## General Description

The WSD3056DN is the highest performance trench Dual N-Ch MOSFET with extreme high cell density,which provide excellent $R_{DSON}$ and gate charge for most of the synchronous buck converter applications .

The WSD3056DN 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

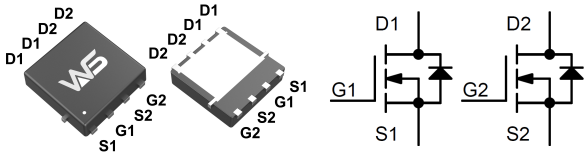
## Product Summery

| $B_{VDSS}$ | $R_{DSON}$ | $I_D$ |
|---|---|---|
| 30V | 13mΩ | 35A |

## Applications

- POL Applications
- MB / VGA / Vcore
- Load Switch
- SMPS 2nd SR

## DFN3X3 Dual Pin Configuration




## Absolute Maximum Ratings @TA=25℃ unless otherwise noted

| Symbol | Parameter | | Rating | Units |
|---|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | | 30 | V |
| $V_{GS}$ | Gate-Source Voltage | | ±20 | V |
| $I_D$ | Drain Current (Continuous) *AC | $T_C$=25°C | 35 | A |
| | | $T_C$=100°C | 22 | |
| $I_{DM}$ | Drain Current (Pulse) *B | | 140 | A |
| $P_D$ | Power Dissipation | $T_C$=25°C | 27 | W |
| EAS | Single Pulse Avalanche Energy | | 13 | mJ |
| RθJA | Thermal Resistance Junction to ambient | | 62 | ℃/W |
| $R_{\theta JC}$ | Thermal Resistance Junction to Case | | 4.6 | ℃/W |
| $T_J$//$T_{STG}$ | Operating Temperature/ Storage Temperature | | -55~150 | ℃ |

**Electrical Characteristics @$T_A$=25℃ unless otherwise noted**

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **Static** | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$ = 0V, $I_D$ = 250μA | 30 | | | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$ = 30 V, $V_{GS}$ = 0V | | | 1 | μA |
| $I_{GSS}$ | Gate Leakage Current | $V_{GS}$ = ±20V, $V_{DS}$ = 0V | | | 100 | nA |
| **On Characteristics** | | | | | | |
| $V_{GS(TH)}$ | Gate Threshold Voltage | $V_{GS}$ = $V_{DS}$, $I_{DS}$ = 250μA | 1.2 | 1.8 | 2.5 | V |
| $R_{DS(on)}$ | Drain-Source On-state Resistance | $V_{GS}$ = 10V, $I_D$ = 10A | | 10 | 13 | mΩ |
| | | $V_{GS}$ = 4.5V, $I_D$ = 8A | | 14 | 18 | mΩ |
| gFS | Forward Transconductance | $V_{DS}$ = 5V, $I_D$= 5A | | 6 | | S |
| **Switching** | | | | | | |
| Qg | Total Gate Charge | $V_{GS}$=10V, $V_{DS}$=15V, $I_D$=5A | | 7.2 | | nC |
| Qgs | Gate-Source Charge | | | 2.3 | | nC |
| Qgd | Gate-Drain Charge | | | 3 | | nC |
| td (on) | Turn-on Delay Time | $V_{GS}$=10V, $V_{DD}$=15V, $I_D$=1A,$R_G$=6Ω | | 3.8 | | ns |
| tr | Turn-on Rise Time | | | 10 | | ns |
| td(off) | Turn-off Delay Time | | | 22 | | ns |
| tf | Turn-off Fall Time | | | 6.6 | | ns |
| Rg | Gate resistance | $V_{GS}$=0V, $V_{DS}$=0V, f=1MHz | | 2.8 | | Ω |
| **Dynamic** | | | | | | |
| Ciss | Input Capacitance | $V_{GS}$=0V, $V_{DS}$=15V, f=1MHz | | 620 | | pF |
| Coss | Output Capacitance | | | 85 | | pF |
| Crss | Reverse Transfer Capacitance | | | 30 | | pF |
| **Drain-Source Diode Characteristics and Maximum Ratings** | | | | | | |
| $I_S$ | Continuous Source Current | $V_G$=$V_D$=0V , Force Current | | | 35 | A |
| $I_{SM}$ | Pulsed Source Current3 | | | | 70 | A |
| $V_{SD}$ | Diode Forward Voltage | $I_{SD}$ = 1A , $V_{GS}$=0V | | | 1.2 | V |

Note :

1，Repetitive Rating : Pulsed width limited by maximum junction temperature.

2，VDD=25V,VGS=10V,L=0.1mH,IAS=16A.,RG=25 ,Starting TJ=25℃.

3，The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.

4，Essentially independent of operating temperature.

## Typical Characteristics

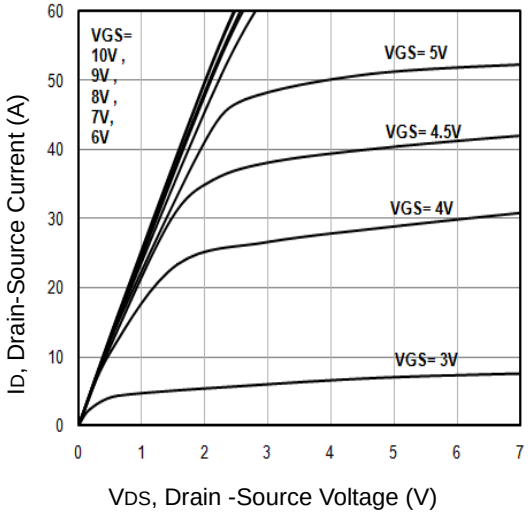



**Fig1.** Typical Output Characteristics

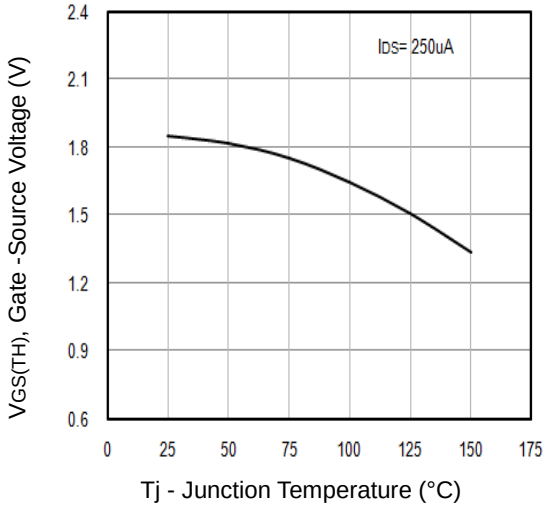



**Fig2.** Threshold Voltage Vs. Temperature

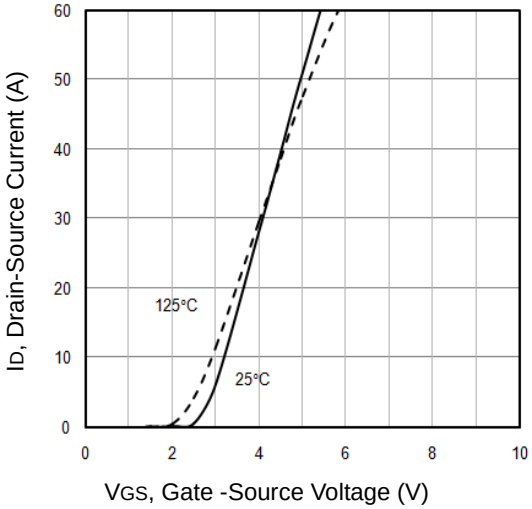



**Fig3.** Typical Transfer Characteristics

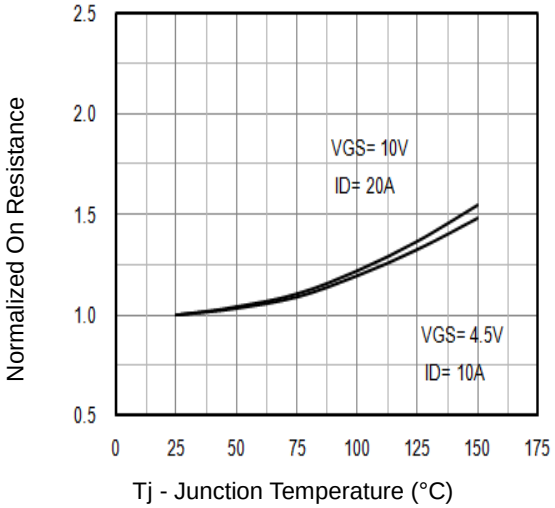



**Fig4.** Normalized On-Resistance Vs. Temperature

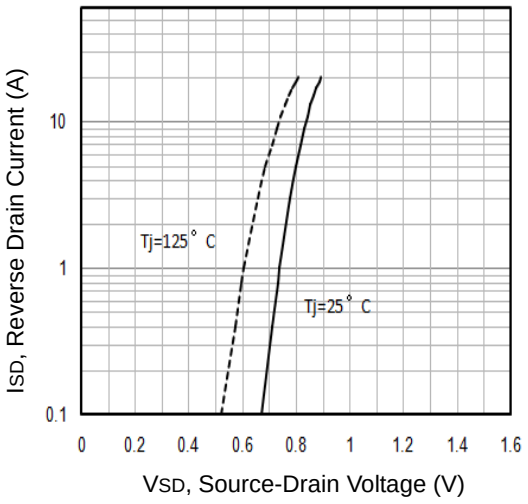



**Fig5.** Typical Source-Drain Diode Forward Voltage

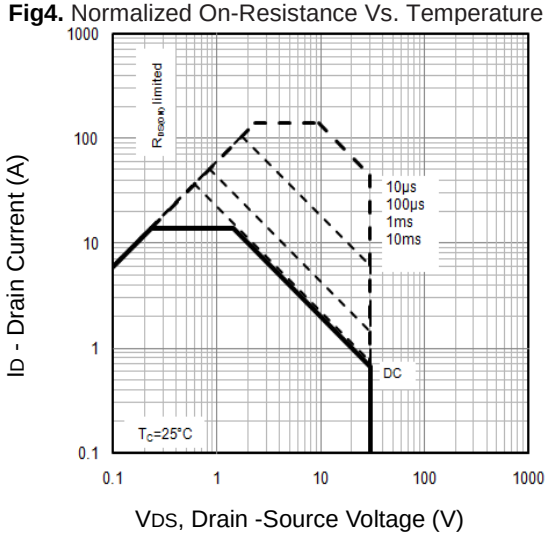



**Fig6.** Maximum Safe Operating Area

## Typical Characteristics

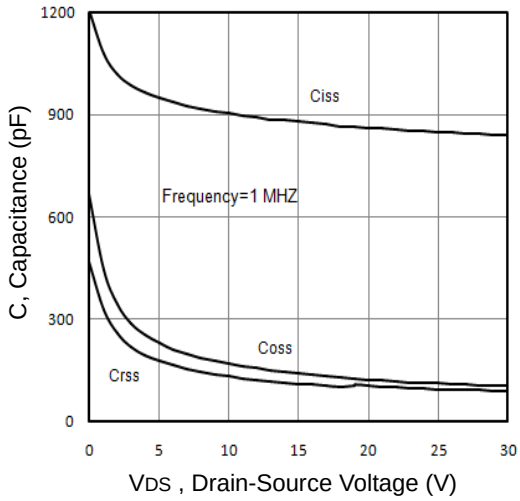



**Fig7.** Typical Capacitance Vs.Drain-Source Voltage

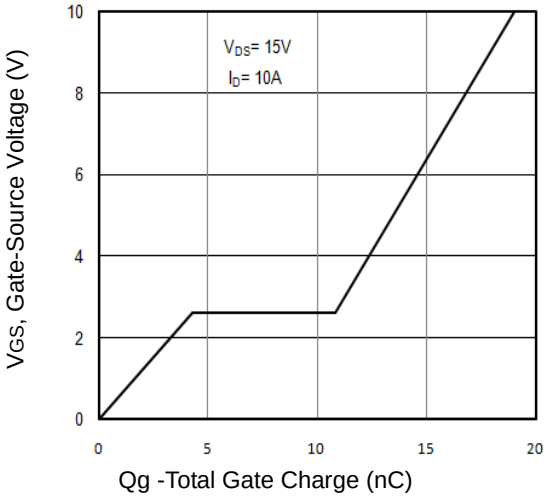



**Fig8.** Typical Gate Charge Vs.Gate-Source Voltage

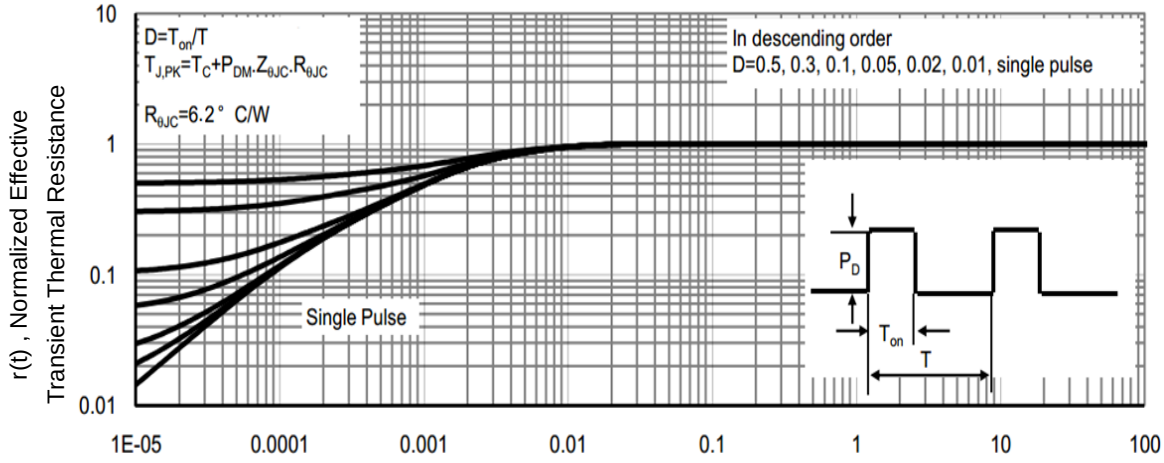



**Fig9.** T1 ,Transient Thermal Response Curve

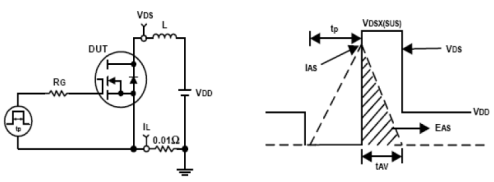



**Fig10.** Unclamped Inductive Test Circuit and waveforms

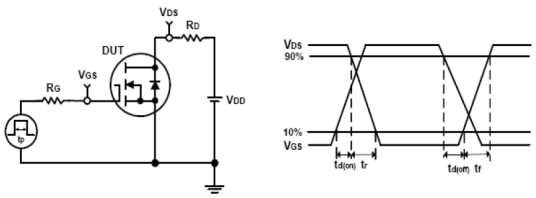



**Fig11.** Switching Time Test Circuit and waveforms

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