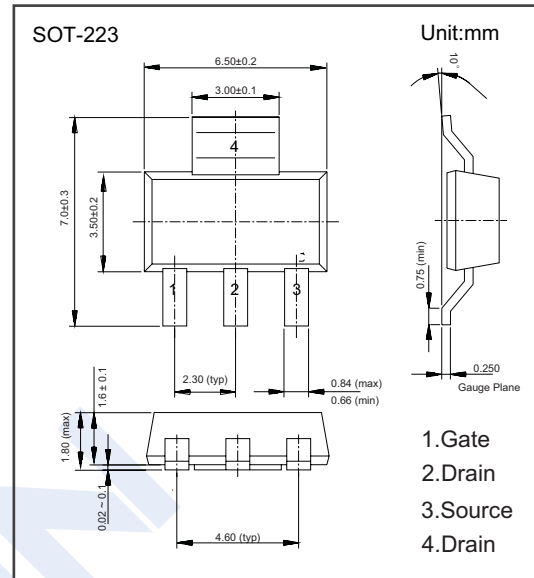
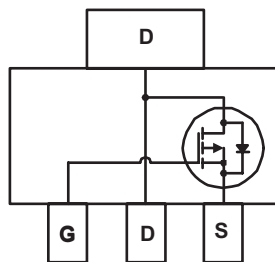


## P-Channel MOSFET

## 2SJ3001

## ■ Features

- -0.67 A, -200 V,  $R_{DS(on)} = 2.7\Omega$  (Max.)  
@  $V_{GS} = -10V$ ,  $I_D = -0.335 A$
- Low Gate Charge (Typ. 6.0 nC)
- Low  $C_{rss}$  (Typ. 7.5 pF)

■ Absolute Maximum Ratings  $T_C = 25^\circ C$  unless otherwise noted.

| Parameter                                                                       | Symbol     | Rating                              | Unit          |
|---------------------------------------------------------------------------------|------------|-------------------------------------|---------------|
| Drain-Source Voltage                                                            | $V_{DS}$   | -200                                | V             |
| Gate-Source Voltage                                                             | $V_{GS}$   | $\pm 30$                            |               |
| Continuous Drain Current                                                        | $I_D$      | $T_C=25^\circ C$<br>-0.67           | A             |
|                                                                                 |            | $T_C=70^\circ C$<br>-0.53           |               |
| Pulsed Drain Current                                                            | $I_{DM}$   | -2.7                                |               |
| Single Pulsed Avalanche Energy                                                  | $E_{AS}$   | 150                                 | mJ            |
| Avalanche Current                                                               | $I_{AR}$   | -0.67                               | A             |
| Repetitive Avalanche Energy                                                     | $E_{AR}$   | 0.25                                | mJ            |
| Peak Diode Recovery $dv/dt$                                                     | $dv/dt$    | -5.5                                | V/ns          |
| Power Dissipation                                                               | $P_D$      | $T_C=25^\circ C$<br>2.5             | W             |
|                                                                                 |            | - Derate above $25^\circ C$<br>0.02 | W/ $^\circ C$ |
| Thermal Resistance Junction- to-Ambient                                         | $R_{thJA}$ | 50                                  | $^\circ C/W$  |
| Junction Temperature                                                            | $T_J$      | 150                                 | $^\circ C$    |
| Storage Temperature Range                                                       | $T_{stg}$  | -55 to 150                          |               |
| Maximum lead temperature for soldering purposes,<br>1/8 from case for 5 seconds | $T_L$      | 300                                 |               |

## Notes:

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2.  $L = 500mH$ ,  $I_{AS} = -0.67A$ ,  $V_{DD} = -50V$ ,  $R_G = 25\Omega$ , Starting  $T_J = 25^\circ C$
3.  $I_{SD} \leq -2.8A$ ,  $di/dt \leq 300A/\mu s$ ,  $V_{DD} \leq BV_{DSS}$ , Starting  $T_J = 25^\circ C$

## P-Channel MOSFET

## 2SJ3001

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

| Parameter                                 | Symbol                      | Test Conditions                                                                      | Min  | Typ   | Max       | Unit                |
|-------------------------------------------|-----------------------------|--------------------------------------------------------------------------------------|------|-------|-----------|---------------------|
| Drain-Source Breakdown Voltage            | $BV_{DS}$                   | $I_D = -250\mu\text{A}$ , $V_{GS} = 0\text{V}$                                       | -200 |       |           | V                   |
| Breakdown Voltage Temperature Coefficient | $\Delta BV_{DS}/\Delta T_J$ | $I_D = -250\mu\text{A}$ , Referenced to $25^\circ\text{C}$                           |      | -0.18 |           | V/ $^\circ\text{C}$ |
| Zero Gate Voltage Drain Current           | $I_{DSS}$                   | $V_{DS} = -200\text{V}$ , $V_{GS} = 0\text{V}$                                       |      |       | -1        | $\mu\text{A}$       |
|                                           |                             | $V_{DS} = -160\text{V}$ , $T_C = 125^\circ\text{C}$                                  |      |       | -10       |                     |
| Gate-Body Leakage Current                 | $I_{GSS}$                   | $V_{DS} = 0\text{V}$ , $V_{GS} = \pm 30\text{V}$                                     |      |       | $\pm 100$ | nA                  |
| Gate Threshold Voltage                    | $V_{GS(th)}$                | $V_{DS} = V_{GS}$ , $I_D = -250\mu\text{A}$                                          | -3.0 |       | -5.0      | V                   |
| Static Drain-Source On-Resistance         | $R_{DS(on)}$                | $V_{GS} = -10\text{V}$ , $I_D = -0.335\text{A}$                                      |      |       | 2.7       | $\Omega$            |
| Forward Transconductance                  | $g_{FS}$                    | $V_{DS} = -40\text{V}$ , $I_D = -0.335\text{A}$                                      | 0.2  |       |           | S                   |
| Input Capacitance                         | $C_{iss}$                   | $V_{DS} = -25\text{V}$ , $V_{GS} = 0\text{V}$ ,<br>$f = 1\text{MHz}$                 |      | 190   | 250       | pF                  |
| Output Capacitance                        | $C_{oss}$                   |                                                                                      |      | 45    | 60        |                     |
| Reverse Transfer Capacitance              | $C_{rss}$                   |                                                                                      |      | 7.5   | 10        |                     |
| Total Gate Charge                         | $Q_g$                       | $V_{DS} = -160\text{V}$ , $I_D = -2.8\text{A}$<br>$V_{GS} = -10\text{V}$ (Note 4)    |      | 6.0   | 8.0       | nC                  |
| Gate Source Charge                        | $Q_{gs}$                    |                                                                                      |      | 1.7   |           |                     |
| Gate Drain Charge                         | $Q_{gd}$                    |                                                                                      |      | 2.9   |           |                     |
| Turn-On DelayTime                         | $t_{d(on)}$                 | $V_{DD} = -100\text{V}$ , $I_D = -2.8\text{A}$<br>$R_G = 25\Omega$ (Note 4)          |      | 8.5   | 25        | ns                  |
| Turn-On Rise Time                         | $t_r$                       |                                                                                      |      | 35    | 80        |                     |
| Turn-Off DelayTime                        | $t_{d(off)}$                |                                                                                      |      | 12    | 35        |                     |
| Turn-Off Fall Time                        | $t_f$                       |                                                                                      |      | 25    | 60        |                     |
| Maximum Body-Diode Continuous Current     | $I_S$                       |                                                                                      |      |       | -0.67     | A                   |
| Source Current Pulsed                     | $I_{SM}$                    |                                                                                      |      |       | -2.7      |                     |
| Diode Forward Voltage                     | $V_{SD}$                    | $I_S = -0.67\text{A}$ , $V_{GS} = 0\text{V}$                                         |      |       | -5.0      | V                   |
| Reverse Recovery Time                     | $t_{rr}$                    | $V_{GS} = 0\text{V}$ , $I_S = -2.8\text{A}$ ,<br>$dI_F/dt = 100\text{A}/\mu\text{s}$ |      | 100   |           | ns                  |
| Reverse Recovery Charge                   | $Q_{rr}$                    |                                                                                      |      | 0.34  |           | $\mu\text{C}$       |

Notes: 4. Essentially independent of operating temperature

## ■ Marking

|         |       |
|---------|-------|
| Marking | J3001 |
|---------|-------|

## P-Channel MOSFET

## 2SJ3001

## ■ Typical Characteristics

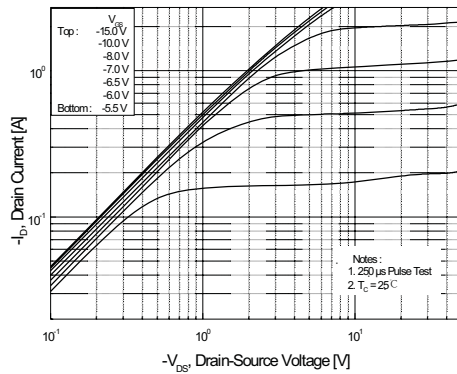


Figure 1. On-Region Characteristics

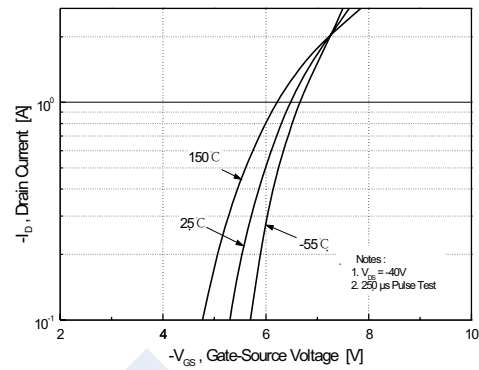


Figure 2. Transfer Characteristics

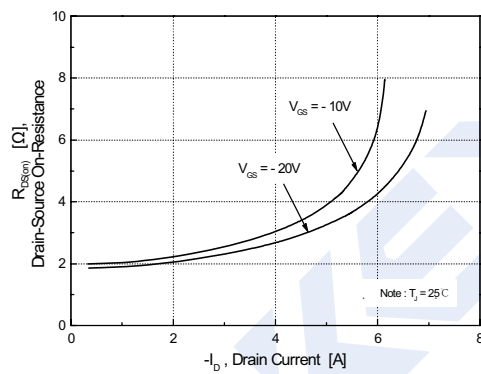


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

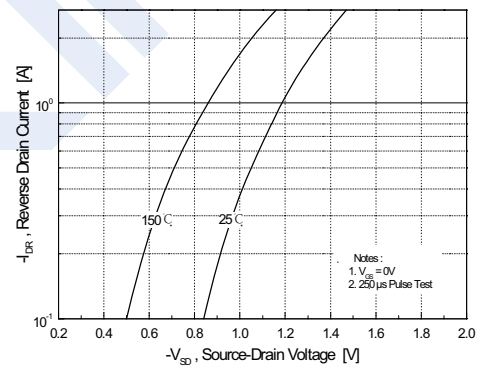


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

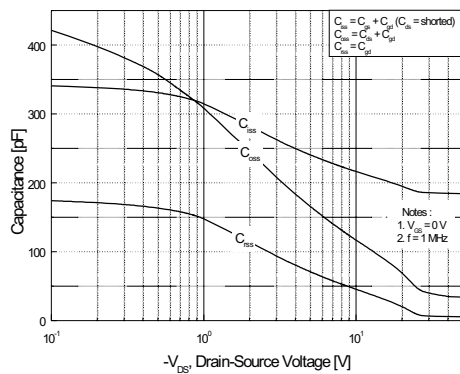


Figure 5. Capacitance Characteristics

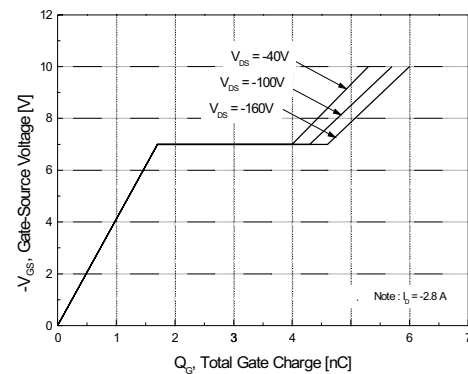


Figure 6. Gate Charge Characteristics

## P-Channel MOSFET

## 2SJ3001

## ■ Typical Characteristics (Continued)

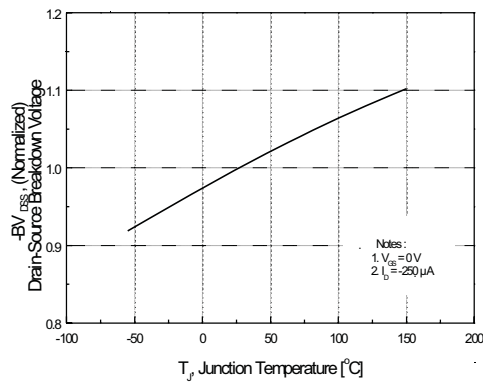


Figure 7. Breakdown Voltage Variation vs. Temperature

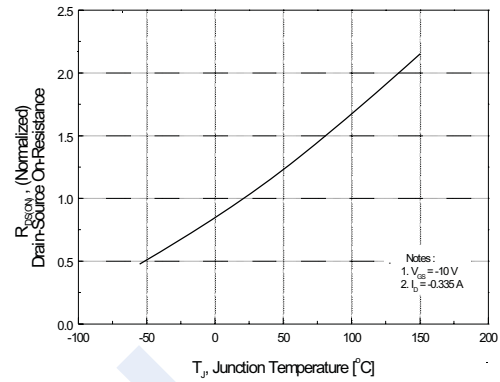


Figure 8. On-Resistance Variation vs. Temperature

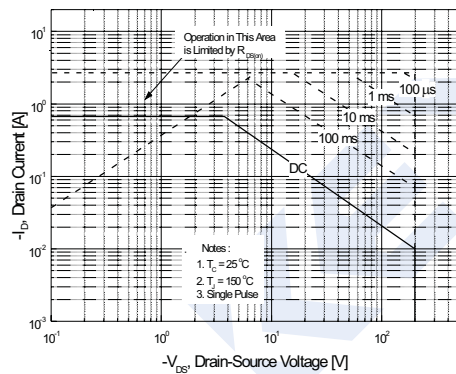


Figure 9. Maximum Safe Operating Area

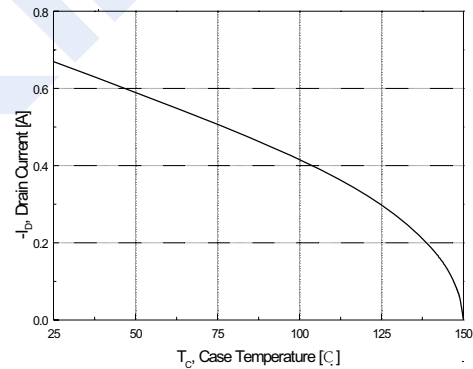


Figure 10. Maximum Drain Current vs. Case Temperature

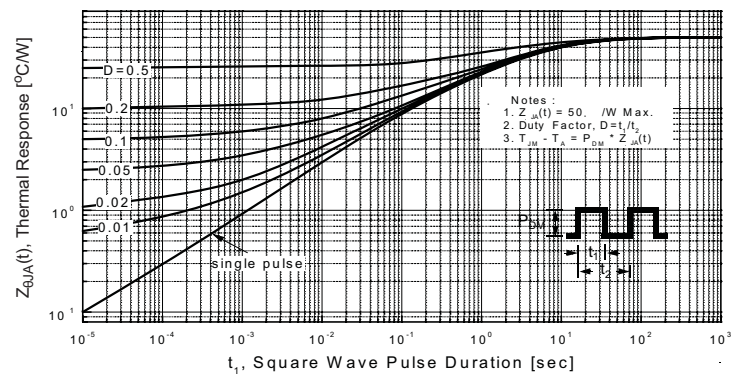


Figure 11. Transient Thermal Response Curve

## P-Channel MOSFET

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Figure 12. Gate Charge Test Circuit &amp; Waveform

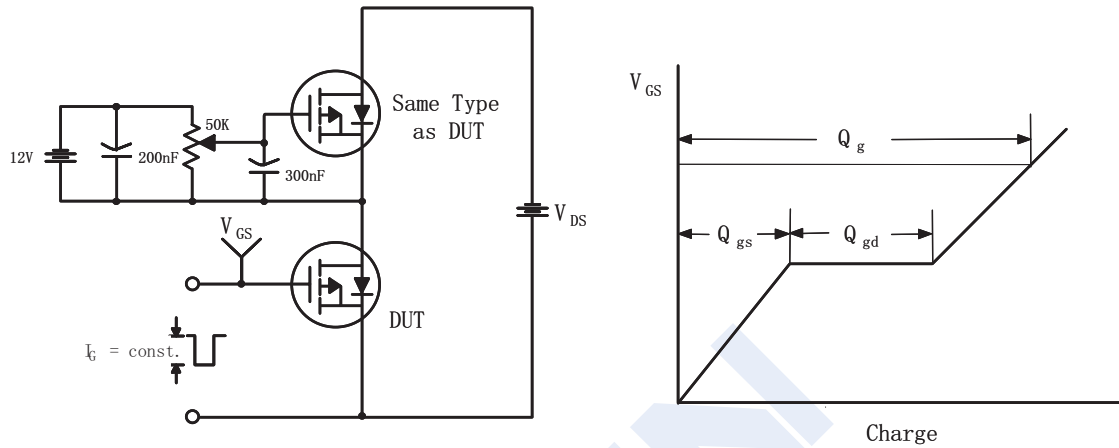


Figure 13. Resistive Switching Test Circuit &amp; Waveforms

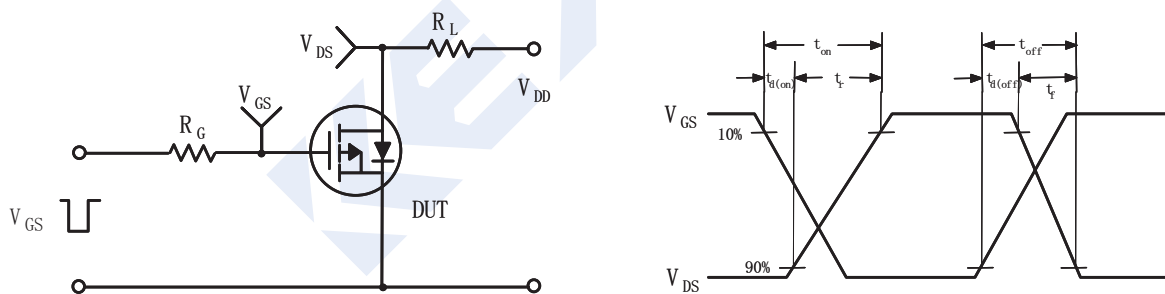
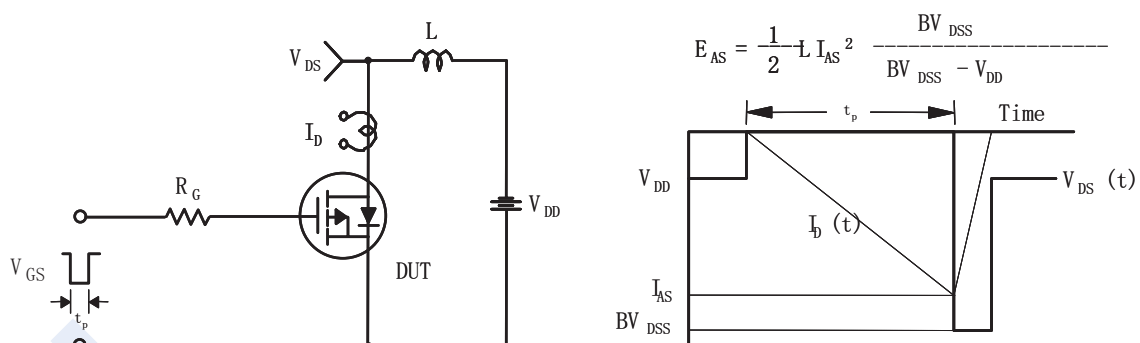


Figure 14. Unclamped Inductive Switching Test Circuit &amp; Waveforms



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Figure 15. Peak Diode Recovery dv/dt Test Circuit &amp; Waveforms

