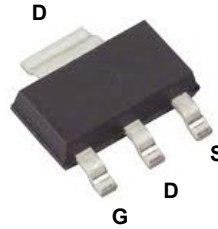
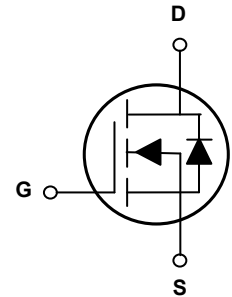


Main Product Characteristics

| | |
|---------------|--------------|
| $V_{(BR)DSS}$ | 200V |
| $R_{DS(ON)}$ | 700mΩ (Max.) |
| I_D | 4A |



SOT-223



Schematic Diagram

Features and Benefits

- Advanced MOSFET process technology
- Ideal for high efficiency switched mode power supplies
- Low on-resistance with low gate charge
- Fast switching and reverse body recovery

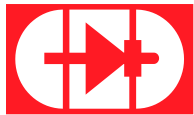


Description

The GSFL2004 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 ($T_C=25^{\circ}C$ unless otherwise specified)

| Parameter | Symbol | Max. | Unit |
|---|-----------------|-------------|------|
| Drain-Source Voltage | V_{DS} | 200 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Drain Current-Continuous ($T_A=25^{\circ}C$) | I_D | 4 | A |
| Drain Current-Continuous ($T_A=100^{\circ}C$) | | 2.8 | |
| Drain Current-Pulsed ¹ | I_{DM} | 16 | A |
| Single Pulse Avalanche Energy ² | E_{AS} | 10.6 | mJ |
| Power Dissipation ($T_A=25^{\circ}C$) | P_D | 30 | W |
| Power Dissipation-Derate above 25°C | | 0.24 | |
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 4.17 | °C/W |
| Operating Junction Temperature Range | T_J | -55 To +150 | °C |
| Storage Temperature Range | T_{STG} | -55 To +150 | °C |


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

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---|------------------------------|---|------|-------|-----------|----------------------|
| On / Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=250\mu A$ | 200 | - | - | V |
| BV_{DSS} Temperature Coefficient | $\Delta BV_{DSS}/\Delta T_J$ | Reference to 25°C , $I_D=1\text{mA}$ | - | 0.055 | - | $V/^\circ\text{C}$ |
| Drain-Source Leakage Current | I_{DSS} | $V_{DS}=200V, V_{GS}=0V, T_J=25^\circ\text{C}$ | - | - | 1 | μA |
| | | $V_{DS}=160V, V_{GS}=0V, T_J=125^\circ\text{C}$ | - | - | 10 | μA |
| Gate-Source Leakage Current | I_{GSS} | $V_{GS}=\pm 20V, V_{DS}=0V$ | - | - | ± 100 | nA |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | $V_{GS}=10V, I_D=3A$ | - | 510 | 700 | m Ω |
| | | $V_{GS}=4.5V, I_D=2A$ | - | 550 | 750 | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{GS}=V_{DS}, I_D=250\mu A$ | 1.0 | 1.8 | 2.9 | V |
| $V_{GS(th)}$ Temperature Coefficient | $\Delta V_{GS(th)}$ | | - | -5 | - | mV/ $^\circ\text{C}$ |
| Forward Transconductance | gfs | $V_{DS}=10V, I_D=3A$ | - | 8 | - | S |
| Dynamic and Switching Characteristics | | | | | | |
| Total Gate Charge ^{2,3} | Q_g | $V_{DS}=100V, V_{GS}=10V, I_D=4A$ | - | 12.6 | - | nC |
| Gate-Source Charge ^{2,3} | Q_{gs} | | - | 2.1 | - | |
| Gate-Drain Charge ^{2,3} | Q_{gd} | | - | 2.2 | - | |
| Turn-On Delay Time ^{2,3} | $t_{d(on)}$ | $V_{DD}=100V, V_{GS}=10V, R_G=5\Omega, I_D=4A$ | - | 13 | - | nS |
| Rise Time ^{2,3} | t_r | | - | 10 | - | |
| Turn-Off Delay Time ^{2,3} | $t_{d(off)}$ | | - | 40 | - | |
| Fall Time ^{2,3} | t_f | | - | 10 | - | |
| Input Capacitance | C_{iss} | $V_{DS}=30V, V_{GS}=0V, F=1\text{MHz}$ | - | 775 | - | pF |
| Output Capacitance | C_{oss} | | - | 12.5 | - | |
| Reverse Transfer Capacitance | C_{rss} | | - | 4.4 | - | |
| Gate Resistance | R_g | $V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$ | - | 1.4 | 3 | Ω |
| Source-Drain Ratings and Characteristics | | | | | | |
| Continuous Source Current | I_S | $V_G=V_D=0V, \text{Force Current}$ | - | - | 4 | A |
| Pulsed Source Current | I_{SM} | | - | - | 16 | A |
| Diode Forward Voltage | V_{SD} | $V_{GS}=0V, I_S=2A, T_J=25^\circ\text{C}$ | - | - | 1.2 | V |
| Reverse Recovery Time ² | T_{rr} | $V_R=50V, I_S=4A, d_i/d_f=100A/\mu\text{S}, T_J=25^\circ\text{C}$ | - | 86 | - | nS |
| Reverse Recovery Charge ² | Q_{rr} | | - | 280 | - | nC |

Notes:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2. $V_{DD}=40V, V_{GS}=10V, L=0.5\text{mH}, R_G=25\Omega$, starting $T_J=25^\circ\text{C}$.
3. Pulse test: pulse width $\leq 300\mu\text{S}$, duty cycle $\leq 2\%$.
4. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

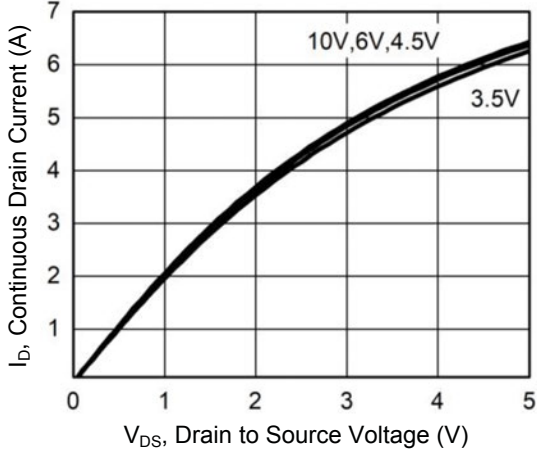


Figure 1. Typical Output Characteristics

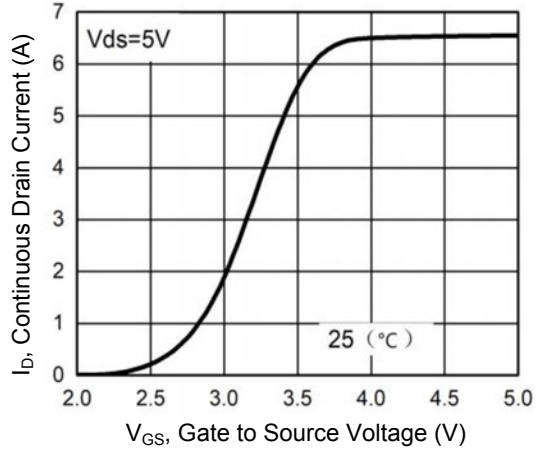


Figure 2. Transfer Characteristics

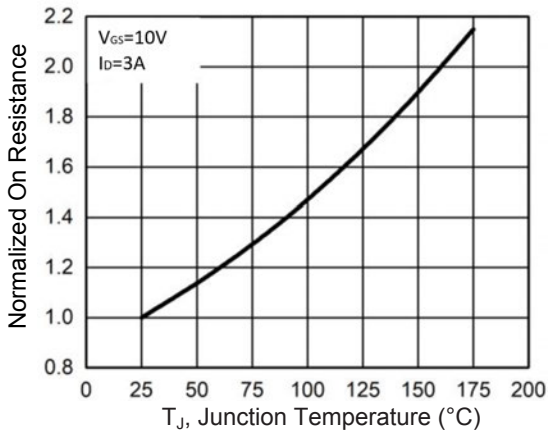


Figure 3. Normalized $R_{DS(on)}$ vs. T_J

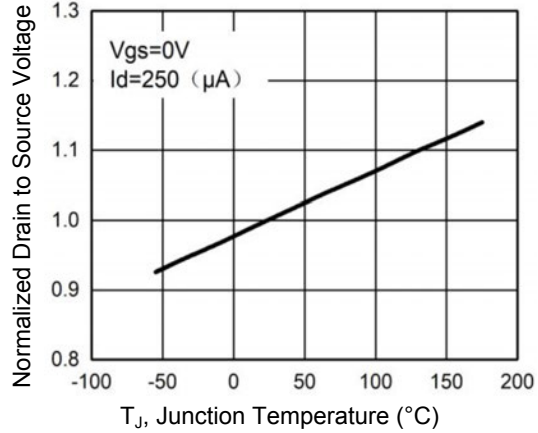


Figure 4. Normalized BV_{dss} vs. T_J

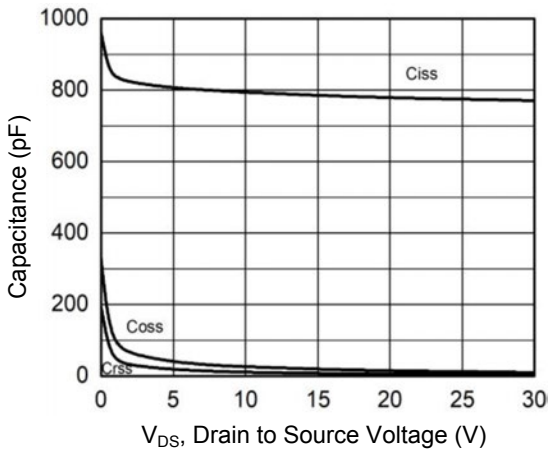


Figure 5. Capacitance Characteristics

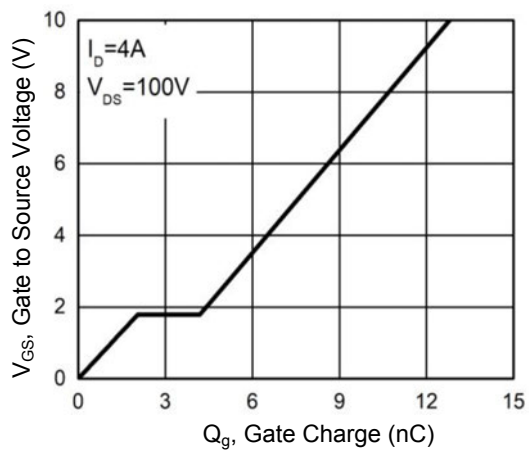


Figure 6. Gate Charge Characteristics

Typical Electrical and Thermal Characteristic Curves

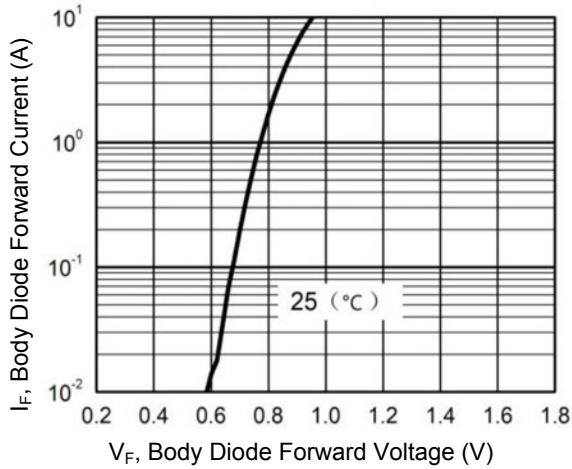


Figure 7. Body Diode Characteristics

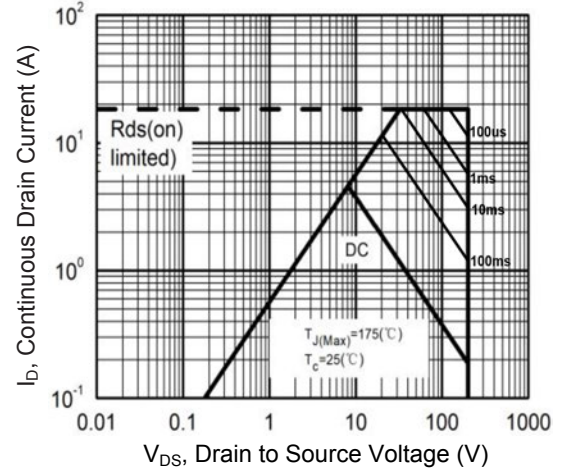
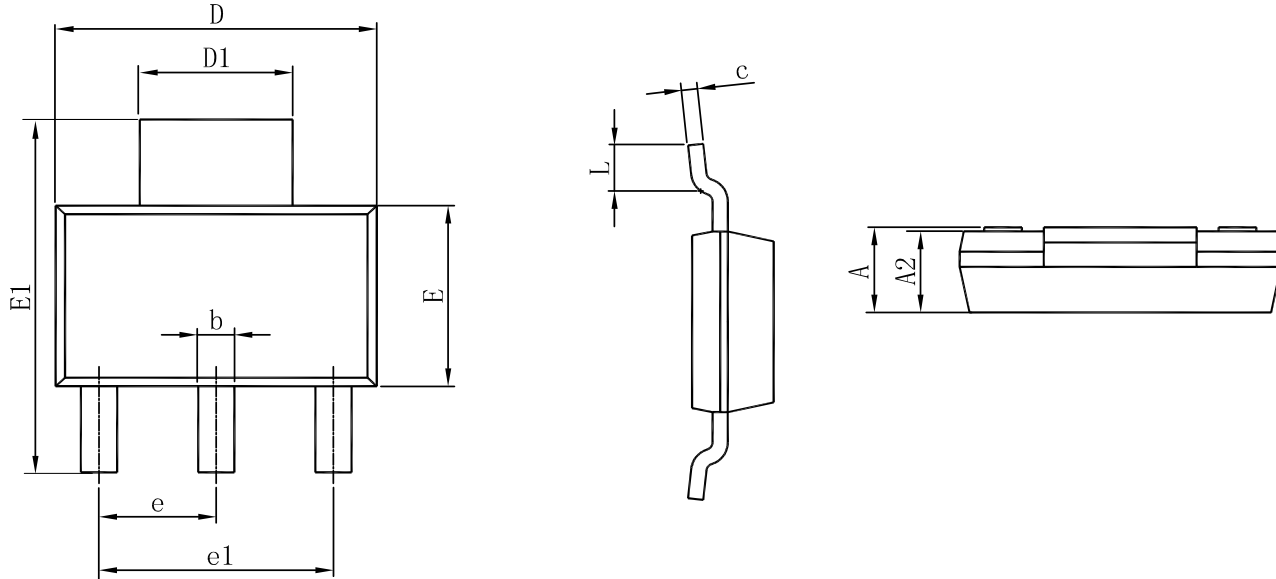


Figure 8. Maximum Safe Operation Area

Package Outline Dimensions (SOT-223)



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 1.50 | 1.80 | 0.059 | 0.071 |
| A2 | 1.45 | 1.80 | 0.057 | 0.071 |
| b | 0.60 | 0.84 | 0.024 | 0.033 |
| c | 0.20 | 0.35 | 0.008 | 0.014 |
| D | 6.20 | 6.70 | 0.244 | 0.264 |
| D1 | 2.90 | 3.10 | 0.114 | 0.122 |
| E | 3.30 | 3.70 | 0.130 | 0.146 |
| E1 | 6.70 | 7.30 | 0.264 | 0.287 |
| e | 2.30 TYP | | 0.091 TYP | |
| e1 | 4.40 | 4.70 | 0.173 | 0.185 |
| L | 0.70 | 1.10 | 0.028 | 0.043 |

Order Information

| Device | Package | Marking | Carrier | Quantity |
|----------|---------|---------|-------------|-----------------|
| GSFL2004 | SOT-223 | L2004 | Tape & Reel | 3,000pcs / Reel |