# HMZ**1515**

## *Silicon N-Channel Power MOSFET*

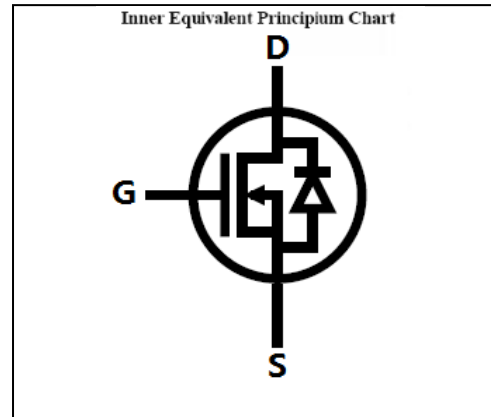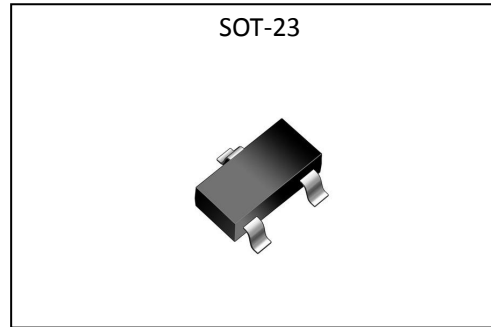| $V_{DSX}$ | 150 | V |
|---|---|---|
| $I_{DSS\ MIN}$ | 200 | mA |
| $R_{DS(ON)type}$ | 7.3 | Ω |

### General Description :

HMZ1515 the silicon N-channel Depletion mode MOSFETS, is obtained by the self-aligned planar Technology which reduce the conduction loss, improve switching performance and enhance the avalanche energy. The package form is SOT-23, which accords with the RoHS and Halogen Free standard.

SOT-23



### Features :

- N-Channel

- ESD improved Capability

- Depletion Mode

- dv/dt rated

- Pb-free lead plating;ROHS compliant

- Halogen Free

Inner Equivalent Principium Chart



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

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DSX}$ | Drain-to-Source Voltage | 155 | V |
| $I_D$ | Continuous Drain Current | 0.2 | A |
| | Continuous Drain Current $T_C$ =70 °C | 0.16 | A |
| $I_{DM}$[a1] | Pulsed Drain Current | 0.8 | A |
| $V_{GS}$ | Gate-to-Source Voltage | ±20 | V |
| dv/dt [a2] | Peak Diode Recovery dv/dt | 5.0 | V/ns |
| $P_D$ | Power Dissipation | 1.2 | W |
| TJ , Tstg | Operating Junction and Storage Temperature Range | 150 , −55 to 150 | ℃ |
| $T_L$ | Maximum Temperature for Soldering | 300 | ℃ |

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

### OFF Characteristics

| Symbol | Parameter | Test Conditions | Rating | | | Units |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $V_{DSX}$ | Drain to Source Breakdown Voltage | $V_{GS}$=-15V,$I_D$=250μA | 150 | -- | -- | V |
| $I_{D(off)}$ | Off-state Drain to Source Current | $V_{DS}$=150V,$V_{GS}$=-12V | -- | -- | 0.1 | μA |
| | | $V_{DS}$=120V,$V_{GS}$=-12V,Ta=125°C | -- | -- | 10 | μA |
| $I_{GSS(F)}$ | Gate to Source Forward Leakage | $V_{GS}$=+10V | -- | -- | 100 | nA |
| $I_{GSS(R)}$ | Gate to Source Reverse Leakage | $V_{GS}$=-10V | -- | -- | -100 | nA |

### ON Characteristics

| Symbol | Parameter | Test Conditions | Rating | | | Units |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $I_{DSS}$ | On-state drain current | $V_{GS}$=0V,$V_{DS}$=25V | 200 | -- | -- | mA |
| $R_{DS(ON)}$ | Drain-to-Source On-Resistance | $V_{GS}$=0V,$I_D$=200mA | -- | 9.5 | 15 | Ω |
| | | $V_{GS}$=10V,$I_D$=200mA | -- | 7.3 | 10 | |
| $V_{GS(TH)}$ | Gate Threshold Voltage | $V_{DS}$=3V,$I_D$=8.0μA | -8.0 | -6.5 | -5.0 | V |

### Dynamic Characteristics

| Symbol | Parameter | Test Conditions | Rating | | | Units |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $g_{fs}$ | Forward Transconductance | $V_{DS}$=50V,$I_D$=0.01A | -- | -- | -- | S |
| $C_{iss}$ | Input Capacitance | $V_{GS}$=-12V,$V_{DS}$=25V f=1.0MHz | -- | 12 | -- | pF |
| $C_{oss}$ | Output Capacitance | | -- | 5.5 | -- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | -- | 2.1 | -- | |

### Resistive Switching Characteristics

| Symbol | Parameter | Test Conditions | Rating | | | Units |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $t_{d(ON)}$ | Turn-on Delay Time | $I_D$=0.2A,$V_{DD}$=75V $V_{GS}$=-10...0V $R_G$=20.0Ω | -- | 9.5 | -- | Ns |
| $t_r$ | Rise Time | | -- | 21 | -- | |
| $t_{d(OFF)}$ | Turn-Off Delay Time | | -- | 9.0 | -- | |
| $t_f$ | Fall Time | | -- | 25 | -- | |
| $Q_g$ | Total Gate Charge | $I_D$=0.2A,$V_{DD}$=75V $V_{GS}$=-10V to 0V | -- | 1.5 | -- | nC |
| $Q_{gs}$ | Gate to Source Charge | | -- | 0.8 | -- | |
| $Q_{gd}$ | Gate to Drain ("Miller")Charge | | -- | 0.55 | -- | |

**Source-Drain Diode Characteristics**

| Symbol | Parameter | Test Conditions | Rating | | | Units |
|--------|-----------|-----------------|--------|--------|--------|-------|
| | | | Min. | Typ. | Max. | |
| $I_S$ | Continuous Source Current (Body Diode) | $Ta=25°C$ | -- | -- | 0.2 | A |
| $I_{SM}$ | Maximum Pulsed Current (Body Diode) | | -- | -- | 0.8 | A |
| $V_{SD}$ | Diode Forward Voltage | $I_F=200mA,V_{GS}=-12V$ | -- | -- | 1.2 | V |
| $t_{rr}$ | Reverse Recovery Time | $I_F=0.01A,T_j=25°C$ | -- | 260 | -- | ns |
| $Q_{rr}$ | Reverse Recovery Charge | $dI_F/dt=100A/us,V_R=75V$ | -- | 650 | -- | nC |

| Symbol | Parameter | Typ. | Units |
|--------|-----------|------|-------|
| $R_{\theta JA}$ | Junction-to-Ambient | 250 | ℃/W |
| $R_{\theta JC}$ | Junction-to-Case | 105 | ℃/W |

## Typical Electrical and Thermal Characteristics (Curves)
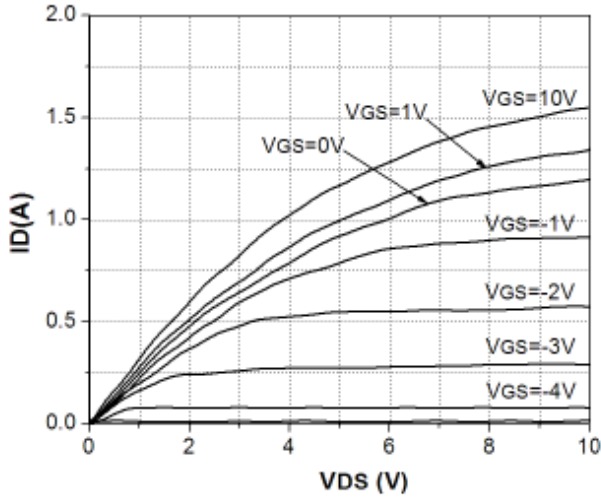
**Figure 1. Output Characteristics**
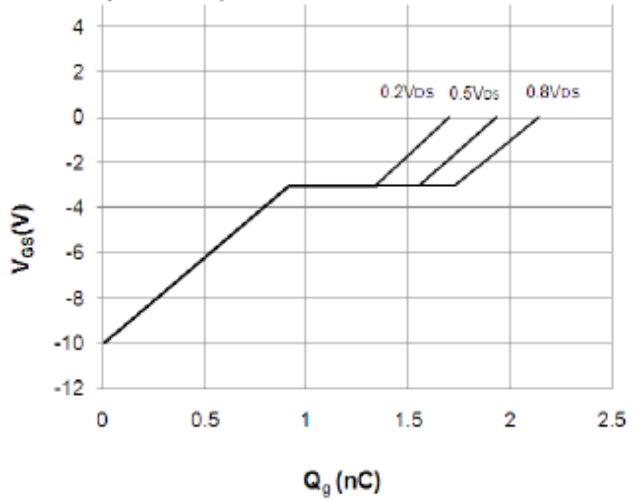
**Figure 2. Gate Charge**
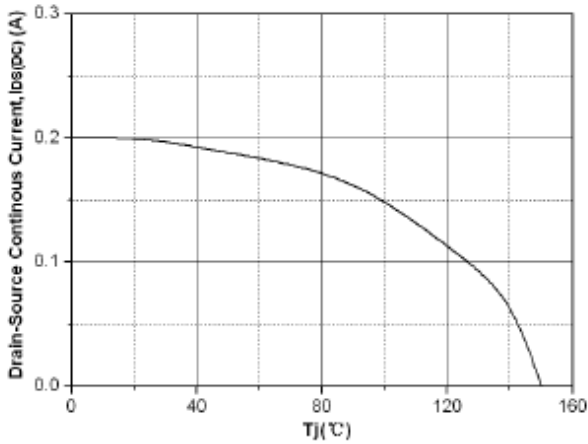
**Figure 3. Continuous Drain Current Derating vs. Junction Temperature**
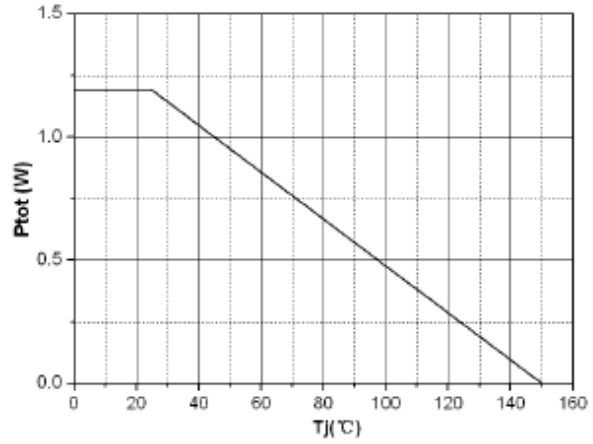
**Figure 4. Power Dissipation Derating vs. Junction Temperature**
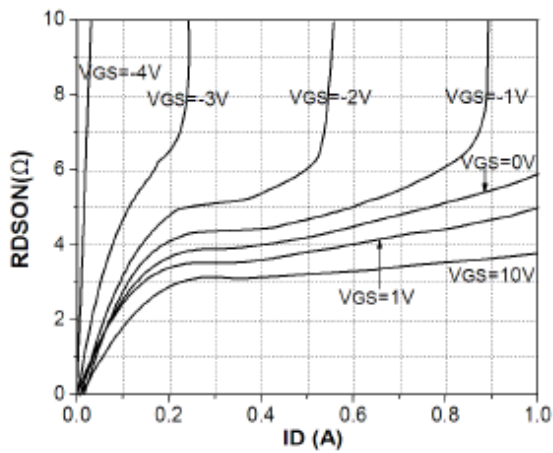
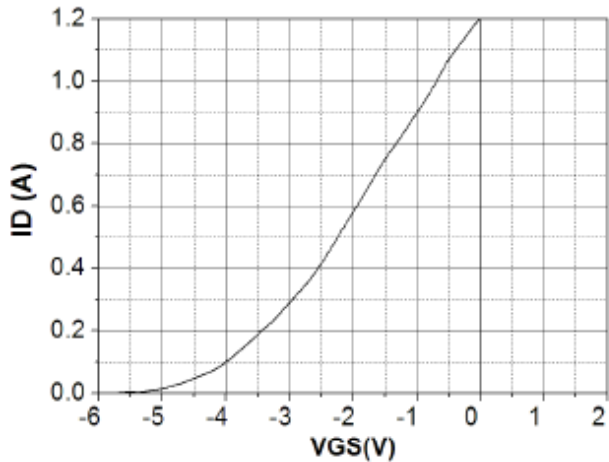**Figure 5. Typ.Drain Source on Resistance Tj = 25 °C**
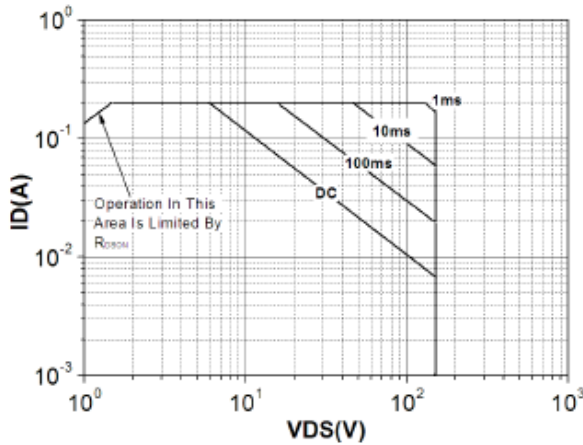
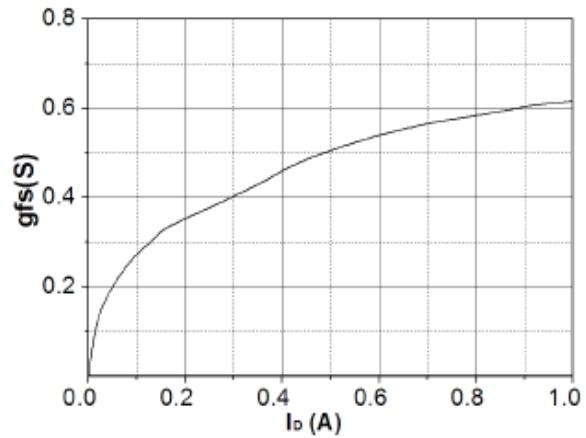**Figure 6. Typ. Transfer Characteristics**

Figure 7. Safe Operation Area



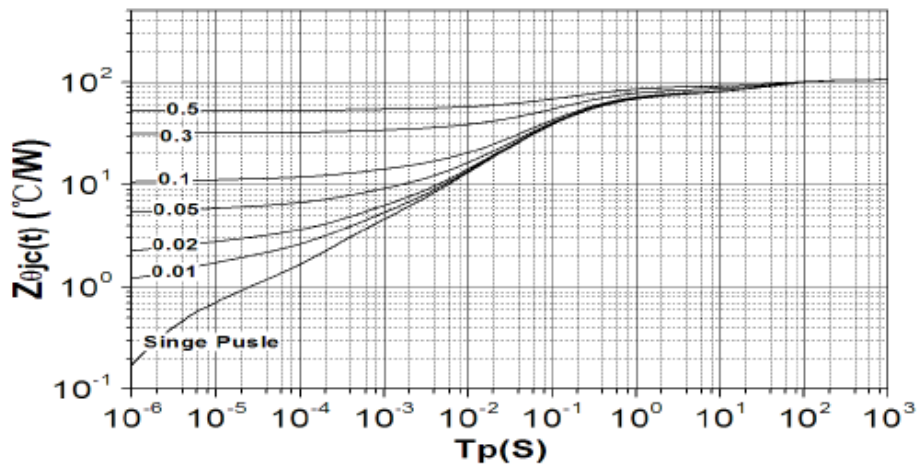Figure 8. Typ. Forward Trans conductance
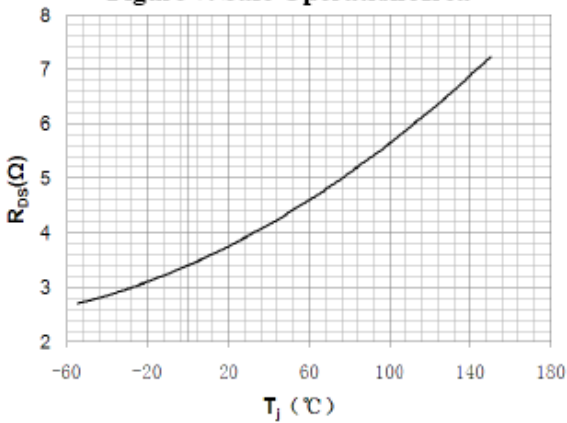


Figure 9. Drain Source on state Resistance
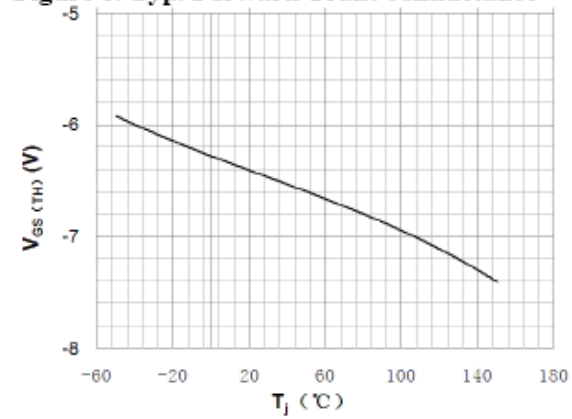


Figure 10 .Typ. Gate Threshold Voltage



Figure 11. Transient Thermal Impedance
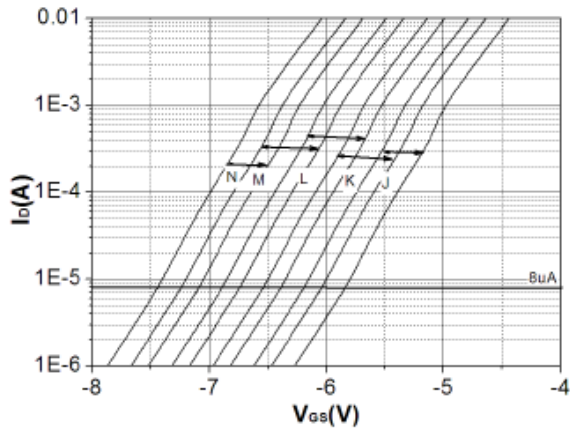(Junction – Case Mounted on Specified Board)

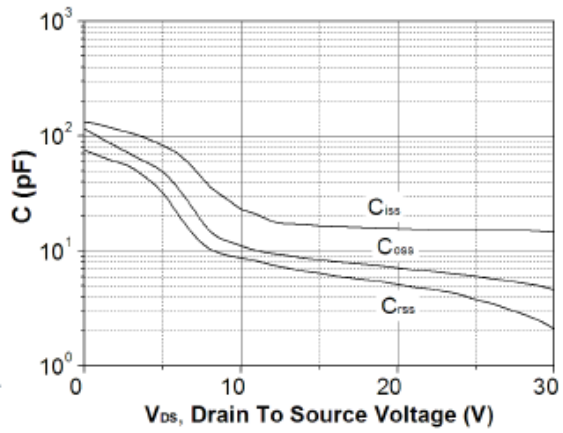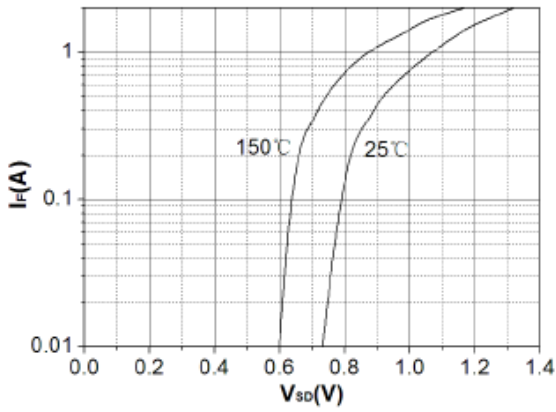Figure 12. Threshold Voltage Bands
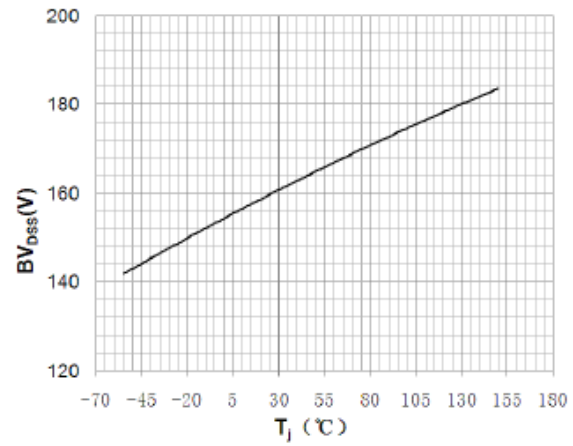
Figure 13. Typ. capacitances

Figure 14. Forward Characteristics of reverse diode

Figure 15. Drain Source Breakdown Voltage