



**PRODUCT SUMMARY**

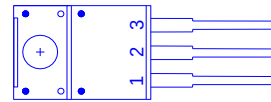
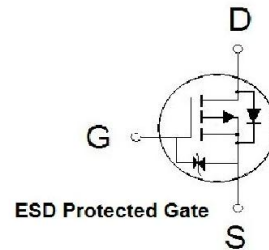
|               |              |       |
|---------------|--------------|-------|
| $V_{(BR)DSS}$ | $R_{DS(ON)}$ | $I_D$ |
| -30V          | 8m $\Omega$  | -56A  |

**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.

**Applications**

- Protection Circuits Applications.
- Logic/Load Switch Circuits Applications.



1. GATE
2. DRAIN
3. SOURCE

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

| PARAMETERS/TEST CONDITIONS              |                           | SYMBOL         | LIMITS     | UNITS            |
|-----------------------------------------|---------------------------|----------------|------------|------------------|
| Drain-Source Voltage                    |                           | $V_{DS}$       | -30        | V                |
| Gate-Source Voltage                     |                           | $V_{GS}$       | $\pm 20$   | V                |
| Continuous Drain Current <sup>2,3</sup> | $T_C = 25^\circ\text{C}$  | $I_D$          | -56        | A                |
|                                         | $T_C = 100^\circ\text{C}$ |                | -35        |                  |
| Pulsed Drain Current <sup>1</sup>       |                           | $I_{DM}$       | -168       |                  |
| Avalanche Current                       |                           | $I_{AS}$       | -71        |                  |
| Avalanche Energy                        | $L = 0.1\text{mH}$        | $E_{AS}$       | 252        | mJ               |
| Power Dissipation                       | $T_C = 25^\circ\text{C}$  | $P_D$          | 43         | W                |
|                                         | $T_C = 100^\circ\text{C}$ |                | 17         |                  |
| Junction & Storage Temperature Range    |                           | $T_J, T_{stg}$ | -55 to 150 | $^\circ\text{C}$ |

**THERMAL RESISTANCE RATINGS**

| THERMAL RESISTANCE  | SYMBOL          | TYPICAL | MAXIMUM | UNITS                       |
|---------------------|-----------------|---------|---------|-----------------------------|
| Junction-to-Case    | $R_{\theta JC}$ |         | 2.9     | $^\circ\text{C} / \text{W}$ |
| Junction-to-Ambient | $R_{\theta JA}$ |         | 62.5    |                             |

<sup>1</sup>Pulse width limited by maximum junction temperature.

<sup>2</sup>Limited only by maximum temperature allowed.

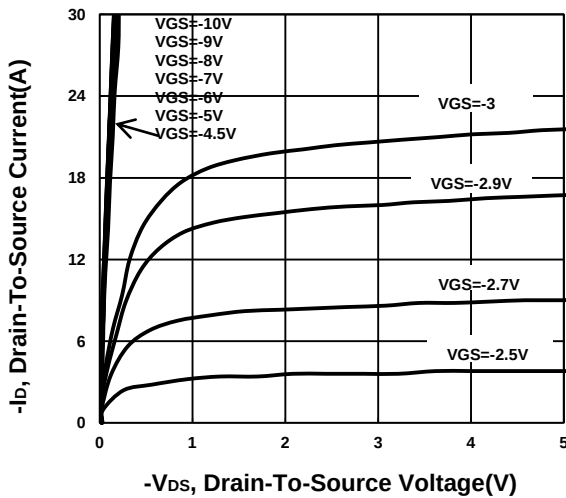
<sup>3</sup>Package limitation current is -55A.

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

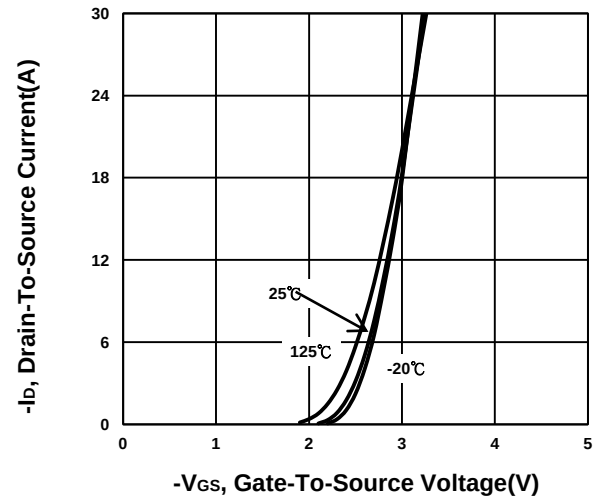
| PARAMETER                                                                      | SYMBOL        | TEST CONDITIONS                                                       | LIMITS |       |          | UNIT      |
|--------------------------------------------------------------------------------|---------------|-----------------------------------------------------------------------|--------|-------|----------|-----------|
|                                                                                |               |                                                                       | MIN    | TYP   | MAX      |           |
| STATIC                                                                         |               |                                                                       |        |       |          |           |
| Drain-Source Breakdown Voltage                                                 | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = -250\mu A$                                        | -30    |       |          | V         |
| Gate Threshold Voltage                                                         | $V_{GS(th)}$  | $V_{DS} = V_{GS}, I_D = -250\mu A$                                    | -1.3   | -1.65 | -2.3     |           |
| Gate-Body Leakage                                                              | $I_{GSS}$     | $V_{DS} = 0V, V_{GS} = \pm 20V$                                       |        |       | $\pm 10$ | $\mu A$   |
| Zero Gate Voltage Drain Current                                                | $I_{DSS}$     | $V_{DS} = -30V, V_{GS} = 0V$                                          |        |       | -1       | $\mu A$   |
|                                                                                |               | $V_{DS} = -30V, V_{GS} = 0V, T_J = 125\text{ }^{\circ}C$              |        |       | -10      |           |
| Drain-Source On-State Resistance <sup>1</sup>                                  | $R_{DS(ON)}$  | $V_{GS} = -4.5V, I_D = -20A$                                          |        | 8.6   | 13.8     | $m\Omega$ |
|                                                                                |               | $V_{GS} = -10V, I_D = -20A$                                           |        | 5.6   | 8        |           |
| Forward Transconductance <sup>1</sup>                                          | $g_{fs}$      | $V_{DS} = -5V, I_D = -20A$                                            |        | 48    |          | S         |
| DYNAMIC                                                                        |               |                                                                       |        |       |          |           |
| Input Capacitance                                                              | $C_{iss}$     | $V_{GS} = 0V, V_{DS} = -15V, f = 1MHz$                                |        | 5251  |          | pF        |
| Output Capacitance                                                             | $C_{oss}$     |                                                                       |        | 812   |          |           |
| Reverse Transfer Capacitance                                                   | $C_{rss}$     |                                                                       |        | 724   |          |           |
| Gate resistance                                                                | $R_g$         | $V_{GS}=0V, V_{DS}=0V, f=1MHz$                                        |        | 2     |          | $\Omega$  |
| Total Gate Charge <sup>2</sup>                                                 | $Q_g$         | $V_{DS} = -15V, V_{GS}= -10V, I_D = -20A$                             |        | 120   |          | nC        |
| Gate-Source Charge <sup>2</sup>                                                | $Q_{gs}$      |                                                                       |        | 16    |          |           |
| Gate-Drain Charge <sup>2</sup>                                                 | $Q_{gd}$      |                                                                       |        | 28    |          |           |
| Turn-On Delay Time <sup>2</sup>                                                | $t_{d(on)}$   | $V_{DS} = -15V,$<br>$I_D \cong -20A, V_{GS} = -10V, R_{GS} = 6\Omega$ |        | 17    |          | nS        |
| Rise Time <sup>2</sup>                                                         | $t_r$         |                                                                       |        | 77    |          |           |
| Turn-Off Delay Time <sup>2</sup>                                               | $t_{d(off)}$  |                                                                       |        | 160   |          |           |
| Fall Time <sup>2</sup>                                                         | $t_f$         |                                                                       |        | 119   |          |           |
| SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS ( $T_J = 25\text{ }^{\circ}C$ ) |               |                                                                       |        |       |          |           |
| Continuous Current                                                             | $I_S$         |                                                                       |        |       | -33      | A         |
| Forward Voltage <sup>1</sup>                                                   | $V_{SD}$      | $I_F = -20A, V_{GS} = 0V$                                             |        |       | -1.3     | V         |
| Reverse Recovery Time                                                          | $t_{rr}$      | $I_F = -20A, dI_F/dt = 100A / \mu S$                                  |        | 25    |          | nS        |
| Reverse Recovery Charge                                                        | $Q_{rr}$      |                                                                       |        | 19    |          | nC        |

<sup>1</sup>Pulse test : Pulse Width  $\leq 300\text{ }\mu\text{sec}$ , Duty Cycle  $\leq 2\%$ .<sup>2</sup>Independent of operating temperature.<sup>3</sup>Package limitation current is -55A.

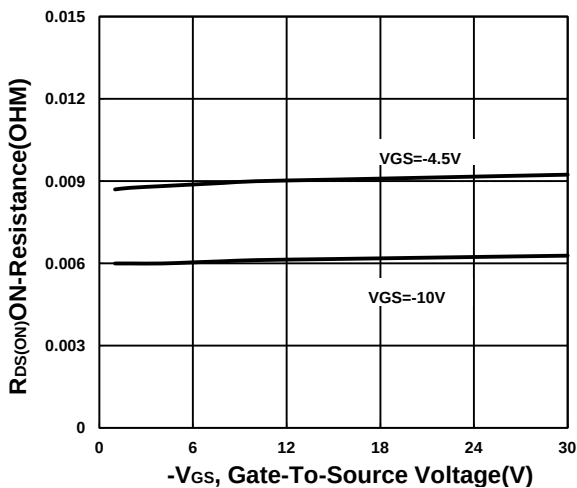
**Output Characteristics**



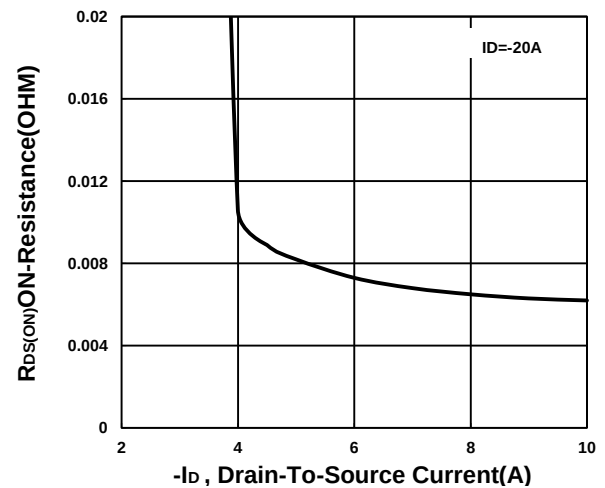
**Transfer Characteristics**



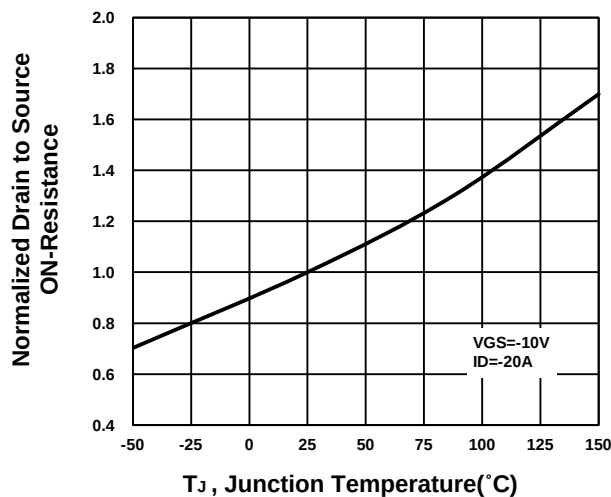
**On-Resistance VS Gate-To-Source**



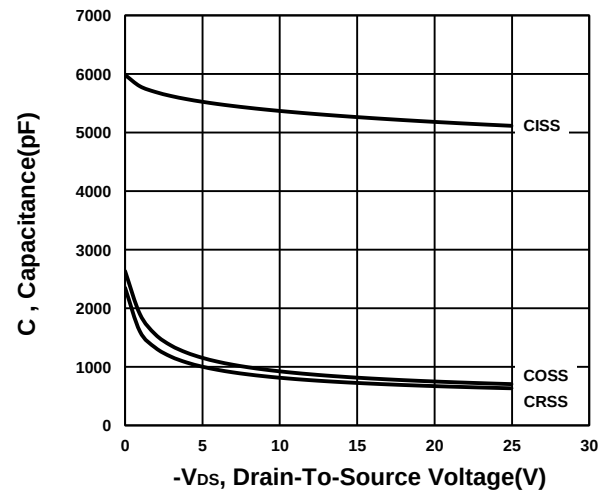
**On-Resistance VS Drain Current**



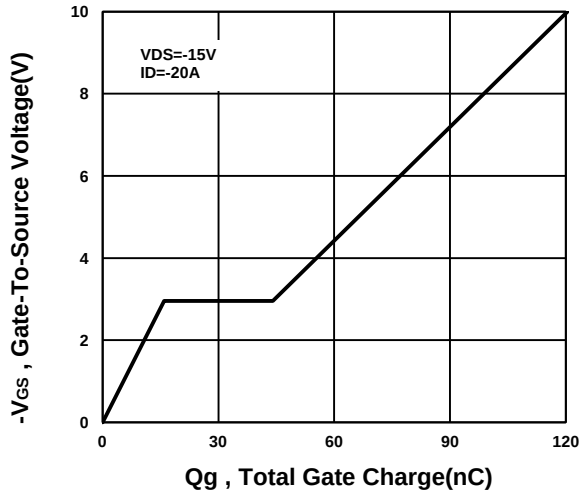
**On-Resistance VS Temperature**



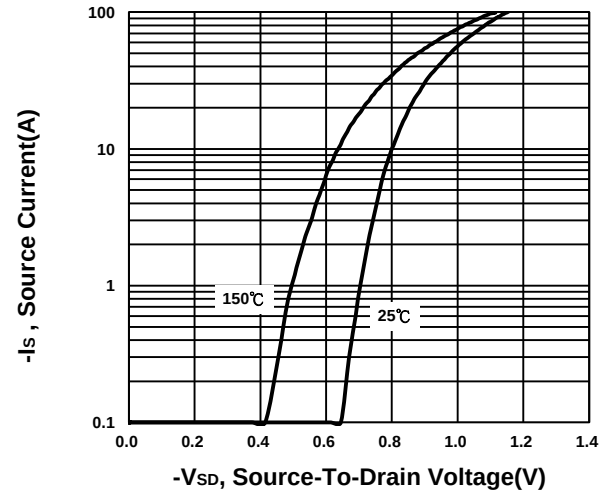
**Capacitance Characteristic**



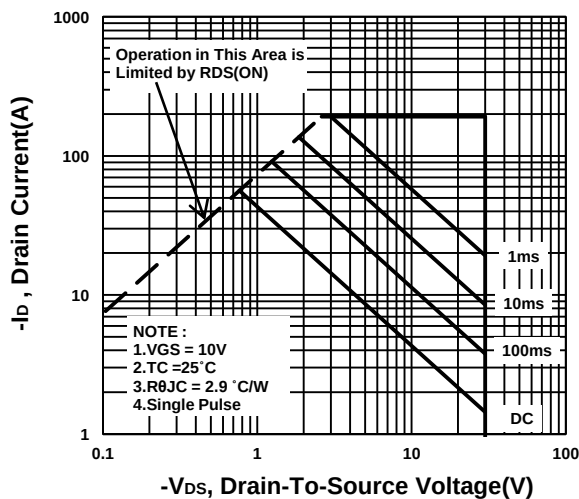
**Gate charge Characteristics**



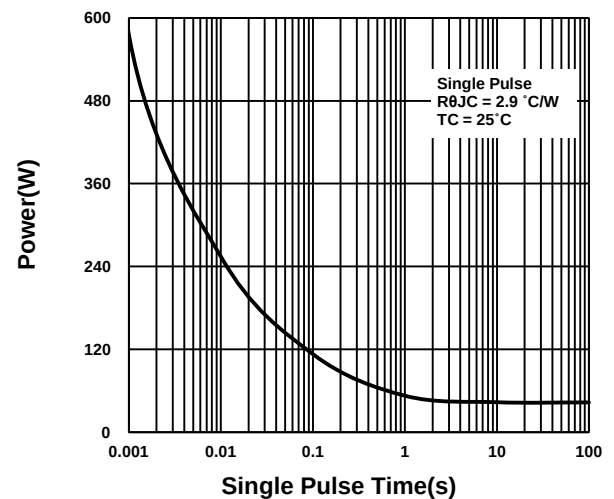
**Source-Drain Diode Forward Voltage**



**Safe Operating Area**



**Single Pulse Maximum Power Dissipation**



**Transient Thermal Response Curve**

