# SILIKRON

# SSF1116

**Feathers:**

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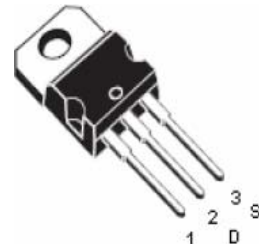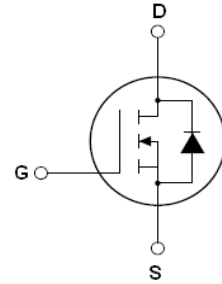- Fully characterized avalanche voltage and current

**Description:**

The SSF1116 is a new generation of high voltage and low current N–Channel enhancement mode trench power MOSFET. This new technology increases the device reliability and electrical parameter repeatability. SSF1116 is assembled in high reliability and qualified assembly house.

**Application:**

- Power switching application

**ID =75A**
**BV=110V**
**Rdson=12**mΩ (Typ.)





**SSF1116 TOP View (T0-220)**

## Absolute Maximum Ratings

| | Parameter | Max. | Units |
|---|---|---|---|
| $I_D$@$T_c$=25 ℃ | Continuous drain current,VGS@10V | 75 | A |
| $I_D$@$T_c$=100℃ | Continuous drain current,VGS@10V | 61 | |
| $I_{DM}$ | Pulsed drain current ① | 300 | |
| $P_D$@$T_C$=25℃ | Power dissipation | 273 | W |
| | Linear derating factor | 1.5 | W/℃ |
| $V_{GS}$ | Gate-to-Source voltage | ±20 | V |
| $E_{AS}$ | Single pulse avalanche energy ② | 300 | mJ |
| $E_{AR}$ | Repetitive avalanche energy | TBD | mJ |
| dv/dt | Peak diode recovery voltage | 31 | v/ns |
| $T_J$ $T_{STG}$ | Operating Junction and Storage Temperature Range | –55 to +175 | ℃ |

## Thermal Resistance

| | Parameter | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| $R_{θJC}$ | Junction-to-case | — | 0.55 | — | ℃/W |
| $R_{θJA}$ | Junction-to-ambient | — | — | 62 | |

## Electrical Characteristics @TJ=25 ℃ (unless otherwise specified)

| | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|
| $BV_{DSS}$ | Drain-to-Source breakdown voltage | 110 | 120 | — | V | $V_{GS}$=0V,$I_D$=250µA |
| $R_{DS(on)}$ | Static Drain-to-Source on-resistance | — | 12 | 16 | mΩ | $V_{GS}$=10V,$I_D$=30A |
| $V_{GS(th)}$ | Gate threshold voltage | 2.0 | — | 4.0 | V | $V_{DS}$=$V_{GS}$,$I_D$=250µA |
| $I_{DSS}$ | Drain-to-Source leakage current | — | — | 2 | µA | $V_{DS}$=110V,$V_{GS}$=0V |
| | | — | — | 10 | | $V_{DS}$=110V, $V_{GS}$=0V,$T_J$=150℃ |
| $I_{GSS}$ | Gate-to-Source forward leakage | — | — | 100 | nA | $V_{GS}$=20V |
| | Gate-to-Source reverse leakage | — | — | -100 | | $V_{GS}$=-20V |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| $Q_g$ | *Total gate charge* | — | 110 | | | | $I_D$=30A,$V_{GS}$=10V |
| $Q_{gs}$ | *Gate-to-Source charge* | — | 22 | — | nC | | $V_{DD}$=30V |
| $Q_{gd}$ | *Gate-to-Drain("Miller") charge* | — | 39 | — | | | |
| $t_{d(on)}$ | *Turn-on delay time* | — | 20 | | | | $V_{DD}$=30V |
| $t_r$ | *Rise time* | — | 16 | | nS | | $I_D$=2A ,$R_L$=15Ω |
| $t_{d(off)}$ | *Turn-Off delay time* | — | 69 | | | | $R_G$=2.5Ω |
| $t_f$ | *Fall time* | — | 19 | | | | $V_{GS}$=10V |
| $C_{iss}$ | *Input capacitance* | — | 3150 | | | | $V_{GS}$=0V |
| $C_{oss}$ | Output capacitance | — | 350 | | pF | | $V_{DS}$=25V |
| $C_{rss}$ | Reverse transfer capacitance | — | 240 | | | | f=1.0MHZ |

**Source-Drain Ratings and Characteristics**

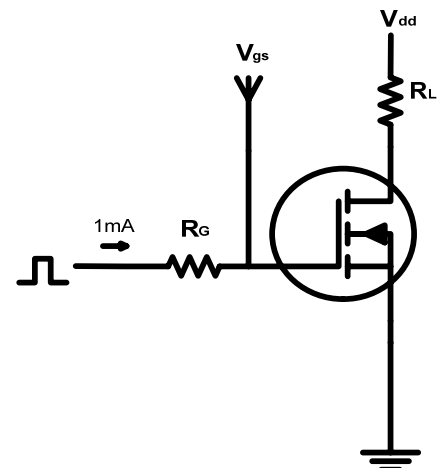| | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current (Body Diode) | — | — | 75 | A | MOSFET symbol showing the integral reverse p-n junction diode. |
| $I_{SM}$ | Pulsed Source Current (Body Diode) ① | — | | 300 | | |
| $V_{SD}$ | Diode Forward Voltage | — | — | 1.3 | V | $T_J$=25℃,$I_S$=60A,$V_{GS}$=0V ③ |
| $t_{rr}$ | Reverse Recovery Time | — | 54 | — | nS | $T_J$=25℃,$I_F$=75A |
| $Q_{rr}$ | Reverse Recovery Charge | — | 131 | — | μC | di/dt=100A/μs ③ |
| $t_{on}$ | Forward Turn-on Time | Intrinsic turn-on time is negligible (turn-on is dominated by Ls + LD) | | | | |

Notes:

① Repetitive rating; pulse width limited by max junction temperature.

② Test condition: L =0.3mH, VDD = 50V,Id=45A

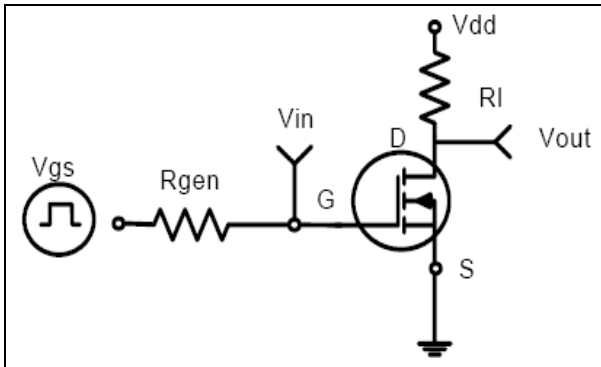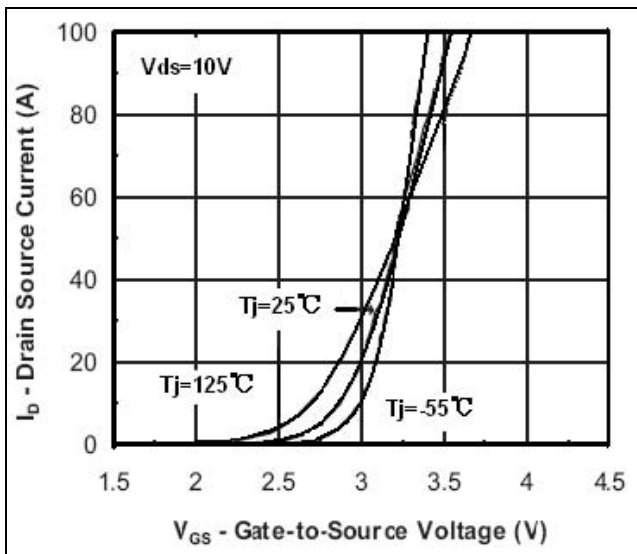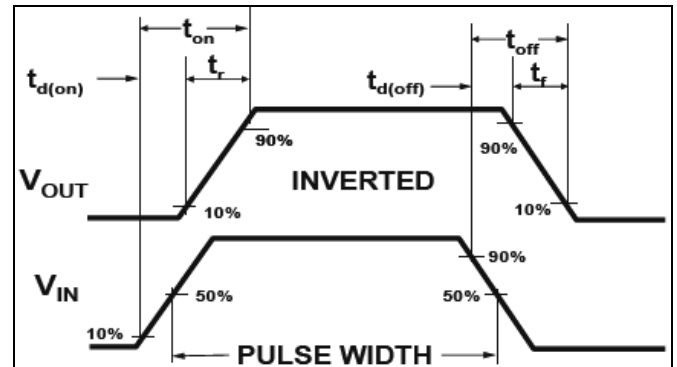③ Pulse width≤300μS, duty cycle≤1.5% ; RG = 25Ω  Starting TJ = 25°C
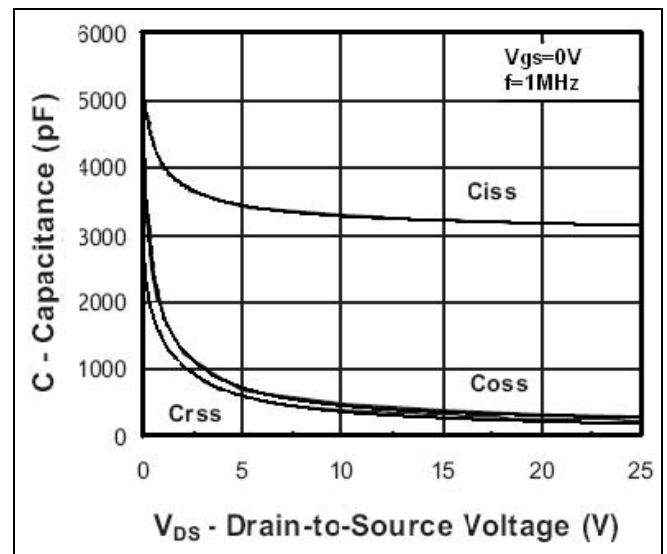
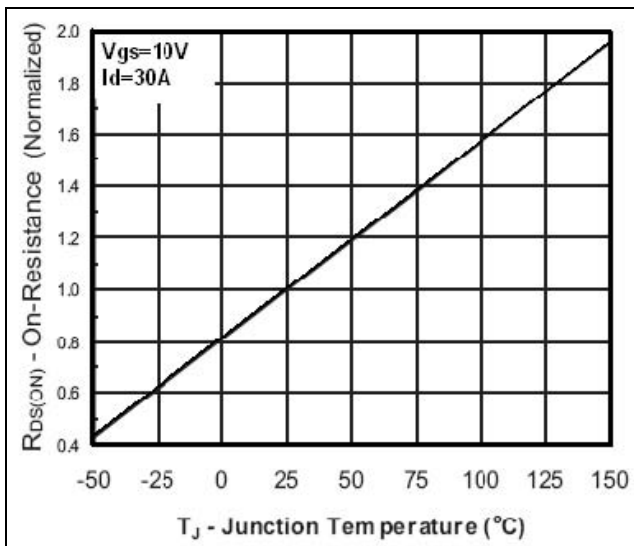**EAS Test Circuit:**

**Gate Charge Test Circuit:**

**Switch Time Test Circuit:**
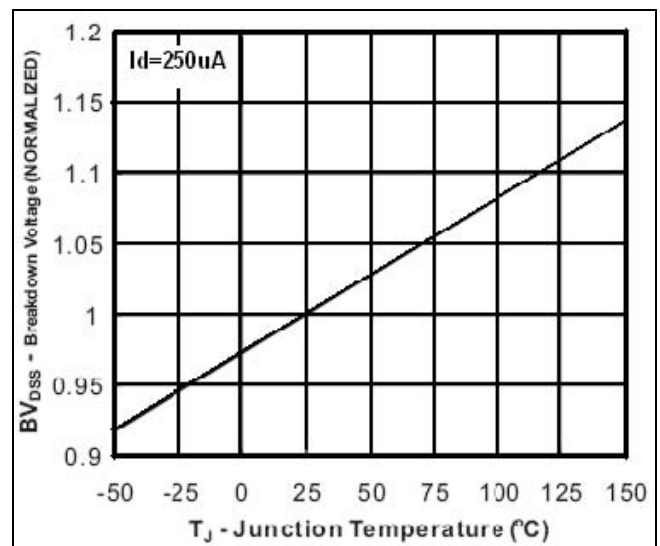
**Switch Waveform:**
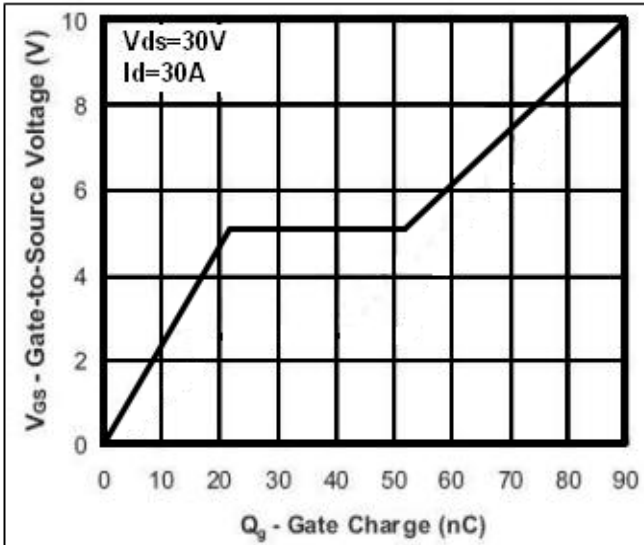






**Transfer Characteristic**
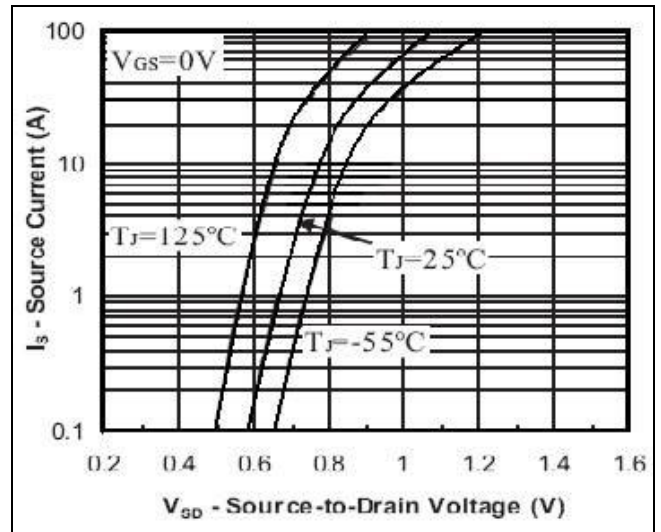


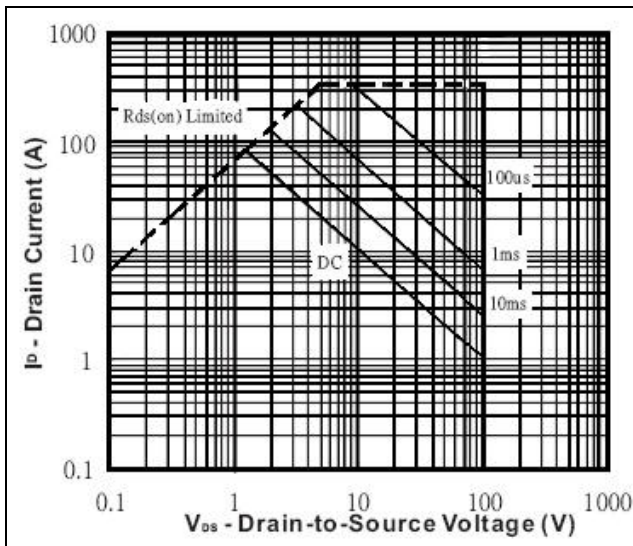**Capacitance**



**On Resistance vs. Junction Temperature**



**Breakdown Voltage vs. Junction Temperature**
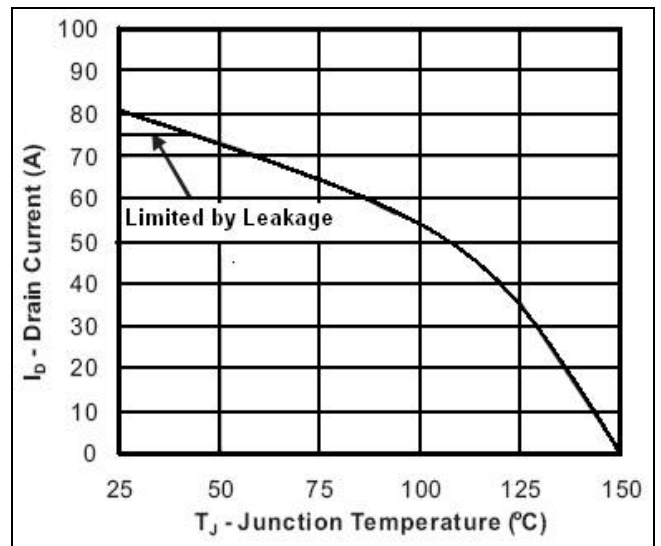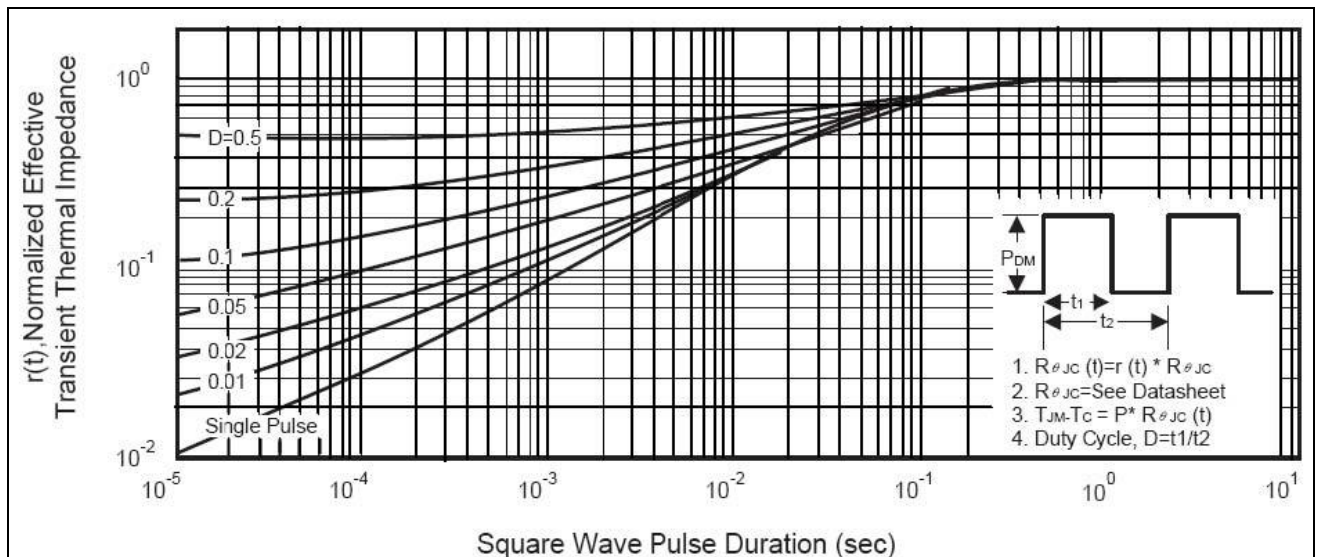
**Gate Charge**



**Source-Drain Diode Forward Voltage**



**Safe Operation Area**



**Max Drain Current vs. Junction**



**Transient Thermal Impedance Curve**

**TO-220 MECHANICAL DATA:**



POA0015988_M

| Dim | mm | | | inch | | |
|-----|-----|-----|-----|-----|-----|-----|
| | Min | Typ | Max | Min | Typ | Max |
| A | 4.40 | | 4.60 | 0.173 | | 0.181 |
| b | 0.61 | | 0.88 | 0.024 | | 0.034 |
| b1 | 1.14 | | 1.70 | 0.044 | | 0.066 |
| c | 0.49 | | 0.70 | 0.019 | | 0.027 |
| D | 15.25 | | 15.75 | 0.6 | | 0.62 |
| D1 | | 1.27 | | | 0.050 | |
| E | 10 | | 10.40 | 0.393 | | 0.409 |
| e | 2.40 | | 2.70 | 0.094 | | 0.106 |
| e1 | 4.95 | | 5.15 | 0.194 | | 0.202 |
| F | 1.23 | | 1.32 | 0.048 | | 0.051 |
| H1 | 6.20 | | 6.60 | 0.244 | | 0.256 |
| J1 | 2.40 | | 2.72 | 0.094 | | 0.107 |
| L | 13 | | 14 | 0.511 | | 0.551 |
| L1 | 3.50 | | 3.93 | 0.137 | | 0.154 |
| L20 | | 16.40 | | | 0.645 | |
| L30 | | 28.90 | | | 1.137 | |
| ØP | 3.75 | | 3.85 | 0.147 | | 0.151 |
| Q | 2.65 | | 2.95 | 0.104 | | 0.116 |