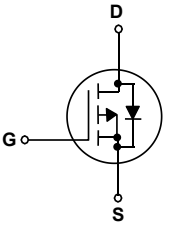
## Features

- P-Channel
- Low Gate Charge
- High Power and current handing capability
- Lead free product is acquired

| | | |
|---|---|---|
| $V_{DS}$ | -12 | V |
| $R_{DS(on),TYP}$@ $V_{GS}$=-4.5 V | 13 | mΩ |
| $R_{DS(on),TYP}$@ $V_{GS}$=-2.5 V | 19 | mΩ |
| $I_D$ | -8 | A |

**SOT-23**


| Part ID | Package Type | Marking | Packing |
|---|---|---|---|
| ZT1209 | SOT-23 | 1209 | 3000pcs/Reel |

| Symbol | Parameter | | Rating | Unit |
|---|---|---|---|---|
| **Common Ratings ($T_C$=25°C Unless Otherwise Noted)** | | | | |
| $V_{GS}$ | Gate-Source Voltage | | ±12 | V |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | | -12 | V |
| $T_J$ | Maximum Junction Temperature | | 150 | °C |
| $T_{STG}$ | Storage Temperature Range | | -55 to 150 | °C |
| $I_{DM}$ | Drain Current-Continuous@ Current-Pulsed (Note 1) | $T_C$ =25°C | -32 | A |
| **Mounted on Large Heat Sink** | | | | |
| $I_D$ | Drain Current-Continuous | $T_C$ =25°C | -8 | A |
| | | $T_C$ =100°C | -5 | A |
| $P_D$ | Maximum Power Dissipation | $T_C$ =25°C | 3 | W |
| | | $T_C$ =100°C | 1.25 | W |
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient | | 40 | °C/W |

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

| Symbol | Parameter | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Static Electrical Characteristics @ $T_j$=25°C (unless otherwise stated)** | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V, $I_D$=-250μA | -12 | -- | -- | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=-12V,$V_{GS}$=0V | -- | -- | -1 | μA |
| $I_{GSS}$ | Gate-Body Leakage Current | $V_{GS}$=±10V,$V_{DS}$=0V | -- | -- | ±100 | nA |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$,$I_D$=-250μA | -0.5 | -0.7 | -1.0 | V |
| $R_{DS(on)}$ | Drain-Source On-State Resistance | $V_{GS}$=-4.5V,$I_D$=-5A | -- | 13 | 17 | mΩ |
| $R_{DS(on)}$ | Drain-Source On-State Resistance | $V_{GS}$=-2.5V,$I_D$=-4A | -- | 19 | 26 | mΩ |
| $g_{FS}$ | Forward Transconductance | $V_{DS}$=-5V ,$I_D$=-5A | -- | 14 | -- | S |
| **Dynamic Electrical Characteristics @ $T_j$ = 25°C (unless otherwise stated)** (Note 2) | | | | | | |
| Ciss | Input Capacitance | $V_{DS}$=-10V,$V_{GS}$=0V, f=1MHz | -- | 1448 | -- | pF |
| Coss | OutputCapacitance | | -- | 322 | -- | pF |
| Crss | ReverseTransferCapacitance | | -- | 282 | -- | pF |
| Qg | Total Gate Charge | $V_{DS}$=-10V,$I_D$ =-5A, $V_{GS}$=-4.5V | -- | 16 | -- | nC |
| Qgs | Gate-SourceCharge | | -- | 3.4 | -- | nC |
| Qgd | Gate-DrainCharge | | -- | 4.1 | -- | nC |
| **Switching Characteristics** | | | | | | |
| Td(on) | Turn-on Delay Time | $V_{DS}$=-10V, $R_L$=2Ω, $R_G$=3Ω, $V_{GS}$=-4.5V | -- | 16 | -- | ns |
| Tr | Turn-on Rise Time | | -- | 64 | -- | ns |
| Td(off) | Turn-Off Delay Time | | -- | 71 | -- | ns |
| Tf | Turn-Off Fall Time | | -- | 62 | -- | ns |
| **Source- Drain Diode Characteristics@ $T_j$ = 25°C (unless otherwise stated)** | | | | | | |
| $I_{SD}$ | Source-Drain Current (Body Diode) | | -- | -- | -8 | A |
| $V_{SD}$ | Forward on voltage (Note 1) | $I_S$=-5.0A,$V_{GS}$=0V | -- | -- | -1.2 | V |

Notes:
1.Repetitive Rating: Pulse width limited by maximum junction temperature.

## Typical Electrical And Thermal Characteristics (Curves)

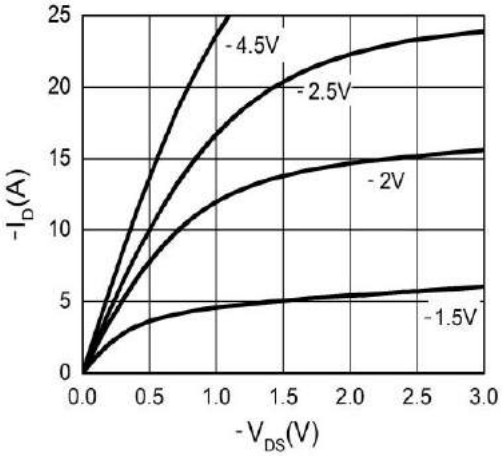



Figure 1. Output Characteristics

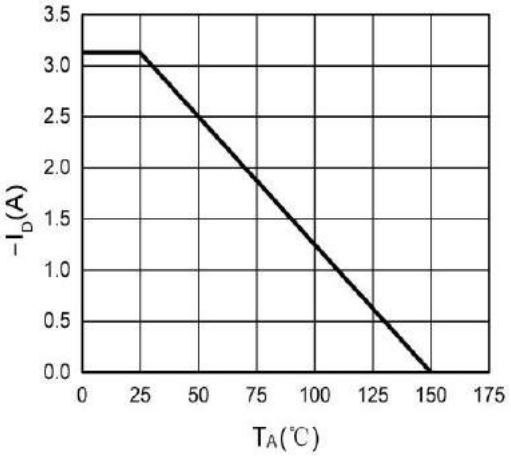



Figure 4. Power Dissipation

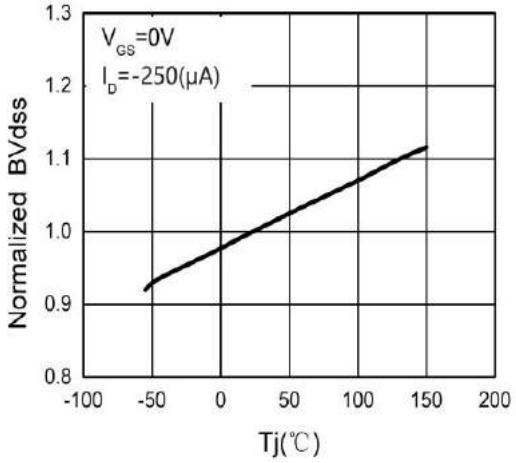



Figure 2. $BV_{DSS}$ vs Junction Temperature

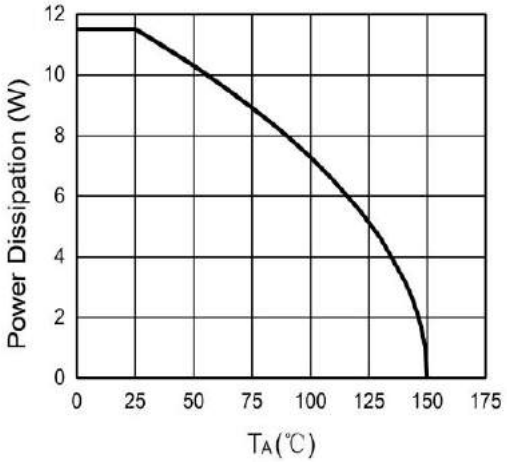



Figure 5. Drain Current

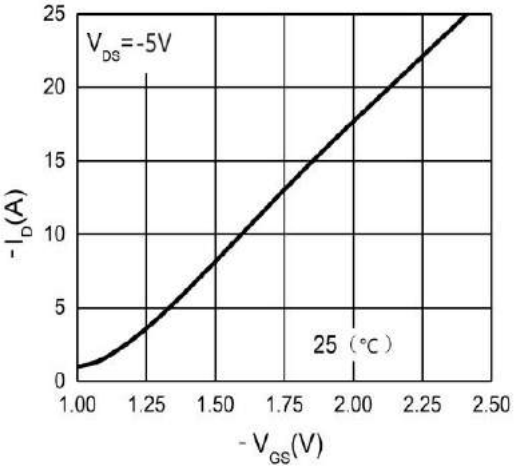



Figure 3. Transfer Characteristics

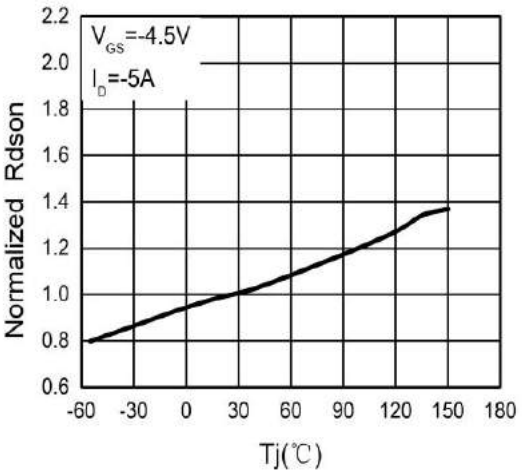



Figure 6. $R_{DS(ON)}$ vs Junction Temperature

## Typical Electrical And Thermal Characteristics (Curves)

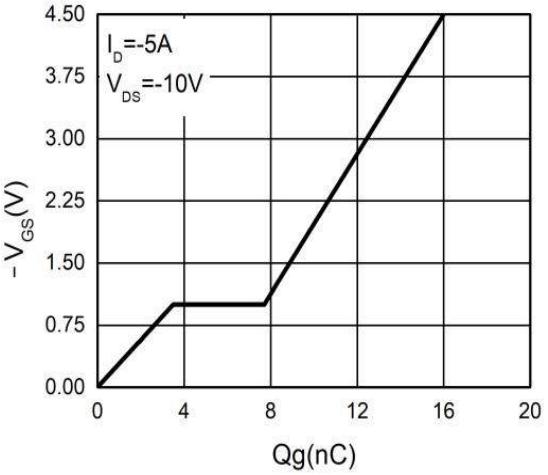



Figure 7. Gate Charge Waveforms

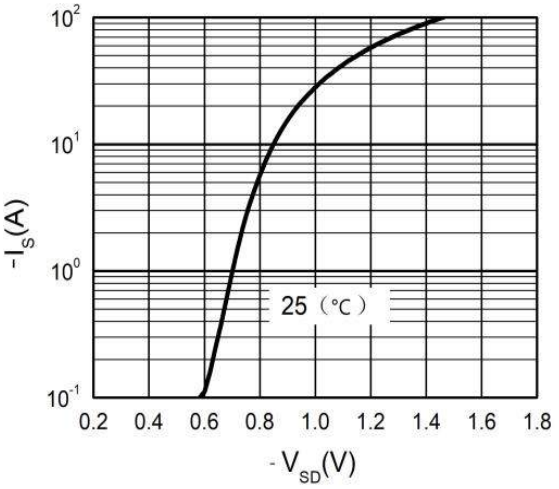



Figure 9. Body-Diode Characteristics

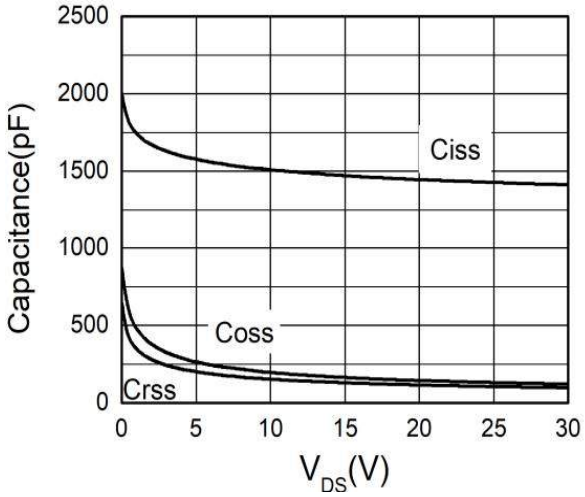



Figure 8. Capacitance

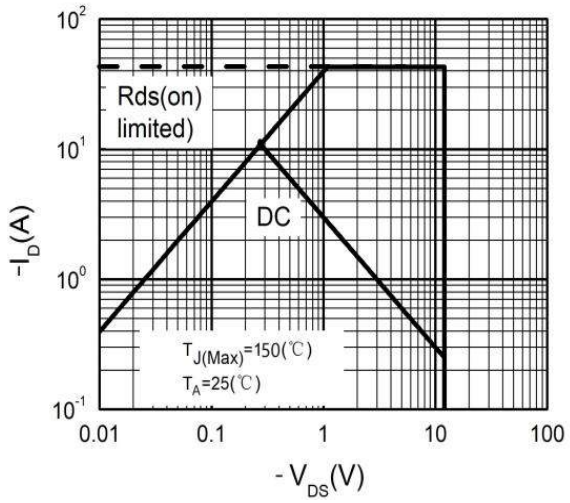
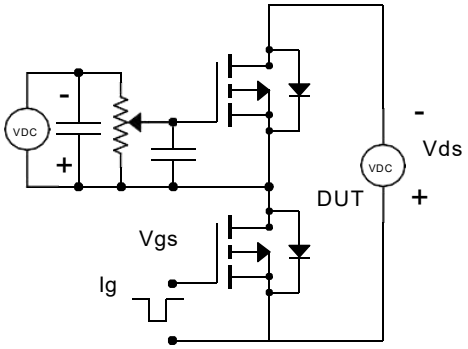
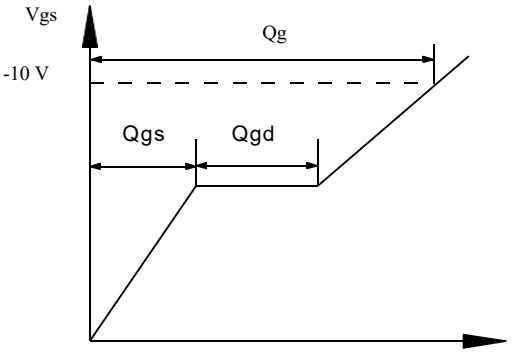


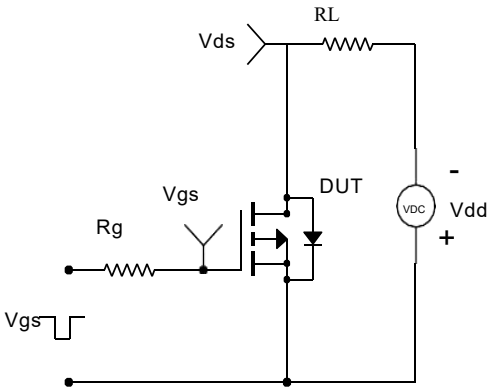

Figure 10. Maximum Safe Operating Area

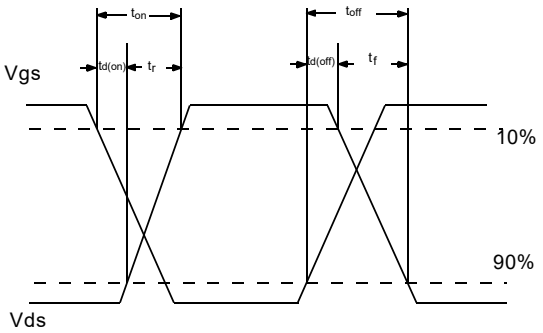
## Gate Charge Test Circuit & Waveform



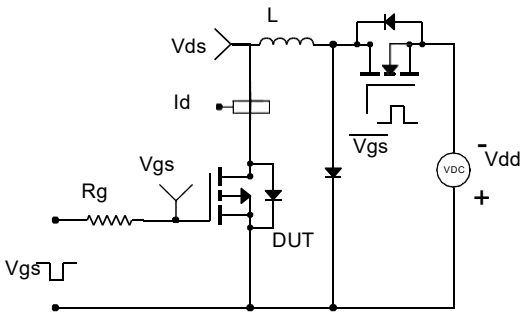



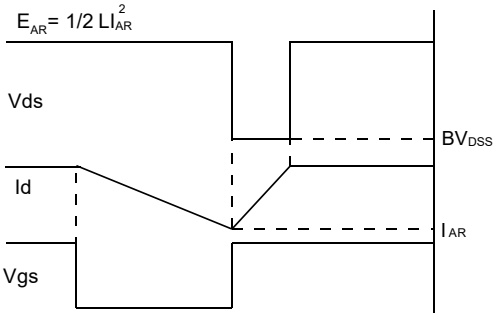

## Resistive Switching Test Circuit & Waveforms



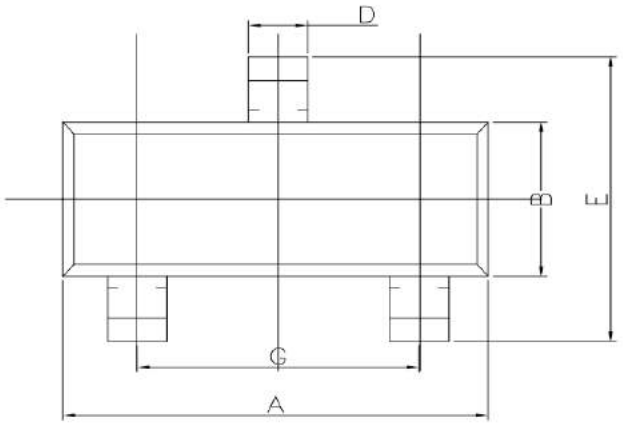



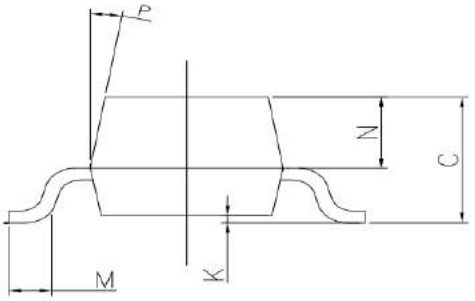

## Unclamped Inductive Switching Test Circuit & Waveforms

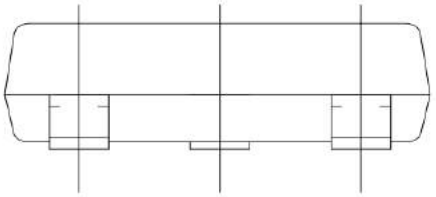


# SOT-23 Package Information



| DIM | MILLIMETERS |
|---|---|
| A | 2.90 ± 0.1 |
| B | 1.30 ± 0.10 |
| C | 0.90 ~ 1.15 |
| D | 0.40 ± 0.1 |
| E | 2.40 ± 0.15 |
| G | 1.90 ± 0.10 |
| K | 0.00~0.10 |
| M | 0.30MIN |
| N | 0.60 ± 0.10 |
| P | 10°TYP |

## Customer Service

**Sales and Service:**

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