# JSFN38N100A

*JS Silicon N-Channel Power MOSFET*

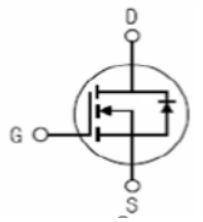
## General Description:

JSFN38N100A, the silicon N-channel Enhanced VDMOSFET, is obtained by the self-aligned planar Technology which reduce the conduction loss, improve switching performance and enhance the avalanche energy. The transistor can be used in various power switching circuit for system miniaturization and higher efficiency. The package form is SOT-227B, which accords with the RoHS standard.

| | | |
|---|---|---|
| $V_{DSS}$($T_C$=150℃) | 1000 | V |
| $I_D$ | 38 | A |
| $P_D$($T_C$=25℃) | 890 | W |
| $R_{DS(ON)MAX}$ | 280 | mΩ |

SOT-227B


Inner Equivalent Principium Chart




## Features:

- Fast Switching
- ESD Improved Capability
- Low Gate Charge
- Low Reverse transfer capacitances
- 100% Single Pulse avalanche energy Test

## Applications:

- Power switch circuit of POWER

## Package Marking and Ordering Information:

| Device Marking | Device | Device Package | Quantity |
|---|---|---|---|
| JSFN38N100A | JSFN38N100A | SOT-227B | 10 |

## Absolute Maximum Ratings (TA= 25℃ unless otherwise specified):

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DSS}$ | Drain-to-Source Voltage | 1000 | V |
| $I_D$ | Continuous Drain Current | 38 | A |
| | Continuous Drain Current $T_C$=100 °C | 30 | A |
| $I_{DM}$[a1] | Pulsed Drain Current (pulse width limited by $T_{JM}$) | 152 | A |
| $V_{GS}$ | Gate-to-Source Voltage | ±40 | V |
| $E_{AS}$ | Single Pulse Avalanche Energy | 5000 | mJ |
| $E_{Ar}$[a1] | Avalanche Energy, Repetitive | 60 | mJ |
| $I_{AR}$ [a1] | Avalanche Current | 38 | A |
| dv/dt[a2] | Peak Diode Recovery dv/dt | 5.0 | V/ns |
| $P_D$ | Power Dissipation | 890 | W |
| | Derating Factor above 25°C | 7.12 | W/℃ |
| $T_J$, $T_{stg}$ | Operating Junction and Storage Temperature Range | 150, −55 to 150 | ℃ |
| $T_L$ | Maximum Temperature for Soldering | 300 | ℃ |

Caution Stresses greater than those in the "Absolute Maximum Ratings" may cause permanent damage to the device

## Thermal Characteristics

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $R_{thJC}$ | Thermal Resistance, Junction-to-Case | 0.14 | ℃/ W |
| $R_{thcs}$ | Thermal Resistance, Case to heatsink | 0.05 | ℃/ W |

## Electrical Characteristics (Tc= 25℃ unless otherwise specified):

**OFF Characteristics**

| Symbol | Parameter | Test Conditions | Rating | | | Units |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $V_{DSS}$ | Drain to Source Breakdown Voltage | $V_{GS}$=0V, $I_D$=250μA | 1000 | -- | -- | V |
| $I_{DSS}$ | Drain to Source Leakage Current | $V_{DS}$=1000V, $V_{GS}$=0V,$T_a$=25℃ | -- | -- | 1.0 | μA |
| | | $V_{DS}$=800V, $V_{GS}$=0V,$T_a$=125℃ | -- | -- | 100 | |
| $I_{GSS(F)}$ | Gate to Source Forward Leakage | $V_{GS}$=+30V | -- | -- | 100 | nA |
| $I_{GSS(R)}$ | Gate to Source Reverse Leakage | $V_{GS}$=-30V | -- | -- | -100 | nA |

**ON Characteristics**

| Symbol | Parameter | Test Conditions | Rating | | | Units |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $R_{DS(ON)}$ | Drain-to-Source On-Resistance | $V_{GS}$=10V, $I_D$=19A | -- | 240 | 280 | mΩ |
| $V_{GS(TH)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$, $I_D$=8mA | 3.0 | -- | 6.0 | V |
| $g_{fs}$ | Forward Trans conductance | $V_{DS}$=15V, $I_D$=19A | -- | 40 | -- | S |
| Pulse width<380μs; duty cycle<2%. | | | | | | |

**Dynamic Characteristics**

| Symbol | Parameter | Test Conditions | Rating | | | Units |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $C_{iss}$ | Input Capacitance | $V_{GS}$=0V $V_{DS}$=25V f=1.0MHz | -- | 13 | -- | nF |
| $C_{oss}$ | Output Capacitance | | -- | 1050 | -- | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | -- | 250 | -- | |

**Resistive Switching Characteristics**

| Symbol | Parameter | Test Conditions | Rating | | | Units |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $t_{d(ON)}$ | Turn-on Delay Time | $I_D$=19A, $V_{DD}$=500V $V_{GS}$=10V, $R_g$=25Ω | -- | 30 | -- | ns |
| $t_r$ | Rise Time | | -- | 30 | -- | |
| $t_{d(OFF)}$ | Turn-Off Delay Time | | -- | 60 | -- | |
| $t_f$ | Fall Time | | -- | 35 | -- | |
| $Q_g$ | Total Gate Charge | $I_D$=19A, $V_{DD}$=500V $V_{GS}$=10V | -- | 240 | -- | nC |
| $Q_{gs}$ | Gate to Source Charge | | -- | 40 | -- | |
| $Q_{gd}$ | Gate to Drain (“Miller”) Charge | | -- | 100 | -- | |

| **Source-Drain Diode Characteristics** | | | | | | |
|---|---|---|---|---|---|---|
| Symbol | Parameter | Test Conditions | Rating | | | Units |
| | | | Min. | Typ. | Max. | |
| $I_{SD}$ | Continuous Source Current (Body Diode) | | -- | -- | 38 | A |
| $I_{SM}$ | Maximum Pulsed Current (Body Diode) | | -- | -- | 152 | A |
| $V_{SD}$ | Diode Forward Voltage | $I_S$=38A, $V_{GS}$=0V | -- | -- | 1.5 | V |
| $t_{rr}$ | Reverse Recovery Time | $I_S$=38A,$T_j$=25℃ | -- | 500 | -- | ns |
| $Q_{rr}$ | Reverse Recovery Charge | $dI_F/dt$=100A/μs, $V_{GS}$=0V | -- | 3.8 | -- | uC |

a1: Repetitive rating; pulse width limited by maximum junction temperature

a2: $I_{SD}$=38A,di/dt≤100A/us, $V_{DD}$≤$BV_{DS}$, Start $T_J$=25℃

**Characteristics Curve:**

**Fig. 1. Output Characteristics @ 25°C**

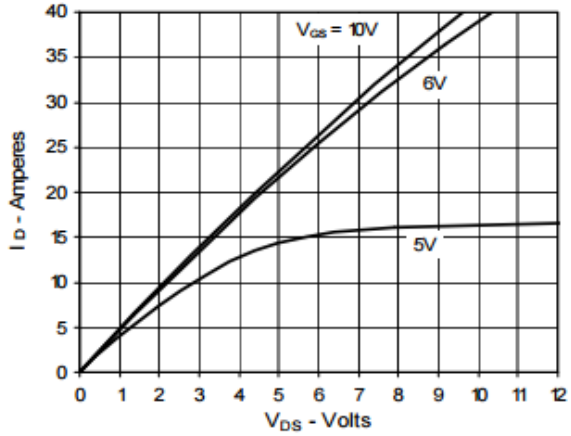



**Fig. 2. Extended Output Characteristics @ 25°C**

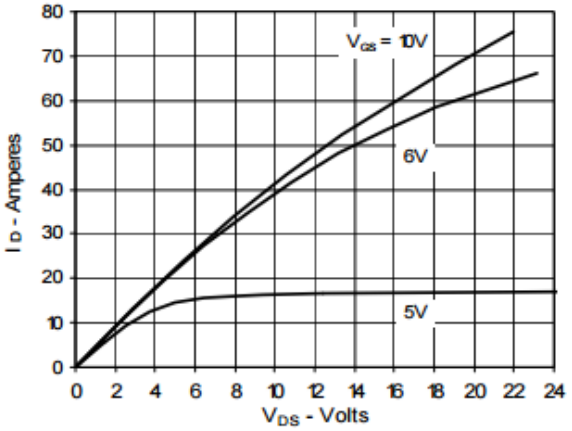



**Fig. 3. Output Characteristics @ 125°C**

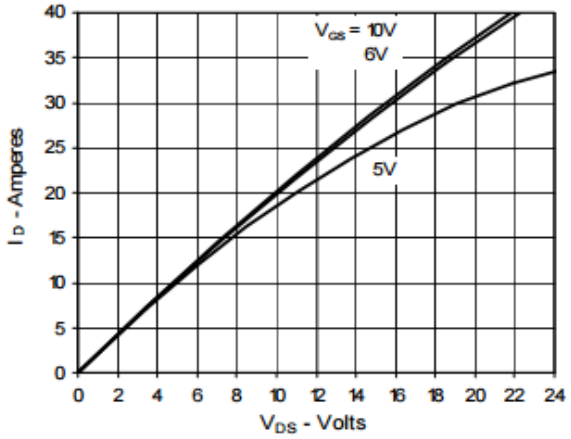



**Fig. 4. $R_{DS(on)}$ Normalized to $I_D$ = 19A Value vs. Junction Temperature**

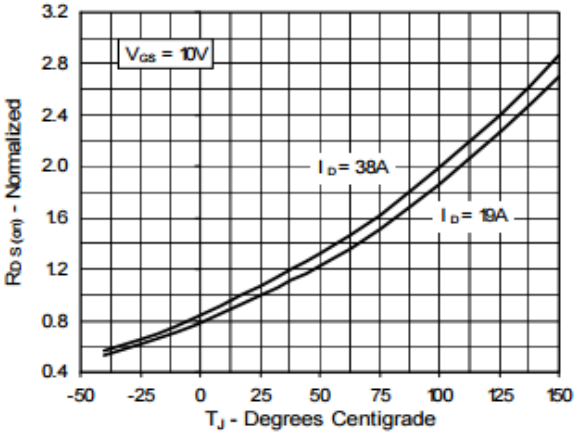



**Fig. 5. $R_{DS(on)}$ Normalized to $I_D$ = 19A Value vs. Drain Current**

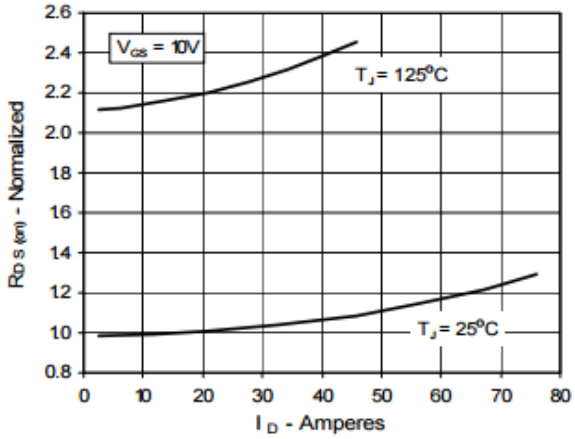



**Fig. 6. Drain Current vs. Case Temperature**

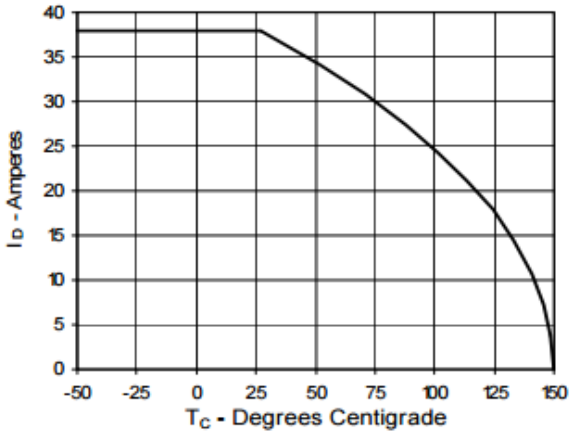


**Fig. 7. Input Admittance**

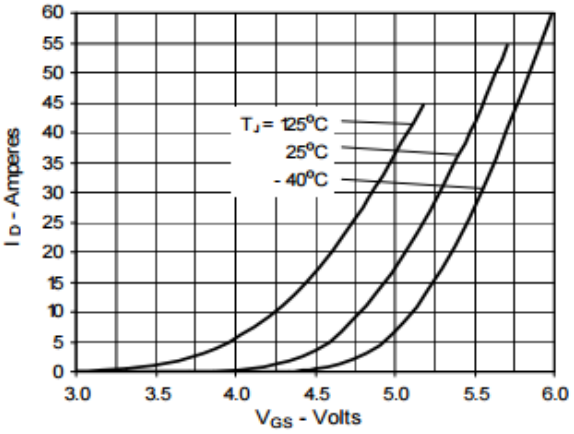



**Fig. 8. Transconductance**

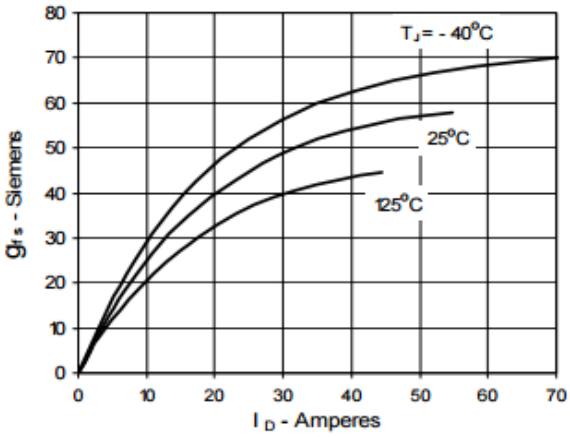



**Fig. 9. Source Current vs. Source-To-Drain Voltage**

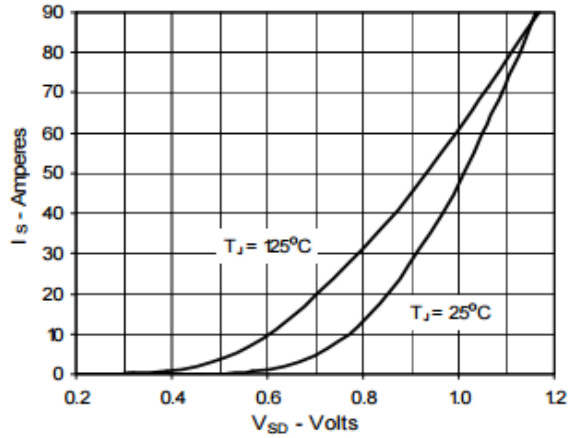



**Fig. 10. Gate Charge**

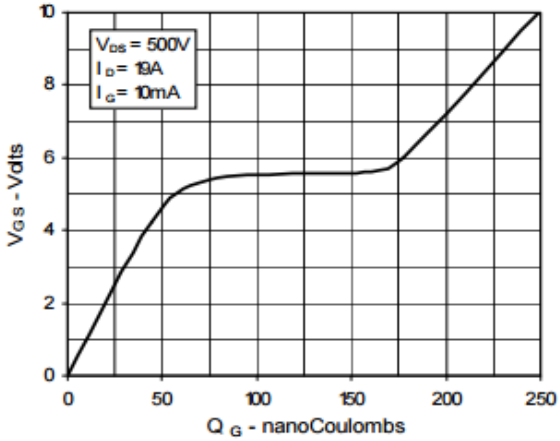



**Fig. 11. Capacitance**

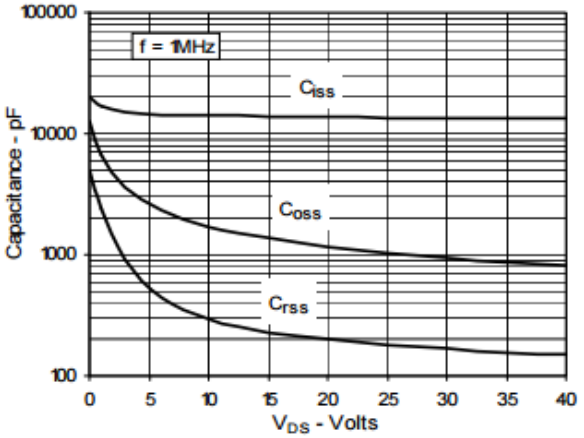
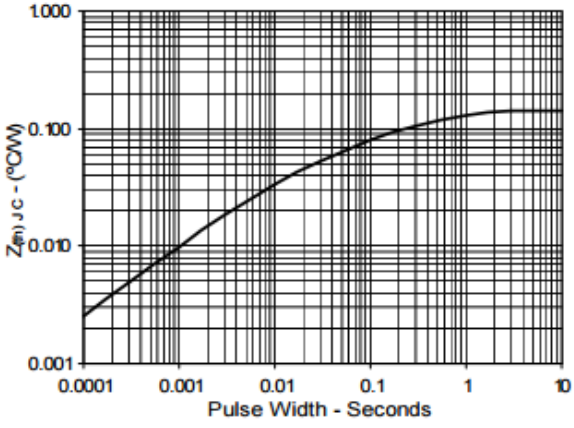
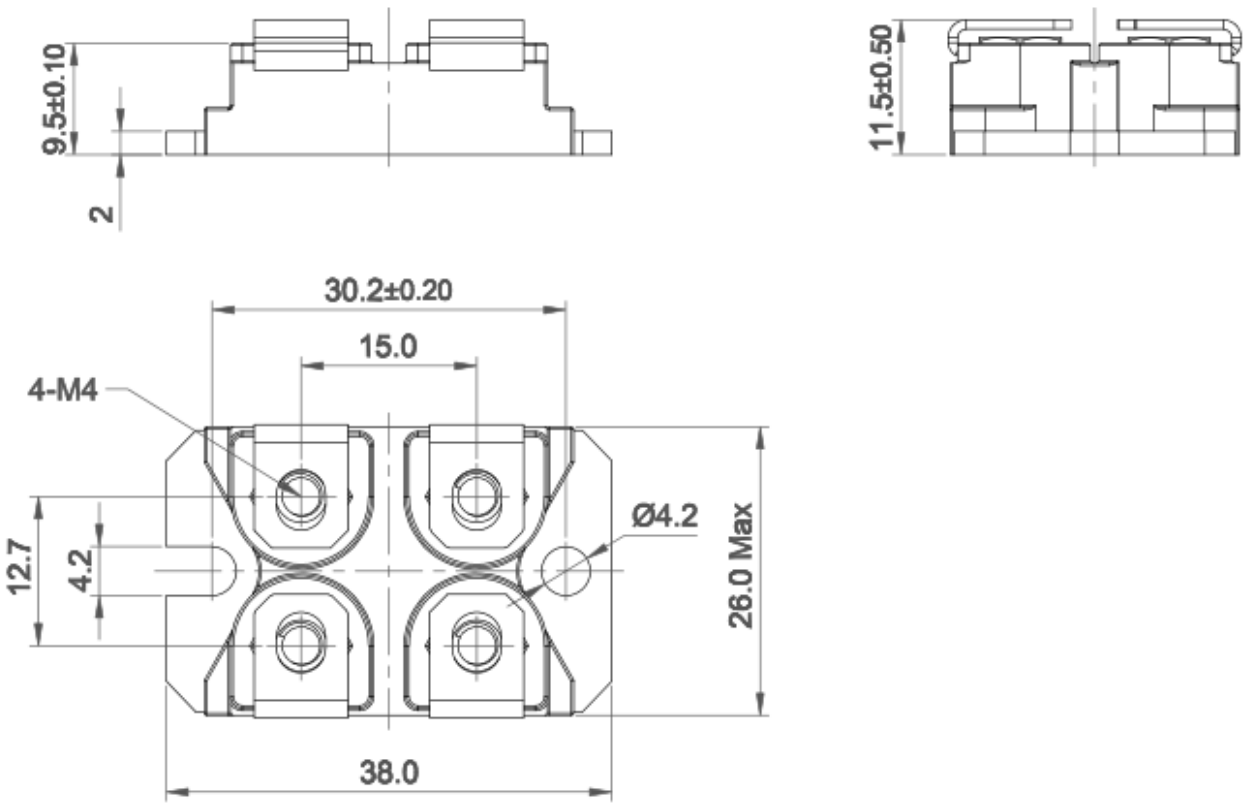



**Fig. 12. Maximum Transient Thermal Impedance**



**Package Information**



**Revision History**

| Revision | Date | Descriptions |
|---|---|---|
| REV.1.1 | Feb., 2018 | "Typical Performance Characteristics" Update |
| REV.1.0 | Jun., 2017 | Initial Version |