

Features:

- Advanced trench process technology
- avalanche energy, 100% test
- Fully characterized avalanche voltage and current

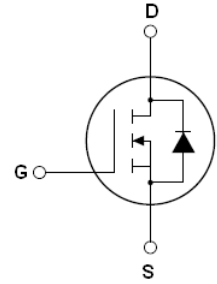
Description:

The SSF6010A is a new generation of middle voltage and high current N-Channel enhancement mode trench power MOSFET. This new technology increases the device reliability and electrical parameter repeatability. SSF6010A is assembled in high reliability and qualified assembly house.

Application:

- Power switching application

ID =75A
BV=60V
Rdson=8mΩ (typ.)



SSF6010A TOP View (D2PAK)

Absolute Maximum Ratings

| | Parameter | Max. | Units |
|---------------------------------------|--|-------------|------------------|
| $I_D @ T_c=25\text{ }^\circ\text{C}$ | Continuous drain current, VGS@10V | 75 | A |
| $I_D @ T_c=100\text{ }^\circ\text{C}$ | Continuous drain current, VGS@10V | 45 | |
| I_{DM} | Pulsed drain current ① | 300 | |
| $P_D @ T_c=25\text{ }^\circ\text{C}$ | Power dissipation | 144 | W |
| | Linear derating factor | 0.74 | W/ C |
| V_{GS} | Gate-to-Source voltage | ± 20 | V |
| E_{AS} | Single pulse avalanche energy ② | 220 | mJ |
| E_{AR} | Repetitive avalanche energy | TBD | |
| T_J T_{STG} | Operating Junction and Storage Temperature Range | -55 to +175 | $^\circ\text{C}$ |

Thermal Resistance

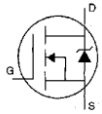
| | Parameter | Min. | Typ. | Max. | Units |
|-----------------|---------------------|------|------|------|-------|
| $R_{\theta JC}$ | Junction-to-case | — | 1.04 | — | C/W |
| $R_{\theta JA}$ | Junction-to-ambient | — | — | 62 | |

Electrical Characteristics @TJ=25 °C (unless otherwise specified)

| | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|--------------|--------------------------------------|------|------|------|---------|--|
| BV_{DSS} | Drain-to-Source breakdown voltage | 60 | — | — | V | $V_{GS}=0V, I_D=250\mu A$ |
| $R_{DS(on)}$ | Static Drain-to-Source on-resistance | — | 8 | 10 | mΩ | $V_{GS}=10V, I_D=30A$ |
| $V_{GS(th)}$ | Gate threshold voltage | 2.0 | — | 4.0 | V | $V_{DS}=V_{GS}, I_D=250\mu A$ |
| g_{fs} | Forward transconductance | — | 58 | — | S | $V_{DS}=5V, I_D=30A$ |
| I_{DSS} | Drain-to-Source leakage current | — | — | 2 | μA | $V_{DS}=60V, V_{GS}=0V$ |
| | | — | — | 10 | | $V_{DS}=60V, V_{GS}=0V, T_J=150\text{ }^\circ\text{C}$ |
| I_{GSS} | Gate-to-Source forward leakage | — | — | 100 | nA | $V_{GS}=20V$ |
| | Gate-to-Source reverse leakage | — | — | -100 | | $V_{GS}=-20V$ |

| | | | | | | |
|--------------|--------------------------------|---|------|---|----|---|
| Q_g | Total gate charge | — | 45 | — | nC | $I_D=30A$ $V_{DD}=30V$ $V_{GS}=10V$ |
| Q_{gs} | Gate-to-Source charge | — | 4.2 | — | | |
| Q_{gd} | Gate-to-Drain("Miller") charge | — | 15 | — | | |
| $t_{d(on)}$ | Turn-on delay time | — | 14.6 | — | nS | $V_{DD}=30V$ $I_D=2A, R_L=15\Omega$ $R_G=2.5\Omega$ $V_{GS}=10V$ |
| t_r | Rise time | — | 14.2 | — | | |
| $t_{d(off)}$ | Turn-Off delay time | — | 40 | — | | |
| t_f | Fall time | — | 7.3 | — | | |
| C_{iss} | Input capacitance | — | 1480 | — | pF | $V_{GS}=0V$ $V_{DS}=25V$ $f=1.0MHZ$ |
| C_{oss} | Output capacitance | — | 190 | — | | |
| C_{rss} | Reverse transfer capacitance | — | 135 | — | | |

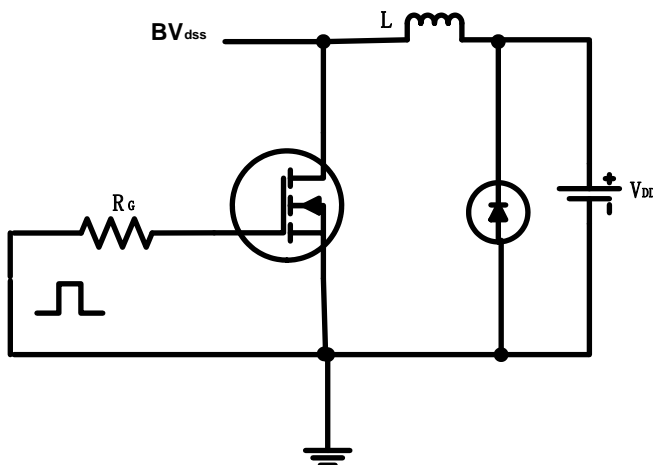
Source-Drain Ratings and Characteristics

| | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|----------|---|---|------|------|-------|--|
| I_S | Continuous Source Current (Body Diode) | — | — | 75 | A | MOSFET symbol showing the integral reverse p-n junction diode.  |
| I_{SM} | Pulsed Source Current (Body Diode) ① | — | — | 300 | | |
| V_{SD} | Diode Forward Voltage | — | — | 1.3 | V | $T_J=25C, I_S=40A, V_{GS}=0V$ ③ |
| t_{rr} | Reverse Recovery Time | — | 33 | — | nS | $T_J=25C, I_F=60A$ $di/dt=100A/\mu s$ ③ |
| Q_{rr} | Reverse Recovery Charge | — | 61 | — | nC | |
| t_{on} | Forward Turn-on Time | Intrinsic turn-on time is negligible (turn-on is dominated by $L_s + L_D$) | | | | |

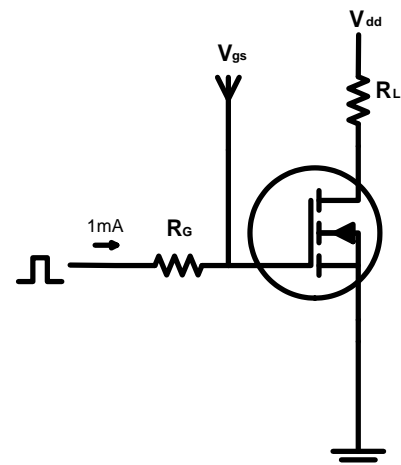
Notes:

- ① Repetitive rating; pulse width limited by max junction temperature.
- ② Test condition: $L = 0.3mH, V_{DD} = 30V, I_D=37A$
- ③ Pulse width $\leq 300\mu s$, duty cycle $\leq 1.5\%$; $R_G = 25\Omega$ Starting $T_J = 25^\circ C$

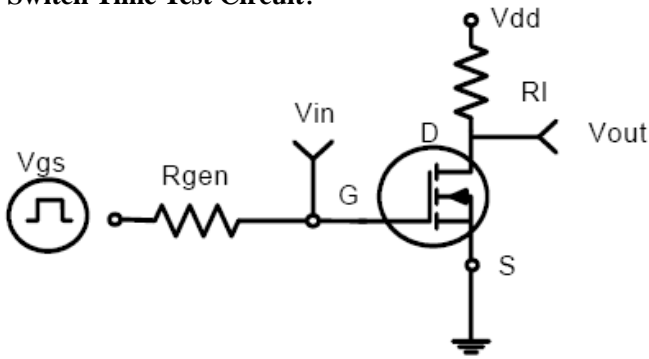
EAS test circuit:



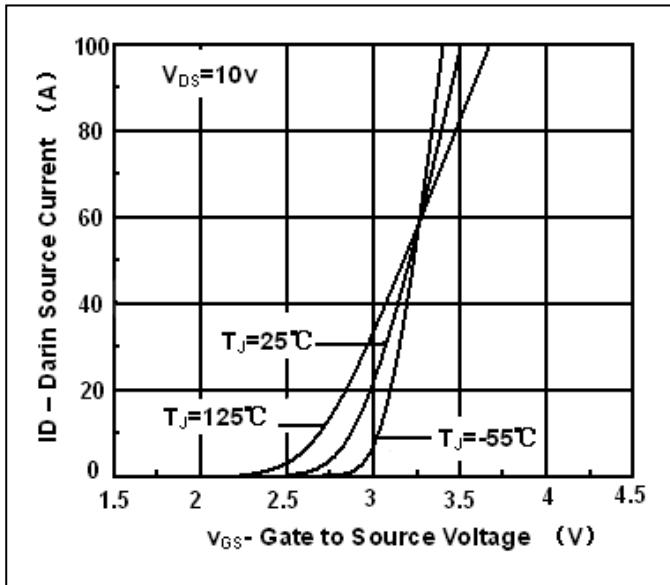
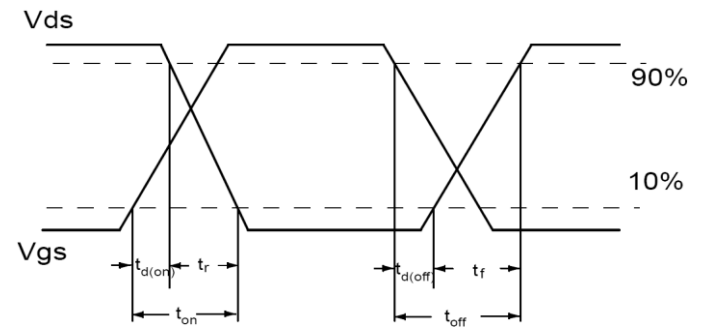
Gate charge test circuit:



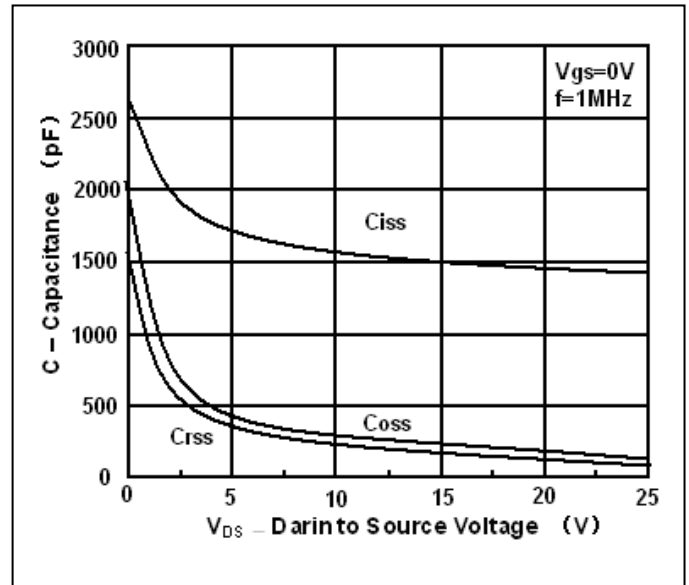
Switch Time Test Circuit:



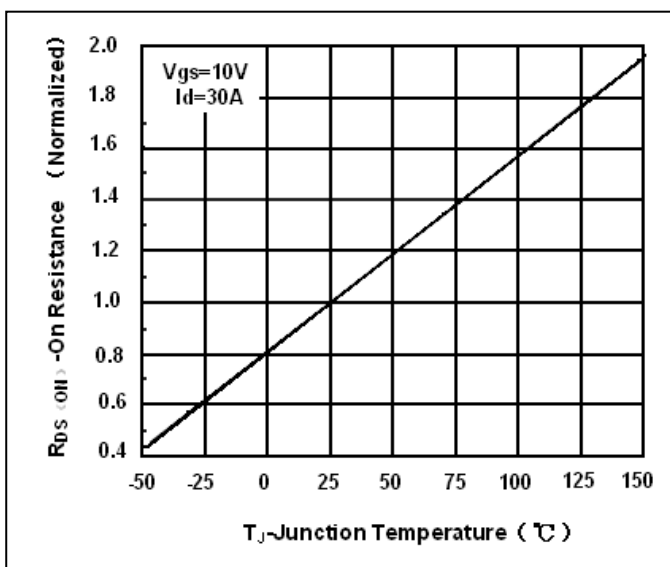
Switch Waveforms:



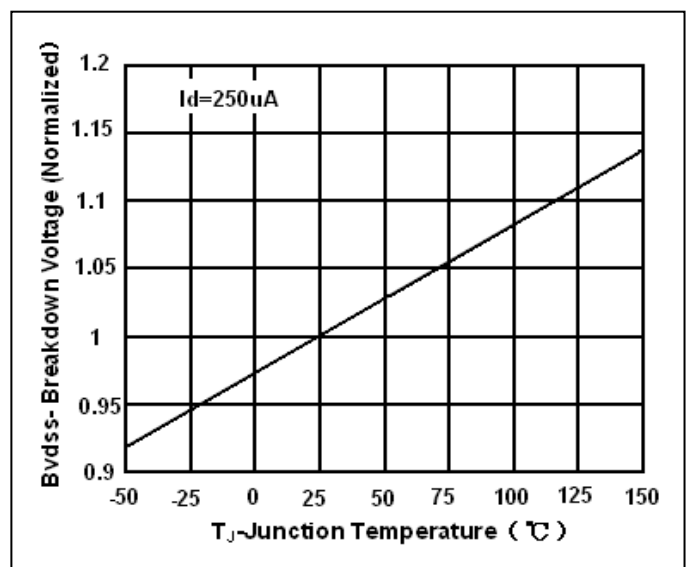
Transfer Characteristic



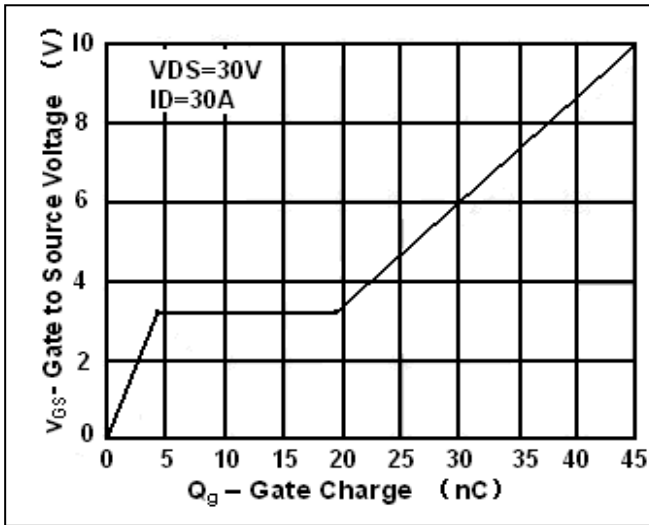
Capacitance



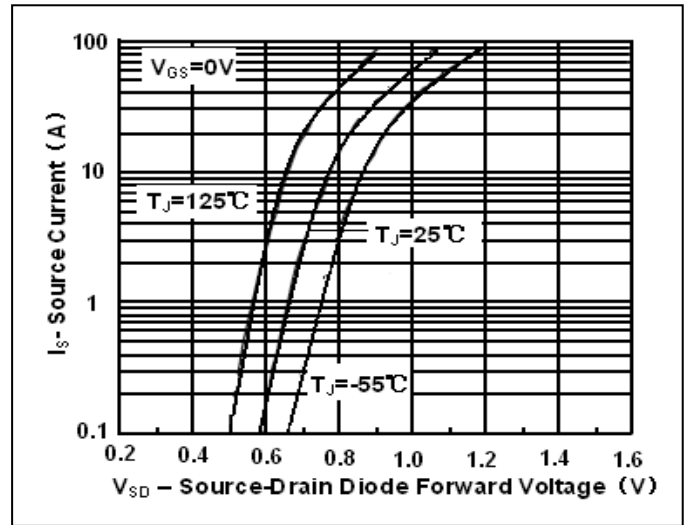
On Resistance vs. Junction Temperature



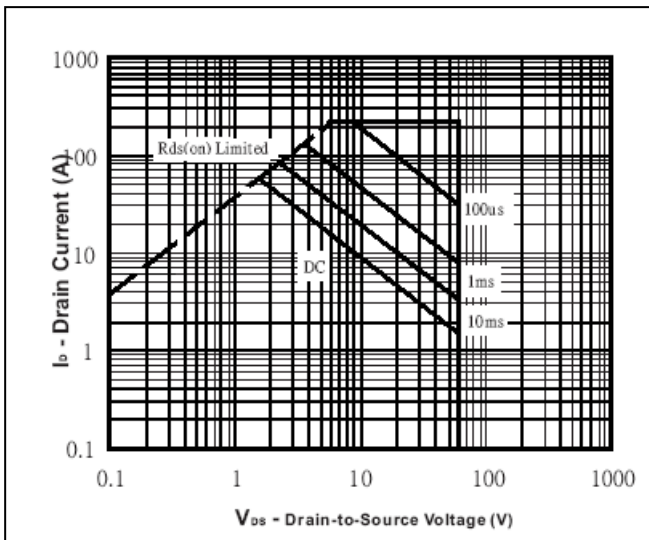
Breakdown Voltage vs. Junction Temperature



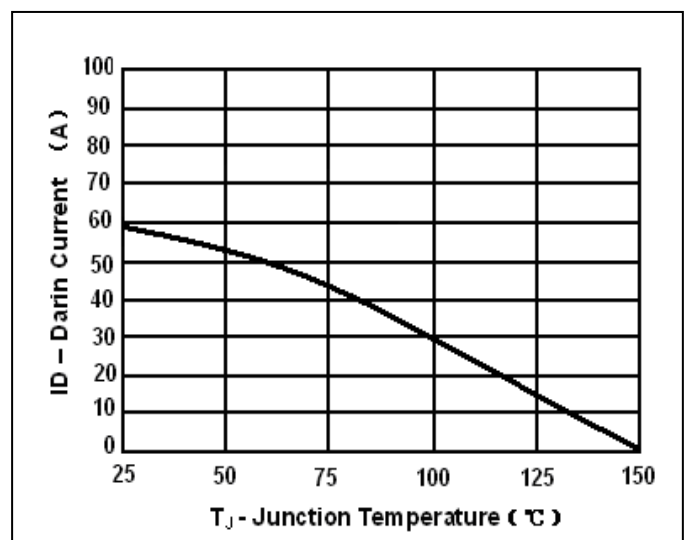
Gate Charge



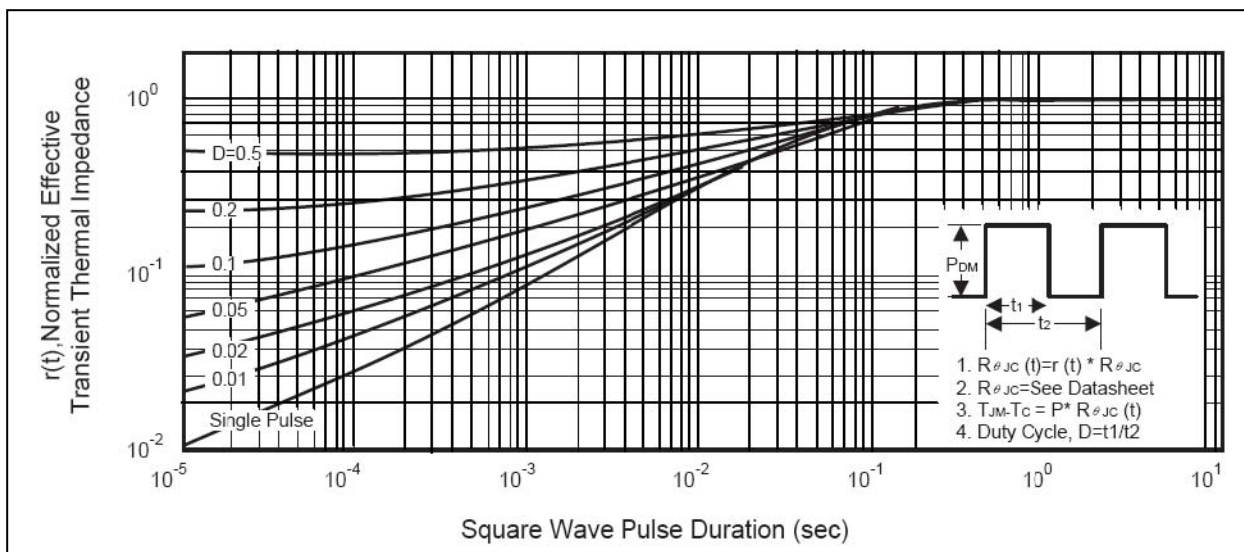
Source-Drain Diode Forward Voltage



Safe Operation Area



Max Drain Current vs. Junction Temperature



Transient Thermal Impedance Curve

TO263 (D2PAK) MECHANICAL DATA:

| DIM. | mm. | | | inch | | |
|------|------|-----|-------|-------|-------|-------|
| | MIN. | TYP | MAX. | MIN. | TYP. | MAX. |
| A | 4.4 | | 4.6 | 0.173 | | 0.181 |
| A1 | 2.49 | | 2.69 | 0.098 | | 0.106 |
| A2 | 0.03 | | 0.23 | 0.001 | | 0.009 |
| B | 0.7 | | 0.93 | 0.027 | | 0.036 |
| B2 | 1.14 | | 1.7 | 0.044 | | 0.067 |
| C | 0.45 | | 0.6 | 0.017 | | 0.023 |
| C2 | 1.23 | | 1.36 | 0.048 | | 0.053 |
| D | 8.95 | | 9.35 | 0.352 | | 0.368 |
| D1 | | 8 | | | 0.315 | |
| E | 10 | | 10.4 | 0.393 | | |
| E1 | | 8.5 | | | 0.334 | |
| G | 4.88 | | 5.28 | 0.192 | | 0.208 |
| L | 15 | | 15.85 | 0.590 | | 0.625 |
| L2 | 1.27 | | 1.4 | 0.050 | | 0.055 |
| L3 | 1.4 | | 1.75 | 0.055 | | 0.068 |
| M | 2.4 | | 3.2 | 0.094 | | 0.126 |
| R | | 0.4 | | | 0.015 | |
| V2 | 0° | | 4° | | | |

