

# New Jersey Semi-Conductor Products, Inc.

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## 3SK249

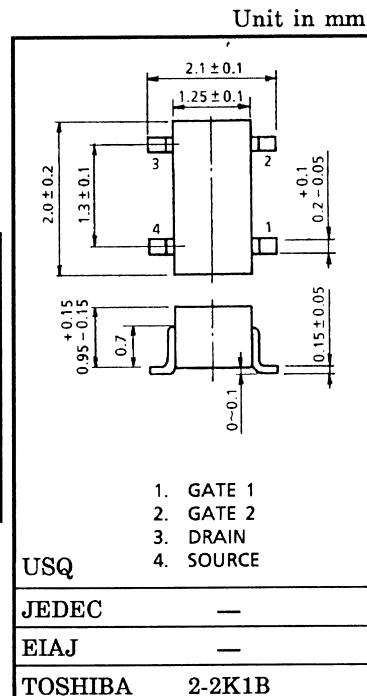
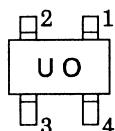
TV TUNER, UHF RF AMPLIFIER APPLICATIONS

- Superior Cross Modulation Performance.
- Low Reverse Transfer Capacitance :  $C_{rss}=20\text{fF}$  (Typ.)
- Low Noise Figure. :  $NF=1.5\text{dB}$  (Typ.)

MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

| CHARACTERISTIC            | SYMBOL    | RATING  | UNIT             |
|---------------------------|-----------|---------|------------------|
| Drain-Source Voltage      | $V_{DS}$  | 12.5    | V                |
| Gate 1-Source Voltage     | $V_{G1S}$ | $\pm 8$ | V                |
| Gate 2-Source Voltage     | $V_{G2S}$ | $\pm 8$ | V                |
| Drain Current             | $I_D$     | 30      | mA               |
| Drain Power Dissipation   | $P_D$     | 100     | mW               |
| Chanel Temperature        | $T_{ch}$  | 125     | $^\circ\text{C}$ |
| Storage Temperature Range | $T_{stg}$ | -55~125 | $^\circ\text{C}$ |

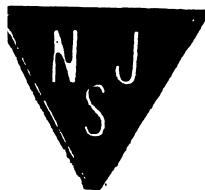
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ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

Weight : 0.006g

| CHARACTERISTIC                | SYMBOL         | TEST CONDITION  | MIN. | TYP. | MAX.     | UNIT |
|-------------------------------|----------------|---|------|------|----------|------|
| Gate 1 Leakage Current        | $I_{G1SS}$     | $V_{DS}=0$ , $V_{G1S}=\pm 6\text{V}$ , $V_{G2S}=0$                                    | —    | —    | $\pm 50$ | nA   |
| Gate 2 Leakage Current        | $I_{G2SS}$     | $V_{DS}=0$ , $V_{G1S}=0$ , $V_{G2S}=\pm 6\text{V}$                                    | —    | —    | $\pm 50$ | nA   |
| Drain-Source Voltage          | $V_{(BR) DSX}$ | $V_{G1S}=-0.5\text{V}$ , $V_{G2S}=-0.5\text{V}$<br>$I_D=100\mu\text{A}$               | 12.5 | —    | —        | V    |
| Drain Current                 | $I_{DSS}$      | $V_{DS}=6\text{V}$ , $V_{G2S}=4.5\text{V}$ ,<br>$V_{G1S}=0\text{V}$                   | 0    | —    | 0.1      | mA   |
| Gate 1-Source Cut-off Voltage | $V_{G1S(OFF)}$ | $V_{DS}=6\text{V}$ , $V_{G2S}=4.5\text{V}$ ,<br>$I_D=100\mu\text{A}$                  | 0.4  | 0.9  | 1.4      | V    |
| Gate 2-Source Cut-off Voltage | $V_{G2S(OFF)}$ | $V_{DS}=6\text{V}$ , $V_{G1S}=4.0\text{V}$ ,<br>$I_D=100\mu\text{A}$                  | 0.5  | 1.0  | 1.5      | V    |
| Forward Transfer Admittance   | $ Y_{fs} $     | $V_{DS}=6\text{V}$ , $V_{G2S}=4.5\text{V}$ ,<br>$I_D=10\text{mA}$ , $f=1\text{kHz}$   | 17   | 21   | —        | mS   |
| Input Capacitance             | $C_{iss}$      | $V_{DS}=6\text{V}$ , $V_{G2S}=4.5\text{V}$ ,<br>$I_D=10\text{mA}$ , $f=1\text{MHz}$   | 0.9  | 1.5  | 2.1      | pF   |
| Reverse Transfer Capacitance  | $C_{rss}$      |   | —    | 20   | 40       | fF   |
| Power Gain                    | $G_{ps}$       | $V_{DS}=6\text{V}$ , $V_{G2S}=4.5\text{V}$ ,<br>$I_D=10\text{mA}$ , $f=800\text{MHz}$ | 18   | 20   | —        | dB   |
| Noise Figure                  | NF             |   | —    | 1.5  | 2.5      |      |



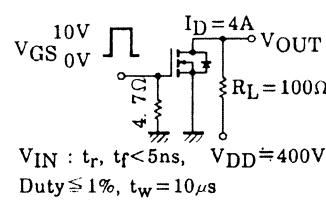
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## 2SK1358

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### Electrical Characteristics ( $T_a = 25^\circ C$ )

| CHARACTERISTIC                                  | SYMBOL               | TEST CONDITION                          | MIN. | TYP. | MAX.      | UNIT     |
|---|----------------------|---|------|------|-----------|----------|
| Gate Leakage Current                            | $I_{GSS}$            | $V_{GS} = \pm 25V, V_{DS} = 0V$         | -    | -    | $\pm 100$ | nA       |
| Drain Cut-off Current                           | $I_{DSS}$            | $V_{DS} = 720V, V_{GS} = 0V$            | -    | -    | 300       | $\mu A$  |
| Drain-Source Breakdown Voltage                  | $V_{(BR) DSS}$       | $I_D = 10mA, V_{GS} = 0V$               | 900  | -    | -         | V        |
| Gate Threshold Voltage                          | $V_{th}$             | $V_{DS} = 10V, I_D = 1mA$               | 1.5  | -    | 3.5       | V        |
| Drain-Source ON Resistance                      | $R_{DS (\text{ON})}$ | $I_D = 4A, V_{GS} = 10V$                | -    | 1.1  | 1.4       | $\Omega$ |
| Forward Transfer Admittance                     | $ Y_{fs} $           | $V_{DS} = 20V, I_D = 4A$                | 2.0  | 4.0  | -         | S        |
| Input Capacitance                               | $C_{iss}$            | $V_{DS} = 25V, V_{GS} = 0V, f = 1MHz$   | -    | 1300 | 1800      | pF       |
| Reverse Transfer Capacitance                    | $C_{rss}$            |   | -    | 100  | 150       |          |
| Output Capacitance                              | $C_{oss}$            |   | -    | 180  | 260       |          |
| Switching Time                                  | Rise Time            | $t_r$                                   | -    | 25   | 50        | ns       |
|   | Turn-on Time         | $t_{on}$                                | -    | 40   | 80        |          |
|   | Fall Time            | $t_f$                                   | -    | 20   | 40        |          |
|   | Turn-off Time        | $t_{off}$                               | -    | 100  | 200       |          |
| Total Gate Charge (Gate-Source Plus Gate-Drain) | $Q_g$                | $V_{DD} = 400V, V_{GS} = 10V, I_D = 9A$ | -    | 120  | 240       | nC       |
| Gate-Source Charge                              | $Q_{gs}$             |   | -    | 70   | -         |          |
| Gate-Drain ("Miller") Charge                    | $Q_{gd}$             |   | -    | 50   | -         |          |



### Source-Drain Diode Ratings and Characteristics ( $T_a = 25^\circ C$ )

| CHARACTERISTICS                  | SYMBOL    | TEST CONDITION             | MIN. | TYP. | MAX. | UNIT |
|----------------------------------|-----------|----------------------------|------|------|------|------|
| Continuous Drain Reverse Current | $I_{DR}$  | -                          | -    | -    | 9    | A    |
| Pulse Drain Reverse Current      | $I_{DRP}$ | -                          | -    | -    | 27   | A    |
| Diode Forward Voltage            | $V_{DSF}$ | $I_{DR} = 9A, V_{GS} = 0V$ | -    | -    | -2.0 | V    |