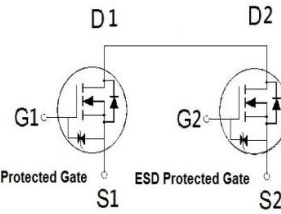




PRODUCT SUMMARY

| | | |
|---------------|--------------|-------|
| $V_{(BR)DSS}$ | $R_{DS(ON)}$ | I_D |
| 20V | 8.5mΩ | 39A |

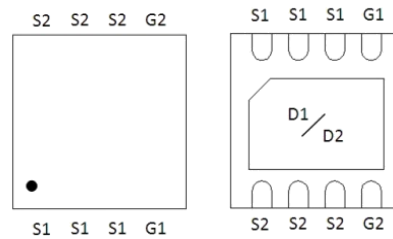


Features

- Pb-Free, Halogen Free and RoHS compliant.
- Low $R_{DS(on)}$ to Minimize Conduction Losses.
- Ohmic Region Good $R_{DS(on)}$ Ratio.
- Optimized Gate Charge to Minimize Switching Losses.
- Products Integrated ESD diode with ESD Protected up to 2KV.

Applications

- Protection Circuits Applications.
- Logic/Load Switch Circuits Applications.
- Portable Devices for Battery PACK Applications.



G : GATE
D : DRAIN
S : SOURCE

ABSOLUTE MAXIMUM RATINGS ($T_A = 25\text{ °C}$ Unless Otherwise Noted)

| PARAMETERS/TEST CONDITIONS | | SYMBOL | LIMITS | UNITS |
|--|-----------------------|----------------|------------|-------|
| Drain-Source Voltage | | V_{DS} | 20 | V |
| Gate-Source Voltage | | V_{GS} | ±8 | V |
| Continuous Drain Current ² | $T_C = 25\text{ °C}$ | I_D | 39 | A |
| | $T_C = 100\text{ °C}$ | | 24 | |
| | $T_A = 25\text{ °C}$ | | 12 | |
| | $T_A = 70\text{ °C}$ | | 9.7 | |
| Pulsed Drain Current ¹ | | I_{DM} | 60 | |
| Avalanche Current | | I_{AS} | 23.5 | |
| Avalanche Energy | L = 0.1mH | E_{AS} | 27.6 | mJ |
| Power Dissipation | $T_C = 25\text{ °C}$ | P_D | 23 | W |
| | $T_C = 100\text{ °C}$ | | 9.4 | |
| | $T_A = 25\text{ °C}$ | | 2.2 | |
| | $T_A = 70\text{ °C}$ | | 1.4 | |
| Operating Junction & Storage Temperature Range | | T_j, T_{stg} | -55 to 150 | °C |

THERMAL RESISTANCE RATINGS

| THERMAL RESISTANCE | SYMBOL | TYPICAL | MAXIMUM | UNITS |
|----------------------------------|-----------------|---------|---------|-------|
| Junction-to-Ambient ³ | $R_{\theta JA}$ | | 55 | °C/W |
| Junction-to-case | $R_{\theta JC}$ | | 5.3 | |

¹Pulse width limited by maximum junction temperature.

²Package limitation current is 24A.

³The value of $R_{\theta JA}$ is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^\circ\text{C}$.

ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$, Unless Otherwise Noted)

| PARAMETER | SYMBOL | TEST CONDITIONS | LIMITS | | | UNIT | | |
|--|--------------------|--|---|------|----------|------------|--|----|
| | | | MIN | TYP | MAX | | | |
| STATIC | | | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = 250\mu A$ | 20 | | | V | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\mu A$ | 0.35 | 0.67 | 1 | | | |
| Gate-Body Leakage | I_{GSS} | $V_{DS} = 0V, V_{GS} = \pm 8V$ | | | ± 10 | μA | | |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = 16V, V_{GS} = 0V$ | | | 1 | μA | | |
| | | $V_{DS} = 10V, V_{GS} = 0V, T_J = 125^\circ\text{C}$ | | | 10 | | | |
| Drain-Source On-State Resistance ¹ | $R_{DS(ON)}$ | $V_{GS} = 4.5V, I_D = 3A$ | 5.1 | 6.8 | 8.5 | m Ω | | |
| | | $V_{GS} = 3.8V, I_D = 3A$ | 5.4 | 7.2 | 9 | | | |
| | | $V_{GS} = 3.1V, I_D = 3A$ | 5.7 | 7.6 | 9.5 | | | |
| | | $V_{GS} = 2.5V, I_D = 3A$ | 6.3 | 8.4 | 10.5 | | | |
| | | $V_{GS} = 1.8V, I_D = 3A$ | 7 | 11 | 15 | | | |
| Forward Transconductance ¹ | g_{fs} | $V_{DS} = 5V, I_D = 3A$ | | 32 | | S | | |
| DYNAMIC | | | | | | | | |
| Input Capacitance | C_{iss} | $V_{GS} = 0V, V_{DS} = 10V, f = 1\text{MHz}$ | | 1589 | | pF | | |
| Output Capacitance | C_{oss} | | | 214 | | | | |
| Reverse Transfer Capacitance | C_{rss} | | | 165 | | | | |
| Gate Resistance | R_g | $V_{GS} = 0V, V_{DS} = 0V, f = 1\text{MHz}$ | | 2.3 | | Ω | | |
| Total Gate Charge ² | $Q_g(V_{GS}=4.5V)$ | $V_{DS} = 10V, I_D = 3A$ | | 18.5 | | nC | | |
| | $Q_g(V_{GS}=3.8V)$ | | | 16 | | | | |
| Gate-Source Charge ² | Q_{gs} | | | 1.7 | | | | |
| Gate-Drain Charge ² | Q_{gd} | | | 4.5 | | | | |
| Turn-On Delay Time ² | $t_{d(on)}$ | | $V_{DD} = 10V$ $I_D \cong 3A, V_{GEN} = 4.5V, R_G = 6\Omega$ | | 38 | | | nS |
| Rise Time ² | t_r | | | | 42 | | | |
| Turn-Off Delay Time ² | $t_{d(off)}$ | | | | 60 | | | |
| Fall Time ² | t_f | | | 25 | | | | |

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_J = 25 °C)

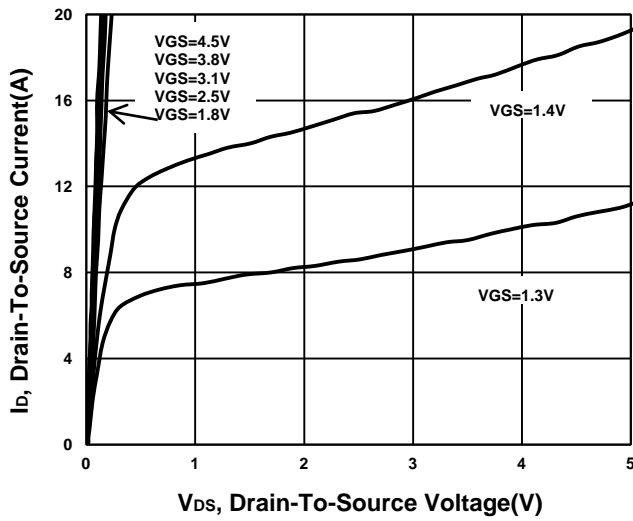
| | | | | | | |
|---------------------------------|-----------------|---|--|----|-----|----|
| Continuous Current ³ | I _S | | | | 19 | A |
| Forward Voltage ¹ | V _{SD} | I _F = 3A, V _{GS} = 0V | | | 1.2 | V |
| Reverse Recovery Time | t _{rr} | I _F = 3A , di _F /dt = 100A / μS | | 24 | | nS |
| Reverse Recovery Charge | Q _{rr} | | | 8 | | nC |

¹Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.

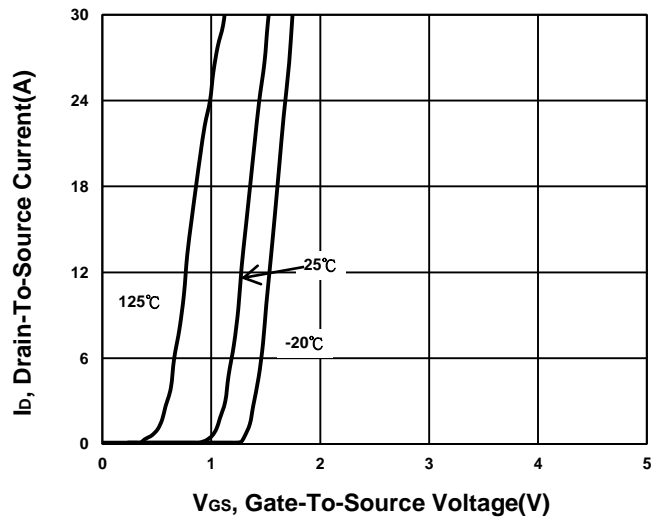
²Independent of operating temperature.

³Package limitation current is 24A.

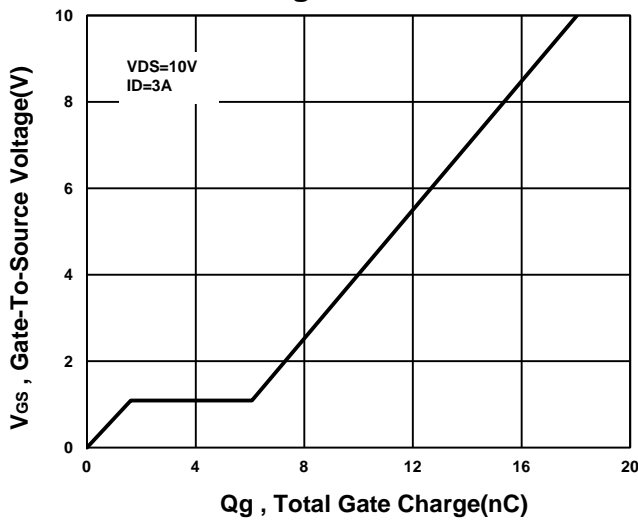
Output Characteristics



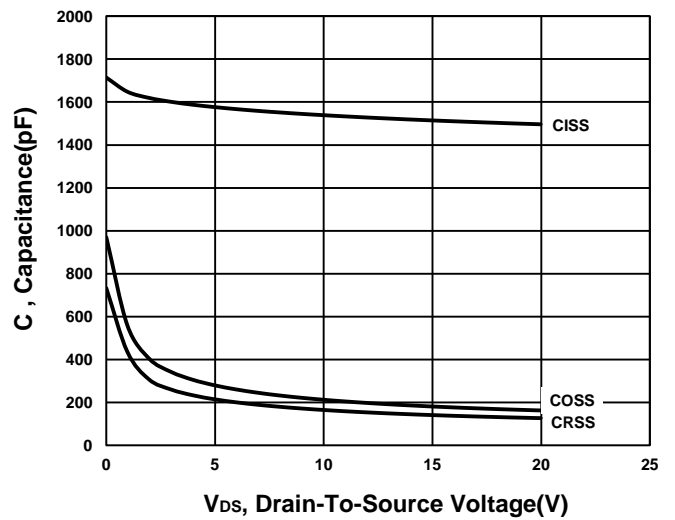
Transfer Characteristics



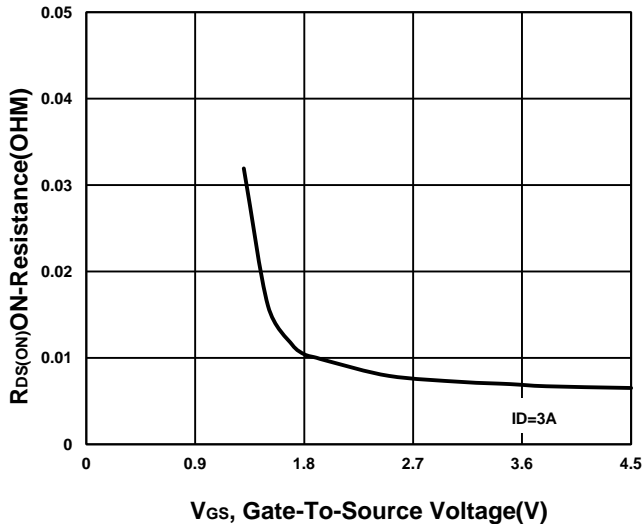
Gate charge Characteristics



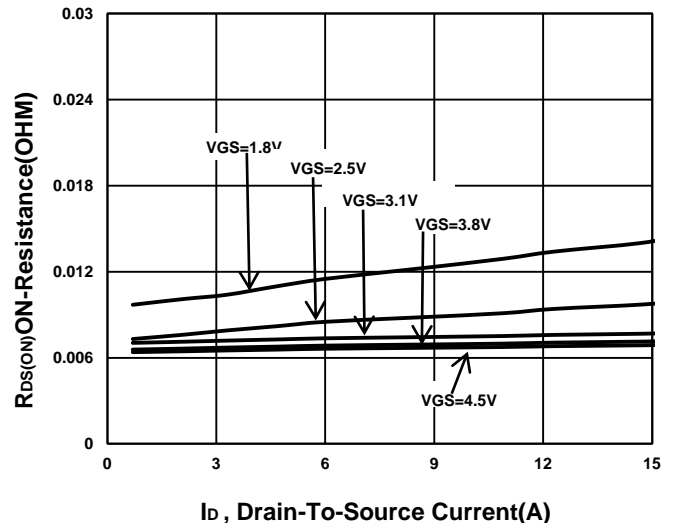
Capacitance Characteristic



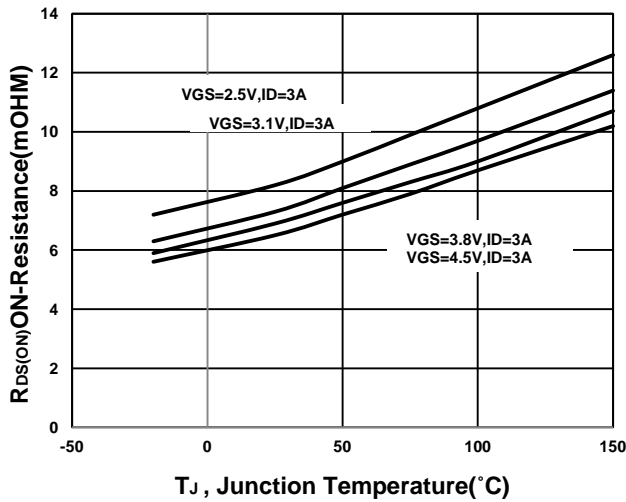
On-Resistance VS Gate-To-Source



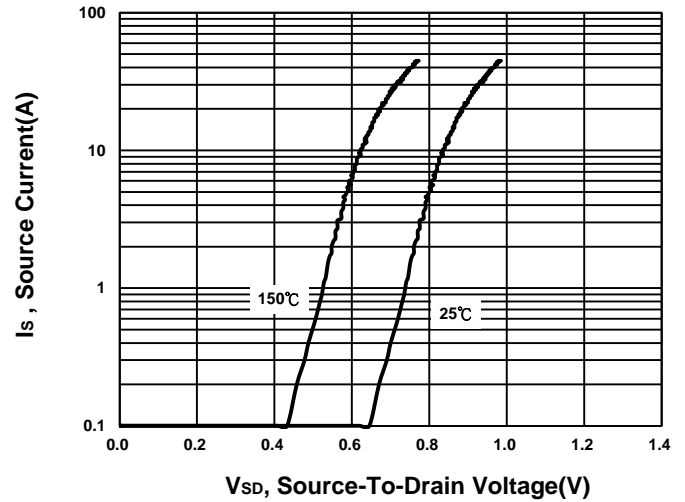
On-Resistance VS Drain Current



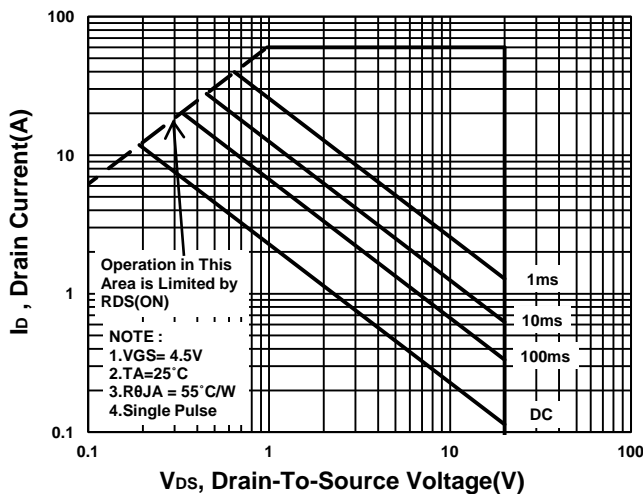
On-Resistance VS Temperature



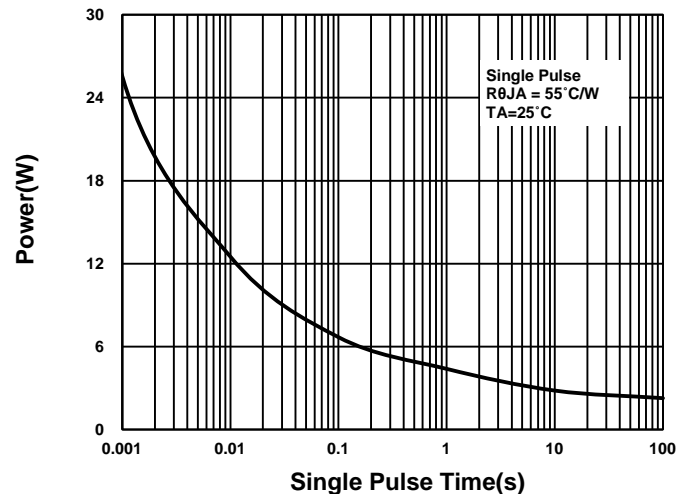
Source-Drain Diode Forward Voltage



Safe Operating Area



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve

