## Description

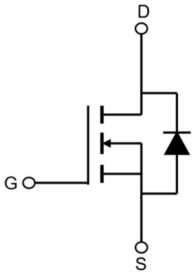
### Features

- 30V,5.8A
  $R_{DS(ON)}$< 26mΩ @ $V_{GS}$=10V
  $R_{DS(ON)}$< 32mΩ @ $V_{GS}$=4.5V
  $R_{DS(ON)}$< 50mΩ @ $V_{GS}$=2.5V
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquired

### Application

- Load Switch
- PWM Application
- Power management


SOT-23-3




Schematic Diagram

## Package Marking and Ordering Information

| Device Marking | Device | OUTLINE | Device Package | Reel Size | Reel (PCS) | Per Carton (PCS) |
|---|---|---|---|---|---|---|
| VSM3400A-S2 | VSM3400A | TAPING | SOT-23-3 | 7inch | 3000 | 180000 |

## Absolute Maximum Ratings ($T_A$=25℃ unless otherwise specified)

| Symbol | Parameter | | Max. | Units |
|---|---|---|---|---|
| $V_{DSS}$ | Drain-Source Voltage | | 30 | V |
| $V_{GSS}$ | Gate-Source Voltage | | ±12 | V |
| $I_D$ | Continuous Drain Current | $T_A$= 25℃ | 5.8 | A |
| | | $T_A$= 100℃ | 3.8 | A |
| $I_{DM}$ | Pulsed Drain Current note1 | | 23.2 | A |
| $P_D$ | Power Dissipation | $T_A$= 25℃ | 1.36 | W |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Case | | 92 | ℃/W |
| $T_J$, $T_{STG}$ | Operating and Storage Temperature Range | | -55 to +150 | ℃ |

## Electrical Characteristics ($T_J$=25℃ unless otherwise specified)

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| **Off Characteristic** | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V, $I_D$=250μA | 30 | - | - | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=30V, $V_{GS}$=0V, | - | - | 1.0 | μA |
| $I_{GSS}$ | Gate to Body Leakage Current | $V_{DS}$=0V, $V_{GS}$= ±12V | - | - | ±100 | nA |
| **On Characteristics** | | | | | | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$, $I_D$=250μA | 0.5 | 0.9 | 1.4 | V |
| $R_{DS(on)}$ | Static Drain-Source on-Resistance note2 | $V_{GS}$=10V, $I_D$=4.2A | - | 20.4 | 26 | mΩ |
| | | $V_{GS}$=4.5V, $I_D$=4A | - | 23 | 32 | |
| | | $V_{GS}$=2.5V, $I_D$=1A | - | 30 | 50 | |
| **Dynamic Characteristics** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=15V, $V_{GS}$=0V, f=1.0MHz | - | 702 | - | pF |
| $C_{oss}$ | Output Capacitance | | - | 66 | - | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | - | 52 | - | pF |
| $Q_g$ | Total Gate Charge | $V_{DS}$=15V, I=4A, $V_{GS}$=4.5V | - | 4.8 | - | nC |
| $Q_{gs}$ | Gate-Source Charge | | - | 1.2 | - | nC |
| $Q_{gd}$ | Gate-Drain(“Miller”) Charge | | - | 1.7 | - | nC |
| **Switching Characteristics** | | | | | | |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{DS}$=15V, $I_D$=4A, $R_{GEN}$=3Ω, $V_{GS}$ =4.5V | - | 12 | - | ns |
| $t_r$ | Turn-on Rise Time | | - | 52 | - | ns |
| $t_{d(off)}$ | Turn-off Delay Time | | - | 17 | - | ns |
| $t_f$ | Turn-off Fall Time | | - | 10 | - | ns |
| **Drain-Source Diode Characteristics and Maximum Ratings** | | | | | | |
| $I_S$ | Maximum Continuous Drain to Source Diode Forward Current | | - | - | 5.8 | A |
| $I_{SM}$ | Maximum Pulsed Drain to Source Diode Forward Current | | - | - | 23.2 | A |
| $V_{SD}$ | Drain to Source Diode Forward Voltage | $V_{GS}$=0V, $I_S$=5.8A | - | - | 1.2 | V |

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

# Typical Performance Characteristics

**Figure1:** Output Characteristics

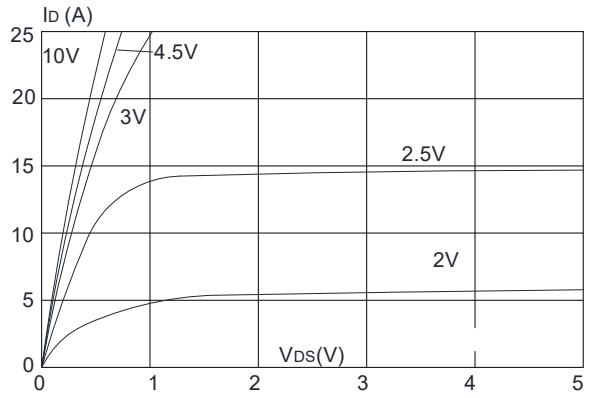



**Figure 2:** Typical Transfer Characteristics

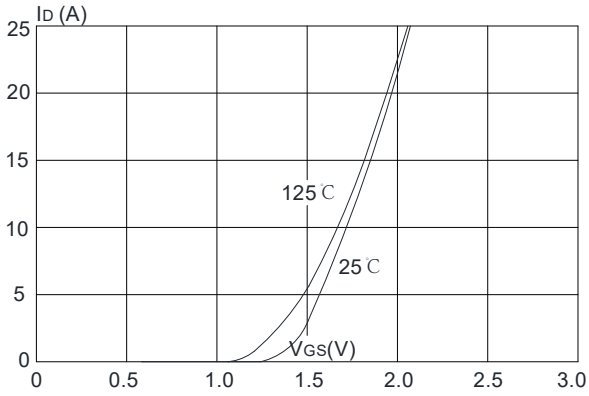



**Figure 3:**On-resistance vs. Drain Current

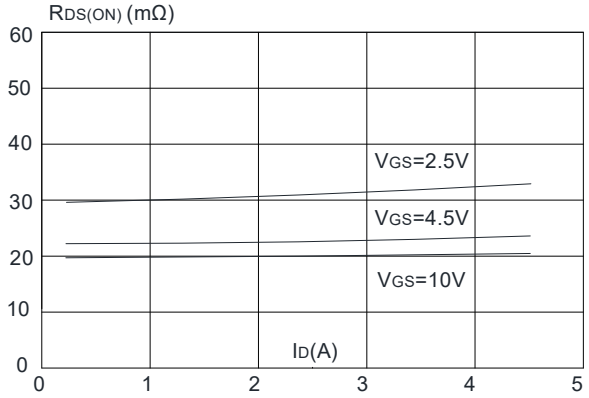



**Figure 4**: Body Diode Characteristics

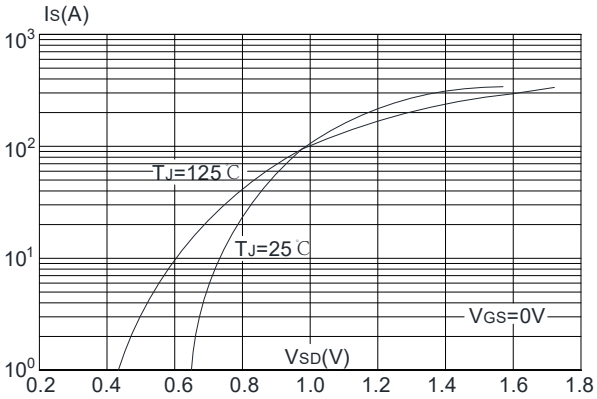



**Figure 5:** Gate Charge Characteristics

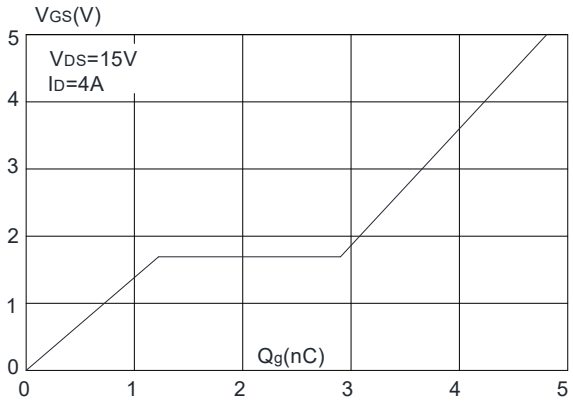



**Figure 6:** Capacitance Characteristics

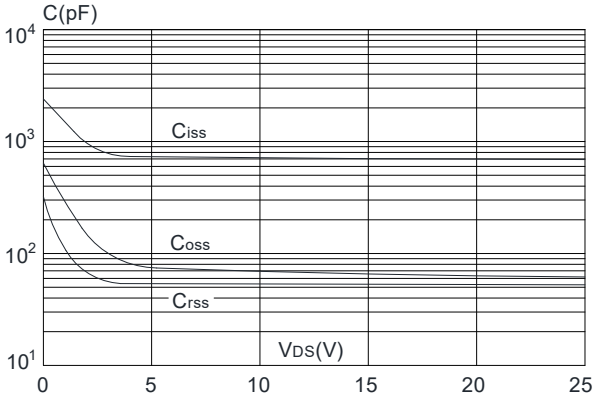


**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature

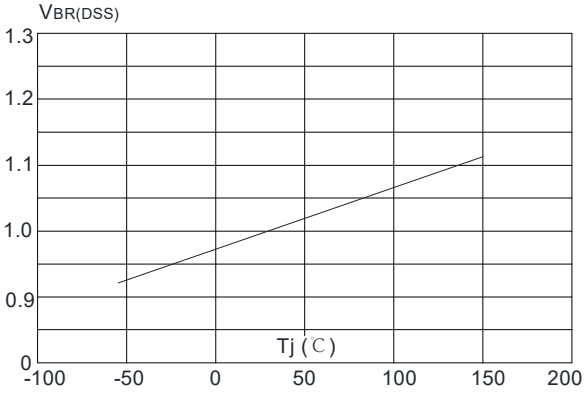



**Figure 8:** Normalized on Resistance vs. Junction Temperature

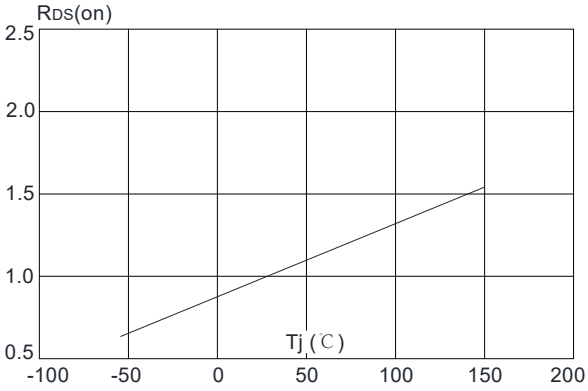



**Figure 9:** Maximum Safe Operating Area

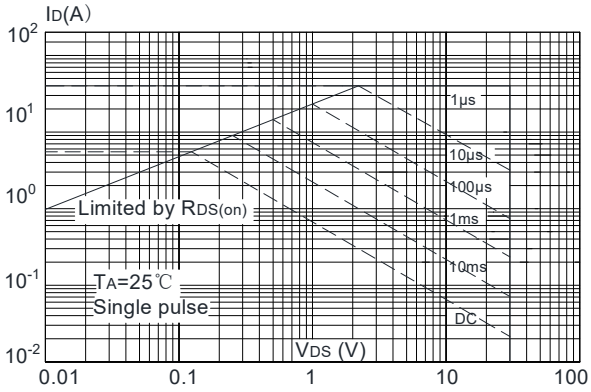



**Figure 10:** Maximum Continuous Drain Current vs. Case Temperature

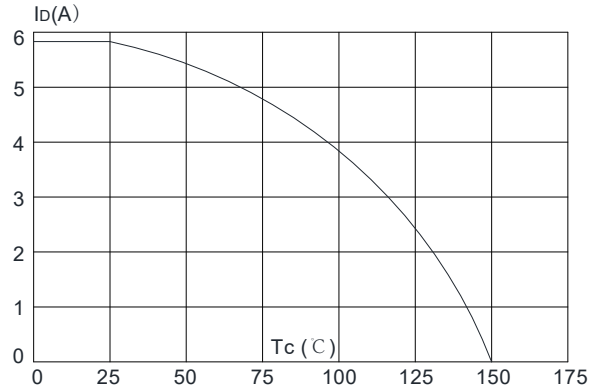
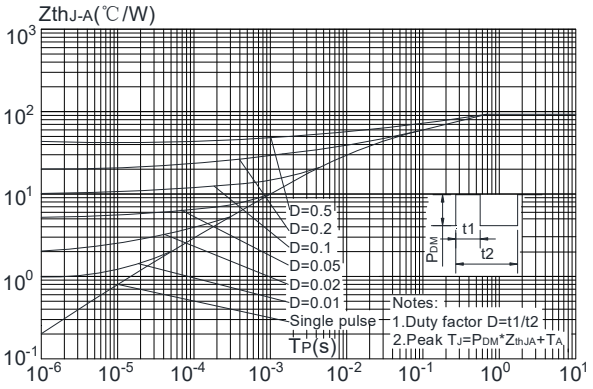



**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



## Test Circuit

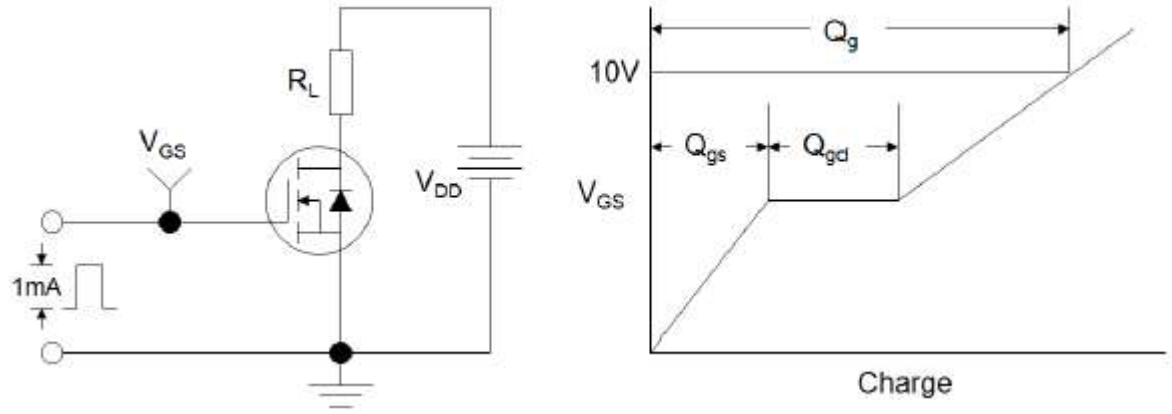



**Figure1:Gate Charge Test Circuit & Waveform**

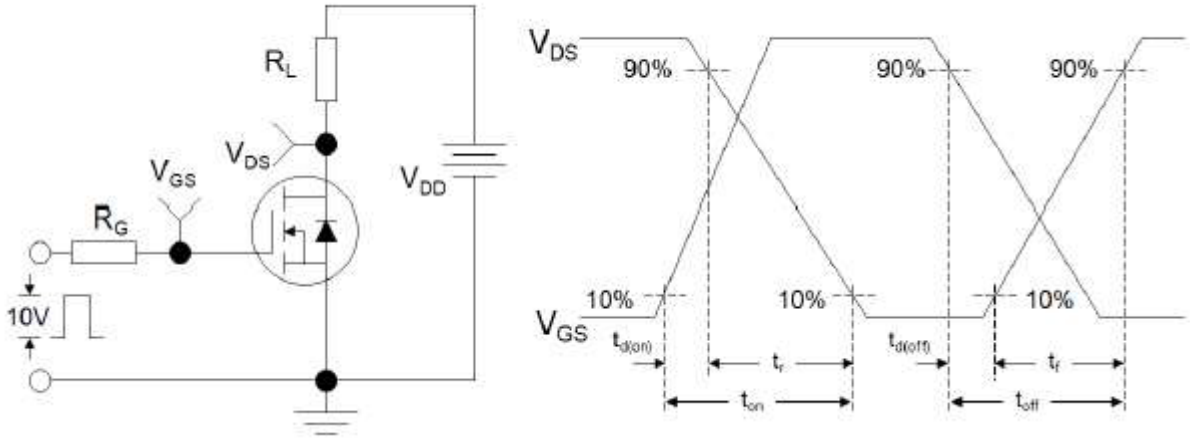



**Figure 2: Resistive Switching Test Circuit & Waveforms**

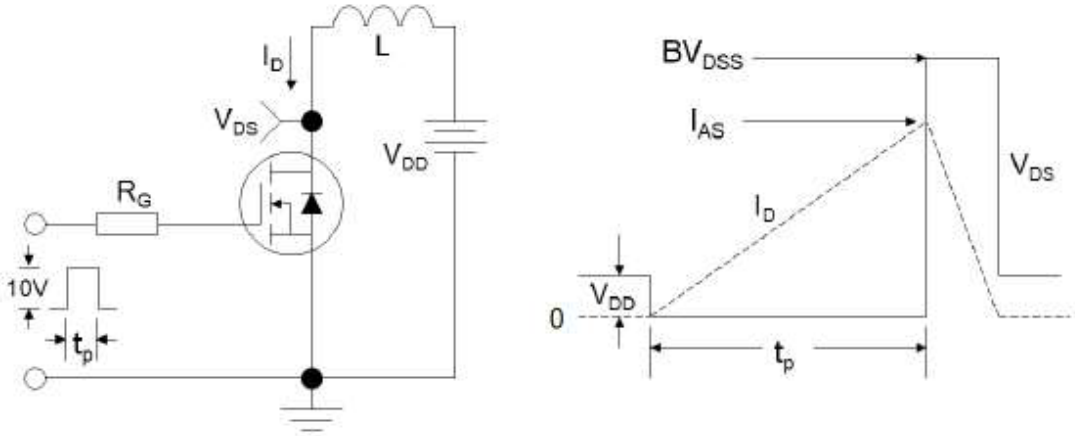



**Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms**