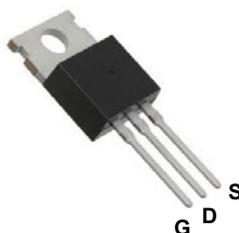
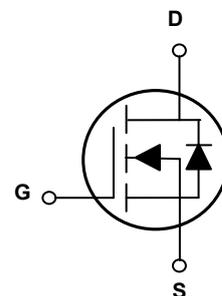


Main Product Characteristics

| | |
|---------------|--------------|
| $V_{(BR)DSS}$ | 30V |
| $R_{DS(ON)}$ | 5.8mΩ (Max.) |
| I_D | 100A |



TO-220



Schematic Diagram

Features and Benefits

- Advanced MOSFET process technology
- Low on-resistance
- Fast switching and reverse body recovery

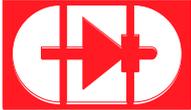


Description

The GSFH3006 utilizes the latest techniques to achieve high cell density and low on-resistance. These features make this device extremely efficient and reliable for use in high efficiency switch mode power supplies and a wide variety of other applications.

Absolute Maximum Ratings ($T_A=25^{\circ}C$ unless otherwise specified)

| Parameter | Symbol | Max. | Unit |
|--|-----------------|-------------|---------------|
| Drain-Source Voltage | V_{DS} | 30 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Continuous Drain Current @ Steady-State ¹ , $T_A=25^{\circ}C$ | I_D | 100 | A |
| Continuous Drain Current @ Steady-State, $T_A=100^{\circ}C$ | | 68 | A |
| Pulsed Drain Current ² | I_{DM} | 400 | A |
| Single Pulsed Avalanche Energy ³ | E_{AS} | 200 | mJ |
| Power Dissipation, $T_A=25^{\circ}C$ | P_D | 83 | W |
| Power Dissipation, $T_A=100^{\circ}C$ | | 37.8 | |
| Linear Derating Factor, $T_A=25^{\circ}C$ | | 0.66 | |
| Thermal Resistance, Junction to Case | $R_{\theta JC}$ | 1.51 | $^{\circ}C/W$ |
| Junction to Ambient (PCB Mounted, Steady-State) ⁴ | $R_{\theta JA}$ | 62.0 | $^{\circ}C/W$ |
| Operating and Storage Temperature Range | T_J, T_{STG} | -55 to +150 | $^{\circ}C$ |


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

| Parameter | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|---|---------------|--|------|------|-----------|------------|
| On/Off Characteristic | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=250\mu A$ | 30 | - | - | V |
| Drain- Source Leakage Current | I_{DSS} | $V_{DS}=30V, V_{GS}=0V$ | - | - | 1 | uA |
| | | $T_J=125^\circ\text{C}$ | - | - | 50 | |
| Gate-Source Forward Leakage | I_{GSS} | $V_{GS}=\pm 20V$ | - | - | ± 100 | nA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | 1.0 | 1.6 | 2.6 | V |
| Static Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS}=10V, I_D=20A$ | - | 4.3 | 5.8 | m Ω |
| | | $V_{GS}=4.5V, I_D=15A$ | - | 5.2 | 7.5 | |
| Gate Resistance | R_g | $f=1.0\text{MHz}$ | - | 4.2 | - | Ω |
| Dynamic Characteristics | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS}=25V, V_{GS}=0V,$ $f=1.0\text{MHz}$ | - | 2180 | - | pF |
| Output Capacitance | C_{oss} | | - | 270 | - | pF |
| Reverse Transfer Capacitance | C_{rss} | | - | 210 | - | pF |
| Total Gate Charge | Q_g | $V_{DD}=24V, I_D=30A,$ $V_{GS}=10V$ | - | 47.2 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 8.8 | - | nC |
| Gate-Drain ("Miller") Charge | Q_{gd} | | - | 9.6 | - | nC |
| Switching Characteristics | | | | | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD}=20V, I_D=60A,$ $R_{GEN}=1.8\Omega, V_{GS}=4.5V$ | - | 12.3 | - | nS |
| Rise Time | t_r | | - | 87.3 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 140 | - | nS |
| Fall Time | t_f | | - | 82.4 | - | nS |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| Continuous Source Current (Body Diode) | I_S | MOSFET symbol showing the integral reverse p-n junction diode. | - | - | 100 | A |
| Pulsed Source Current (Body Diode) | I_{SM} | | - | - | 400 | A |
| Diode Forward Voltage | V_{SD} | $V_{GS}=0V, I_S=20A$ | - | 0.9 | 1.2 | V |
| Reverse Recovery Time | t_{rr} | $T_J=25^\circ\text{C}, I_F=30A,$ $di/dt= 100A/\mu S$ | - | 16.5 | - | nS |
| Reverse Recovery Charge | Q_{rr} | | - | 6.5 | - | uC |

Notes:

1. Pulse test: Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
2. Repetitive rating; pulse width limited by max. junction temperature.
3. $L=0.5\text{mH}, V_{DD}=15V, R_G=25\Omega, T_J=25^\circ\text{C}$.
4. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

Typical Electrical and Thermal Characteristic Curves

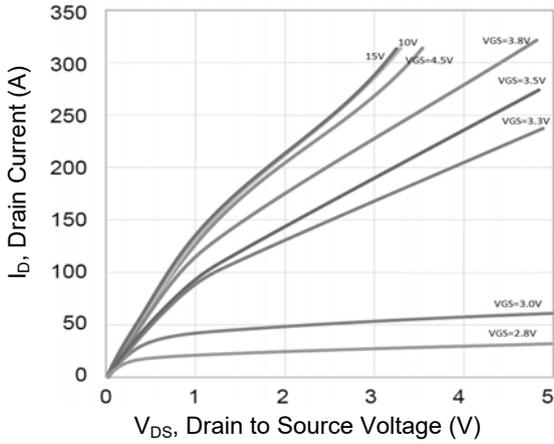


Figure 1. Output Characteristics

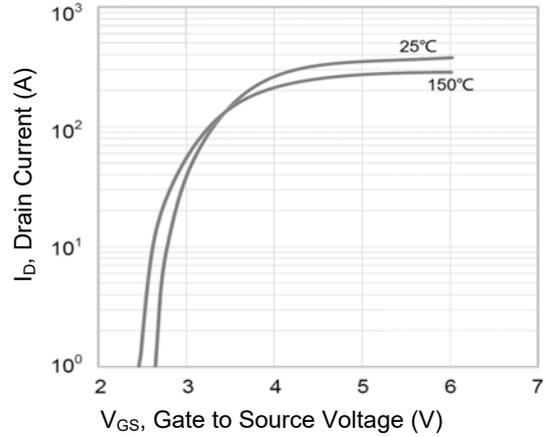


Figure 2. Transfer Characteristics

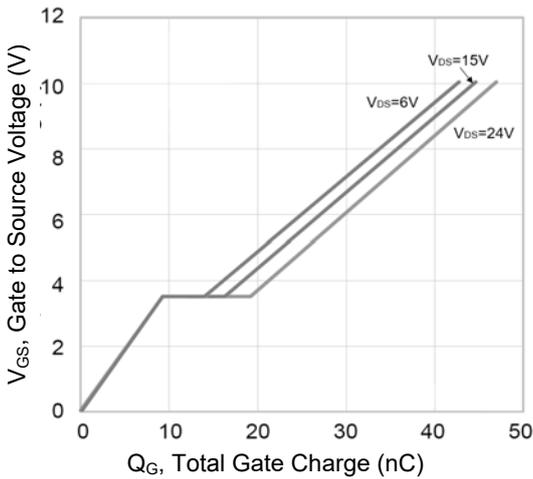


Figure 3. Gate Charge

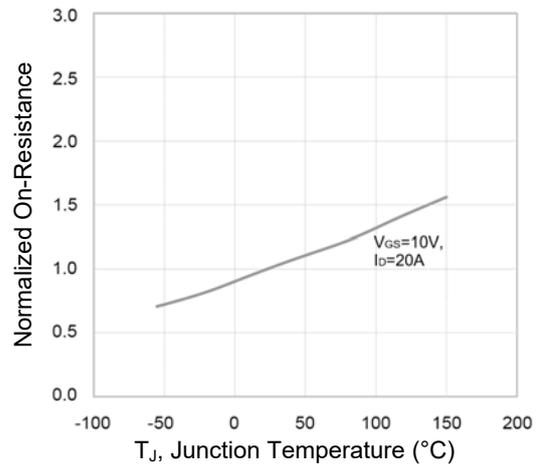


Figure 4. Normalized $R_{DS(ON)}$ vs. T_J

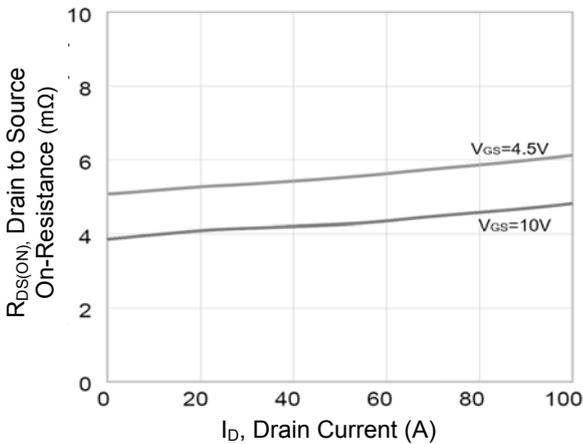


Figure 5. $R_{DS(ON)}$ vs. Drain Current

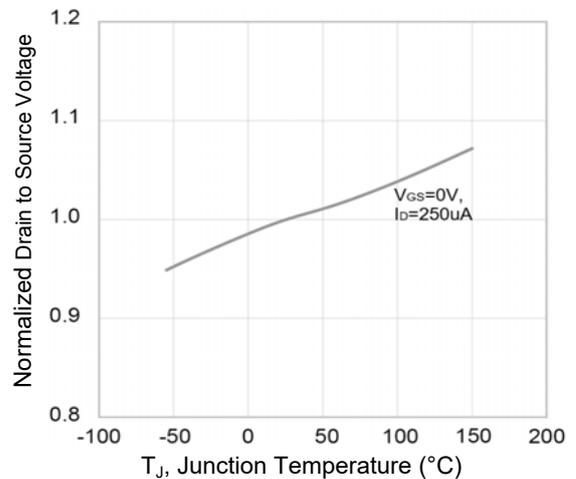


Figure 6. Normalized BV_{DSS} vs. T_J

Typical Electrical and Thermal Characteristic Curves

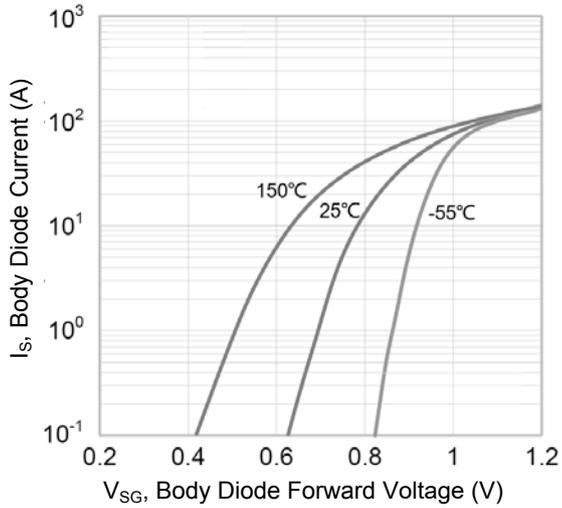


Figure 7. Body Diode Characteristics

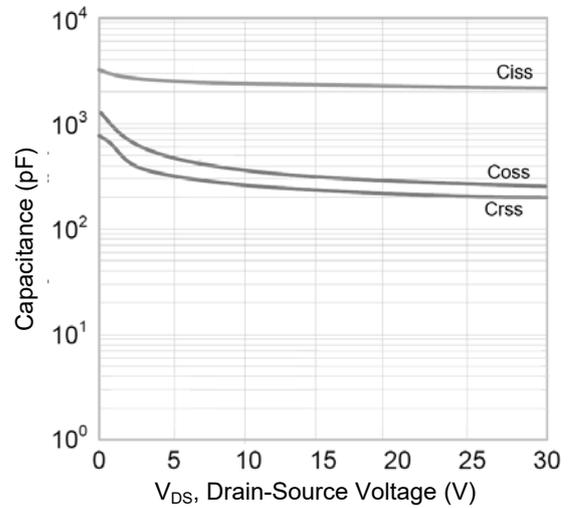


Figure 8. Capacitance Characteristics

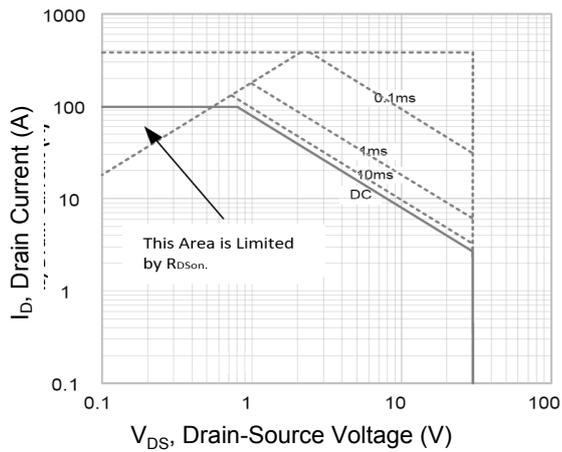
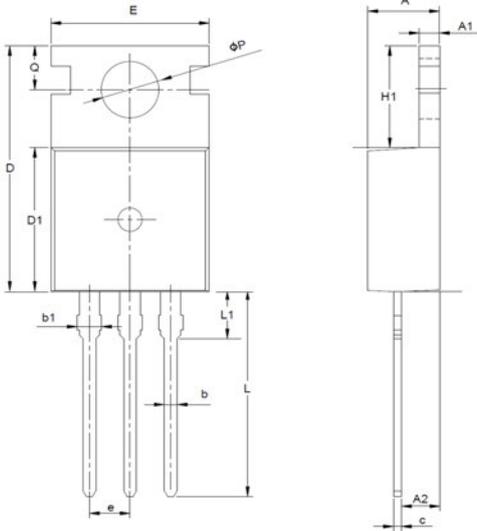


Figure 9. Safe Operation Area

Package Outline Dimensions (TO-220)



| Symbol | Dimensions in Millimeters | | Dimensions in Inches | |
|--------|---------------------------|--------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 4.300 | 4.700 | 0.169 | 0.186 |
| A1 | 1.000 | 1.500 | 0.039 | 0.059 |
| A2 | 1.800 | 2.800 | 0.071 | 0.110 |
| b | 0.600 | 1.000 | 0.024 | 0.039 |
| b1 | 1.000 | 1.600 | 0.039 | 0.063 |
| c | 0.300 | 0.700 | 0.012 | 0.028 |
| D | 15.100 | 16.100 | 0.594 | 0.634 |
| D1 | 8.100 | 10.000 | 0.319 | 0.394 |
| E | 9.600 | 10.400 | 0.378 | 0.410 |
| e | 2.540 BSC | | 0.100 BSC | |
| H1 | 6.100 | 7.000 | 0.240 | 0.276 |
| L | 12.600 | 13.600 | 0.496 | 0.535 |
| L1 | - | 3.950 | - | 0.156 |
| ΦP | 3.400 | 3.900 | 0.134 | 0.154 |
| Q | 2.600 | 3.200 | 0.102 | 0.126 |