## General Description

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® E series is optimized for its switching characteristics to achieve balance between EMI and efficiency. It is designed to enable power supply systems to reach the highest efficiency while still meeting EMI standards.

## Features

- Low $R_{DS(ON)}$ & FOM
- Extremely low switching loss
- Excellent stability and uniformity
- EMI and performance balanced

## Applications

- LED lighting
- Charger
- Adapter
- TV power
- Telecom power
- Server power
- Solar/UPS

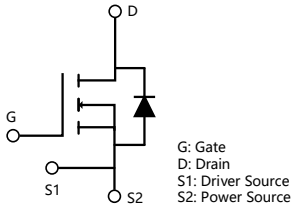
## Key Performance Parameters

| Parameter | Value | Unit |
|---|---|---|
| $V_{DS,\ min}$ @ $T_{j(max)}$ | 700 | V |
| $I_{D,\ pulse}$ | 36 | A |
| $R_{DS(ON),\ max}$ @ $V_{GS}$=10V | 360 | mΩ |
| $Q_g$ | 15.2 | nC |

## Marking Information

| Product Name | Package | Marking |
|---|---|---|
| OSG65R360JEF | PDFN8*8 | OSG65R360JE |

## Package & Pin Information

## Absolute Maximum Ratings at $T_j$=25°C 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 | $I_D$ | 12 | A |
| Continuous drain current[1], $T_C$=100 °C | | 7.6 | |
| Pulsed drain current[2], $T_C$=25 °C | $I_{D,\ pulse}$ | 36 | A |
| Continuous diode forward current[1], $T_C$=25 °C | $I_S$ | 12 | A |
| Diode pulsed current[2], $T_C$=25 °C | $I_{S,\ pulse}$ | 36 | A |
| Power dissipation[3], $T_C$=25 °C | $P_D$ | 83 | W |
| Single pulsed avalanche energy[5] | $E_{AS}$ | 200 | mJ |
| MOSFET dv/dt ruggedness, $V_{DS}$=0…480 V | dv/dt | 50 | V/ns |
| Reverse diode dv/dt, $V_{DS}$=0…480 V, $I_{SD}$≤$I_D$ | 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 | $R_{\theta JC}$ | 1.5 | °C/W |
| Thermal resistance, junction-ambient[4] | $R_{\theta JA}$ | 62 | °C/W |

## Electrical Characteristics at $T_j$=25°C 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 μA |
| | | 700 | 770 | | | $V_{GS}$=0 V, $I_D$=250 μA, $T_j$=150 °C |
| Gate threshold voltage | $V_{GS(th)}$ | 2.9 | | 3.9 | V | $V_{DS}$=$V_{GS}$, $I_D$=250 μA |
| Drain-source on-state resistance | $R_{DS(ON)}$ | | 0.32 | 0.36 | Ω | $V_{GS}$=10 V, $I_D$=6 A |
| | | | 0.78 | | | $V_{GS}$=10 V, $I_D$=6 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 | μA | $V_{DS}$=650 V, $V_{GS}$=0 V |

## Dynamic Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test condition |
|---|---|---|---|---|---|---|
| Input capacitance | $C_{iss}$ | | 815.1 | | pF | $V_{GS}$=0 V, $V_{DS}$=50 V, $f$=100 kHz |
| Output capacitance | $C_{oss}$ | | 59.6 | | pF | |
| Reverse transfer capacitance | $C_{rss}$ | | 2.9 | | pF | |
| Turn-on delay time | $t_{d(on)}$ | | 30.8 | | ns | $V_{GS}$=10 V, $V_{DS}$=400 V, $R_G$=2 Ω, $I_D$=6 A |
| Rise time | $t_r$ | | 18.6 | | ns | |
| Turn-off delay time | $t_{d(off)}$ | | 71.1 | | ns | |
| Fall time | $t_f$ | | 14.0 | | ns | |

## Gate Charge Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test condition |
|---|---|---|---|---|---|---|
| Total gate charge | $Q_g$ | | 15.2 | | nC | $V_{GS}$=10 V, $V_{DS}$=400 V, $I_D$=6 A |
| Gate-source charge | $Q_{gs}$ | | 3.3 | | nC | |
| Gate-drain charge | $Q_{gd}$ | | 5.9 | | nC | |
| Gate plateau voltage | $V_{plateau}$ | | 6.3 | | V | |

## Body Diode Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test condition |
|---|---|---|---|---|---|---|
| Diode forward voltage | $V_{SD}$ | | | 1.3 | V | $I_S$=12 A, $V_{GS}$=0 V |
| Reverse recovery time | $t_{rr}$ | | 232.0 | | ns | $V_R$=400 V, $I_S$=6 A, di/dt=100 A/μs |
| Reverse recovery charge | $Q_{rr}$ | | 2.1 | | μC | |
| Peak reverse recovery current | $I_{rrm}$ | | 19.5 | | 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 $R_{\theta JA}$ 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=60 mH, starting $T_j$=25 °C.

## Electrical Characteristics Diagrams

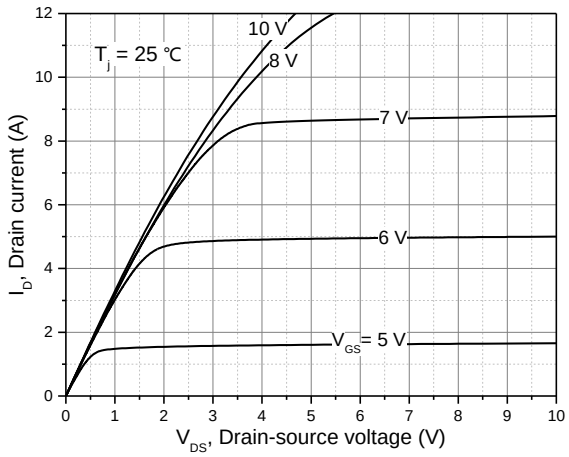



**Figure 1. Typ. output characteristics**

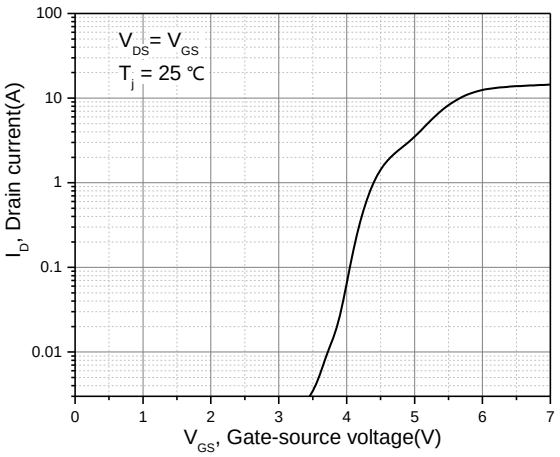



**Figure 2. Typ. transfer characteristics**

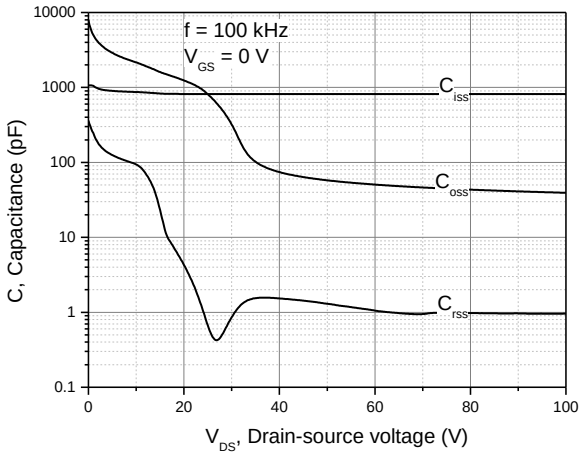



**Figure 3. Typ. capacitances**

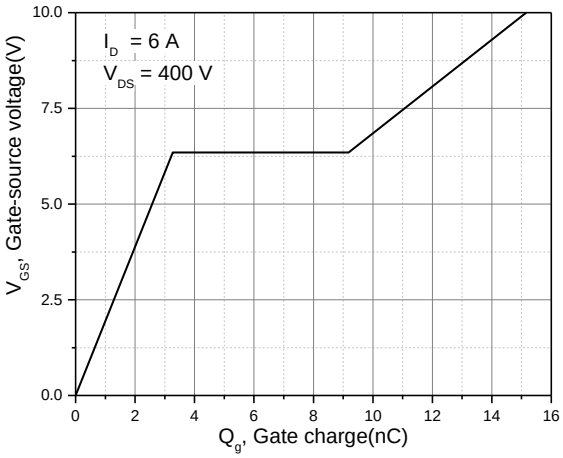



**Figure 4. Typ. gate charge**

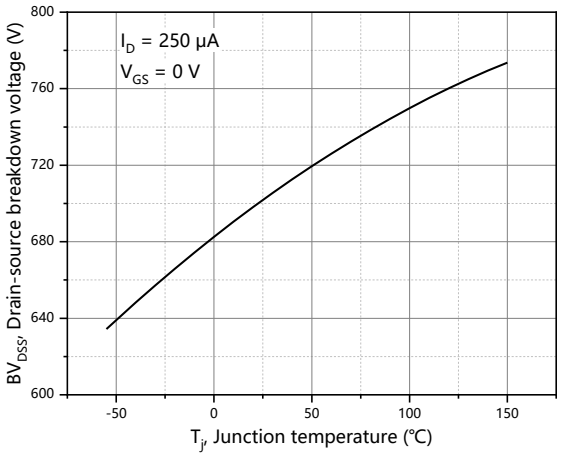



**Figure 5. Drain-source breakdown voltage**

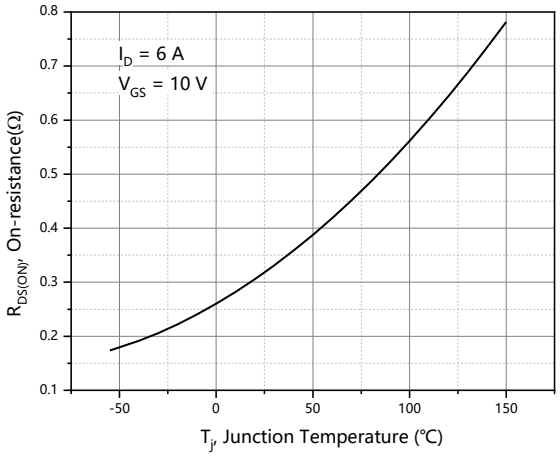



**Figure 6. Drain-source on-state resistance**

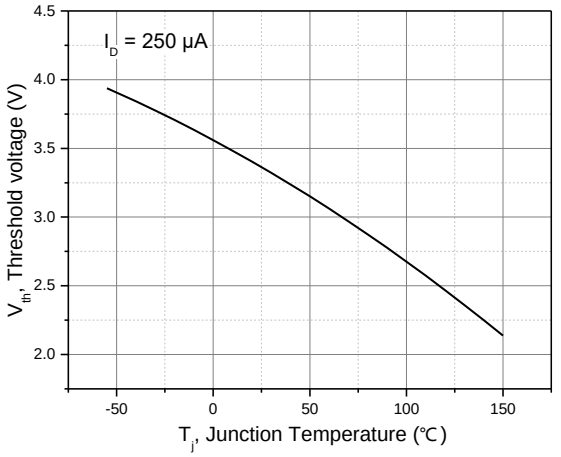



**Figure 7. Threshold voltage**

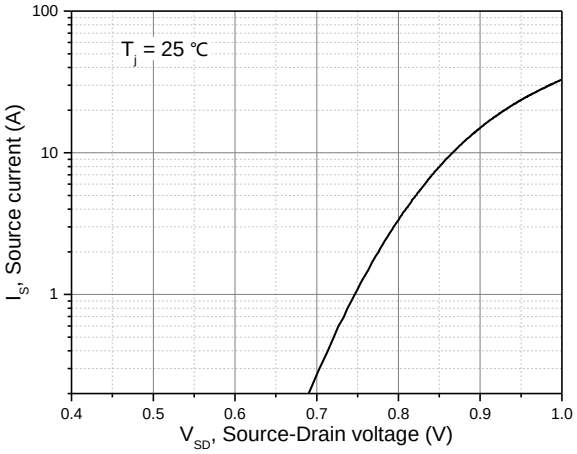



**Figure 8. Forward characteristic of body diode**

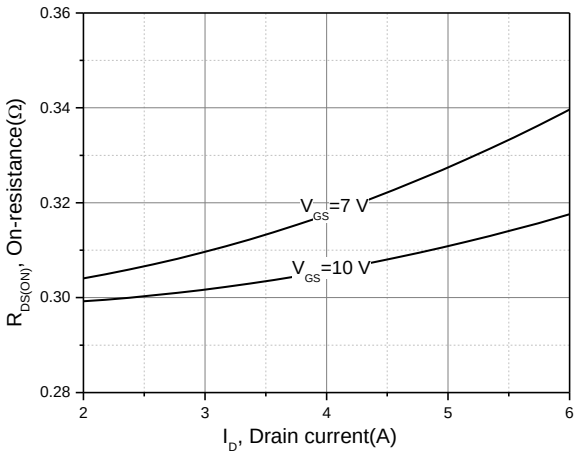



**Figure 9. Drain-source on-state resistance**

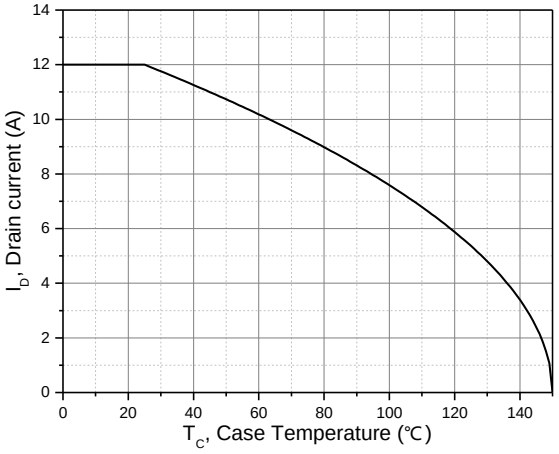



**Figure 10. Drain current**

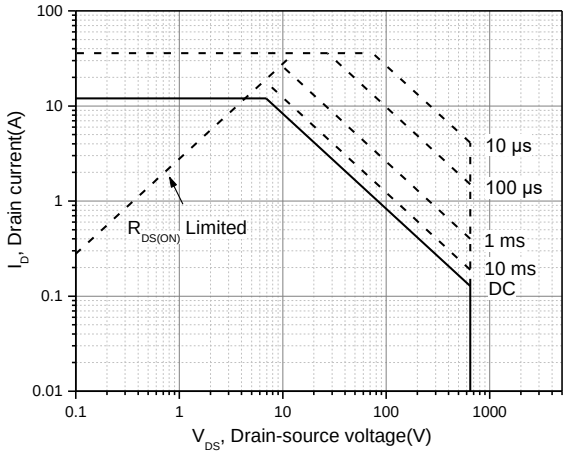



**Figure 11. Safe operation area $T_C$=25 °C**

## Test circuits and waveforms

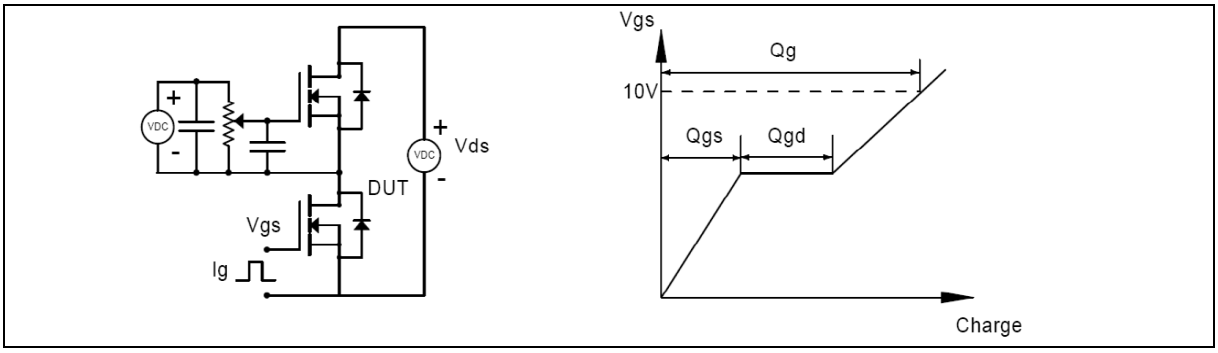



**Figure 1. Gate charge test circuit & waveform**

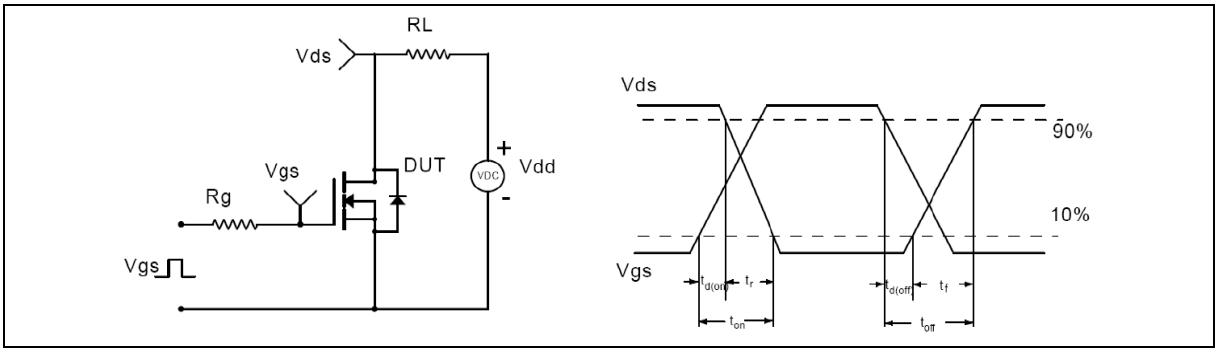



**Figure 2. Switching time test circuit & waveforms**

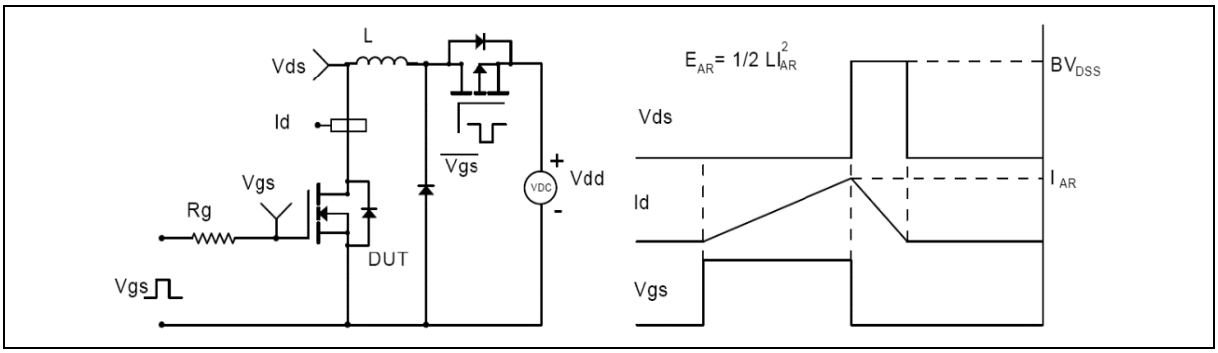



**Figure 3. Unclamped inductive switching (UIS) test circuit & waveforms**

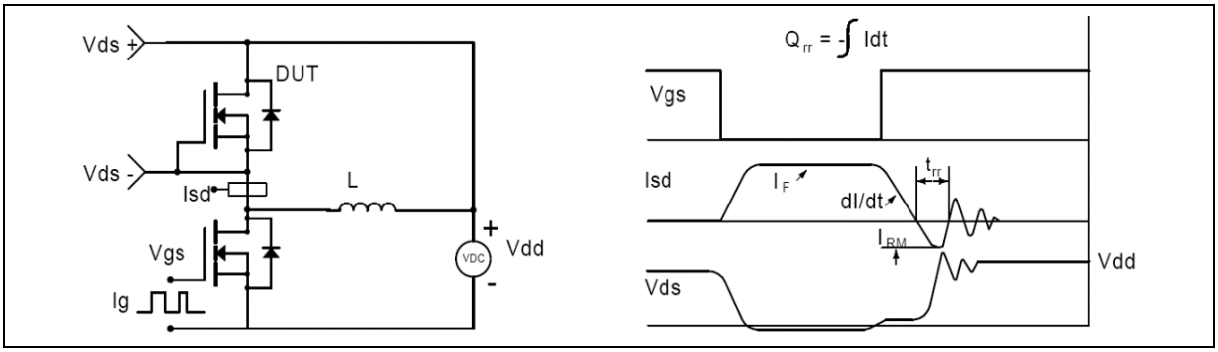
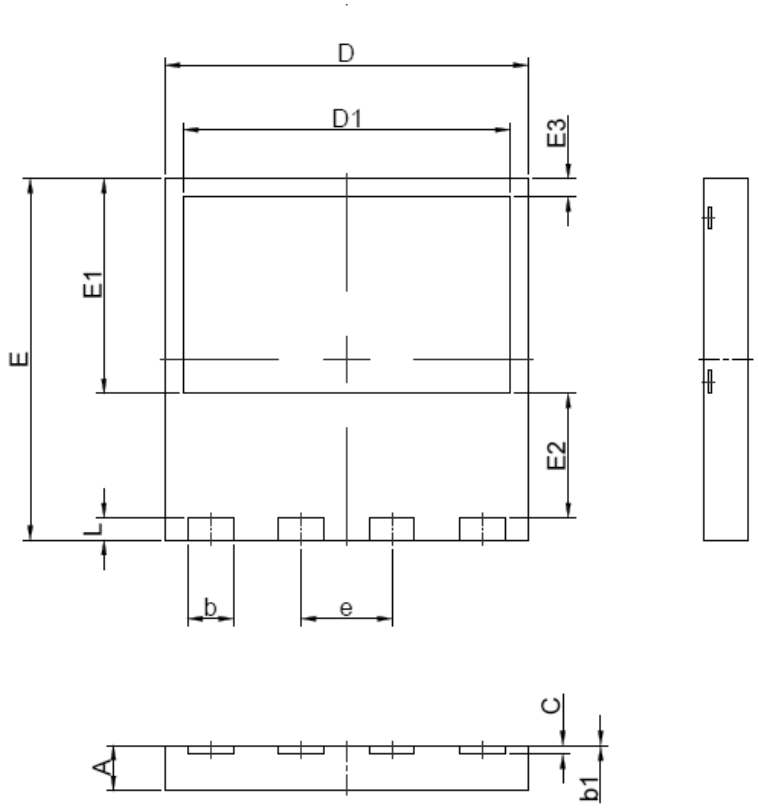



**Figure 4. Diode reverse recovery test circuit & waveforms**

## Package Information




| Symbol | mm | | |
|---|---|---|---|
| | Min | Nom | Max |
| A | 0.90 | 1.00 | 1.10 |
| b | 0.90 | 1.00 | 1.10 |
| b1 | 0.00 | 0.02 | 0.05 |
| C | 0.2 REF | | |
| D | 7.90 | 8.00 | 8.10 |
| D1 | 7.10 | 7.20 | 7.30 |
| E | 7.90 | 8.00 | 8.10 |
| E1 | 4.65 | 4.75 | 4.85 |
| E2 | 2.65 | 2.75 | 2.85 |
| E3 | 0.3 | 0.4 | 0.5 |
| e | 2.0 BSC | | |
| L | 0.4 | 0.5 | 0.6 |

Version 1: PDFN8*8-L package outline dimension

## Ordering Information

| Package Type | Units/ Reel | Reels/ Inner Box | Units/ Inner Box | Inner Boxes/ Carton Box | Units/ Carton Box |
|---|---|---|---|---|---|
| PDFN8*8-L | 2500 | 1 | 2500 | 10 | 25000 |

## Product Information

| Product | Package | Pb Free | RoHS | Halogen Free |
|---|---|---|---|---|
| OSG65R360JEF | PDFN8*8 | yes | yes | yes |

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