

## General Description

This MOSFET uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a wide variety of applications.

## Features

- Low gate charge
- 100% DVDS tested
- High power and current handling capability
- Lead free product is acquired

## Applications

- PWM applications
- Power mangement
- Load switch



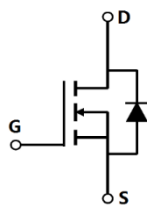
## Key Performance Parameters

| Parameter                      | Value | Unit       |
|--------------------------------|-------|------------|
| $V_{DS}$                       | 30    | V          |
| $R_{DS(ON), max} @ V_{GS}=10V$ | 2.1   | m $\Omega$ |

## Marking Information

| Product Name | Package    | Marking    |
|--------------|------------|------------|
| OSH03N019GF  | PDFN5X6-8L | OSH03N019G |

## Package & Pin information



**Absolute Maximum Ratings** at  $T_j=25^{\circ}\text{C}$  unless otherwise noted

| Parameter                                    | Symbol         | Value      | Unit               |
|----------------------------------------------|----------------|------------|--------------------|
| Drain-source voltage                         | $V_{DS}$       | 30         | V                  |
| Gate-source voltage                          | $V_{GS}$       | $\pm 20$   | V                  |
| Continuous Drain Current                     | $I_D$          | 150        | A                  |
| Pulsed Drain Current <sup>1)</sup>           | $I_{D,pulse}$  | 600        | A                  |
| Power Dissipation                            | $P_D$          | 79         | W                  |
| Single pulsed avalanche energy <sup>2)</sup> | $E_{AS}$       | 460        | mJ                 |
| Operation and storage temperature            | $T_{stg}, T_j$ | -55 to 150 | $^{\circ}\text{C}$ |

**Thermal Characteristics**

| Parameter                            | Symbol          | Value | Unit                 |
|--------------------------------------|-----------------|-------|----------------------|
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 1.58  | $^{\circ}\text{C/W}$ |

**Electrical Characteristics** at  $T_j=25^{\circ}\text{C}$  unless otherwise specified

| Parameter                        | Symbol       | Min. | Typ. | Max. | Unit             | Test condition                                  |
|----------------------------------|--------------|------|------|------|------------------|-------------------------------------------------|
| Drain-source breakdown voltage   | $BV_{DSS}$   | 30   |      |      | V                | $V_{GS}=0\text{ V}, I_D=250\text{ }\mu\text{A}$ |
| Gate threshold voltage           | $V_{GS(th)}$ | 1.0  |      | 2.5  | V                | $V_{DS}=V_{GS}, I_D=250\text{ }\mu\text{A}$     |
| Drain-source on-state resistance | $R_{DS(ON)}$ |      | 1.6  | 2.1  | $\text{m}\Omega$ | $V_{GS}=10\text{ V}, I_D=20\text{ A}$           |
| Drain-source on-state resistance | $R_{DS(ON)}$ |      | 2.4  | 3.2  | $\text{m}\Omega$ | $V_{GS}=4.5\text{ V}, I_D=20\text{ A}$          |
| Gate-source leakage current      | $I_{GSS}$    |      |      | 100  | nA               | $V_{GS}=20\text{ V}, V_{DS}=0\text{ V}$         |
|                                  |              |      |      | -100 |                  | $V_{GS}=-20\text{ V}, V_{DS}=0\text{ V}$        |
| Drain-source leakage current     | $I_{DSS}$    |      |      | 1    | $\mu\text{A}$    | $V_{DS}=30\text{ V}, V_{GS}=0\text{ V}$         |
| Gate resistance                  | $R_G$        |      | 1    |      | $\Omega$         | $f=1\text{ MHz}$ , Open drain                   |

### Dynamic Characteristics

| Parameter                    | Symbol       | Min. | Typ. | Max. | Unit | Test condition                                                                             |
|------------------------------|--------------|------|------|------|------|--------------------------------------------------------------------------------------------|
| Input capacitance            | $C_{iss}$    |      | 6510 |      | pF   | $V_{GS}=0\text{ V}$ ,<br>$V_{DS}=15\text{ V}$ ,<br>$f=1.0\text{ MHz}$                      |
| Output capacitance           | $C_{oss}$    |      | 737  |      | pF   |                                                                                            |
| Reverse transfer capacitance | $C_{rss}$    |      | 598  |      | pF   |                                                                                            |
| Turn-on delay time           | $t_{d(on)}$  |      | 21   |      | ns   | $V_{GS}=10\text{ V}$ ,<br>$V_{DS}=15\text{ V}$ ,<br>$R_G=3\ \Omega$ ,<br>$I_D=20\text{ A}$ |
| Rise time                    | $t_r$        |      | 18   |      | ns   |                                                                                            |
| Turn-off delay time          | $t_{d(off)}$ |      | 64   |      | ns   |                                                                                            |
| Fall time                    | $t_f$        |      | 16.5 |      | ns   |                                                                                            |

### Gate Charge Characteristics

| Parameter          | Symbol   | Min. | Typ. | Max. | Unit | Test condition                                                        |
|--------------------|----------|------|------|------|------|-----------------------------------------------------------------------|
| Total Gate Charge  | $Q_g$    |      | 115  |      | nC   | $V_{GS}=10\text{ V}$ ,<br>$V_{DS}=15\text{ V}$ ,<br>$I_D=20\text{ A}$ |
| Gate-Source Charge | $Q_{gs}$ |      | 15.4 |      | nC   |                                                                       |
| Gate-Drain Charge  | $Q_{gd}$ |      | 27.2 |      | nC   |                                                                       |

### Body Diode Characteristics

| Parameter                           | Symbol   | Min. | Typ. | Max. | Unit | Test condition                                          |
|-------------------------------------|----------|------|------|------|------|---------------------------------------------------------|
| Source drain current (Body Diode)   | $I_{SD}$ |      |      | 150  | A    | $T_A=25^\circ\text{C}$                                  |
| Diode forward voltage <sup>3)</sup> | $V_{SD}$ |      |      | 1.2  | V    | $I_S=20\text{ A}$ ,<br>$V_{GS}=0\text{ V}$              |
| Reverse recovery time               | $t_{rr}$ |      | 33   |      | ns   | $I_S=20\text{ A}$ ,<br>$di/dt=100\text{ A}/\mu\text{s}$ |
| Reverse recovery charge             | $Q_{rr}$ |      | 29   |      | nC   |                                                         |

**Note:** 1) Pulse width limited by maximum allowable junction temperature  
 2) EAS condition:  $V_{DD}=30\text{ V}$ ,  $V_{GS}=10\text{ V}$ ,  $L=0.3\text{ mH}$ , starting  $T_J=25^\circ\text{C}$   
 3) Repetitive Rating: Pulse width limited by maximum junction temperature.

## Electrical Characteristics Diagrams

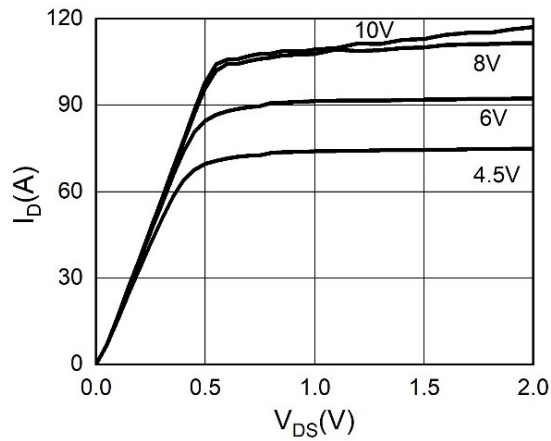


Figure 1. Typ. output characteristics

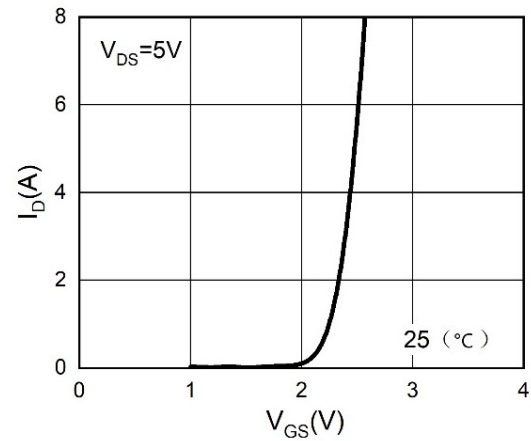


Figure 2. Typ. transfer characteristics

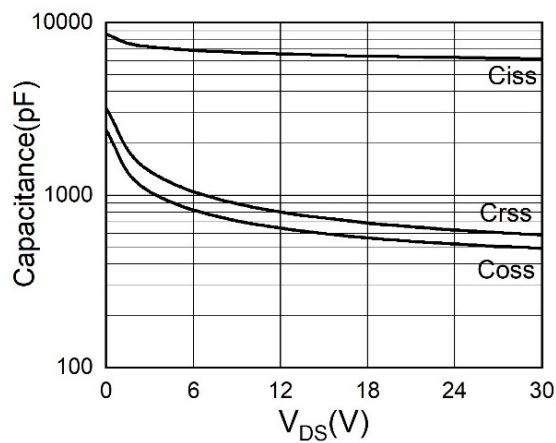


Figure 3. Capacitance

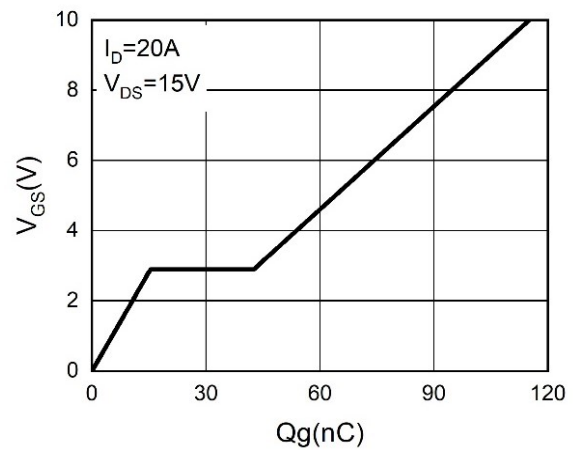


Figure 4. Gate charge waveforms

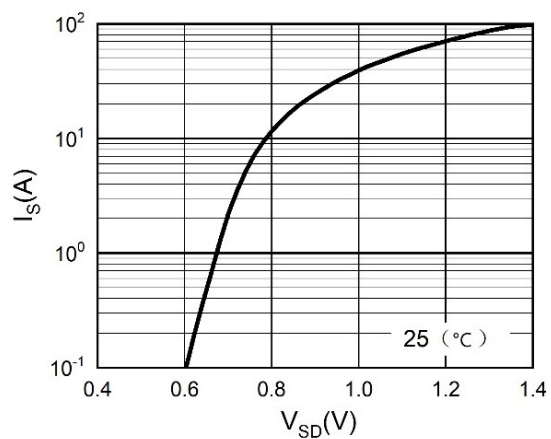


Figure 5. Body-Diode characteristics

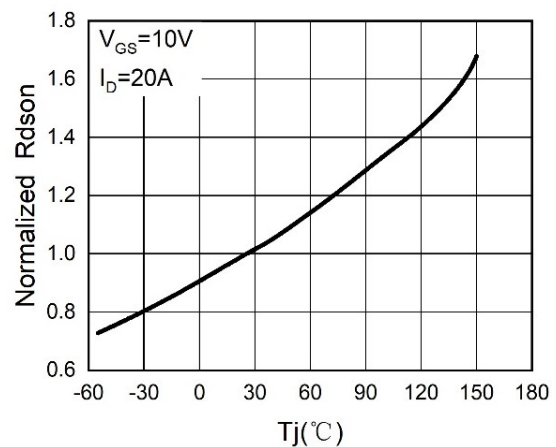
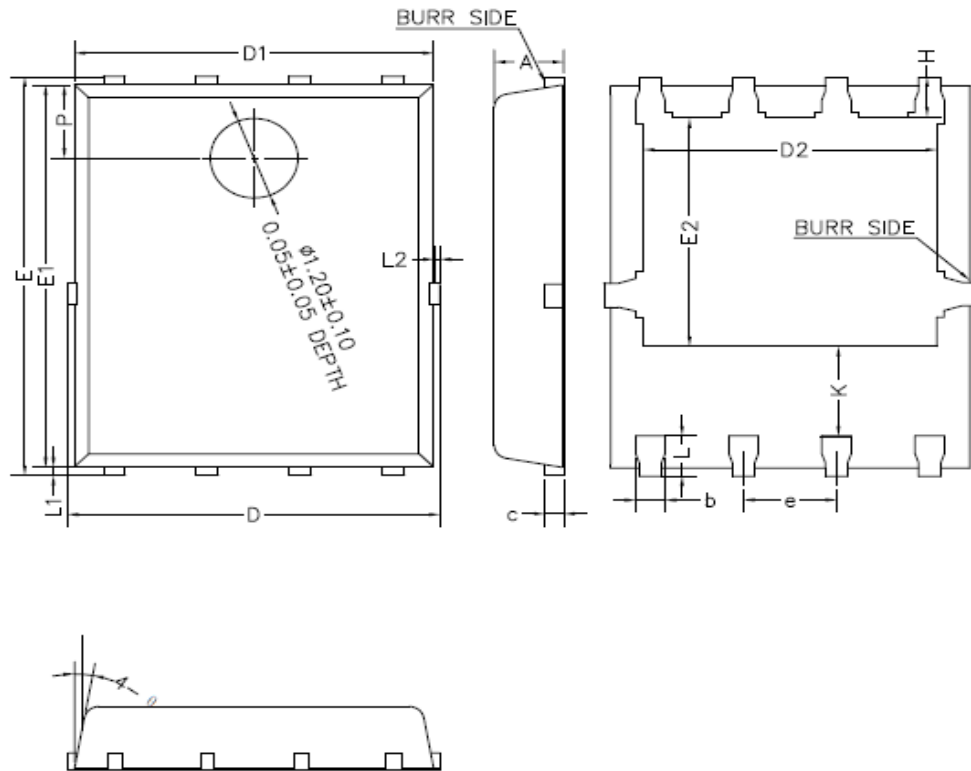


Figure 6.  $R_{DS(ON)}$  vs junction temperature

## Package Information



| Symbol   | mm    |       |       |
|----------|-------|-------|-------|
|          | Min.  | Typ.  | Max.  |
| A        | 1.000 | 1.100 | 1.200 |
| b        | 0.35  | 0.40  | 0.45  |
| c        | 0.21  | 0.25  | 0.34  |
| D        | -     | -     | 5.100 |
| D1       | 4.900 | 4.950 | 5.000 |
| D2       | 3.910 | 4.010 | 4.110 |
| e        | 1.17  | 1.27  | 1.37  |
| E        | 5.900 | 6.000 | 6.100 |
| E1       | 5.700 | 5.750 | 5.800 |
| E2       | 3.340 | 3.440 | 3.540 |
| H        | 0.510 | 0.610 | 0.710 |
| K        | 1.100 | -     | -     |
| L        | 0.510 | 0.610 | 0.710 |
| L1       | 0.060 | 0.130 | 0.200 |
| L2       | -     | -     | 0.150 |
| P        | 1.00  | 1.10  | 1.20  |
| $\theta$ | 8°    | 10°   | 12°   |

Version1: PDFN5X6-G package outline dimension

**Ordering Information**

| Package   | Units/<br>Reel | Reels/<br>Inner Box | Units/<br>Inner Box | Inner Boxes/<br>Carton Box | Units/<br>Carton Box |
|-----------|----------------|---------------------|---------------------|----------------------------|----------------------|
| PDFN5X6-G | 5000           | 2                   | 10000               | 6                          | 60000                |

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