

General Description

The WSD2022DN is the highest performance trench Dual N-Ch MOSFET with extreme high cell density, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The WSD2022DN 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

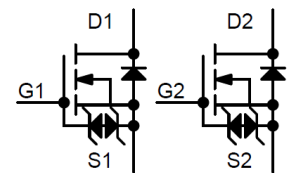
Product Summary

BVDSS	RDSON	ID
20V	21mΩ	22A

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	20	V
V_{GS}	Gate-Source Voltage	± 8	V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	22	A
$I_D@T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	4.8	A
$I_D@T_A=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	7.4	A
$I_D@T_A=70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	5.7	A
I_{DM}	Pulsed Drain Current ²	24	A
EAS	Single Pulse Avalanche Energy ³	15	mJ
I_{AS}	Avalanche Current	16	A
$P_D@T_C=25^\circ C$	Total Power Dissipation ⁴	2.5	W
$P_D@T_A=25^\circ C$	Total Power Dissipation ⁴	1.6	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	---	75	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	8.5	$^\circ C/W$

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 =250μA	20	---	---	V
ΔBV _{DSS} /ΔT _J	BVDSS Temperature Coefficient	Reference to 25°C, I _D =1mA	---	0.0332	---	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =4.5V, I _D =8A	---	16.2	21	mΩ
		V _{GS} =2.5V, I _D =7A	---	19.4	25	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250μA	0.4	0.52	1	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	-5.08	---	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =24V, V _{GS} =0V, T _J =25°C	---	---	1	μA
		V _{DS} =24V, V _{GS} =0V, T _J =55°C	---	---	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±8V, V _{DS} =0V	---	---	±10	μA
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =6.5A	---	13	---	S
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	2.2	3.0	Ω
Q _g	Total Gate Charge (4.5V)	V _{DS} =10V, V _{GS} =4.5V, I _D =8A	---	13.8	17.94	nC
Q _{gs}	Gate-Source Charge		---	4.1	5.33	
Q _{gd}	Gate-Drain Charge		---	5.6	7.28	
T _{d(on)}	Turn-On Delay Time	V _{DD} =10V, V _{GEN} =5V, R _G =3Ω I _D =1A, R _L =1.5Ω	---	6.2	12.4	ns
T _r	Rise Time		---	12.7	25.4	
T _{d(off)}	Turn-Off Delay Time		---	51.7	103.4	
T _f	Fall Time		---	16	32	
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1MHz	---	1160	---	pF
C _{oss}	Output Capacitance		---	104	---	
C _{rss}	Reverse Transfer Capacitance		---	29	---	

Guaranteed Avalanche Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
EAS	Single Pulse Avalanche Energy ⁵	V _{DD} =25V, L=0.1mH, I _{AS} =7.5A	15	---	---	mJ

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current ^{1,6}	V _G =V _D =0V, Force Current	---	---	5	A
I _{SM}	Pulsed Source Current ^{2,6}		---	---	25	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =7.5A, T _J =25°C	---	---	1	V
t _{rr}	Reverse Recovery Time	I _F =7.5A, dI/dt=100A/μs, T _J =25°C	---	13	---	nS
Q _{rr}	Reverse Recovery Charge		---	3	---	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=0.1mH, I_{AS}=7.5A
- 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

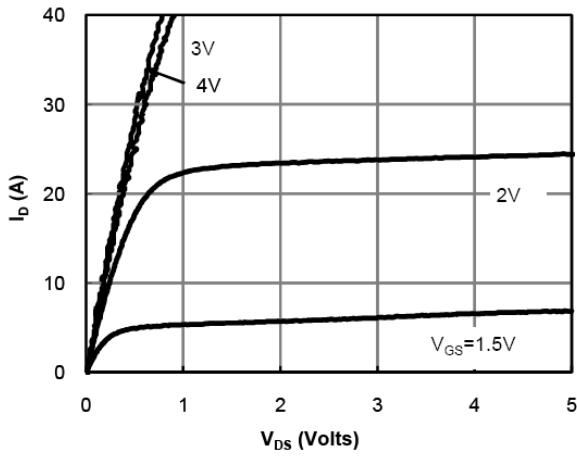


Fig 1: On-Region Characteristics

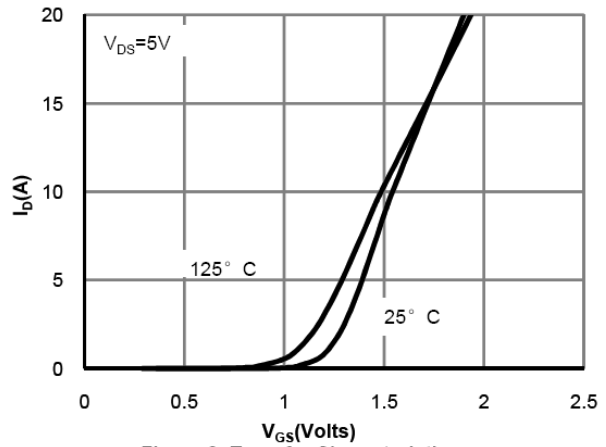


Figure 2: Transfer Characteristics

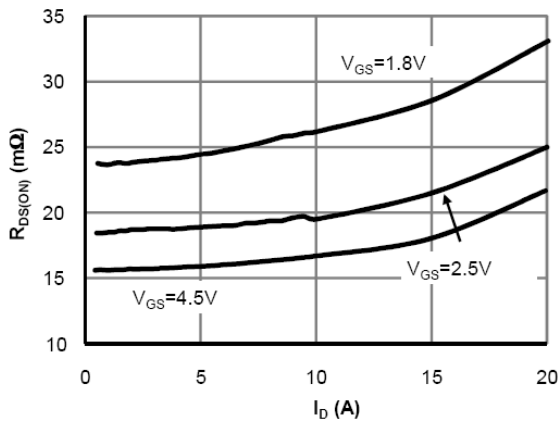


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

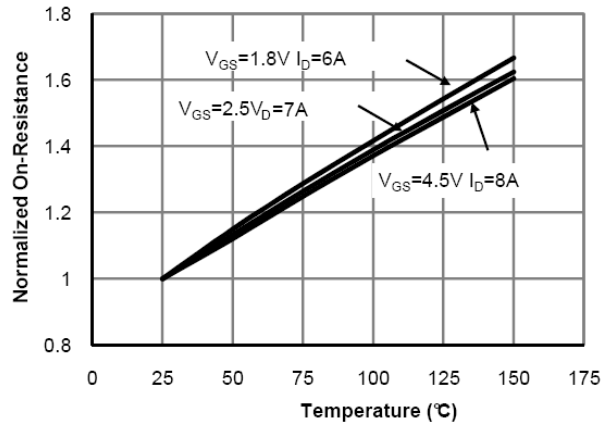


Figure 4: On-Resistance vs. Junction Temperature

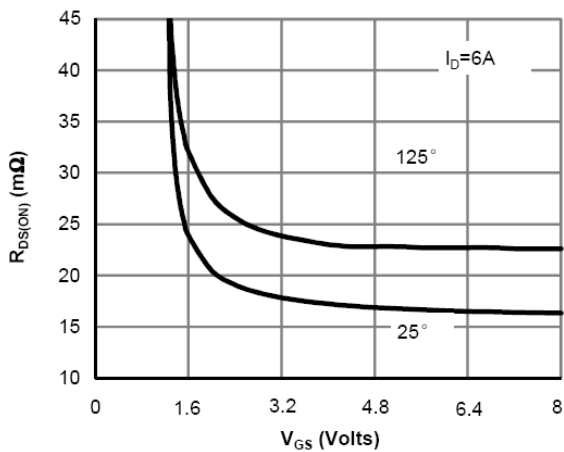


Figure 5: On-Resistance vs. Gate-Source Voltage

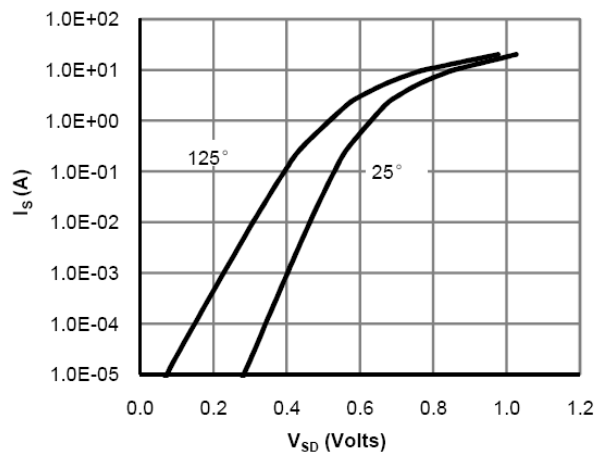


Figure 6: Body-Diode Characteristics

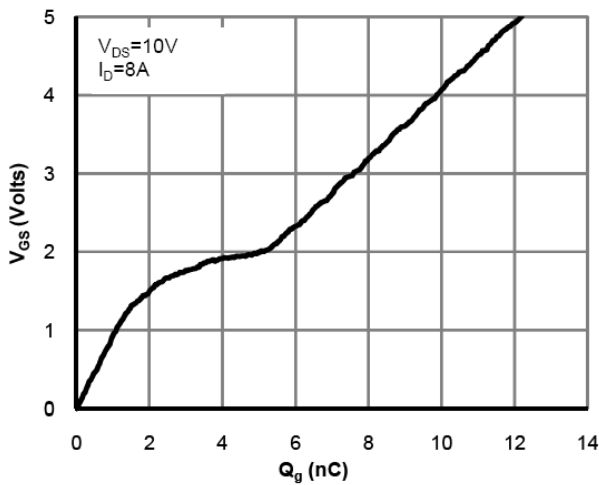


Figure 7: Gate-Charge Characteristics

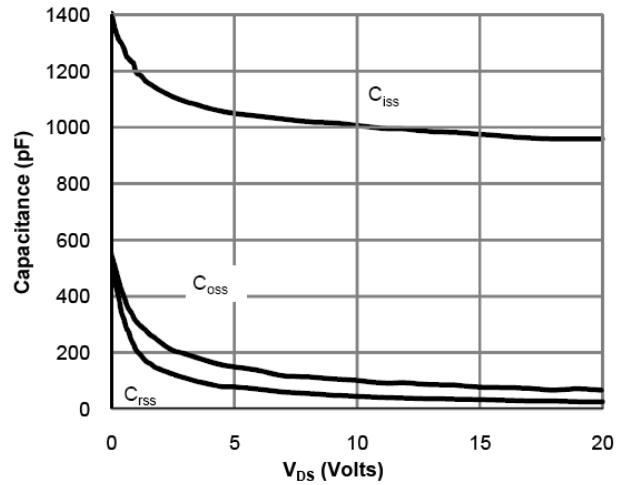


Figure 8: Capacitance Characteristics

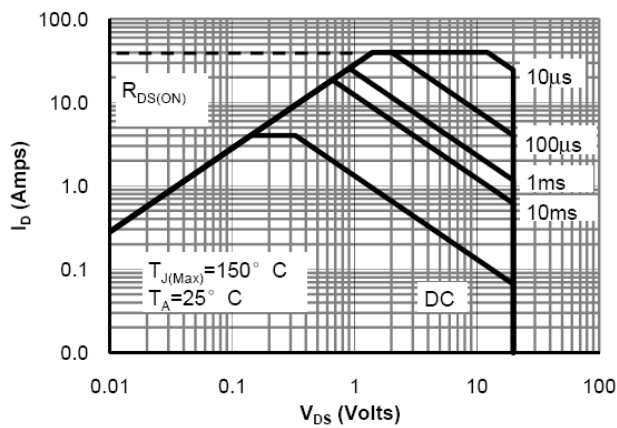


Figure 9: Maximum Forward Biased Safe Operating Area

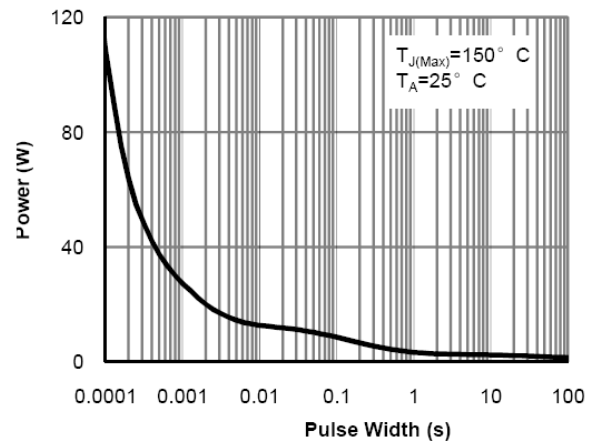


Figure 10: Single Pulse Power Rating Junction-to-Case

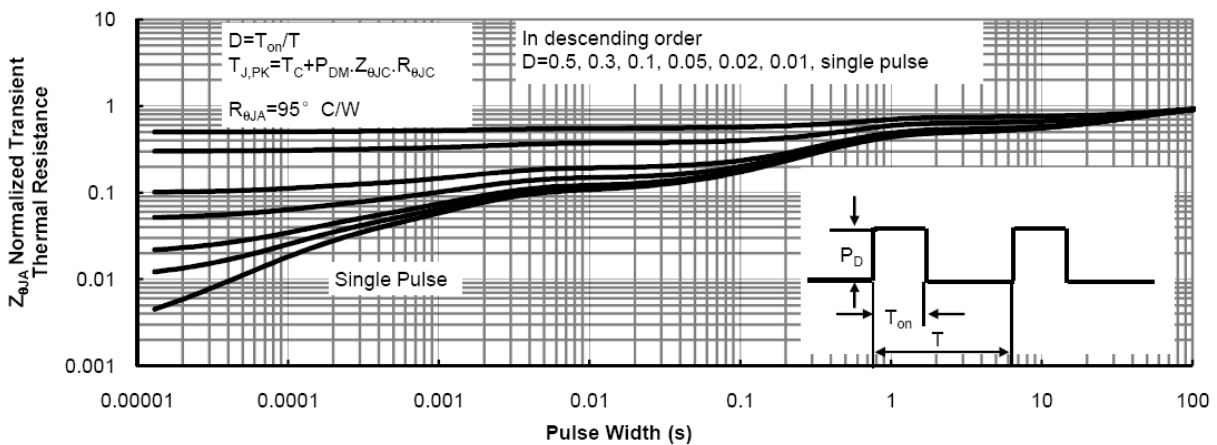


Figure 11: Normalized Maximum Transient Thermal Impedance



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