



**PRODUCT SUMMARY**

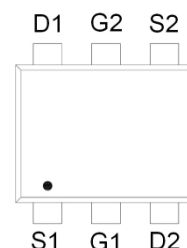
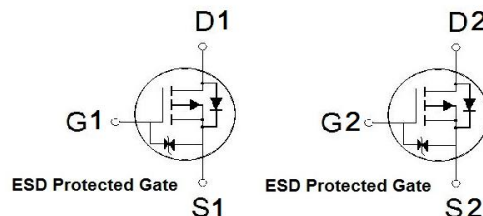
| $V_{(BR)DSS}$ | $R_{DS(ON)}$  | $I_D$  |
|---------------|---------------|--------|
| -20V          | 520m $\Omega$ | -0.53A |

**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.
- ESD Protection – HBM Class : 1C.

**Applications**

- Protection Circuits Applications.
- Logic/Load Switch Circuits Applications.
- Space Limit & Smart Devices Applications.



G: GATE  
D: DRAIN  
S: SOURCE

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

| PARAMETERS/TEST CONDITIONS                     |                                    | SYMBOL         | LIMITS     | UNITS              |
|------------------------------------------------|------------------------------------|----------------|------------|--------------------|
| Gate-Source Voltage                            |                                    | $V_{GS}$       | $\pm 12$   | V                  |
| Continuous Drain Current <sup>1</sup>          | $T_A = 25\text{ }^{\circ}\text{C}$ | $I_D$          | -0.53      | A                  |
|                                                | $T_A = 70\text{ }^{\circ}\text{C}$ |                | -0.42      |                    |
| Pulsed Drain Current <sup>2</sup>              |                                    | $I_{DM}$       | -1         | A                  |
| Power Dissipation                              | $T_A = 25\text{ }^{\circ}\text{C}$ | $P_D$          | 0.25       | W                  |
|                                                | $T_A = 70\text{ }^{\circ}\text{C}$ |                | 0.16       |                    |
| Operating 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-Ambient | $R_{\theta JA}$ |         | 500     | $^{\circ}\text{C} / \text{W}$ |

<sup>1</sup>Limited by maximum junction temperature.

<sup>2</sup>Limited by package.

**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 | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = -250\mu A$     | -20    |       |      | V    |
| Gate Threshold Voltage         | $V_{GS(th)}$  | $V_{DS} = V_{GS}, I_D = -250\mu A$ | -0.4   | -0.96 | -1.2 |      |

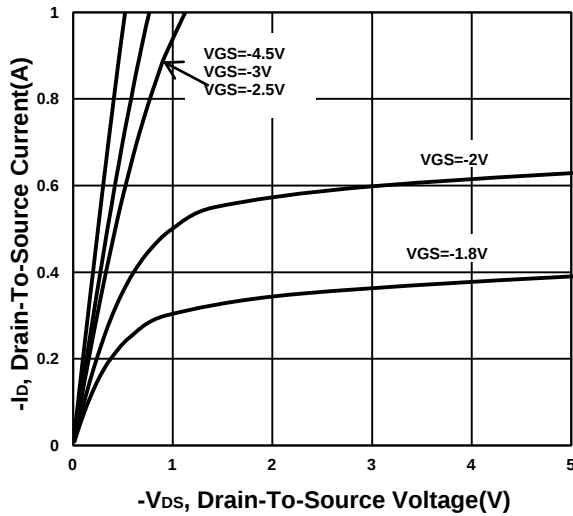
|                                               |              |                                                 |  |      |          |           |
|-----------------------------------------------|--------------|-------------------------------------------------|--|------|----------|-----------|
| Gate-Body Leakage                             | $I_{GSS}$    | $V_{DS} = 0V, V_{GS} = \pm 10V$                 |  |      | $\pm 30$ | $\mu A$   |
| Zero Gate Voltage Drain Current               | $I_{DSS}$    | $V_{DS} = -16V, V_{GS} = 0V$                    |  |      | -1       | $\mu A$   |
|                                               |              | $V_{DS} = -10V, V_{GS} = 0V, T_J = 125^\circ C$ |  |      | -10      |           |
| Drain-Source On-State Resistance <sup>1</sup> | $R_{DS(ON)}$ | $V_{GS} = -4.5V, I_D = -450mA$                  |  | 477  | 520      | $m\Omega$ |
|                                               |              | $V_{GS} = -2.5V, I_D = -100mA$                  |  | 700  | 800      |           |
|                                               |              | $V_{GS} = -1.8V, I_D = -100mA$                  |  | 1200 | 3500     |           |
| Forward Transconductance <sup>1</sup>         | $g_{fs}$     | $V_{DS} = -5V, I_D = -100mA$                    |  | 1.6  |          | S         |

| DYNAMIC                                                                 |                     |                                                                                                            |  |     |      |    |
|-------------------------------------------------------------------------|---------------------|------------------------------------------------------------------------------------------------------------|--|-----|------|----|
| Input Capacitance                                                       | C <sub>ISS</sub>    | V <sub>GS</sub> = 0V, V <sub>DS</sub> = -10V, f = 1MHz                                                     |  | 48  |      | pF |
| Output Capacitance                                                      | C <sub>OSS</sub>    |                                                                                                            |  | 18  |      |    |
| Reverse Transfer Capacitance                                            | C <sub>RSS</sub>    |                                                                                                            |  | 10  |      |    |
| Total Gate Charge <sup>2</sup>                                          | Q <sub>g</sub>      | V <sub>GS</sub> = -4.5V ,<br>V <sub>DS</sub> =-20V, I <sub>D</sub> = -1A                                   |  | 1.1 |      | nC |
| Gate-Source Charge <sup>2</sup>                                         | Q <sub>gs</sub>     |                                                                                                            |  | 0.2 |      |    |
| Gate-Drain Charge <sup>2</sup>                                          | Q <sub>gd</sub>     |                                                                                                            |  | 0.3 |      |    |
| Turn-On Delay Time <sup>2</sup>                                         | t <sub>d(on)</sub>  | V <sub>DD</sub> = -10V    , I <sub>D</sub> ≅ -450mA<br>, V <sub>GS</sub> = -4.5V, R <sub>GEN</sub> = 5.1 Ω |  | 17  |      | nS |
| Rise Time <sup>2</sup>                                                  | t <sub>r</sub>      |                                                                                                            |  | 30  |      |    |
| Turn-Off Delay Time <sup>2</sup>                                        | t <sub>d(off)</sub> |                                                                                                            |  | 76  |      |    |
| Fall Time <sup>2</sup>                                                  | t <sub>f</sub>      |                                                                                                            |  | 46  |      |    |
| SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T <sub>J</sub> = 25 °C) |                     |                                                                                                            |  |     |      |    |
| Continuous Current                                                      | I <sub>S</sub>      |                                                                                                            |  |     | -0.2 | A  |
| Forward Voltage <sup>1</sup>                                            | V <sub>SD</sub>     | I <sub>F</sub> = -450mA, V <sub>GS</sub> = 0V                                                              |  |     | -1.2 | V  |
| Reverse Recovery Time                                                   | t <sub>rr</sub>     | I <sub>F</sub> = -1A, dI/dt = 100 A/μs                                                                     |  | 46  |      | nS |
| Reverse Recovery Charge                                                 | Q <sub>rr</sub>     |                                                                                                            |  | 28  |      | nC |

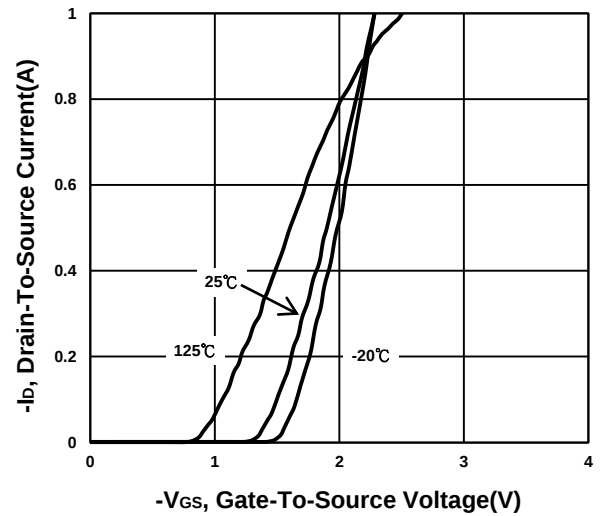
<sup>1</sup>Pulse test : Pulse Width  $\leq 300 \mu sec$ , Duty Cycle  $\leq 2\%$ .

<sup>2</sup>Independent of operating temperature.

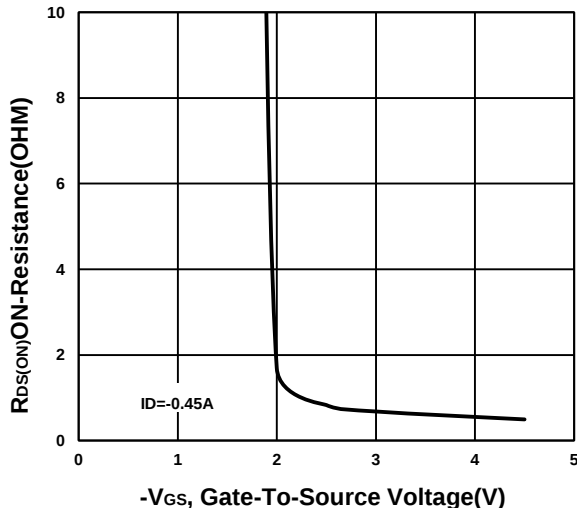
Output Characteristics



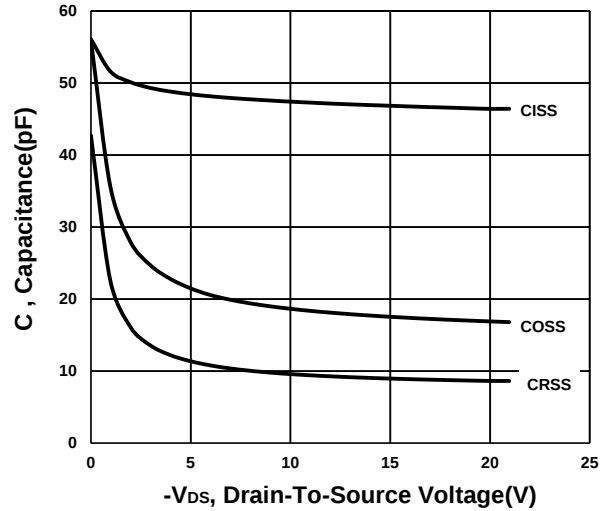
Transfer Characteristics



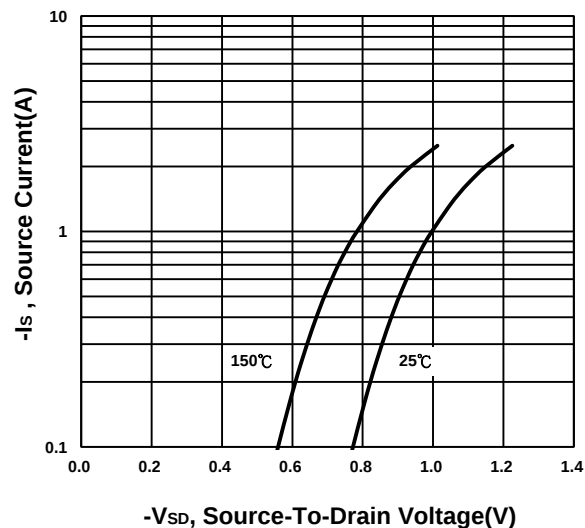
On-Resistance VS Gate-To-Source



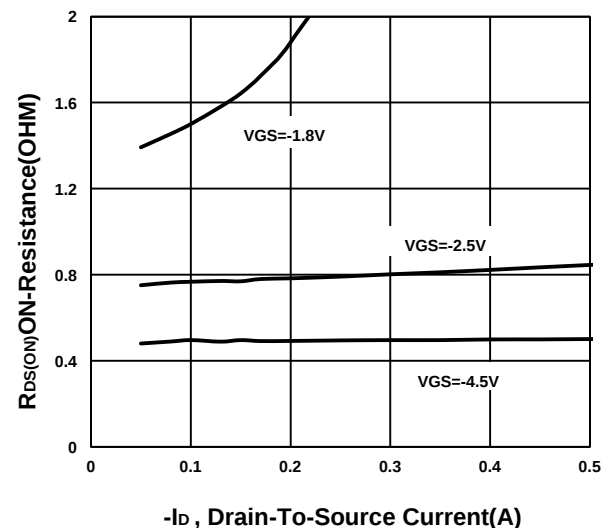
Capacitance Characteristic



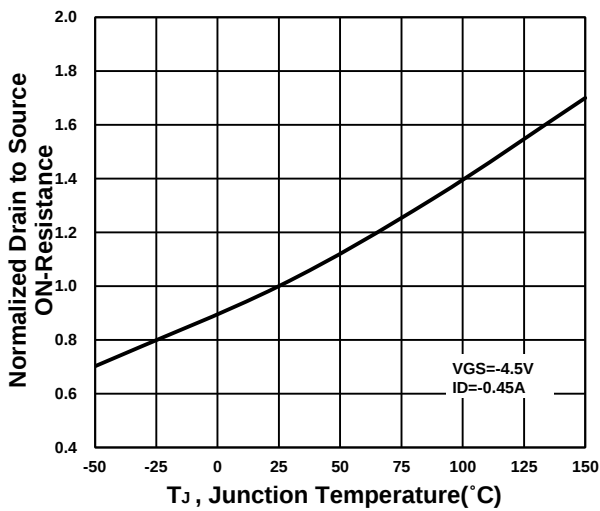
Source-Drain Diode Forward Voltage



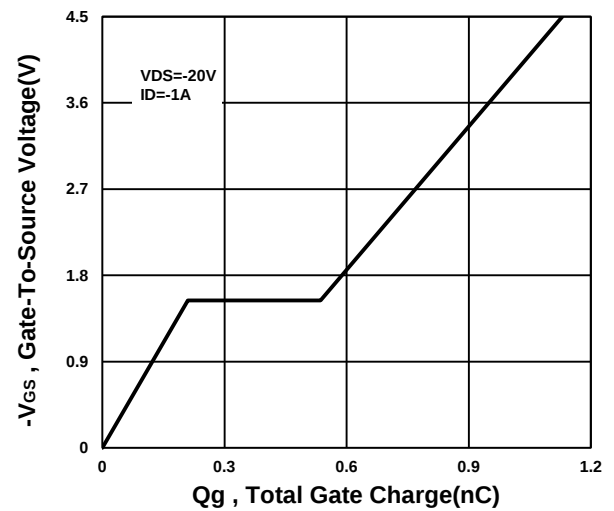
On-Resistance VS Drain Current



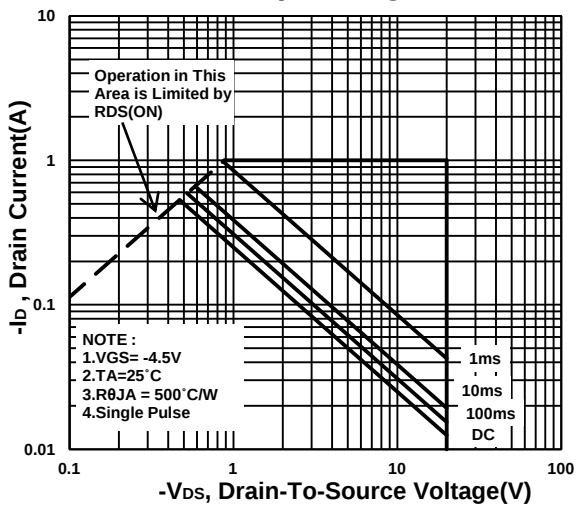
On-Resistance VS Temperature



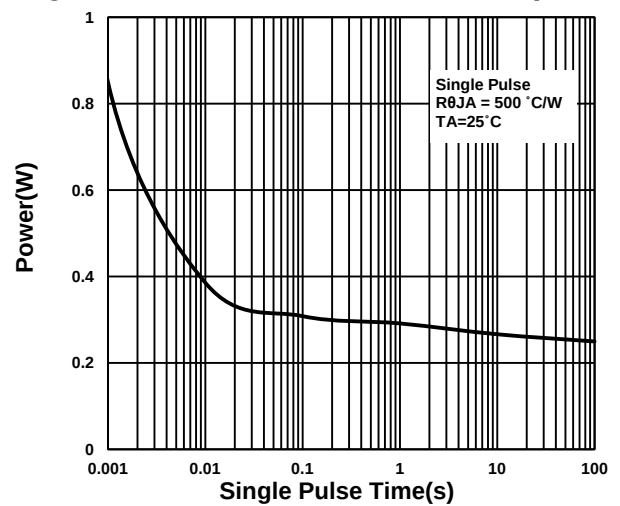
Gate charge Characteristics



Safe Operating Area



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve

