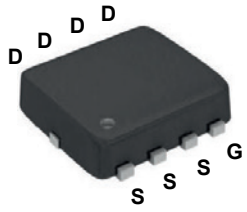
GOOD-ARK SEMICONDUCTOR

# GSGN2R803

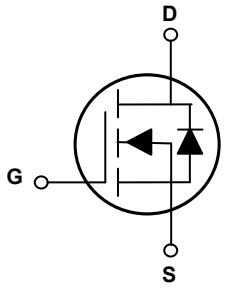
**30V N-Channel MOSFET**

## Main Product Characteristics

| | |
|---|---|
| $V_{(BR)DSS}$ | 30V |
| $R_{DS(ON)}$ | 2.8 mΩ (Max.) |
| $I_D$ | 50A |




PPAK3x3




Schematic Diagram

## Features and Benefits

- Advanced MOSFET process technology
- Ideal for high efficiency switched mode power supplies
- Low on-resistance with low gate charge
- Fast switching and reverse body recovery

## Description

The GSGN2R803 utilizes the latest techniques to achieve high cell density and low on-resistance. These features make this device extremely efficient and reliable for use in high efficiency switch mode power supplies and a wide variety of other applications.

## Absolute Maximum Ratings ($T_J$=25°C unless otherwise specified)

| Parameter | Symbol | Parameter | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 30 | V |
| Gate-to-Source Voltage | $V_{GS}$ | ±20 | V |
| Continuous Drain Current, @ Steady-State ($T_C$=25°C) | $I_D$ | 50 | A |
| Continuous Drain Current, @ Steady-State ($T_C$=100°C) | | 36 | A |
| Pulsed Drain Current[2] | $I_{DM}$ | 200 | A |
| Power Dissipation ($T_C$=25°C)[3] | $P_D$ | 50 | W |
| | | 0.40 | W/°C |
| Single Pulse Avalanche Energy[1] | $E_{AS}$ | 100 | mJ |
| Single Pulse Avalanche Current | $I_{AS}$ | 20 | A |
| Junction-to-Ambient (PCB Mounted, Steady-State) | $R_{\theta JA}$ | 50 | °C/W |
| Junction-to-Case | $R_{\theta JC}$ | 2.5 | °C/W |
| Operating Junction and Storage Temperature Range | $T_J/T_{STG}$ | -55 to +150 | °C |
| Soldering Temperature | $T_{sold}$ | 260 | °C |

## Electrical Characteristics ($T_J$=25°C unless otherwise specified)

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **On / Off Characteristics** | | | | | | |
| Drain-to-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$=0V, $I_D$=250μA | 30 | - | - | V |
| Drain-to-Source Leakage Current | $I_{DSS}$ | $V_{DS}$=30V, $V_{GS}$=0V, $T_J$=25°C | - | - | 1.0 | μA |
| | | $V_{DS}$=30V, $V_{GS}$=0V, $T_J$=125°C | - | 2.5 | - | |
| Static Drain-to-Source On-Resistance | $R_{DS(ON)}$ | $V_{GS}$=10V, $I_D$=20A | - | 2.2 | 2.8 | mΩ |
| | | $V_{GS}$=4.5V, $I_D$=20A | - | 3.3 | 4.4 | |
| Gate-to-Source Forward Leakage | $I_{GSS}$ | $V_{DS}$=0V, $V_{GS}$=±20V | - | - | ±100 | nA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$, $I_D$=250μA | 1.2 | - | 2.8 | V |
| **Dynamic and Switching Characteristics** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$=0V, $V_{DS}$=15V, $f$=1MHz | - | 1809 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 582 | - | |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 35 | - | |
| Total Gate Charge[4,5] | $Q_g$ | $I_D$=20A, $V_{DD}$=15V, $V_{GS}$=10V | - | 27 | - | nC |
| Gate-to-Source Charge[4,5] | $Q_{gs}$ | | - | 6.6 | - | |
| Gate-to-Drain ("Miller") Charge[4,5] | $Q_{gd}$ | | - | 3.1 | - | |
| Gate to Plateau[4,5] | $V_{plateau}$ | | - | 3.4 | - | V |
| Turn-on Delay Time[4,5] | $t_{d(on)}$ | $V_{DD}$=20V, $V_{GS}$=10V, $R_G$=3Ω, $I_D$=20A | - | 6.0 | - | nS |
| Rise Time[4,5] | $t_r$ | | - | 32 | - | |
| Turn-Off Delay Time[4,5] | $t_{d(off)}$ | | - | 36 | - | |
| Fall Time[4,5] | $t_f$ | | - | 13 | - | |
| Gate Resistance | $R_g$ | $f$=1MHz | - | 4.2 | - | Ω |
| **Source-Drain Ratings and Characteristics** | | | | | | |
| Continuous Source Current (Body Diode) | $I_S$ | MOSFET symbol showing the integral reverse p-n junction diode. | - | - | 50 | A |
| Diode Pulse Current | $I_{S.pulse}$ | | - | - | 200 | A |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=10A, $V_{GS}$=0V | - | - | 1.4 | V |
| Reverse Recovery Time[4] | $T_{rr}$ | $I_S$=20A, $V_{GS}$=0V, $V_R$=30V, $dI_F/dt$=100A/us | - | 37 | - | nS |
| Reverse Recovery Charge[4] | $Q_{rr}$ | | - | 23 | - | nC |

Notes:

1. L=0.1mH, $V_{DD}$=24V, $R_G$=25Ω, starting temperature $T_J$=25°C.
2. Pulse time of 5μs.
3. The dissipated power value will change with the temperature. When it is greater than 25°C, the dissipated power value will decrease by 0.55°C/W for every 1 degree of temperature increase.
4. Pulse test: Pulse width ≤ 300μs, duty cycle ≤ 2%.
5. Basically unaffected by operating temperature.

## Typical Electrical and Thermal Characteristic Curves

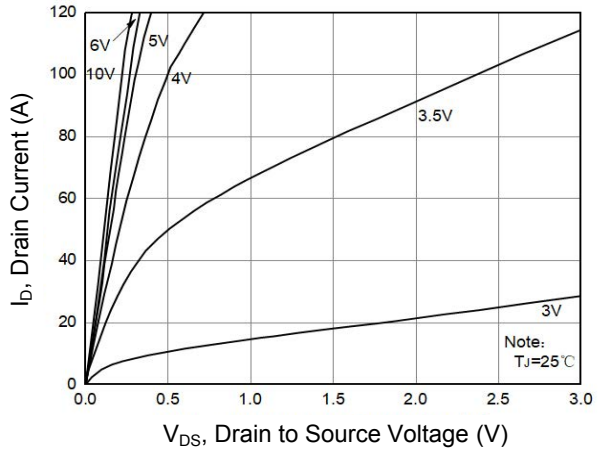



**Figure 1. Output Characteristics**

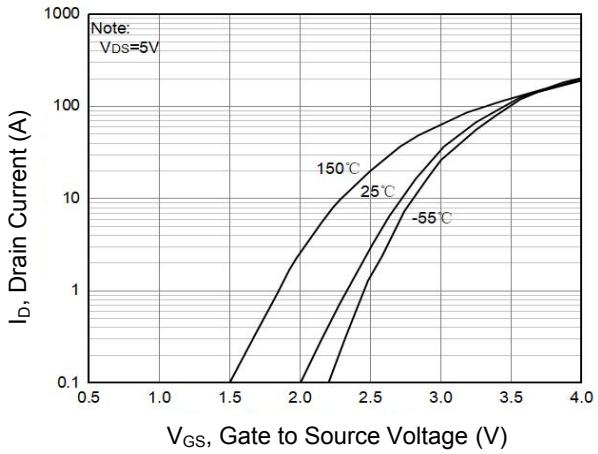



**Figure 2. Transfer Characteristics**

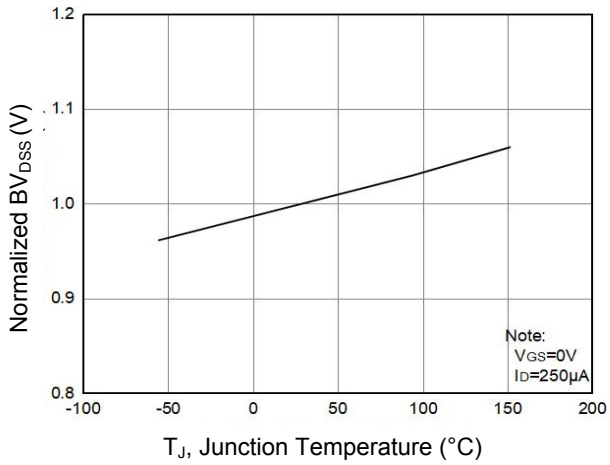



**Figure 3. Normalized $BV_{DSS}$ Vs. $T_J$**

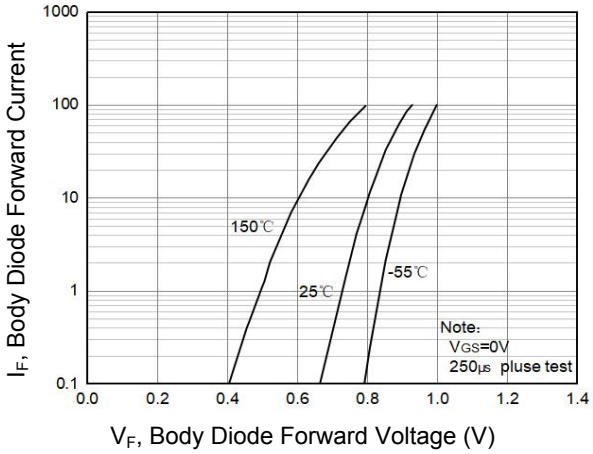



**Figure 4. Body Diode Characteristics**

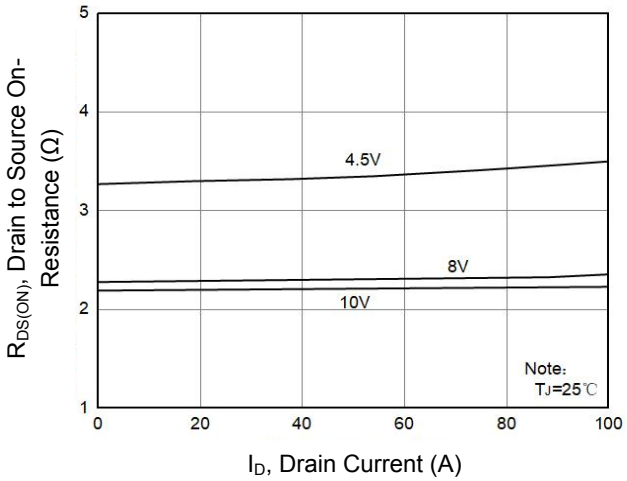



**Figure 5. $R_{DS(ON)}$ Vs. Drain Current**

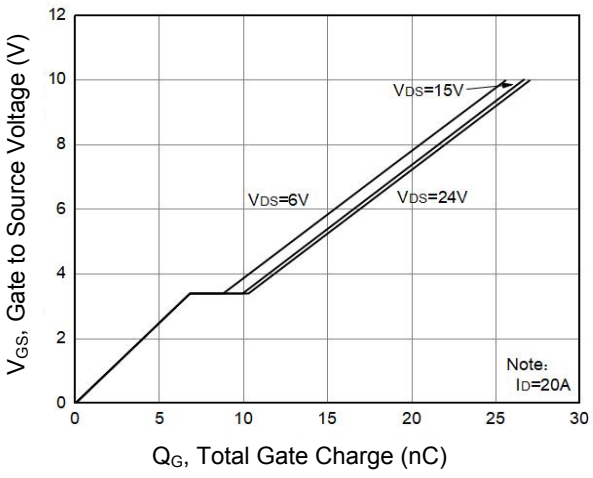



**Figure 6. Gate Charge**

## Typical Electrical and Thermal Characteristic Curves

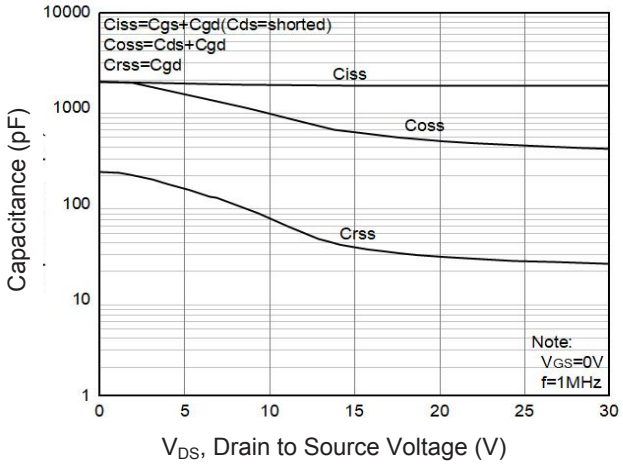



**Figure 7. Capacitance Characteristics**

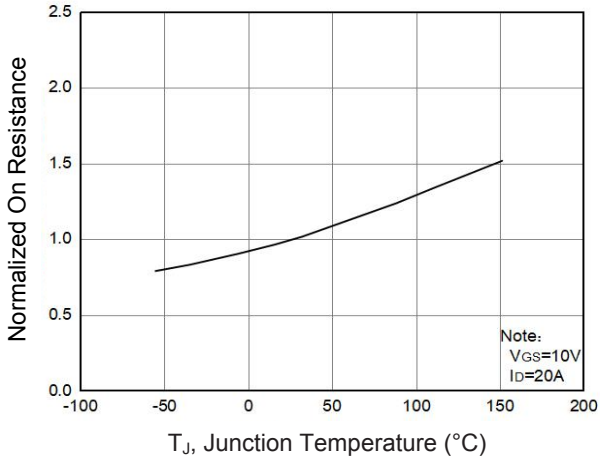



**Figure 8. Normalized $R_{DS(ON)}$ Vs. $T_J$**

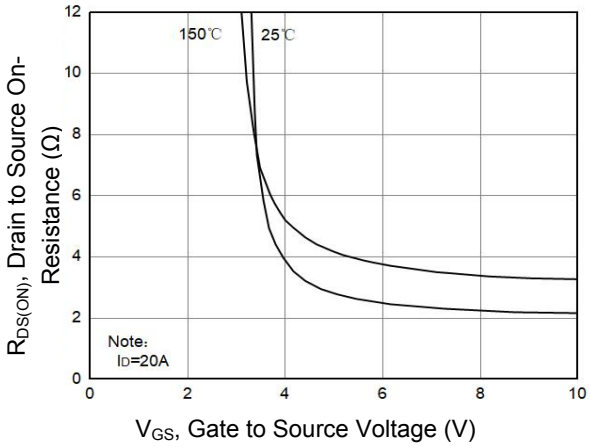



**Figure 9. $R_{DS(on)}$ vs. Gate to Source Voltage**

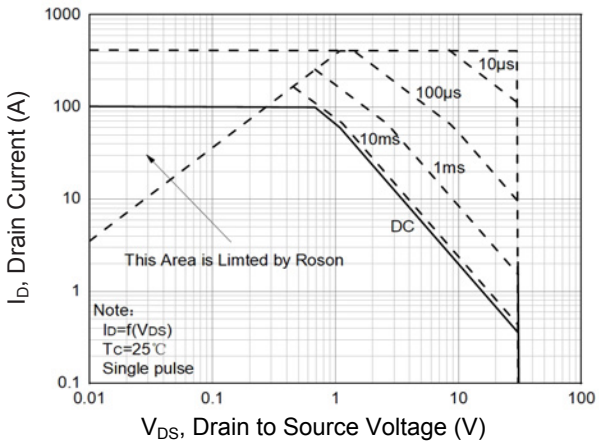
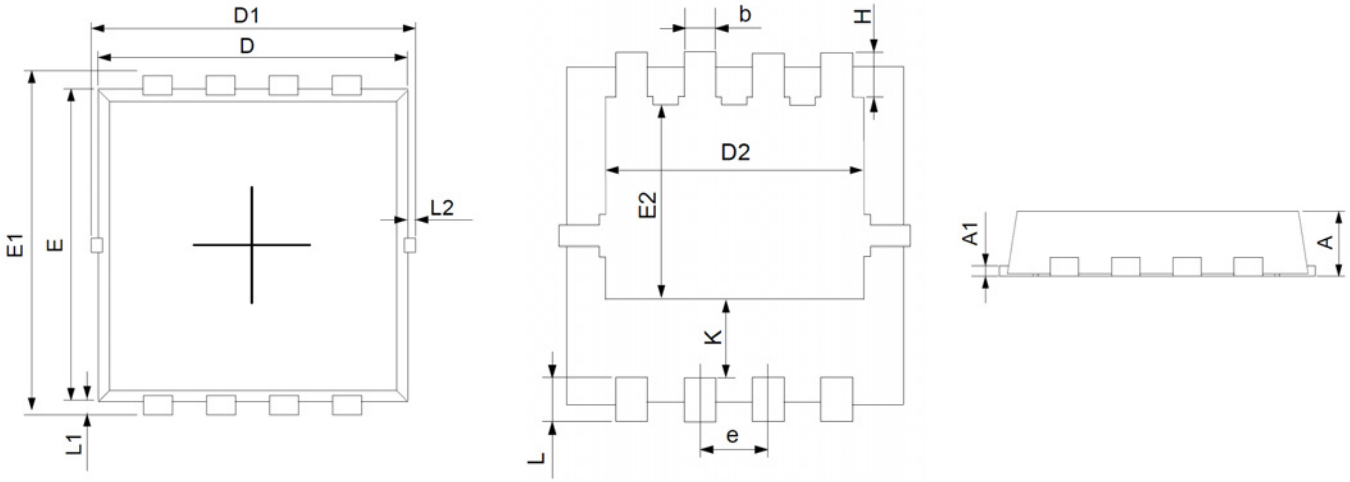



**Figure 10. Safe Operation Area**

## Package Outline Dimensions (PPAK3x3)




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 0.700 | 0.900 | 0.028 | 0.035 |
| A1 | 0.140 | 0.200 | 0.006 | 0.008 |
| D | 3.050 | 3.250 | 0.120 | 0.128 |
| E | 2.900 | 3.100 | 0.114 | 0.122 |
| D1 | 3.100 | 3.500 | 0.122 | 0.138 |
| D2 | 2.350 | 2.500 | 0.093 | 0.098 |
| E1 | 3.100 | 3.500 | 0.122 | 0.138 |
| E2 | 1.640 | 1.840 | 0.065 | 0.072 |
| b | 0.250 | 0.350 | 0.010 | 0.014 |
| k | 0.590 | 0.790 | 0.023 | 0.031 |
| e | 0.550 | 0.750 | 0.022 | 0.030 |
| E4 | 3.340 | 3.920 | 0.131 | 0.154 |
| L | 0.250 | 0.550 | 0.010 | 0.022 |
| L1 | 0.100 | 0.200 | 0.004 | 0.008 |
| H | 0.320 | 0.520 | 0.013 | 0.020 |

## Order Information

| Device | Package | Marking | Carrier | Quantity |
|---|---|---|---|---|
| GSGN2R803 | PPAK3x3 | N2R803 | Tape & Reel | 5,000pcs / Reel |