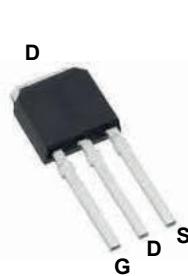
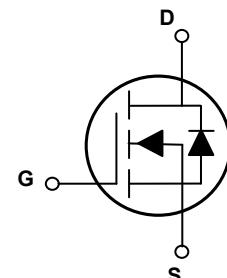


Main Product Characteristics

| | |
|---------------|--------------|
| $V_{(BR)DSS}$ | 650V |
| $R_{DS(ON)}$ | 0.64Ω (max.) |
| I_D | 7A |



TO-251



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 GSJG65R640 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 ($T_C=25^\circ\text{C}$ unless otherwise specified)

| Parameter | Symbol | Parameter. | Unit |
|--|-----------------|--------------|---------------------------|
| Drain-Source Voltage | V_{DS} | 650 | V |
| Gate-to-Source Voltage | V_{GS} | ± 30 | V |
| Continuous Drain Current, @ Steady-State ($T_C=25^\circ\text{C}$) | I_D | 7 | A |
| Continuous Drain Current, @ Steady-State ($T_C=100^\circ\text{C}$) | | 4.4 | A |
| Pulsed Drain Current | I_{DM} | 28 | A |
| Power Dissipation ($T_C=25^\circ\text{C}$) | P_D | 40 | W |
| | | 0.32 | W/ $^\circ\text{C}$ |
| Single Pulse Avalanche Energy ¹ | E_{AS} | 221 | mJ |
| Body Diode Reverse Voltage Slope ² | dv/dt | 50 | V/ns |
| MOS dv/dt Reggedness ³ | dv/dt | 100 | V/ns |
| Junction-to-Ambient (PCB Mounted, Steady-State) | $R_{\theta JA}$ | 62.5 | $^\circ\text{C}/\text{W}$ |
| Junction-to-Case | $R_{\theta JC}$ | 3.12 | $^\circ\text{C}/\text{W}$ |
| Operating Junction and Storage Temperature Range | T_J/T_{STG} | -55 to + 150 | $^\circ\text{C}$ |

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

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---|-----------------------------|---|------|------|------|---------------|
| On / Off Characteristics | | | | | | |
| Drain-to-Source Breakdown Voltage | $V_{(\text{BR})\text{DSS}}$ | $V_{\text{GS}}=0\text{V}, I_D=250\mu\text{A}$ | 650 | - | - | V |
| Drain-to-Source Leakage Current | I_{DSS} | $V_{\text{DS}}=650\text{V}, V_{\text{GS}}=0\text{V}$ | - | - | 200 | nA |
| Gate-to-Source Forward Leakage | I_{GSS} | $V_{\text{DS}}=0\text{V}, V_{\text{GS}}=30\text{V}$ | - | - | 100 | nA |
| | | $V_{\text{DS}}=0\text{V}, V_{\text{GS}}=-30\text{V}$ | - | - | -100 | |
| Static Drain-to-Source On-Resistance | $R_{\text{DS}(\text{ON})}$ | $V_{\text{GS}}=10\text{V}, I_D=3.5\text{A}, T_J=25^\circ\text{C}$ | - | 0.54 | 0.64 | Ω |
| | | $V_{\text{GS}}=10\text{V}, I_D=3.5\text{A}, T_J=125^\circ\text{C}$ | - | 1.09 | - | Ω |
| Gate Threshold Voltage | $V_{\text{GS}(\text{th})}$ | $V_{\text{DS}}=V_{\text{GS}}, I_D=250\mu\text{A}$ | 2.0 | - | 4.0 | V |
| Dynamic and Switching Characteristics | | | | | | |
| Input Capacitance | C_{iss} | $V_{\text{GS}}=0\text{V}, V_{\text{DS}}=100\text{V}, f=1\text{MHz}$ | - | 605 | - | pF |
| Output Capacitance | C_{oss} | | - | 25 | - | |
| Reverse Transfer Capacitance | C_{rss} | | - | 0.8 | - | |
| Total Gate Charge ^{4,5} | Q_g | $I_D=7\text{A}, V_{\text{DD}}=520\text{V}, V_{\text{GS}}=10\text{V}$ | - | 20 | - | nC |
| Gate-to-Source Charge ^{4,5} | Q_{gs} | | - | 5.2 | - | |
| Gate-to-Drain ("Miller") Charge ^{4,5} | Q_{gd} | | - | 8.8 | - | |
| Turn-On Delay Time ^{4,5} | $t_{\text{d}(\text{on})}$ | $V_{\text{DD}}=325\text{V}, V_{\text{GS}}=10\text{V}, R_G=25\Omega, I_D=7\text{A}$ | - | 21 | - | nS |
| Rise Time ^{4,5} | t_r | | - | 39 | - | |
| Turn-Off Delay Time ^{4,5} | $t_{\text{d}(\text{off})}$ | | - | 90 | - | |
| Fall Time ^{4,5} | t_f | | - | 36 | - | |
| Gate Resistance | R_g | $f=1\text{MHz}$ | - | 4.7 | - | Ω |
| Source-Drain Ratings and Characteristics | | | | | | |
| Continuous Source Current (Body Diode) | I_S | $T_C=25^\circ\text{C}$, MOSFET symbol showing the integral reverse p-n junction diode. | - | - | 7 | A |
| Source Pulse Current | I_{SM} | | - | - | 28 | A |
| Diode Forward Voltage | V_{SD} | $I_S=7\text{A}, V_{\text{GS}}=0\text{V}$ | - | - | 1.4 | V |
| Reverse Recovery Time ³ | T_{rr} | $I_F=7\text{A}, V_{\text{GS}}=0\text{V}, \frac{dI_F}{dt}=100\text{A}/\mu\text{s}$ | - | 239 | - | nS |
| Reverse Recovery Charge ³ | Q_{rr} | | - | 2.5 | - | μC |

Note:

1. $L=79\text{mH}, I_{AS}=2.2\text{A}, V_{DD}=100\text{V}$, starting temperature $T_J=25^\circ\text{C}$.
2. $V_{\text{DS}}=0-400\text{V}, I_{SD}\leq 20\text{A}, T_J=25^\circ\text{C}$.
3. $V_{\text{DS}}=0-480\text{V}$.
4. Pulse test: pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
5. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

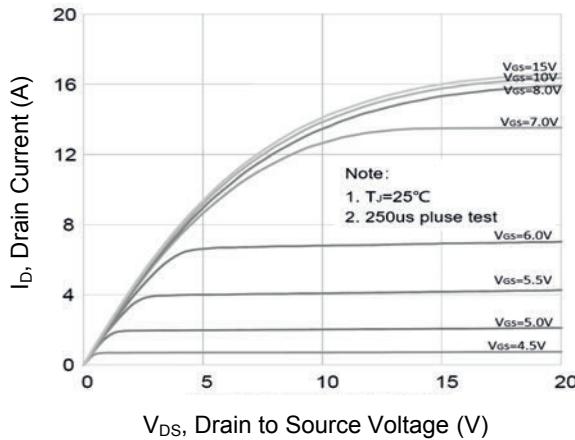


Figure 1. Typical Output Characteristics

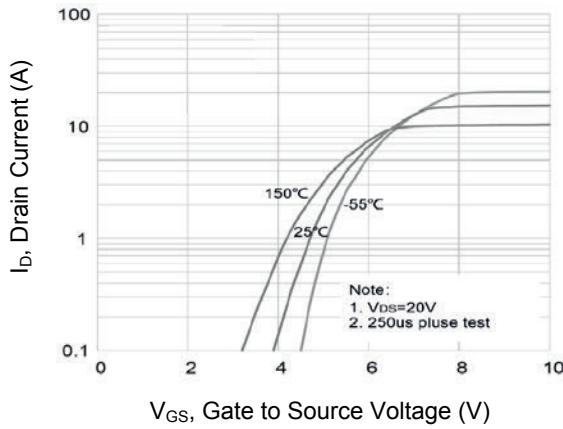


Figure 2. Transfer Characteristics

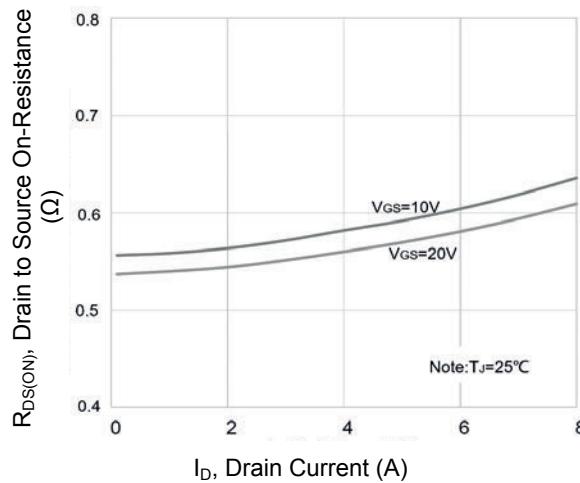


Figure 3. $R_{DS(\text{ON})}$ Vs. Drain Current

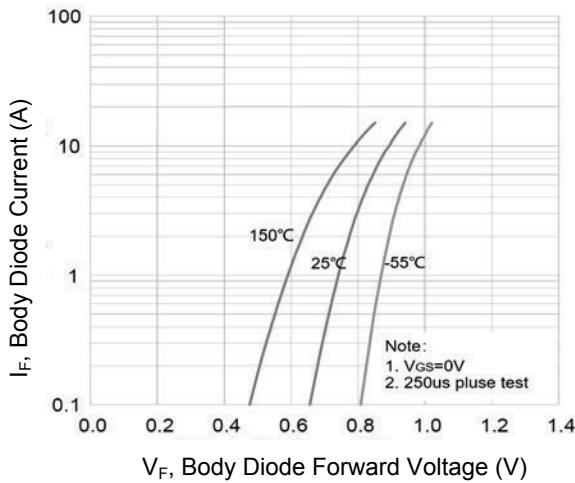


Figure 4. Body Diode Characteristics

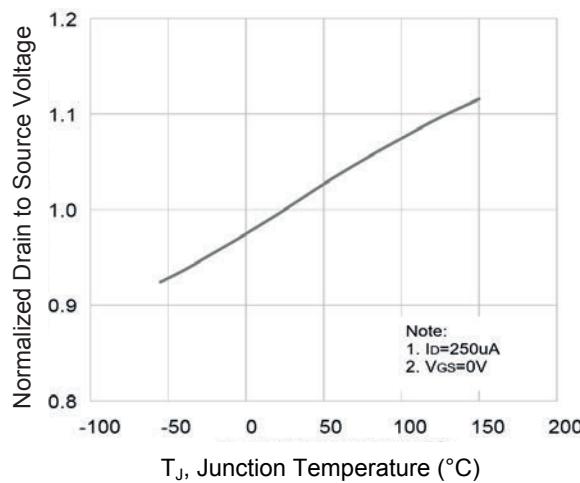


Figure 5. Normalized BV_{DS} Vs. T_J

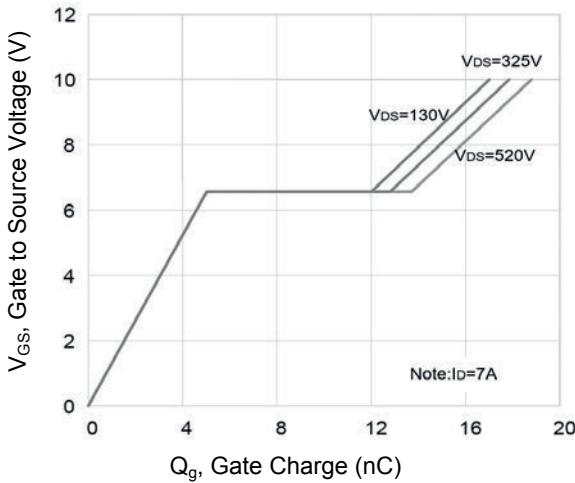


Figure 6. Gate Charge

Typical Electrical and Thermal Characteristic Curves

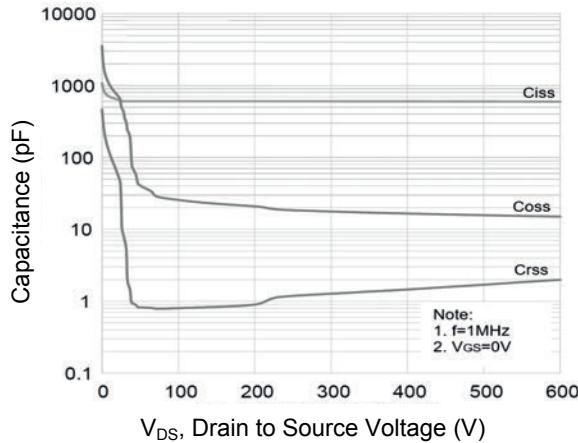


Figure 7. Capacitance Characteristics

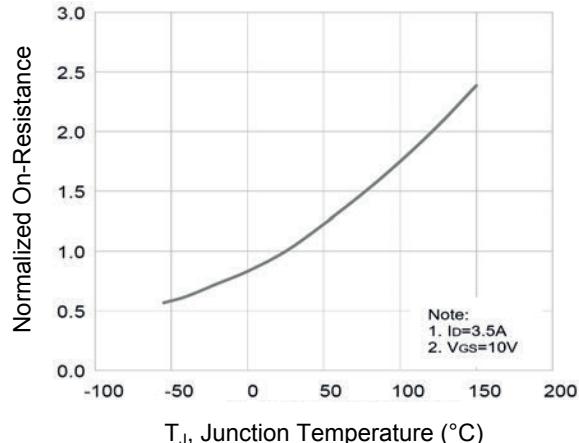


Figure 8. Normalized $R_{DS(ON)}$ Vs. T_J

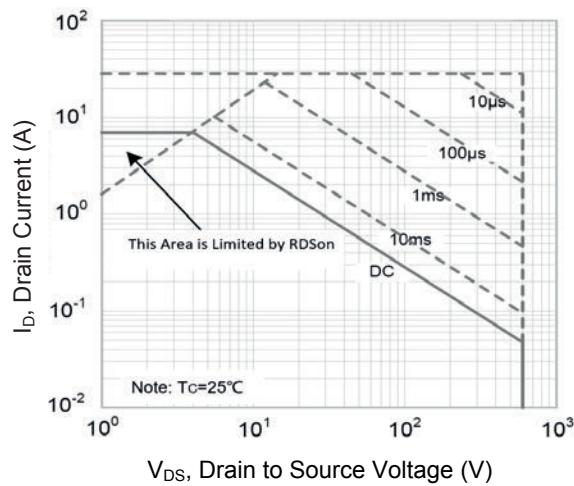
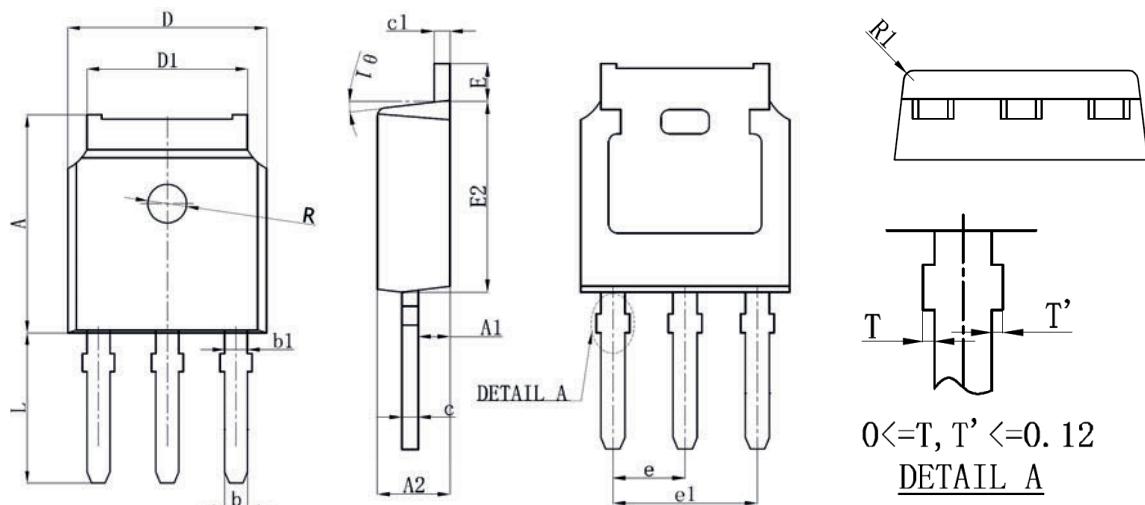


Figure 9. Safe Operation Area

Package Outline Dimensions (TO-251)



| Symbol | Dimensions in Millimeters | | Dimensions in Inches | |
|--------|---------------------------|------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 7.05 | 7.15 | 0.278 | 0.281 |
| A1 | 0.96 | 1.06 | 0.038 | 0.042 |
| A2 | 2.25 | 2.35 | 0.089 | 0.093 |
| b | 0.760 REF | | 0.030 REF | |
| b1 | 1.000 REF | | 0.039 REF | |
| c | 0.508 REF | | 0.020 REF | |
| c1 | 0.508 REF | | 0.020 REF | |
| D | 6.55 | 6.65 | 0.258 | 0.262 |
| D1 | 5.22 | 5.42 | 0.206 | 0.213 |
| E | 0.95 | 1.05 | 0.037 | 0.041 |
| E2 | 6.05 | 6.15 | 0.238 | 0.242 |
| e | 2.286 BSC | | 0.090 BSC | |
| e1 | 4.572 REF | | 0.180 REF | |
| L | 4.80 | 5.20 | 0.189 | 0.205 |
| θ1 | 7° REF | | 7° REF | |
| R | 1.300 REF | | 0.051 REF | |
| R1 | 0.250 REF | | 0.010 REF | |