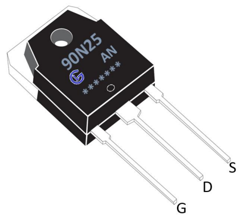
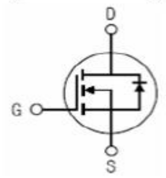
# GL90N25AN

*Silicon N-Channel Power MOSFET*

| | | |
|---|---|---|
| $V_{DSS}(T_C$=150℃) | 250 | V |
| $I_D$ | 90 | A |
| $P_D(T_C$=25℃) | 960 | W |
| $R_{DS(ON)TYP}$ | 25 | mΩ |

TO-3P(N)




## General Description

GL90N25AN, 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 TO-3P(N), which accords with the RoHS standard.

## 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

**Absolute** (Tc=25℃ unless otherwise specified)

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DSS}$ | Drain-to-Source Voltage | 250 | V |
| $I_D$ | Continuous Drain Current | 90 | A |
| | Continuous Drain Current $T_C$=100 °C | 70 | A |
| $I_{DM}$[a1] | Pulsed Drain Current( pulse width limited by $T_{JM}$) | 360 | A |
| $V_{GS}$ | Gate-to-Source Voltage | ±30 | V |
| $E_{AS}$ | Single Pulse Avalanche Energy | 3500 | mJ |
| $E_{Ar}$[a1] | Avalanche Energy ,Repetitive | 250 | mJ |
| $I_{AR}$[a1] | Avalanche Current | 45 | A |
| dv/dt[a2] | Peak Diode Recovery dv/dt | 5.0 | V/ns |
| $P_D$ | Power Dissipation | 960 | W |
| | Derating Factor above 25°C | 7.68 | 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 |
|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance, Junction-to-Case | 0.21 | ℃/ W |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient | 40 | ℃/ 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 | 250 | -- | -- | V |
| $I_{DSS}$ | Drain to Source Leakage Current | $V_{DS}$=250V, $V_{GS}$=0V,$T_a$=25℃ | -- | -- | 1.0 | μA |
| | | $V_{DS}$=200V, $V_{GS}$=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,$I_D$=45A | -- | 25 | 35 | mΩ |
| $V_{GS(TH)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$,$I_D$=250μA | 2.0 | -- | 4.0 | V |
| $g_{fs}$ | Forward Trans conductance | $V_{DS}$=15V,$I_D$=45A | -- | 50 | -- | 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 | -- | 7500 | -- | pF |
| $C_{oss}$ | Output Capacitance | | -- | 880 | -- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | -- | 180 | -- | |

**Resistive Switching Characteristics**

| Symbol | Parameter | Test Conditions | Rating | | | Units |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $t_{d(ON)}$ | Turn-on Delay Time | $I_D$=45A,$V_{DD}$=125V $V_{GS}$=10V,$R_g$=25Ω | -- | 68 | -- | ns |
| $t_r$ | Rise Time | | -- | 120 | -- | |
| $t_{d(OFF)}$ | Turn-Off Delay Time | | -- | 485 | -- | |
| $t_f$ | Fall Time | | -- | 145 | -- | |
| $Q_g$ | Total Gate Charge | $I_D$=45A,$V_{DD}$=125V $V_{GS}$=10V | -- | 140 | -- | nC |
| $Q_{gs}$ | Gate to Source Charge | | -- | 22 | -- | |
| $Q_{gd}$ | Gate to Drain ( "Miller" )Charge | | -- | 55 | -- | |

| Source-Drain Diode Characteristics | | | | | | |
|---|---|---|---|---|---|---|
| Symbol | Parameter | Test Conditions | Rating | | | Units |
| | | | Min. | Typ. | Max. | |
| $I_{SD}$ | Continuous Source Current (Body Diode) | | -- | -- | 90 | A |
| $I_{SM}$ | Maximum Pulsed Current (Body Diode) | | -- | -- | 360 | A |
| $V_{SD}$ | Diode Forward Voltage | $I_S$=90A,$V_{GS}$=0V | -- | -- | 1.5 | V |
| $t_{rr}$ | Reverse Recovery Time | $I_S$=90A,$T_j$=25℃ dI$_F$/dt=100A/μs,$V_{GS}$=0V | -- | 380 | -- | ns |
| $Q_{rr}$ | Reverse Recovery Charge | | -- | 3.7 | -- | uC |

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

a2： $I_{SD}$=90A,di/dt≤100A/us,$V_{DD}$≤$BV_{DS}$, Start $T_J$=25℃

## Characteristics Curves

Fig. 1. Output Characteristics @ $T_J = 25^oC$

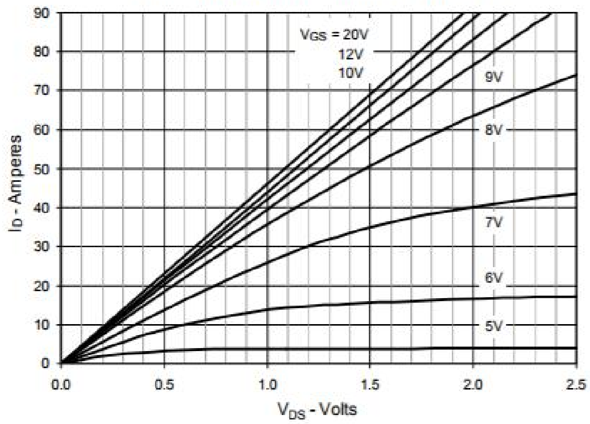



Fig. 2. Extended Output Characteristics @ $T_J = 25^oC$

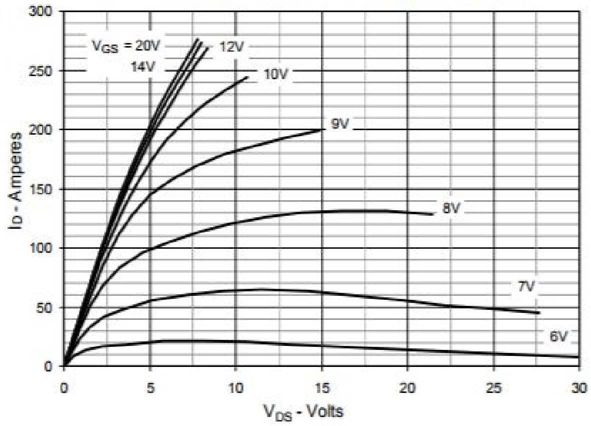



Fig. 3. Output Characteristics @ $T_J = 125^oC$

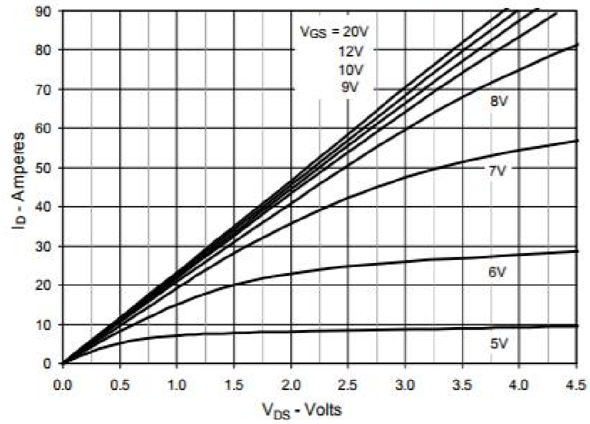



Fig. 4. $R_{DS(on)}$ Normalized to $I_D$ = 45A Value vs. Junction Temperature

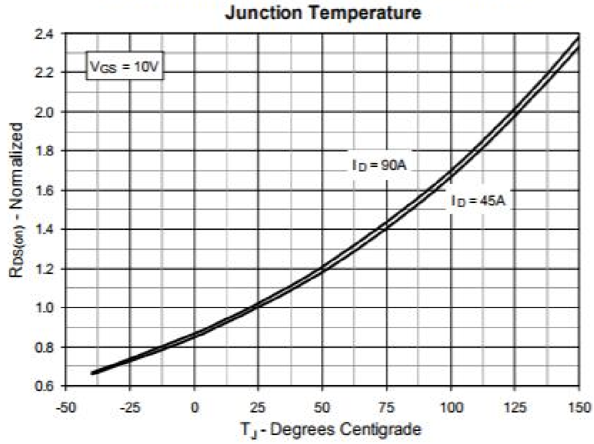



Fig. 5. $R_{DS(on)}$ Normalized to $I_D$ = 45A Value vs. Drain Current

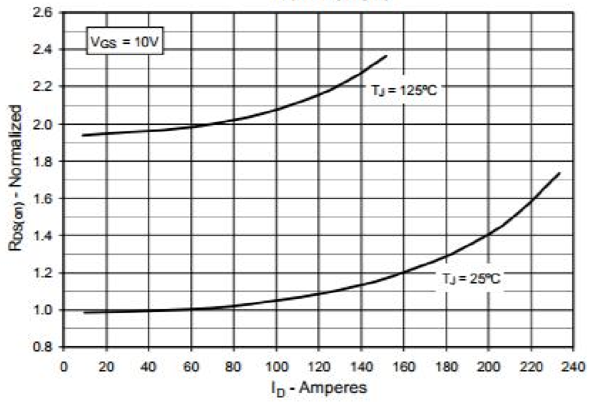



Fig. 6. Maximum Drain Current vs. Case Temperature

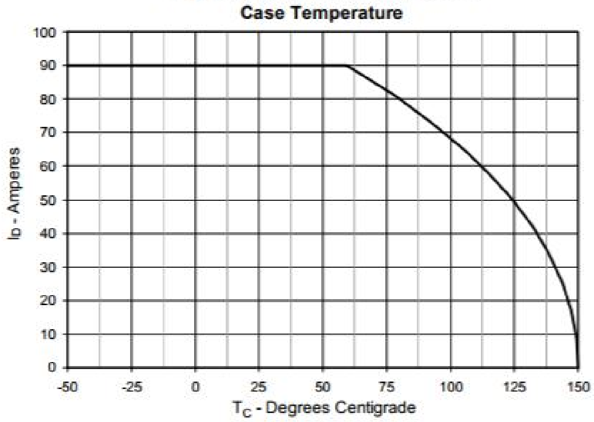


**Fig. 7. Input Admittance**

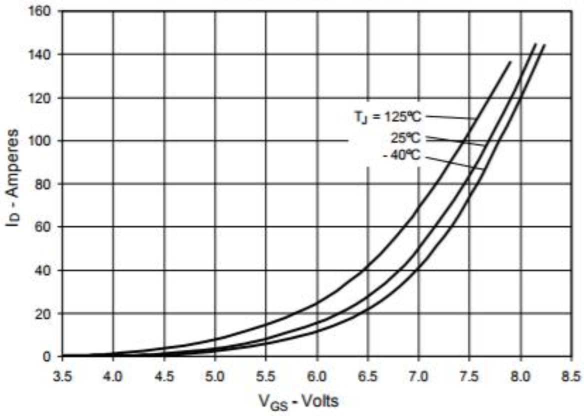



**Fig. 8. Transconductance**

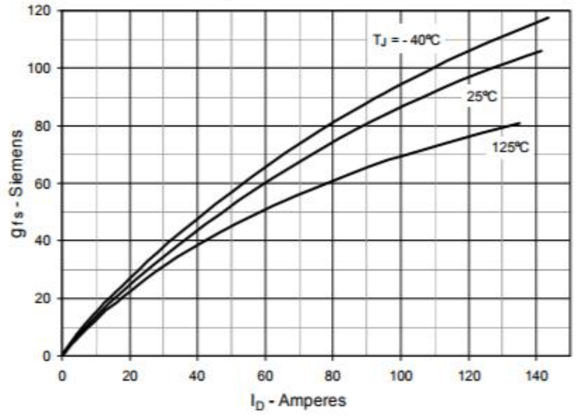



**Fig. 9. Forward Voltage Drop of Intrinsic Diode**

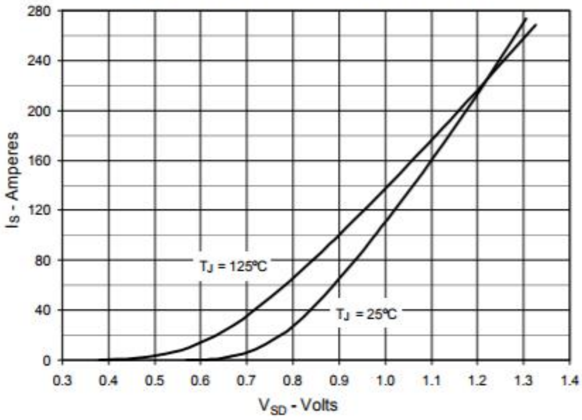



**Fig. 10. Gate Charge**

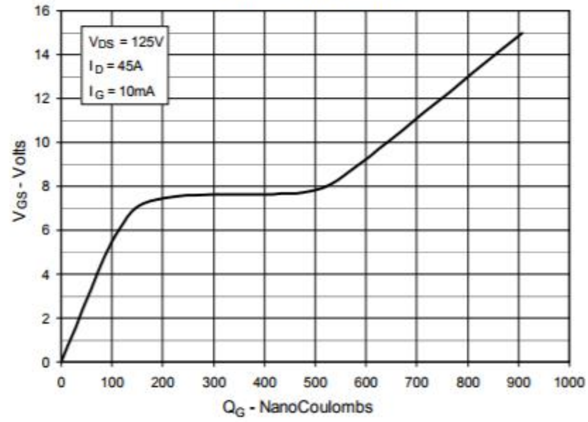



**Fig. 11. Capacitance**

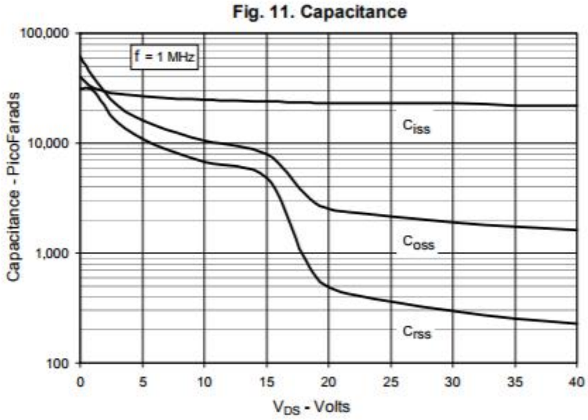



**Fig. 12. Maximum Transient Thermal Impedance**

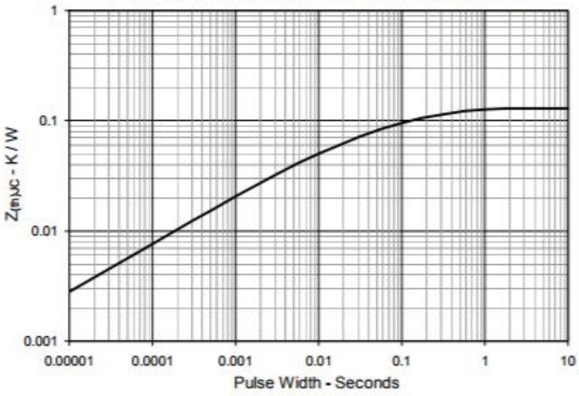


**Fig. 13. Forward-Bias Safe Operating Area @ $T_C$ = 25ºC**

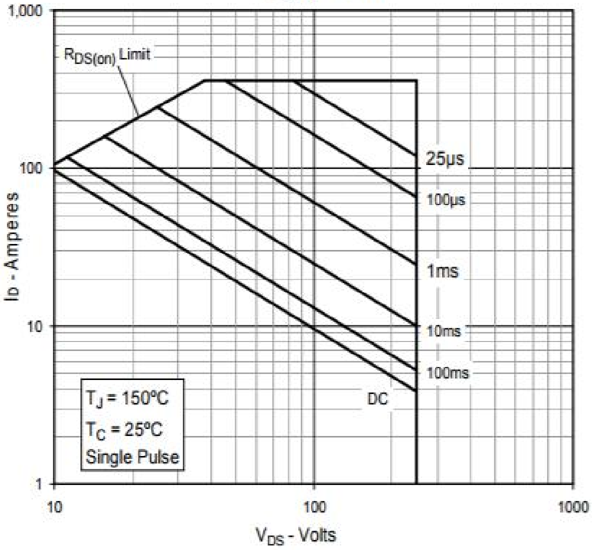



**Fig. 14. Forward-Bias Safe Operating Area @ $T_C$ = 75ºC**