

General Description

The WSD2090DN56 is the highest performance trench N-Ch MOSFET with extreme high cell density, which provide excellent R_{DS(on)} 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

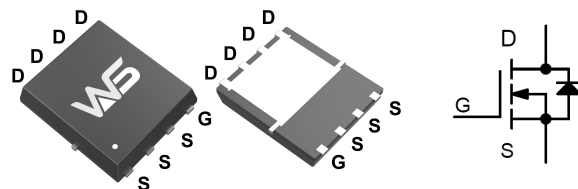
Product Summary

BVDSS	R _{DS(on)}	I _D
20V	2.8mΩ	80A

Applications

- Switch
- Power System
- Load Switch

DFN5X6-8 Pin Configuration



Absolute Maximum Ratings (T_c=25°C unless otherwise noted)

Symbol	Parameter	Max.	Units
V _{DSS}	Drain-Source Voltage	20	V
V _{GSS}	Gate-Source Voltage	±12	V
I _D @T _c =25°C	Continuous Drain Current, V _{GS} @ 10V ₁	80	A
I _D @T _c =100°C	Continuous Drain Current, V _{GS} @ 10V ₁	59	A
I _{DM}	Pulsed Drain Current <small>note1</small>	360	A
EAS	Single Pulsed Avalanche Energy <small>note2</small>	110	mJ
P _D	Power Dissipation	81	W
R _{θJA}	Thermal Resistance, Junction to Case	65	°C/W
R _{θJC}	Thermal Resistance Junction-Case 1	4	°C/W
T _J , T _{STG}	Operating and Storage Temperature Range	-55 to +175	°C

Electrical Characteristics (T_J=25 °C, unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
BVDSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	20	24	---	V
ΔBVDSS/ΔT _J	BVDSS Temperature Coefficient	Reference to 25°C, I _D =1mA	---	0.018	---	V/°C
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	0.50	0.65	1.0	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =4.5V, I _D =30A	---	2.8	4.0	mΩ
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =2.5V, I _D =20A	---	4.0	6.0	
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =20V, V _{GS} =0V	---	---	1	μA
I _{GSS}	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	---	
t _{D(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	---	
t _{D(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°C 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: T_J=25°C, V_{DD}=15V, V_G=4.5V, R_G=25Ω, L=0.5mH, I_{AS}=21A

Typical Characteristics

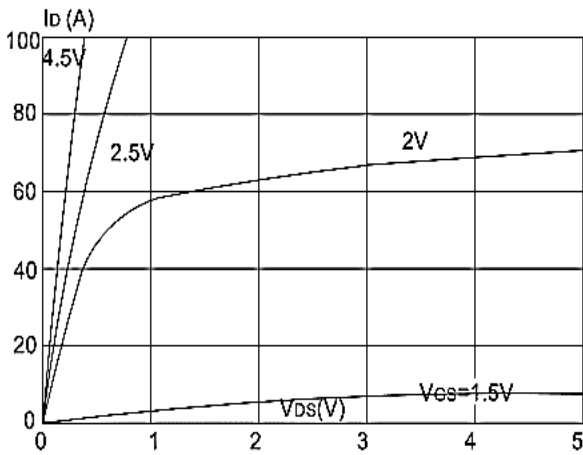


Figure 1: Output Characteristics

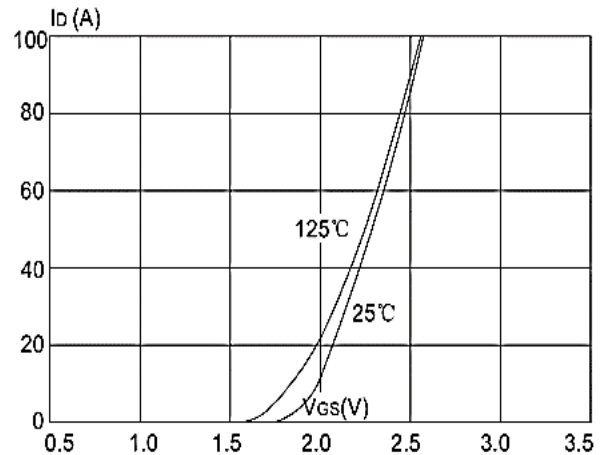


Figure 2: Typical Transfer Characteristics

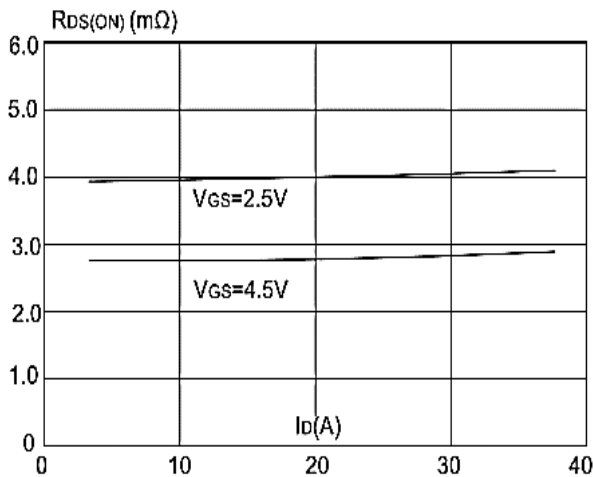


Figure 3: On-resistance vs. Drain Current

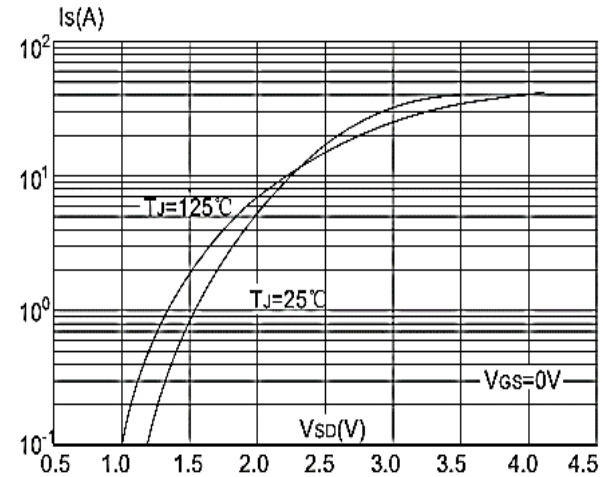


Figure 4: Body Diode Characteristics

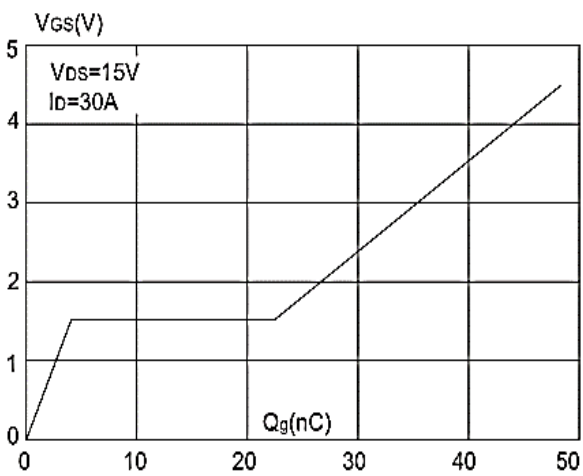


Figure 5: Gate Charge Characteristics

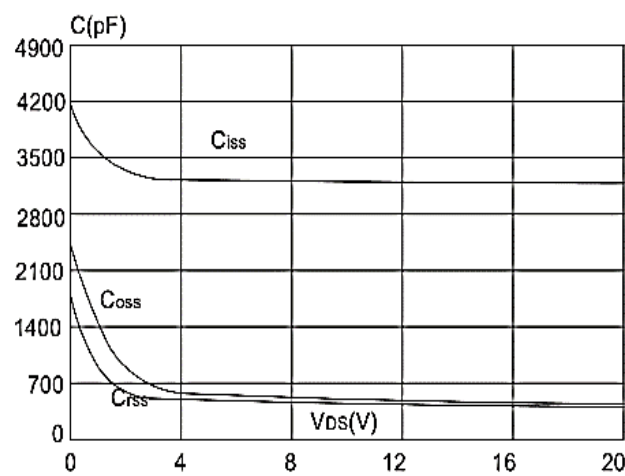


Figure 6: Capacitance Characteristics

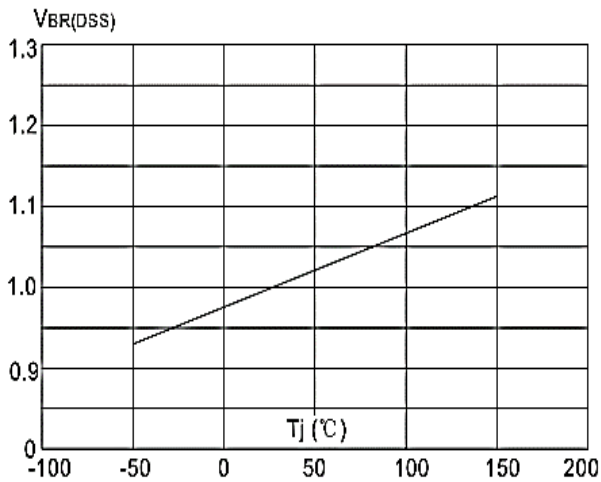


Figure 7: Normalized Breakdown Voltage vs Junction Temperature

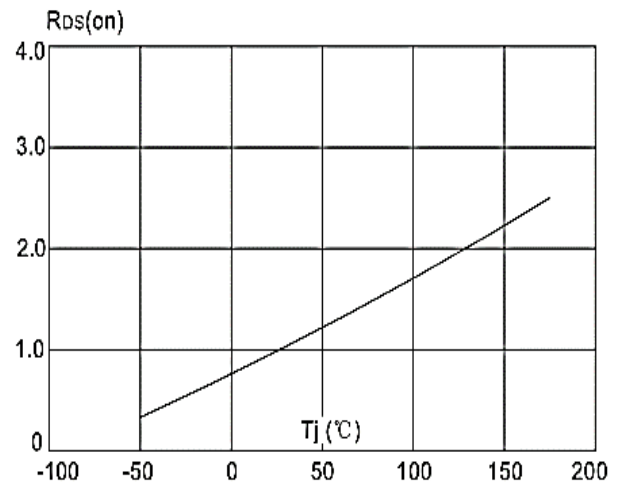


Figure 8: Normalized on Resistance vs. Junction Temperature

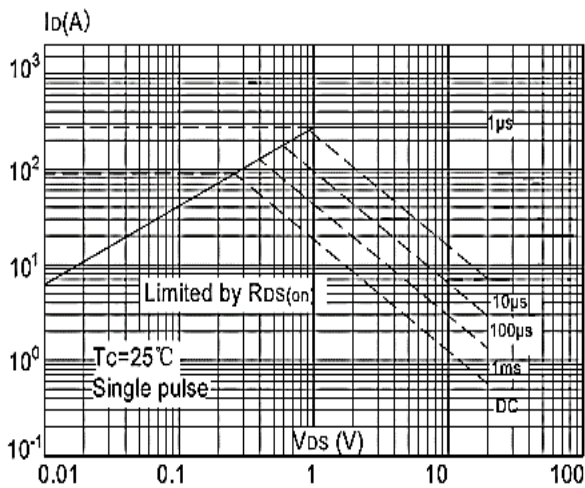


Figure 9: Maximum Safe Operating Area

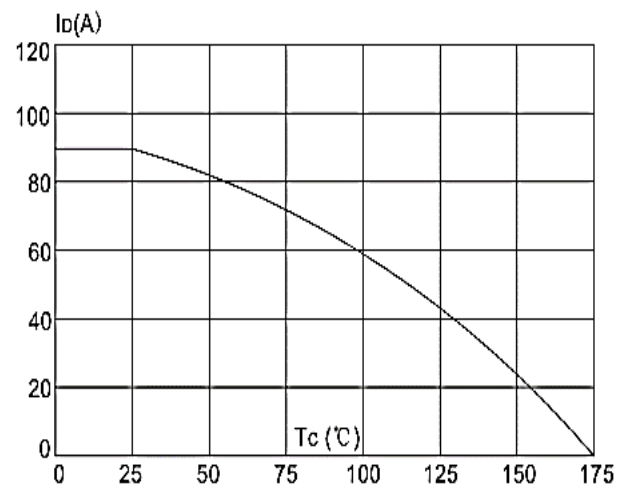


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

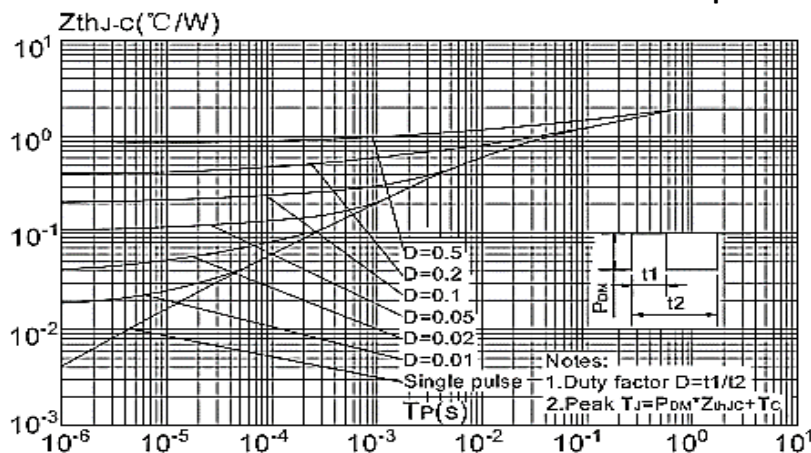


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambien



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