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.

The GreenMOS® Generic series is optimized for extreme switching performance to minimize switching loss. It is tailored for high power density applications to meet the highest efficiency standards.

GreenMOS®

RoHS compliant

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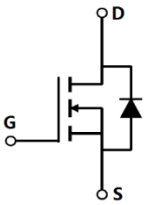
| Parameter | Value | Unit |
|---|---|---|
| $V_{DS,\ min}$ @ $T_{j(max)}$ | 700 | V |
| $I_{D,\ pulse}$ | 75 | A |
| $R_{DS(ON)\ ,\ max}$ @ $V_{GS}$=10V | 125 | |
| $Q_g$ | 41.9 | nC |

| Product Name | Package | Marking |
|---|---|---|
| OSG65R125FF | TO220F | OSG65R125F |

## 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 | $I_D$ | 25 | A |
| Continuous drain current[1], $T_C$=100 °C | | 16 | |
| Pulsed drain current[2], $T_C$=25 °C | $I_{D,\ pulse}$ | 75 | A |
| Continuous diode forward current[1], $T_C$=25 °C | $I_S$ | 25 | A |
| Diode pulsed current[2], $T_C$=25 °C | $I_{S,\ pulse}$ | 75 | A |
| Power dissipation[3] , $T_C$=25 °C | $P_D$ | 34 | W |
| Single pulsed avalanche energy[5] | $E_{AS}$ | 730 | 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 | 3.7 | °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, $I_D$=1 mA |
| | | 700 | 740 | | | $V_{GS}$=0 V, $I_D$=1 mA, $T_j$=150 °C |
| Gate threshold voltage | $V_{GS(th)}$ | 2.9 | | 3.9 | V | $V_{DS}$=$V_{GS}$, $I_D$=1 mA |
| Drain-source on-state resistance | $R_{DS(ON)}$ | | 0.115 | 0.125 | | $V_{GS}$=10 V, $I_D$=12.5 A |
| | | | 0.278 | | | $V_{GS}$=10 V, $I_D$=12.5 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 | $C_{iss}$ | | 2390.8 | | pF | $V_{GS}$=0 V, $V_{DS}$=50 V, 00 kHz |
| Output capacitance | $C_{oss}$ | | 154.1 | | pF | |
| Reverse transfer capacitance | $C_{rss}$ | | 3.9 | | pF | |
| Turn-on delay time | $t_{d(on)}$ | | 32.4 | | ns | $V_{GS}$=10 V, $V_{DS}$=400 V, $R_G$ $I_D$=12.5 A |
| Rise time | $t_r$ | | 30.8 | | ns | |
| Turn-off delay time | $t_{d(off)}$ | | 63.2 | | ns | |
| Fall time | $t_f$ | | 4.9 | | ns | |

## Gate Charge Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test condition |
|---|---|---|---|---|---|---|
| Total gate charge | $Q_g$ | | 41.9 | | nC | $V_{GS}$=10 V, $V_{DS}$=400 V, $I_D$=12.5 A |
| Gate-source charge | $Q_{gs}$ | | 10.4 | | nC | |
| Gate-drain charge | $Q_{gd}$ | | 14.1 | | nC | |
| Gate plateau voltage | $V_{plateau}$ | | 5.7 | | V | |

## Body Diode Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test condition |
|---|---|---|---|---|---|---|
| Diode forward voltage | $V_{SD}$ | | | 1.4 | V | $I_S$=25 A, $V_{GS}$=0 V |
| Reverse recovery time | $t_{rr}$ | | 365.2 | | ns | $I_S$=12.5 A, |
| Reverse recovery charge | $Q_{rr}$ | | 4.7 | | C | |
| Peak reverse recovery current | $I_{rrm}$ | | 24.9 | | A | |

**Note**

1) Calculated continuous current based on maximum allowable junction temperature.
2) Repetitive rating; pulse width limited by max. junction temperature.
3) Pd is based on max. junction temperature, using junction-case thermal resistance.
4) The value of R is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with $T_a$=25 °C.
5) $V_{DD}$=100 V, $V_{GS}$=10 V, L=80 mH, starting $T_j$=25 °C.

## 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 |

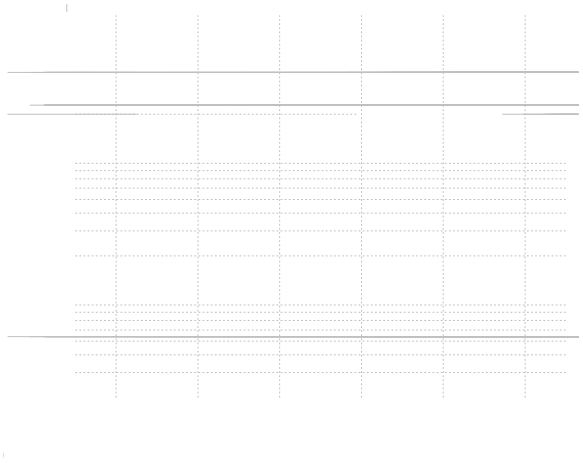


Figure 7. Forward characteristic of body diode

Figure 8. Drain-source on-state resistance

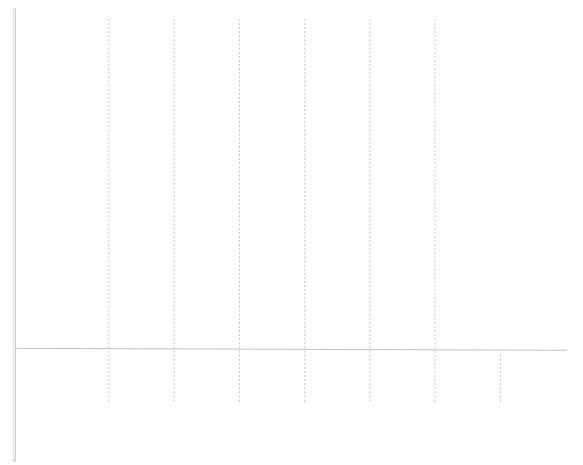


Figure 9. Drain current

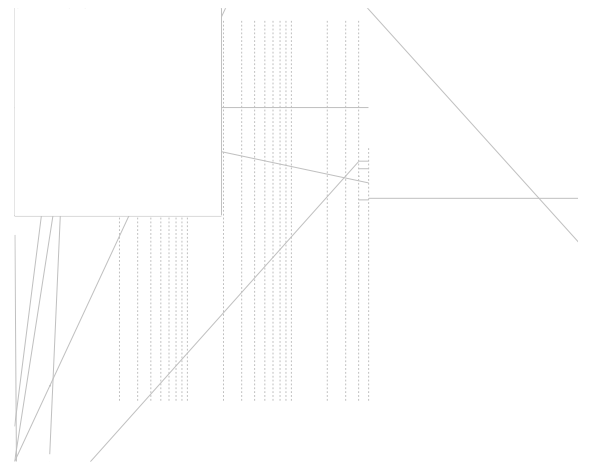


Figure 10. Safe operation area $T_C$=25

## Package Information

## 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 |

## Product Information

| Product | Package | Pb Free | RoHS | Halogen Free |
|---|---|---|---|---|
| OSG65R125FF | TO220F | yes | yes | yes |