



# GL69N25A47

## Silicon N-Channel Power MOSFET

### General Description

GL69N25A47, 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-247, which accords with the RoHS standard.

### Features

- Fast Switching
- Low ON Resistance( $R_{ds(on)} \leq 41m\Omega$ )
- Low Gate Charge (Typical Data:150nC)
- Low Reverse transfer capacitances(Typical:290pF)
- 100% Single Pulse avalanche energy Test

### Applications

- Power switch circuit of adaptor and charger

### Absolute (Tc=25°C unless otherwise specified)

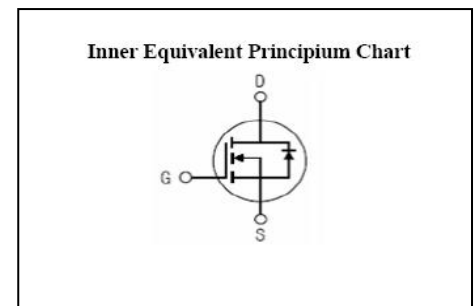
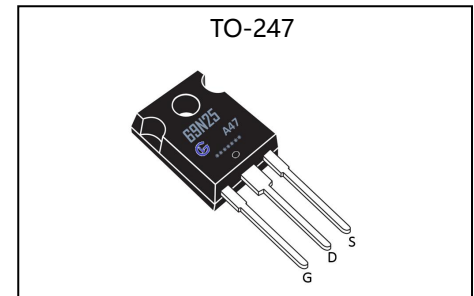
| Symbol         | Parameter                                        | Rating          | Units         |
|----------------|--------------------------------------------------|-----------------|---------------|
| $V_{DSS}^{a1}$ | Drain-to-Source Voltage                          | 200             | V             |
| $I_D$          | Continuous Drain Current                         | 69              | A             |
|                | Continuous Drain Current $T_C=100^\circ C$       | 44.2            | A             |
| $I_{DM}^{a2}$  | Pulsed Drain Current                             | 276             | A             |
| $V_{GS}$       | Gate-to-Source Voltage                           | $\pm 30$        | V             |
| $E_{AS}^{a2}$  | Single Pulse Avalanche Energy                    | 2050            | mJ            |
| $dv/dt^{a3}$   | Peak Diode Recovery $dv/dt$                      | 5               | V/ns          |
| $P_D$          | Power Dissipation                                | 480             | W             |
|                | Derating Factor above $25^\circ C$               | 3.84            | W/ $^\circ C$ |
| $T_J, T_{stg}$ | Operating Junction and Storage Temperature Range | 150, -55 to 150 | $^\circ C$    |
| $T_L$          | Maximum Temperature for Soldering                | 300             | $^\circ C$    |

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    | 0.26   | $^\circ C/W$ |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient | 40     | $^\circ C/W$ |

|                       |     |            |
|-----------------------|-----|------------|
| $V_{DSS}$             | 250 | V          |
| $I_D$                 | 69  | A          |
| $P_D(T_C=25^\circ C)$ | 480 | W          |
| $R_{DS(ON).MAX.}$     | 41  | m $\Omega$ |





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Electrical Characteristics (Tc= 25°C unless otherwise specified)

| OFF Characteristics          |                                   |                                              |        |      |      |         |
|------------------------------|-----------------------------------|----------------------------------------------|--------|------|------|---------|
| Symbol                       | Parameter                         | Test Conditions                              | Rating |      |      | Units   |
|                              |                                   |                                              | Min.   | Typ. | Max. |         |
| $V_{DSS}$                    | Drain to Source Breakdown Voltage | $V_{GS}=0V, I_D=250\mu A$                    | 250    | --   | --   | V       |
| $\Delta BV_{DSS}/\Delta T_J$ | Bvdss Temperature Coefficient     | $I_D=250\mu A, \text{Reference } 25^\circ C$ | --     | 0.22 | --   | V/°C    |
| $I_{DSS}$                    | Drain to Source Leakage Current   | $V_{DS}=250V, V_{GS}=0V, T_a=25^\circ C$     | --     | --   | 1    | $\mu A$ |
|                              |                                   | $V_{DS}=200V, V_{GS}=0V, T_a=125^\circ C$    | --     | --   | 10   |         |
| $I_{GSS(F)}$                 | 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 | $V_{GS}=10V, I_D=34.5A$       | --     | --   | 41   | mΩ    |
| $V_{GS(TH)}$                      | Gate Threshold Voltage        | $V_{DS}=V_{GS}, I_D=250\mu A$ | 2.0    | --   | 4.0  | V     |
| $g_{fs}$                          | Forward Trans conductance     | $V_{DS}=15V, I_D=34.5A$       | --     | 25   | --   | S     |
| Pulse width<380μs; duty cycle<2%. |                               |                               |        |      |      |       |

| Dynamic Characteristics |                              |                                       |        |      |      |       |
|-------------------------|------------------------------|---------------------------------------|--------|------|------|-------|
| Symbol                  | Parameter                    | Test Conditions                       | Rating |      |      | Units |
|                         |                              |                                       | Min.   | Typ. | Max. |       |
| $C_{iss}$               | Input Capacitance            | $V_{GS}=0V, V_{DS}=25V$<br>$f=1.0MHz$ | --     | 4530 | --   | pF    |
| $C_{oss}$               | Output Capacitance           |                                       | --     | 750  | --   |       |
| $C_{rss}$               | Reverse Transfer Capacitance |                                       | --     | 88   | --   |       |

| Resistive Switching Characteristics |                                  |                                                       |        |      |      |       |
|-------------------------------------|----------------------------------|-------------------------------------------------------|--------|------|------|-------|
| Symbol                              | Parameter                        | Test Conditions                                       | Rating |      |      | Units |
|                                     |                                  |                                                       | Min.   | Typ. | Max. |       |
| $t_{d(ON)}$                         | Turn-on Delay Time               | $I_D=69A, V_{DD}=125V$<br>$V_{GS}=10V, R_g=1.8\Omega$ | --     | 90   | --   | ns    |
| $t_r$                               | Rise Time                        |                                                       | --     | 750  | --   |       |
| $t_{d(OFF)}$                        | Turn-Off Delay Time              |                                                       | --     | 150  | --   |       |
| $t_f$                               | Fall Time                        |                                                       | --     | 230  | --   |       |
| $Q_g$                               | Total Gate Charge                | $I_D=69A, V_{DD}=125V$<br>$V_{GS}=10V$                | --     | 81   | --   | nC    |
| $Q_{gs}$                            | Gate to Source Charge            |                                                       | --     | 29   | --   |       |
| $Q_{gd}$                            | Gate to Drain ( "Miller" )Charge |                                                       | --     | 40   | --   |       |



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| Source-Drain Diode Characteristics |                                        |                                 |        |      |      |         |
|------------------------------------|----------------------------------------|---------------------------------|--------|------|------|---------|
| Symbol                             | Parameter                              | Test Conditions                 | Rating |      |      | Units   |
|                                    |                                        |                                 | Min.   | Typ. | Max. |         |
| $I_{SD}$                           | Continuous Source Current (Body Diode) |                                 | --     | --   | 69   | A       |
| $I_{SM}$                           | Maximum Pulsed Current (Body Diode)    |                                 | --     | --   | 136  | A       |
| $V_{SD}$                           | Diode Forward Voltage                  | $I_S=69A, V_{GS}=0V$            | --     | --   | 1.5  | V       |
| $t_{rr}$                           | Reverse Recovery Time                  | $I_S=69A, T_j=25^{\circ}C$      | --     | 250  | --   | ns      |
| $Q_{rr}$                           | Reverse Recovery Charge                | $di_F/dt=100A/\mu s, V_{GS}=0V$ | --     | 5.8  | --   | $\mu C$ |

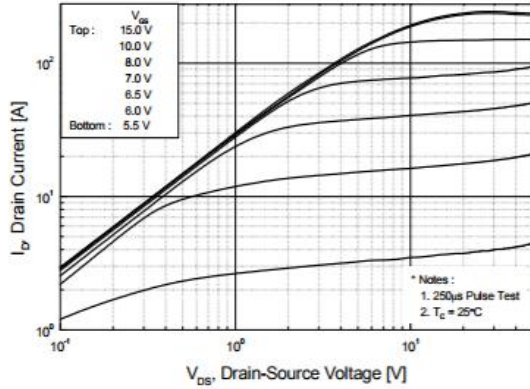
a1:  $T_J=+25^{\circ}C$  to  $+175^{\circ}C$

a2: Repetitive rating: pulse width limited by maximum junction temperature

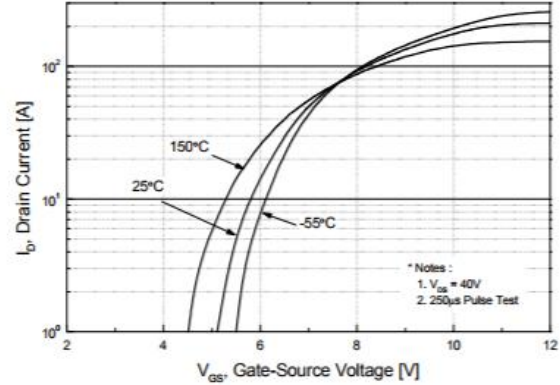
a3:  $I_{SD}=69A, di/dt \leq 100A/\mu s, V_{DD} \leq BV_{DS}, T_J=175^{\circ}C$

### Characteristics Curves

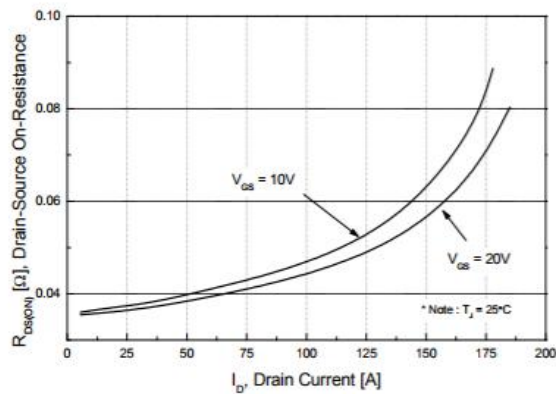
**Figure 1. On-Region Characteristics**



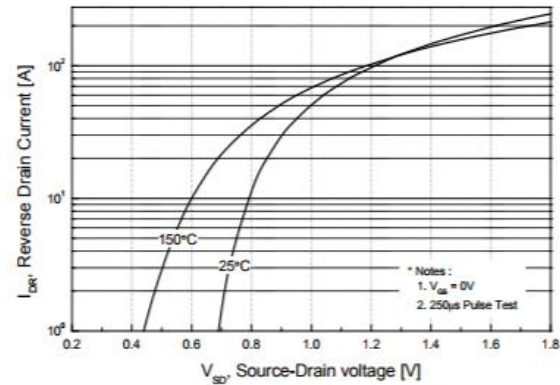
**Figure 2. Transfer Characteristics**



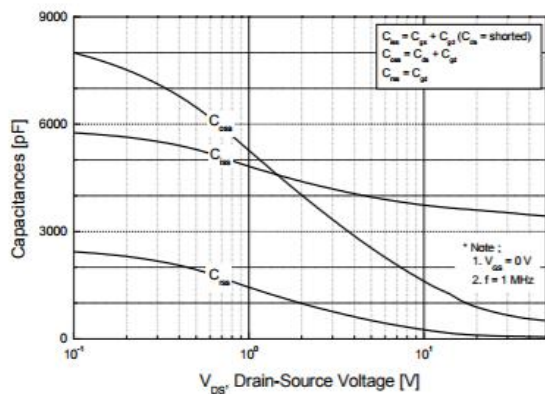
**Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage**



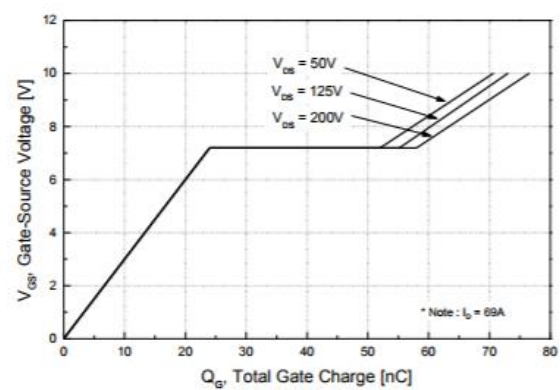
**Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature**



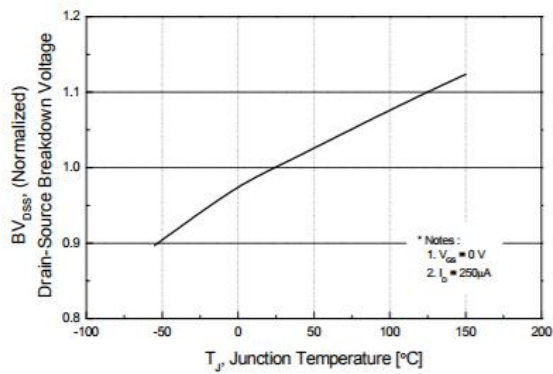
**Figure 5. Capacitance Characteristics**



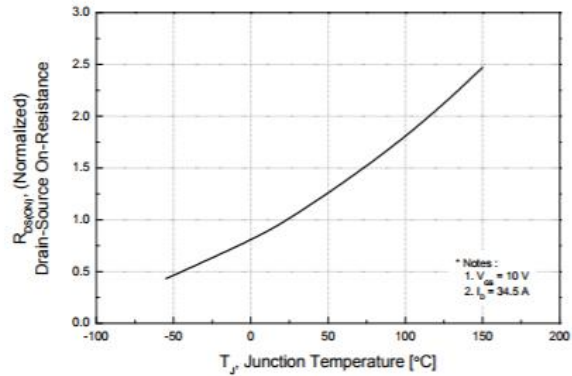
**Figure 6. Gate Charge Characteristics**



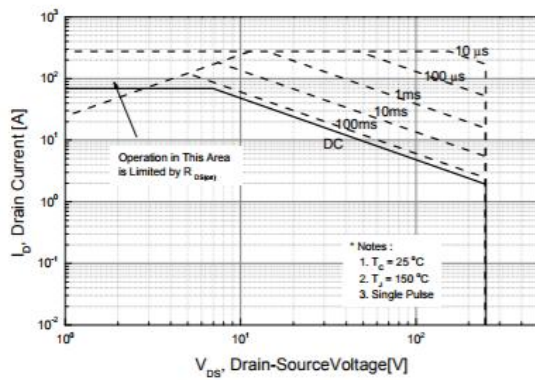
**Figure 7. Breakdown Voltage Variation vs. Temperature**



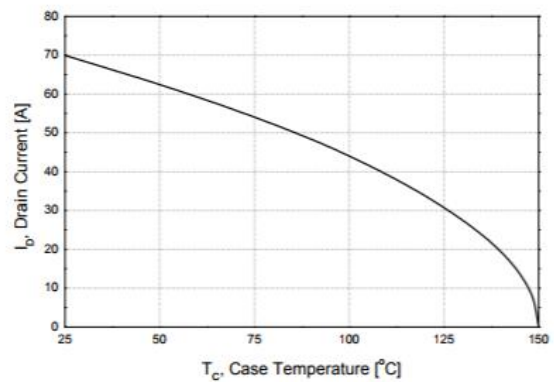
**Figure 8. On-Resistance Variation vs. Temperature**



**Figure 9. Maximum Safe Operating Area**



**Figure 10. Maximum Drain Current vs. Case Temperature**



**Figure 11. Transient Thermal Response Curve**

