## General Description

The WSK250N03 is the highest performance trench N-ch MOSFET with extreme high cell density , which provide excellent RDSON and gate charge for most of the synchronous buck converter applications .

The WSK250N03 meet the RoHS and Green Product requirement , 100% EAS guaranteed with full function reliability approved.

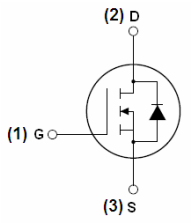
## Product Summery

| BVDSS | RDSON | ID |
|---|---|---|
| 30V | 1.8mΩ | 250A |

## Applications

- High Frequency Point-of-Load Synchronous Buck Converter
- Networking DC-DC Power System

## TO-263-2L Pin Configuration




## 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℃ | Continuous Drain Current, $V_{GS}$ @ 10V[1] | 250 | A |
| $I_D$@$T_C$=100℃ | Continuous Drain Current, $V_{GS}$ @ 10V[1] | 180 | A |
| $I_{DM}$ | Pulsed Drain Current[2] | 1000 | A |
| EAS | Single Pulse Avalanche Energy[3] | 600 | mJ |
| $I_{AS}$ | Avalanche Current | 200 | A |
| $P_D$@$T_C$=25℃ | Total Power Dissipation[3] | 200 | W |
| $P_D$@$T_C$=100℃ | Total Power Dissipation[3] | 120 | W |
| $T_{STG}$ | Storage Temperature Range | -55 to 170 | ℃ |
| $T_J$ | Operating Junction Temperature Range | -55 to 175 | ℃ |

## Electrical Characteristics ($T_J$=25℃, unless otherwise noted)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V , $I_D$=250uA | 30 | --- | --- | V |
| $\triangle BV_{DSS}/\triangle T_J$ | BVDSS Temperature Coefficient | Reference to 25℃ , $I_D$=1mA | --- | 0.098 | --- | V/℃ |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance[2] | $V_{GS}$=10V , $I_D$=20A | --- | 1.8 | 2.5 | mΩ |
| | | $V_{GS}$=4.5V , $I_D$=10A | --- | 2.5 | 3.5 | mΩ |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}$=$V_{DS}$ , $I_D$ =250uA | 1 | 1.8 | 3 | V |
| $\triangle V_{GS(th)}$ | $V_{GS(th)}$ Temperature Coefficient | | --- | -6.57 | --- | mV/℃ |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=80V , $V_{GS}$=0V , $T_J$=25℃ | --- | --- | 1 | uA |
| | | $V_{DS}$=80V , $V_{GS}$=0V , $T_J$=55℃ | --- | --- | 2 | |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=±20V , $V_{DS}$=0V | --- | --- | ±100 | nA |
| gfs | Forward Transconductance | $V_{DS}$=5V , $I_D$=20A | 28 | --- | --- | S |
| $Q_g$ | Total Gate Charge (10V) | $V_{DS}$=50V , $V_{GS}$=10V , $I_D$=120A | --- | 232 | --- | nC |
| $Q_{gs}$ | Gate-Source Charge | | --- | 26 | --- | |
| $Q_{gd}$ | Gate-Drain Charge | | --- | 59 | --- | |
| $T_{d(on)}$ | Turn-On Delay Time | $V_{DD}$=30V , $V_{GS}$=10V , $R_G$=6Ω $I_D$=145A , $R_L$=30Ω | --- | 50 | --- | ns |
| $T_r$ | Rise Time | | --- | 111 | --- | |
| $T_{d(off)}$ | Turn-Off Delay Time | | --- | 88 | --- | |
| $T_f$ | Fall Time | | --- | 74 | --- | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=30V , $V_{GS}$=0V , f=1MHz | --- | 10600 | --- | pF |
| $C_{oss}$ | Output Capacitance | | --- | 1156 | --- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 732 | --- | |

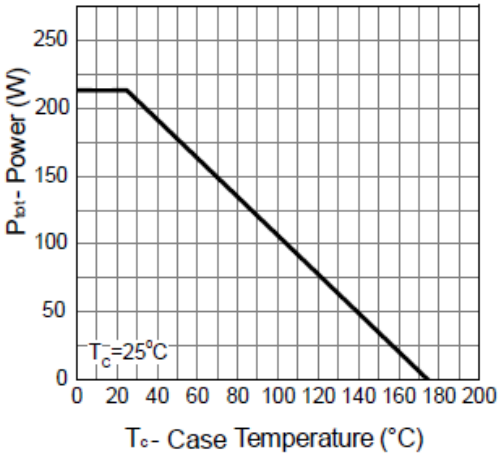
## Diode Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current[1,6] | $V_G$=$V_D$=0V , Force Current | --- | --- | 250 | A |
| $I_{SM}$ | Pulsed Source Current[2,6] | | --- | --- | 300 | A |
| $V_{SD}$ | Diode Forward Voltage[2] | $V_{GS}$=0V , $I_S$=20A , $T_J$=25℃ | --- | --- | 1.2 | V |

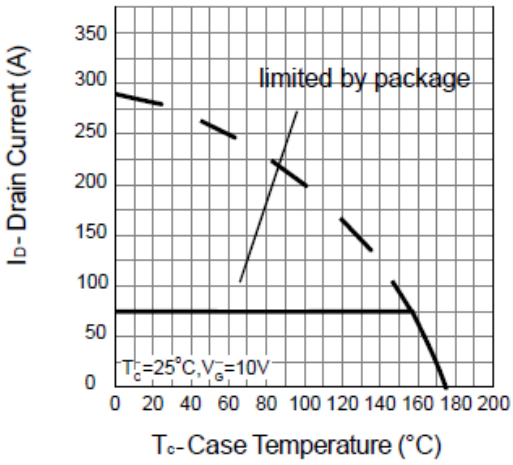
Note :
1.The data tested by surface mounted on a 1 inch$^2$ FR-4 board with 2OZ copper,t≦10sec.
2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3.The EAS data shows Max. rating . The test condition is $V_{DD}$=25V,$V_{GS}$=10V,L=0.5mH,$I_{AS}$=20A
4.The power dissipation is limited by 150℃ junction 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.

## Typical Characteristics

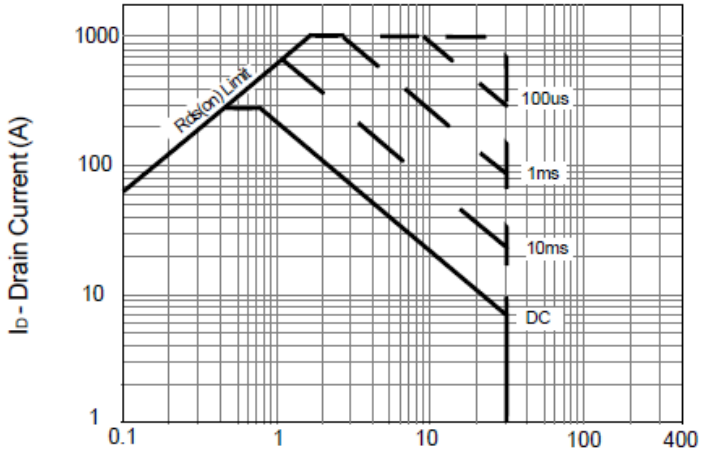
**Power Dissipation**



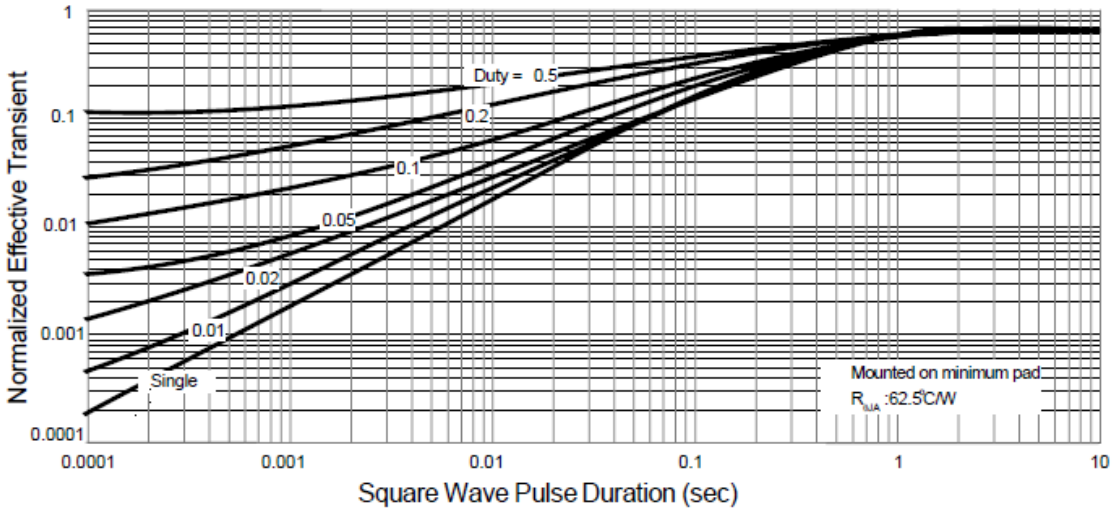

**Drain Current**



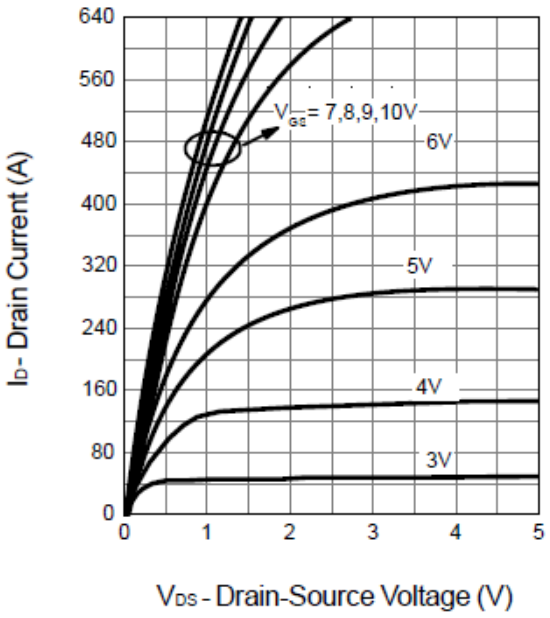

**Safe Operation Area**



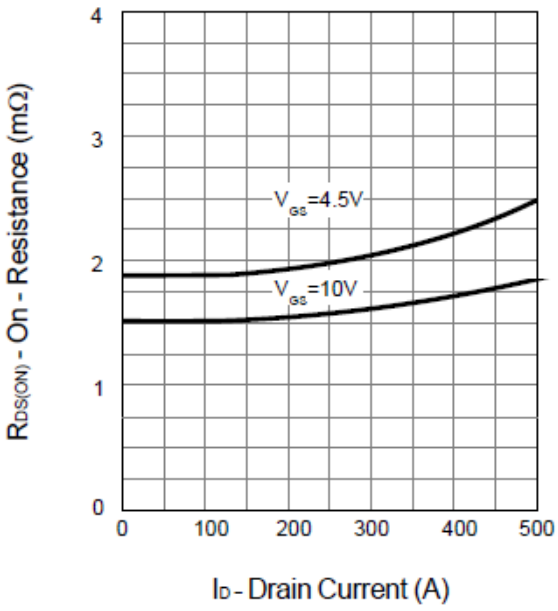

**Thermal Transient Impedance**



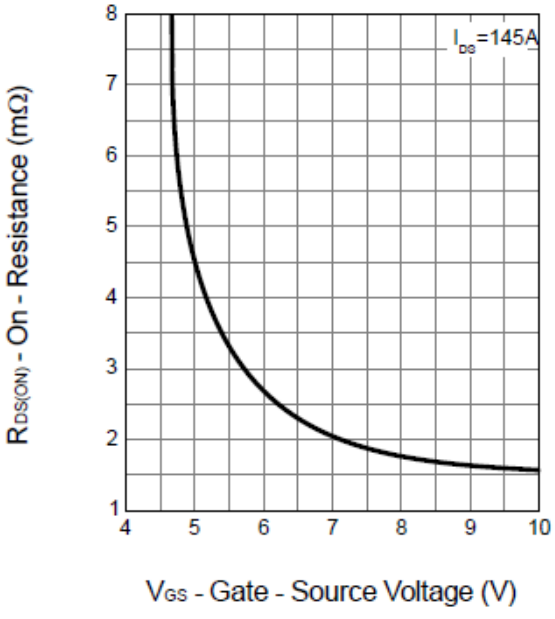
**Output Characteristics**



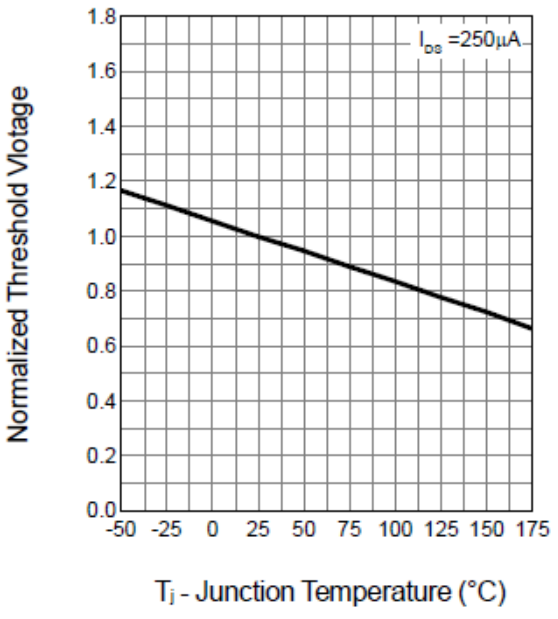

**Drain-Source On Resistance**



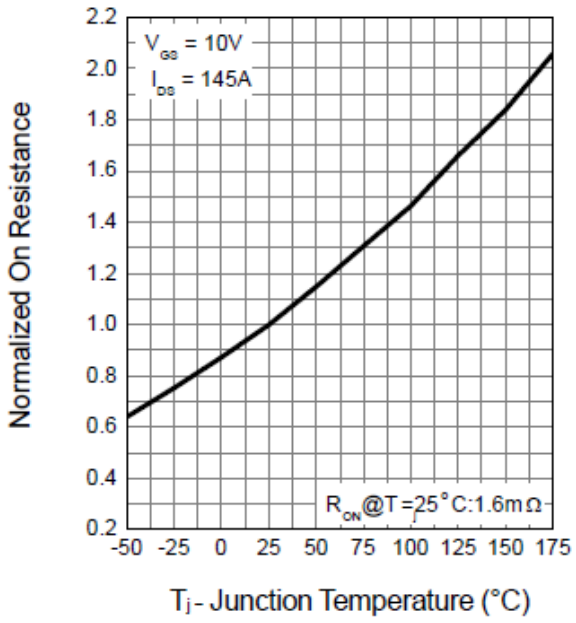

**Drain-Source On Resistance**



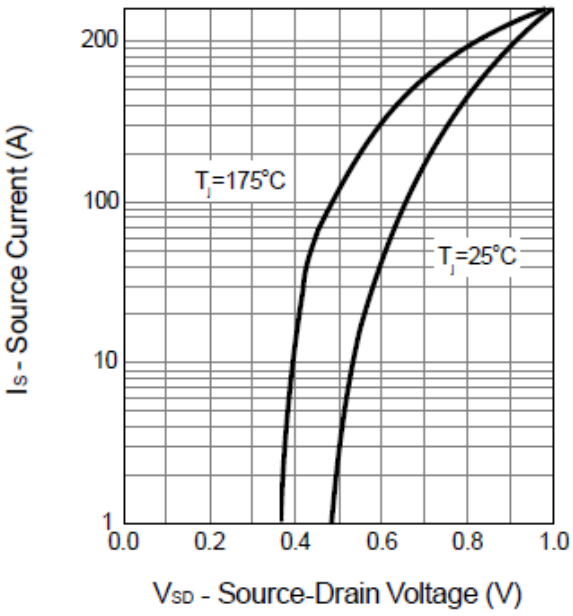

**Gate Threshold Voltage**



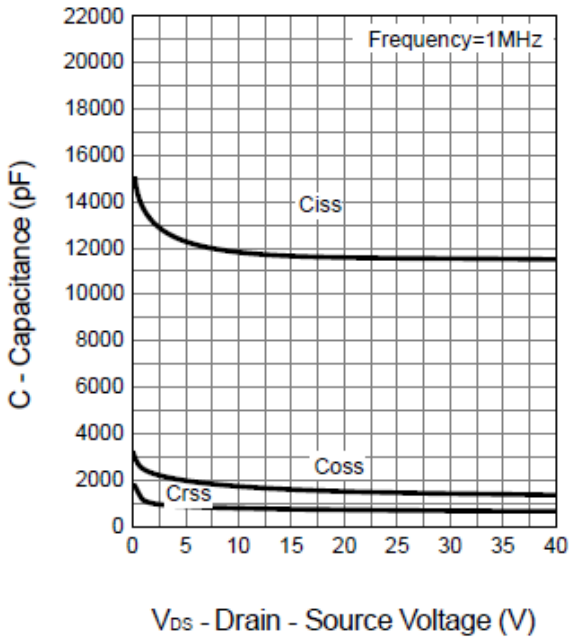
**Drain-Source On Resistance**



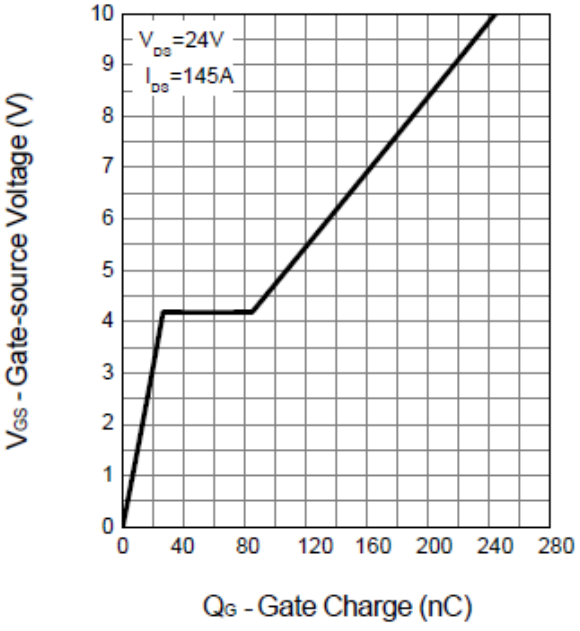

**Source-Drain Diode Forward**



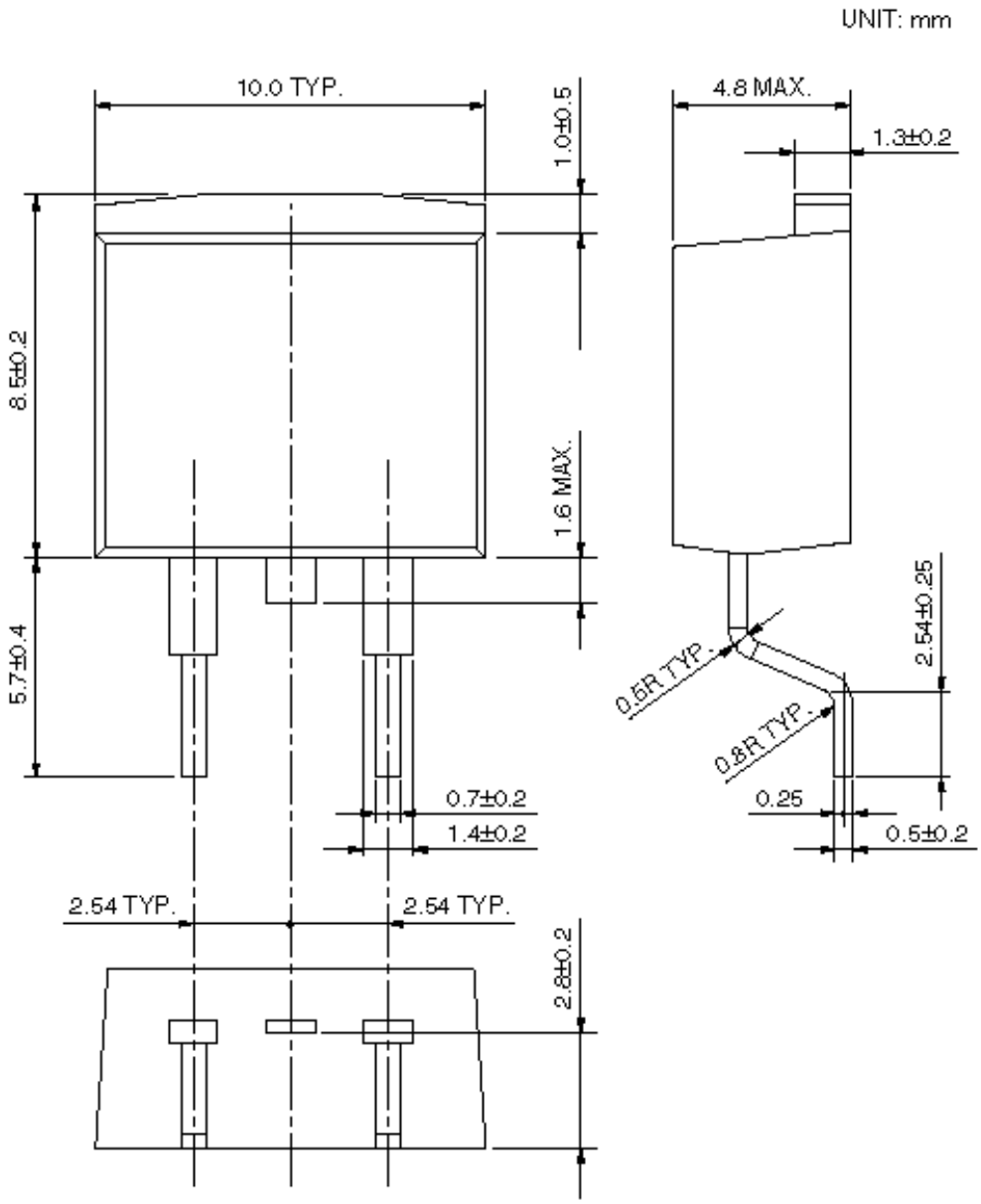

**Capacitance**




**Gate Charge**



- **Package Information**




**TO-263-2L**

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