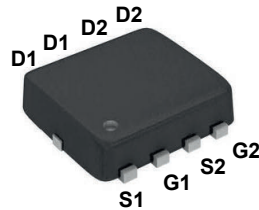
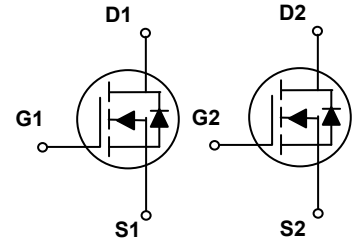


### Main Product Characteristics

|               |                     |
|---------------|---------------------|
| $V_{(BR)DSS}$ | 40V                 |
| $R_{DS(ON)}$  | 22m $\Omega$ (Max.) |
| $I_D$         | 8A                  |



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
- AEC-Q101 qualified



### Description

The GSFN4820AU 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 ( $T_A=25^{\circ}\text{C}$ unless otherwise specified)

| Parameter                                             | Symbol          | Max.        | Unit                        |
|-------------------------------------------------------|-----------------|-------------|-----------------------------|
| Drain-Source Voltage                                  | $V_{DS}$        | 40          | V                           |
| Gate-Source Voltage                                   | $V_{GS}$        | $\pm 20$    | V                           |
| Drain Current-Continuous ( $T_A=25^{\circ}\text{C}$ ) | $I_D$           | 8           | A                           |
| Drain Current-Continuous ( $T_A=70^{\circ}\text{C}$ ) |                 | 6.3         |                             |
| Drain Current-Pulsed <sup>1</sup>                     | $I_{DM}$        | 32          | A                           |
| Single Pulse Avalanche Energy <sup>2</sup>            | $E_{AS}$        | 4.9         | mJ                          |
| Single Pulse Avalanche Current <sup>2</sup>           | $I_{AS}$        | 10          | A                           |
| Power Dissipation ( $T_A=25^{\circ}\text{C}$ )        | $P_D$           | 29          | W                           |
| Power Dissipation-De-rate above 25 $^{\circ}\text{C}$ |                 | 0.2         | W/ $^{\circ}\text{C}$       |
| Thermal Resistance, Junction-to-Case                  | $R_{\theta JC}$ | 5.18        | $^{\circ}\text{C}/\text{W}$ |
| Operating Junction Temperature Range                  | $T_J$           | -50 To +175 | $^{\circ}\text{C}$          |
| Storage Temperature Range                             | $T_{STG}$       | -50 To +175 | $^{\circ}\text{C}$          |

**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                  | $BV_{DSS}$   | $V_{GS}=0V, I_D=250\mu A$                                        | 40   | -    | -         | V          |
| Drain-Source Leakage Current                    | $I_{DSS}$    | $V_{DS}=40V, V_{GS}=0V, T_J=25^{\circ}\text{C}$                  | -    | -    | 1         | $\mu A$    |
|                                                 |              | $V_{DS}=32V, V_{GS}=0V, T_J=125^{\circ}\text{C}$                 | -    | -    | 10        | $\mu A$    |
| Gate-Source Leakage Current                     | $I_{GSS}$    | $V_{GS}=\pm 20V, V_{DS}=0V$                                      | -    | -    | $\pm 100$ | nA         |
| Static Drain-Source On-Resistance               | $R_{DS(ON)}$ | $V_{GS}=10V, I_D=3A$                                             | -    | 17   | 22        | m $\Omega$ |
|                                                 |              | $V_{GS}=4.5V, I_D=2A$                                            | -    | 20   | 26        |            |
| Gate Threshold Voltage                          | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$                                    | 1.1  | 1.6  | 2.8       | V          |
| Forward Transconductance                        | $g_{fs}$     | $V_{DS}=10V, I_D=1A$                                             | -    | 4.5  | -         | S          |
| <b>Dynamic and Switching Characteristics</b>    |              |                                                                  |      |      |           |            |
| Total Gate Charge <sup>2,3</sup>                | $Q_g$        | $V_{DS}=32V, I_D=3A, V_{GS}=10V$                                 | -    | 10.8 | -         | nC         |
| Gate-Source Charge <sup>2,3</sup>               | $Q_{gs}$     |                                                                  | -    | 1.6  | -         |            |
| Gate-Drain Charge <sup>2,3</sup>                | $Q_{gd}$     |                                                                  | -    | 3.3  | -         |            |
| Turn-On Delay Time <sup>2,3</sup>               | $t_{d(on)}$  | $V_{DD}=15V, R_G=3.3\Omega, V_{GS}=10V, I_D=1A$                  | -    | 3.8  | -         | nS         |
| Rise Time <sup>2,3</sup>                        | $t_r$        |                                                                  | -    | 10.5 | -         |            |
| Turn-Off Delay Time <sup>2,3</sup>              | $t_{d(off)}$ |                                                                  | -    | 22.2 | -         |            |
| Fall Time <sup>2,3</sup>                        | $t_f$        |                                                                  | -    | 6.6  | -         |            |
| Input Capacitance                               | $C_{iss}$    | $V_{DS}=25V, V_{GS}=0V, F=1\text{MHz}$                           | -    | 800  | -         | pF         |
| Output Capacitance                              | $C_{oss}$    |                                                                  | -    | 71   | -         |            |
| Reverse Transfer Capacitance                    | $C_{rss}$    |                                                                  | -    | 110  | -         |            |
| Gate Resistance                                 | $R_g$        | $V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$                            | -    | 2.6  | -         | $\Omega$   |
| <b>Source-Drain Ratings and Characteristics</b> |              |                                                                  |      |      |           |            |
| Continuous Source Current                       | $I_S$        | $V_G=V_D=0V,$<br>Force Current                                   | -    | -    | 30        | A          |
| Pulsed Source Current                           | $I_{SM}$     |                                                                  | -    | -    | 120       | A          |
| Diode Forward Voltage                           | $V_{SD}$     | $V_{GS}=0V, I_S=1A, T_J=25^{\circ}\text{C}$                      | -    | -    | 1         | V          |
| Reverse Recovery Time                           | $T_{rr}$     | $V_R=30V, I_S=8A,$<br>$di/dt=100A/\mu s, T_J=25^{\circ}\text{C}$ | -    | 33   | -         | nS         |
| Reverse Recovery Charge                         | $Q_{rr}$     |                                                                  | -    | 12   | -         | nC         |

Notes:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2.  $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=9.9A, R_G=25\Omega$ , Starting  $T_J=25^{\circ}\text{C}$ .
3. The data tested by pulsed, pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .

## Typical Electrical and Thermal Characteristic Curves

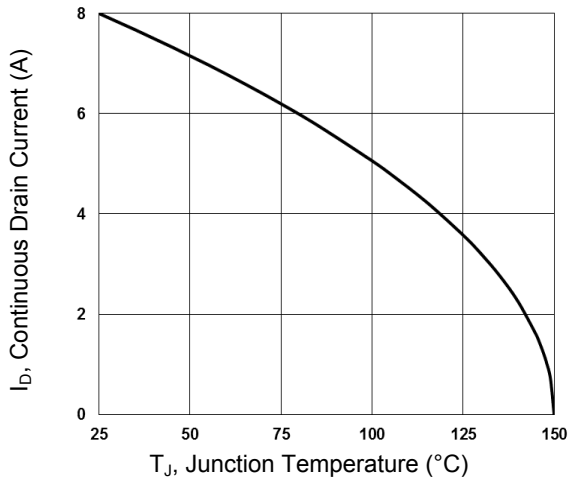


Figure 1. Continuous Drain Current vs.  $T_J$

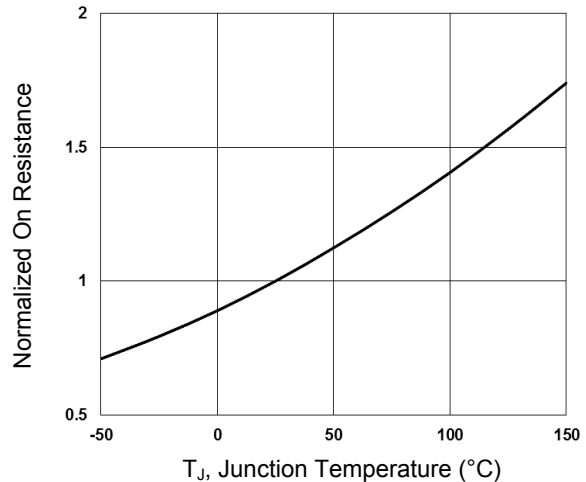


Figure 2. Normalized  $R_{DS(ON)}$  vs.  $T_J$

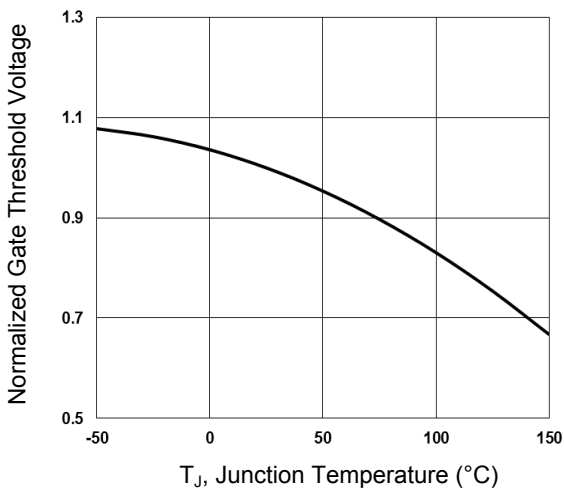


Figure 3. Normalized  $V_{th}$  vs.  $T_J$

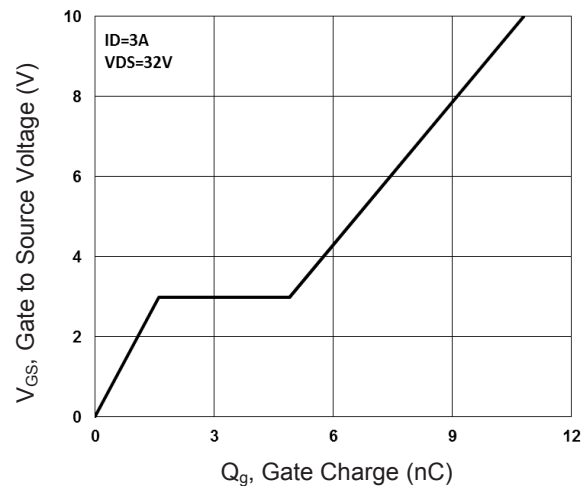


Figure 4. Gate Charge Waveform

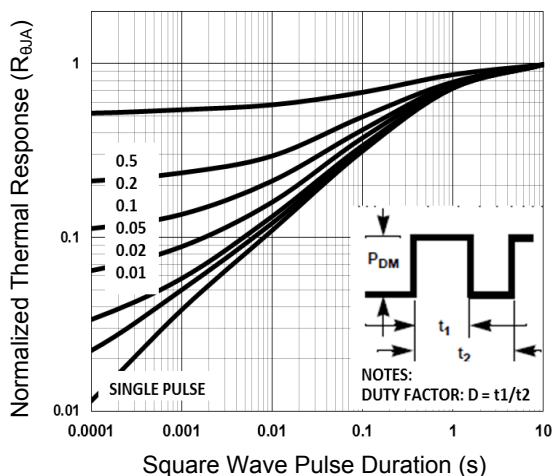


Figure 5. Normalized Transient Impedance

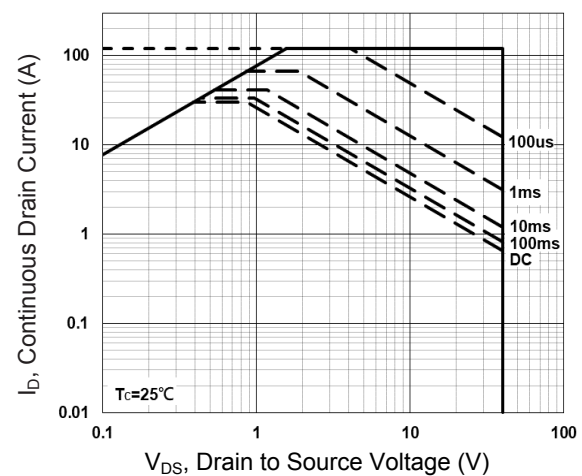
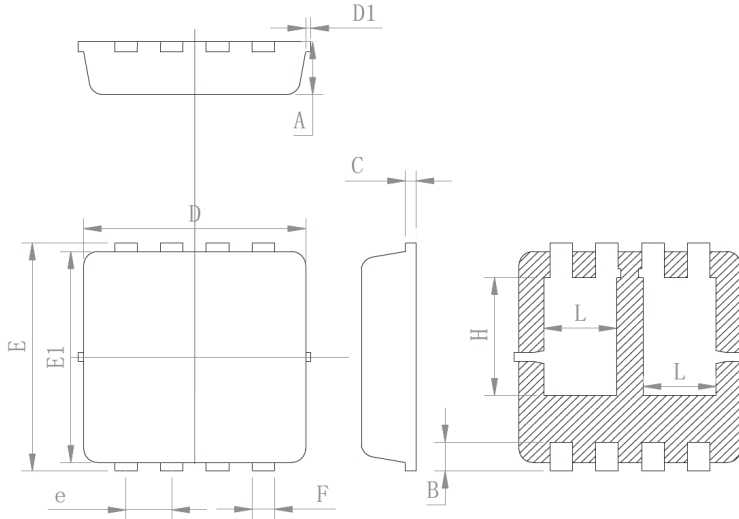


Figure 6. Maximum Safe Operation Area

## Package Outline Dimensions (PPAK3x3)



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 0.725                     | 0.825 | 0.029                | 0.032 |
| B      | 0.280                     | 0.480 | 0.011                | 0.019 |
| C      | 0.130                     | 0.200 | 0.005                | 0.008 |
| D      | 3.050                     | 3.250 | 0.120                | 0.128 |
| D1     | -                         | 0.100 | -                    | 0.004 |
| E      | 3.250                     | 3.450 | 0.128                | 0.136 |
| E1     | 3.000                     | 3.200 | 0.118                | 0.126 |
| e      | 0.600                     | 0.700 | 0.024                | 0.028 |
| F      | 0.250                     | 0.350 | 0.010                | 0.014 |
| H      | 1.630                     | 1.830 | 0.064                | 0.072 |
| L      | 0.930                     | 1.130 | 0.037                | 0.044 |

## Order Information

| Device     | Package | Marking | Carrier     | Quantity        |
|------------|---------|---------|-------------|-----------------|
| GSFN4820AU | PPAK3x3 | N4820AU | Tape & Reel | 5,000pcs / Reel |