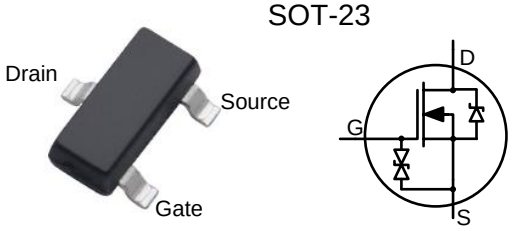
# Depletion-Mode Power MOSFET

## General Features

- ESD improved Capability
- Depletion Mode (Normally On)
- Proprietary Advanced Planar Technology
- Rugged Polysilicon Gate Cell Structure
- Fast Switching Speed
- RoHS Compliant
- Halogen-free available

| $BV_{DSX}$ | $R_{DS(ON)}$ (Max.) | $I_{DSS,min}$ |
|---|---|---|
| 600V | 700 Ω | 5mA |

SOT-23




## Applications

- Normally-on Switches
- SMPS Start-up Circuit
- Linear Amplifier
- Converters
- Constant Current Source
- Telecom

## Ordering Information

| Part Number | Package | Marking | Remark |
|---|---|---|---|
| DMZ6005E | SOT-23 | 605E | Halogen Free |

## Absolute Maximum Ratings

TA =25℃ unless otherwise specified

| Symbol | Parameter | DMZ6005E | Unit |
|---|---|---|---|
| $V_{DSX}$ | Drain-to-Source Voltage[1] | 600 | V |
| $V_{DGX}$ | Drain-to-Gate Voltage[1] | 600 | V |
| $I_D$ | Continuous Drain Current | 0.02 | A |
| $I_{DM}$ | Pulsed Drain Current[2] | 0.08 | |
| $P_D$ | Power Dissipation | 0.50 | W |
| $V_{GS}$ | Gate-to-Source Voltage | ±20 | V |
| $T_L$ | Soldering Temperature<br>Distance of 1.6mm from case for 10 seconds | 300 | ℃ |
| $T_J$ and $T_{STG}$ | Operating and Storage Temperature Range | -55 to 150 | |

*Caution: Stresses greater than those listed in the"Absolute Maximum Ratings" may cause permanent damage to the device.*

## Thermal Characteristics

| Symbol | Parameter | DMZ6005E | Unit |
|---|---|---|---|
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient | 250 | K/W |

# Electrical Characteristics

## OFF Characteristics

TA =25℃ unless otherwise specified

| Symbol | Parameter | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|
| $BV_{DSX}$ | Drain-to-Source Breakdown Voltage | 600 | -- | -- | V | $V_{GS}$=-5V, $I_D$=250μA |
| $I_{D(OFF)}$ | Drain-to-Source Leakage Current | -- | -- | 0.1 | μA | $V_{DS}$=600V，$V_{GS}$= -5V |
| | | -- | -- | 10 | μA | $V_{DS}$=600V，$V_{GS}$= -5V $T_J$=125℃ |
| $I_{GSS}$ | Gate-to-Source Leakage Current | -- | -- | 20 | μA | $V_{GS}$=+20V, $V_{DS}$=0V |
| | | -- | -- | -20 | | $V_{GS}$=-20V, $V_{DS}$=0V |

## ON Characteristics

TA =25℃ unless otherwise specified

| Symbol | Parameter | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|
| $I_{DSS}$ | Saturated Drain-to-Source Current | 5 | -- | 25 | mA | $V_{GS}$=0V, $V_{DS}$=25V |
| $R_{DS(ON)}$ | Static Drain-to-Source On-Resistance | -- | 500 | 700 | Ω | $V_{GS}$=0V，$I_D$=3mA [3] |
| $V_{GS(OFF)}$ | Gate-to-Source Cut-off Voltage | -3.3 | -- | -1.5 | V | $V_{DS}$ =3V, $I_D$=8μA |
| gfs | Forward Transconductance | -- | 15.4 | -- | mS | $V_{DS}$ =10V, $I_D$=5mA |

## Dynamic Characteristics

Essentially independent of operating temperature

| Symbol | Parameter | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|
| $C_{ISS}$ | Input Capacitance | -- | 12.3 | -- | pF | $V_{GS}$=-5V $V_{DS}$=25V f=1.0MHz |
| $C_{OSS}$ | Oput Capacitance | -- | 2.6 | -- | | |
| $C_{RSS}$ | Reverse Transfer Capacitance | -- | 1.8 | -- | | |
| $Q_G$ | Total Gate Charge | -- | 1.55 | -- | nC | $V_{GS}$=-5V~5V $V_{DS}$=300V, $I_D$=7mA |
| $Q_{GS}$ | Gate-to-Source Charge | -- | 0.12 | -- | | |
| $Q_{GD}$ | Gate-to-Drain (Miller) Charge | -- | 0.56 | -- | | |

## Resistive Switching Characteristics

Essentially independent of operating temperature

| Symbol | Parameter | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|
| $t_{d(ON)}$ | Turn-on Delay Time | -- | 4 | -- | ns | $V_{GS}$ = -5V~5V $V_{DD}$ = 300V, $I_D$=7mA $R_G$ = 20 Ω |
| $t_{rise}$ | Rise Time | -- | 9 | -- | | |
| $t_{d(OFF)}$ | Turn-off Delay Time | -- | 14 | -- | | |
| $t_{fall}$ | Fall Time | -- | 84 | -- | | |

## Source-Drain Diode Characteristics

TA =25℃ unless otherwise specified

| Symbol | Parameter | Min | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|
| $V_{SD}$ | Diode Forward Voltage | -- | -- | 1.2 | V | $I_{SD}$ =3.0 mA, $V_{GS}$ = -10 V |

NOTE：

[1] $T_J$=+25℃ to +150℃
[2] Repetitive rating, pulse width limited by maximum junction temperature.
[3] Pulse width≤380μs;duty cycle≤2%.

Figure 1. Maximum Power Dissipation vs. Case Temperature

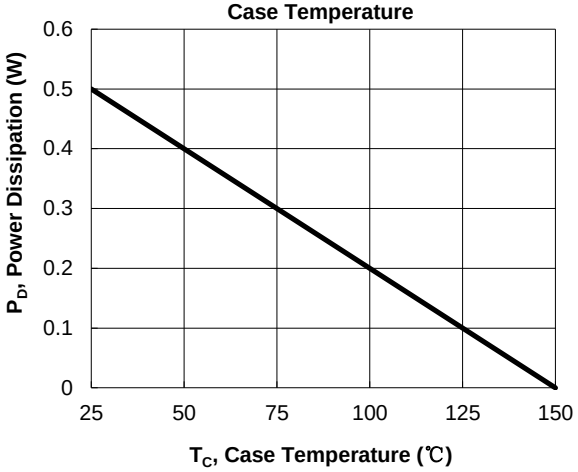



Figure 2. Maximum Continuous Drain Current vs Case Temperature

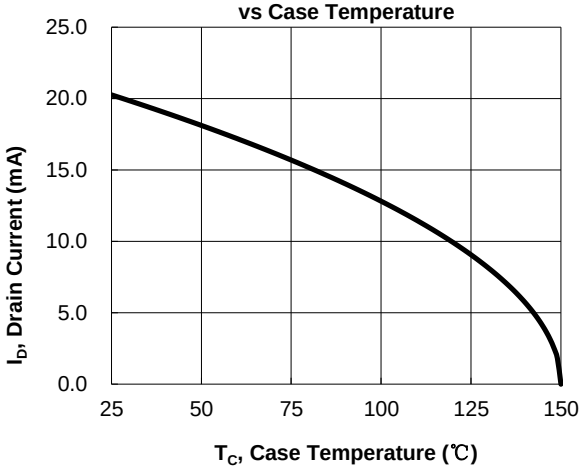



Figure 3. Typical Output Characteristics

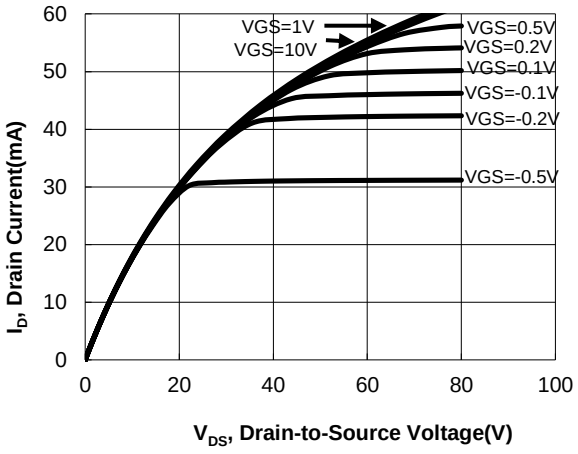



Figure 4. Typical Transfer Characteristics

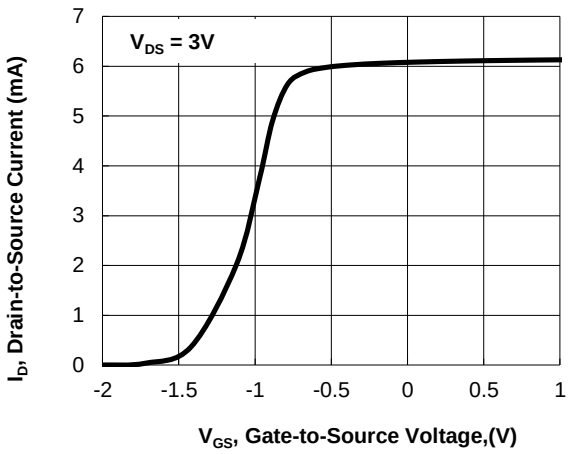



Figure 5. Typical Capacitance vs. Drain-to-Source Voltage

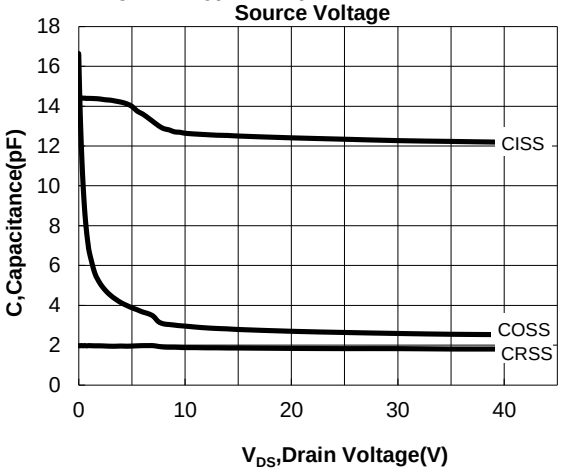
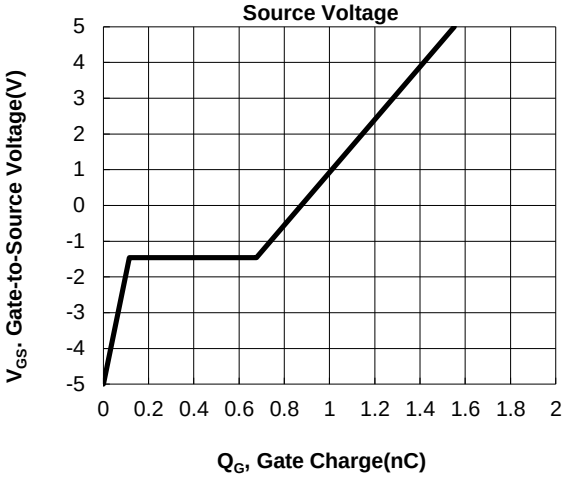
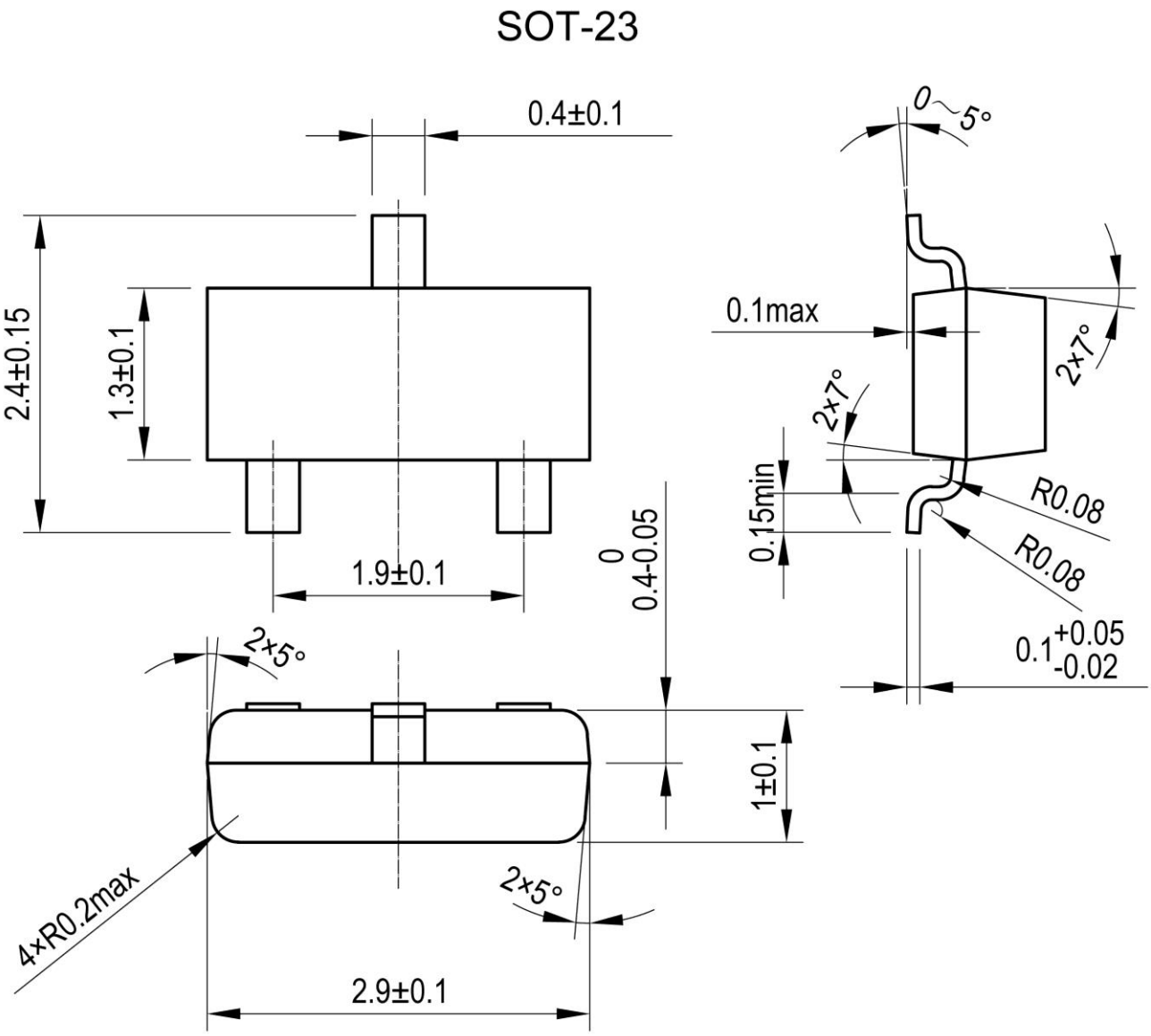



Figure 6. Typical Gate Charge vs. Gate-to-Source Voltage



## Package Dimensions



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