

General Description

The WSD3075DN56 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 WSD3075DN56 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

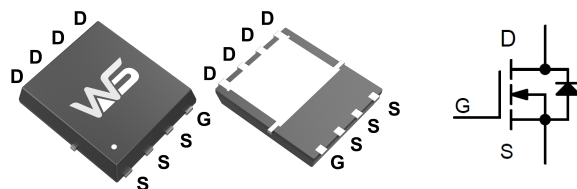
Product Summary

BVDSS	RDSON	ID
30V	6.5mΩ	75A

Applications

- Battery protection
- Load switch
- Uninterruptible power supply

DFN5X6-8 Pin Configuration



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

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	30	V
V _{GS}	Gate-Source Voltage	±20	V
I _D	Continuous Drain Current, V _{GS} @ 10V(Tc=25°C)	75	A
I _D	Continuous Drain Current, V _{GS} @ 10V(Tc=100°C)	38	A
I _{DM}	Pulsed Drain Current	115	A
EAS	Single Pulse Avalanche Energy	57.8	mJ
I _{AS}	Avalanche Current	34	A
P _D	Total Power Dissipation (Tc=25°C)	46	W
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C
R _{θJA}	Thermal Resistance Junction-Ambient	62	°C/W
R _{θJC}	Thermal Resistance Junction-Case	2.7	°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 =250uA	30	---	---	V
ΔBV _{DSS} /ΔT _J	BVDSS Temperature Coefficient	Reference to 25°C, I _D =1mA	---	0.027	---	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ₂	V _{GS} =10V, I _D =30A	---	6.5	8.5	mΩ
		V _{GS} =4.5V, I _D =15A	---	11	14	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.2	1.5	2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	-5.8	---	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =24V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =24V, V _{GS} =0V, T _J =55°C	---	---	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =30A	---	38	---	S
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	1.7	2.9	Ω
Q _g	Total Gate Charge (4.5V)	V _{DS} =15V, V _{GS} =4.5V, I _D =15A	---	12.6	17.6	nC
Q _{gs}	Gate-Source Charge		---	4.2	5.9	
Q _{gd}	Gate-Drain Charge		---	5.1	7.1	
T _{d(on)}	Turn-On Delay Time	V _{DD} =15V, V _{GS} =10V, R _G =3.3Ω, I _D =15A	---	4.6	9.2	ns
T _r	Rise Time		---	12.2	22	
T _{d(off)}	Turn-Off Delay Time		---	26.6	53	
T _f	Fall Time		---	8	16	
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1MHz	---	1317	1844	pF
C _{oss}	Output Capacitance		---	163	228	
C _{rss}	Reverse Transfer Capacitance		---	131	183	
I _S	Continuous Source Current _{1,5}	V _G =V _D =0V, Force Current	---	---	58	A
I _{SM}	Pulsed Source Current _{2,5}		---	---	115	A
V _{SD}	Diode Forward Voltage ₂	V _{GS} =0V, I _S =1A, T _J =25°C	---	---	1	V
t _{rr}	Reverse Recovery Time	I _F =30A, dI/dt=100A/μs, T _J =25°C	---	9.2	---	nS
Q _{rr}	Reverse Recovery Charge		---	2	---	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=25V,VGS=10V,L=0.1mH,IAS=3
- 4.The power dissipation is limited by 150°C 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

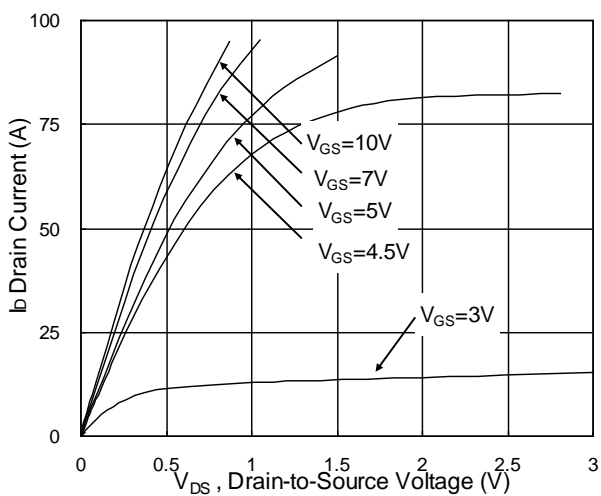


Fig.1 Typical Output Characteristics

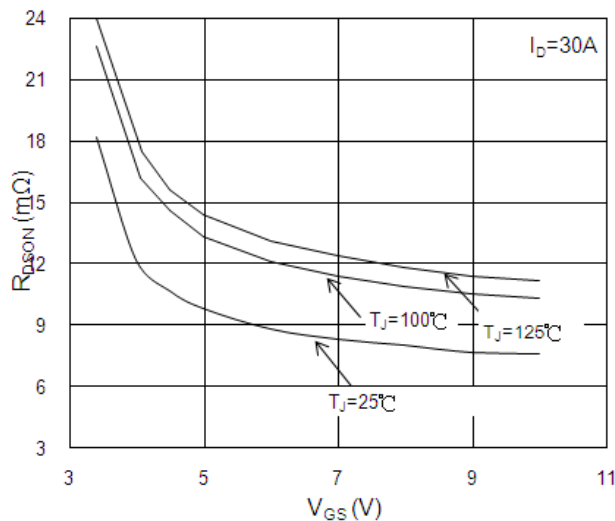


Fig.2 On-Resistance vs. Gate-Source

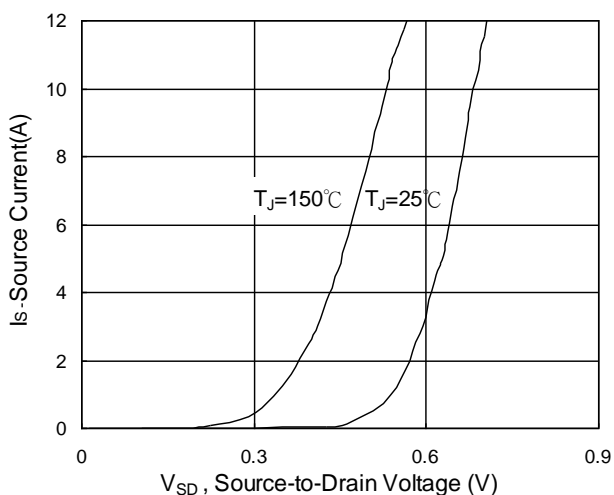


Fig.3 Forward Characteristics of reverse

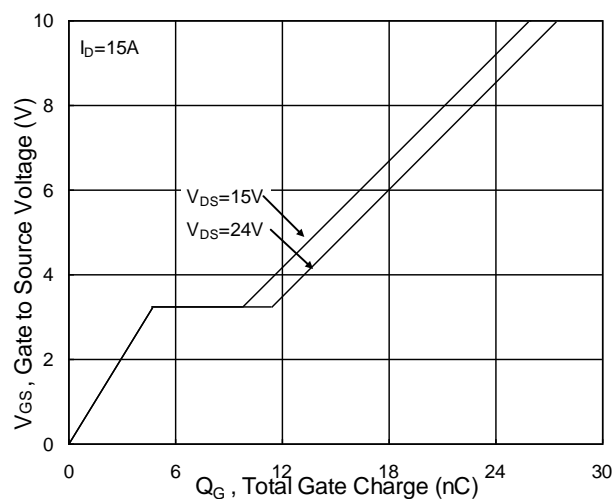


Fig.4 Gate-Charge Characteristics

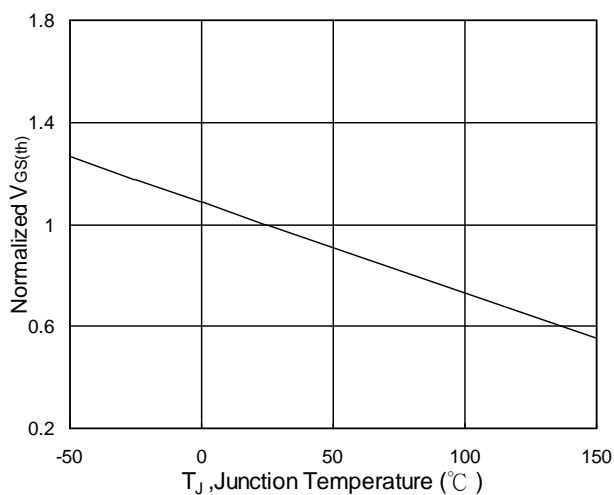


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

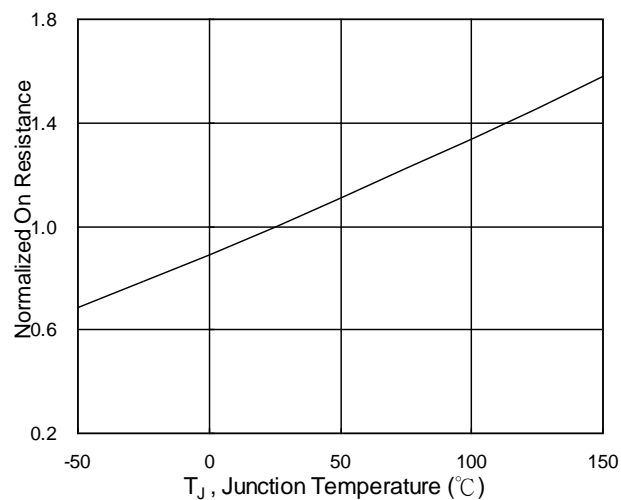


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

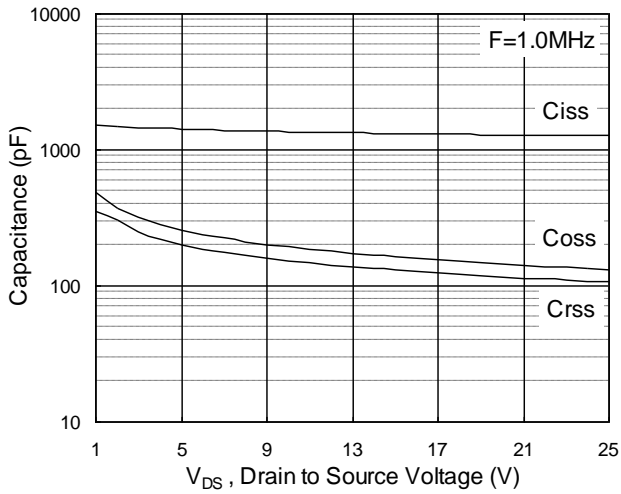


Fig.7 Capacitance

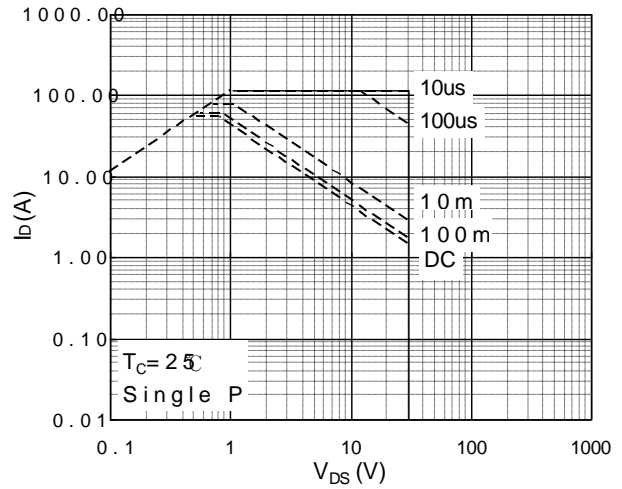


Fig.8 Safe Operating Area

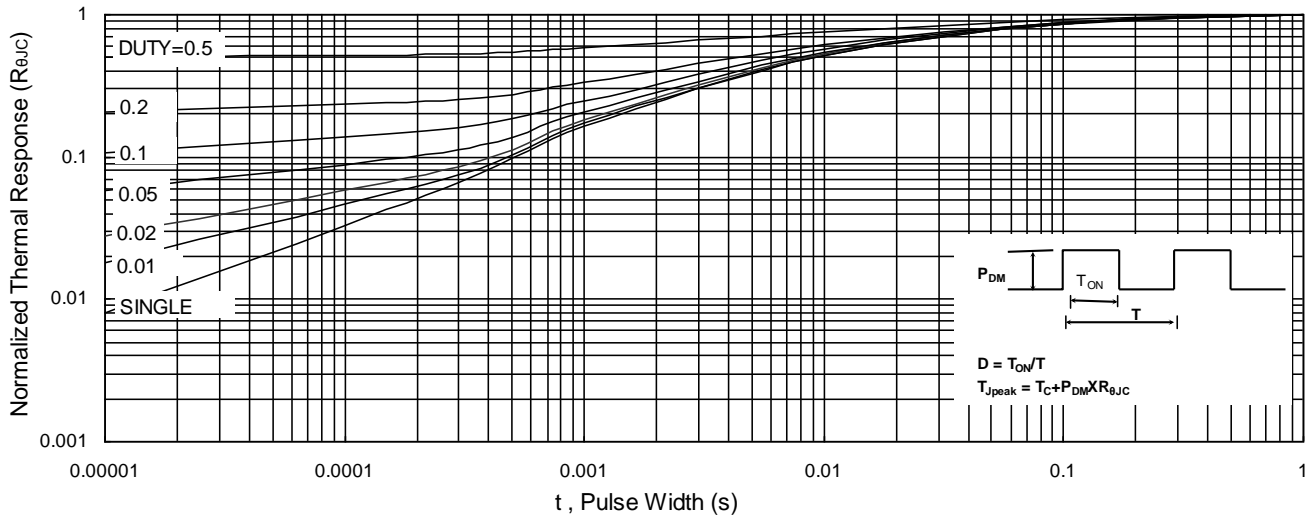


Fig.9 Normalized Maximum Transient Thermal Impedance

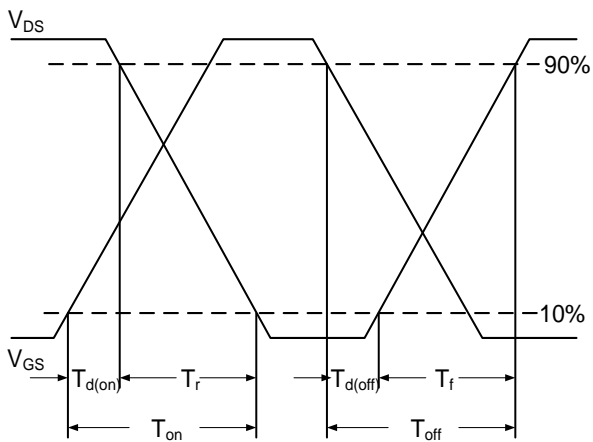


Fig.10 Switching Time Waveform

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

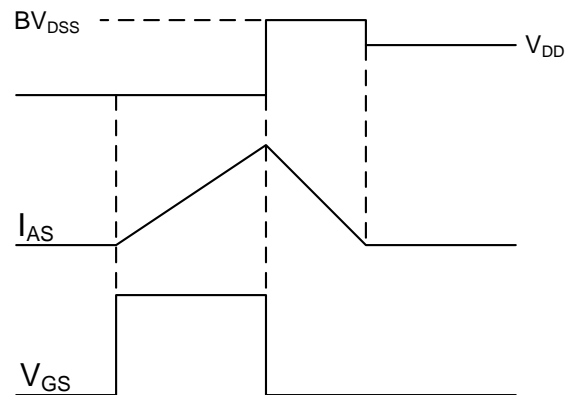


Fig.17 Unclamped Inductive Switching Waveform

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