General Description

The WSD3075DN56 is the highest performance trench N-Channel MOSFET with extreme high cell density, which provide excellent $R_{DS(ON)}$ and gate charge for most of the synchronous buck converter applications.

The WSD3075DN56 meet the RoHS and Green Product requirement 100% E_{AS} guaranteed with full function reliability approved.

Product Summery

BV_{DSS}	$R_{DS(ON)}$	I_D
30V	6.5mΩ	75A

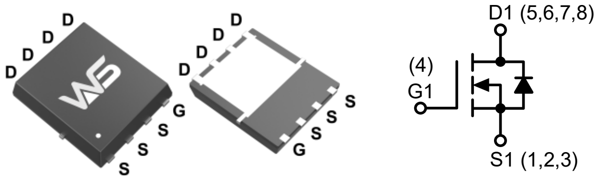
Applications

- Battery protection
- Load switch.
- Uninterruptible power supply

Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% E_{AS} Guaranteed
- Green Device Available

DFN5X6-8L Pin Configuration



Absolute Maximum Ratings (T_C=25°C, Unless Otherwise Noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	±20	
I_D	Continuous Drain Current, V_{GS} @ 10V (T_C=25°C)	75	A
	Continuous Drain Current, V_{GS} @ 10V (T_C=100°C)	38	
I_{DM}	Pulsed Drain Current	115	
E_{AS}	Single pulse avalanche energy	57.8	mJ
I_{AS}	Avalanche Current	34	A
P_D	Total Power Dissipation (T_C=25°C)	46	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	

Thermal Data

Symbol	Parameter	Rating	Units
$R_{\theta JA}$	Thermal Resistance Junction-Ambient	62	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case	2.7	

Electrical Characteristics (T_J=25°C, Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250μA	30	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} 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=250μA	1.2	1.5	2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	5.8	---	mV/°C
I_{DSS}	Drain-Source Leakage Current	V_{DS}=24V , V_{GS}=0V , T_J=25°C	---	---	1.0	μA
		V_{DS}=24V , V_{GS}=0V , T_J=55°C	---	---	5.0	
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=1.0MHz	---	1.7	2.9	Ω
Q_g	Total Gate Charge	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_{DS}=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=1.0MHz	---	1317	1844	pF
C_{oss}	Output Capacitance		---	163	228	
C_{rss}	Reverse Transfer Capacitance		---	131	183	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
I_S	Continuous Source Current [1,5]	V_G=V_D=0V, Force Current	---	---	58	A
I_{SM}	Pulsed Source Current [2,5]		---	---	115	
V_{SD}	Diode Forward Voltage [2]	V_{GS}=0V , I_S=1A , T_J=25°C	---	---	1.0	V
t_{rr}	Reverse Recovery Time	I_S=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 inch^2 FR-4 board with 2OZ copper.
2. The data tested by pulsed, pulse width ≤ 300μs , duty cycle ≤ 2%.
3. The E_{AS} data shows Max. rating . The test condition is V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=34A
4. The power dissipation is limited by 150°C junction temperature.
5. The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

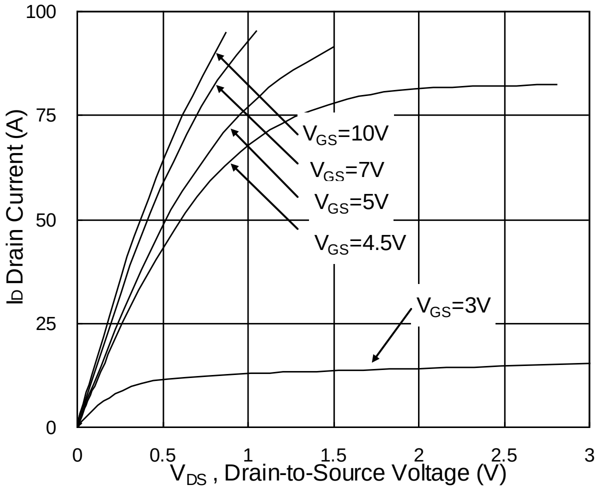


Fig.1 Typical Output Characteristics

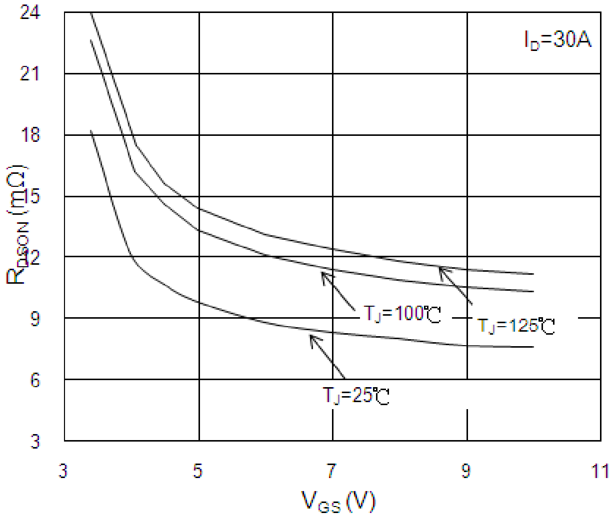


Fig.2 On-Resistance vs. Gate-Source

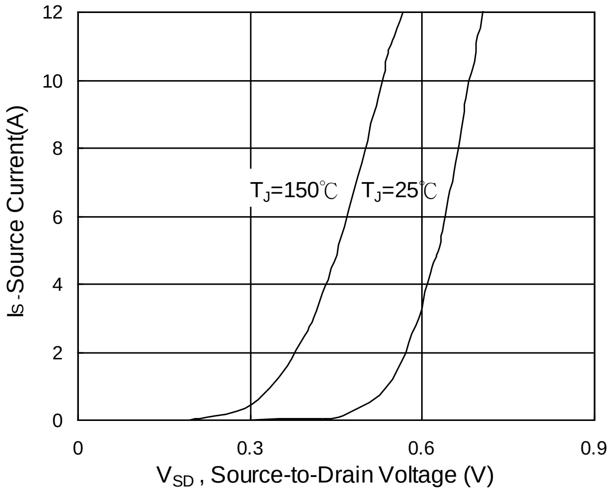


Fig.3 Forward Characteristics of reverse

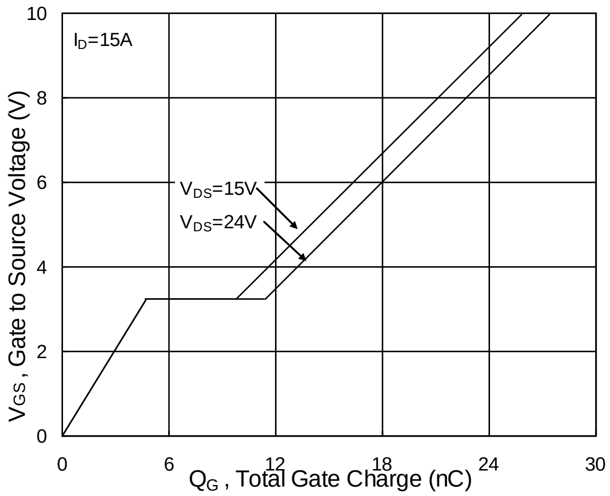


Fig.4 Gate-Charge Characteristics

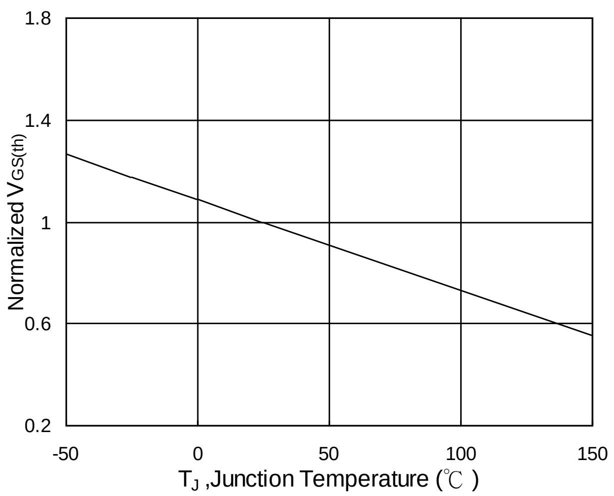


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

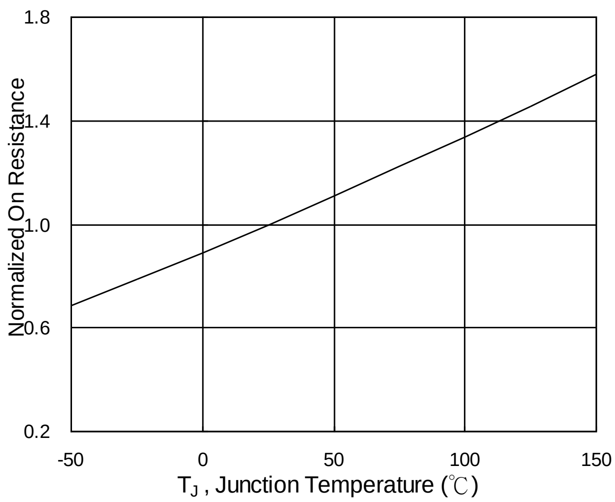


Fig.6 Normalized R_{DSON} vs. T_J

Typical Characteristics (Cont.)

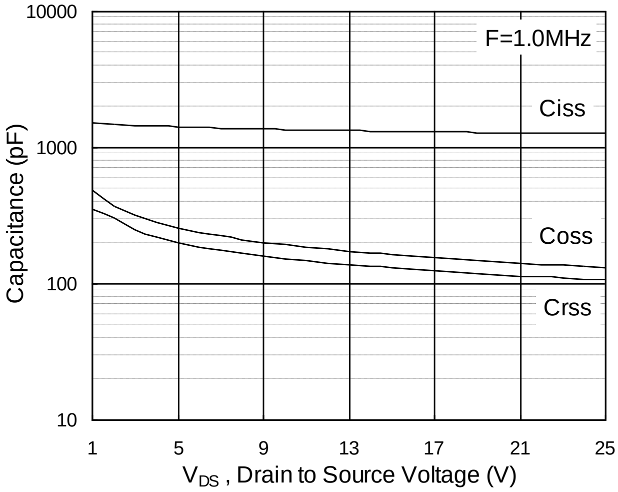


Fig.7 Capacitance

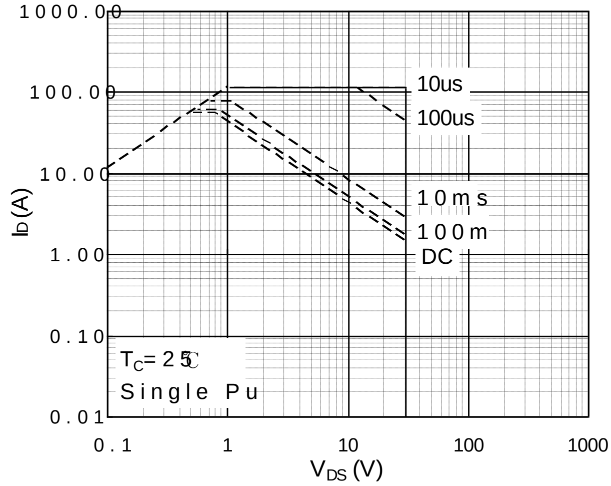


Fig.8 Safe Operating Area

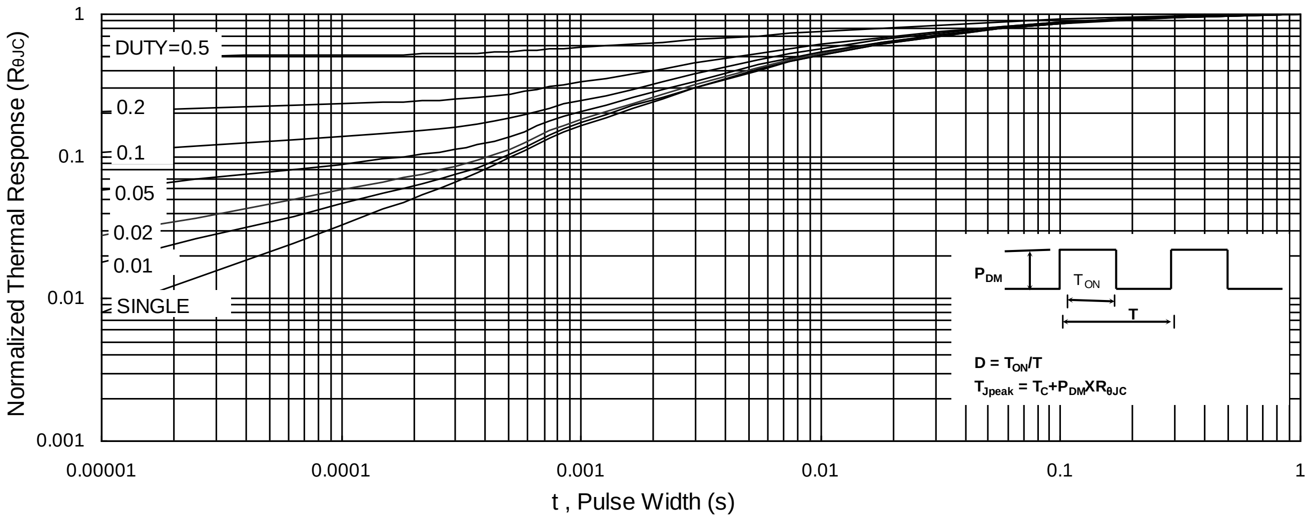


Fig.9 Normalized Maximum Transient Thermal Impedance

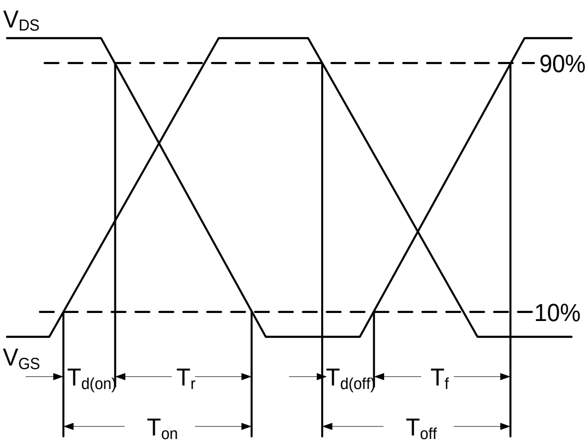


Fig.10 Switching Time Waveform

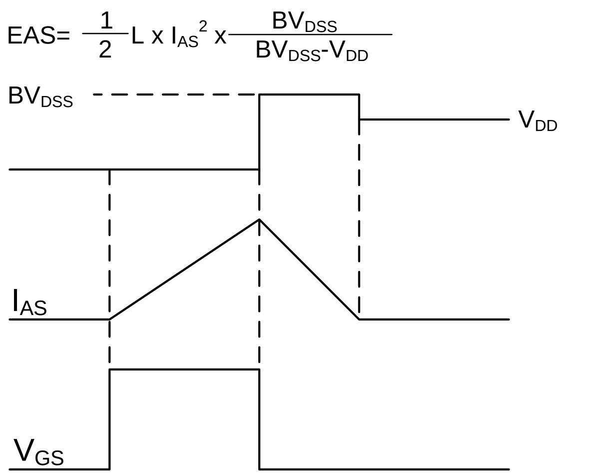
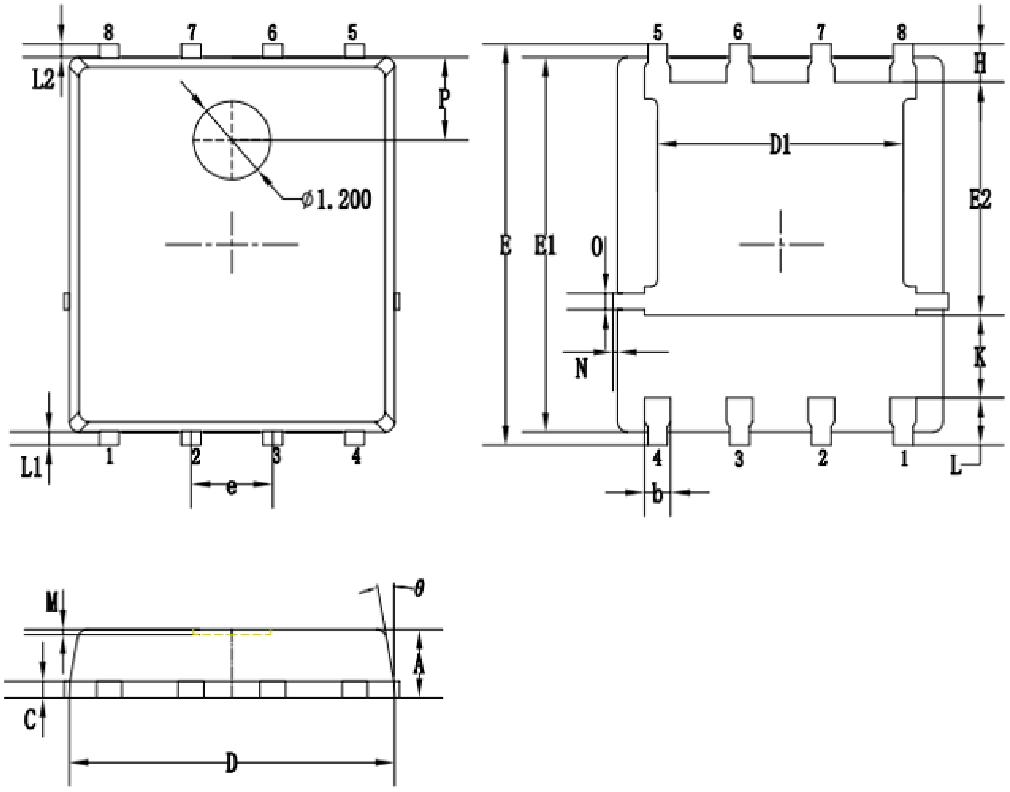


Fig.17 Unclamped Inductive Switching Waveform

Packaging information



SYMBOLS	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.05	1.20
b	0.35	0.40	0.50
C	0.20	0.25	0.35
D	4.90	5.05	5.20
D1	3.72	3.82	3.92
E	6.00	6.15	6.30
E1	5.60	5.75	5.90
E2	3.47	3.57	3.67
e	1.27 BSC.		
H	0.48	0.58	0.68
K	1.17	1.27	1.37
L	0.64	0.74	0.84
L1/L2	0.20 REF.		
θ	8°	10°	12°
M	0.08 REF.		
N	0	-	0.15
O	0.25 REF.		
P	1.28 REF.		

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