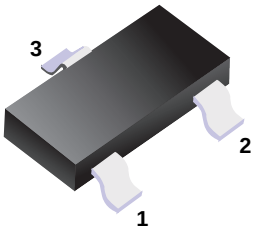
## ■N- Enhancement Mode Field Effect Transistor

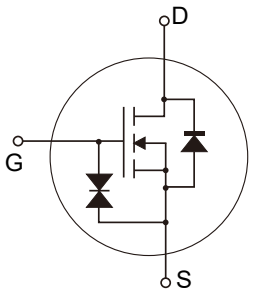



1. Gate
2. Source
3. Drain

### ■ Features

- $V_{DS}$ = 20V,$I_D$ = 6.5A
  $R_{DS(ON)}$ < 26mΩ @ $V_{GS}$=2.5V
  $R_{DS(ON)}$ < 22mΩ @ $V_{GS}$=4.5V
- High power and current handing capability
- ESD protected(HBM) up to 2KV

### ■ Simplified outline(SOT-23)




### ■ Applications

- Load switch
- PWM applications

### ■ MARKING

| Marking | AGSA |
|---|---|

### ■ Absolute Maximum Ratings Ta = 25℃

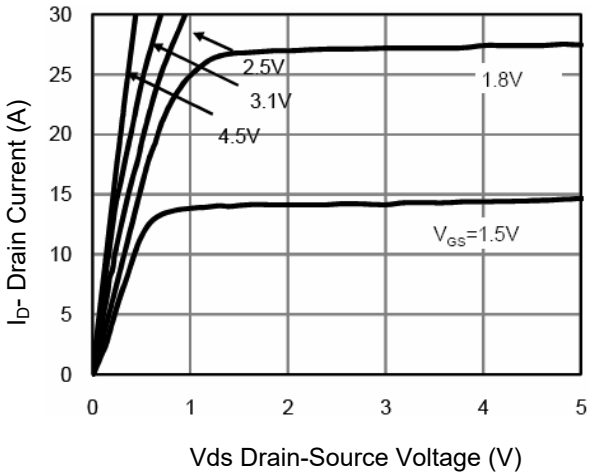
| Parameter | Symbol | Limit | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 20 | V |
| Gate-Source Voltage | $V_{GS}$ | ±8 | V |
| Drain Current-Continuous | $I_D$ | 6.5 | A |
| Drain Current-Pulsed Note1 | $I_{DM}$ | 30 | A |
| Maximum Power Dissipation | $P_D$ | 0.9 | W |
| Operating Junction and Storage Temperature Range | $T_J$,$T_{STG}$ | 150,-55 To 150 | ℃ |
| Thermal Resistance,Junction-to-Ambient Note2 | $R_{\theta JA}$ | 139 | ℃/W |

■ Electrical Characteristics Ta = 25℃

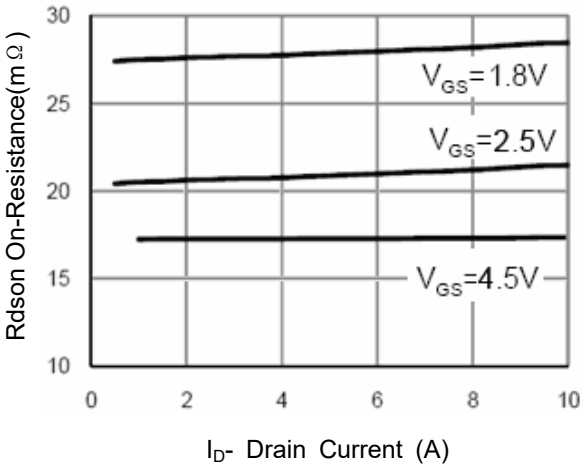
| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Static Characteristics** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$=0V $I_D$=250μA | 20 | - | - | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=20V,$V_{GS}$=0V | - | - | 1 | μA |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{GS}$=±8V,$V_{DS}$=0V | - | - | ±10 | μA |
| Gate Threshold Voltage Note3 | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$,$I_D$=250μA | 0.45 | 0.7 | 1 | V |
| Drain-Source On-State Resistance Note3 | $R_{DS(ON)}$ | $V_{GS}$=4.5V, $I_D$=6.5A | - | 17 | 22 | mΩ |
| | | $V_{GS}$=2.5V, $I_D$=5.5A | - | 21 | 26 | mΩ |
| Forward Transconductance Note3 | $g_{FS}$ | $V_{DS}$=5V,$I_D$=6.5A | 8 | - | - | S |
| **Dynamic Characteristics** | | | | | | |
| Input Capacitance | $C_{lss}$ | $V_{DS}$=10V,$V_{GS}$=0V, f=1.0MHz | - | 1295 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 160 | - | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 87 | - | pF |
| **Switching Characteristics** | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}$=10V, $R_L$=1.5Ω $V_{GS}$=4.5V,$R_{GEN}$=3Ω | - | 280 | - | nS |
| Turn-on Rise Time | $t_r$ | | - | 328 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 3.76 | - | nS |
| Turn-Off Fall Time | $t_f$ | | - | 2.24 | - | nS |
| Total Gate Charge | $Q_g$ | $V_{DS}$=10V,$I_D$=6.5A, $V_{GS}$=4.5V | - | 10 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 4.2 | - | nC |
| Gate-Drain Charge | $Q_{gd}$ | | - | 2.6 | - | nC |
| **Drain-Source Diode Characteristics** | | | | | | |
| Diode Forward Voltage Note3 | $V_{SD}$ | $V_{GS}$=0V,$I_S$=6.5A | - | - | 1.2 | V |
| Diode Forward Current Note2 | $I_S$ | | - | - | 6.5 | A |

Notes:

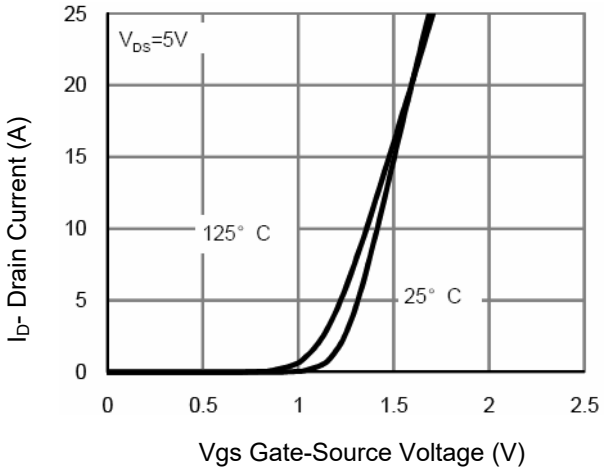
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.



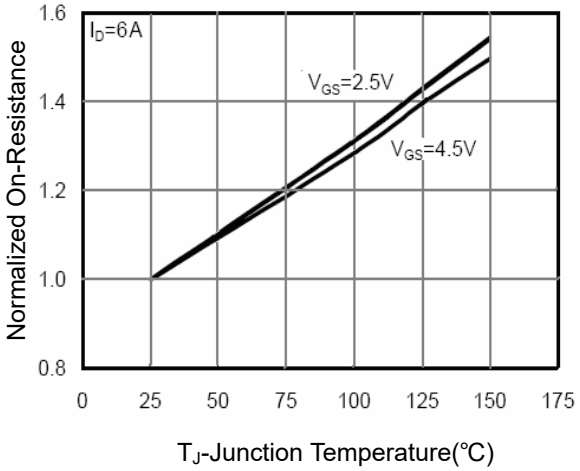

**Output Characteristics**



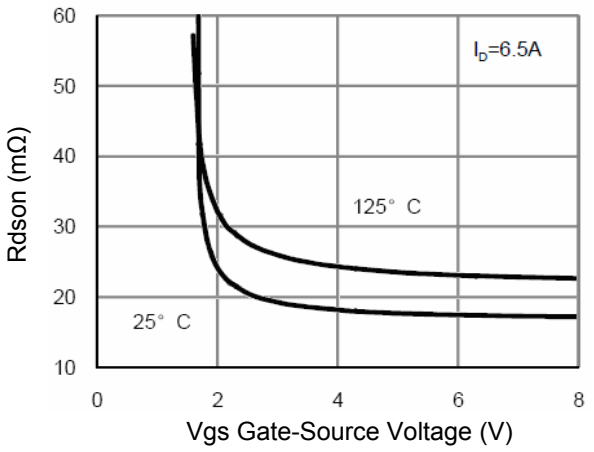

**Drain-Source On-Resistance**



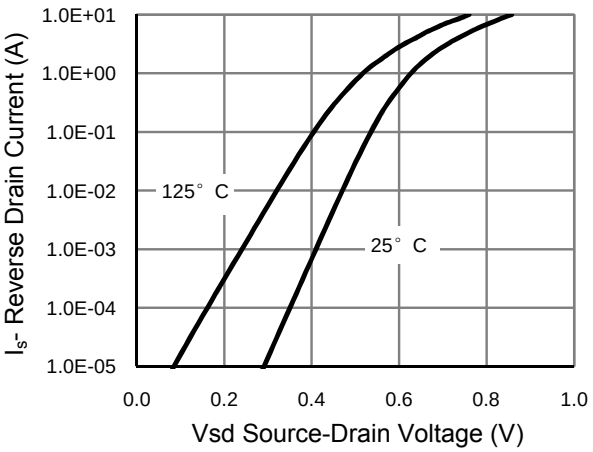

**Transfer Characteristics**



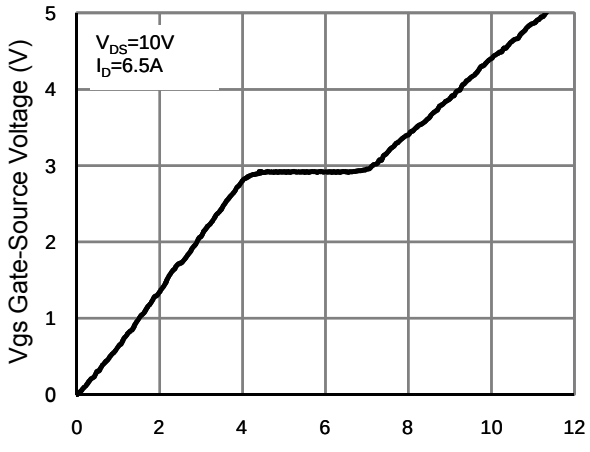

**Drain-Source On-Resistance**



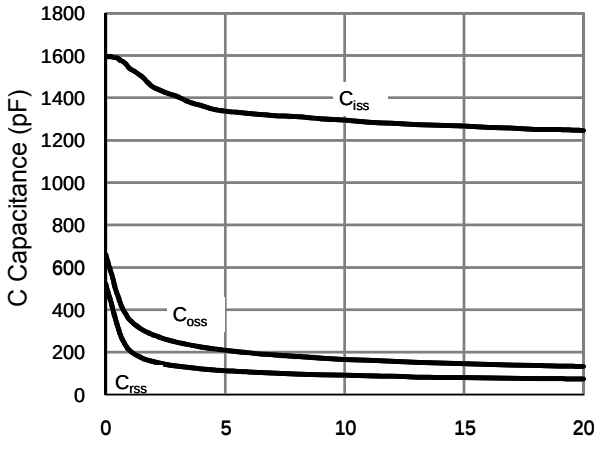

**Rdson vs Vgs**



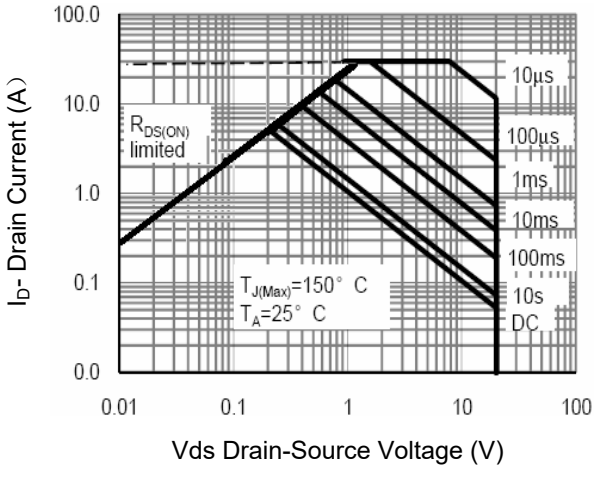

**Source- Drain Diode Forward**




**Gate Charge**

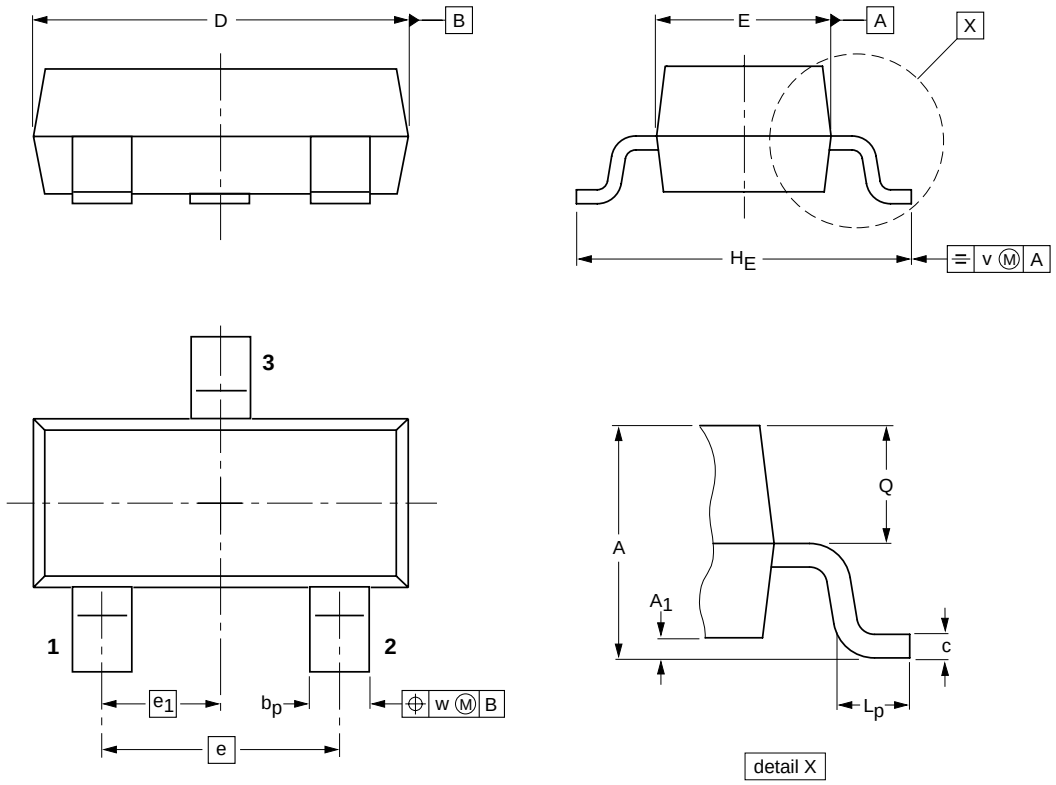



**Capacitance vs Vds**




**Safe Operation Area**

## Package Outline SOT-23




**DIMENSIONS (mm are the original dimensions)**

| UNIT | A | $A_1$ max. | $b_p$ | c | D | E | e | $e_1$ | $H_E$ | $L_p$ | Q | v | w |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 1.1<br>0.9 | 0.1 | 0.48<br>0.38 | 0.15<br>0.09 | 3.0<br>2.8 | 1.4<br>1.2 | 1.9 | 0.95 | 2.5<br>2.1 | 0.45<br>0.15 | 0.55<br>0.45 | 0.2 | 0.1 |

## Summary of Packing Options

| Package | Packing Description | Packing Quantity | Industry Standard |
|---|---|---|---|
| SOT-23 | Tape/Reel,7"reel | 3000 | EIA-481-1 |