

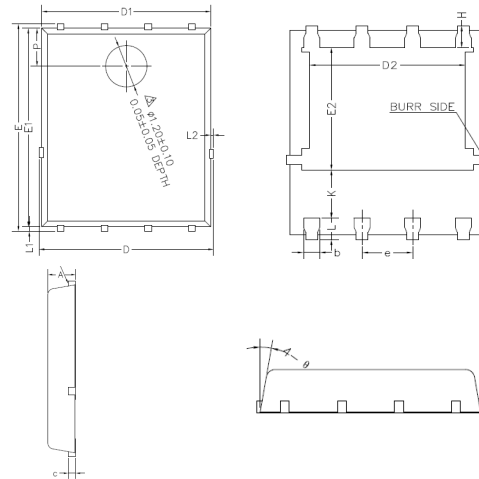
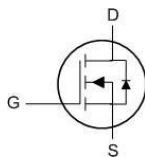
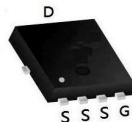
**Description**

The 80N03NF is the high cell density Trench MOSFET, which provide excellent RDSON and gate charge for DC/DC converters application.

The 80N03NF meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

100% EAS Guaranteed  
Green Device Available  
Super Low Gate Charge  
Low  $R_{DS(ON)}$

Advanced high cell density Trench technology



PDFN5X6

Dimensions In Millimeters

| SYMBOL | min  | max  | SYMBOL | min  | max  | SYMBOL   | min | max |
|--------|------|------|--------|------|------|----------|-----|-----|
| A      | 0.95 | 1.20 | E      | 5.9  | 6.1  | L2       |     | 0.2 |
| b      | 0.25 | 0.40 | E1     | 5.7  | 5.8  | $\theta$ |     | 13° |
| c      | 0.21 | 0.34 | E2     | 3.34 | 3.54 | P        | 1.0 | 1.2 |
| D      |      | 5.1  | H      | 0.51 | 0.71 |          |     |     |
| D1     | 4.8  | 5.0  | K      | 1.1  |      |          |     |     |
| D2     | 3.91 | 4.20 | L      | 0.51 | 0.71 |          |     |     |
| e      | 1.17 | 1.37 | L1     | 0.06 | 0.2  |          |     |     |

**Product Summary**

| BVDSS | RDSON         | ID  |
|-------|---------------|-----|
| 30V   | 4.3m $\Omega$ | 82A |

**Absolute Maximum Ratings**

| Symbol                | Parameter                                  | Rating     | Units      |
|-----------------------|--------------------------------------------|------------|------------|
| $V_{DS}$              | Drain-Source Voltage                       | 30         | V          |
| $V_{GS}$              | Gate-Source Voltage                        | $\pm 20$   | V          |
| $I_D@T_C=25^\circ C$  | Continuous Drain Current, $V_{GS} @ 10V^1$ | 82         | A          |
| $I_D@T_C=100^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 53         | A          |
| $I_{DM}$              | Pulsed Drain Current <sup>2</sup>          | 155        | A          |
| EAS                   | Single Pulse Avalanche Energy <sup>3</sup> | 38.8       | mJ         |
| $I_{AS}$              | Avalanche Current                          | 34         | A          |
| $P_D@T_C=25^\circ C$  | Total Power Dissipation <sup>4</sup>       | 37         | W          |
| $T_{STG}$             | Storage Temperature Range                  | -55 to 150 | $^\circ C$ |
| $T_J$                 | Operating Junction Temperature Range       | -55 to 150 | $^\circ C$ |

**Thermal Data**

| Symbol          | Parameter                                        | Typ. | Max. | Unit         |
|-----------------|--------------------------------------------------|------|------|--------------|
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient <sup>1</sup> | ---  | 50   | $^\circ C/W$ |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case <sup>1</sup>    | ---  | 4.6  | $^\circ C/W$ |

# 80N03NF

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

| Symbol              | Parameter                                      | Conditions                                                                              | Min. | Typ. | Max. | Unit |
|---------------------|------------------------------------------------|-----------------------------------------------------------------------------------------|------|------|------|------|
| BV <sub>DSS</sub>   | Drain-Source Breakdown Voltage                 | V <sub>GS</sub> =0V, I <sub>D</sub> =250uA                                              | 30   | ---  | ---  | V    |
| R <sub>DS(ON)</sub> | Static Drain-Source On-Resistance <sup>2</sup> | V <sub>GS</sub> =10V, I <sub>D</sub> =20A                                               | ---  | 4.3  | 6.2  | mΩ   |
|                     |                                                | V <sub>GS</sub> =4.5V, I <sub>D</sub> =15A                                              | ---  | 5.7  | 8    |      |
| V <sub>GS(th)</sub> | Gate Threshold Voltage                         | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA                                | 1.2  | ---  | 2.5  | V    |
| I <sub>DSS</sub>    | Drain-Source Leakage Current                   | V <sub>DS</sub> =24V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C                         | ---  | ---  | 1    | uA   |
|                     |                                                | V <sub>DS</sub> =24V, V <sub>GS</sub> =0V, T <sub>J</sub> =55°C                         | ---  | ---  | 5    |      |
| I <sub>GSS</sub>    | Gate-Source Leakage Current                    | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V                                              | ---  | ---  | ±100 | nA   |
| g <sub>fs</sub>     | Forward Transconductance                       | V <sub>DS</sub> =5V, I <sub>D</sub> =20A                                                | ---  | 67   | ---  | S    |
| R <sub>g</sub>      | Gate Resistance                                | V <sub>DS</sub> =0V, V <sub>GS</sub> =0V, f=1MHz                                        | ---  | 1.7  | ---  | Ω    |
| Q <sub>g</sub>      | Total Gate Charge (4.5V)                       | V <sub>DS</sub> =15V, V <sub>GS</sub> =4.5V, I <sub>D</sub> =15A                        | ---  | 8    | ---  | nC   |
| Q <sub>gs</sub>     | Gate-Source Charge                             |                                                                                         | ---  | 2.4  | ---  |      |
| Q <sub>gd</sub>     | Gate-Drain Charge                              |                                                                                         | ---  | 3.2  | ---  |      |
| T <sub>d(on)</sub>  | Turn-On Delay Time                             | V <sub>DD</sub> =15V, V <sub>GS</sub> =10V, R <sub>G</sub> =3.3Ω<br>I <sub>D</sub> =15A | ---  | 7.1  | ---  | ns   |
| T <sub>r</sub>      | Rise Time                                      |                                                                                         | ---  | 40   | ---  |      |
| T <sub>d(off)</sub> | Turn-Off Delay Time                            |                                                                                         | ---  | 15   | ---  |      |
| T <sub>f</sub>      | Fall Time                                      |                                                                                         | ---  | 6    | ---  |      |
| C <sub>iss</sub>    | Input Capacitance                              | V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1MHz                                       | ---  | 814  | ---  | pF   |
| C <sub>oss</sub>    | Output Capacitance                             |                                                                                         | ---  | 498  | ---  |      |
| C <sub>rss</sub>    | Reverse Transfer Capacitance                   |                                                                                         | ---  | 41   | ---  |      |

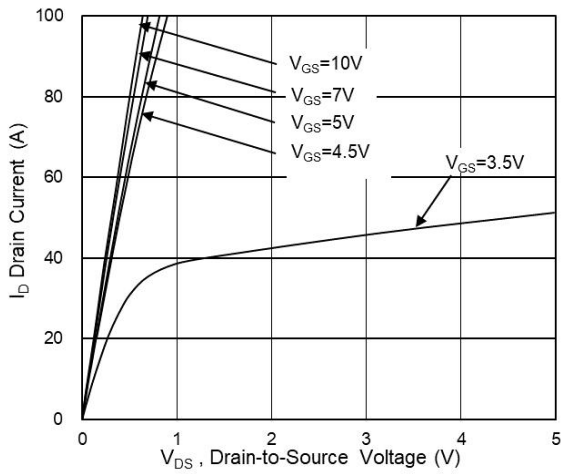
## Diode Characteristics

| Symbol          | Parameter                                | Conditions                                                    | Min. | Typ. | Max. | Unit |
|-----------------|------------------------------------------|---------------------------------------------------------------|------|------|------|------|
| I <sub>S</sub>  | Continuous Source Current <sup>1,6</sup> | V <sub>G</sub> =V <sub>D</sub> =0V, Force Current             | ---  | ---  | 82   | A    |
| V <sub>SD</sub> | Diode Forward Voltage <sup>2</sup>       | V <sub>GS</sub> =0V, I <sub>S</sub> =1A, T <sub>J</sub> =25°C | ---  | ---  | 1    | V    |
| t <sub>rr</sub> | Reverse Recovery Time                    | I <sub>F</sub> =20A, di/dt=100A/μs,                           | ---  | 15   | ---  | nS   |
| Q <sub>rr</sub> | Reverse Recovery Charge                  | T <sub>J</sub> =25°C                                          | ---  | 25   | ---  | nC   |

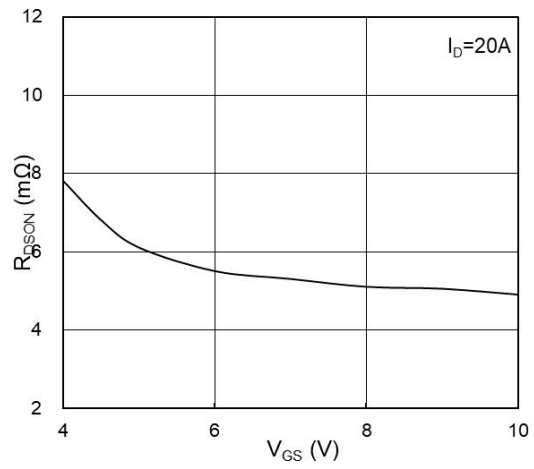
Note :

- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 20Z 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>=25V, V<sub>GS</sub>=10V, L=0.1mH, I<sub>AS</sub>=24A
- 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.

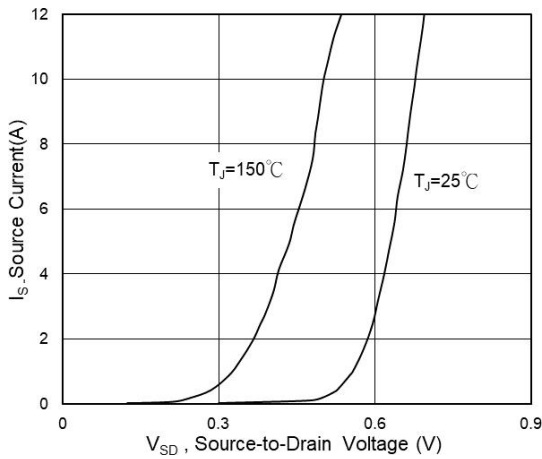
## RATING AND CHARACTERISTIC CURVES (80N03NF)



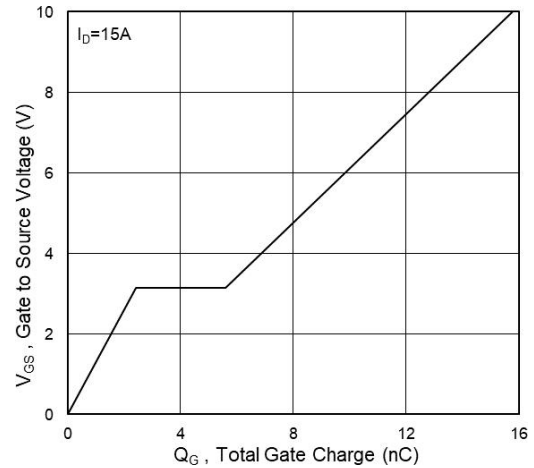
**Fig.1 Typical Output Characteristics**



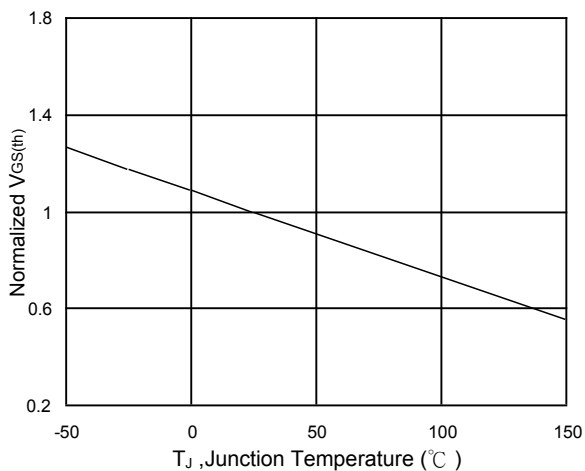
**Fig.2 On-Resistance vs G-S Voltage**



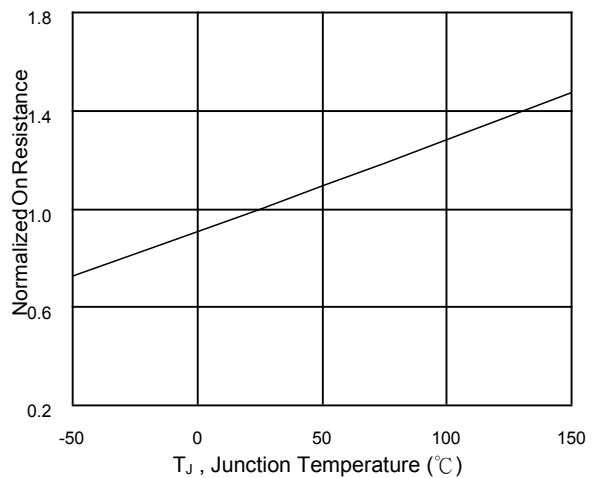
**Fig.3 Source Drain Forward Characteristics**



**Fig.4 Gate-Charge Characteristics**

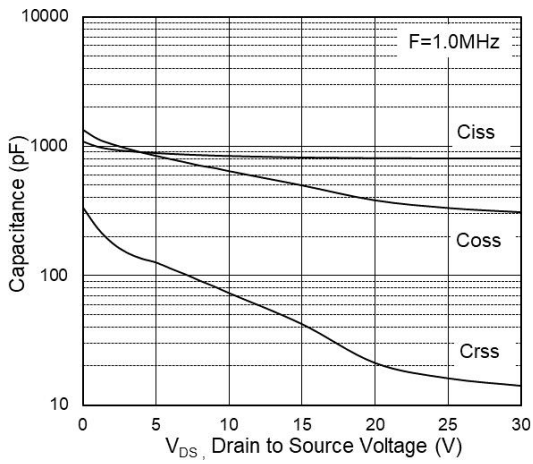


**Fig.5 Normalized  $V_{GS(th)}$  vs  $T_J$**

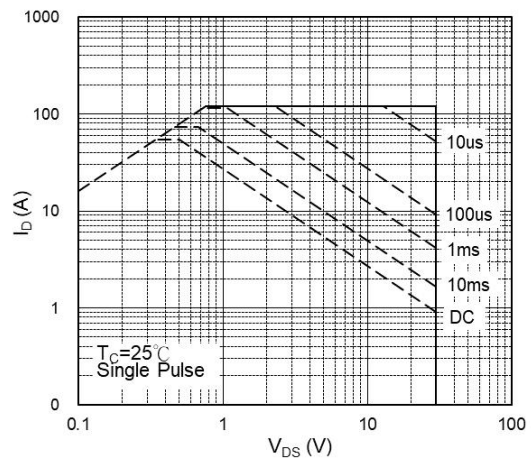


**Fig.6 Normalized  $R_{DS(on)}$  vs  $T_J$**

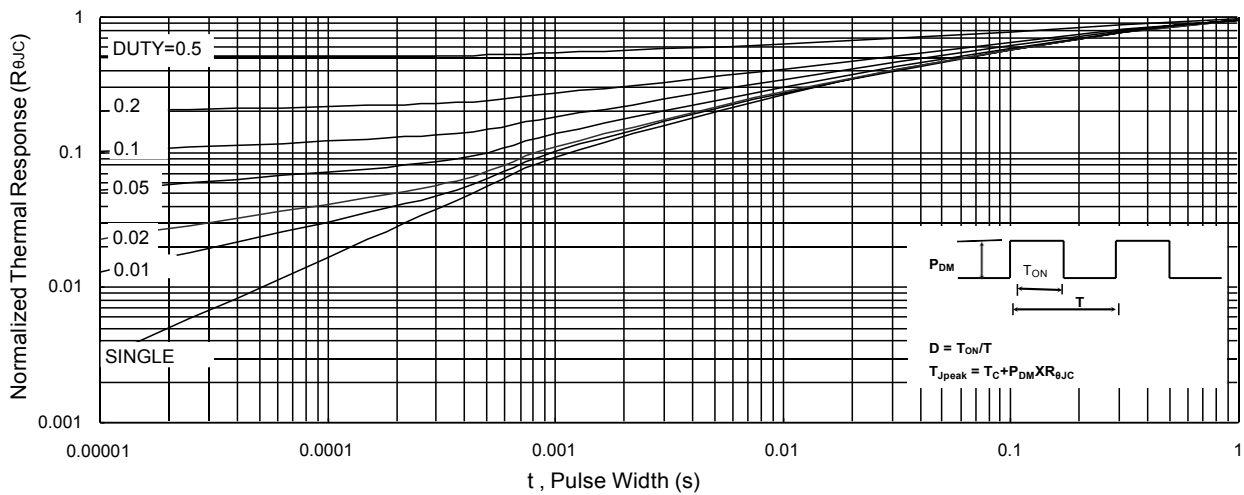
## RATING AND CHARACTERISTIC CURVES (80N03NF)



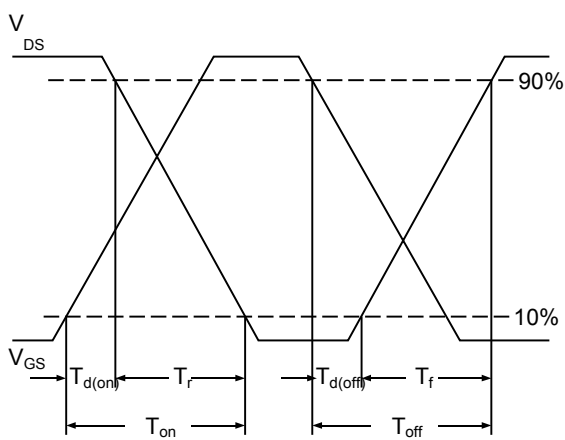
**Fig.7 Capacitance**



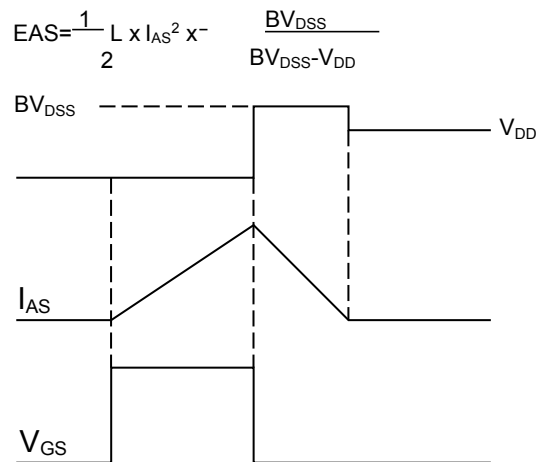
**Fig.8 Safe Operating Area**



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



**Fig.10 Switching Time Waveform**



**Fig.11 Unclamped Inductive Switching Waveform**