

General Description

The WSR4N65F 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 WSR7N65F 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
- Green Device Available

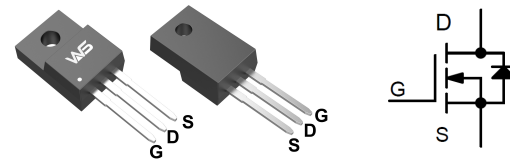
Product Summary

| BV_{DSS} | R_{DSON} | I_D |
|------------|------------|-------|
| 650V | 2.6Ω | 4A |

Applications

- AC/DC Power Conversion in Switched Mode Power Supplies (SMPS).
- Uninterruptible Power Supply(UPS)
- Adapter.

TO-220F Pin Configuration



Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|-----------------------|--|------------|-------|
| V_{DS} | Drain-Source Voltage | 650 | V |
| V_{GS} | Gate-Source Voltage | ±30 | V |
| $I_D@T_C=25^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^{1.5}$ | 4 | A |
| $I_D@T_C=100^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^{1.5}$ | 2.5 | A |
| I_{DM} | Pulsed Drain Current ^{1,2,5} | 16 | A |
| EAS | Single Pulse Avalanche Energy ¹ | 128 | mJ |
| P_D | Total Power Dissipation ^{1,5} | 39 | W |
| T_{STG} | Storage Temperature Range | -55 to 150 | °C |
| T_J | Operating Junction Temperature Range | -55 to 150 | °C |

Thermal Data

| Symbol | Parameter | Typ. | Max. | Unit |
|-----------------|--|------|------|------|
| $R_{\theta JA}$ | Thermal Resistance Junction-ambient ¹ | --- | 65 | °C/W |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case ¹ | --- | 3.2 | °C/W |

Electrical Characteristics (T_J=25 °C, unless otherwise noted)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-------------------------------------|--|--|------|-------|------|-------|
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =250uA | 650 | --- | --- | V |
| ΔBV _{DSS} /ΔT _J | BVDSS Temperature Coefficient | Reference to 25°C, I _D =250uA | --- | 0.6 | --- | V/°C |
| R _{DS(ON)} | Static Drain-Source On-Resistance ² | V _{GS} =10V, I _D =3.5A | --- | 2.6 | 3.0 | Ω |
| V _{GS(th)} | Gate Threshold Voltage | V _{GS} =V _{DS} , I _D =250uA | 2.0 | 3.0 | 4.0 | V |
| ΔV _{GS(th)} | V _{GS(th)} Temperature Coefficient | | --- | -4.57 | --- | mV/°C |
| I _{DSS} | Drain-Source Leakage Current | V _{DS} =650V, V _{GS} =0V, T _J =25°C | --- | --- | 1 | uA |
| | | V _{DS} =520V, V _{GS} =0V, T _J =55°C | --- | --- | 10 | |
| I _{GSS} | Gate-Source Leakage Current | V _{GS} =±30V, V _{DS} =0V | --- | --- | ±100 | nA |
| g _{fs} | Forward Transconductance | V _{DS} =40V, I _D =3.5A | --- | 5 | --- | S |
| Q _g | Total Gate Charge (10V) | V _{DS} =520V, V _{GS} =10V, I _D =7A | --- | 10.2 | --- | nC |
| Q _{gs} | Gate-Source Charge | | --- | 2.3 | --- | |
| Q _{gd} | Gate-Drain Charge | | --- | 2.1 | --- | |
| T _{d(on)} | Turn-On Delay Time | V _{DD} =300V, V _{GS} =10V, R _G =25Ω, I _D =10A. | --- | 15.5 | --- | ns |
| T _r | Rise Time | | --- | 13 | --- | |
| T _{d(off)} | Turn-Off Delay Time | | --- | 40 | --- | |
| T _f | Fall Time | | --- | 16 | --- | |
| C _{iss} | Input Capacitance | V _{DS} =25V, V _{GS} =0V, f=1MHz | --- | 550 | --- | pF |
| C _{oss} | Output Capacitance | | --- | 46 | --- | |
| C _{rss} | Reverse Transfer Capacitance | | --- | 2.3 | --- | |

Diode Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-----------------|--|---|------|------|------|------|
| I _S | Continuous Source Current ^{1,2,5} | V _G =V _D =0V, Force Current | --- | --- | 4 | A |
| I _{SM} | Pulsed Source Current ^{1,2} | | --- | --- | 16 | A |
| V _{SD} | Diode Forward Voltage ¹ | V _{GS} =0V, I _S =7A, T _J =25°C | --- | --- | 1.4 | V |
| t _{rr} | Reverse Recovery Time | I _F =7A, dI/dt=40A/μs, T _J =25°C | --- | 454 | --- | nS |
| Q _{rr} | Reverse Recovery Charge | | --- | 2076 | --- | nC |

Notes:

Note 1 : limited by maximum junction temperature.

Note 2 : Bond wire current limit.

Note 3 : V_{DS}=520V, I_D=4A.

Note 4 : I_D=0.5A, V_{DD}=50V, T_J=25°C.

Note 5 : Repetitive Rating : Pulse width limited by maximum junction temperature.

Typical Characteristics

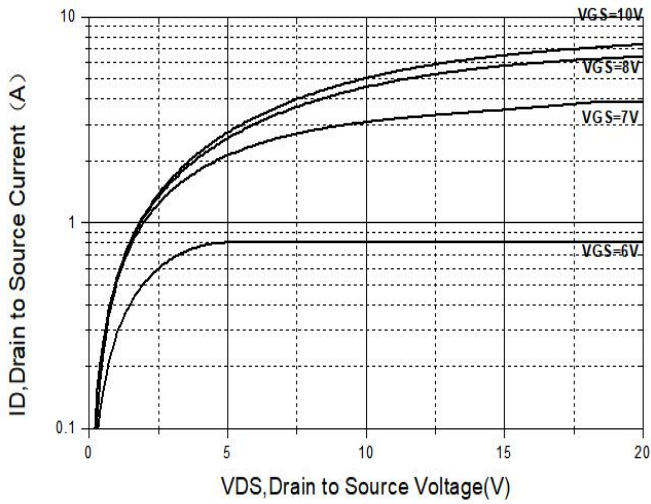


Figure 1 Output Characteristics

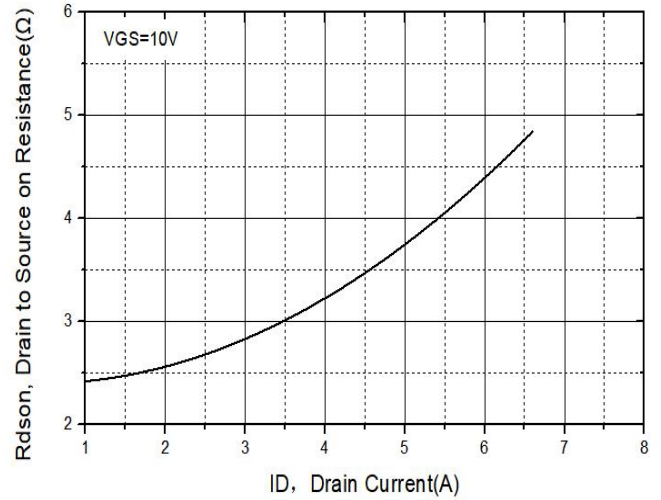


Figure 3 $R_{DS(on)}$ - I_D Characteristics

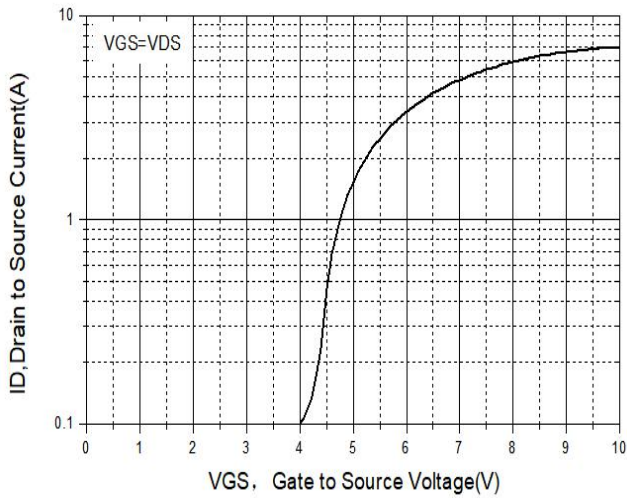


Figure 2 Transfer Characteristics

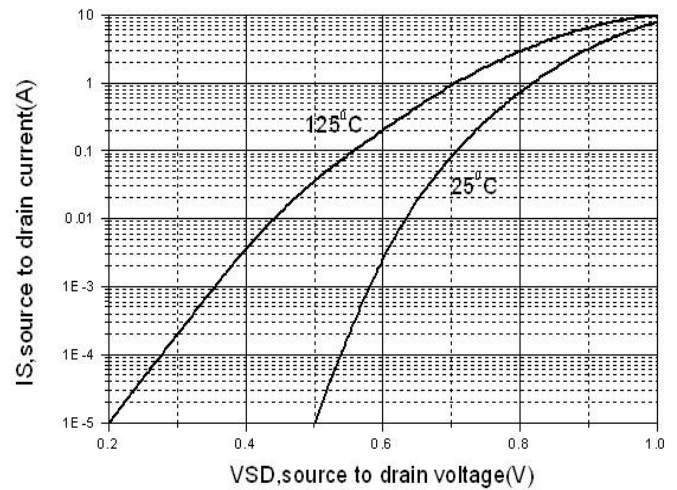


Figure 4 Body diode Characteristics

Typical Characteristics

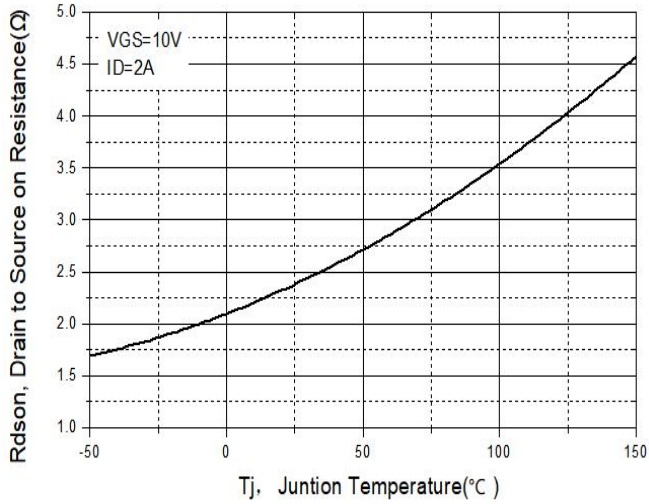


Figure 5 Rdson- Tj Relation

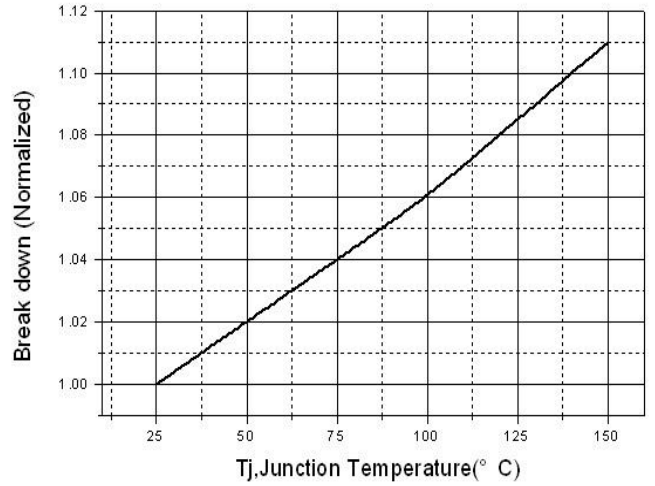


Figure 6 BVDSS vs Junction Temperature

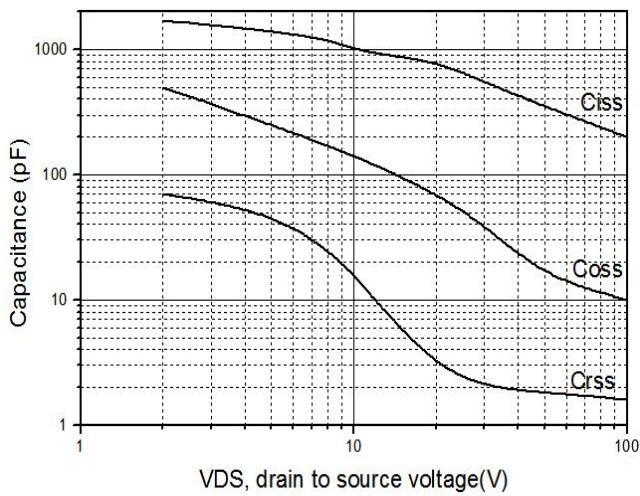


Figure 7 Capacitance vs Vds

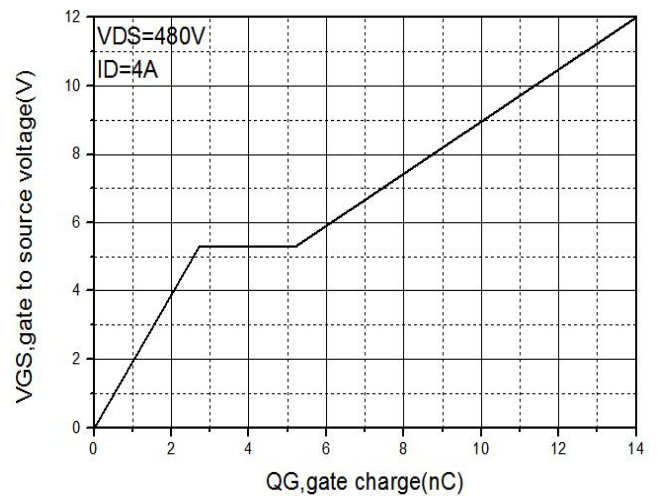


Figure 8 VGS vs QG Characteristics

Typical Characteristics

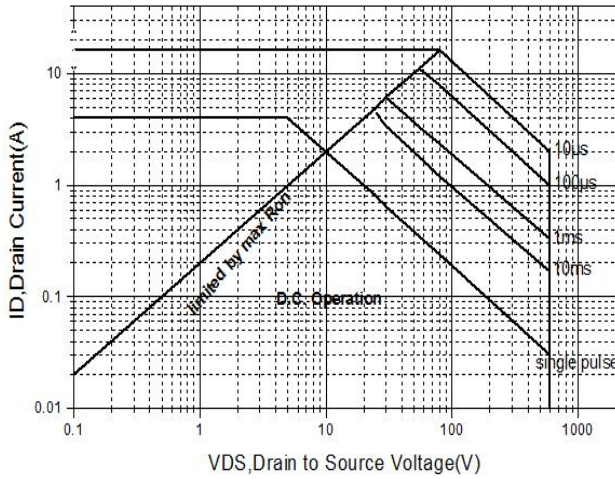


Figure 9 Safe Operation Area

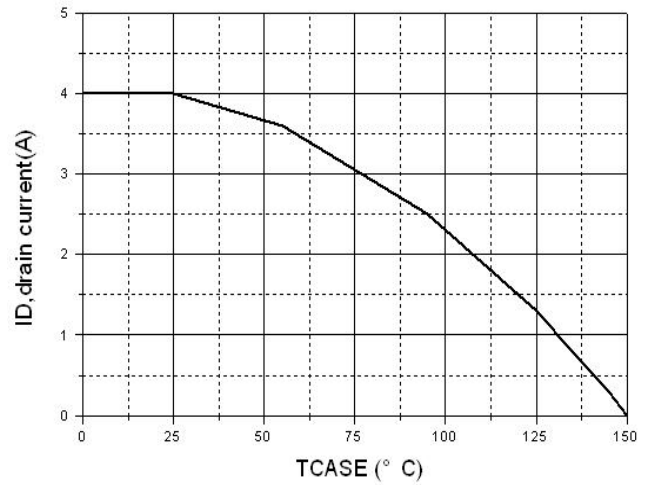


Figure 10 Maximum current attenuation

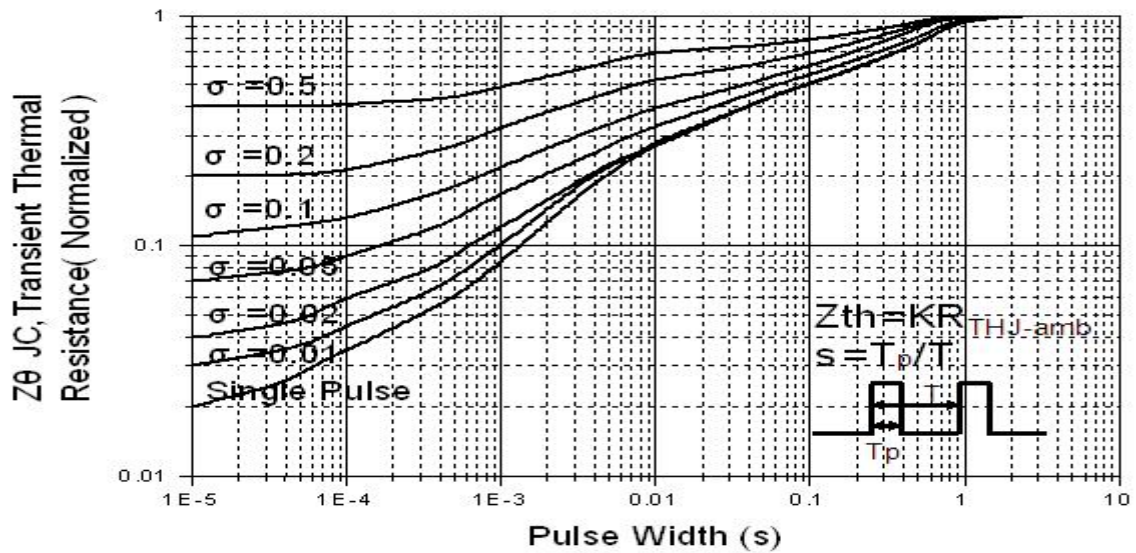


Figure 11 Normalized Maximum Transient Thermal Impedance



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