



# TF2123

## N-CHANNEL JFET

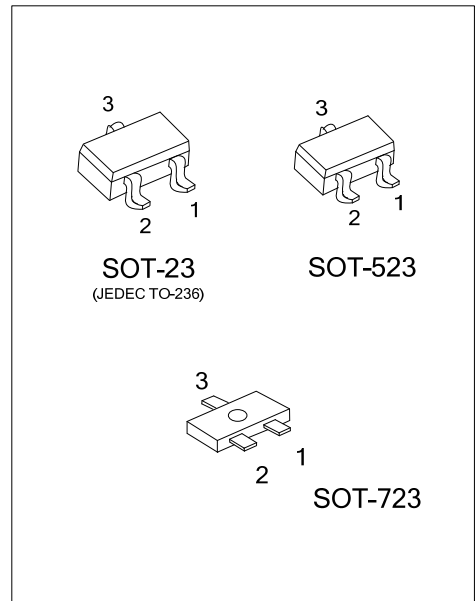
### N-CHANNEL JFET CAPACITOR MICROPHONE APPLICATIONS

■ DESCRIPTION

The UTC **TF2123** uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with low gate voltages. This device is suitable for use in capacitor microphone applications.

■ FEATURES

- \*Suited for use in audio, telephone capacitor microphones.
- \*Good voltage characteristic.
- \*Good transient characteristic.



■ ORDERING INFORMATION

| Ordering Number |                 | Package | Pin Assignment |   |   | Packing   |
|-----------------|-----------------|---------|----------------|---|---|-----------|
| Lead Free       | Halogen Free    |         | 1              | 2 | 3 |           |
| TF2123L-x-AE3-R | TF2123G-x-AE3-R | SOT-23  | S              | D | G | Tape Reel |
| TF2123L-x-AN3-R | TF2123G-x-AN3-R | SOT-523 | S              | D | G | Tape Reel |
| TF2123L-x-AQ3-R | TF2123G-x-AQ3-R | SOT-723 | S              | D | G | Tape Reel |

|                                                                                                |                                                                                                                                                                          |
|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>TF2123L-x-AE3-R</p> <p>(1)Packing Type<br/>(2)Package Type<br/>(3)Rank<br/>(4)Lead Free</p> | <p>(1) R: Tape Reel<br/>(2) AE3: SOT-23, AN3: SOT-523, AQ3: SOT-723<br/>(3) x: refer to CLASSIFICATION OF <math>I_{DSS}</math><br/>(4) L: Lead Free, G: Halogen Free</p> |
|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

■ MARKING

| TF2123-A                                | TF2123-B                                | TF2123-C                                |
|-----------------------------------------|-----------------------------------------|-----------------------------------------|
| <p>L: Lead Free<br/>G: Halogen Free</p> | <p>L: Lead Free<br/>G: Halogen Free</p> | <p>L: Lead Free<br/>G: Halogen Free</p> |

■ ABSOLUTE MAXIMUM RATINGS (  $T_A=25^{\circ}\text{C}$ , unless otherwise specified )

| PARAMETER            | SYMBOL    | RATING   | UNIT               |
|----------------------|-----------|----------|--------------------|
| Gate Drain Voltage   | $V_{GDO}$ | -20      | V                  |
| Gate Current         | $I_G$     | 10       | mA                 |
| Drain Current        | $I_D$     | 10       | mA                 |
| Power Dissipation    | $P_D$     | 100      | mW                 |
| Junction Temperature | $T_J$     | 150      | $^{\circ}\text{C}$ |
| Storage Temperature  | $T_{STG}$ | -55~+150 | $^{\circ}\text{C}$ |

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

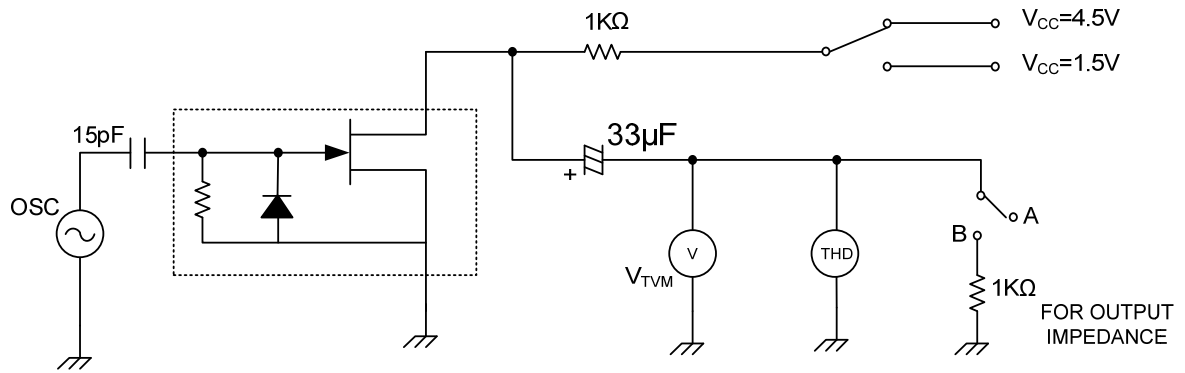
■ ELECTRICAL CHARACTERISTICS (  $T_A=25^{\circ}\text{C}$ , unless otherwise specified )

| PARAMETER                       | SYMBOL          | TEST CONDITIONS                                                                                               | MIN                      | TYP   | MAX | UNIT          |
|---------------------------------|-----------------|---------------------------------------------------------------------------------------------------------------|--------------------------|-------|-----|---------------|
| Gate Drain Breakdown Voltage    | $BV_{GDO}$      | $I_G=-100\mu\text{A}$                                                                                         | -20                      |       |     | V             |
| Gate Source Cut off Voltage     | $V_{GS(OFF)}$   | $V_{DS}=2\text{V}, I_D=1\mu\text{A}$                                                                          |                          | -0.38 |     | V             |
| Zero-Gate Voltage Drain Current | $I_{DSS}$       | $V_{DS}=2\text{V}, V_{GS}=0\text{V}$                                                                          | TF2123-A                 | 100   | 170 | $\mu\text{A}$ |
|                                 |                 |                                                                                                               | TF2123-B                 | 150   | 270 | $\mu\text{A}$ |
|                                 |                 |                                                                                                               | TF2123-C                 | 210   | 350 | $\mu\text{A}$ |
| Drain Current                   | $I_D$           | $V_{DD}=2\text{V}, R_L=2.2\text{k}\Omega, C_g=5\text{pF}$                                                     | $I_{DSS}=100\mu\text{A}$ | 98    |     | $\mu\text{A}$ |
|                                 |                 |                                                                                                               | $I_{DSS}=250\mu\text{A}$ | 244   |     | $\mu\text{A}$ |
|                                 |                 |                                                                                                               | $I_{DSS}=350\mu\text{A}$ | 337   |     | $\mu\text{A}$ |
| Forward Transfer Admittance     | $Y_{fs}$        | $V_{DS}=2\text{V}, V_{GS}=0\text{V}$                                                                          |                          | 1.43  |     | mS            |
| Input Capacitance               | $C_{ISS}$       | $V_{DS}=2, V_{GS}=0, f=1\text{MHz}$                                                                           |                          | 5.0   |     | pF            |
| Voltage Gain                    | $G_V$           | $V_{DD}=2\text{V}, R_L=2.2\text{k}\Omega, C_g=5\text{pF}, f=1\text{kHz}, V_{IN}=10\text{mV}$                  | $I_{DSS}=100\mu\text{A}$ | 0.1   |     | dB            |
|                                 |                 |                                                                                                               | $I_{DSS}=250\mu\text{A}$ | 1.95  |     | dB            |
|                                 |                 |                                                                                                               | $I_{DSS}=350\mu\text{A}$ | 2.25  |     | dB            |
| Delta Voltage Gain              | $\Delta G_V$    | $V_{IN}=10\text{mV}, R_L=2.2\text{k}\Omega, C_g=5\text{pF}, f=1\text{kHz}, V_{DD}=2\text{V to }1.5\text{V}$   |                          | -0.5  |     | dB            |
| Frequency Characteristic        | $\Delta G_V(f)$ | $V_{IN}=10\text{mV}, R_L=2.2\text{k}\Omega, C_g=5\text{pF}, V_{DD}=2\text{V}, f=1\text{kHz to }110\text{kHz}$ |                          | -0.2  |     | dB            |
| Output Noise Voltage            | $V_{NO}$        | $V_{DD}=2\text{V}, C_g=5\text{pF}, A\text{-curve filter}$                                                     | $R_L=1\text{k}\Omega$    | -107  |     | dB            |
|                                 |                 |                                                                                                               | $R_L=2.2\text{k}\Omega$  | -102  |     | dB            |
| Total Harmonic distortion       | THD             | $V_{DD}=2\text{V}, R_L=2.2\text{k}\Omega, C_g=5\text{pF}, f=1\text{kHz}, V_{IN}=50\text{mV}$                  |                          | 0.9   |     | %             |

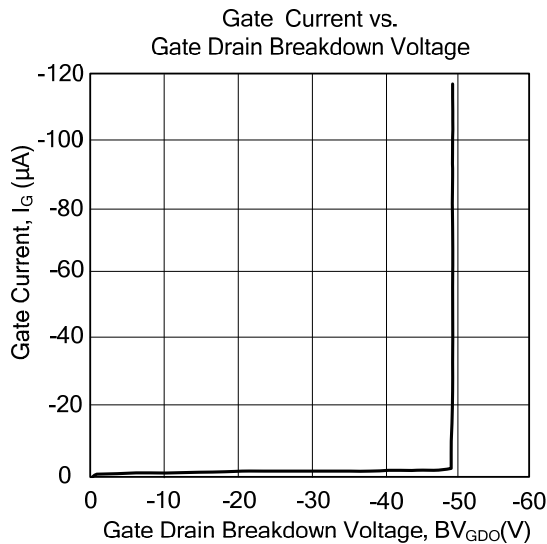
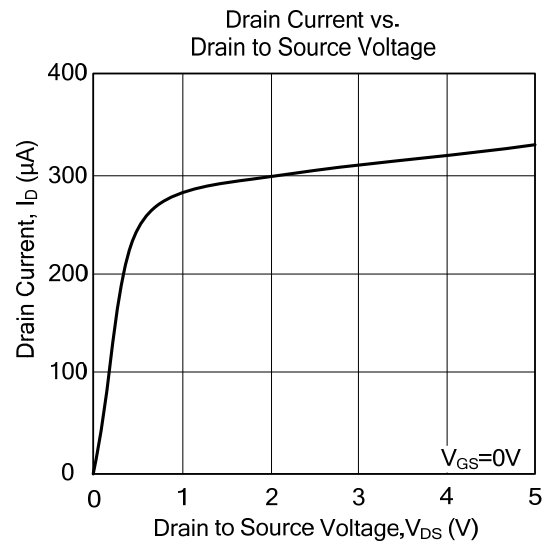
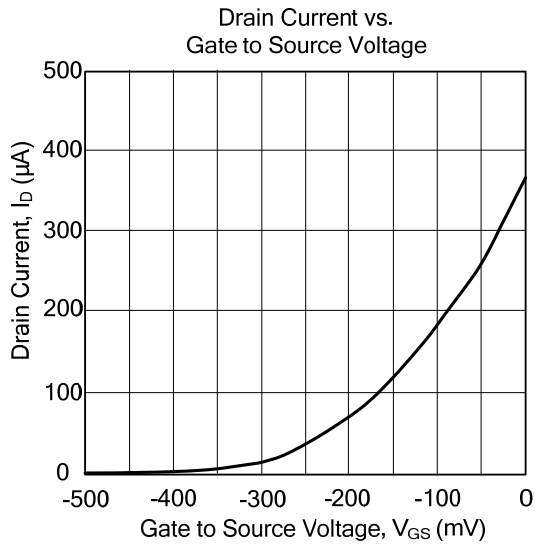
■ CLASSIFICATION OF  $I_{DSS}$

| RANK  | A       | B       | C       |
|-------|---------|---------|---------|
| RANGE | 100-170 | 150-270 | 210-350 |

■ TEST CIRCUIT ( $T_A=25^\circ\text{C}$ )



## TYPICAL CHARACTERISTICS



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