

### General Description:

GL7N90A0 the silicon N-channel Enhanced VDMOSFETS 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-263, which accords with the RoHS standard.

### Features:

- Fast Switching
- Low Gate Charge and Rdson
- Low Reverse transfer capacitances
- 100% Single Pulse avalanche energy Test

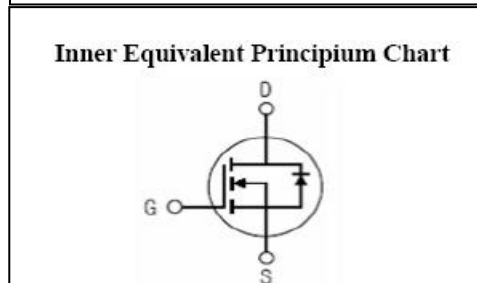
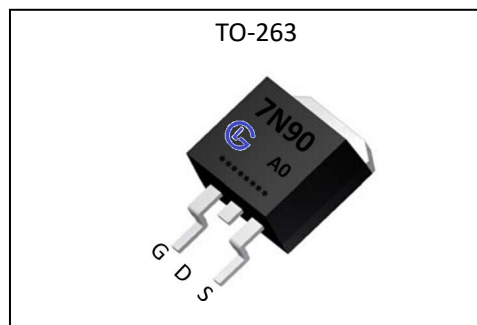
### Applications:

Power switch circuit of adaptor and charger.

**Absolute** (T<sub>c</sub>= 25°C unless otherwise specified):

| Symbol                            | Parameter                                        | Rating          | Units |
|-----------------------------------|--------------------------------------------------|-----------------|-------|
| V <sub>DSS</sub>                  | Drain-to-Source Voltage                          | 900             | V     |
| I <sub>D</sub>                    | Continuous Drain Current                         | 7.0             | A     |
|                                   | Continuous Drain Current T <sub>c</sub> = 100 °C | 5.0             | A     |
| I <sub>DM</sub> <sup>a1</sup>     | Pulsed Drain Current                             | 28              | A     |
| V <sub>GS</sub>                   | Gate-to-Source Voltage                           | ± 30            | V     |
| E <sub>AS</sub> <sup>a2</sup>     | Single Pulse Avalanche Energy                    | 700             | mJ    |
| E <sub>AR</sub> <sup>a1</sup>     | Avalanche Energy ,Repetitive                     | 60              | mJ    |
| I <sub>AR</sub> <sup>a1</sup>     | Avalanche Current                                | 2.4             | A     |
| dv/dt <sup>a3</sup>               | Peak Diode Recovery dv/dt                        | 5.0             | V/ns  |
| P <sub>D</sub>                    | Power Dissipation                                | 160             | W     |
|                                   | Derating Factor above 25°C                       | 1.28            | W/°C  |
| T <sub>J</sub> , T <sub>stg</sub> | Operating Junction and Storage Temperature Range | 150, -55 to 150 | °C    |
| T <sub>L</sub>                    | MaximumTemperature for Soldering                 | 300             | °C    |

|                                         |     |   |
|-----------------------------------------|-----|---|
| V <sub>DSS</sub>                        | 900 | V |
| I <sub>D</sub>                          | 7   | A |
| P <sub>D</sub> (T <sub>c</sub> =25 °C ) | 160 | W |
| R <sub>DS(ON)TYP</sub>                  | 1.4 | Ω |





# GL7N90A0

## GL Silicon N-Channel Power MOSFET

**Electrical Characteristics** (T<sub>c</sub>= 25 °C unless otherwise specified):

| OFF Characteristics                    |                                   |                                                                      |        |      |      |       |
|----------------------------------------|-----------------------------------|----------------------------------------------------------------------|--------|------|------|-------|
| Symbol                                 | Parameter                         | Test Conditions                                                      | Rating |      |      | Units |
|                                        |                                   |                                                                      | Min.   | Typ. | Max. |       |
| V <sub>DSS</sub>                       | Drain to Source Breakdown Voltage | V <sub>GS</sub> =0V, I <sub>D</sub> =250μA                           | 900    | --   | --   | V     |
| Δ BV <sub>DSS</sub> / Δ T <sub>J</sub> | Bvdss Temperature Coefficient     | ID=250uA, Reference 25 °C                                            | --     | 0.8  | --   | V/°C  |
| I <sub>DSS</sub>                       | Drain to Source Leakage Current   | V <sub>DS</sub> = 900V, V <sub>GS</sub> = 0V, T <sub>a</sub> = 25 °C | --     | --   | 1    | μA    |
|                                        |                                   | V <sub>DS</sub> =720V, V <sub>GS</sub> = 0V, T <sub>a</sub> = 125 °C | --     | --   | 250  |       |
| I <sub>GSS(F)</sub>                    | Gate to Source Forward Leakage    | V <sub>GS</sub> =+30V                                                | --     | --   | 10   | μA    |
| I <sub>GSS(R)</sub>                    | Gate to Source Reverse Leakage    | V <sub>GS</sub> =-30V                                                | --     | --   | -10  | μA    |

| ON Characteristics             |                               |                                                            |        |      |      |       |
|--------------------------------|-------------------------------|------------------------------------------------------------|--------|------|------|-------|
| Symbol                         | Parameter                     | Test Conditions                                            | Rating |      |      | Units |
|                                |                               |                                                            | Min.   | Typ. | Max. |       |
| R <sub>DS(ON)</sub>            | Drain-to-Source On-Resistance | V <sub>GS</sub> =10V, I <sub>D</sub> =3.0A                 | --     | 1.4  | 1.8  | Ω     |
| V <sub>GS(TH)</sub>            | Gate Threshold Voltage        | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA | 2.5    | --   | 4.5  | V     |
| Pulse width tp ≤ 380μs, δ ≤ 2% |                               |                                                            |        |      |      |       |

| Dynamic Characteristics |                              |                                                          |        |      |      |       |
|-------------------------|------------------------------|----------------------------------------------------------|--------|------|------|-------|
| Symbol                  | Parameter                    | Test Conditions                                          | Rating |      |      | Units |
|                         |                              |                                                          | Min.   | Typ. | Max. |       |
| g <sub>fs</sub>         | Forward Transconductance     | V <sub>DS</sub> =15V, I <sub>D</sub> =3A                 | --     | 8.0  | --   | S     |
| C <sub>iss</sub>        | Input Capacitance            | V <sub>GS</sub> = 0V V <sub>DS</sub> = 25V<br>f = 1.0MHz | --     | 1460 | --   | pF    |
| C <sub>oss</sub>        | Output Capacitance           |                                                          | --     | 130  | --   |       |
| C <sub>rss</sub>        | Reverse Transfer Capacitance |                                                          | --     | 23   | --   |       |

| Resistive Switching Characteristics |                                |                                                                                            |        |      |      |       |
|-------------------------------------|--------------------------------|--------------------------------------------------------------------------------------------|--------|------|------|-------|
| Symbol                              | Parameter                      | Test Conditions                                                                            | Rating |      |      | Units |
|                                     |                                |                                                                                            | Min.   | Typ. | Max. |       |
| t <sub>d(ON)</sub>                  | Turn-on Delay Time             | I <sub>D</sub> =7.0A V <sub>DD</sub> = 450V<br>V <sub>GS</sub> = 10V R <sub>G</sub> = 9.1Ω | --     | 22   | --   | ns    |
| t <sub>r</sub>                      | Rise Time                      |                                                                                            | --     | 45   | --   |       |
| t <sub>d(OFF)</sub>                 | Turn-Off Delay Time            |                                                                                            | --     | 33   | --   |       |
| t <sub>f</sub>                      | Fall Time                      |                                                                                            | --     | 37   | --   |       |
| Q <sub>g</sub>                      | Total Gate Charge              | I <sub>D</sub> =7.0A V <sub>DD</sub> =450V<br>V <sub>GS</sub> = 10V                        | --     | 37   | --   | nC    |
| Q <sub>gs</sub>                     | Gate to Source Charge          |                                                                                            | --     | 8.0  | --   |       |
| Q <sub>gd</sub>                     | Gate to Drain ("Miller")Charge |                                                                                            | --     | 14   | --   |       |

| Source-Drain Diode Characteristics               |                                        |                                 |        |      |      |       |
|--------------------------------------------------|----------------------------------------|---------------------------------|--------|------|------|-------|
| Symbol                                           | Parameter                              | Test Conditions                 | Rating |      |      | Units |
|                                                  |                                        |                                 | Min.   | Typ. | Max. |       |
| $I_S$                                            | Continuous Source Current (Body Diode) |                                 | --     | --   | 7    | A     |
| $I_{SM}$                                         | Maximum Pulsed Current (Body Diode)    |                                 | --     | --   | 28   | A     |
| $V_{SD}$                                         | Diode Forward Voltage                  | $I_S=7.0A, V_{GS}=0V$           | --     | --   | 1.5  | V     |
| $t_{rr}$                                         | Reverse Recovery Time                  | $I_S=7.0A, T_J = 25^\circ C$    | --     | 380  | --   | ns    |
| $Q_{rr}$                                         | Reverse Recovery Charge                | $dI_F/dt=100A/\mu s, V_{GS}=0V$ | --     | 1400 | --   | nC    |
| Pulse width $t_p \leq 380\mu s, \delta \leq 2\%$ |                                        |                                 |        |      |      |       |

| Symbol          | Parameter           | Typ.  | Units        |
|-----------------|---------------------|-------|--------------|
| $R_{\theta JC}$ | Junction-to-Case    | 0.782 | $^\circ C/W$ |
| $R_{\theta JA}$ | Junction-to-Ambient | 62    | $^\circ C/W$ |

<sup>a1</sup>: Repetitive rating; pulse width limited by maximum junction temperature

<sup>a2</sup>:  $L=10.0mH, I_D=11.8A, \text{Start } T_J=25^\circ C$

<sup>a3</sup>:  $I_{SD}=7A, di/dt \leq 100A/\mu s, V_{DD} \leq BV_{DS}, \text{Start } T_J=25^\circ C$

Test Circuit and Waveform

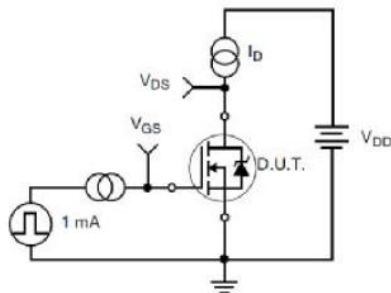


Figure 17. Gate Charge Test Circuit

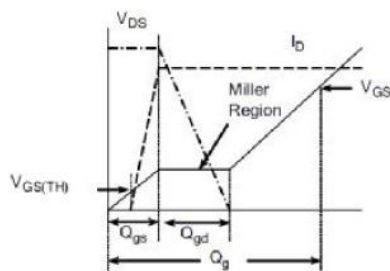


Figure 18. Gate Charge Waveform

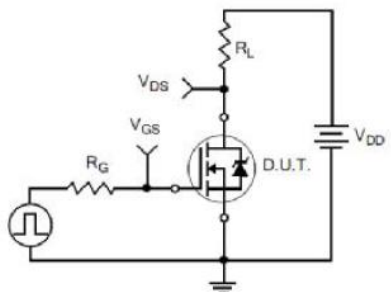


Figure 19. Resistive Switching Test Circuit

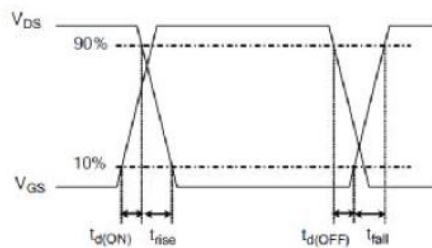


Figure 20. Resistive Switching Waveforms

### Characteristics Curve:

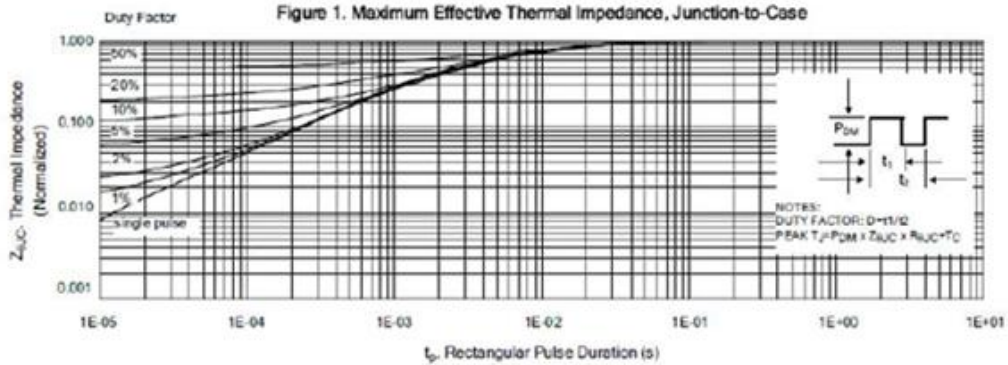


Figure 2. Maximum Power Dissipation vs Case Temperature

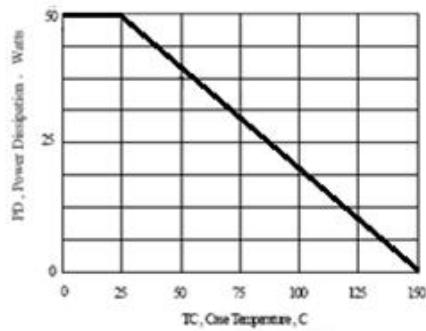


Figure 3. Maximum Continuous Drain Current vs Case Temperature

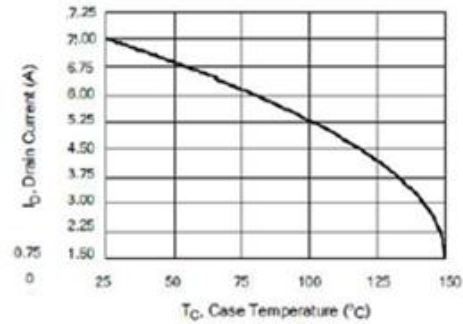


Figure 4. Typical Output Characteristics

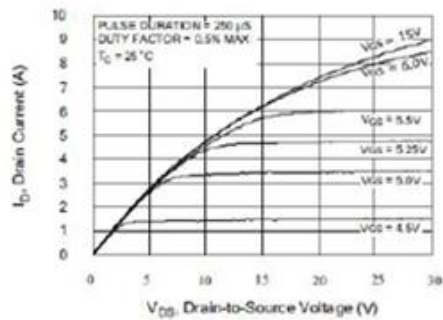


Figure 5. Typical Drain-to-Source ON Resistance vs Gate Voltage and Drain Current

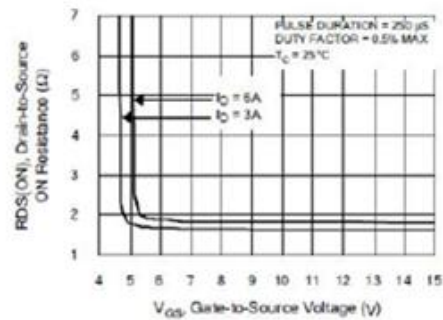


Figure 6. Maximum Peak Current Capability

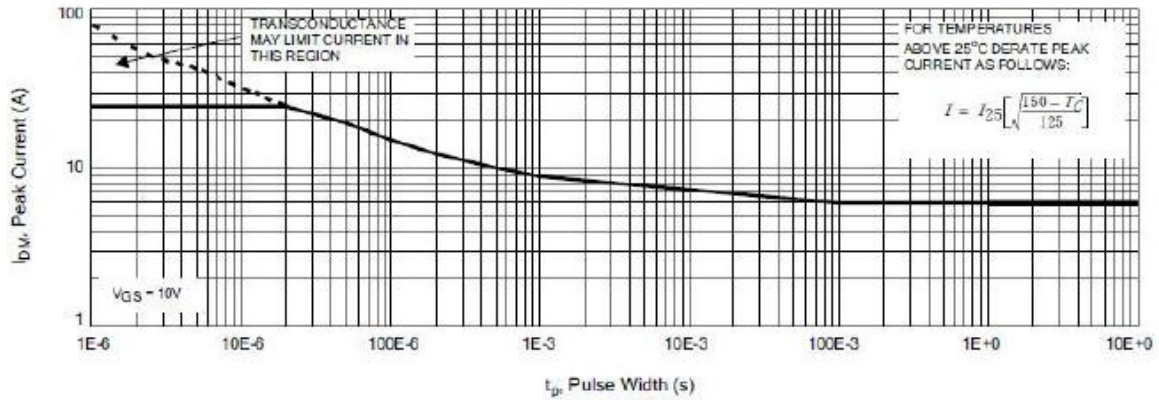


Figure 7. Typical Transfer Characteristics

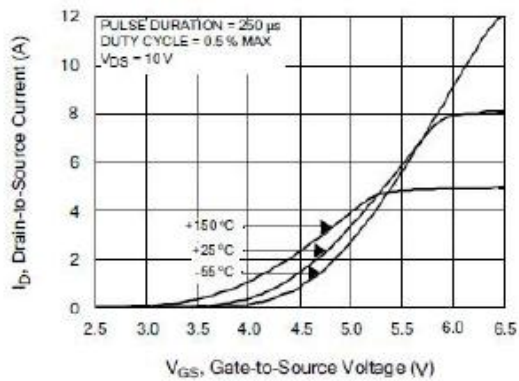


Figure 8. Unclamped Inductive Switching Capability

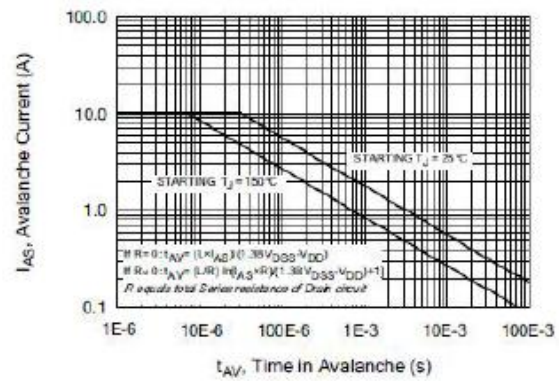


Figure 9. Typical Drain-to-Source ON Resistance vs Drain Current

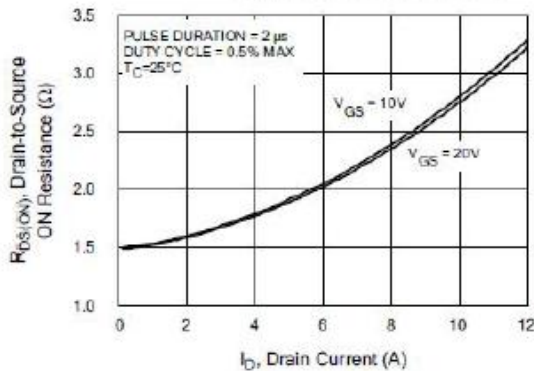
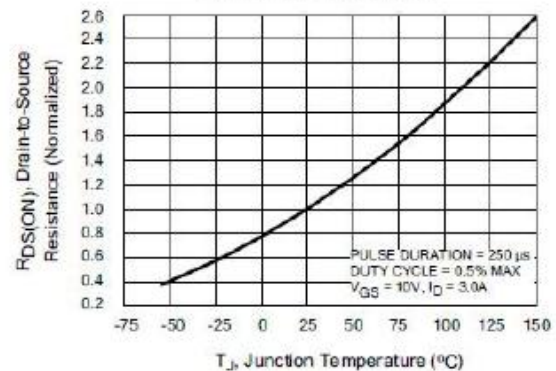
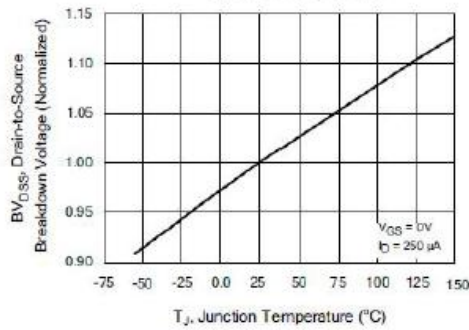


Figure 10. Typical Drain-to-Source ON Resistance vs Junction Temperature

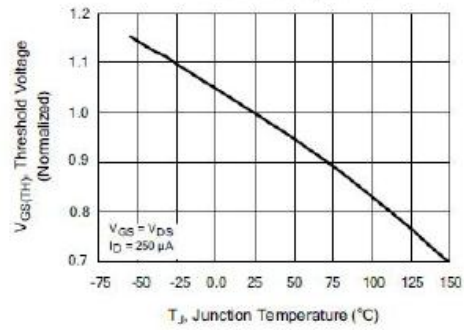




**Figure 11. Typical Breakdown Voltage vs Junction Temperature**



**Figure 12. Typical Threshold Voltage vs Junction Temperature**



**Figure 13. Maximum Forward Bias Safe Operating Area**

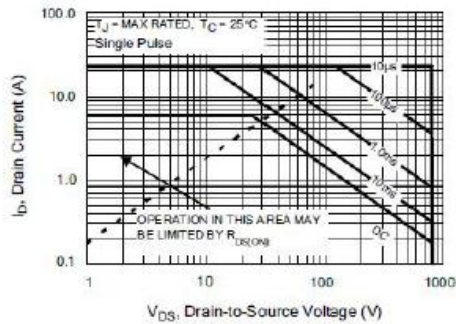
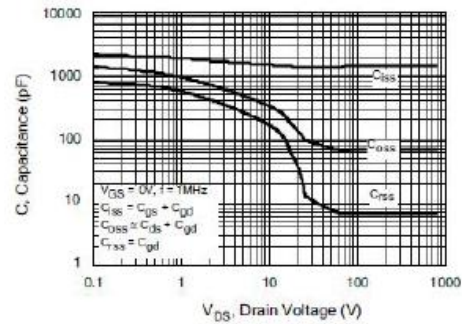
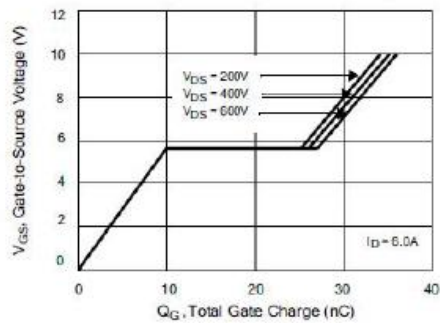


Figure 14. Typical Capacitance vs



**Figure 15. Typical Gate Charge vs Gate-to-Source Voltage**



**Figure 16. Typical Body Diode Transfer Characteristics**

