Elektronische Bauelemente

# SSD80N03

**80A , 30V , $R_{DS(ON)}$ 5.5mΩ**

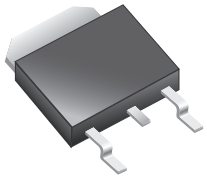
**N-Ch Enhancement Mode Power MOSFET**

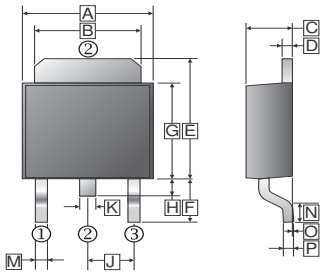
RoHS Compliant Product
A suffix of "-C" specifies halogen free

## DESCRIPTION

The SSD80N03 is the highest performance trench N-ch MOSFETs with extreme high cell density , which provide excellent $R_{DS(ON)}$ and gate charge for most of the synchronous buck converter applications .

**TO-252(D-Pack)**



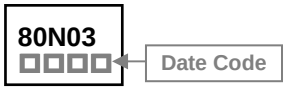



| REF. | Millimeter | | REF. | Millimeter | |
|---|---|---|---|---|---|
| | Min. | Max. | | Min. | Max. |
| A | 6.35 | 6.80 | J | 2.30 REF. | |
| B | 5.20 | 5.50 | K | 0.64 | 0.90 |
| C | 2.15 | 2.40 | M | 0.50 | 1.1 |
| D | 0.45 | 0.58 | N | 0.9 | 1.65 |
| E | 6.8 | 7.5 | O | 0 | 0.15 |
| F | 2.40 | 3.0 | P | 0.43 | 0.58 |
| G | 5.40 | 6.25 | | | |
| H | 0.64 | 1.20 | | | |

## FEATURES

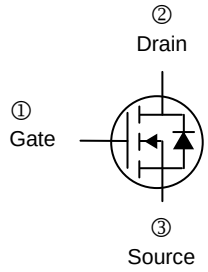
- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% EAS Guaranteed
- Green Device Available

## MARKING




## PACKAGE INFORMATION

| Package | MPQ | Leader Size |
|---|---|---|
| TO-252 | 2.5K | 13 inch |




## ABSOLUTE MAXIMUM RATINGS ($T_A$=25℃ unless otherwise specified)

| Parameter | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 30 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Continuous Drain Current [1] | $V_{GS}$=10V, $T_C$=25℃ | $I_D$ | 80 | A |
| | $V_{GS}$=10V,$T_C$=100℃ | | 57 | A |
| Pulsed Drain Current [2] | | $I_{DM}$ | 160 | A |
| Total Power Dissipation [4] | $T_C$=25℃ | $P_D$ | 59 | W |
| Linear Derating Factor | | | 0.5 | W / ℃ |
| Single Pulse Avalanche Energy [3] | | $E_{AS}$ | 252 | mJ |
| Single Pulse Avalanche Current | | $I_{AS}$ | 48 | A |
| Operating Junction and Storage Temperature Range | | $T_J$, $T_{STG}$ | -55~150 | ℃ |
| **Thermal Resistance Rating** | | | | |
| Maximum Thermal Resistance Junction-Ambient [1] | | $R_{\theta JA}$ | 62 | ℃ / W |
| Maximum Thermal Resistance Junction-Case [1] | | $R_{\theta JC}$ | 2.1 | ℃ / W |

## ELECTRICAL CHARACTERISTICS ($T_J$=25℃ unless otherwise specified)

| Parameter | | Symbol | Min. | Typ. | Max. | Unit | Teat Conditions |
|---|---|---|---|---|---|---|---|
| **Static** | | | | | | | |
| Drain-Source Breakdown Voltage | | $BV_{DSS}$ | 30 | - | - | V | $V_{GS}$=0, $I_D$=250μA |
| Gate-Threshold Voltage | | $V_{GS(th)}$ | 1.0 | - | 2.5 | V | $V_{DS}$=$V_{GS}$, $I_D$=250μA |
| Forward Transconductance | | $g_{fs}$ | - | 43 | - | S | $V_{DS}$=5V, $I_D$=30A |
| Gate-Source Leakage Current | | $I_{GSS}$ | - | - | ±100 | nA | $V_{GS}$= ±20V |
| Drain-Source Leakage Current | $T_J$ =25℃ | $I_{DSS}$ | - | - | 1 | μA | $V_{DS}$=24V, $V_{GS}$=0 |
| | $T_J$ =55℃ | | - | - | 5 | | $V_{DS}$=24V, $V_{GS}$=0 |
| Static Drain-Source On-Resistance [2] | | $R_{DS(ON)}$ | - | - | 5.5 | mΩ | $V_{GS}$=10V, $I_D$=30A |
| | | | - | - | 8 | | $V_{GS}$=4.5V, $I_D$=15A |
| Total Gate Charge | | $Q_g$ | - | 20 | - | nC | $I_D$=15A<br>$V_{DS}$=15V<br>$V_{GS}$=4.5V |
| Gate-Source Charge | | $Q_{gs}$ | - | 7.6 | - | | |
| Gate-Drain (“Miller”) Change | | $Q_{gd}$ | - | 7.2 | - | | |
| Turn-on Delay Time | | $T_{d(on)}$ | - | 7.8 | - | nS | $V_{DD}$=15V<br>$I_D$=15A<br>$V_{GS}$=10V<br>$R_G$=3.3 Ω |
| Rise Time | | $T_r$ | - | 15 | - | | |
| Turn-off Delay Time | | $T_{d(off)}$ | - | 37.3 | - | | |
| Fall Time | | $T_f$ | - | 10.6 | - | | |
| Input Capacitance | | $C_{iss}$ | - | 2295 | - | pF | $V_{GS}$ =0<br>$V_{DS}$=15V<br>f =1.0MHz |
| Output Capacitance | | $C_{oss}$ | - | 267 | - | | |
| Reverse Transfer Capacitance | | $C_{rss}$ | - | 210 | - | | |
| **Guaranteed Avalanche Characteristics** | | | | | | | |
| Single Pulse Avalanche Energy [5] | | EAS | 63 | - | - | mJ | $V_{DD}$=25V,L=0.1mH , $I_{AS}$=24A |
| **Source-Drain Diode** | | | | | | | |
| Diode Forward Voltage [2] | | $V_{SD}$ | - | - | 1 | V | $I_S$=1A, $V_{GS}$=0 |
| Continuous Source Current [1,6] | | $I_S$ | - | - | 80 | A | $V_D$=$V_G$=0, Force Current |
| Pulsed Source Current [2,6] | | $I_{SM}$ | - | - | 160 | A | |
| Reverse Recovery Time | | $T_{RR}$ | - | 14 | - | nS | $I_F$=30A, dI/dt=100A/μS<br>$T_J$ =25℃ |
| Reverse Recovery Charge | | $Q_{RR}$ | - | 5 | - | nC | |

Notes:
1. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.
2. The data tested by pulsed , pulse width≦300μs , duty cycle≦2%
3. The EAS data shows Max. rating . The test condition is $V_{DD}$=25V,$V_{GS}$=10V,L=0.1mH,$I_{AS}$=48A
4. The power dissipation is limited by 150℃ junct ion temperature
5. The Min. value is 100% EAS tested guarantee.
6. The data is theoretically the same as $I_D$ and $I_{DM}$ , in real applications , should be limited by total power dissipation.

## CHARACTERISTIC CURVES

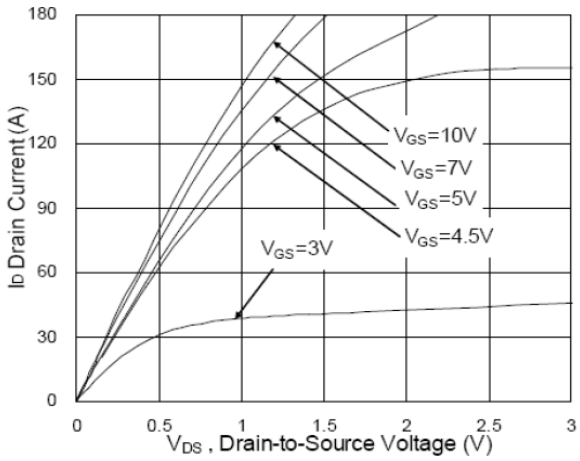



Fig.1 Typical Output Characteristics

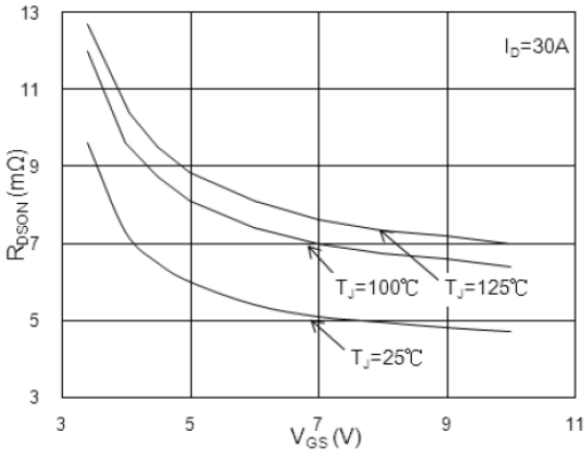



Fig.2 On-Resistance vs. G-S Voltage

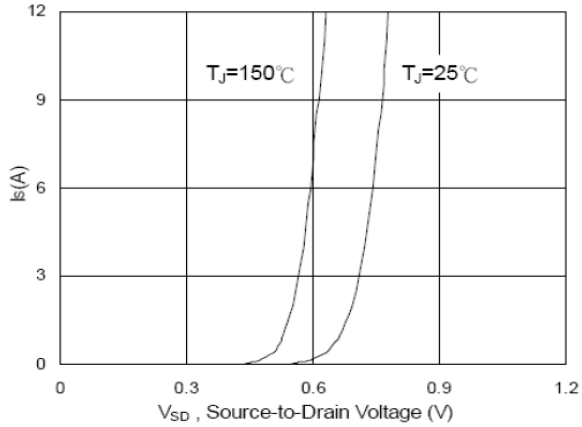



Fig.3 Forward Characteristics of Reverse

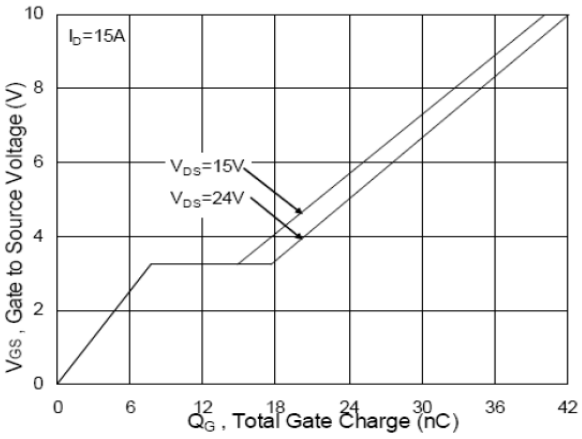



Fig.4 Gate-Charge Characteristics

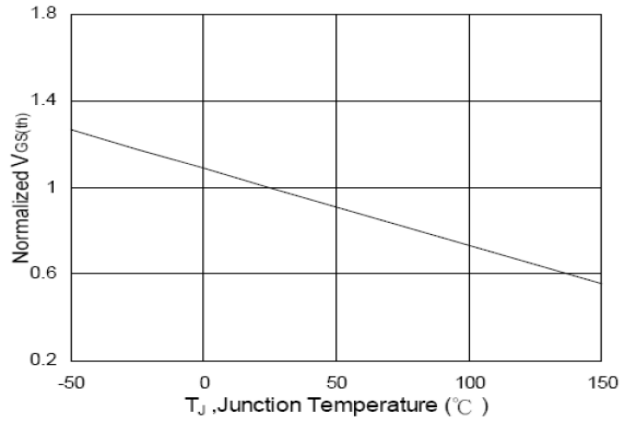



Fig.5 Normalized $V_{GS(th)}$ vs. $T_J$

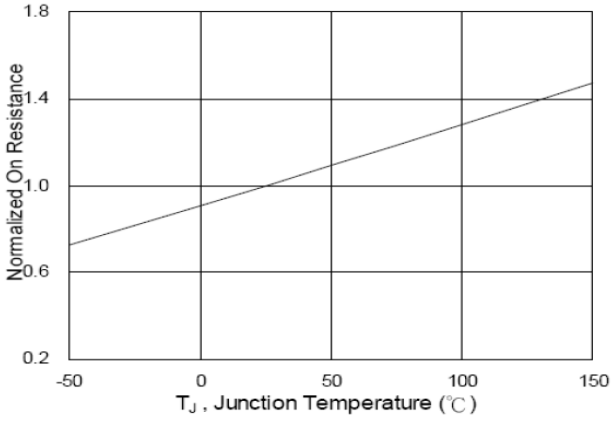



Fig.6 Normalized $R_{DSON}$ vs. $T_J$

## CHARACTERISTIC CURVES

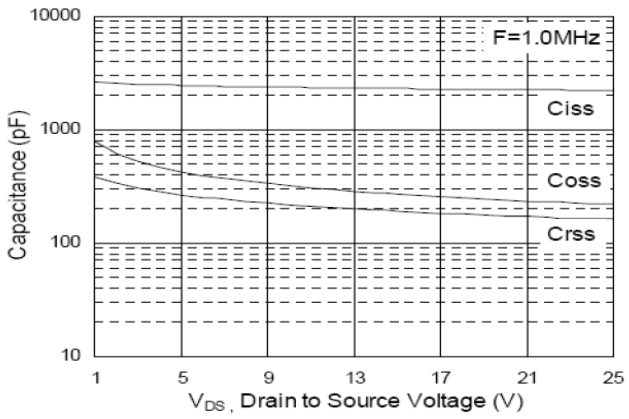



Fig.7 Capacitance

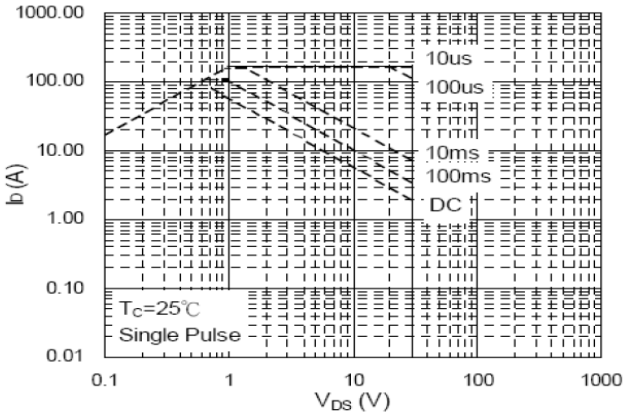



Fig.8 Safe Operating Area

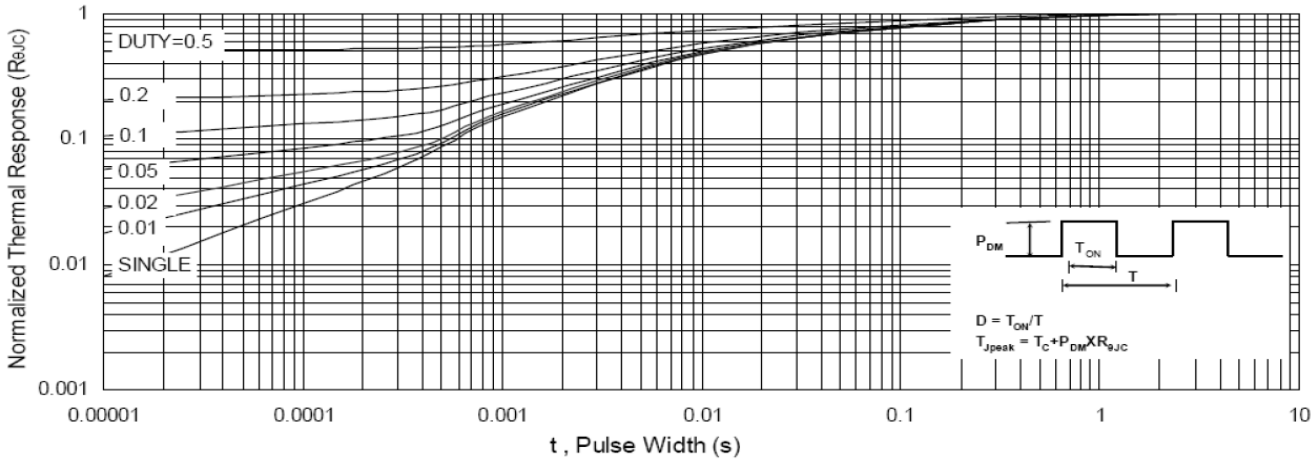



Fig.9 Normalized Maximum Transient Thermal Impedance

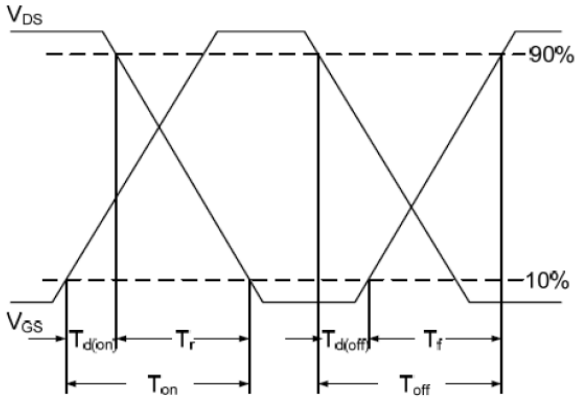



Fig.10 Switching Time Waveform

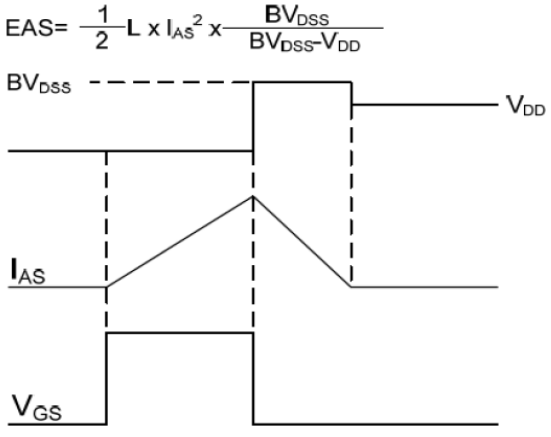



Fig.11 Unclamped Inductive Switching Waveform