



GL60N06A8

GL Silicon N-Channel Power MOSFET

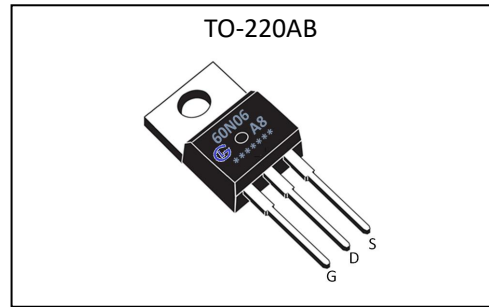
General Description:

The GL60N06A8 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications. The package form is TO-220AB, which accords with the RoHS standard.

| | | |
|------------------|-----|------------|
| V_{DSS} | 60 | V |
| I_D | 60 | A |
| P_D | 85 | W |
| $R_{DS(ON)type}$ | 9.5 | m Ω |

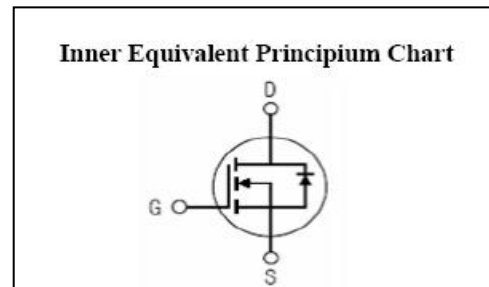
Features:

- $R_{DS(ON)} < 12m\Omega @ V_{GS}=10V$ (Typ9.5m Ω)
- High density cell design for ultra low R_{dson}
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation



Applications:

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply



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

| Symbol | Parameter | Rating | Units |
|----------------|--|-----------------|-------|
| V_{DSS} | Drain-to-Source Voltage | 60 | V |
| I_D | Continuous Drain Current | 60 | A |
| I_{DM} | Pulsed Drain Current | 120 | A |
| V_{GS} | Gate-to-Source Voltage | ± 20 | V |
| P_D | Power Dissipation | 85 | W |
| E_{AS} | Single pulse avalanche energy ^{a5} | 290 | mJ |
| T_J, T_{stg} | Operating Junction and Storage Temperature Range | 175, -55 to 175 | °C |



GL60N06A8

GL Silicon N-Channel Power MOSFET

Electrical Characteristics ($T_c = 25^\circ\text{C}$ unless otherwise specified) :

| OFF Characteristics | | | | | | |
|---------------------|-----------------------------------|---|--------|------|------|---------|
| Symbol | Parameter | Test Conditions | Rating | | | Units |
| | | | Min. | Typ. | Max. | |
| V_{DSS} | Drain to Source Breakdown Voltage | $V_{GS}=0V, I_D=250\mu A$ | 60 | -- | -- | V |
| I_{DSS} | Drain to Source Leakage Current | $V_{DS}=60V, V_{GS}=0V, T_a=25^\circ\text{C}$ | -- | -- | 1.0 | μA |
| $I_{GSS(F)}$ | Gate to Source Forward Leakage | $V_{GS}=+20V$ | -- | -- | 0.1 | μA |
| $I_{GSS(R)}$ | Gate to Source Reverse Leakage | $V_{GS}=-20V$ | -- | -- | -0.1 | μA |

| ON Characteristics ^{a3} | | | | | | |
|----------------------------------|-------------------------------|-------------------------------|--------|------|------|------------|
| Symbol | Parameter | Test Conditions | Rating | | | Units |
| | | | Min. | Typ. | Max. | |
| $R_{DS(ON)}$ | Drain-to-Source On-Resistance | $V_{GS}=10V, I_D=30A$ | -- | 9.5 | 12 | m Ω |
| $V_{GS(TH)}$ | Gate Threshold Voltage | $V_{DS}=V_{GS}, I_D=250\mu A$ | 2.0 | 3.0 | 4.0 | V |

Pulse width $t_p \leq 380\mu s, \delta \leq 2\%$

| Dynamic Characteristics ^{a4} | | | | | | |
|---------------------------------------|------------------------------|--|--------|------|------|-------|
| Symbol | Parameter | Test Conditions | Rating | | | Units |
| | | | Min. | Typ. | Max. | |
| g_{fs} | Forward Transconductance | $V_{DS}=5V, I_D=30A$ | 25 | -- | -- | S |
| C_{iss} | Input Capacitance | $V_{GS}=0V, V_{DS}=25V$ $f=1.0\text{MHz}$ | -- | 2498 | -- | pF |
| C_{oss} | Output Capacitance | | -- | 185 | -- | |
| C_{rss} | Reverse Transfer Capacitance | | -- | 80 | -- | |

| Resistive Switching Characteristics ^{a4} | | | | | | |
|---|----------------------------------|--|--------|------|------|-------|
| Symbol | Parameter | Test Conditions | Rating | | | Units |
| | | | Min. | Typ. | Max. | |
| $t_{d(ON)}$ | Turn-on Delay Time | $V_{DD}=30V, I_D=2A, R_L=1\Omega$ $V_{GS}=10V, R_G=3\Omega$ | -- | 12 | -- | ns |
| t_r | Rise Time | | -- | 5.2 | -- | |
| $t_{d(OFF)}$ | Turn-Off Delay Time | | -- | 38 | -- | |
| t_f | Fall Time | | -- | 27 | -- | |
| Q_g | Total Gate Charge | $V_{DD}=30V, I_D=30A$ $V_{GS}=10V$ | -- | 36 | -- | nC |
| Q_{gs} | Gate to Source Charge | | -- | 9.9 | -- | |
| Q_{gd} | Gate to Drain ("Miller")Charge | | -- | 6.6 | -- | |



GL60N06A8

GL Silicon N-Channel Power MOSFET

Source-Drain Diode Characteristics

| Symbol | Parameter | Test Conditions | Rating | | | Units |
|----------|--|----------------------|--------|------|------|-------|
| | | | Min. | Typ. | Max. | |
| I_S | Continuous Source Current ^{a2} (Body Diode) | | -- | -- | 60 | A |
| V_{SD} | Diode Forward Voltage ^{a3} | $I_S=60A, V_{GS}=0V$ | -- | -- | 1.5 | V |

| Symbol | Parameter | Typ. | Units |
|-----------------|--------------------------------|------|-------|
| $R_{\theta JC}$ | Junction-to-Case ^{a2} | 1.76 | °C/W |

^{a1}: Repetitive Rating: Pulse width limited by maximum junction temperature.

^{a2}: Surface Mounted on FR4 Board, $t \leq 10\text{sec}$.

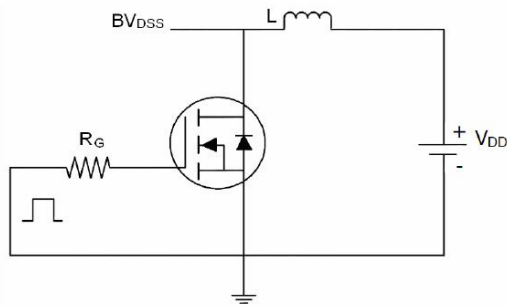
^{a3}: Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.

^{a4}: Guaranteed by design, not subject to production

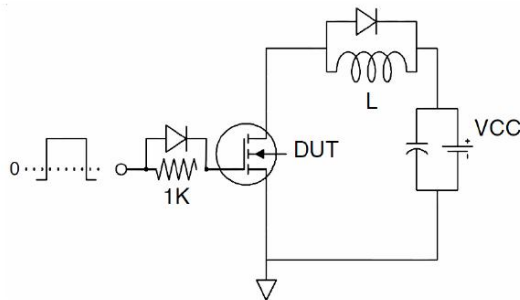
^{a5}: EAS condition: $T_j=25^\circ\text{C}, V_{DD}=30\text{V}, V_G=10\text{V}, L=0.5\text{mH}, R_g=25\Omega$

Test circuit

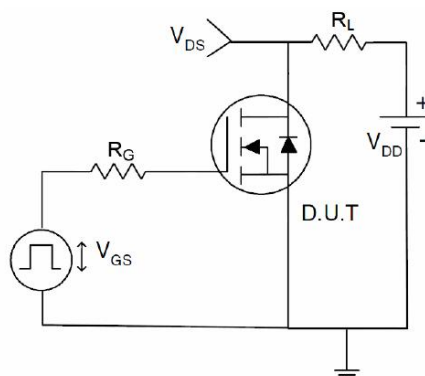
1) EAS test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit





GL60N06A8

GL Silicon N-Channel Power MOSFET

Characteristics Curve:

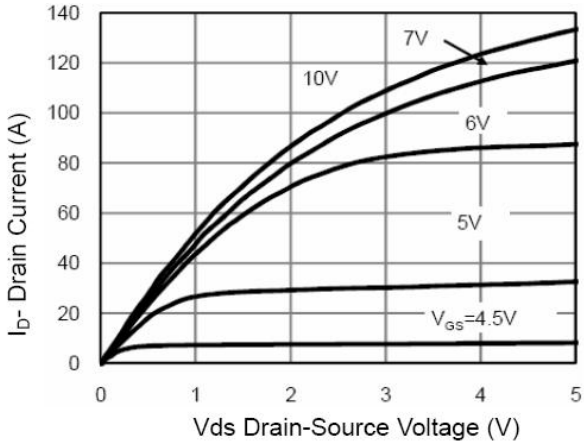


Figure 1 Output Characteristics

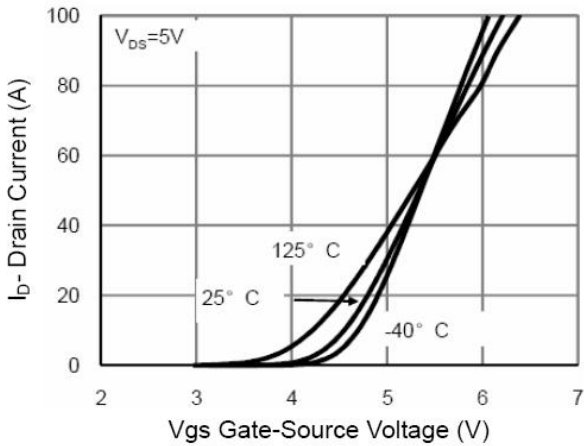


Figure 2 Transfer Characteristics

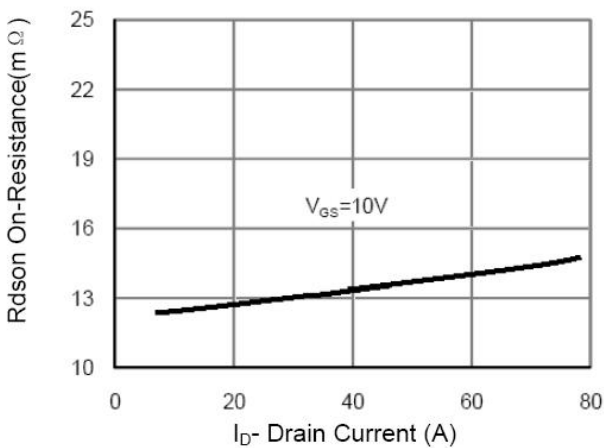


Figure 3 Rdson- Drain Current

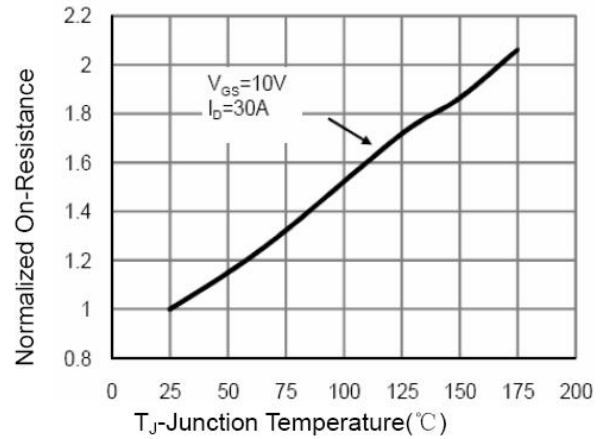


Figure 4 Rdson-Junction Temperature

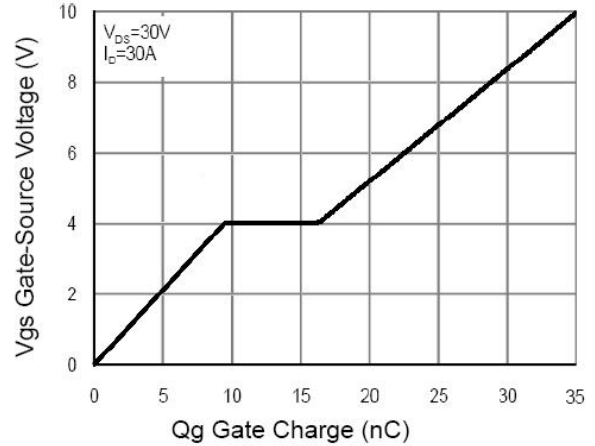


Figure 5 Gate Charge

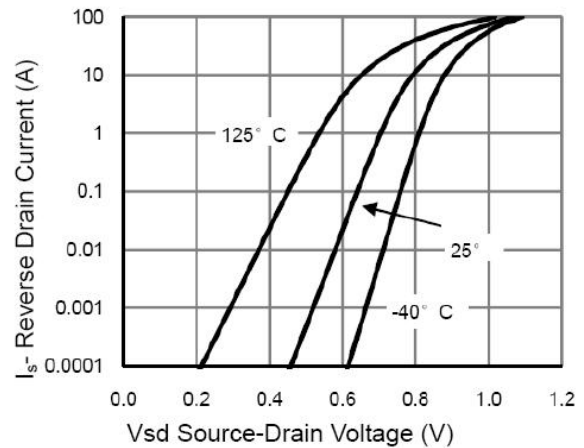


Figure 6 Source- Drain Diode Forward



GL60N06A8

GL Silicon N-Channel Power MOSFET

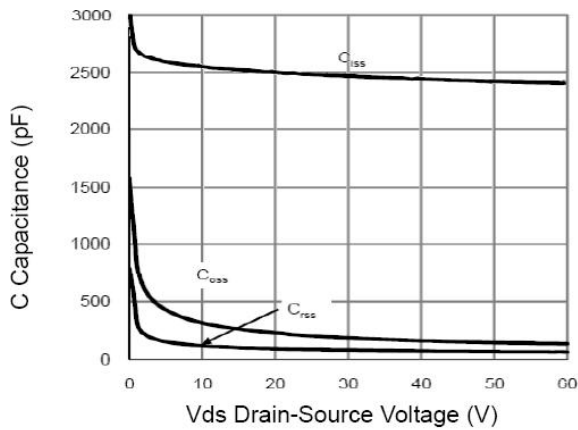


Figure 7 Capacitance vs Vds

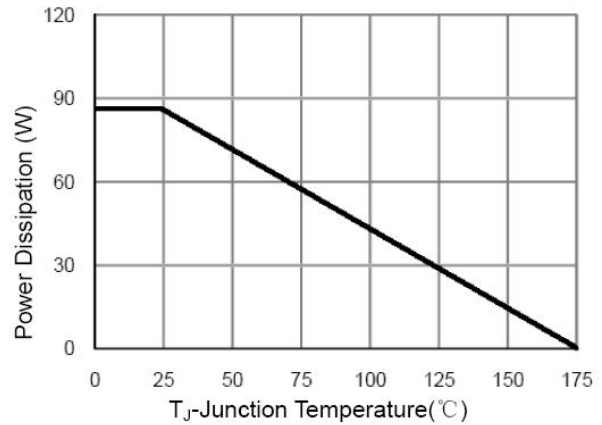


Figure 9 Power De-rating

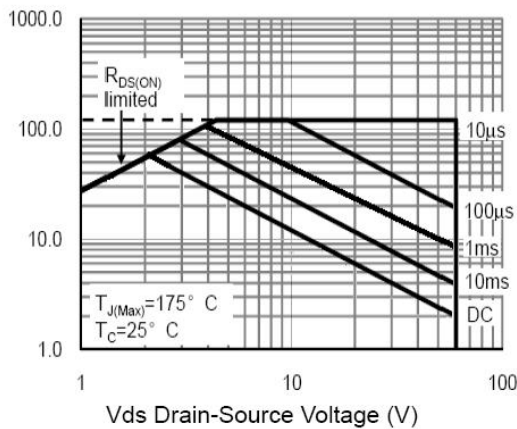


Figure 8 Safe Operation Area

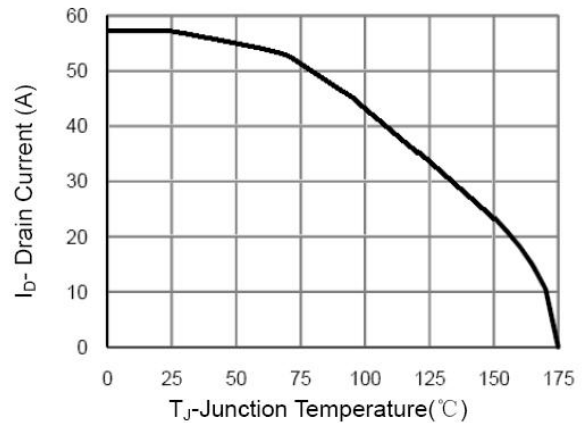


Figure 10 ID Current- Junction Temperature

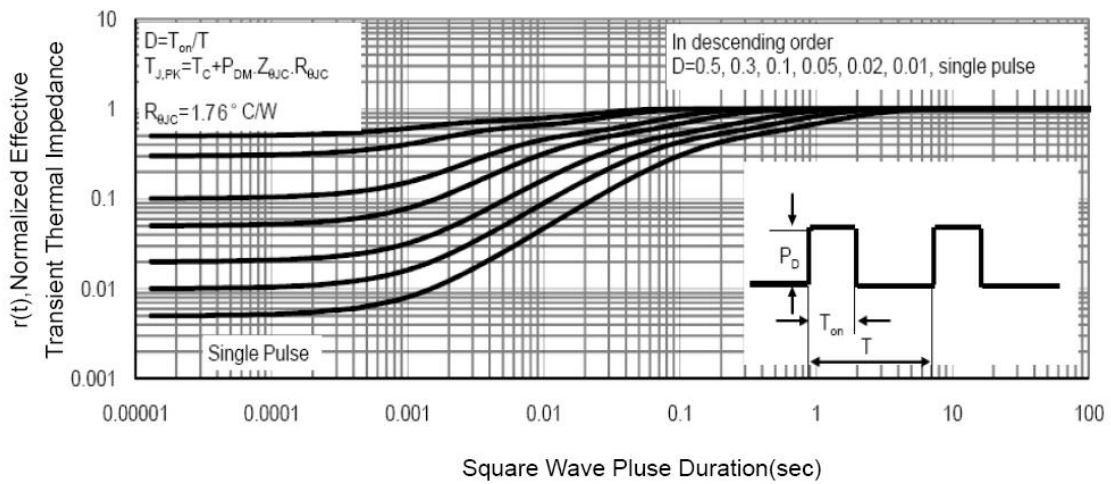


Figure 11 Normalized Maximum Transient Thermal Impedance