General Description

The WSD20100DN56 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 WSD20100DN56 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

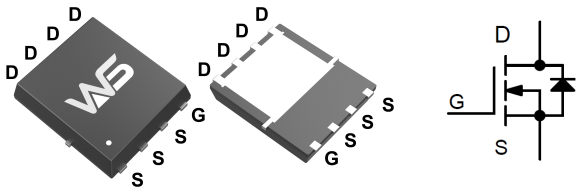
Product Summery

BVDSS	RDSON	ID
20V	1.6mΩ	90A

Applications

- Switch
- Power System
- Load Switch

DFN5X6-8 Pin Configuration



Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	±12	V
I_D@T_C=25℃	Continuous Drain Current[1]	90	A
I_D@T_C=100℃	Continuous Drain Current[1]	48	A
I_{DM}	Pulsed Drain Current[2]	270	A
E_{AS}	Single Pulse Avalanche Energy[3]	80	mJ
I_{AS}	Avalanche Current	40	A
P_D@T_C=25℃	Total Power Dissipation[4]	83	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
$R_{\theta JA}$	Thermal Resistance Junction-ambient [1](t≦10S)	20	℃/W
$R_{\theta JA}$	Thermal Resistance Junction-ambient [1](Steady State)	55	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-case [1]	1.5	℃/W

Electrical Characteristics (T_C=25℃unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	20	23	---	V
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	0.5	0.68	1.0	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance2	V_{GS}=10V , I_D=20A	---	1.6	2.0	mΩ
$R_{DS(ON)}$	Static Drain-Source On-Resistance2	V_{GS}=4.5V , I_D=20A		1.9	2.5	mΩ
$R_{DS(ON)}$	Static Drain-Source On-Resistance2	V_{GS}=2.5V , I_D=20A	---	2.8	3.8	mΩ
I_{DSS}	Drain-Source Leakage Current	V_{DS}=16V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=16V , V_{GS}=0V , T_J=125℃	---	---	5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±10V , V_{DS}=0V	---	---	±10	uA
Rg	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	1.2	---	Ω
Q_g	Total Gate Charge (10V)	V_{DS}=15V , V_{GS}=10V , I_D=20A	---	77	---	nC
Qgs	Gate-Source Charge		---	8.7	---	
Qgd	Gate-Drain Charge		---	14	---	
Td(on)	Turn-On Delay Time	V_{DD}=15V , V_{GS}=10V , R_G=3 , I_D=20A	---	10.2	---	ns
T_r	Rise Time		---	11.7	---	
Td(off)	Turn-Off Delay Time		---	56.4	---	
T_f	Fall Time		---	16.2	---	
Ciss	Input Capacitance	V_{DS}=10V , V_{GS}=0V , f=1MHz	---	4307	---	pF
Coss	Output Capacitance		---	501	---	
Crss	Reverse Transfer Capacitance		---	321	---	
IS	Continuous Source Current1,5	V_G=V_D=0V , Force Current	---	---	50	A
V_{SD}	Diode Forward Voltage2	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.2	V
trr	Reverse Recovery Time	IF=20A , di/dt=100A/μs , T_J=25℃	---	22	---	nS
Q_{rr}	Reverse Recovery Charge		---	72	---	nC

Note :

1、The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.

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

3、The EAS data shows Max. rating . The test condition is VDD=16V,VGS=10V,L=0.1mH,IAS=39A

4、The power dissipation is limited by 175℃ junction temperature

5、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Typical Characteristics

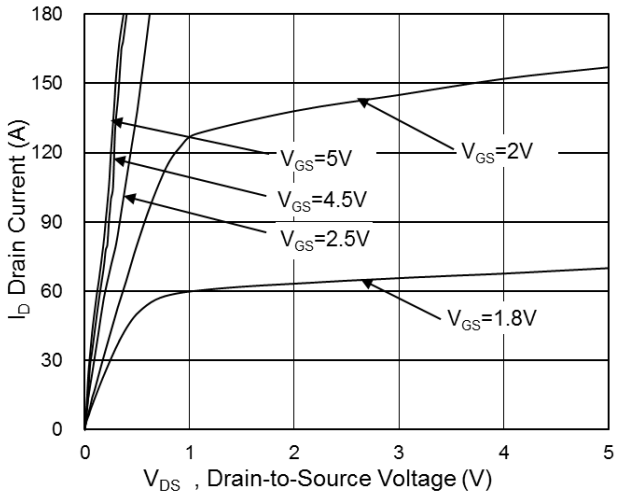


Fig.1 Typical Output Characteristics

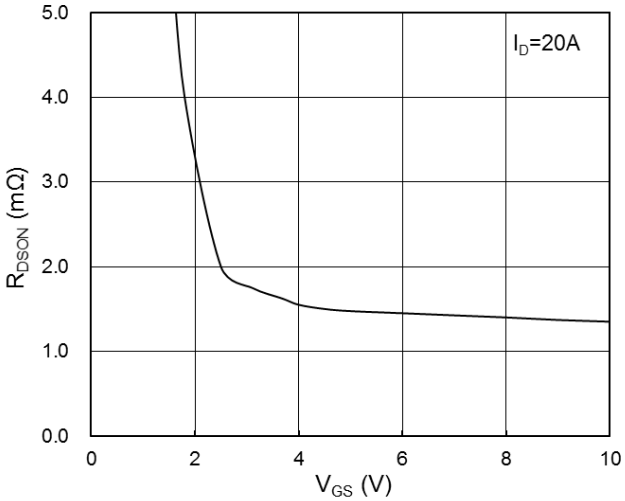


Fig.2 On-Resistance vs. Gate-Source Voltage

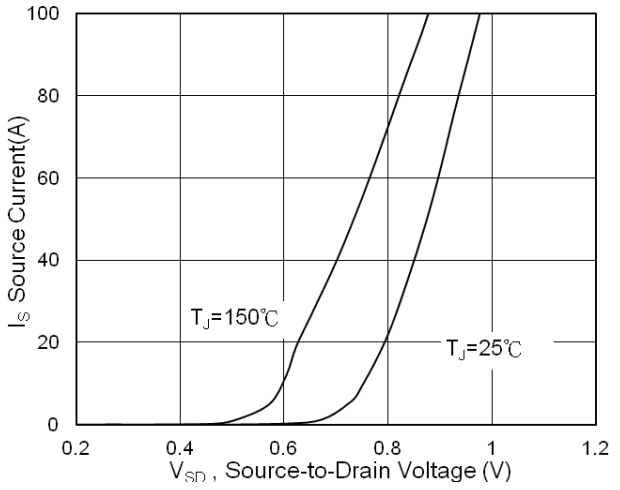


Fig.3 Forward Characteristics of Reverse

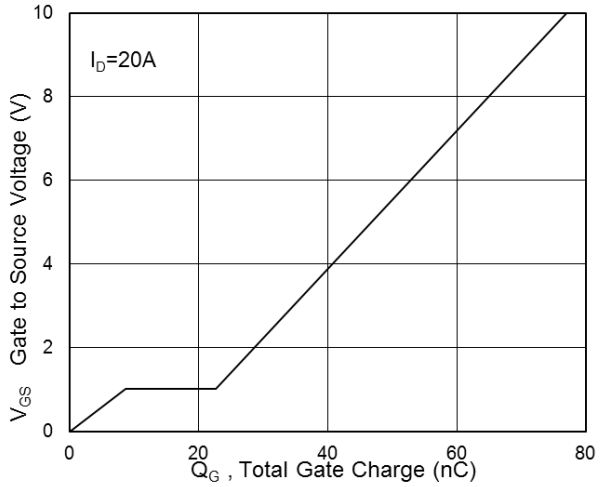


Fig.4 Gate-Charge Characteristics

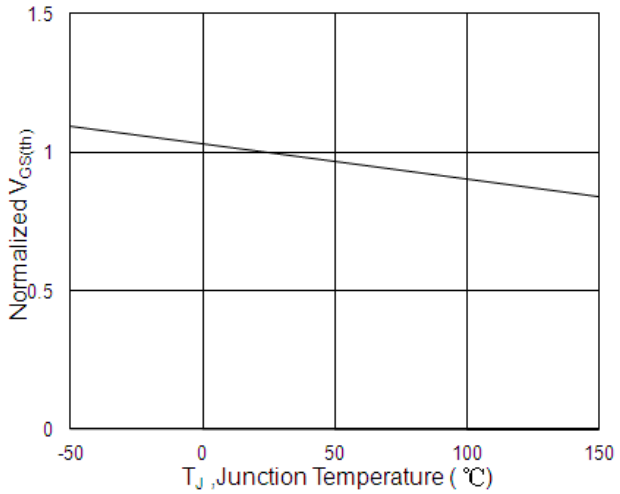


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

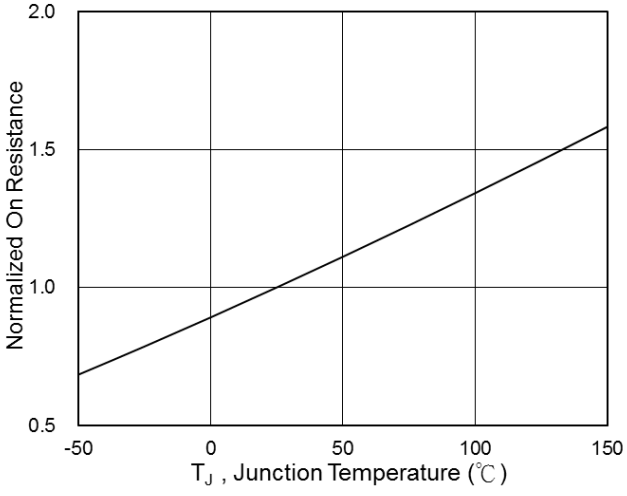


Fig.6 Normalized R_{DSON} vs. T_J

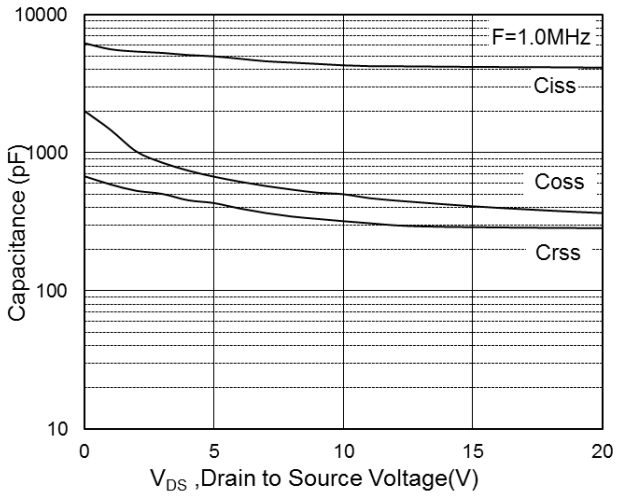


Fig.7 Capacitance

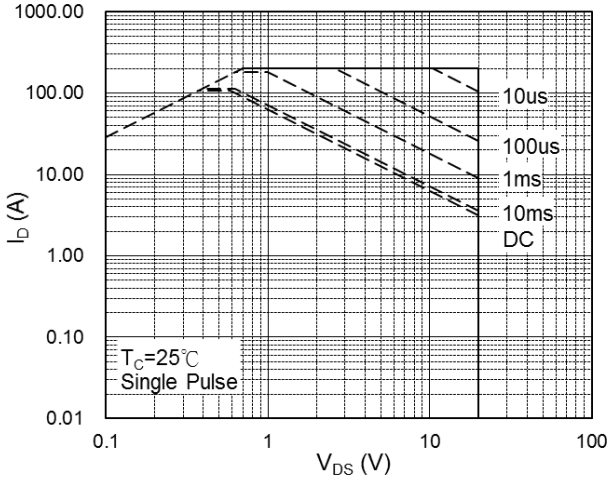


Fig.8 Safe Operating Area

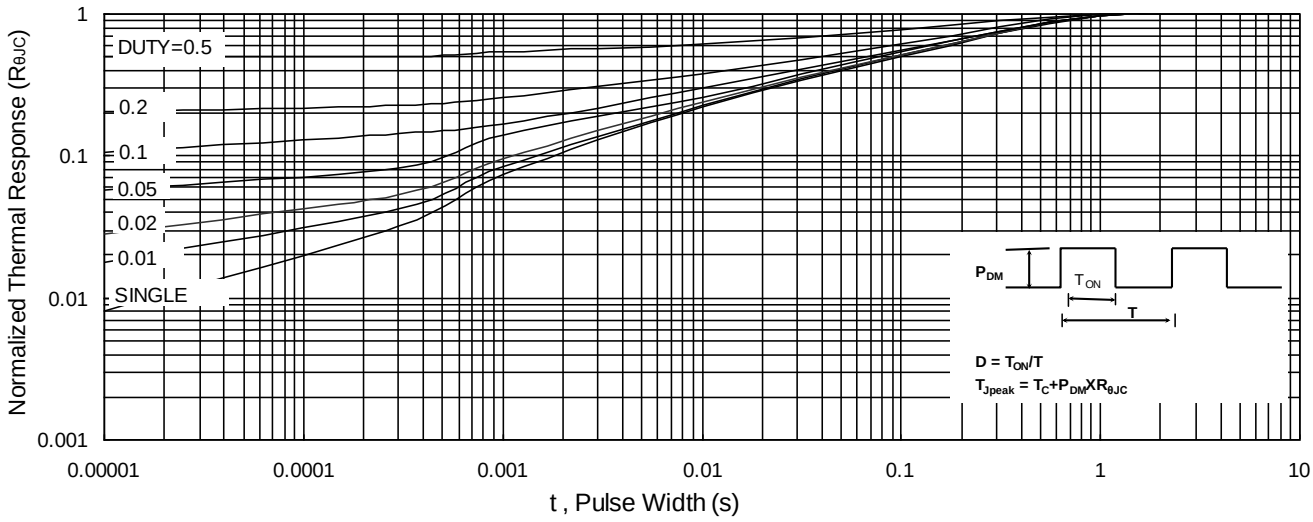


Fig.9 Normalized Maximum Transient Thermal Impedance

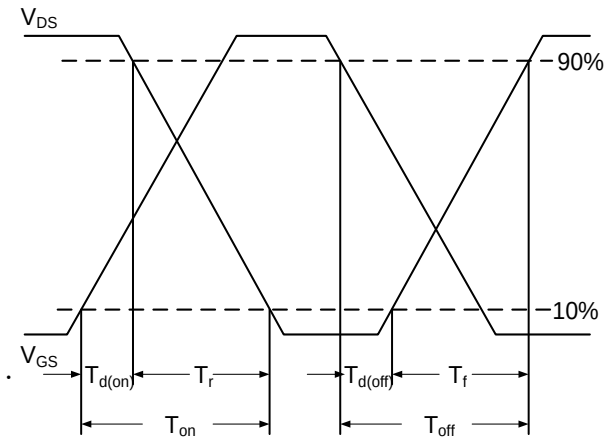


Fig.10 Switching Time Waveform

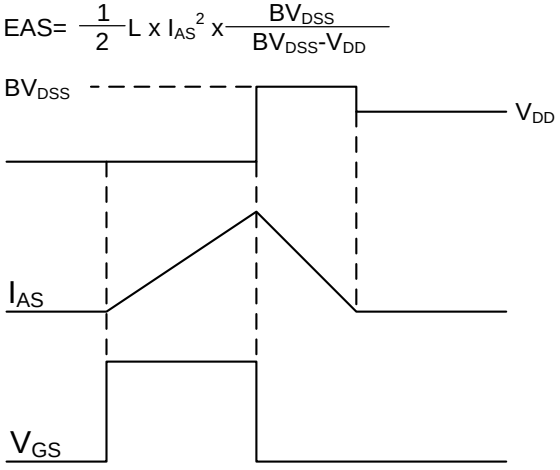


Fig.11 Unclamped Inductive Switching Waveform

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