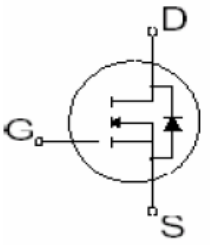
# Taiwan Goodark Technology Co.,Ltd

SSFP11N50

## StarMOS$^T$ Power MOSFET

- Extremely high dv/dt capability
- Low Gate Charge Qg results in Simple Drive Requirement
- 100% avalanche tested
- Gate charge minimized
- Very low intrinsic capacitances
- Very good manufacturing repeatability




**$V_{DSS}$ = 500V**

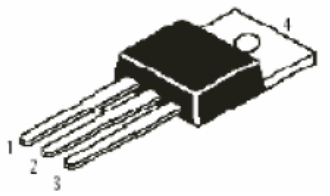
**$I_{D25}$ = 11A**

**$R_{DS(ON)}$ = 0.52 Ω**

### Description

StarMOS is a new generation of high voltage N–Channel enhancement mode power MOSFETs. This new technology minimises the JFET effect, increases packing density and reduces the on-resistance. StarMOS also achieves faster switching speeds through optimised gate layout with planar stripe DMOS technology.

**TO-220**




Pin1–Gate
Pin2–Drain
Pin1–Source

### Application

- Switching application

### Absolute Maximum Ratings

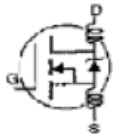
| | Parameter | Max. | Units |
|---|---|---|---|
| $I_D$@Tc=25°C | Continuous Drain Current, $V_{GS}$@10V | 11 | A |
| $I_D$@Tc=100°C | Continuous Drain Current, $V_{GS}$@10V | 7.0 | |
| $I_{DM}$ | Pulsed Drain Current ① | 44 | |
| $P_D$@Tc=25°C | Power Dissipation | 170 | W |
| | Linear Derating Factor | 1.3 | W/°C |
| $V_{GS}$ | Gate-to-Source Voltage | ±30 | V |
| $E_{AS}$ | Single Pulse Avalanche Energy ② | 275 | mJ |
| $I_{AR}$ | Avalanche Current ① | 11 | A |
| $E_{AR}$ | Repetitive Avalanche Energy ① | 17 | mJ |
| dv/dt | Peak Diode Recovery dv/dt ③ | 6.9 | V/ns |
| $T_J$<br>$T_{STG}$ | Operating Junction and<br>Storage Temperature Range | - 55 to +150 | °C |
| | Soldering Temperature, for 10 seconds | 300(1.6mm from case) | |
| | Mounting Torque,6-32 or M3 screw | 10 lbf•in(1.1N•m) | |

### Thermal Resistance

| | Parameter | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| $R_{\theta JC}$ | Junction-to-case | — | — | 0.75 | °C/W |
| $R_{\theta CS}$ | Case-to-Sink,Flat,Greased Surface | — | 0.50 | — | |
| $R_{\theta JA}$ | Junction-to-Ambient | — | — | 62 | |

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

| | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|
| $V_{(BR)DSS}$ | Drain-to-Source Breakdown Voltage | 500 | — | — | V | $V_{GS}$=0V,$I_D$=250μA |
| $\triangle V_{(BR)DSS}/\triangle T_J$ | Breakdown Voltage Temp.Coefficient | — | | — | V/℃ | Reference to 25℃,$I_D$=1mA |
| $R_{DS(on)}$ | Static Drain-to-Source On-resistance | — | — | 0.52 | Ω | $V_{GS}$=10V,$I_D$=6.6A ④ |
| $V_{GS(th)}$ | Gate Threshold Voltage | 2.0 | — | 4.0 | V | $V_{DS}$=$V_{GS}$,$I_D$=250μA |
| gfs | Forward Transconductance | 6.1 | — | — | S | $V_{DS}$=50V,$I_D$=6.6A |
| $I_{DSS}$ | Drain-to-Source Leakage current | — | — | 25 | μA | $V_{DS}$=500V,$V_{GS}$=0V |
| | | — | — | 250 | | $V_{DS}$=400V,$V_{GS}$=0V,$T_J$=150℃ |
| $I_{GSS}$ | Gate-to-Source Forward leakage | — | — | 100 | nA | $V_{GS}$=30V |
| | Gate-to-Source Reverse leakage | — | — | -100 | | $V_{GS}$=-30V |
| Qg | Total Gate Charge | — | — | 52 | nC | $I_D$=11A |
| Qgs | Gate-to-Source charge | — | — | 13 | | $V_{DS}$=400V |
| Qgd | Gate-to-Drain("Miller") charge | — | — | 18 | | $V_{GS}$=10V |
| td(on) | Turn-on Delay Time | — | 14 | — | nS | $V_{DD}$=250V |
| tr | Rise Time | — | 35 | — | | $I_D$=11A |
| td(off) | Turn-Off Delay Time | — | 32 | — | | $R_G$=9.1Ω |
| tf | Fall Time | — | 28 | — | | $R_D$=22Ω |
| $L_D$ | Internal Drain Inductance | — | 4.5 | — | nH | Between lead, 6mm(0.25in.) from package and center of die contact |
| $L_S$ | Internal Source Inductance | — | 7.5 | — | | |
| Ciss | Input Capacitance | — | 1423 | — | pF | $V_{GS}$=0V |
| Coss | Output Capacitance | — | 208 | — | | $V_{DS}$=25V |
| Crss | Reverse Transfer Capacitance | — | 8.1 | — | | f=1.0MHz |




## Source-Drain Ratings and Characteristics

| | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current (Body Diode) | — | — | 11 | A | MOSFET symbol showing the integral reverse p-n junction diode. |
| $I_{SM}$ | Pulsed Source Current (Body Diode) ① | — | — | 44 | | |
| $V_{SD}$ | Diode Forward Voltage | — | — | 1.5 | V | $T_J$=25℃,$I_S$=11A,$V_{GS}$=0V ④ |
| trr | Reverse Recovery Time | — | 510 | 770 | nS | $T_J$=25℃,$I_F$=11A |
| Qrr | Reverse Recovery Charge | — | 3.4 | 5.1 | nC | di/dt=100A/μs ④ |
| ton | 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(see figure 11)

② L = 4.5mH, IAS = 11 A, $R_G$ = 25Ω, Starting TJ = 25°C

③ $I_{SD}$≤11A,di/dt≤140A/μS,$V_{DD}$≤$V_{(BR)DSS}$, TJ≤25℃

④ Pulse width≤300μS; duty cycle≤2%