

### Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)MAX}$ | $I_D$ |
|---------------|-----------------|-------|
| 30V           | 1.0mΩ@10V       | 200A  |
|               | 1.3mΩ@4.5V      |       |

### Feature

- Advanced SGT MOS technology
- Excellent  $R_{DS(on)}$
- Low Gate Charge

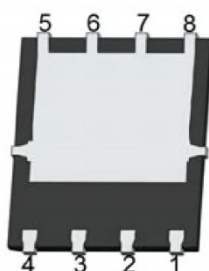
### Application

- Buck
- Boost

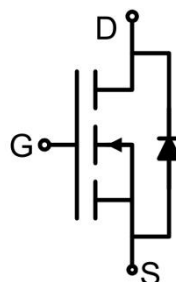
### Package



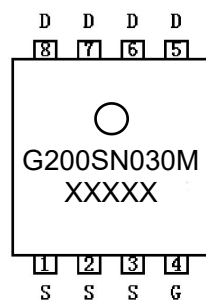
PDFN5\*6-8L



### Circuit diagram



### Marking



### Absolute maximum ratings (T<sub>c</sub>=25°C, unless otherwise noted)

| Parameter                                                                            | Symbol           | Value      | Unit |
|--------------------------------------------------------------------------------------|------------------|------------|------|
| Drain-Source Voltage                                                                 | V <sub>DS</sub>  | 30         | V    |
| Gate-Source Voltage                                                                  | V <sub>GS</sub>  | ±20        | V    |
| Continuous Drain Current <sup>1)</sup> (V <sub>GS</sub> =10V)                        | I <sub>D</sub>   | 200        | A    |
| Continuous Drain Current <sup>1)</sup> (V <sub>GS</sub> =10V, T <sub>c</sub> =100°C) | I <sub>D</sub>   | 185        | A    |
| Pulsed Drain Current                                                                 | I <sub>DM</sub>  | 1012       | A    |
| Power Dissipation <sup>3)</sup>                                                      | P <sub>D</sub>   | 160        | W    |
| Single pulse avalanche energy <sup>2)</sup>                                          | E <sub>AS</sub>  | 745        | mJ   |
| Thermal Resistance, Junction-to-Case                                                 | R <sub>θJC</sub> | 0.78       | °C/W |
| Junction Temperature                                                                 | T <sub>J</sub>   | 150        | °C   |
| Storage Temperature                                                                  | T <sub>STG</sub> | -55 ~ +150 | °C   |

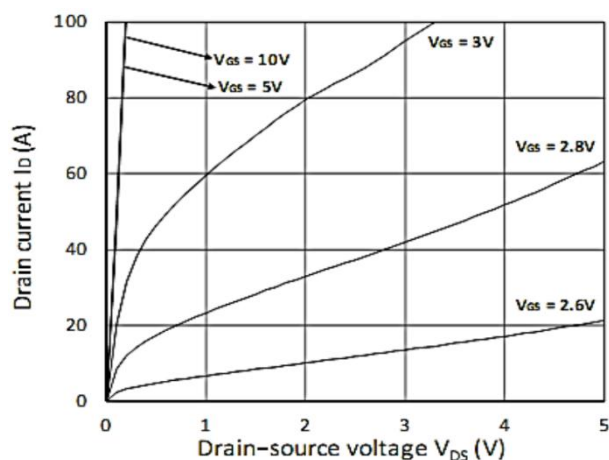
### Electrical characteristics (T<sub>J</sub>=25°C, unless otherwise noted)

| Parameter                             | Symbol               | Test Condition                                                                      | Min. | Typ.  | Max. | Unit |
|---------------------------------------|----------------------|-------------------------------------------------------------------------------------|------|-------|------|------|
| Static Characteristics                |                      |                                                                                     |      |       |      |      |
| Drain-source breakdown voltage        | V <sub>(BR)DSS</sub> | V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA                                         | 30   |       |      | V    |
| Zero gate voltage drain current       | I <sub>DSS</sub>     | V <sub>DS</sub> =30V, V <sub>GS</sub> = 0V                                          |      |       | 1    | μA   |
| Gate-body leakage current             | I <sub>GSS</sub>     | V <sub>GS</sub> =±20V, V <sub>DS</sub> = 0V                                         |      |       | ±100 | nA   |
| Gate threshold voltage                | V <sub>GS(th)</sub>  | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                            | 1.2  | 1.6   | 2.5  | V    |
| Drain-source on-resistance            | R <sub>DS(on)</sub>  | V <sub>GS</sub> =10V, I <sub>D</sub> =20A                                           |      | 0.8   | 1.0  | mΩ   |
|                                       |                      | V <sub>GS</sub> =4.5V, I <sub>D</sub> =10A                                          |      | 1.1   | 1.3  |      |
| Forward Transconductance              | G <sub>FS</sub>      | V <sub>GS</sub> =10V, I <sub>D</sub> =20A                                           |      | 110   |      | S    |
| Dynamic characteristics <sup>5)</sup> |                      |                                                                                     |      |       |      |      |
| Input Capacitance                     | C <sub>iss</sub>     | V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f =1MHz                                  |      | 6790  |      | pF   |
| Output Capacitance                    | C <sub>oss</sub>     |                                                                                     |      | 2450  |      |      |
| Reverse Transfer Capacitance          | C <sub>rss</sub>     |                                                                                     |      | 220   |      |      |
| Total Gate Charge                     | Q <sub>g</sub>       | V <sub>DS</sub> =15V, V <sub>GS</sub> =10V, I <sub>D</sub> =20A                     |      | 109.3 |      | nC   |
| Gate-Source Charge                    | Q <sub>gs</sub>      |                                                                                     |      | 20.8  |      |      |
| Gate-Drain Charge                     | Q <sub>gd</sub>      |                                                                                     |      | 15.2  |      |      |
| Gate Resistance                       | R <sub>g</sub>       | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz                                    |      | 2.2   |      | Ω    |
| Turn-on delay time                    | t <sub>d(on)</sub>   | V <sub>DD</sub> =15V, V <sub>GS</sub> =10V, I <sub>D</sub> =20A, R <sub>G</sub> =3Ω |      | 12    |      | nS   |
| Turn-on rise time                     | t <sub>r</sub>       |                                                                                     |      | 12.3  |      |      |
| Turn-off delay time                   | t <sub>d(off)</sub>  |                                                                                     |      | 88.4  |      |      |
| Turn-off fall time                    | t <sub>f</sub>       |                                                                                     |      | 42.8  |      |      |
| Source-Drain Diode characteristics    |                      |                                                                                     |      |       |      |      |
| Diode Forward Current                 | I <sub>S</sub>       | T <sub>C</sub> =25°C                                                                |      |       | 200  | A    |
| Diode Forward voltage                 | V <sub>SD</sub>      | V <sub>GS</sub> =0V, I <sub>S</sub> =20A                                            |      |       | 1.2  | V    |
| Reverse recover time                  | T <sub>rr</sub>      | I <sub>F</sub> =20A, dI/dt=100A/us                                                  |      | 72    |      | nS   |
| Reverse recovery charge               | Q <sub>rr</sub>      |                                                                                     |      | 36    |      | nC   |

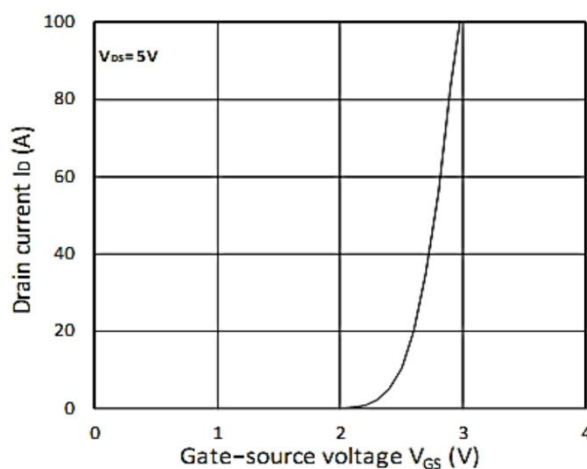
Notes:

- 1) The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 20Z copper.
- 2) The EAS data shows Max. rating. The test condition is V<sub>DD</sub> =25V, V<sub>GS</sub> =10V, L=0.1mH, I<sub>AS</sub> =57A.
- 3) The power dissipation is limited by 150°C junction temperature.
- 4) Guaranteed by design, not subject to production.

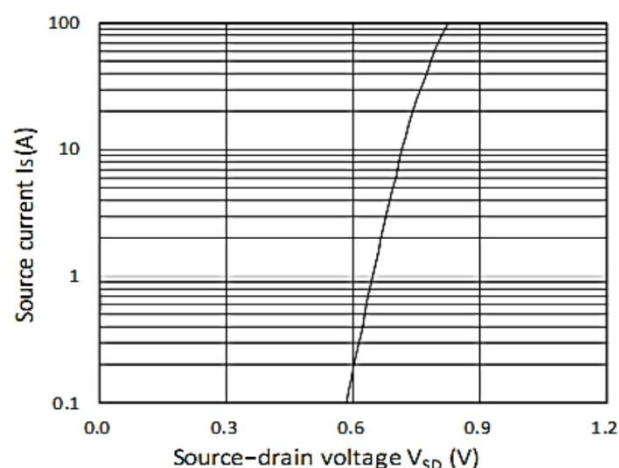
## Typical Characteristics



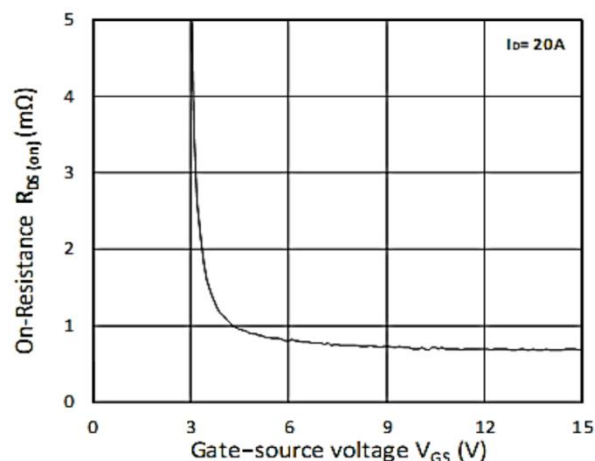
**Figure 1. Output Characteristics**



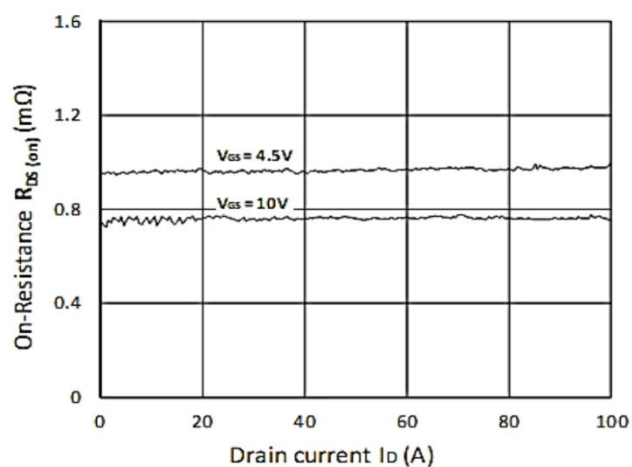
**Figure 2. Transfer Characteristics**



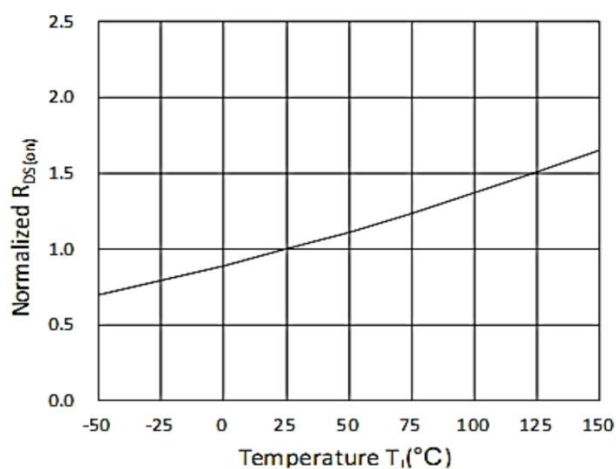
**Figure 3. Forward Characteristics of Reverse**



**Figure 4.  $R_{DS(ON)}$  vs.  $V_{GS}$**



**Figure 5.  $R_{DS(ON)}$  vs.  $I_D$**



**Figure 6. Normalized  $R_{DS(on)}$  vs. Temperature**

## Typical Characteristics

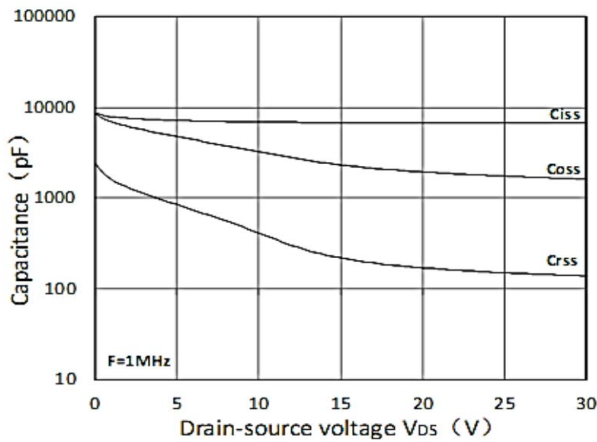


Figure 7. Capacitance Characteristics

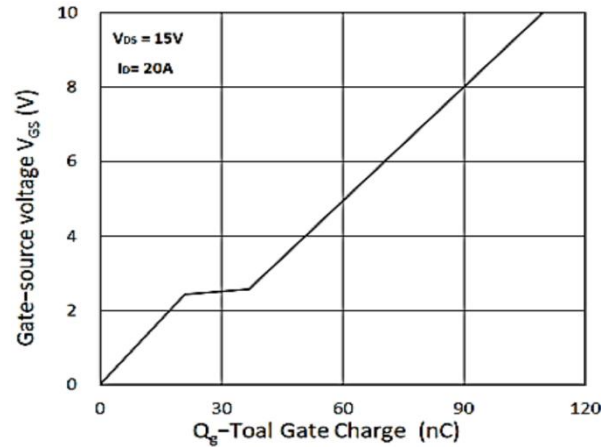


Figure 8. Gate Charge Characteristics

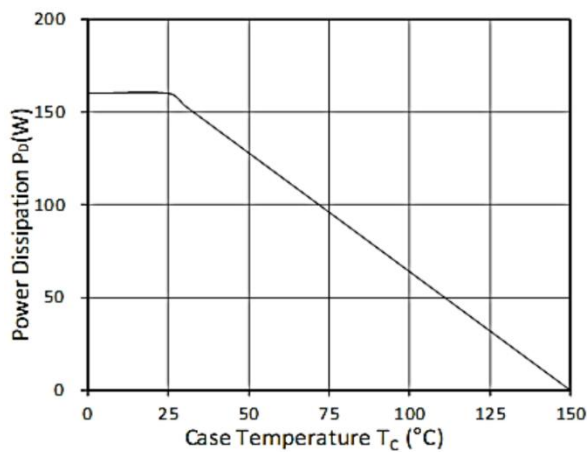


Figure 9. Power Dissipation

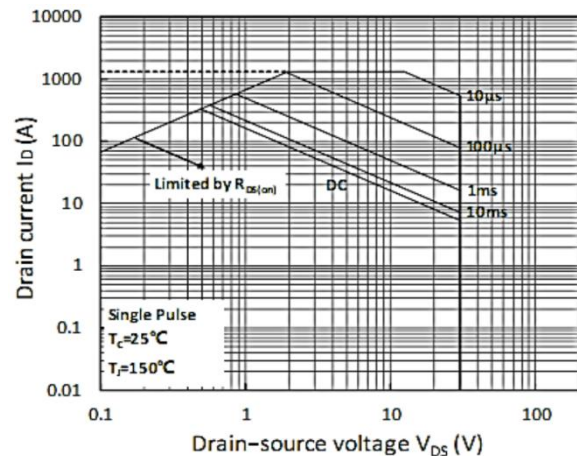


Figure 10. Safe Operating Area

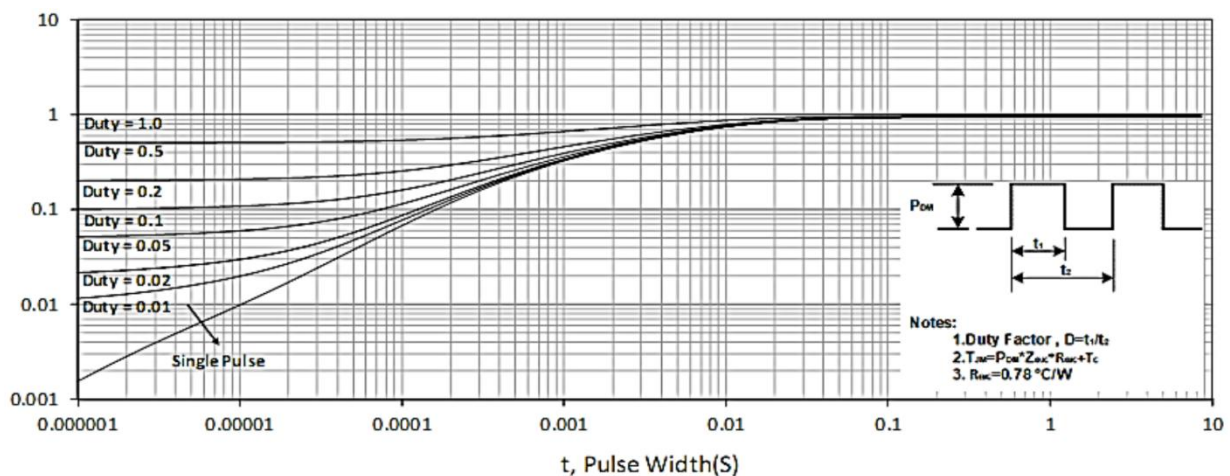
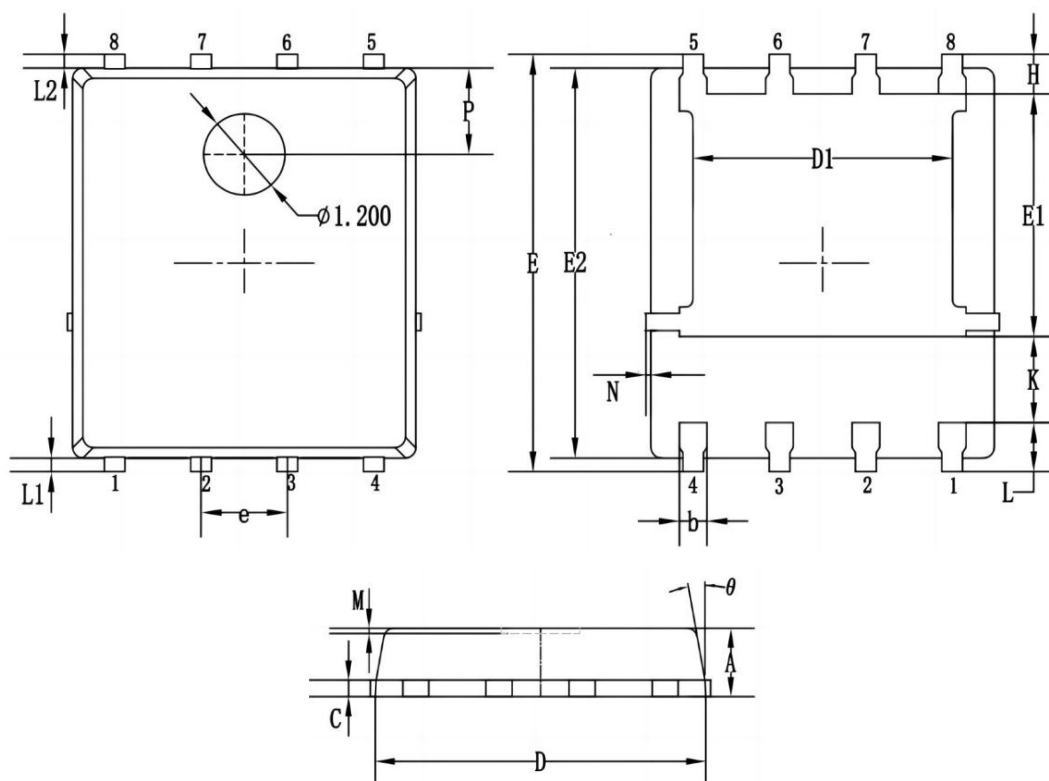


Figure 11. Normalized Maximum Transient Thermal Impedance

### PDFN5\*6-8L Package Information



| Symbol   | Dimensions In Millimeters |       | Dimensions In Inches |       |
|----------|---------------------------|-------|----------------------|-------|
|          | Min.                      | Max.  | Min.                 | Max.  |
| A        | 0.900                     | 1.200 | 0.035                | 0.047 |
| b        | 0.300                     | 0.500 | 0.012                | 0.020 |
| C        | 0.200                     | 0.350 | 0.008                | 0.014 |
| D        | 4.900                     | 5.200 | 0.193                | 0.205 |
| D1       | 3.720                     | 4.120 | 0.146                | 0.162 |
| E        | 5.900                     | 6.300 | 0.232                | 0.248 |
| E1       | 3.300                     | 3.700 | 0.130                | 0.146 |
| E2       | 5.600                     | 5.900 | 0.220                | 0.232 |
| e        | 1.270 BSC                 |       | 0.050 BSC            |       |
| H        | 0.480                     | 0.700 | 0.019                | 0.028 |
| K        | 1.140                     | 1.400 | 0.045                | 0.055 |
| L        | 0.540                     | 0.840 | 0.021                | 0.033 |
| L1/L2    | 0.100                     | 0.300 | 0.004                | 0.012 |
| $\theta$ | 8°                        | 12°   | 8°                   | 12°   |
| M        | 0.080 REF                 |       | 0.003 REF            |       |
| N        | 0.000                     | 0.150 | 0.000                | 0.006 |
| P        | 1.280 REF                 |       | 0.050 REF            |       |