The GreenMOS® high voltage MOSFET utilizes charge balance technology to achieve outstanding low on-resistance and lower gate charge. It is engineered to minimize conduction loss, provide superior switching performance and robust avalanche capability.

GreenMOS®

RoHS

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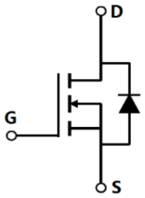
| Parameter | Value | Unit |
|---|---|---|
| $V_{DS,\ min}$ @ $T_{j(max)}$ | 700 | V |
| $I_{D,\ pulse}$ | 24 | A |
| $R_{DS(ON),\ max}$ @ $V_{GS}$=10V | 580 | |
| $Q_g$ | 12.4 | nC |

| Product Name | Package | Marking |
|---|---|---|
| OSG65R580FEF | TO220F | OSG65R580FE |



## Absolute Maximum Ratings at $T_j$=25 unless otherwise noted

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-source voltage | $V_{DS}$ | 650 | V |
| Gate-source voltage | $V_{GS}$ | ±30 | V |
| Continuous drain current[1), $T_C$=25 °C | $I_D$ | 8 | A |
| Continuous drain current[1), $T_C$=100 °C | | 5 | |
| Pulsed drain current[2), $T_C$=25 °C | $I_{D,\ pulse}$ | 24 | A |
| Continuous diode forward current[1), $T_C$=25 °C | $I_S$ | 8 | A |
| Diode pulsed current[2), $T_C$=25 °C | $I_{S,\ pulse}$ | 24 | A |
| Power dissipation[3), $T_C$=25 °C | $P_D$ | 28 | W |
| Single pulsed avalanche energy[5) | $E_{AS}$ | 150 | mJ |
| MOSFET dv/dt ruggedness, $V_{DS}$ | dv/dt | 50 | V/ns |
| Reverse diode dv/dt, $V_{DS}$ $_{SD}$ $_{D}$ | dv/dt | 15 | V/ns |
| Operation and storage temperature | $T_{stg}$, $T_j$ | -55 to 150 | °C |

## Thermal Characteristics

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Thermal resistance, junction-case | R | 4.5 | °C/W |
| Thermal resistance, junction-ambient[4) | R | 62.5 | °C/W |

## Electrical Characteristics at $T_j$=25 unless otherwise specified

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test condition |
|---|---|---|---|---|---|---|
| Drain-source breakdown voltage | $BV_{DSS}$ | 650 | | | V | $V_{GS}$=0 V, $I_D$=250 A |
| | | 700 | 750 | | | $V_{GS}$=0 V, $I_D$ , $T_j$=150 °C |
| Gate threshold voltage | $V_{GS(th)}$ | 2.0 | | 4.0 | V | $V_{DS}$=$V_{GS}$, $I_D$=250 A |
| Drain-source on-state resistance | $R_{DS(ON)}$ | | 0.48 | 0.58 | | $V_{GS}$=10 V, $I_D$=4 A |
| | | | 1.27 | | | $V_{GS}$=10 V, $I_D$=4 A, $T_j$=150 °C |
| Gate-source leakage current | $I_{GSS}$ | | | 100 | nA | $V_{GS}$=30 V |
| | | | | -100 | | $V_{GS}$=-30 V |
| Drain-source leakage current | $I_{DSS}$ | | | 1 | A | $V_{DS}$=650 V, $V_{GS}$=0 V |

## Dynamic Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test condition |
|---|---|---|---|---|---|---|
| Input capacitance | $C_{iss}$ | | 587 | | pF | $V_{GS}$=0 V,<br>$V_{DS}$=50 V,<br>Hz |
| Output capacitance | $C_{oss}$ | | 42.1 | | pF | |
| Reverse transfer capacitance | $C_{rss}$ | | 1.8 | | pF | |
| Turn-on delay time | $t_{d(on)}$ | | 22.4 | | ns | $V_{GS}$=10 V,<br>$V_{DS}$=400 V,<br>$R_G$=10<br>$I_D$=8 A |
| Rise time | $t_r$ | | 16.5 | | ns | |
| Turn-off delay time | $t_{d(off)}$ | | 33.4 | | ns | |
| Fall time | $t_f$ | | 5.1 | | ns | |

## Gate Charge Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test condition |
|---|---|---|---|---|---|---|
| Total gate charge | $Q_g$ | | 12.4 | | nC | $V_{GS}$=10 V,<br>$V_{DS}$=400 V,<br>$I_D$=8 A |
| Gate-source charge | $Q_{gs}$ | | 3.2 | | nC | |
| Gate-drain charge | $Q_{gd}$ | | 5.0 | | nC | |
| Gate plateau voltage | $V_{plateau}$ | | 6.0 | | V | |

## Body Diode Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test condition |
|---|---|---|---|---|---|---|
| Diode forward voltage | $V_{SD}$ | | | 1.2 | V | $I_S$=8 A,<br>$V_{GS}$=0 V |

## Electrical Characteristics Diagrams

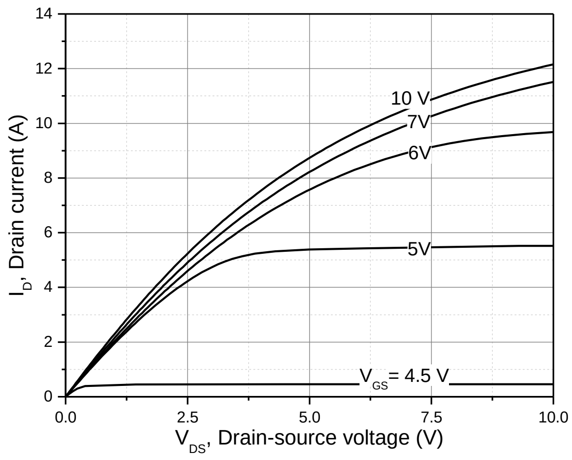


**Figure 1. Typ. output characteristics**

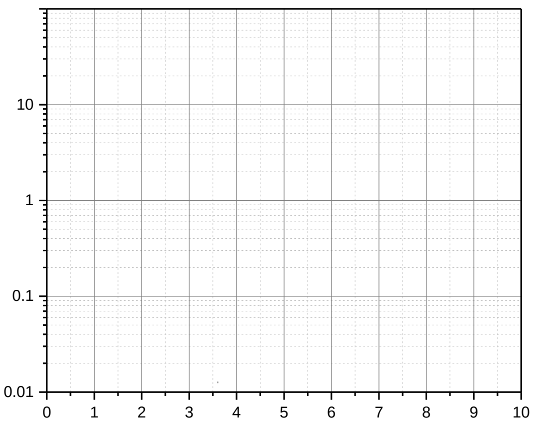


**Figure 2. Typ. transfer characteristics**

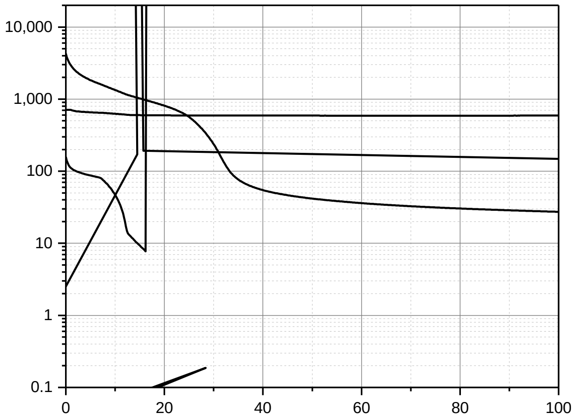


**Figure 3. Typ. capacitances**

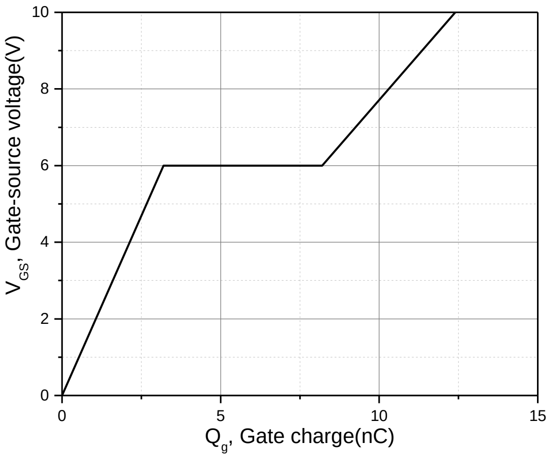


**Figure 4. Typ. gate charge**

**Figure 5. Drain-source breakdown voltage**

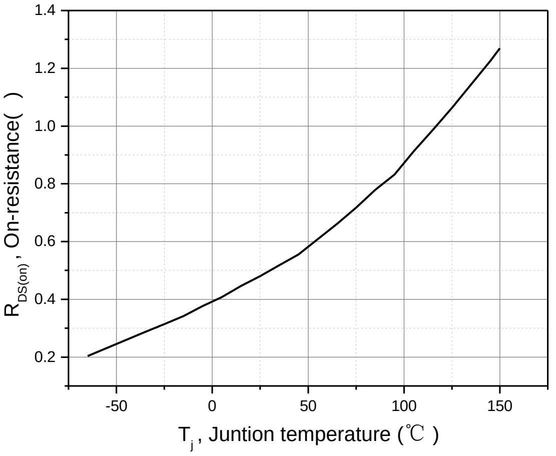


**Figure 6. Drain-source on-state resistance**

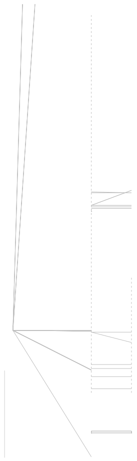


Figure 7. Threshold voltage

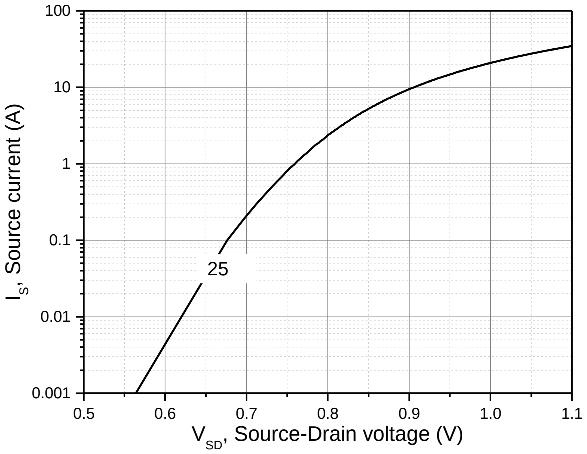


Figure 8. Forward characteristic of body diode

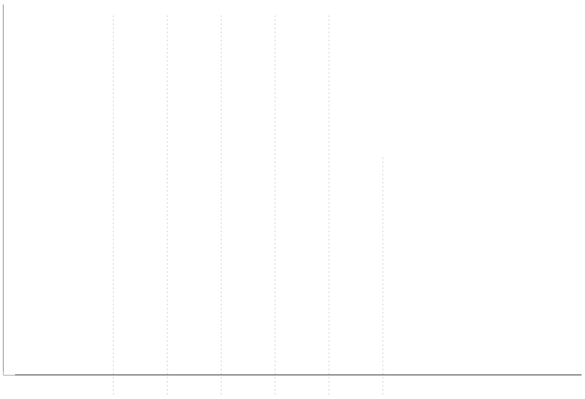


Figure 9. Drain-source on-state resistance

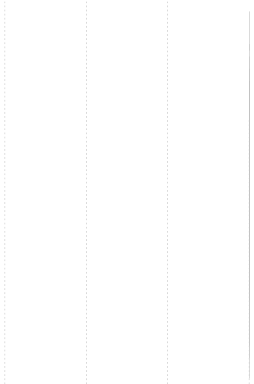


Figure 10. Drain current

Figure 11. Safe operation area $T_C$=25 °C

## Test circuits and waveforms

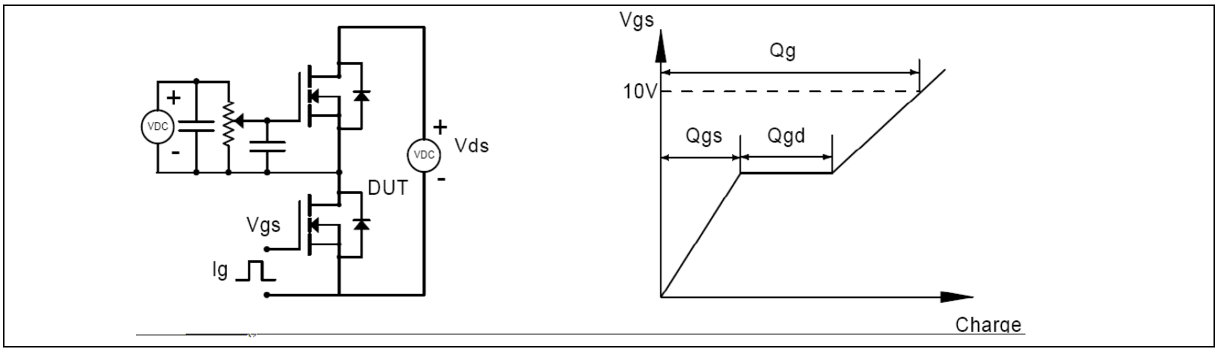


**Figure 1. Gate charge test circuit & waveform**

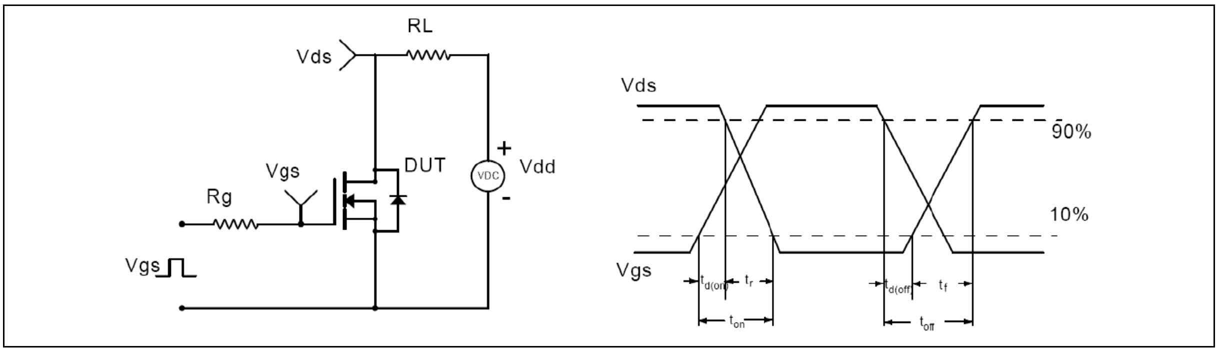


**Figure 2. Switching time test circuit & waveforms**

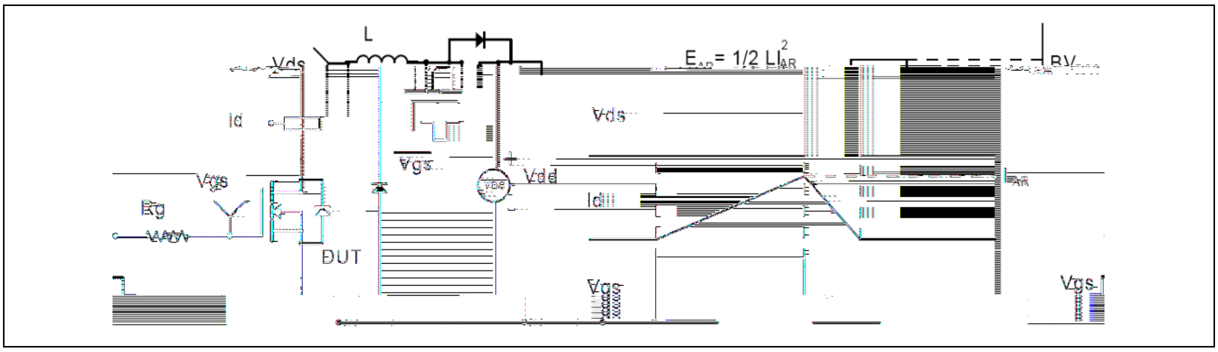


**Figure 3. Unclamped inductive switching (UIS) test circuit & waveforms**

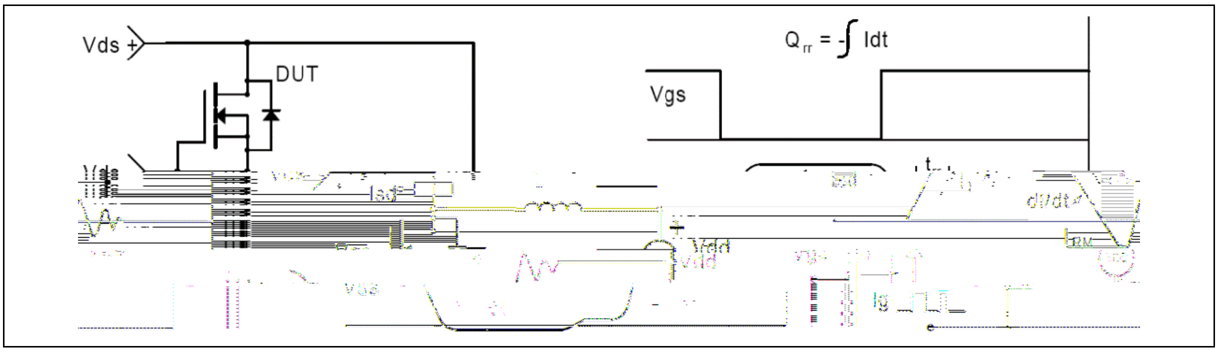


**Figure 4. Diode reverse recovery test circuit & waveforms**

## Package Information

| Symbol | mm | | |
|---|---|---|---|
| | Min | Nom | Max |
| E | 9.96 | 10.16 | 10.36 |
| A | 4.50 | 4.70 | 4.90 |
| A1 | 2.34 | 2.54 | 2.74 |
| A4 | 2.56 | 2.76 | 2.96 |
| c | 0.40 | 0.50 | 0.65 |
| D | 15.57 | 15.87 | 16.17 |

## Package Information

| Symbol | mm | | |
|---|---|---|---|
| | Min | Nom | Max |
| A | 4.40 | 4.50 | 4.60 |
| A1 | 1.27 | 1.30 | 1.33 |
| A2 | 2.30 | 2.40 | 2.50 |
| b | 0.70 | - | 0.90 |
| b1 | 1.27 | - | 1.40 |
| c | 0.45 | 0.50 | 0.60 |
| D | 15.30 | 15.70 | 16.10 |
| D1 | 9.10 | 9.20 | 9.30 |
| D2 | 13.10 | - | 13.70 |

## Ordering Information

| Package Type | Units/ Tube | Tubes/ Inner Box | Units/ Inner Box | Inner Boxes/ Carton Box | Units/ Carton Box |
|---|---|---|---|---|---|
| TO220F-C | 50 | 20 | 1000 | 6 | 6000 |
| TO220F-J | 50 | 20 | 1000 | 5 | 5000 |

## Product Information

| Product | Package | Pb Free | RoHS | Halogen Free |
|---|---|---|---|---|
| OSG65R580FEF | TO220F | yes | yes | yes |

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