

### Description

The SX280N04TLG5 uses advanced technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

### General Features

$V_{DS} = 45V$   $I_D = 280A$

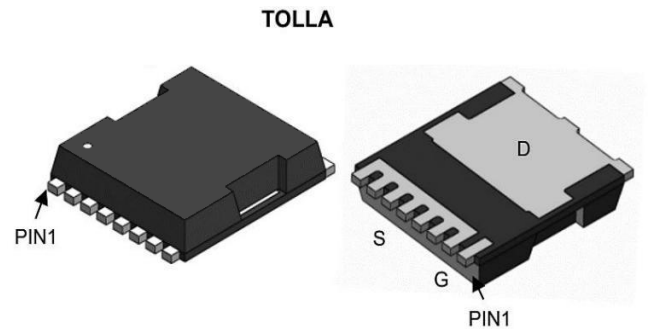
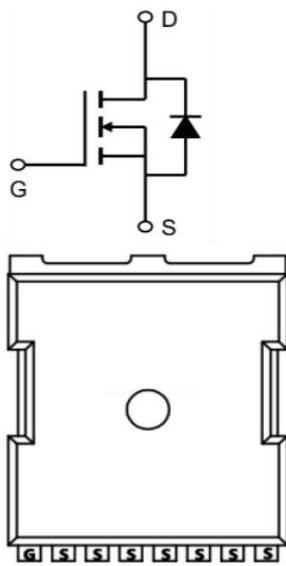
$R_{DS(ON)} < 1.3m\Omega$  @  $V_{GS}=10V$

### Application

BMS

BLDC

UPS



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

| Symbol                 | Parameter                                        | Max.       | Units        |
|------------------------|--------------------------------------------------|------------|--------------|
| $V_{DS}$               | Drain-Source Voltage                             | 45         | V            |
| $V_{GS}$               | Gate-Source Voltage                              | $\pm 20$   | V            |
| $I_{D@TC=25^\circ C}$  | Continuous Drain Current, $V_{GS} @ 10V$         | 300        | A            |
| $I_{D@TC=100^\circ C}$ | Continuous Drain Current, $V_{GS} @ 10V$         | 239        | A            |
| $I_{DM}$               | Pulsed Drain Current                             | 1512       | A            |
| EAS                    | Single Pulsed Avalanche Energy                   | 1512       | mJ           |
| IAS                    | Avalanche Current                                | 70         | A            |
| $PD@TC=25^\circ C$     | Power Dissipation                                | 333.3      | W            |
| $R_{\theta JA}$        | Thermal Resistance Junction-Ambient <sup>1</sup> | 42         | $^\circ C/W$ |
| $R_{\theta JC}$        | Thermal Resistance, Junction to Case             | 0.45       | $^\circ C/W$ |
| $T_J$                  | Operating Junction Temperature Range             | -55 to 175 | $^\circ C$   |
| TSTG                   | Storage Temperature Range                        | -55 to 175 | $^\circ C$   |

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

| Symbol   | Parameter                                             | Test Conditions                         | Min. | Typ. | Max.  | Unit |
|----------|-------------------------------------------------------|-----------------------------------------|------|------|-------|------|
| V(BR)DSS | Drain-Source Breakdown Voltage                        | VGS=0V, ID=250μA                        | 45   | 49   | -     | V    |
| IGSS     | Gate-Body Leakage Current                             | VDS=0V, VGS=±20V                        | -    | -    | ±100  | nA   |
| IDSS     | Zero Gate Voltage Drain Current T <sub>J</sub> =25°C  | VDS=40V, VGS=0V                         | -    | -    | 1     | μA   |
|          | Zero Gate Voltage Drain Current T <sub>J</sub> =100°C |                                         | -    | -    | 100   |      |
| VGS(th)  | Gate-Threshold Voltage                                | VDS=VGS, ID=250μA                       | 1.2  | 1.6  | 2.5   | V    |
| RDS(on)  | Drain-Source on-Resistance <sup>4</sup>               | VGS=10V, ID=20A                         | -    | 1.1  | 1.3   | mΩ   |
|          |                                                       | VGS=4.5V, ID=10A                        | -    | 1.6  | 1.9   |      |
| gfs      | Forward Transconductance <sup>4</sup>                 | VDS=10V, ID=20A                         | -    | 105  | -     | S    |
| Ciss     | Input Capacitance                                     | VDS=20V, VGS=0V,<br>f =1MHz             | -    | 6650 | -     | pF   |
| Coss     | Output Capacitance                                    |                                         | -    | 1495 | -     |      |
| Crss     | Reverse Transfer Capacitance                          |                                         | -    | 103  | -     |      |
| RG       | Gate Resistance                                       | f =1MHz                                 | -    | 2.2  | -     | Ω    |
| Qg       | Total Gate Charge                                     | VGS = 10V, VDS = 20V,<br>ID= 20A        | -    | 118  | -     | nC   |
| Qgs      | Gate-Source Charge                                    |                                         | -    | 19   | -     |      |
| Qgd      | Gate-Drain Charge                                     |                                         | -    | 22.2 | -     |      |
| td(on)   | Turn-on Delay Time                                    | VGS =10V, VDD= 20V,<br>RG = 3Ω, ID= 20A | -    | 13.8 | -     | ns   |
| tr       | Rise Time                                             |                                         | -    | 14   | -     |      |
| td(off)  | Turn-off Delay Time                                   |                                         | -    | 91   | -     |      |
| tf       | Fall Time                                             |                                         | -    | 43   | -     |      |
| trr      | Body Diode Reverse Recovery Time                      | IF = 20A, dI/dt = 100A/μs               | -    | 66   | -     | ns   |
| Qrr      | Body Diode Reverse Recovery Charge                    |                                         | -    | 39.6 | -     | nC   |
| VSD      | Diode Forward Voltage <sup>4</sup>                    | IS = 20A, VGS = 0V                      | -    | -    | 1.2   | V    |
| IS       | Continuous Source Current                             | TC=25°C                                 | -    | -    | - 378 | A    |

**Note :**

- 1、The data tested by surface mounted on a 1 inch 2 FR-4 board with 2OZ copper.
- 2、The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$
- 3、The EAS data shows Max. rating . The test condition is VDD=32V,VGS=10V,L=0.1mH,IAS =70A
- 4、The power dissipation is limited by 150°C junction temperature
- 5、The data is theoretically the same as I D and I DM , in real applications , should be limited by total power dissipation.

## Typical Characteristics

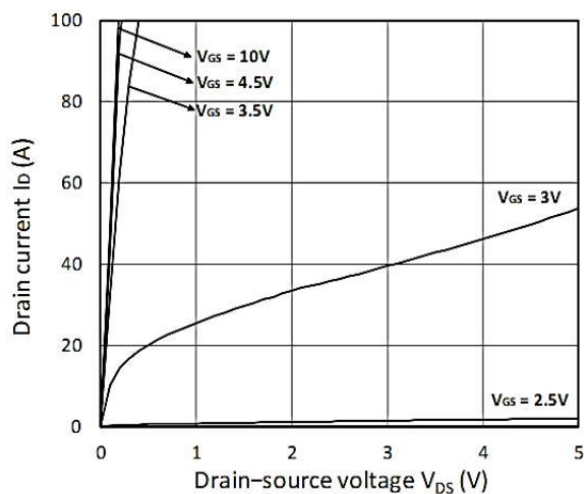


Figure 1. Output Characteristics

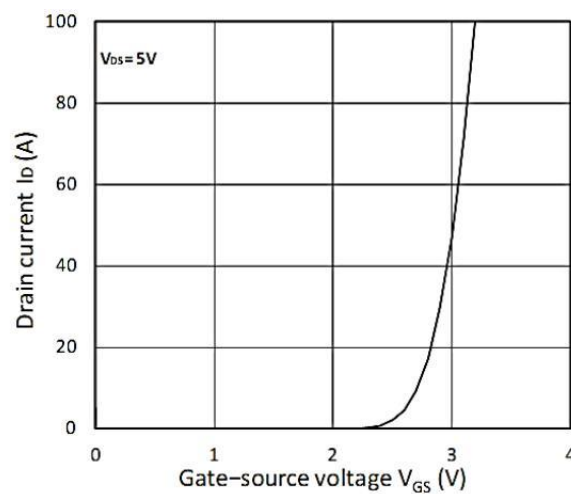


Figure 2. Transfer Characteristics

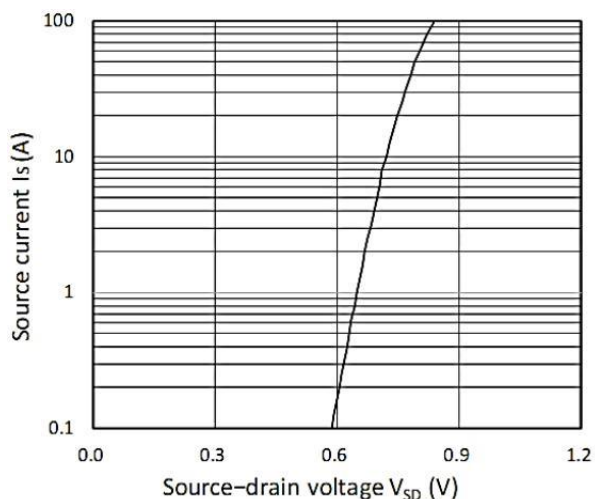


Figure 3. Forward Characteristics of Reverse

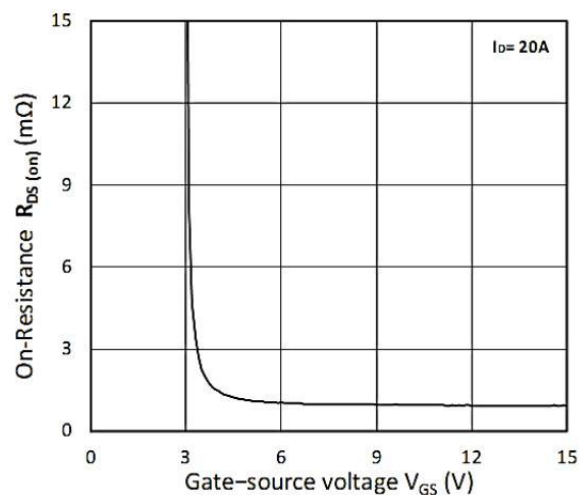


Figure 4. R\_DS(ON) vs. V\_GS

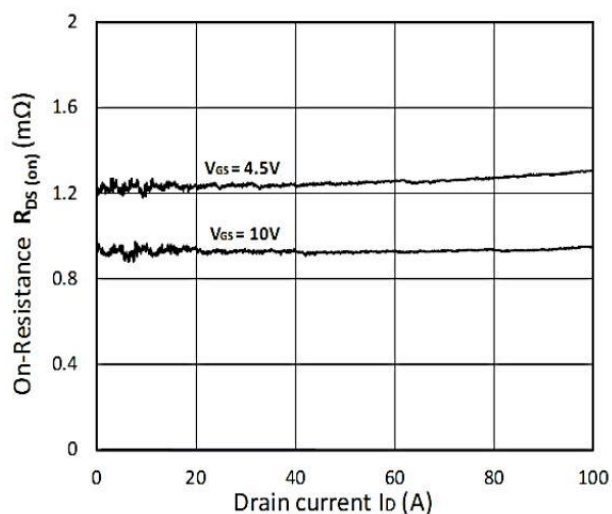


Figure 5. R\_DS(ON) vs. I\_D

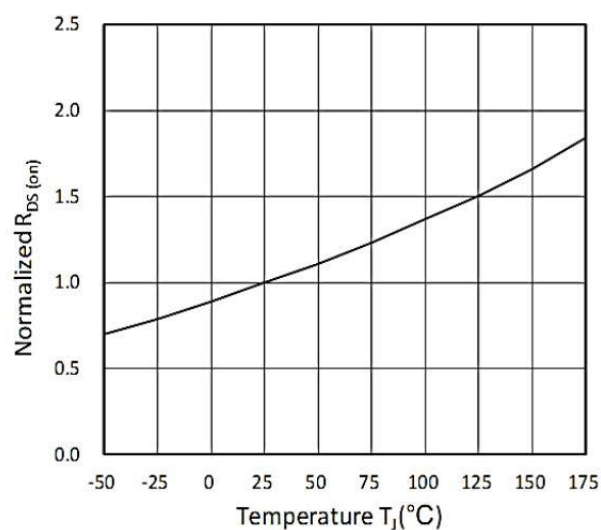


Figure 6. Normalized R\_DS(on) vs. Temperature

## Typical Characteristics

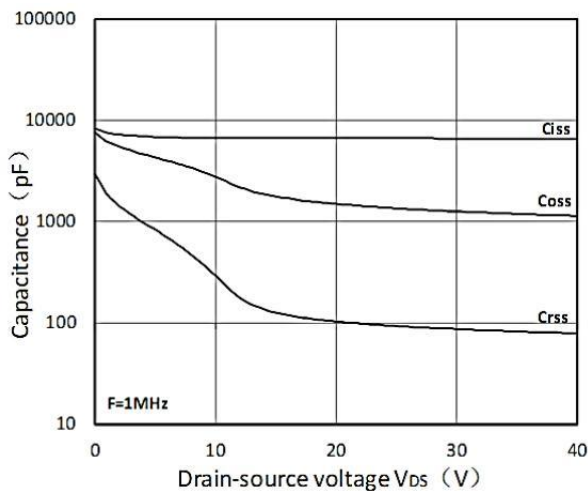


Figure 7. Capacitance Characteristics

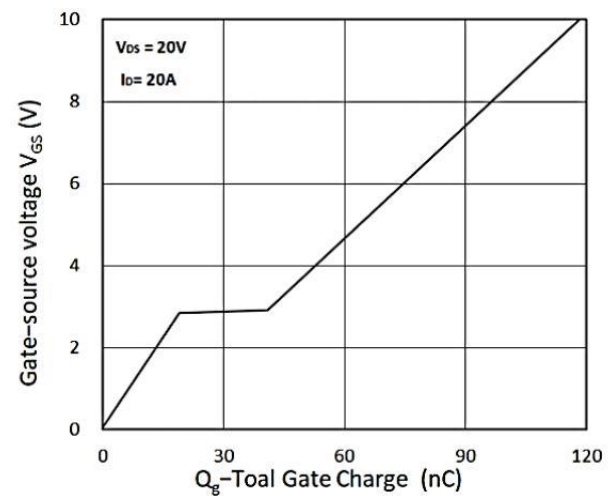


Figure 8. Gate Charge Characteristics

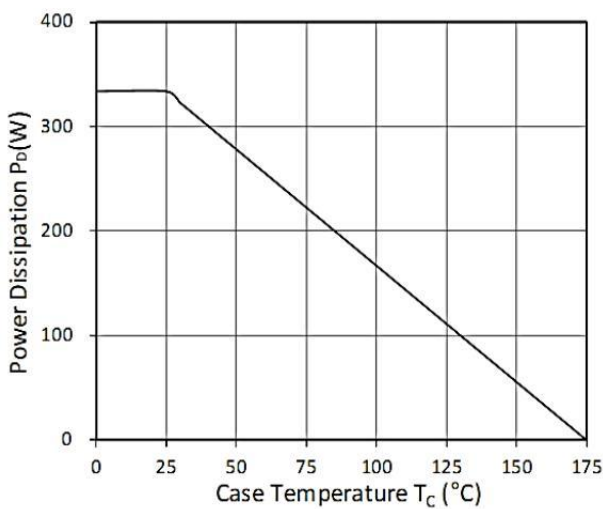


Figure 9. Power Dissipation

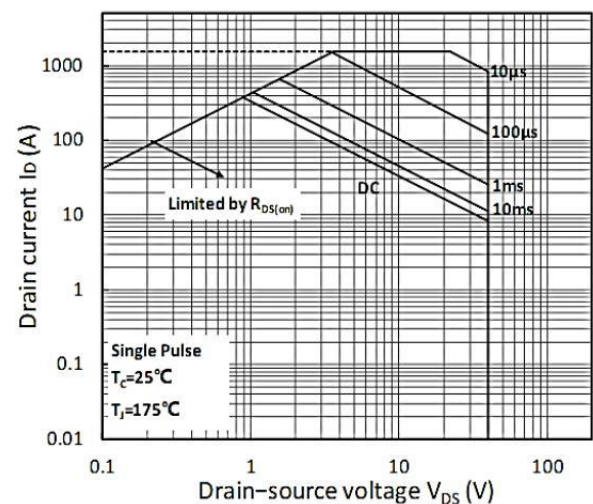


Figure 10. Safe Operating Area

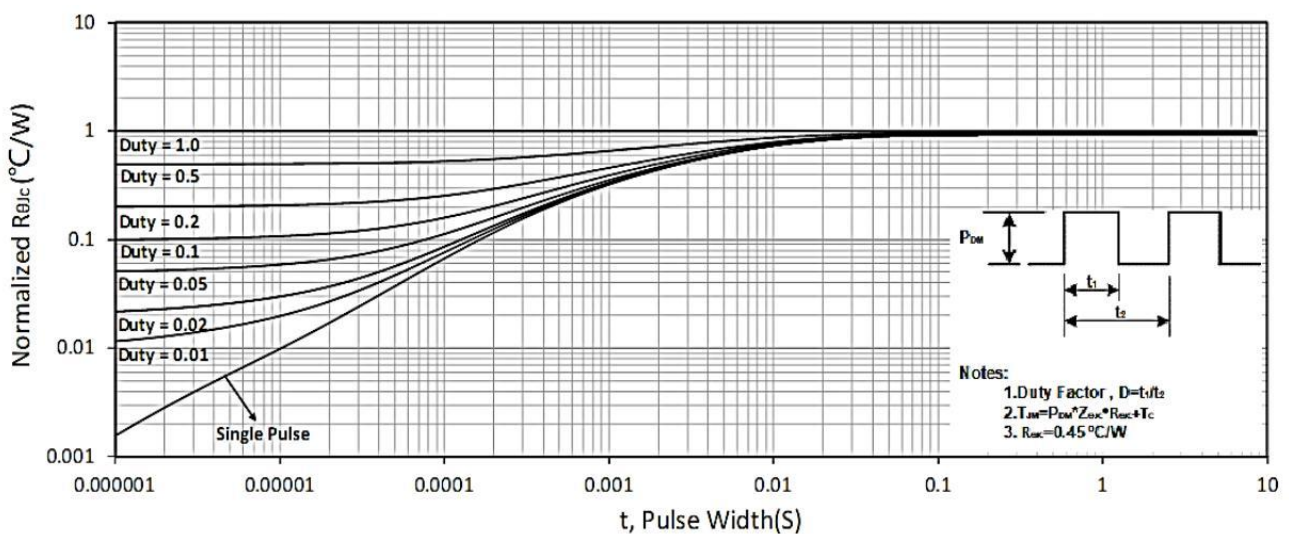
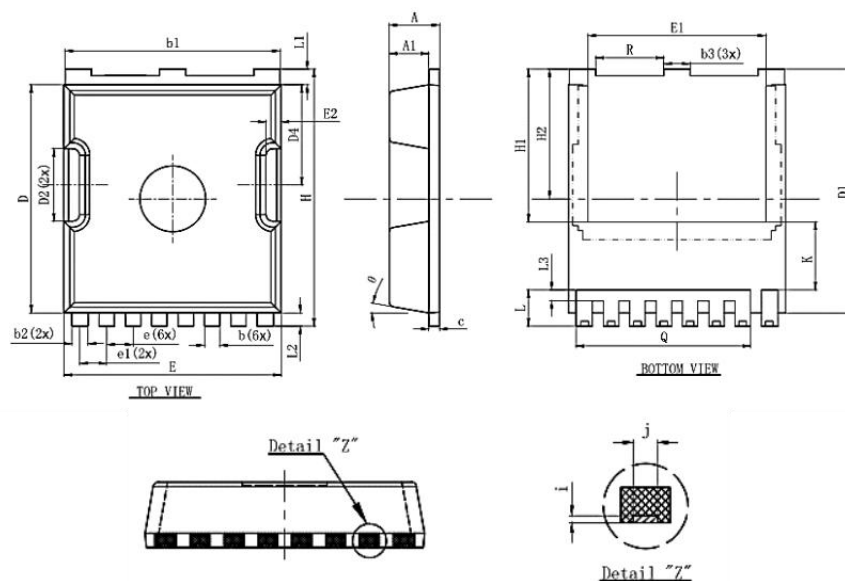


Figure 11 Normalized Maximum Transient Thermal Impedance

**Package Mechanical Data-TOLLA-8-XZ Single**


| Symbol | Dimensions In Millimeters |      |      |
|--------|---------------------------|------|------|
|        | Min.                      | Nom  | Max. |
| A      | 2.2                       | 2.3  | 2.4  |
| A1     | 1.7                       | 1.8  | 1.9  |
| b      | 0.6                       | 0.7  | 0.8  |
| b1     | 9.7                       | 9.8  | 9.9  |
| b2     | 0.65                      | 0.75 | 0.85 |
| b3     | 1.1                       | 1.2  | 1.3  |
| C      | 0.4                       | 0.5  | 0.6  |
| D      | 10.3                      | 10.4 | 10.5 |
| D1     | 11.0                      | 11.1 | 11.2 |
| D2     | 3.2                       | 3.3  | 3.4  |
| D4     | 4.47                      | 4.57 | 4.67 |
| E      | 9.8                       | 9.9  | 10.0 |
| E1     | 8.0                       | 8.1  | 8.2  |
| E2     | 0.5                       | 0.6  | 0.7  |
| e      | 1.200 (BSC)               |      |      |
| e1     | 1.225 (BSC)               |      |      |
| H      | 11.6                      | 11.7 | 11.8 |
| H1     | 6.95BSC                   |      |      |
| H2     | 5.9BSC                    |      |      |
| i      | 0.1REF                    |      |      |
| j      | 0.350REF                  |      |      |
| K      | 3.100REF                  |      |      |
| L      | 1.55                      | 1.65 | 1.75 |
| L1     | 0.6                       | 0.7  | 0.8  |
| L2     | 0.5                       | 0.6  | 0.7  |
| L3     | 0.4                       | 0.5  | 0.6  |
| Q      | 7.95REF                   |      |      |
| R      | 3.0                       | 3.1  | 3.2  |
| θ      | 10°REG                    |      |      |

**Package Marking and Ordering Information**

| Product ID | Pack     | Marking | Qty(PCS) |
|------------|----------|---------|----------|
| TAPING     | TOLLA-8L |         | 2000     |