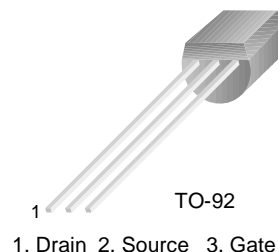


# 2N5638

2N5638

## N-Channel Switch

- This device is designed for low level analog switching, sample and hold circuits and chopper stabilized amplifiers.
- Sourced from process 51.



## Absolute Maximum Ratings \* $T_C=25^\circ\text{C}$ unless otherwise noted

| Symbol         | Parameter  | Value      | Units            |
|----------------|--|------------|------------------|
| $V_{DG}$       | Drain-Gate Voltage                               | 30         | V                |
| $V_{GS}$       | Gate-Source Voltage                              | -30        | V                |
| $I_{GF}$       | Forward Gate Current                             | 50         | mA               |
| $T_J, T_{STG}$ | Operating and Storage Junction Temperature Range | -55 ~ +150 | $^\circ\text{C}$ |

\* These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

### NOTES:

- These ratings are based on a maximum junction temperature of 150 degrees C.
- These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

## Electrical Characteristics $T_C=25^\circ\text{C}$ unless otherwise noted

| Symbol                              | Parameter                         | Test Condition  | Min. | Typ. | Max. | Units    |
|-------------------------------------|-----------------------------------|---|------|------|------|----------|
| <b>Off Characteristics</b>          |                                   |   |      |      |      |          |
| $V_{(BR)GSS}$                       | Gate-Source Breakdown Voltage     | $V_{DS} = 0, I_G = -10\mu\text{A}$  | -30  |      |      | V        |
| $I_{GSS}$                           | Gate Reverse Current              | $V_{GS} = -15\text{V}, V_{DS} = 0$  |      |      | -1.0 | nA       |
| $I_{D(off)}$                        | Drain Cutoff Leakage Current      | $V_{DS} = 12\text{V}, V_{GS} = 15\text{V}$  |      |      | 1.0  | nA       |
| <b>On Characteristics</b>           |                                   |   |      |      |      |          |
| $I_{DSS}$                           | Zero-Gate Voltage Drain Current * | $V_{DS} = 20\text{V}, I_{GS} = 0$   | 50   |      |      | mA       |
| $r_{DS(on)}$                        | Drain-Source On Resistance        | $V_{GS} = 0\text{V}, I_D = 1.0\text{mA}$  |      |      | 30   | $\Omega$ |
| <b>Small Signal Characteristics</b> |                                   |   |      |      |      |          |
| $r_{ds(on)}$                        | Drain-Source On Resistance        | $V_{DS} = V_{GS} = 0, f = 1.0\text{kHz}$  |      |      | 30   | $\Omega$ |
| $C_{iss}$                           | Input Capacitance                 | $V_{DS} = 0, V_{GS} = 12\text{V}, f = 1.0\text{MHz}$  |      |      | 10   | pF       |
| $C_{rss}$                           | Reverse Transfer Capacitance      | $V_{DS} = 0\text{V}, V_{GS} = 12\text{V}, f = 1.0\text{MHz}$  |      |      | 4.0  | pF       |
| <b>Switching Characteristics</b>    |                                   |   |      |      |      |          |
| $t_{d(on)}$                         | Trun On Delay Time                | $V_{DD} = 10\text{V}, V_{GS(on)} = 0$<br>$V_{GS(off)} = -12, I_{D(on)} = 12\text{mA}$<br>$R_G = 50\Omega$ |      |      | 4.0  | ns       |
| $t_r$                               | Rise Time                         |   |      |      | 5.0  | ns       |
| $t_{d(off)}$                        | Trun Off Delay Time               |   |      |      | 5.0  | ns       |
| $t_f$                               | Fall Time                         |   |      |      | 10   | ns       |

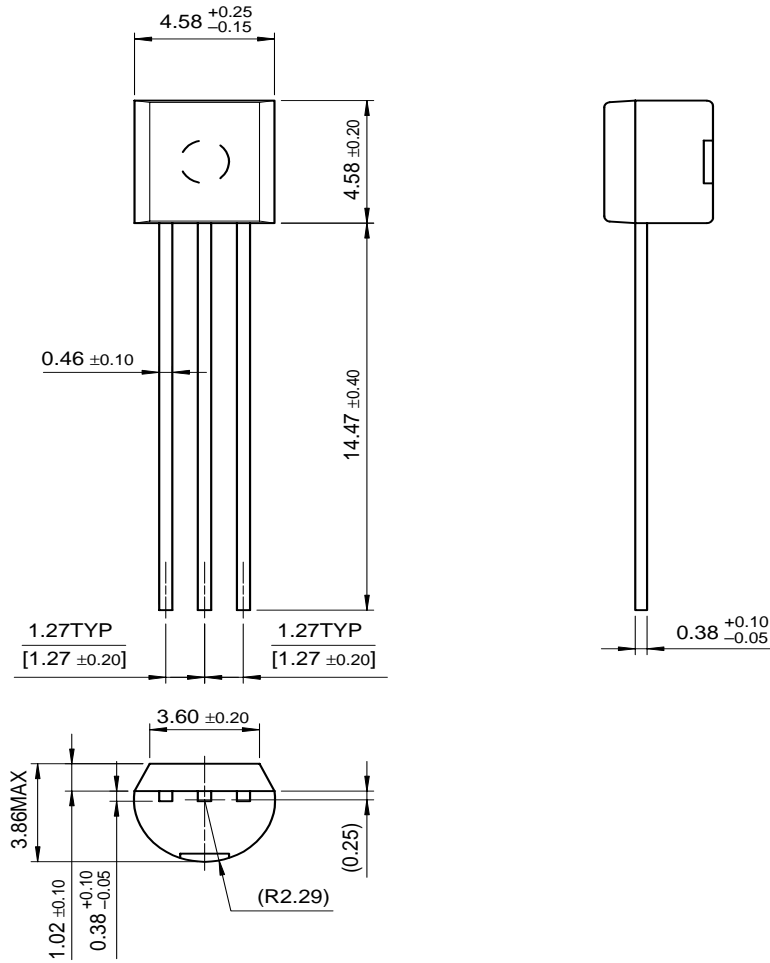
\* Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 1.0\%$

## Thermal Characteristics $T_A=25^\circ\text{C}$ unless otherwise noted

| Symbol          | Parameter   | Max.       | Units                      |
|-----------------|---|------------|----------------------------|
| $P_D$           | Total Device Dissipation<br>Derate above $25^\circ\text{C}$ | 350<br>2.8 | mW<br>mW/ $^\circ\text{C}$ |
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case                        | 125        | $^\circ\text{C/W}$         |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient                     | 357        | $^\circ\text{C/W}$         |

# Package Dimensions

## TO-92



Dimensions in Millimeters

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