

### Description

The SX280N10MP uses advanced technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 10V. This device is suitable for use as a Battery protection or in other Switching application.

### General Features

$V_{DS} = 100V$   $I_D = 280A$

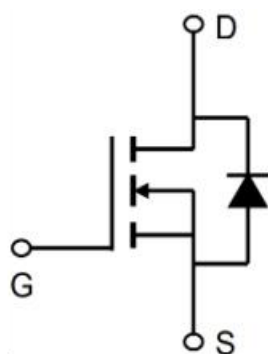
$R_{DS(ON)} < 2.5m\Omega$  @  $V_{GS} = 10V$

### Application

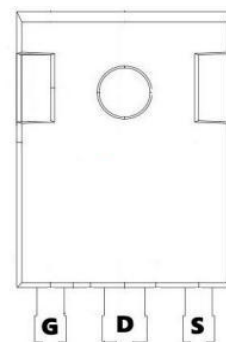
DC/DC Converter

LED Backlighting

Power Management Switches



TO-247-3L



### Absolute Maximum Ratings ( $T_c = 25^\circ C$ unless otherwise noted)

| Symbol                    | Parameter                                | Rating     | Units        |
|---------------------------|------------------------------------------|------------|--------------|
| $V_{DS}$                  | Drain-Source Voltage                     | 100        | V            |
| $V_{GS}$                  | Gate-Source Voltage                      | $\pm 20$   | V            |
| $I_D @ T_c = 25^\circ C$  | Continuous Drain Current, $V_{GS} @ 10V$ | 280        | A            |
| $I_D @ T_c = 100^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V$ | 200        | A            |
| $I_{DM}$                  | Pulsed Drain Current                     | 900        | A            |
| $E_{AS}$                  | Single Pulse Avalanche Energy            | 520        | mJ           |
| $I_{AS}$                  | Avalanche Current                        | 98         | A            |
| $P_D @ T_c = 25^\circ C$  | Total Power Dissipation <sup>4</sup>     | 461        | W            |
| $T_{STG}$                 | Storage Temperature Range                | -55 to 175 | $^\circ C$   |
| $T_J$                     | Operating Junction Temperature Range     | -55 to 175 | $^\circ C$   |
| $R_{\theta JA}$           | Thermal Resistance Junction-Ambient      | 0.42       | $^\circ C/W$ |
| $R_{\theta JC}$           | Thermal Resistance Junction-Case         | 40         | $^\circ C/W$ |

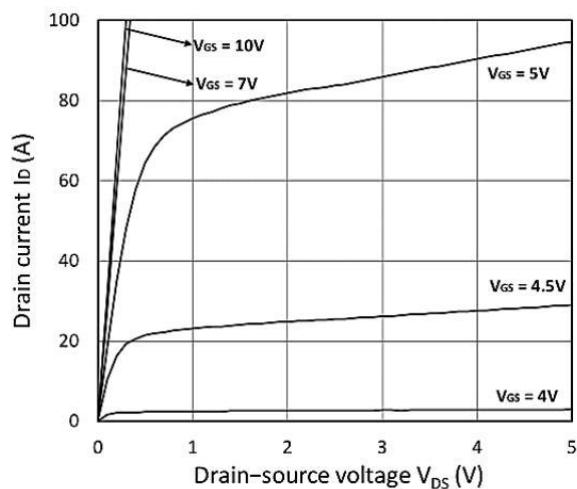
**Electrical Characteristics (T<sub>C</sub>=25°C unless otherwise noted)**

| Symbol          | Parameter                                             | Test Conditions                                                                          | Min. | Typ. | Max. | Unit |
|-----------------|-------------------------------------------------------|------------------------------------------------------------------------------------------|------|------|------|------|
| V(BR)DSS        | Drain-Source Breakdown Voltage                        | V <sub>GS</sub> =0V, I <sub>D</sub> =250μA                                               | 100  | 107  | -    | V    |
| IGSS            | Gate-body Leakage current                             | V <sub>DS</sub> =0V, V <sub>GS</sub> = ±20V                                              | -    | -    | ±100 | nA   |
| IDSS            | Zero Gate Voltage Drain Current T <sub>J</sub> =25°C  | V <sub>DS</sub> =100V, V <sub>GS</sub> =0V                                               | -    | -    | 1    | μA   |
| IDSS            | Zero Gate Voltage Drain Current T <sub>J</sub> =100°C |                                                                                          | -    | -    | 100  |      |
| VGS(th)         | Gate-Threshold Voltage                                | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                                 | 2.0  | 3.0  | 4.0  | V    |
| RDS(on)         | Drain-Source on-Resistance <sup>4</sup>               | V <sub>GS</sub> =10V, I <sub>D</sub> =20A                                                | -    | 2.0  | 2.5  | mΩ   |
| gfs             | Forward Transconductance <sup>4</sup>                 | V <sub>DS</sub> =10V, I <sub>D</sub> =20A                                                | -    | 76   | -    | S    |
| Ciss            | Input Capacitance                                     | V <sub>DS</sub> =50V, V <sub>GS</sub> =0V, f=1MHz                                        | -    | 9030 | -    | pF   |
| Coss            | Output Capacitance                                    |                                                                                          | -    | 1505 | -    |      |
| Crss            | Reverse Transfer Capacitance                          |                                                                                          | -    | 40   | -    |      |
| R <sub>g</sub>  | Gate Resistance                                       | f =1MHz                                                                                  | -    | 2.3  | -    | Ω    |
| Q <sub>g</sub>  | Total Gate Charge                                     | V <sub>GS</sub> = 10V, V <sub>DS</sub> = 50V,<br>I <sub>D</sub> =20A                     | -    | 150  | -    | nC   |
| Q <sub>gs</sub> | Gate-Source Charge                                    |                                                                                          | -    | 32.5 | -    |      |
| Q <sub>gd</sub> | Gate-Drain Charge                                     |                                                                                          | -    | 49   | -    |      |
| td(on)          | Turn-on Delay Time                                    | V <sub>GS</sub> =10V, V <sub>DD</sub> =50V, R <sub>G</sub> =<br>3Ω, I <sub>D</sub> = 20A | -    | 27   | -    | ns   |
| t <sub>r</sub>  | Rise Time                                             |                                                                                          | -    | 78.5 | -    |      |
| td(off)         | Turn-off Delay Time                                   |                                                                                          | -    | 110  | -    |      |
| t <sub>f</sub>  | Fall Time                                             |                                                                                          | -    | 86   | -    |      |
| trr             | Body Diode Reverse Recovery Time                      | I <sub>F</sub> = 20A, dI/dt=100A/μs                                                      | -    | 88   | -    | ns   |
| Q <sub>rr</sub> | Body Diode Reverse Recovery Charge                    |                                                                                          | -    | 220  | -    | nC   |
| VSD             | Diode Forward Voltage <sup>4</sup>                    | I <sub>D</sub> = 20A, V <sub>GS</sub> =0V                                                | -    | -    | 1.2  | V    |
| IS              | Continuous Source Current T <sub>C</sub> =25°C        |                                                                                          | -    | -    | 220  | A    |

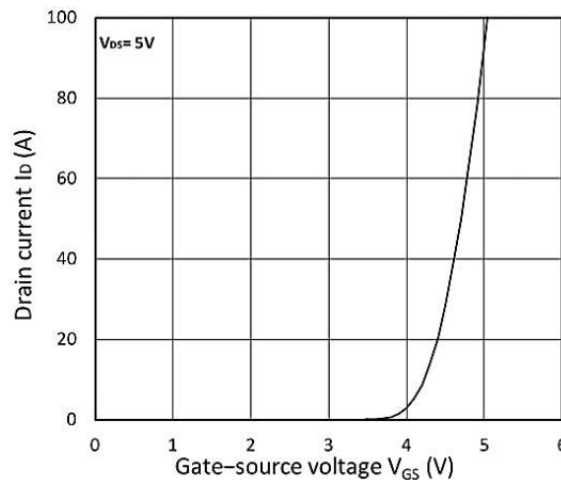
**Notes:**

- 1、The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2、The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
- 3、The EAS data shows Max. rating . The test condition is V<sub>DD</sub>=50V, V<sub>GS</sub>=10V, L=0.5mH, I<sub>AS</sub>=54A
- 4、The power dissipation is limited by 150°C junction temperature
- 5、The data is theoretically the same as I<sub>D</sub> and I<sub>DM</sub> , in real applications , should be limited by total power dissipation.

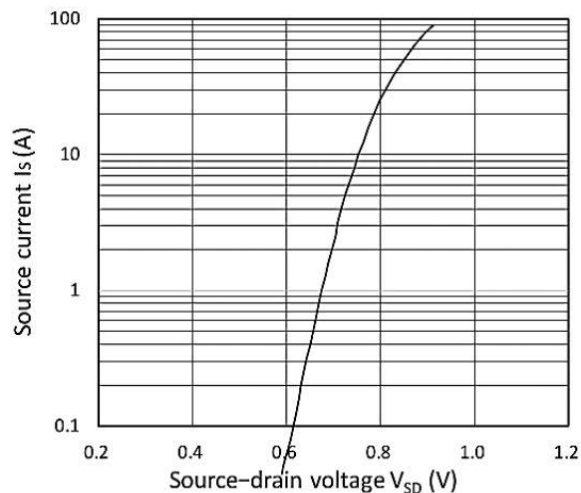
## Typical Characteristics



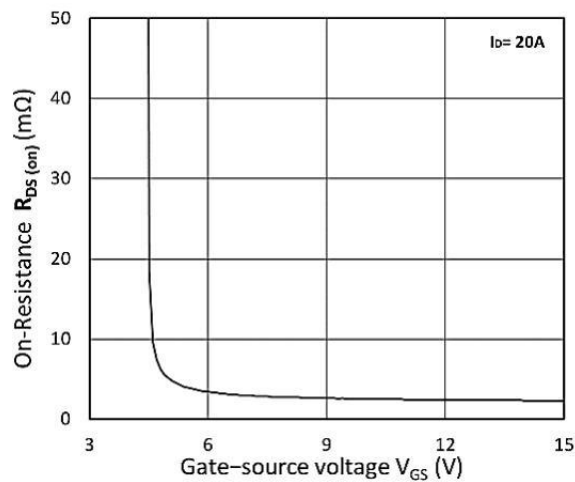
**Figure 1. Output Characteristics**



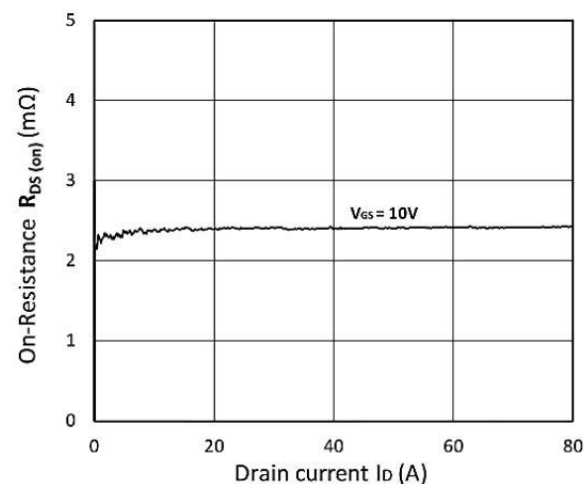
**Figure 2. Transfer Characteristics**



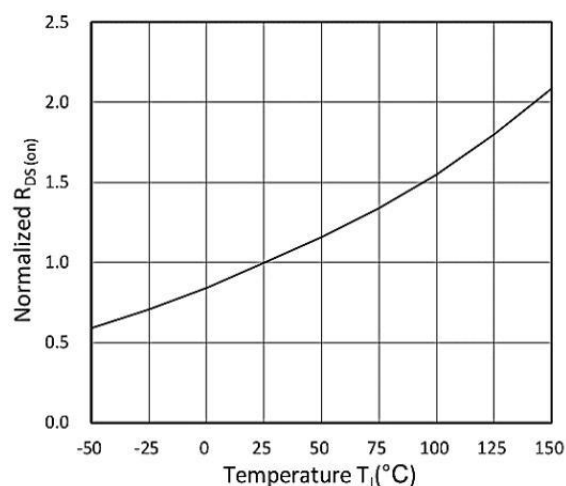
**Figure 3. Forward Characteristics of Reverse**



**Figure 4. R\_DS(ON) vs. V\_GS**

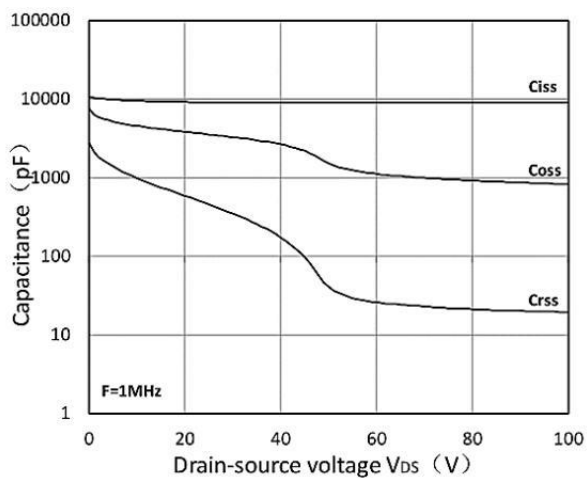


**Figure 5. R\_DS(ON) vs. I\_D**

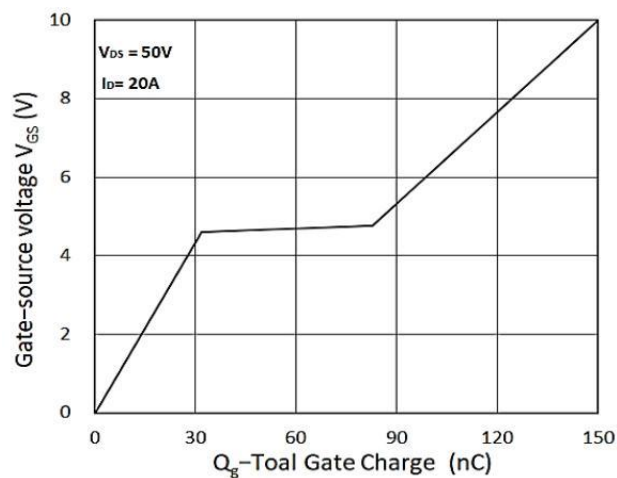


**Figure 6. Normalized R\_DS(on) vs. Temperature**

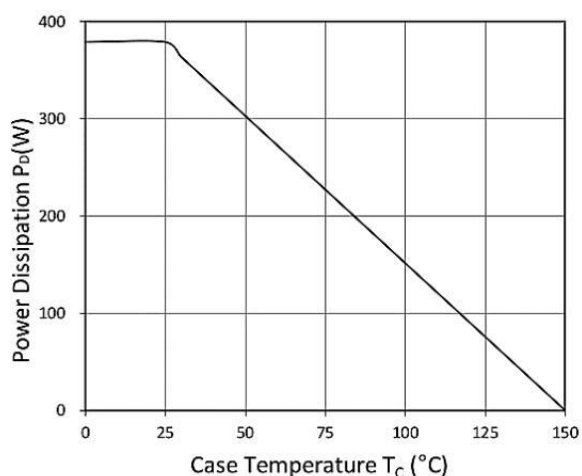
## Typical Characteristics



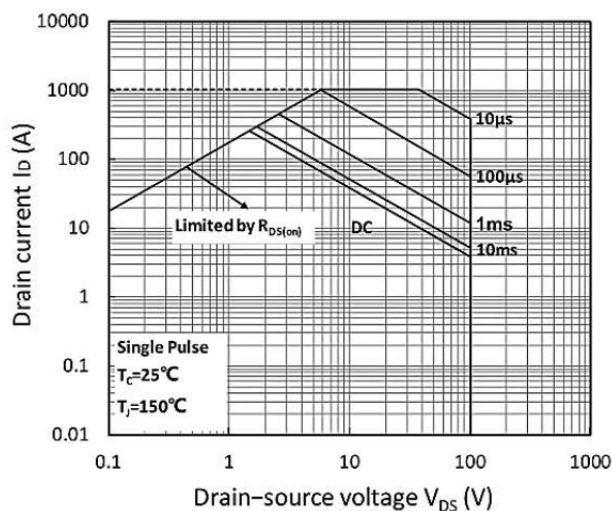
**Figure 7. Capacitance Characteristics**



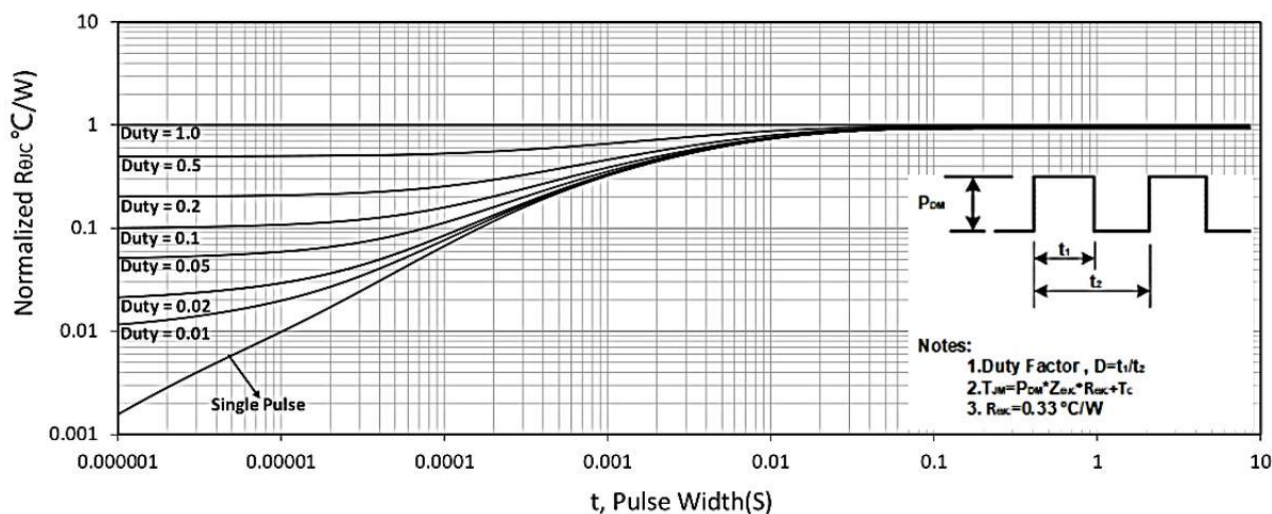
**Figure 8. Gate Charge Characteristics**



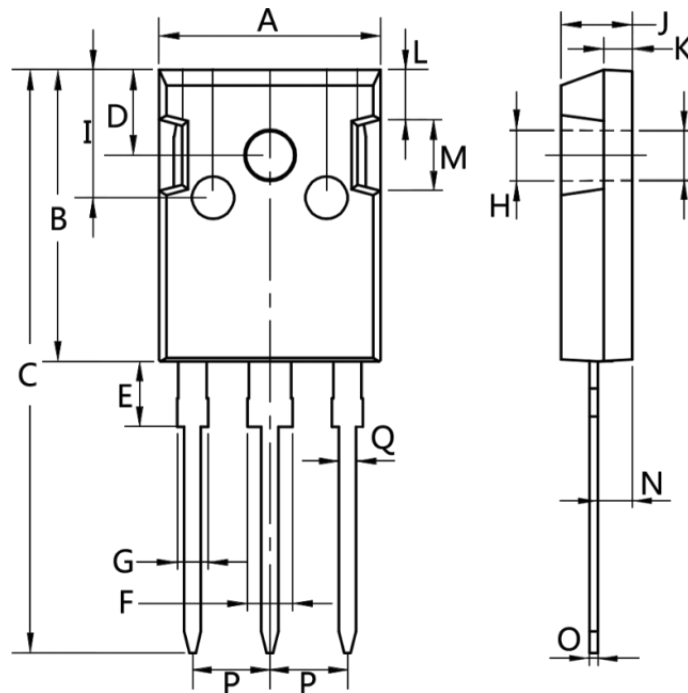
**Figure 9. Power Dissipation**



**Figure 10. Safe Operating Area**



**Figure 11. Normalized Maximum Transient Thermal Impedance**

**Package Mechanical Data-TO-247-3L**


| Dim. | Min.     | Max. |
|------|----------|------|
| A    | 15.0     | 16.0 |
| B    | 20.0     | 21.0 |
| C    | 41.0     | 42.0 |
| D    | 5.0      | 6.0  |
| E    | 4.0      | 5.0  |
| F    | 2.5      | 3.5  |
| G    | 1.75     | 2.5  |
| H    | 3.0      | 3.5  |
| I    | 8.0      | 10.0 |
| J    | 4.9      | 5.1  |
| K    | 1.9      | 2.1  |
| L    | 3.5      | 4.0  |
| M    | 4.75     | 5.25 |
| N    | 2.0      | 3.0  |
| O    | 0.55     | 0.75 |
| P    | Typ 5.08 |      |
| Q    | 1.2      | 1.3  |

**Package Marking and Ordering Information**

| Product ID | Pack      | Marking | Qty(PCS) |
|------------|-----------|---------|----------|
| TAPING     | TO-247-3L |         | 330      |