-72)



**NOTES:**

- 1. Dimensions are in inches.
- \* 2. Millimeters are given for general information only.
- \* 3. Hatched areas on package denote metallized areas.
- \* 4. Lid material: Kovar.
- \* 5. Pad 1 = Drain, Pad 2 = Source, Pad 3 = Gate, Pad 4 = Shielding connected to the lid.

| Symbol          | Dimensions |      |             |      | Note |
|-----------------|------------|------|-------------|------|------|
|                 | Inches     |      | Millimeters |      |      |
|                 | Min        | Max  | Min         | Max  |      |
| BH              | .046       | .056 | 1.17        | 1.42 |      |
| BL              | .115       | .128 | 2.92        | 3.25 |      |
| BW              | .085       | .108 | 2.16        | 2.74 |      |
| CL              |            | .128 |             | 3.25 |      |
| CW              |            | .108 |             | 2.74 |      |
| LL <sub>1</sub> | .022       | .038 | 0.56        | 0.96 |      |
| LL <sub>2</sub> | .017       | .035 | 0.43        | 0.89 |      |
| LS <sub>1</sub> | .036       | .040 | 0.91        | 1.02 |      |
| LS <sub>2</sub> | .071       | .079 | 1.81        | 2.01 |      |
| LW              | .016       | .024 | 0.41        | 0.61 |      |
| r               |            | .008 |             | .203 |      |
| r1              |            | .012 |             | .305 |      |
| r2              |            | .022 |             | .559 |      |

\* **FIGURE 2.** Physical dimensions, surface mount (2N3821UB, 2N3822UB, AND 2N3823UB).