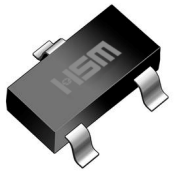
# HMZ0202

## General Description :

HMZ0202 the silicon N-channel Enhanced VDMOSFETS, is obtained by the self-aligned planar Technology which reduce the conduction loss, improve switching performance and enhance the avalanche energy. The transistor can be used in various power switching circuit for system miniaturization and higher efficiency. The package form is SOT-23, which accords with the RoHS standard.

| | | |
|---|---|---|
| $V_{DSS}$ | 200 | V |
| $I_D$ | 2 | A |
| $P_D$ ($T_C$=25℃) | 1.25 | W |
| $R_{DS(ON)typ}$ | 2.4 | Ω |

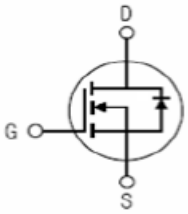
SOT-23



## Features :

- Fast Switching
- Low Gate Charge and Vth
- Low Reverse transfer capacitances
- 100% Single Pulse avalanche energy Test

Inner Equivalent Principium Chart




## Applications :

- LED Lighting
- Charger
- Standby Power

**Absolute** ( Tc=25℃ unless otherwise specified ) :

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DSS}$ | Drain-to-Source Voltage | 200 | V |
| $I_D$ | Continuous Drain Current | 2 | A |
| | Continuous Drain Current $T_C$ = 100 °C | 1.2 | A |
| $I_{DM}$ [a1] | Pulsed Drain Current | 5 | A |
| $V_{GS}$ | Gate-to-Source Voltage | ±20 | V |
| $E_{AS}$ [a2] | Single Pulse Avalanche Energy | 30 | mJ |
| dv/dt [a3] | Peak Diode Recovery dv/dt | 5.0 | V/ns |
| $P_D$ | Power Dissipation | 1.25 | W |
| $T_J$ , $T_{stg}$ | Operating Junction and Storage Temperature Range | 150 , −55 to 150 | ℃ |
| $T_L$ | Maximum Temperature for Soldering | 300 | ℃ |

**Electrical Characteristics** ( Tc=25℃ unless otherwise specified ) :

| OFF Characteristics | | | | | | |
|---|---|---|---|---|---|---|
| Symbol | Parameter | Test Conditions | Rating | | | Units |
| | | | Min. | Typ. | Max. | |
| $V_{DSS}$ | Drain to Source Breakdown Voltage | $V_{GS}$=0V, $I_D$=250μA | 200 | -- | -- | V |
| $\Delta BV_{DSS}/\Delta T_J$ | Bvdss Temperature Coefficient | ID=250uA,Reference25℃ | -- | 0.21 | -- | V/℃ |
| $I_{DSS}$ | Drain to Source Leakage Current | $V_{DS}$=200V, $V_{GS}$=0V,$T_a$=25℃ | -- | -- | 1 | μA |
| | | $V_{DS}$=160V, $V_{GS}$=0V,$T_a$=125℃ | -- | -- | 100 | |
| $I_{GSS(F)}$ | Gate to Source Forward Leakage | $V_{GS}$=+30V | -- | -- | 100 | μA |
| $I_{GSS(R)}$ | Gate to Source Reverse Leakage | $V_{GS}$=-30V | -- | -- | -100 | μA |

| ON Characteristics | | | | | | |
|---|---|---|---|---|---|---|
| Symbol | Parameter | Test Conditions | Rating | | | Units |
| | | | Min. | Typ. | Max. | |
| $R_{DS(ON)}$ | Drain-to-Source On-Resistance | $V_{GS}$=4.5V,$I_D$=2.0A | -- | 2.4 | 3.0 | Ω |
| $R_{DS(ON)}$ | Drain-to-Source On-Resistance | $V_{GS}$=2.5V,$I_D$=2.0A | -- | 2.6 | 3.1 | Ω |
| $V_{GS(TH)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$, $I_D$=250μA | 0.4 | 0.7 | 1.5 | V |
| Pulse width tp≤300μs,δ≤2% | | | | | | |

| Dynamic Characteristics | | | | | | |
|---|---|---|---|---|---|---|
| Symbol | Parameter | Test Conditions | Rating | | | Units |
| | | | Min. | Typ. | Max. | |
| $g_{fs}$ | Forward Transconductance | $V_{DS}$=25V,$I_D$=2.0A | -- | 1.0 | -- | S |
| $C_{iss}$ | Input Capacitance | $V_{GS}$=0V,$V_{DS}$=25V f=1.0MHz | -- | 80 | -- | pF |
| $C_{oss}$ | Output Capacitance | | -- | 6 | -- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | -- | 2 | -- | |

| Resistive Switching Characteristics | | | | | | |
|---|---|---|---|---|---|---|
| Symbol | Parameter | Test Conditions | Rating | | | Units |
| | | | Min. | Typ. | Max. | |
| $t_{d(ON)}$ | Turn-on Delay Time | $I_D$=2A,$V_{DD}$=100V $R_G$=10Ω | -- | 2 | -- | ns |
| $t_r$ | Rise Time | | -- | 4 | -- | |
| $t_{d(OFF)}$ | Turn-Off Delay Time | | -- | 6 | -- | |
| $t_f$ | Fall Time | | -- | 3 | -- | |
| $Q_g$ | Total Gate Charge | $I_D$=2A,$V_{DD}$=100V $V_{GS}$=10V | -- | 2 | -- | nC |
| $Q_{gs}$ | Gate to Source Charge | | -- | 1 | -- | |
| $Q_{gd}$ | Gate to Drain ( “Miller” )Charge | | -- | 1.2 | -- | |

| Source-Drain Diode Characteristics | | | | | | |
|---|---|---|---|---|---|---|
| Symbol | Parameter | Test Conditions | Rating | | | Units |
| | | | Min. | Typ. | Max. | |
| $I_S$ | Continuous Source Current (Body Diode) | | -- | -- | 2 | A |
| $I_{SM}$ | Maximum Pulsed Current (Body Diode) | | -- | -- | 5 | A |
| $V_{SD}$ | Diode Forward Voltage | $I_S$=2.0A,$V_{GS}$=0V | -- | -- | 1.5 | V |
| $t_{rr}$ | Reverse Recovery Time | $I_S$=2.0A,$T_j$=25°C | -- | 50 | -- | ns |
| $Q_{rr}$ | Reverse Recovery Charge | $dI_F/dt$=100A/us, | -- | 40 | -- | uC |
| $I_{RRM}$ | Reverse Recovery Current | $V_{GS}$=0V | -- | 1 | -- | A |
| Pulse width tp≤300μs,δ≤2% | | | | | | |

| Symbol | Parameter | Typ. | Units |
|---|---|---|---|
| $R_{\theta JA}$ | Junction-to-Ambient | 100 | ℃/W |

[a1] : Repetitive rating; pulse width limited by maximum junction temperature

[a2] : L=10.0mH, $I_D$=1A, Start $T_J$=25℃

[a3] : $I_{SD}$ =5A,di/dt ≤100A/us,$V_{DD}$≤$BV_{DS}$, Start $T_J$=25℃

Figure 6. Maximum Peak Current Capability

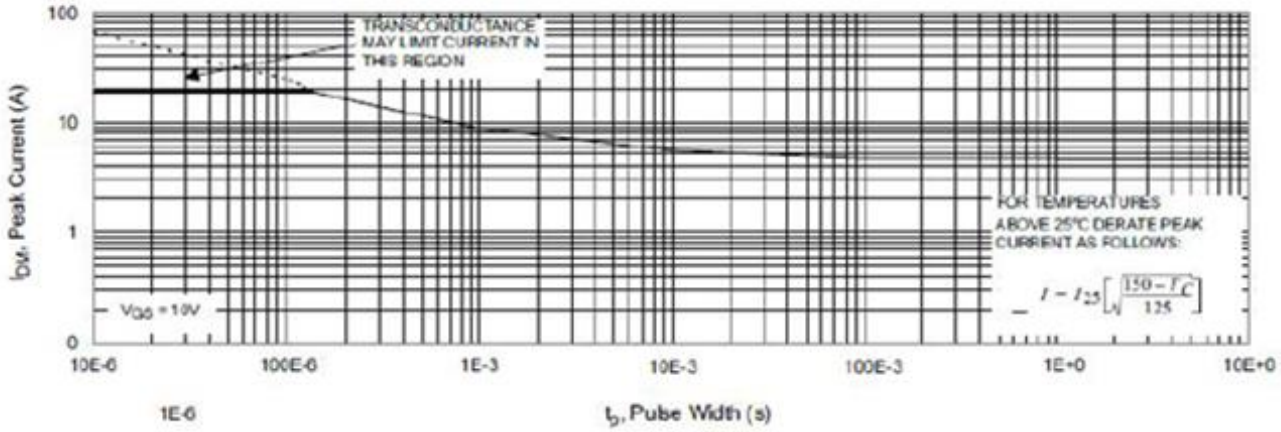



Figure 7. Typical Transfer Characteristics

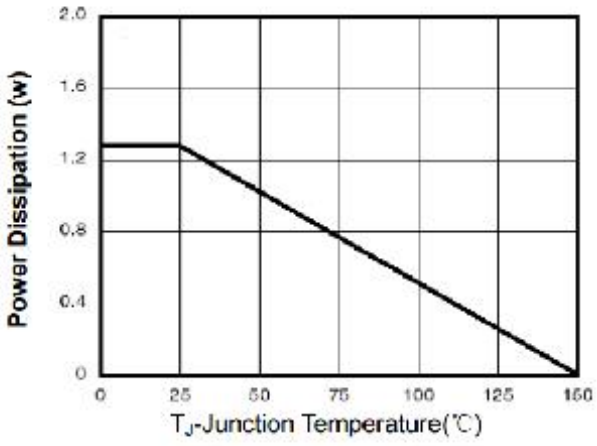



Figure 8. Unclamped Inductive Switching Capability

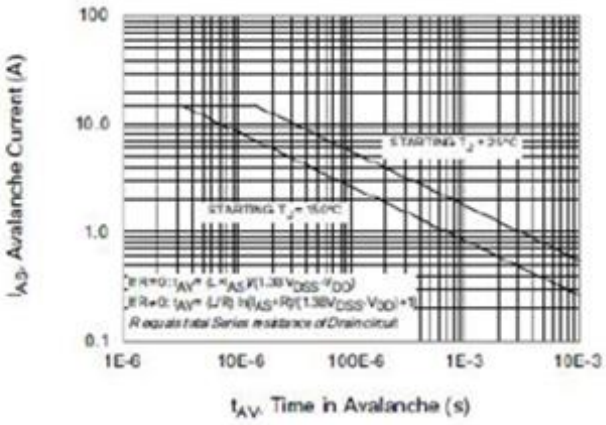



Figure 9. Typical Drain-to-Source ON Resistance vs Drain Current

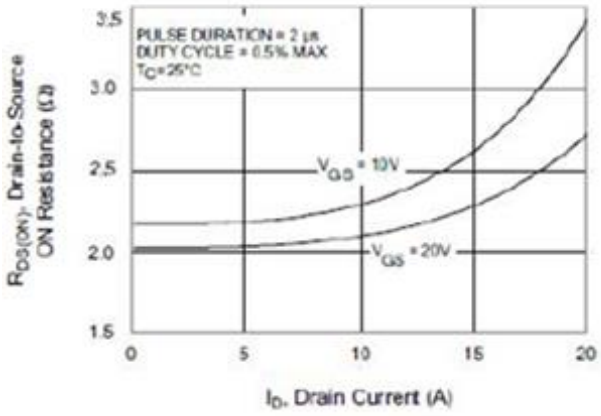



Figure 10. Typical Drain-to-Source ON Resistance vs Junction Temperature

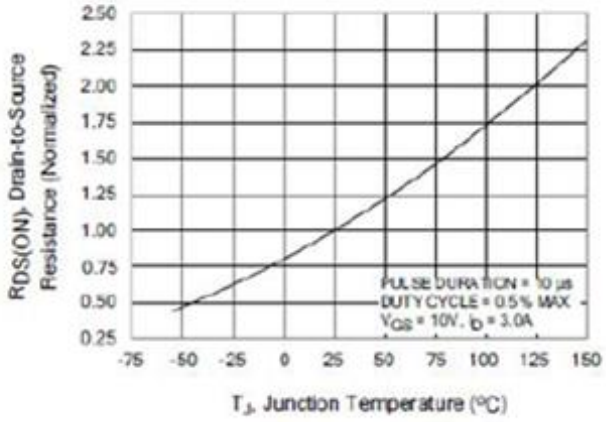


Figure 11. Typical Breakdown Voltage vs Junction Temperature

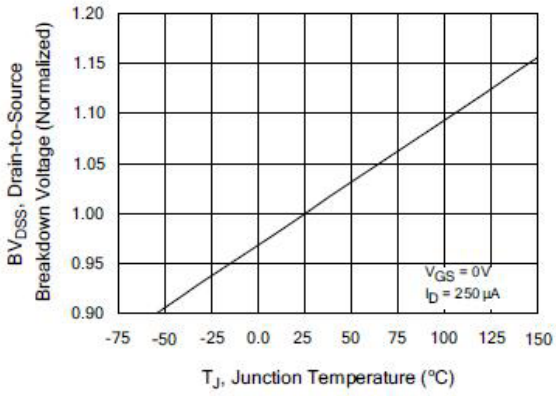



Figure 12. Typical Threshold Voltage vs Junction Temperature

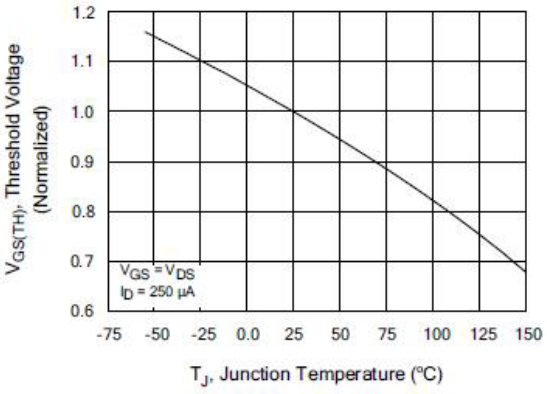



Figure 13. Maximum Forward Bias Safe Operating Area

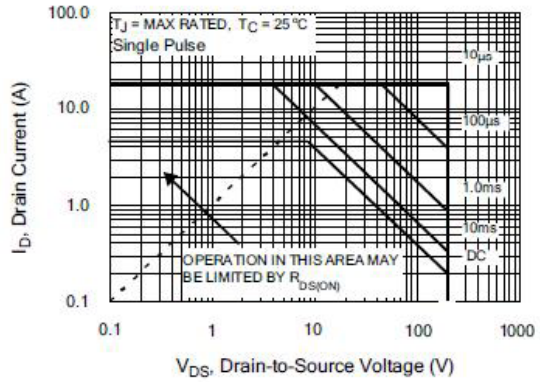



Figure 14. Typical Capacitance vs Drain-to-Source Voltage

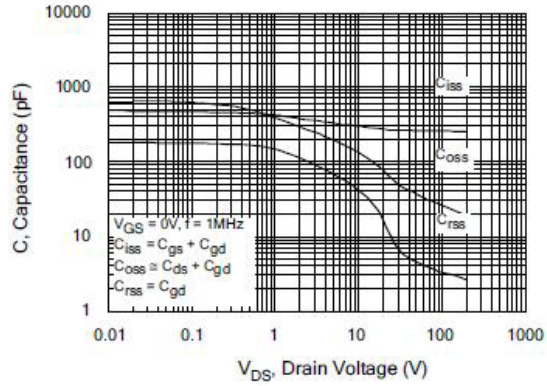



Figure 15. Typical Gate Charge vs Gate-to-Source Voltage

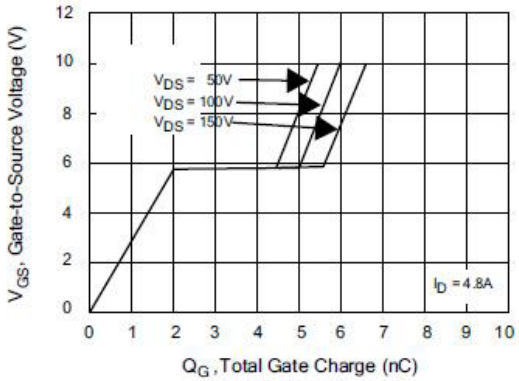



Figure 16. Typical Body Diode Transfer Characteristics