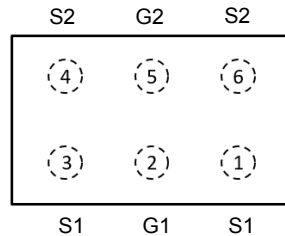
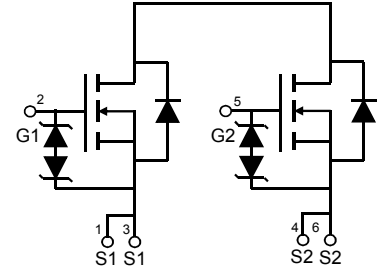


### Main Product Characteristics

|                  |                     |
|------------------|---------------------|
| $V_{SSS}$        | 20V                 |
| $R_{SS(ON)}$ TYP | 4.9m $\Omega$ @4.5V |
|                  | 5.1m $\Omega$ @4.0V |
|                  | 5.2m $\Omega$ @3.8V |
|                  | 5.7m $\Omega$ @3.1V |
|                  | 6.6m $\Omega$ @2.5V |
| $I_S$            | 12A                 |



CSP



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 GSFCP0212 utilizes the latest techniques to achieve high cell density, low on-resistance and low gate charge. Embedded with ESD diodes, this device is extremely efficient and reliable for use as a load switch and battery protection application.

### Absolute Maximum Ratings ( $T_A=25^\circ\text{C}$ unless otherwise specified)

| Parameter                              | Symbol    | Max.        | Unit             |
|--|-----------|-------------|------------------|
| Source-Source Voltage                  | $V_{SSS}$ | 20          | V                |
| Gate-Source Voltage                    | $V_{GSS}$ | $\pm 12$    | V                |
| Source Current (DC) <sup>1</sup>       | $I_S$     | 12          | A                |
| Source Current (Pulsed) <sup>1,2</sup> | $I_{SP}$  | 120         | A                |
| Total Power Dissipation <sup>1</sup>   | $P_T$     | 2.0         | W                |
| Channel Temperature Range              | $T_{ch}$  | +150        | $^\circ\text{C}$ |
| Storage Temperature Range              | $T_{STG}$ | -55 To +150 | $^\circ\text{C}$ |

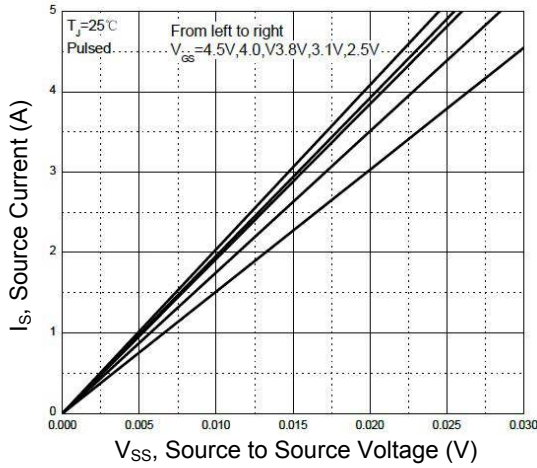
**Electrical Characteristics** ( $T_A=25^{\circ}\text{C}$  unless otherwise specified)

| Parameter                              | Symbol       | Conditions                            | Min. | Typ. | Max.      | Unit      |
|--|--------------|---------------------------------------|------|------|-----------|-----------|
| <b>Static Parameters</b>               |              |                                       |      |      |           |           |
| Source-Source Breakdown Voltage        | $BV_{SSS}$   | $V_{GS}=0V, I_S=1mA$                  | 20   | -    | -         | V         |
| Zero Gate Voltage Source Current       | $I_{SSS}$    | $V_{SS}=16V, V_{GS}=0V$               | -    | -    | 100       | nA        |
| Gate-Source Leakage Current            | $I_{GSS}$    | $V_{GS}=\pm 10V, V_{SS}=0V$           | -    | -    | $\pm 10$  | $\mu A$   |
|  |              | $V_{GS}=\pm 5V, V_{SS}=0V$            | -    | -    | $\pm 1.0$ |           |
| Gate to Source Threshold Voltage       | $V_{GS(th)}$ | $V_{SS}=V_{GS}, I_S=250\mu A$         | 0.4  | 0.85 | 1.2       | V         |
| Static Source to Source On- Resistance | $R_{SS(ON)}$ | $V_{GS}=4.5V, I_S=3A$                 | 2.9  | 4.9  | 6.8       | $m\Omega$ |
|  |              | $V_{GS}=4.0V, I_S=3A$                 | 3.0  | 5.1  | 7.1       |           |
|  |              | $V_{GS}=3.8V, I_S=3A$                 | 3.1  | 5.2  | 7.3       |           |
|  |              | $V_{GS}=3.1V, I_S=3A$                 | 3.4  | 5.7  | 8.0       |           |
|  |              | $V_{GS}=2.5V, I_S=3A$                 | 4.0  | 6.6  | 9.2       |           |
| Turn-On Delay Time <sup>3</sup>        | $t_{d(on)}$  | $V_{DD}=10V, I_S=5A$<br>$V_{GS}=4.0V$ | -    | 0.9  | -         | $\mu S$   |
| Turn-On Rise Time <sup>3</sup>         | $t_r$        |                                       | -    | 2.6  | -         |           |
| Turn-Off Delay Time <sup>3</sup>       | $t_{d(off)}$ |                                       | -    | 5.7  | -         |           |
| Turn-Off Fall Time <sup>3</sup>        | $t_f$        |                                       | -    | 3.9  | -         |           |
| Input Capacitance                      | $C_{iss}$    | $V_{SS}=10V, V_{GS}=0V$<br>$f=1KHz$   | -    | 2609 | -         | $pF$      |
| Output Capacitance                     | $C_{oss}$    |                                       | -    | 362  | -         |           |
| Reverse Transfer Capacitance           | $C_{rss}$    |                                       | -    | 295  | -         |           |
| Total Gate Charge <sup>3</sup>         | $Q_g$        | $V_{SS}=10V, V_{GS}=6V$<br>$I_S=8A$   | -    | 34.7 | -         | $nC$      |
| Gate 1 - Source 1 Charge <sup>3</sup>  | $Q_{g1s1}$   |                                       | -    | 5.9  | -         |           |
| Gate 1 - Source 2 Charge <sup>3</sup>  | $Q_{g1s2}$   |                                       | -    | 11.8 | -         |           |
| Diode Forward Voltage                  | $V_{F(S-S)}$ | $V_{GS}=0V, I_S=1A$                   | -    | -    | 1         | V         |

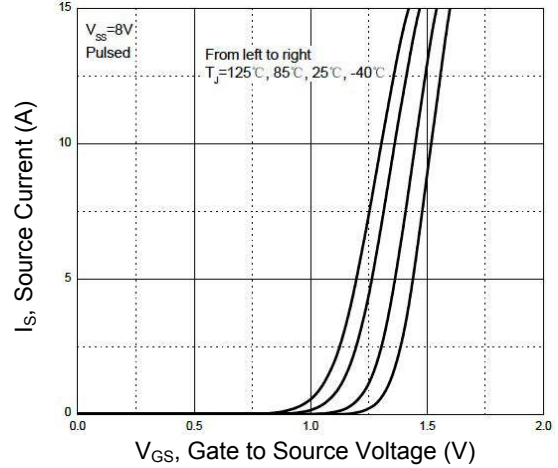
**Notes:**

1. Mounted on FR4 board (25.4 mm x 25.4 mm x t1.0 mm) using the minimum recommended pad size (36 $\mu$ m Copper ).
2.  $t=10ms$ , Duty Cycle  $\leq 1\%$ .
3. When FET1 is measured, G2 and S2 are short-circuited.

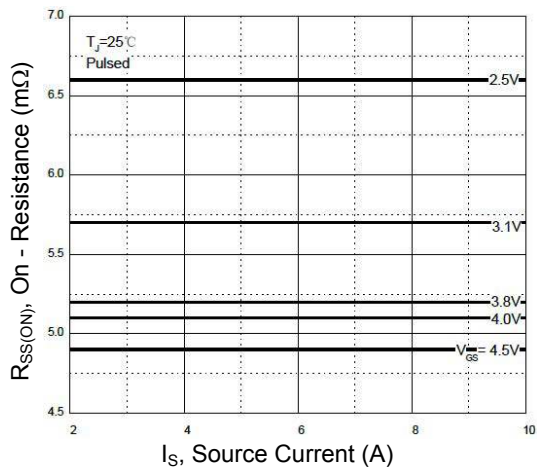
**Typical Electrical and Thermal Characteristic Curves**



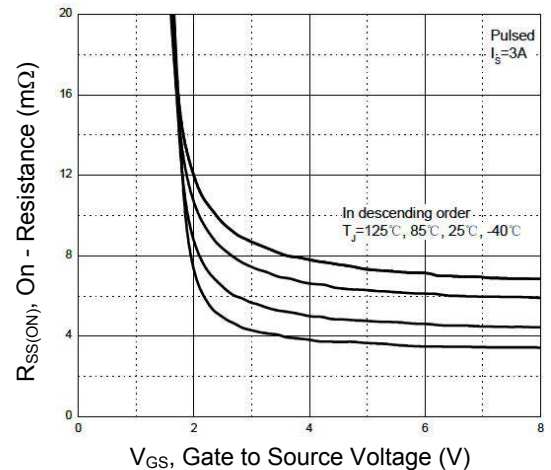
**Figure 1. Output Characteristics**



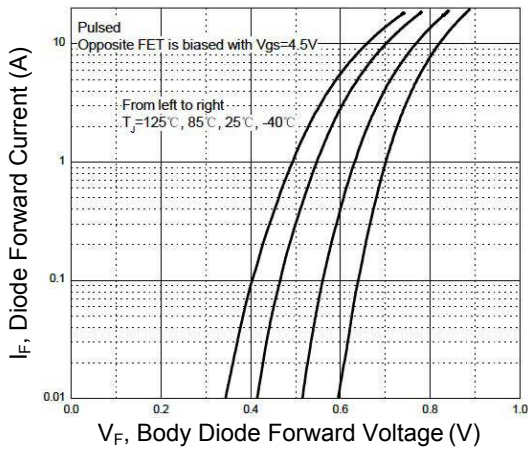
**Figure 2. Transfer Characteristics**



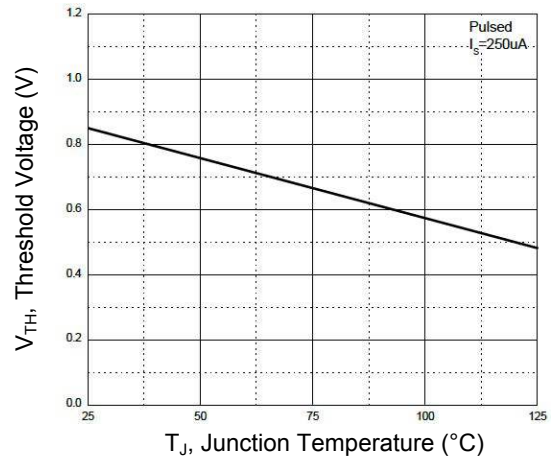
**Figure 3.  $R_{SS(ON)}$  - Source Current**



**Figure 4.  $R_{SS(ON)}$  - Gate to Source Voltage**

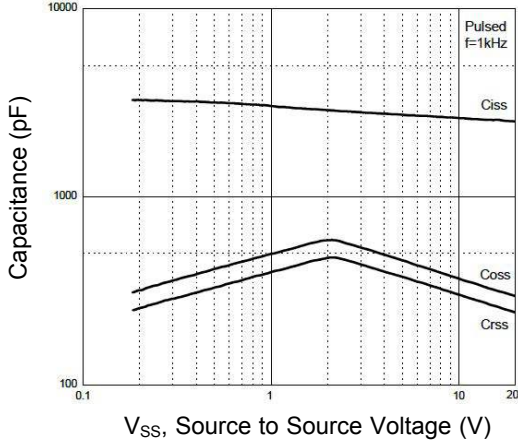


**Figure 5.  $I_F - V_F$**

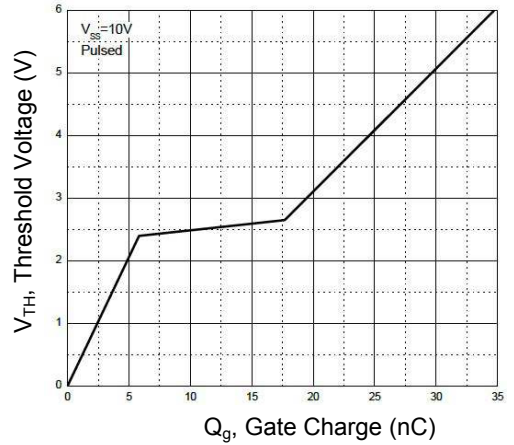


**Figure 6.  $V_{TH}$  vs.  $T_J$**

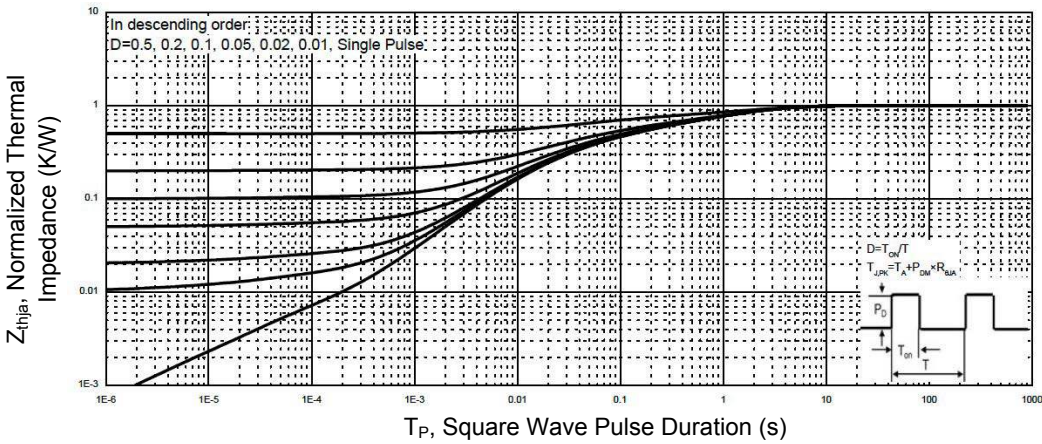
**Typical Electrical and Thermal Characteristic Curves**



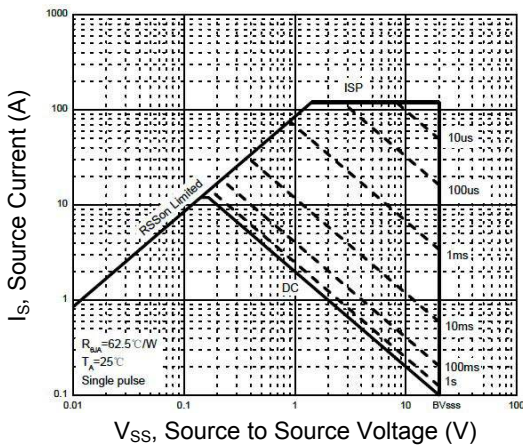
**Figure 7. Capacitance Characteristics**



**Figure 8. Gate Charge Characteristics**



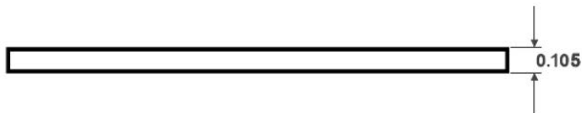
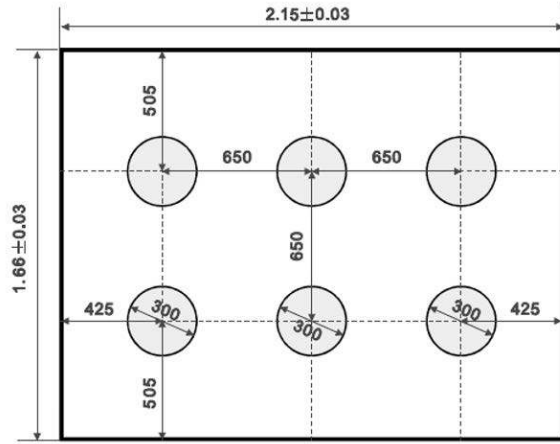
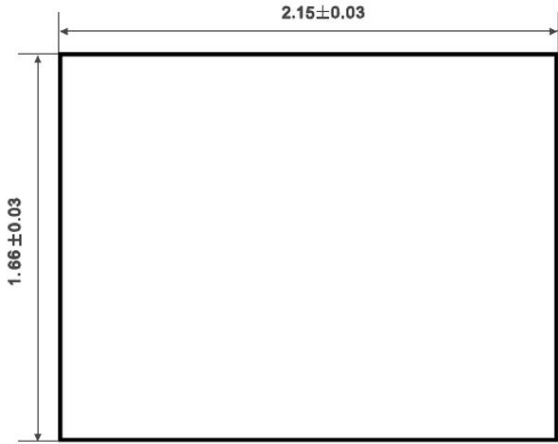
**Figure 9. Normalized Maximum Transient Thermal Impedance**



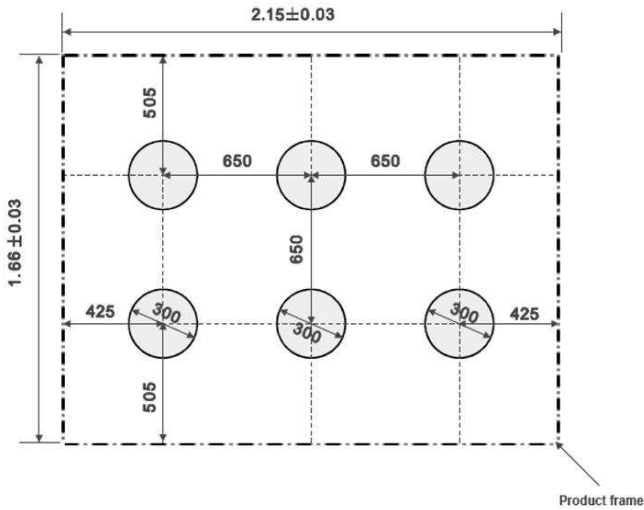
**Figure 10. Maximum Forward Biased Safe Operating Area**

**Package Outline Dimensions (CSP)**

Unit: mm



**Recommended Pad Layout**



**Note:**

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.050$ mm.
3. The pad layout is for reference purposes only.