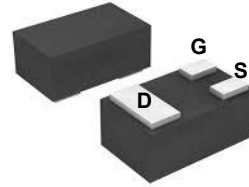
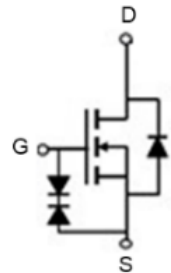


### Main Product Characteristics

|              |               |
|--------------|---------------|
| $V_{DS}$     | 20V           |
| $R_{DS(ON)}$ | 230m $\Omega$ |
| $I_D$        | 1.4A          |



SOT-883



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 GSFW0202 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 supply and a wide variety of other applications.

### Absolute Maximum Ratings (T<sub>J</sub>=25°C unless otherwise specified)

| Parameter  | Symbol           | Max.        | Unit |
|--|------------------|-------------|------|
| Drain-Source Voltage   | $V_{DSS}$        | 20          | V    |
| Gate-Source Voltage  | $V_{GSS}$        | ±8          | V    |
| Drain Current-Continuous <sup>1,3</sup> (T <sub>A</sub> =25°C) | $I_D$            | 1.4         | A    |
| Drain Current-Continuous <sup>1,3</sup> (T <sub>A</sub> =70°C) |                  | 1.1         |      |
| Drain Current-Pulsed <sup>2</sup>                              | $I_{DM}$         | 3.5         | A    |
| Diode Continuous Forward Current                               | $I_S$            | 0.6         | A    |
| Power Dissipation(T <sub>A</sub> =25°C)                        | $P_D$            | 0.7         | W    |
| Power Dissipation(T <sub>A</sub> =70°C)                        |                  | 0.4         |      |
| Thermal Resistance, Junction-to-Ambient <sup>2</sup>           | $R_{\theta JA}$  | 180         | °C/W |
| Storage Temperature Range                                      | T <sub>STG</sub> | -55 To +150 | °C   |
| Operating Junction Temperature Range                           | T <sub>J</sub>   | -55 To +150 | °C   |

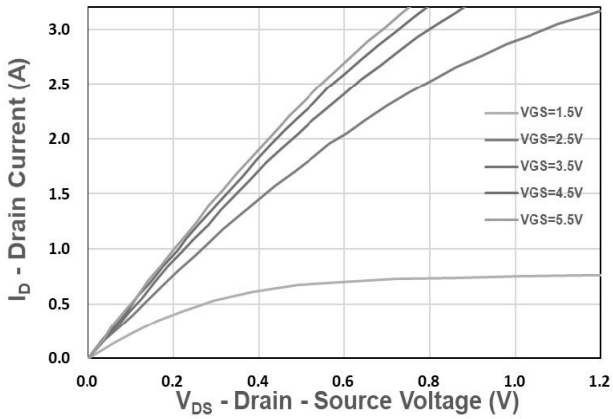
**Electrical Characteristics** ( $T_J=25^{\circ}\text{C}$  unless otherwise specified)

| Parameter                            | Symbol        | Conditions  | Min. | Typ. | Max.     | Unit       |
|--------------------------------------|---------------|---|------|------|----------|------------|
| Drain-Source Breakdown Voltage       | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=250\mu A$                               | 20   | -    | -        | V          |
| Zero Gate Voltage Drain Current      | $I_{DSS}$     | $V_{DS}=16V, V_{GS}=0V$                                 | -    | -    | 1        | $\mu A$    |
| Gate Threshold Voltage               | $V_{GS(th)}$  | $V_{DS}=V_{GS}, I_{DS}=250\mu A$                        | 0.5  | -    | 1        | V          |
| Gate-Source Leakage Current          | $I_{GSS}$     | $V_{GS}=\pm 8V, V_{DS}=0V$                              | -    | -    | $\pm 10$ | $\mu A$    |
| Drain-Source On-State Resistance     | $R_{DS(on)}$  | $V_{GS}=4.5V, I_D=0.55A$                                | -    | 190  | 230      | m $\Omega$ |
|                                      |               | $V_{GS}=2.5V, I_D=0.45A$                                | -    | 234  | 305      |            |
|                                      |               | $V_{GS}=1.8V, I_D=0.35A$                                | -    | 303  | 455      |            |
| Forward Transconductance             | $g_{fs}$      | $V_{DS}=5V, I_D=0.55A$                                  | -    | 1.7  | -        | S          |
| Total Gate Charge                    | $Q_g$         | $V_{DS}=10V, I_D=1A,$<br>$V_{GS}=2.5V$                  | -    | 1.1  | -        | nC         |
| Total Gate Charge                    | $Q_g$         | $V_{DS}=10V, I_D=1A,$<br>$V_{GS}=4.5V$                  | -    | 2    | -        | nC         |
| Gate-Source Charge                   | $Q_{gs}$      |   | -    | 0.3  | -        |            |
| Gate-Drain Charge                    | $Q_{gd}$      |   | -    | 0.3  | -        |            |
| Turn-On Delay Time                   | $t_{d(on)}$   | $V_{DS}=10V, R_{GEN}=6\Omega,$<br>$V_{GS}=4.5V, I_D=2A$ | -    | 1.2  | -        | nS         |
| Turn-On Rise Time                    | $t_r$         |   | -    | 25   | -        |            |
| Turn-Off Delay Time                  | $t_{d(off)}$  |   | -    | 14   | -        |            |
| Turn-Off Fall Time                   | $t_f$         |   | -    | 15   | -        |            |
| Input Capacitance                    | $C_{iss}$     | $V_{DS}=10V, V_{GS}=0V,$<br>$F=1MHz$                    | -    | 43   | -        | pF         |
| Output Capacitance                   | $C_{oss}$     |   | -    | 9    | -        |            |
| Reverse Transfer Capacitance         | $C_{rss}$     |   | -    | 6    | -        |            |
| <b>Reverse Diode Characteristics</b> |               |   |      |      |          |            |
| Diode Forward Voltage                | $V_{SD}$      | $V_{GS}=0V, I_{SD}=0.35A$                               | -    | -    | 1.1      | V          |
| Reverse Recovery Time                | $t_{rr}$      | $I_F=1A,$<br>$di/dt=100A/\mu s$                         | -    | 9    | -        | nS         |
| Reverse Recovery Charge              | $Q_{rr}$      |   | -    | 1    | -        | nC         |

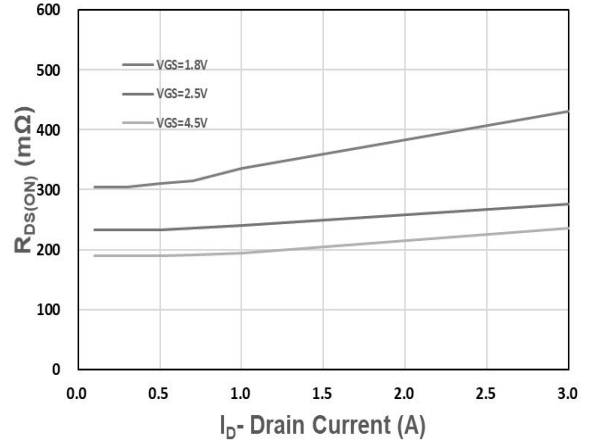
Note :

1. The value of  $R_{\theta JA}$  is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^{\circ}\text{C}$ . The value in any given application depends on the user's specific board design.
2. Repetitive rating, pulse width limited by junction temperature .
3. The current rating is based on the  $t < 10s$  junction to ambient thermal resistance rating.

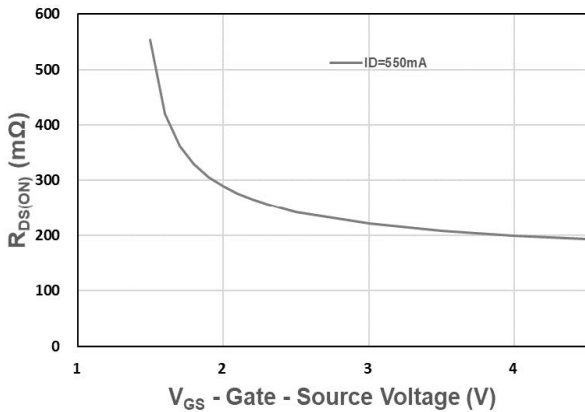
**Typical Electrical and Thermal Characteristic Curves**



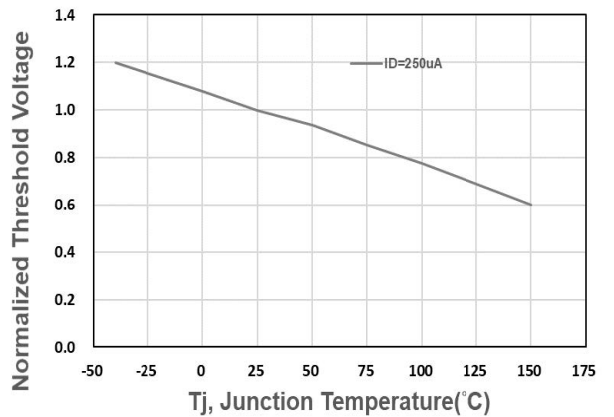
**Figure 1. Output Characteristics**



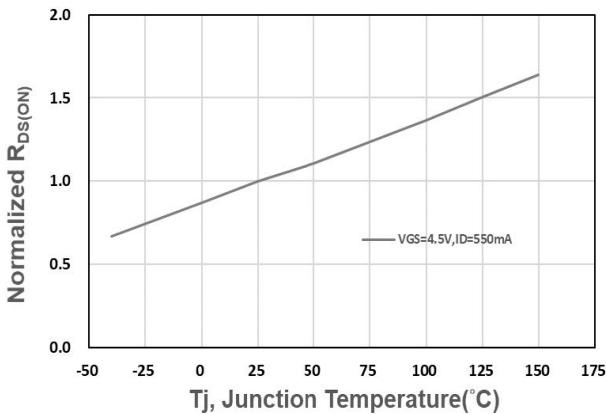
**Figure 2. On-Resistance vs.  $I_D$**



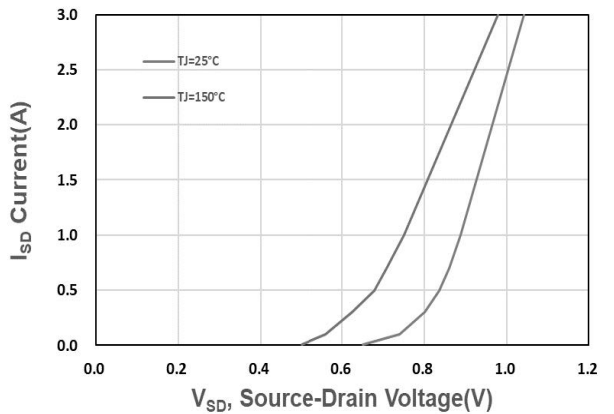
**Figure 3. On-Resistance vs.  $V_{GS}$**



**Figure 4. Gate Threshold Voltage**



**Figure 5. Drain-Source On Resistance**



**Figure 6. Source-Drain Diode Forward**

### Typical Electrical and Thermal Characteristic Curves

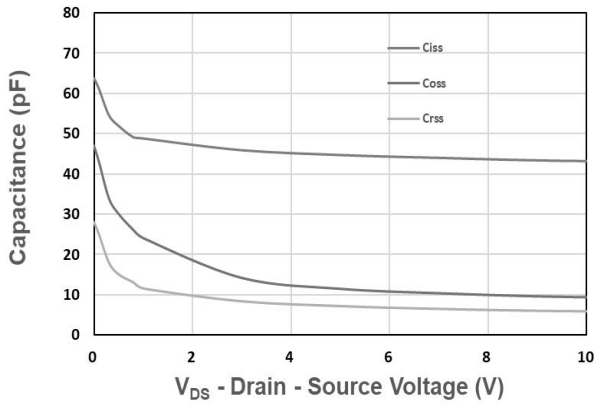


Figure 7. Capacitance

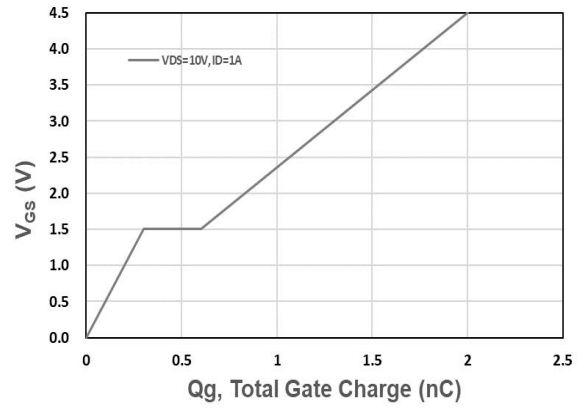


Figure 8. Gate Charge Characteristics

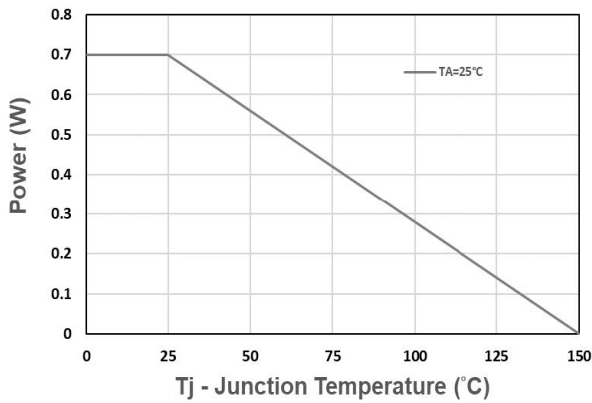


Figure 9. Power Dissipation

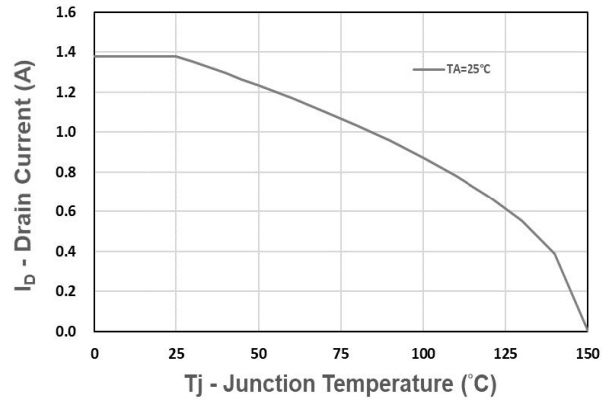


Figure 10. Drain Current

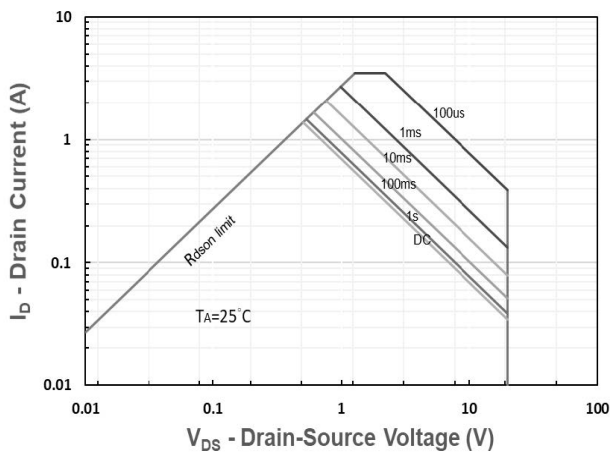


Figure 11. Safe Operating Area

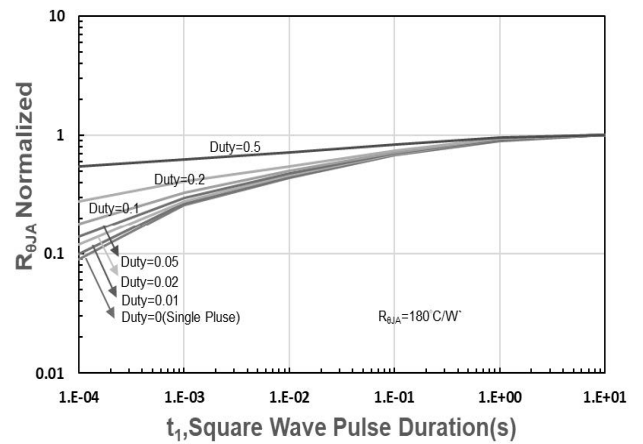
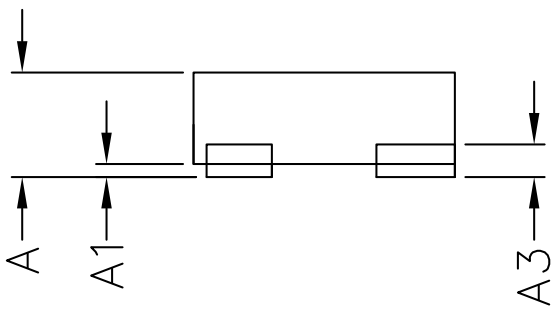
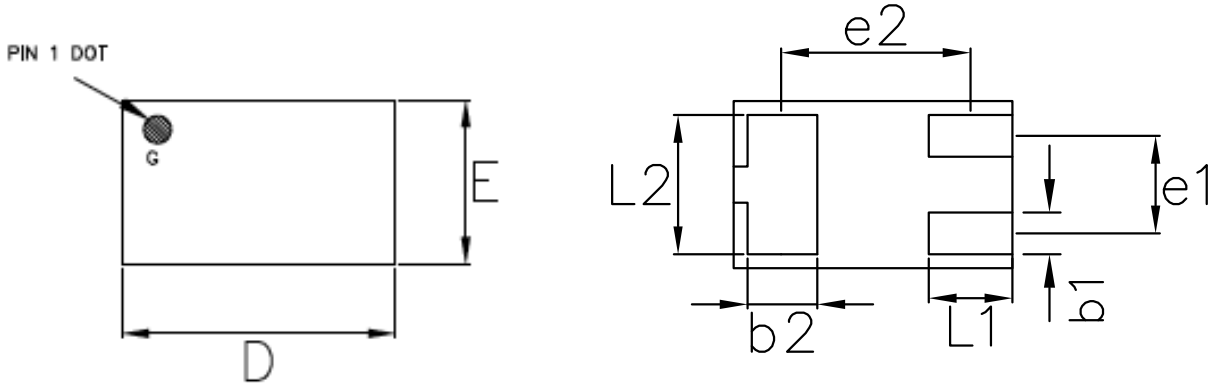


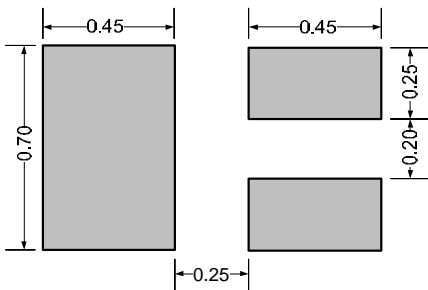
Figure 12.  $R_{\theta JA}$  Transient Thermal Impedance

## Package Outline Dimensions (SOT-883)



| Package Outline Dimensions (MM) |            |      |      |
|---------------------------------|------------|------|------|
| Package                         | SOT-883    |      |      |
| REF.                            | MIN.       | TYP. | MAX  |
| A                               | 0.40       | -    | 0.50 |
| A1                              | 0.001      | -    | 0.05 |
| A3                              | 0.125 REF. |      |      |
| D                               | 0.95       | 1.00 | 1.05 |
| E                               | 0.55       | 0.60 | 0.65 |
| b1                              | 0.10       | 0.15 | 0.20 |
| b2                              | 0.20       | 0.25 | 0.30 |
| L1                              | 0.20       | 0.30 | 0.40 |
| L2                              | 0.40       | 0.50 | 0.60 |
| e1                              | 0.35 BSC   |      |      |
| e2                              | 0.675 BSC  |      |      |

## Recommended Pad Layout



(Unit in MM)

## Order Information

| MPN      | Package | Marking Code | Carrier     | Quantity   | HSF Status     |
|----------|---------|--------------|-------------|------------|----------------|
| GSFW0202 | SOT-883 | 48           | Tape & Reel | 10000/Reel | RoHS Compliant |