General Description

The WSD2090DN56 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 WSD2090DN56 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

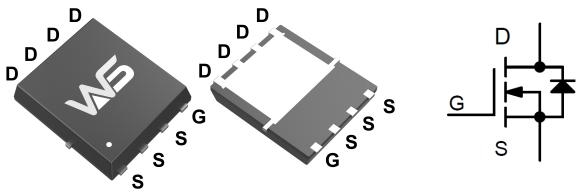
Product Summery

BVDSS	RDSON	ID
20V	2.8mΩ	80A

Applications

- Switch
- Power System
- Load Switch

DFN5X6-8 Pin Configuration



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

Symbol	Parameter	Max.	Units
VDSS	Drain-Source Voltage	20	V
VGSS	Gate-Source Voltage	±12	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	80	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	59	A
IDM	Pulsed Drain Current note1	360	A
EAS	Single Pulsed Avalanche Energy note2	110	mJ
P_D	Power Dissipation	81	W
RθJA	Thermal Resistance, Junction to Case	65	℃/W
RθJC	Thermal Resistance Junction-Case 1	4	℃/W
TJ, TSTG	Operating and Storage Temperature Range	-55 to +175	℃

Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
BVDSS	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	20	24	---	V
△BVDSS/△TJ	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.018	---	V/℃
VGS(th)	Gate Threshold Voltage	V_{DS}= V_{GS}, I_D=250μA	0.50	0.65	1.0	V
RDS(ON)	Static Drain-Source On-Resistance	V_{GS}=4.5V, I_D=30A	---	2.8	4.0	mΩ
RDS(ON)	Static Drain-Source On-Resistance	V_{GS}=2.5V, I_D=20A	---	4.0	6.0	
IDSS	Zero Gate Voltage Drain Current	V_{DS}=20V,V_{GS}=0V	---	---	1	μA
IGSS	Gate-Body Leakage Current	V_{GS}=±10V, V_{DS}=0V	---	---	±100	nA
C_{iss}	Input Capacitance	V_{DS}=10V,V_{GS}=0V,f=1MHZ	---	3200	---	pF
C_{oss}	Output Capacitance		---	460	---	
C_{rss}	Reverse Transfer Capacitance		---	446	---	
Q_g	Total Gate Charge	V_{GS}=4.5V,V_{DS}=10V,I_D=30A	---	11.05	---	nC
Q_{gs}	Gate-Source Charge		---	1.73	---	
Q_{gd}	Gate-Drain Charge		---	3.1	---	
tD(on)	Turn-on Delay Time	V_{GS}=4.5V, V_{DS}=10V, I_D=30A R_{GEN}=1.8Ω	---	9.7	---	ns
t_r	Turn-on Rise Time		---	37	---	
tD(off)	Turn-off Delay Time		---	63	---	
t_f	Turn-off fall Time		---	52	---	
V_{SD}	Diode Forward Voltage	I_S=7.6A,V_{GS}=0V	---	---	1.2	V

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 power dissipation is limited by 150℃ junction temperature

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

5、EAS condition: TJ=25℃, VDD=15V, VG=4.5V, RG=25Ω, L=0.5mH, IAS=21A

Typical Characteristics

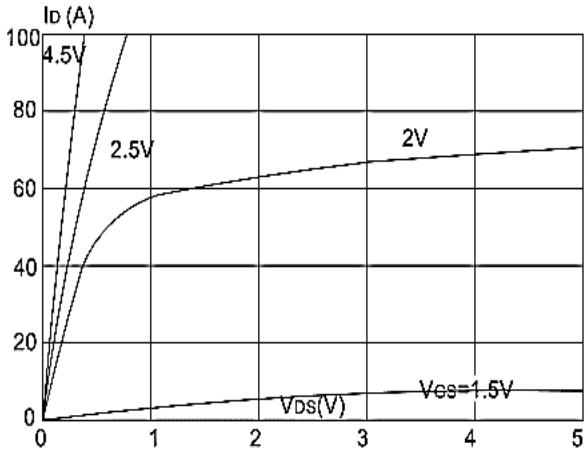


Figure1: Output Characteristics

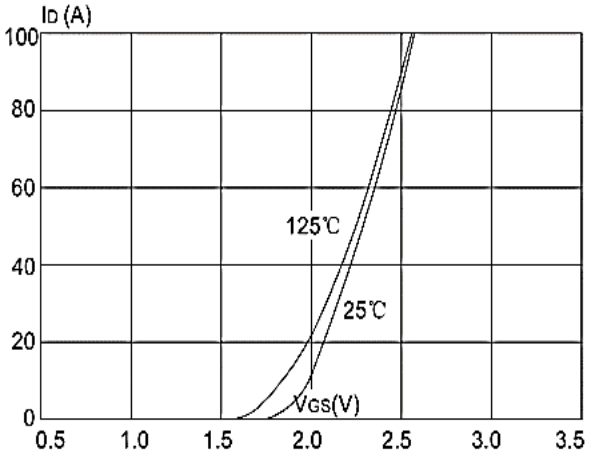


Figure 2: Typical Transfer Characteristics

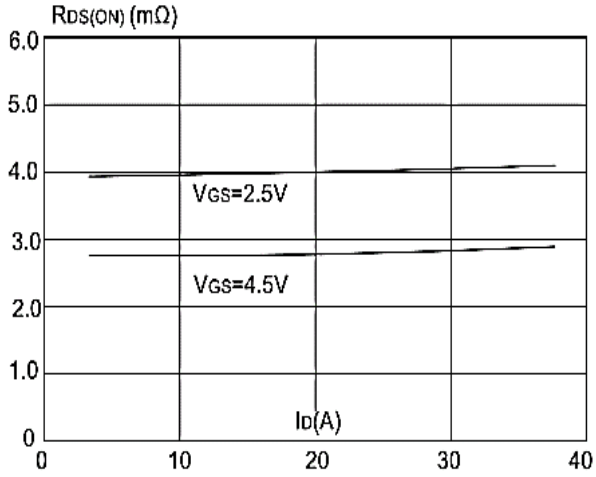


Figure 3:On-resistance vs. Drain Current

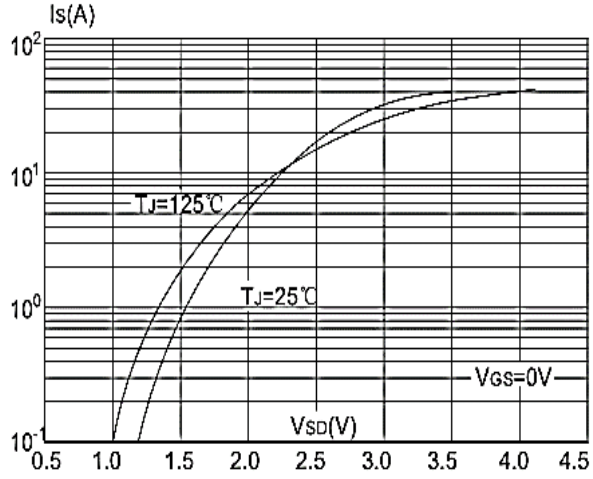


Figure 4: Body Diode Characteristics

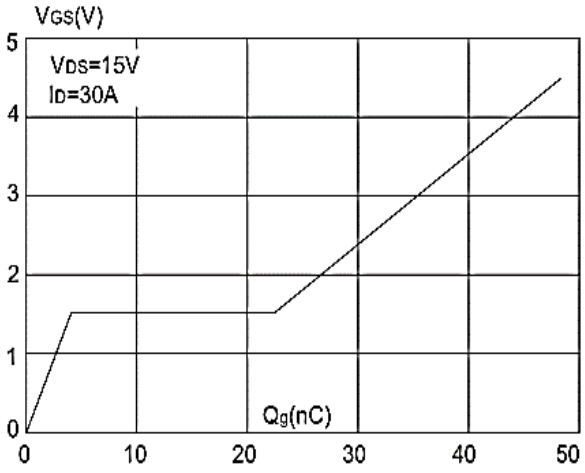


Figure 5: Gate Charge Characteristics

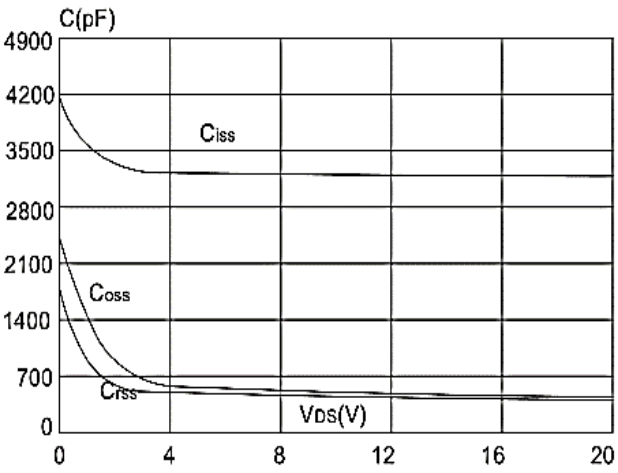


Figure 6: Capacitance Characteristics

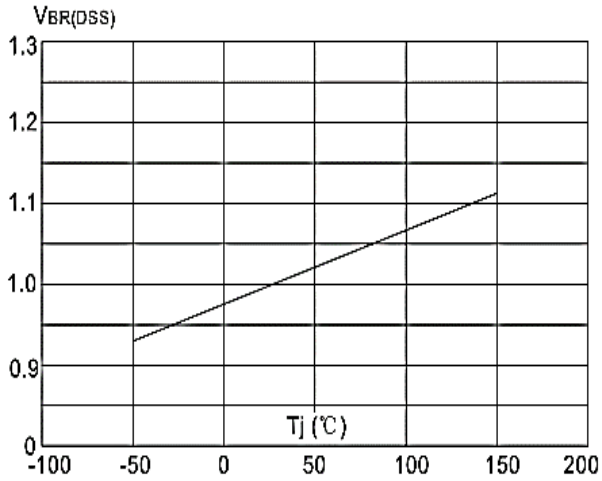


Figure 7: Normalized Breakdown Voltage vs Junction Temperature

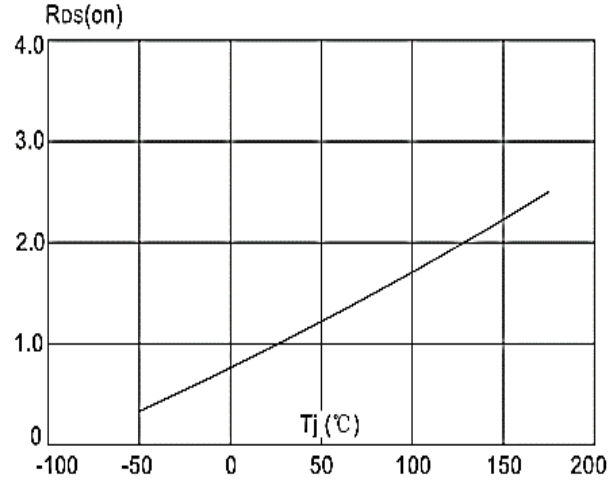


Figure 8: Normalized on Resistance vs. Junction Temperature

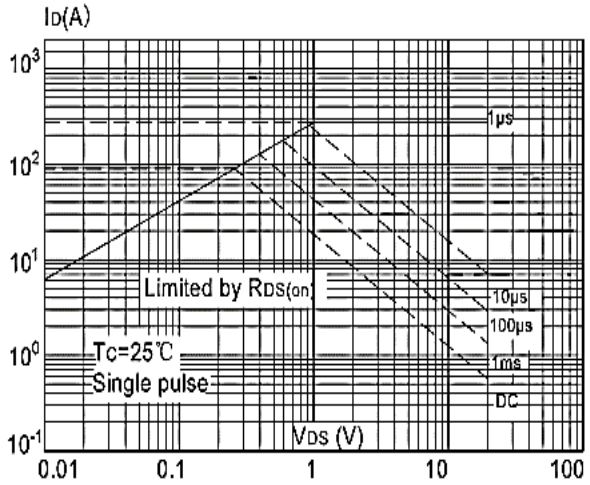


Figure 9: Maximum Safe Operating Area

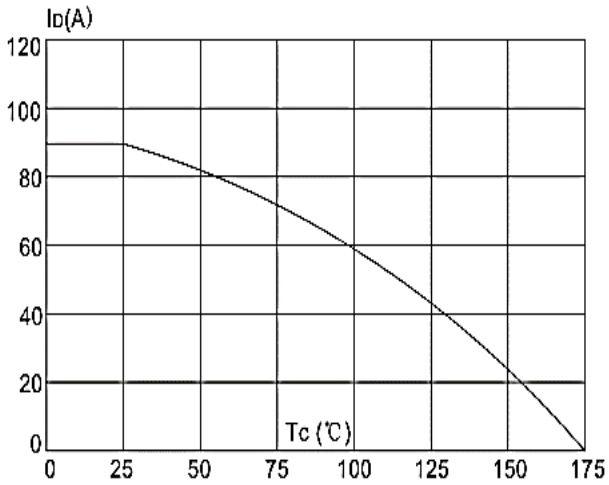


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

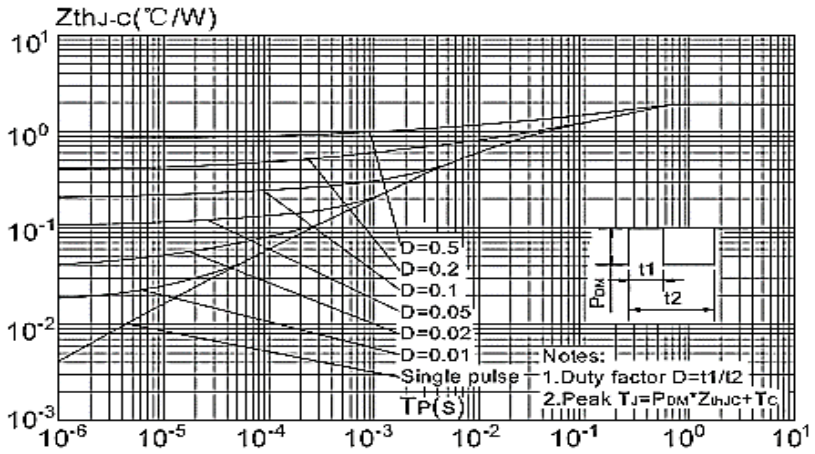


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambien

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