

General Description

The 70N03 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.

The 70N03 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

Features

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

Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|---------------------------------------|--|------------|-------|
| V _{DS} | Drain-Source Voltage | 30 | V |
| V _{GS} | Gate-Source Voltage | ±20 | V |
| I _D @T _C =25°C | Continuous Drain Current ¹ | 70 | A |
| I _D @T _C =100°C | Continuous Drain Current ¹ | 50 | A |
| I _{DM} | Pulsed Drain Current ² | 170 | A |
| EAS | Single Pulse Avalanche Energy ³ | 85 | mJ |
| I _{AS} | Avalanche Current | 45 | A |
| P _D @T _C =25°C | Total Power Dissipation | 65 | W |
| T _{STG} | Storage Temperature Range | -55 to 175 | °C |
| T _J | Operating Junction Temperature Range | -55 to 175 | °C |

Thermal Data

| Symbol | Parameter | Typ. | Max. | Unit |
|------------------|--|------|------|------|
| R _{θJA} | Thermal Resistance Junction-ambient ¹ | --- | 70 | °C/W |
| R _{θJC} | Thermal Resistance Junction -Case ¹ | --- | 2 | °C/W |

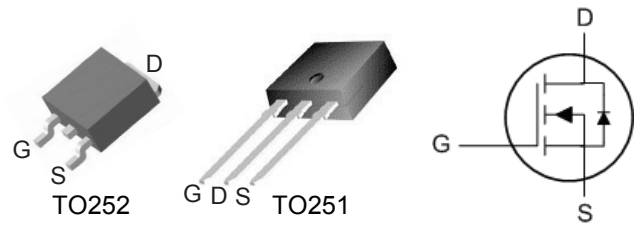
Product Summary

| BVDSS | R _{DS(on)} | ID |
|-------|---------------------|-----|
| 30V | 7mΩ | 70A |

Applications

- High Frequency Point-of-Load Synchronous Buck Converter for MB/NB/UMPC/VGA
- Networking DC-DC Power System
- Load Switch

TO252 / TO251 Pin Configuration



N-Ch 30V Fast Switching MOSFETs

Electrical Characteristics ($T_J=25\text{ }^\circ\text{C}$, unless otherwise noted)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|------------------------------|--|--|------|------|-----------|----------------------|
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D=250\mu A$ | 30 | --- | --- | V |
| $\Delta BV_{DSS}/\Delta T_J$ | BVDSS Temperature Coefficient | Reference to $25\text{ }^\circ\text{C}$, $I_D=1mA$ | --- | 6.5 | --- | MV/ $^\circ\text{C}$ |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance ² | $V_{GS}=10V, I_D=20A$ | --- | 5.3 | 7 | m Ω |
| | | $V_{GS}=4.5V, I_D=20A$ | --- | 7.5 | 11.5 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}=V_{DS}, I_D=250\mu A$ | 1.0 | 1.5 | 3 | V |
| $\Delta V_{GS(th)}$ | $V_{GS(th)}$ Temperature Coefficient | | --- | 5.08 | --- | mV/ $^\circ\text{C}$ |
| I_{DSS} | Drain-Source Leakage Current | $V_{DS}=20V, V_{GS}=0V, T_J=25\text{ }^\circ\text{C}$ | --- | --- | 1 | μA |
| | | $V_{DS}=20V, V_{GS}=0V, T_J=150\text{ }^\circ\text{C}$ | --- | --- | 10 | |
| I_{GSS} | Gate-Source Leakage Current | $V_{GS}=\pm 20V, V_{DS}=0V$ | --- | --- | ± 100 | nA |
| g_{fs} | Forward Transconductance | $V_{DS}=10V, I_D=15A$ | --- | 29 | --- | S |
| R_g | Gate Resistance | $V_{DS}=0V, V_{GS}=0V, f=1MHz$ | --- | 1.7 | 3.4 | Ω |
| Q_g | Total Gate Charge | $V_{DS}=10V, V_{GS}=5V, I_D=30A$ | --- | 16.6 | 25.5 | nC |
| Q_{gs} | Gate-Source Charge | | --- | 8.1 | --- | |
| Q_{gd} | Gate-Drain Charge | | --- | 4.7 | --- | |
| $T_{d(on)}$ | Turn-On Delay Time | $V_{DD}=10V, V_{GS}=10V, R_G=3.3\Omega$ $I_D=30A$ | --- | 13 | --- | ns |
| T_r | Rise Time | | --- | 6.7 | --- | |
| $T_{d(off)}$ | Turn-Off Delay Time | | --- | 22.5 | --- | |
| T_f | Fall Time | | --- | 10.1 | --- | |
| C_{iss} | Input Capacitance | $V_{DS}=20V, V_{GS}=0V, f=1MHz$ | --- | 2211 | --- | pF |
| C_{oss} | Output Capacitance | | --- | 515 | --- | |
| C_{rss} | Reverse Transfer Capacitance | | --- | 174 | --- | |

Diode Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|----------|--|---|------|------|------|------|
| I_S | Continuous Source Current ¹ | $V_G=V_D=0V$, Force Current | --- | 27 | --- | A |
| I_{SM} | Pulsed Source Current ² | | --- | --- | 100 | A |
| V_{SD} | Diode Forward Voltage ² | $V_{GS}=0V, I_S=1A, T_J=25\text{ }^\circ\text{C}$ | --- | --- | 1.3 | V |

Note :

- 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 $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is $V_{DD}=30V, V_{GS}=10V, L=0.1mH, I_L=12A$