

General Description

The WSD3066DN 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 WSD3066DN 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% EAS Guaranteed
- Green Device Available

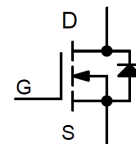
Product Summary

| BVDSS | R _{DS(on)} | ID |
|-------|---------------------|-----|
| 30V | 4.7mΩ | 66A |

Applications

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

DFN3X3-8 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°C | Continuous Drain Current, V _{GS} @ 10V ¹ | 66 | A |
| I _D @T _C =100°C | Continuous Drain Current, V _{GS} @ 10V ¹ | 40 | A |
| I _D @T _A =25°C | Continuous Drain Current, V _{GS} @ 10V ¹ | 15 | A |
| I _D @T _A =70°C | Continuous Drain Current, V _{GS} @ 10V ¹ | 10 | A |
| I _{DM} @T _C =25°C | Pulsed Drain Current ² | 150 | A |
| EAS | Avalanche Energy, Single Pulse (L=0.1mH) ³ | 125 | mJ |
| I _{AS} | Avalanche Current, Single pulse(L=0.1mH) ³ | 50 | A |
| P _D @T _C =25°C | Total Power Dissipation ⁴ | 45 | W |
| P _D @T _A =25°C | Total Power Dissipation ⁴ | 1.78 | 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 _{θJA} | Thermal Resistance Junction-Ambient ¹ | --- | 70 | °C/W |
| R _{θJC} | Thermal Resistance Junction-Case ¹ | --- | 2.7 | °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 | 30 | --- | --- | V |
| ΔBV _{DSS} /ΔT _J | BVDSS Temperature Coefficient | Reference to 25°C, I _D =1mA | --- | 0.028 | --- | V/°C |
| R _{DS(ON)} | Static Drain-Source On-Resistance ² | V _{GS} =10V, I _D =40A | --- | 4.7 | 5.7 | mΩ |
| | | V _{GS} =4.5V, I _D =20A | --- | 5.8 | 7.6 | |
| V _{GS(th)} | Gate Threshold Voltage | V _{GS} =V _{DS} , I _D =250uA | 1.5 | 1.8 | 2.5 | V |
| ΔV _{GS(th)} | V _{GS(th)} Temperature Coefficient | | --- | -6.06 | --- | mV/°C |
| I _{DSS} | Drain-Source Leakage Current | V _{DS} =24V, V _{GS} =0V, T _J =25°C | --- | --- | 1 | uA |
| | | V _{DS} =24V, V _{GS} =0V, T _J =55°C | --- | --- | 30 | |
| I _{GSS} | Gate-Source Leakage Current | V _{GS} =±20V, V _{DS} =0V | --- | --- | ±100 | nA |
| g _{fs} | Forward Transconductance | V _{DS} =5V, I _D =20A | --- | 44 | --- | S |
| R _g | Gate Resistance | V _{DS} =0V, V _{GS} =0V, f=1MHz | --- | 1.0 | 1.1 | Ω |
| Q _g | Total Gate Charge (4.5V) | V _{DS} =15V, V _{GS} =4.5V, I _D =20A | --- | 27.5 | 38.5 | nC |
| Q _{gs} | Gate-Source Charge | | --- | 9.6 | 13.4 | |
| Q _{gd} | Gate-Drain Charge | | --- | 9.4 | 13.7 | |
| T _{d(on)} | Turn-On Delay Time | V _{DD} =15V, V _{Gen} =10V, R _G =6Ω, I _D =1A, R _L =15Ω. | --- | 18.5 | 34 | ns |
| T _r | Rise Time | | --- | 11.3 | 21 | |
| T _{d(off)} | Turn-Off Delay Time | | --- | 62.5 | 114 | |
| T _f | Fall Time | | --- | 23.5 | 43 | |
| C _{iss} | Input Capacitance | V _{DS} =15V, V _{GS} =0V, f=1MHz | --- | 1320 | 1420 | pF |
| C _{oss} | Output Capacitance | | --- | 610 | 640 | |
| C _{rss} | Reverse Transfer Capacitance | | --- | 112 | 150 | |

Guaranteed Avalanche Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|--------|--|---|------|------|------|------|
| EAS | Single Pulse Avalanche Energy ⁵ | V _{DD} =25V, L=0.5mH, I _{AS} =20A | --- | 125 | --- | mJ |

Diode Characteristics

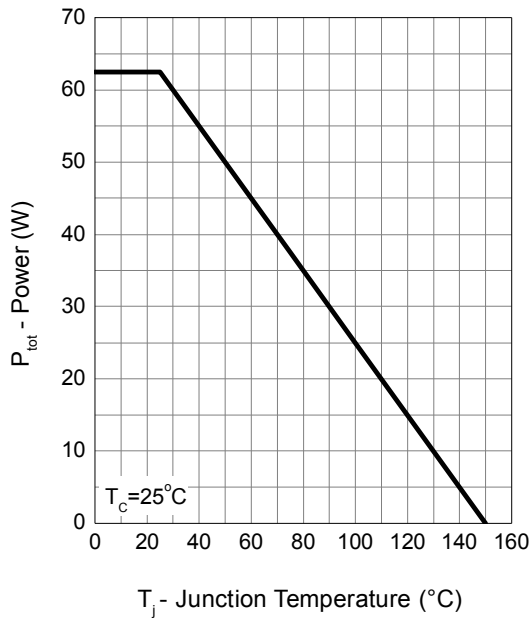
| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-----------------|--|---|------|------|------|------|
| I _S | Continuous Source Current ^{1,6} | V _G =V _D =0V, Force Current | --- | --- | 15 | A |
| I _{SM} | Pulsed Source Current ^{2,6} | | --- | --- | 45 | A |
| V _{SD} | Diode Forward Voltage ² | V _{GS} =0V, I _S =1A, T _J =25°C | --- | --- | 1 | V |
| t _{rr} | Reverse Recovery Time | I _F =40A, di/dt=100A/μs, T _J =25°C | --- | 23 | --- | nS |
| Q _{rr} | Reverse Recovery Charge | | --- | 7 | --- | nC |

Note :

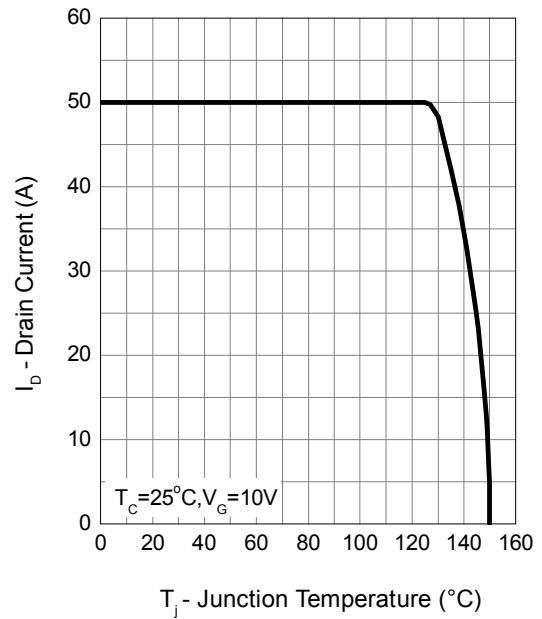
- The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper, t<10sec.
- The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
- The EAS data shows Max. rating. The test condition is V_{DD}=25V, V_{GS}=10V, L=0.5mH, I_{AS}=20A
- The power dissipation is limited by 150°C junction temperature
- The Min. value is 100% EAS tested guarantee.
- The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.

Typical Characteristics

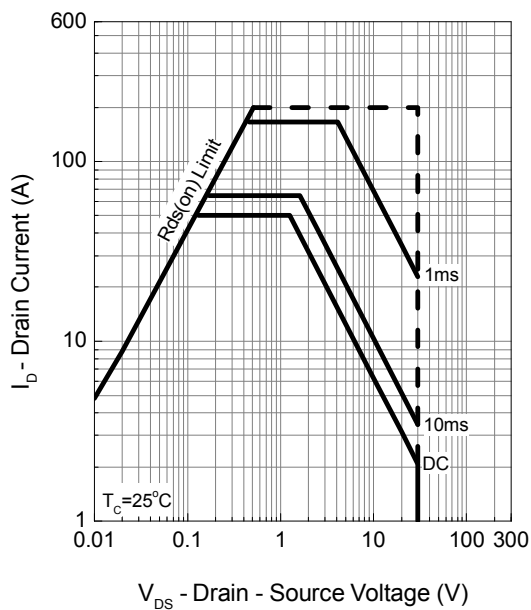
Power Dissipation



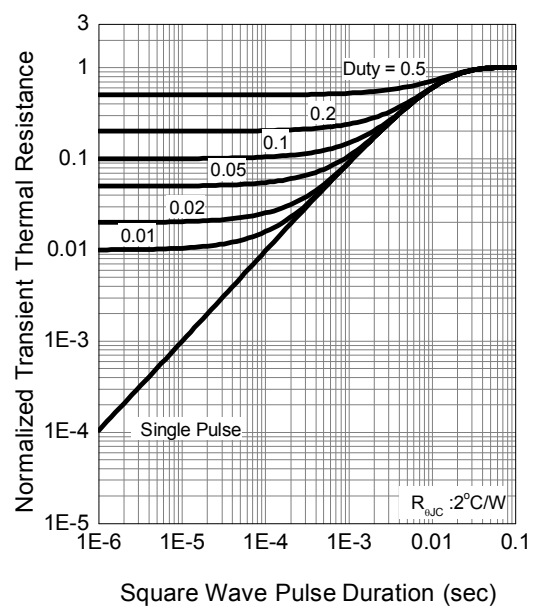
Drain Current



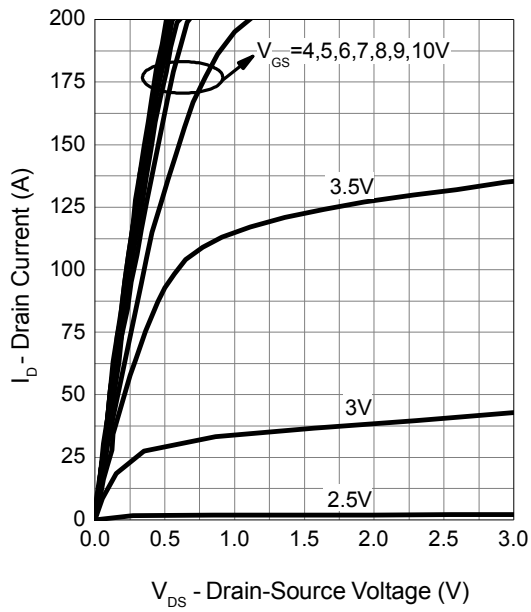
Safe Operation Area



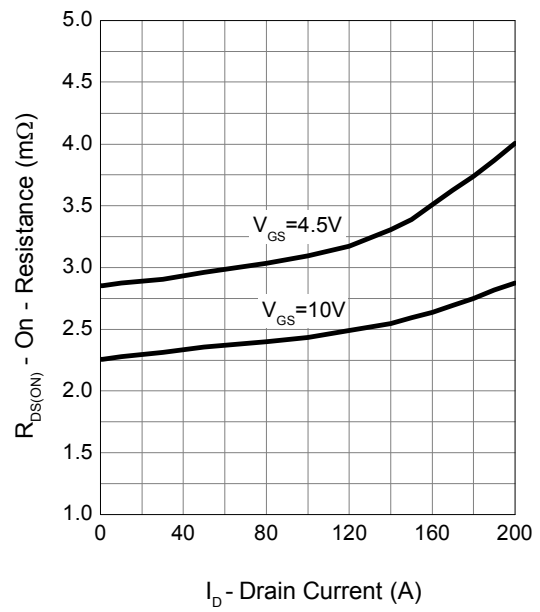
Thermal Transient Impedance



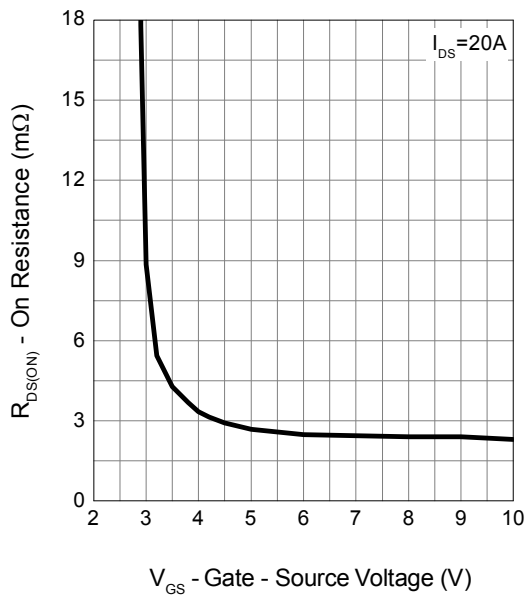
Output Characteristics



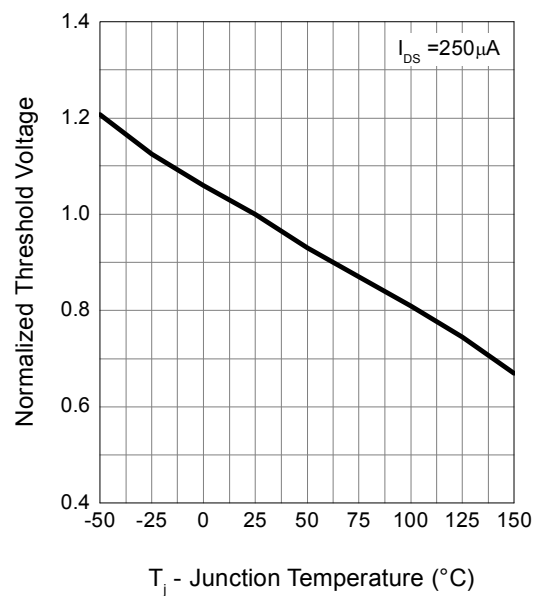
Drain-Source On Resistance



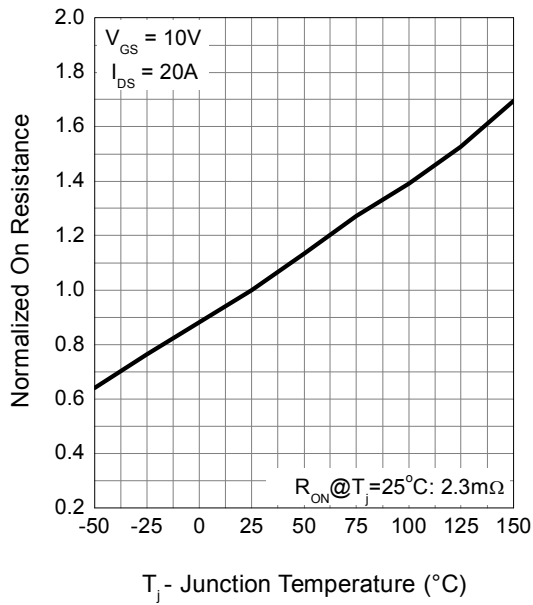
Gate-Source On Resistance



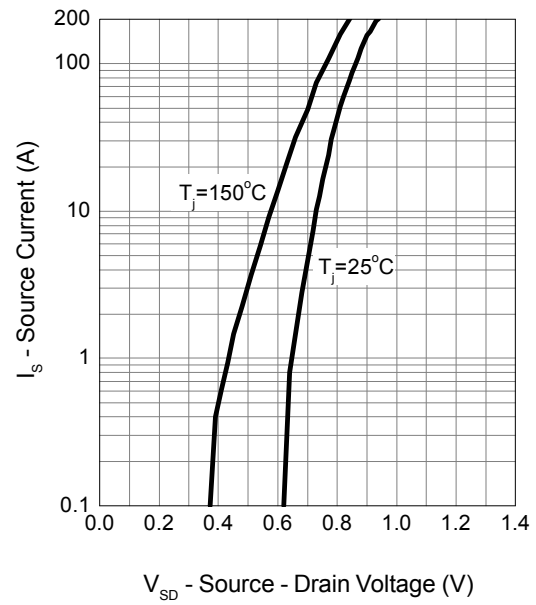
Gate Threshold Voltage



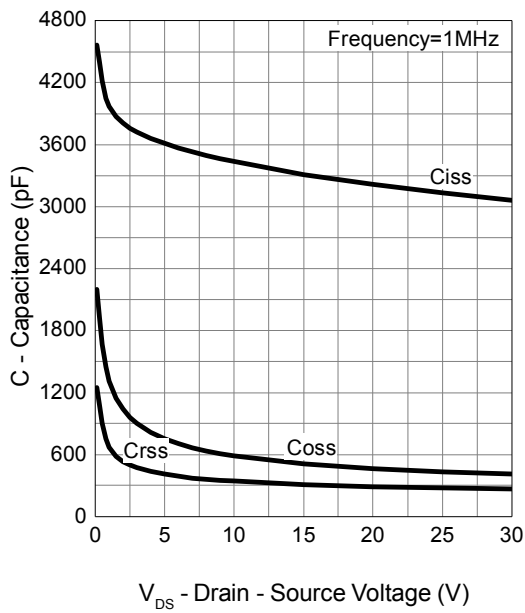
Drain-Source On Resistance



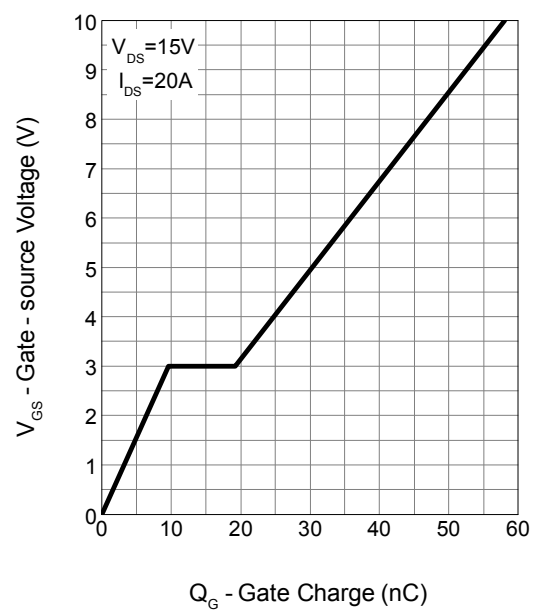
Source-Drain Diode Forward



Capacitance



Gate Charge





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