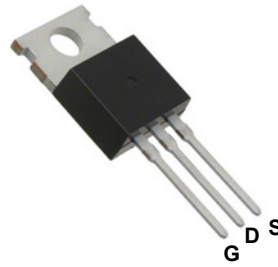
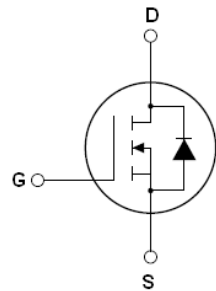


Main Product Characteristics

| | |
|--------------|---------------|
| V_{DS} | 650V |
| $R_{DS(ON)}$ | 260m Ω |
| I_D | 15A |



TO-220



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 GSGH6515 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 supply and a wide variety of other applications.

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

| Parameter | Symbol | Max. | Unit |
|--|-----------------|-------------|---------------------------|
| Drain-Source Voltage($V_{GS}=0\text{V}$) | V_{DS} | 650 | V |
| Gate-Source Voltage($V_{DS}=0\text{V}$) AC ($f>1\text{ Hz}$) | V_{GS} | ± 30 | V |
| Drain Current-Continuous($T_C=25^\circ\text{C}$) | I_D | 15 | A |
| Drain Current-Continuous($T_C=100^\circ\text{C}$) | | 10 | A |
| Drain Current-Pulsed ¹ | I_{DM} | 60 | A |
| Maximum Power Dissipation($T_C=25^\circ\text{C}$) | P_D | 131 | W |
| Derating Factor | | 1.05 | W/ $^\circ\text{C}$ |
| Single Pulse Avalanche Energy ² | E_{AS} | 304 | mJ |
| Avalanche Current ¹ | I_{AR} | 3 | A |
| Repetitive Avalanche Energy, t_{AR} Limited by T_{jmax} ¹ | E_{AR} | 1.6 | mJ |
| Drain Source Voltage Slope, $V_{DS}\leq 480\text{V}$ | dv/dt | 50 | V/nS |
| Reverse Diode dv/dt , $V_{DS}\leq 480\text{V}, I_{SD}<I_D$ | | 15 | V/nS |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 62 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 0.95 | $^\circ\text{C}/\text{W}$ |
| Storage Temperature Range | T_{STG} | -55 To +150 | $^\circ\text{C}$ |
| Operating Junction Temperature Range | T_J | -55 To +150 | $^\circ\text{C}$ |

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

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|--|--------------|--|------|------|-----------|------------|
| On/Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=250\mu A$ | 650 | - | - | V |
| Zero Gate Voltage Drain Current($T_C=25^\circ\text{C}$) | I_{DSS} | $V_{DS}=650V, V_{GS}=0V$ | - | - | 1 | μA |
| Zero Gate Voltage Drain Current($T_C=125^\circ\text{C}$) | | $V_{DS}=650V, V_{GS}=0V$ | - | - | 100 | μA |
| Gate-Source Leakage Current | I_{GSS} | $V_{GS}=\pm 20V, V_{DS}=0V$ | - | - | ± 100 | nA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | 3.0 | 3.5 | 4.0 | V |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS}=10V, I_D=8A$ | - | 220 | 260 | m Ω |
| Dynamic Characteristics | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS}=50V, V_{GS}=0V, F=1\text{MHz}$ | - | 1210 | 1400 | pF |
| Output Capacitance | C_{oss} | | - | 74 | - | |
| Reverse Transfer Capacitance | C_{rss} | | - | 0.2 | - | |
| Total Gate Charge | Q_g | $V_{DS}=480V, I_D=15A, V_{GS}=10V$ | - | 24.7 | 42 | nC |
| Gate-Source Charge | Q_{gs} | | - | 8.2 | - | |
| Gate-Drain Charge | Q_{gd} | | - | 8.5 | - | |
| Switching Characteristics | | | | | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD}=380V, R_G=2.3\Omega, V_{GS}=10V, I_D=8A$ | - | 14 | - | nS |
| Turn-On Rise Time | t_r | | - | 8 | - | |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 55 | - | |
| Turn-Off Fall Time | t_f | | - | 7 | - | |
| Source-Drain Diode Characteristics | | | | | | |
| Source-Drain Current(Body Diode) | I_{SD} | $T_C=25^\circ\text{C}$ | - | - | 15 | A |
| Pulsed Source-Drain Current (Body Diode) | I_{SDM} | | - | - | 60 | A |
| Forward Voltage | V_{SD} | $T_J=25^\circ\text{C}, I_{SD}=15A, V_{GS}=0V$ | - | 0.9 | 1.2 | V |
| Reverse Recovery Time | t_{rr} | $T_J=25^\circ\text{C}, I_F=7.5A, di/dt=100A/\mu s$ | - | 240 | - | nS |
| Reverse Recovery Charge | Q_{rr} | | - | 2 | - | μC |
| Peak Reverse Recovery Current | I_{rrm} | | - | 17 | - | A |

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. $T_J=25^\circ\text{C}, V_{DD}=50V, V_G=10V, R_G=25\Omega$

Typical Electrical and Thermal Characteristic Curves

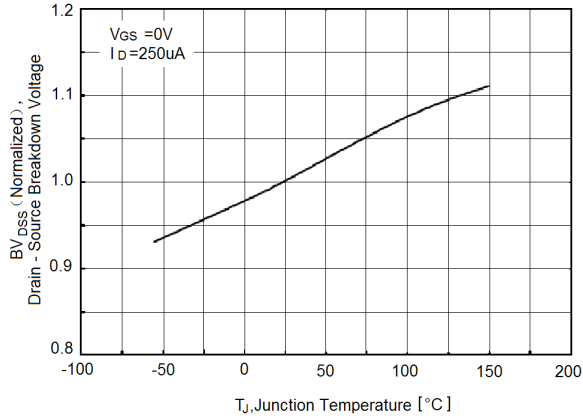


Figure 7. BV_{DSS} vs Junction Temperature

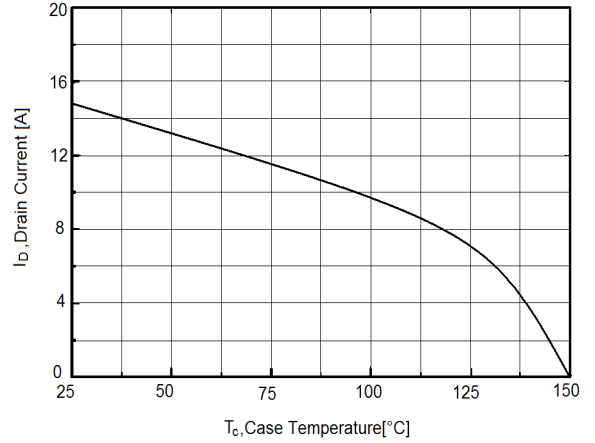


Figure 8. Maximum I_D vs Junction Temperature

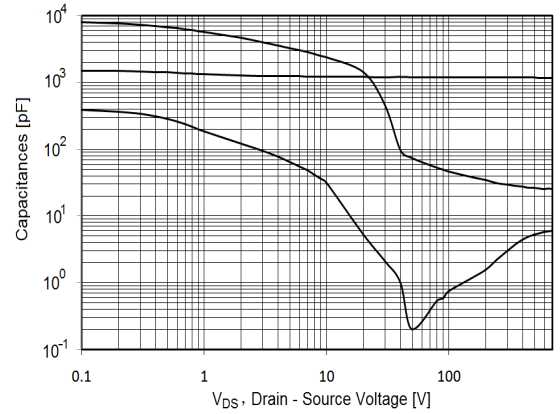


Figure 10. Capacitance

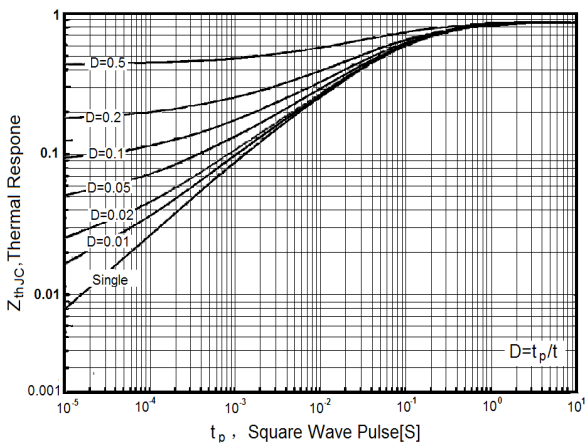


Figure 11. Transient Thermal Impedance

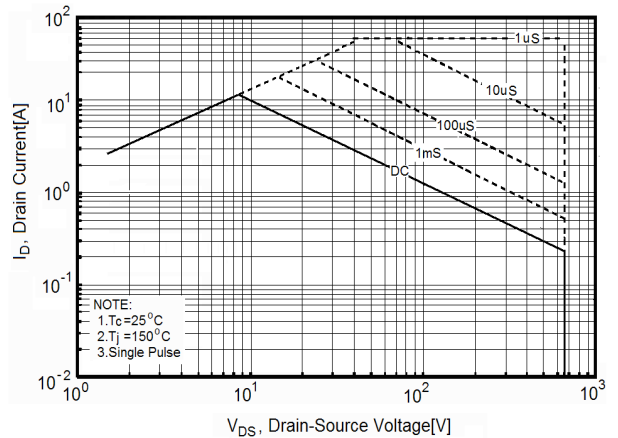


Figure 1. Safe Operating Area

Typical Electrical and Thermal Characteristic Curves

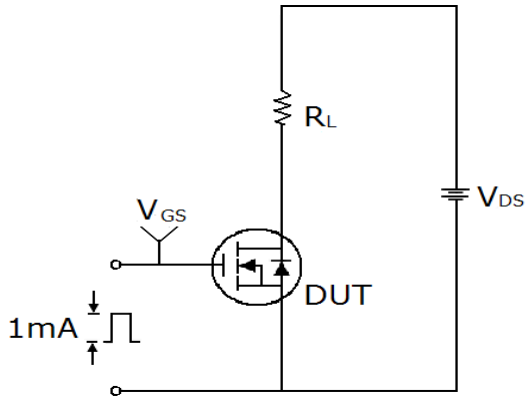


Figure 12. Gate Charge Test Circuit & Waveform

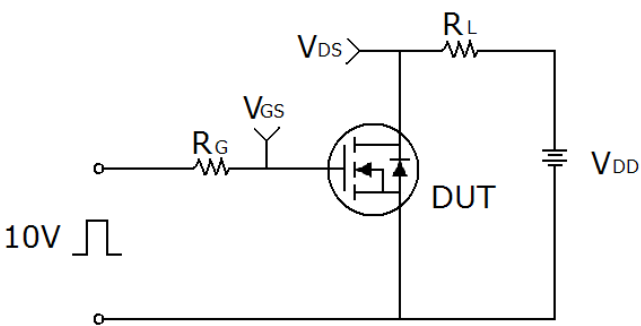
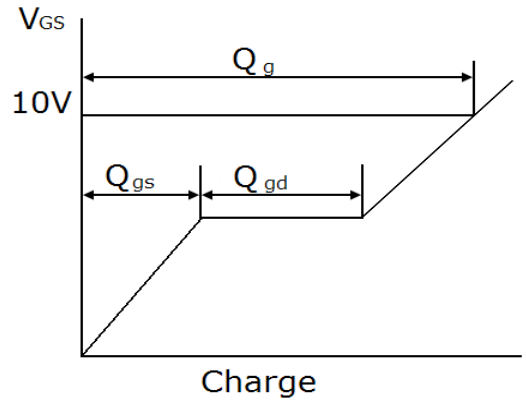


Figure 13. Switch Time Test Circuit

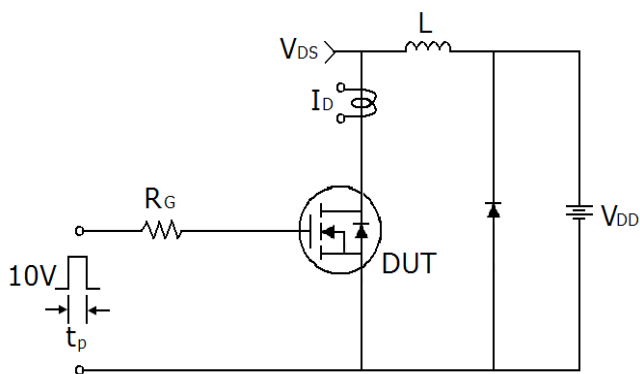
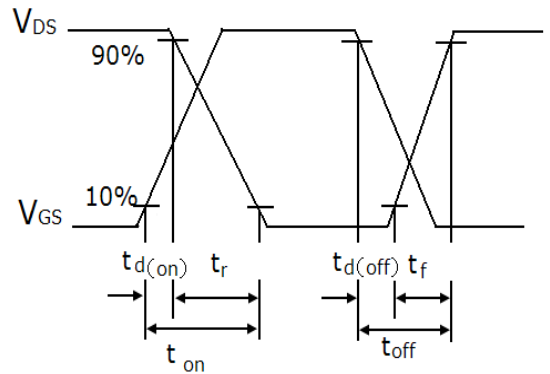
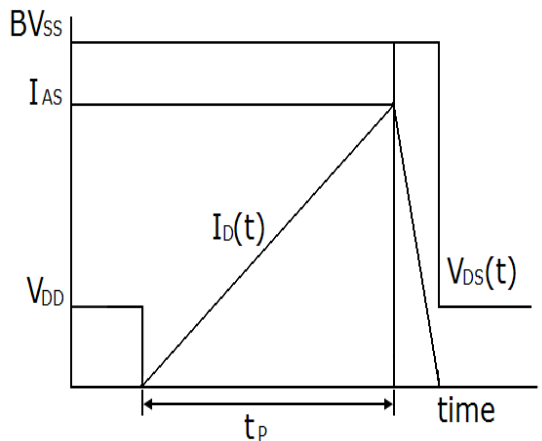
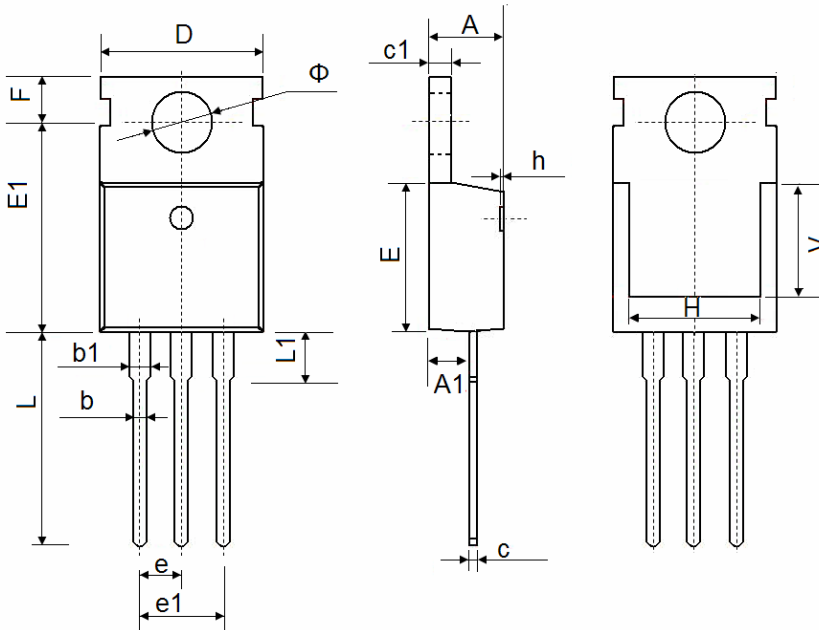


Figure 14. Unclamped Inductive Switching Test Circuit & Waveforms



Package Outline Dimensions (TO-220)



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|--------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 4.400 | 4.600 | 0.173 | 0.181 |
| A1 | 2.250 | 2.550 | 0.089 | 0.100 |
| b | 0.710 | 0.910 | 0.028 | 0.036 |
| b1 | 1.170 | 1.370 | 0.046 | 0.054 |
| c | 0.330 | 0.650 | 0.013 | 0.026 |
| c1 | 1.200 | 1.400 | 0.047 | 0.055 |
| D | 9.910 | 10.250 | 0.390 | 0.404 |
| E | 8.9500 | 9.750 | 0.352 | 0.384 |
| E1 | 12.650 | 12.950 | 0.498 | 0.510 |
| e | 2.540 TYP. | | 0.100 TYP. | |
| e1 | 4.980 | 5.180 | 0.196 | 0.204 |
| F | 2.650 | 2.950 | 0.104 | 0.116 |
| H | 7.900 | 8.100 | 0.311 | 0.319 |
| h | 0.000 | 0.300 | 0.000 | 0.012 |
| L | 12.900 | 13.400 | 0.508 | 0.528 |
| L1 | 2.850 | 3.250 | 0.112 | 0.128 |
| V | 6.900 REF. | | 0.276 REF. | |
| Φ | 3.400 | 3.800 | 0.134 | 0.150 |