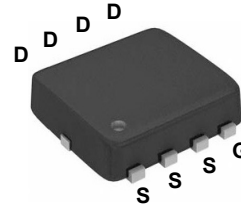
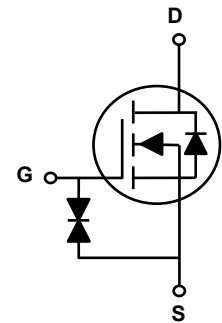


## Main Product Characteristics

|              |              |
|--------------|--------------|
| $BV_{DSS}$   | 100V         |
| $R_{DS(ON)}$ | 40m $\Omega$ |
| $I_D$        | 16A          |



PPAK 3x3



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 GSFN1016 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<sub>C</sub>=25°C unless otherwise specified)

| Parameter  | Symbol          | Value       | Unit |
|--|-----------------|-------------|------|
| Drain-Source Voltage                               | $V_{DS}$        | 100         | V    |
| Gate-Source Voltage                                | $V_{GS}$        | ±20         | V    |
| Drain Current - Continuous (T <sub>C</sub> =25°C)  | $I_D$           | 16          | A    |
| Drain Current - Continuous (T <sub>C</sub> =100°C) |                 | 10          |      |
| Drain Current-Pulsed <sup>1</sup>                  | $I_{DM}$        | 64          | A    |
| Power Dissipation (T <sub>C</sub> =25°C)           | $P_D$           | 29.5        | W    |
| Power Dissipation-Derate above 25°C                |                 | 0.24        |      |
| Max. Thermal Resistance, Junction-to-Ambient       | $R_{\theta JA}$ | 62          | °C/W |
| Max. Thermal Resistance Junction to Case           | $R_{\theta JC}$ | 4.24        | °C/W |
| Operating Junction Temperature Range               | $T_J$           | -55 To +150 | °C   |
| Storage Temperature Range                          | $T_{STG}$       | -55 To +150 | °C   |

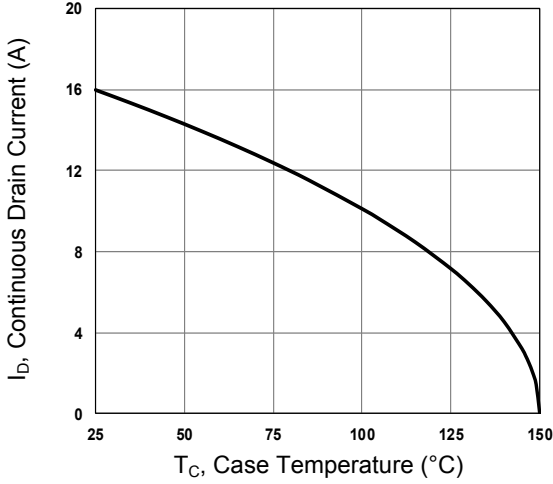
**Electrical Characteristics** ( $T_J=25^\circ\text{C}$  unless otherwise specified)

| Parameter   | Symbol       | Conditions                                    | Min. | Typ. | Max.     | Unit       |
|---|--------------|---|------|------|----------|------------|
| <b>On/Off Characteristics</b>                                 |              |   |      |      |          |            |
| Drain-Source Breakdown Voltage                                | $BV_{DSS}$   | $V_{GS}=0V, I_D=250\mu A$                     | 100  | -    | -        | V          |
| Drain-Source Leakage Current                                  | $I_{DSS}$    | $V_{DS}=80V, V_{GS}=0V, T_J=25^\circ\text{C}$ | -    | -    | 1        | $\mu A$    |
|   |              | $V_{DS}=80V, V_{GS}=0V, T_J=85^\circ\text{C}$ | -    | -    | 10       | $\mu A$    |
| Gate-Source Leakage Current                                   | $I_{GSS}$    | $V_{GS}=\pm 20V, V_{DS}=0V$                   | -    | -    | $\pm 20$ | $\mu A$    |
| Static Drain-Source On-Resistance                             | $R_{DS(ON)}$ | $V_{GS}=10V, I_D=10A$                         | -    | 34   | 40       | m $\Omega$ |
| Gate Threshold Voltage  | $V_{GS(th)}$ | $V_{GS}=V_{DS}, I_D=250\mu A$                 | 2.5  | -    | 4.0      | V          |
| <b>Dynamic and Switching Characteristics</b>                  |              |   |      |      |          |            |
| Total Gate Charge <sup>2</sup>                                | $Q_g$        | $V_{DS}=50V, I_D=8A, V_{GS}=10V$              | -    | 5.6  | 12       | nC         |
| Gate-Source Charge <sup>2</sup>                               | $Q_{gs}$     |   | -    | 1.2  | 2.5      |            |
| Gate-Drain Charge <sup>2</sup>                                | $Q_{gd}$     |   | -    | 1.7  | 3.5      |            |
| Turn-On Delay Time <sup>2</sup>                               | $t_{d(on)}$  | $V_{DD}=50V, R_G=6\Omega, V_{GS}=10V, I_D=8A$ | -    | 4.5  | 10       | nS         |
| Rise Time <sup>2</sup>  | $t_r$        |   | -    | 8    | 16       |            |
| Turn-Off Delay Time <sup>2</sup>                              | $t_{d(off)}$ |   | -    | 12   | 24       |            |
| Fall Time <sup>2</sup>  | $t_f$        |   | -    | 10   | 20       |            |
| Input Capacitance <sup>2</sup>                                | $C_{iss}$    | $V_{DS}=50V, V_{GS}=0V, F=1\text{MHz}$        | -    | 295  | 600      | pF         |
| Output Capacitance <sup>2</sup>                               | $C_{oss}$    |   | -    | 84   | 170      |            |
| Reverse Transfer Capacitance <sup>2</sup>                     | $C_{rss}$    |   | -    | 6    | 12       |            |
| Gate Resistance <sup>2</sup>                                  | $R_g$        | $V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$         | -    | 0.4  | -        | $\Omega$   |
| <b>Drain-Source Diode Characteristics and Maximum Ratings</b> |              |   |      |      |          |            |
| Continuous Source Current                                     | $I_S$        | $V_G=V_D=0V, \text{Force Current}$            | -    | -    | 16       | A          |
| Pulsed Source Current   | $I_{SM}$     |   | -    | -    | 32       | A          |
| Diode Forward Voltage   | $V_{SD}$     | $V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$     | -    | -    | 1        | V          |

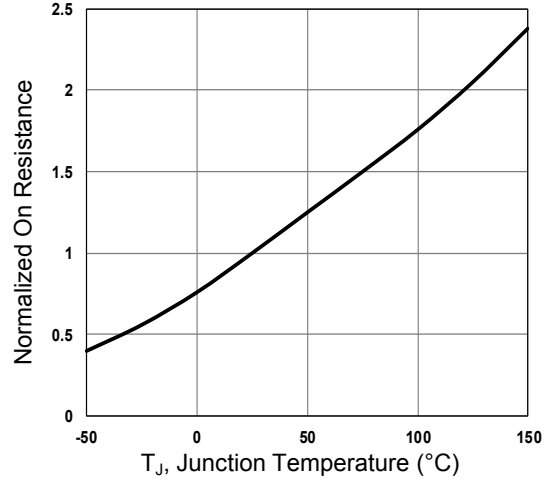
Notes:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2. Essentially independent of operation temperature.

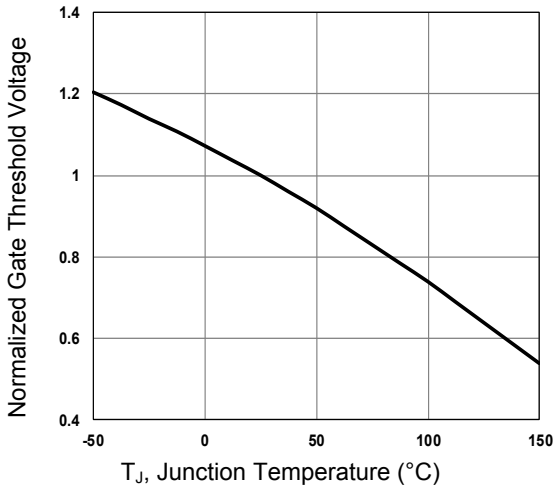
**Typical Electrical and Thermal Characteristic Curves**



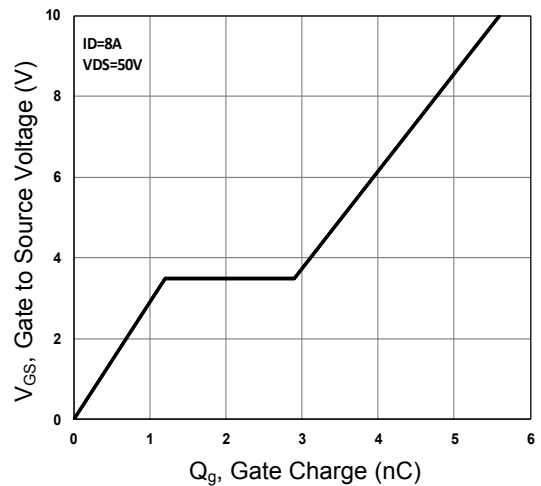
**Figure 1. Continuous Drain Current vs.  $T_C$**



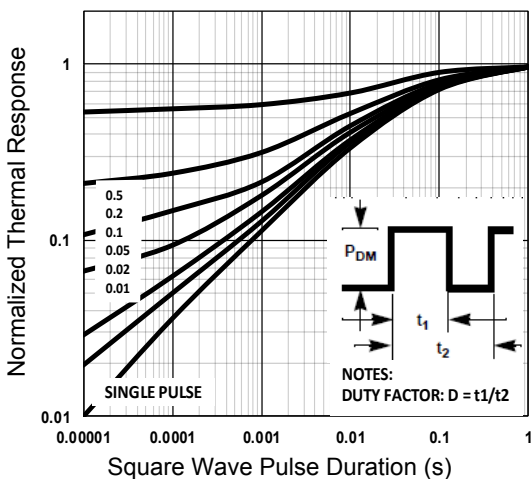
**Figure 2. Normalized  $R_{DSON}$  vs.  $T_J$**



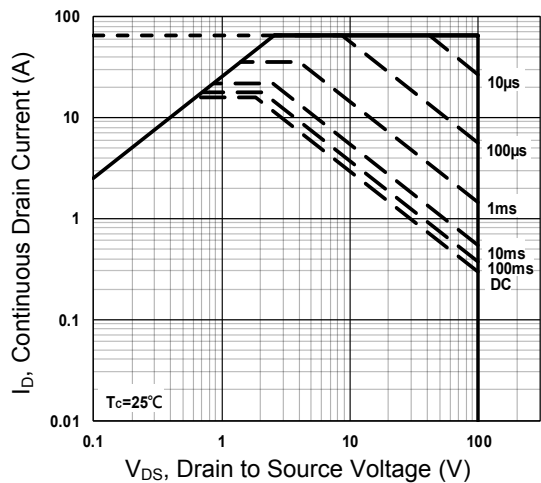
**Figure 3. Normalized  $V_{th}$  vs.  $T_J$**



**Figure 4. Gate Charge Waveform**



**Figure 5. Normalized Transient Impedance**



**Figure 6. Maximum Safe Operation Area**

### Typical Electrical and Thermal Characteristic Curves

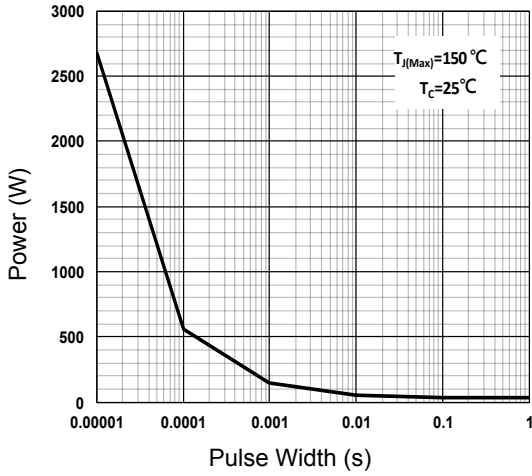
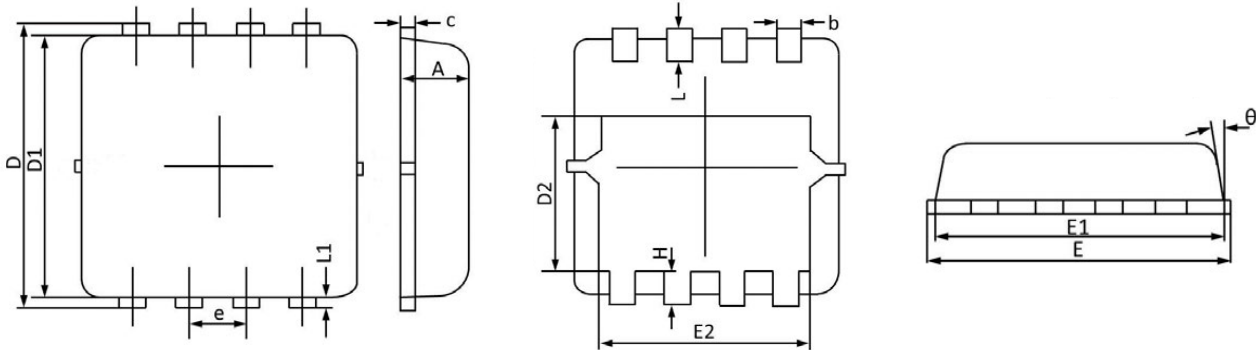


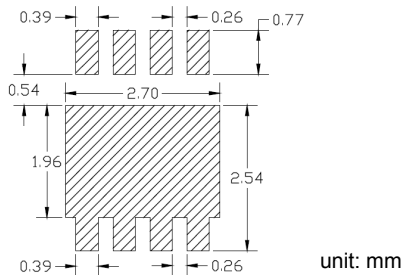
Figure 7. Single Pulse Power Rating

**Package Outline Dimensions (PPAK3x3)**



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 0.700                     | 0.900 | 0.028                | 0.035 |
| b      | 0.250                     | 0.350 | 0.010                | 0.014 |
| c      | 0.100                     | 0.250 | 0.004                | 0.010 |
| D      | 3.050                     | 3.500 | 0.120                | 0.138 |
| D1     | 2.900                     | 3.200 | 0.114                | 0.126 |
| D2     | 1.350                     | 1.950 | 0.053                | 0.077 |
| E      | 3.000                     | 3.400 | 0.118                | 0.134 |
| E1     | 2.900                     | 3.300 | 0.114                | 0.130 |
| E2     | 2.350                     | 2.600 | 0.093                | 0.102 |
| e      | 0.65BSC                   |       | 0.026BSC             |       |
| H      | 0.300                     | 0.750 | 0.012                | 0.030 |
| L      | 0.300                     | 0.600 | 0.012                | 0.024 |
| L1     | 0.060                     | 0.200 | 0.002                | 0.008 |
| θ      | 6°                        | 14°   | 6°                   | 14°   |

**Recommended Pad Layout**



**Order Information**

| Device   | Package | Marking | Packaging   | SPQ              |
|----------|---------|---------|-------------|------------------|
| GSFN1016 | PPAK3x3 | 09F0BHZ | Tape & Reel | 3,000 Pcs / Reel |

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