General Description

The WSD75N12GDN56 uses Super Trench technology that is uniquely optimized to provide the most efficient high frequency switching performance. Both conduction and switching power losses are minimized due to an extremely low combination of $R_{DS(ON)}$ and Q_G. This device is ideal for high frequency switching and synchronous rectification.

Product Summery

BV_{DSS}	$R_{DS(ON)}$	I_D
120V	6.0mΩ	75A

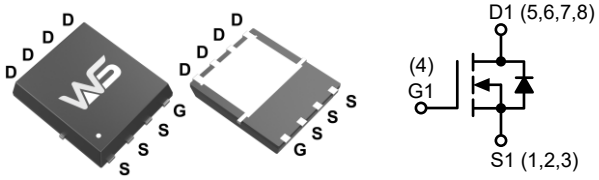
Applications

- DC/DC Converter
- Load switch.

Features

- Excellent gate charge x $R_{DS(ON)}$ product(FOM)
- Very low on-resistance $R_{DS(ON)}$
- 150°C operating temperature
- Pb-free lead plating
- 100% UIS tested.

DFN5X6-8L Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	120	V
V_{GS}	Gate-Source Voltage	±20	
I_D	Continuous Drain Current [1](T_C=25°C)	75	A
	Continuous Drain Current [1](T_C=70°C)	70	
I_{DM}	Pulsed Drain Current	320	
I_{AR}	Single pulse avalanche current	40	
E_{AS}	Single pulse avalanche energy	240	mJ
P_D	Power Dissipation	125	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	
T_L	Maximum Temperature for Soldering	260	

Thermal Data

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	---	50	°C/W
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	---	1.0	

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	120	---	---	V
$R_{DS(ON)}$ [1]	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=20A	---	6.0	6.8	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=250μA	2.5	3.0	3.5	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=120V , V_{GS}=0V	---	---	1.0	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
g_{fs}	Forward Transconductance	V_{DS}=5V , I_D=50A	---	130	---	S
R_g	Gate resistance	V_{DS}=50V , V_{GS}=0V , f=1.0MHz	---	2.5	---	Ω
Q_g	Total Gate Charge	V_{DS}=50V , V_{GS}=10V , I_D=20A	---	61.4	---	nC
Q_{gs}	Gate-Source Charge		---	17.4	---	
Q_{gd}	Gate-Drain Charge		---	14.1	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DS}=50V , V_{GS}=10V , R_G=5Ω , I_D=20A	---	20	---	ns
T_r	Rise Time		---	11	---	
$T_{d(off)}$	Turn-Off Delay Time		---	55	---	
T_f	Fall Time		---	28	---	
C_{iss}	Input Capacitance	V_{DS}=50V , V_{GS}=0V , f=1.0MHz	---	4282	---	pF
C_{oss}	Output Capacitance		---	429	---	
C_{rss}	Reverse Transfer Capacitance		---	17	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
I_S	Continuous Source Current	T_C=25°C	---	---	100	A
I_{SM}	Pulsed Source Current		---	---	320	
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=6A	---	---	1.2	V
t_{rr}	Reverse Recovery Time	I_S=20A, V_{DD}=50V, di_F/dt=100A/μs	---	100	---	ns
Q_{rr}	Reverse Recovery Charge		---	250	---	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≤300μs, duty cycle≤2%.
3. The E_{AS} data shows Max. rating . The test condition is V_{DD}=50V, L=0.3mH, R_G=25Ω, Starting T_J=25°C
4. The power dissipation is limited by 150°C junction temperature.

Typical Characteristics

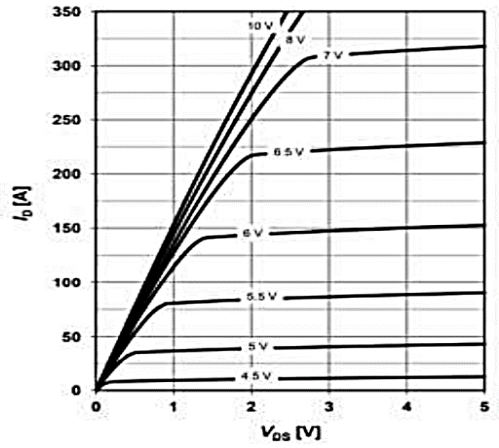


Figure1: output characteristics

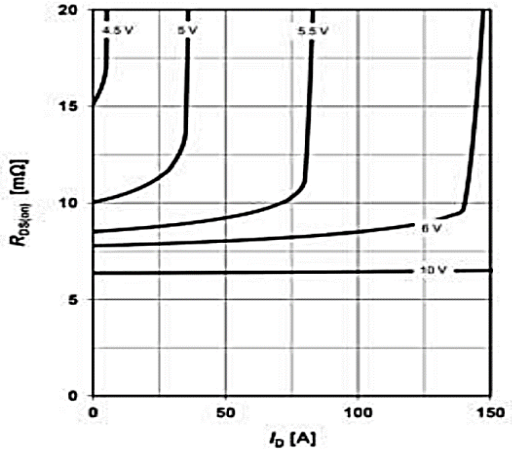


Figure2: Typcal drain-source on resistance

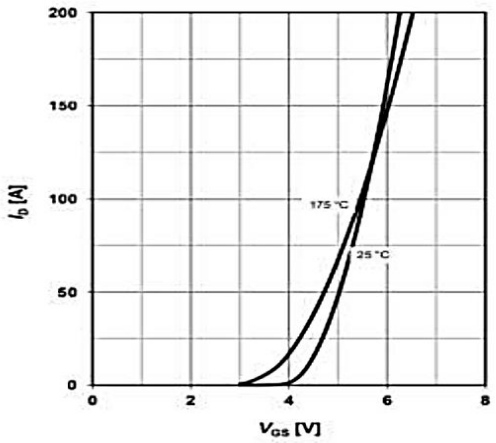


Figure3: transfer characteristics

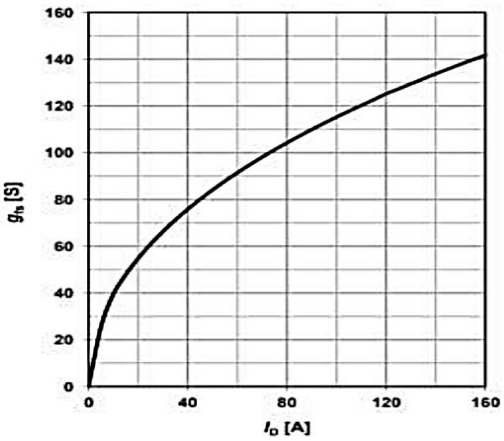


Figure4: forward transconductance

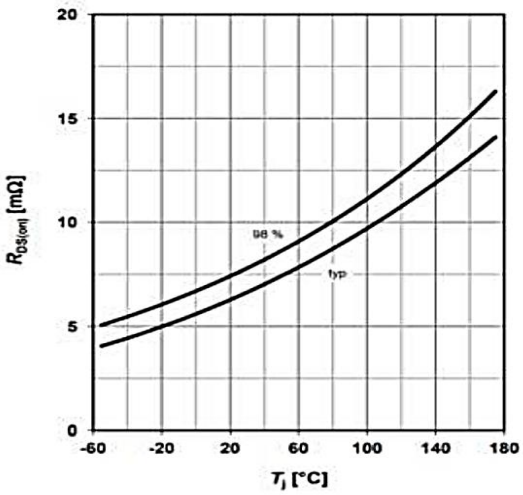


Figure5： Drain-source on-state resistance

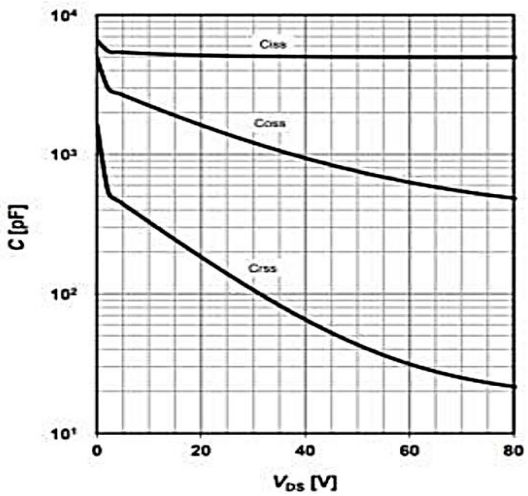


Figure6: Typ. capacitances

Typical Characteristics (Cont.)

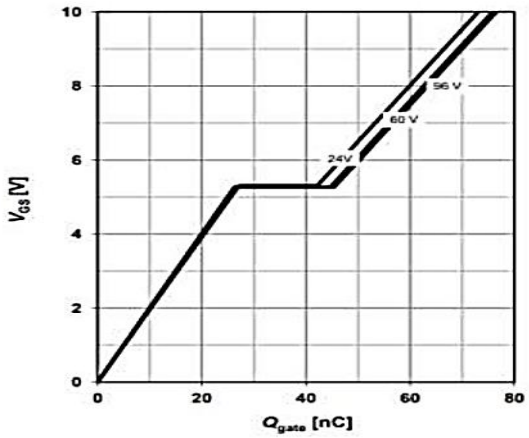


Figure7： Typ. gate charge

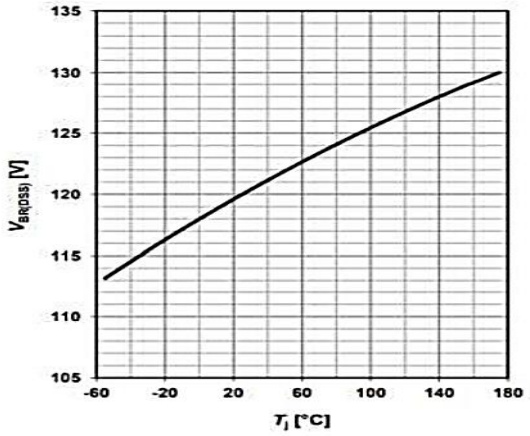


Figure8： Drain-source breakdown voltage

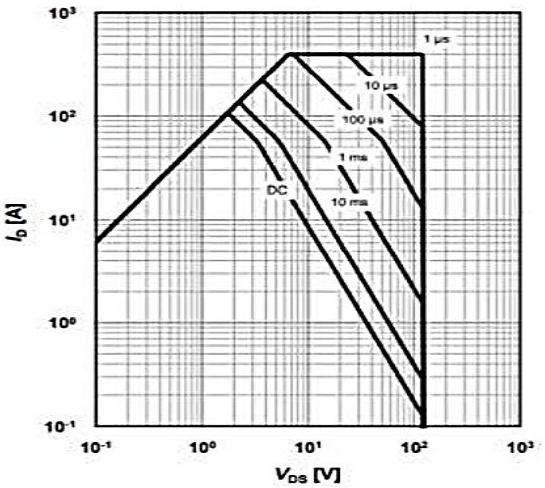


Figure9：Safe operating area

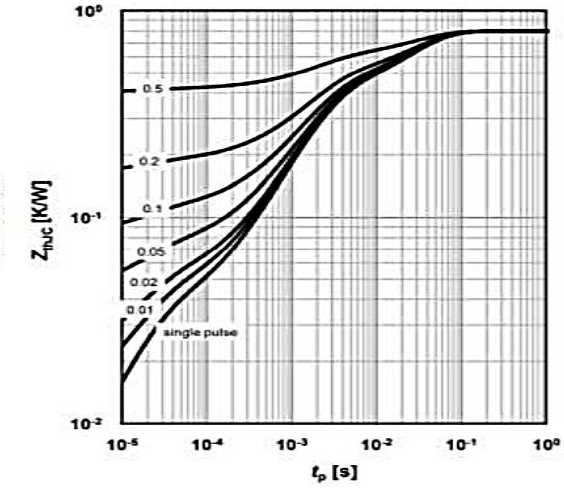
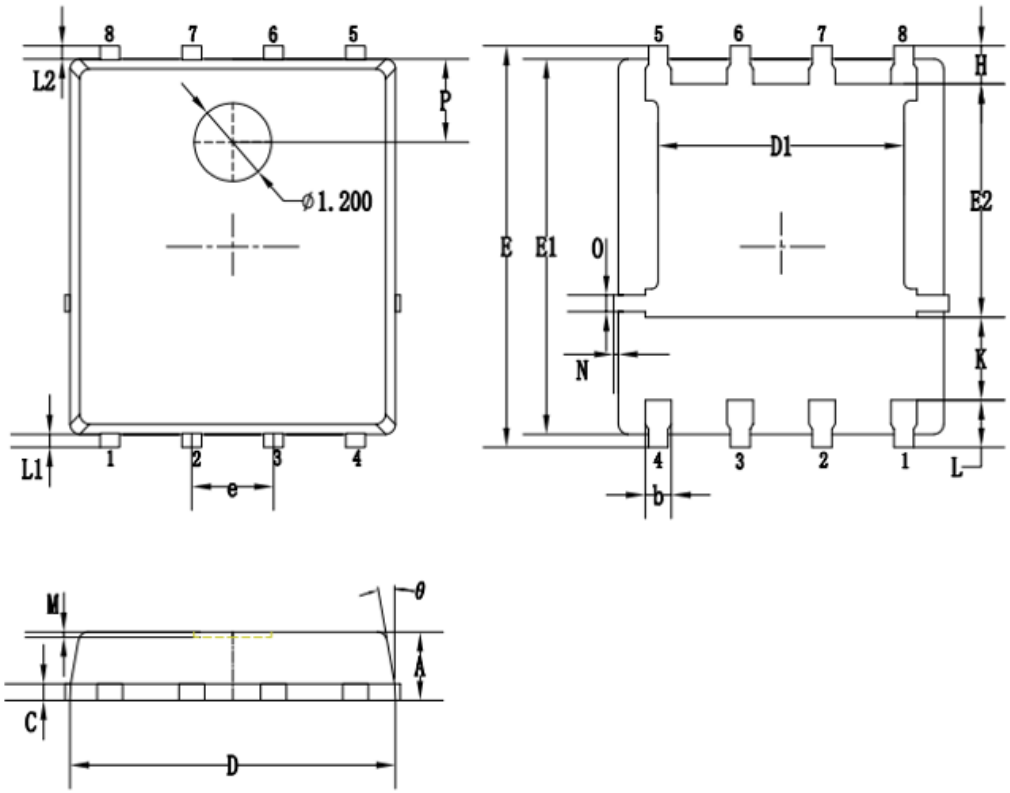


Figure10：Max. transient thermal impedance

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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