General Description

The WSD100N06GDN56 is the SGT MOSFET with extreme high cell density, which provide excellent $R_{DS(ON)}$ and gate charge for most of the synchronous buck converter applications.

The WSD100N06GDN56 meet the RoHS and Green Product requirement 100% E_{AS} guaranteed with full function reliability approved.

Features

- Lead Free and Green Devices Available (RoHS Compliant)
- 100% UIS + Rg Tested
- Reliable and Rugged
- Moisture Sensitivity Level MSL1 (per JEDEC J-STD-020D)

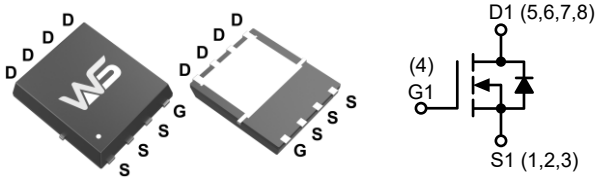
Product Summery

BV_{DSS}	$R_{DS(ON)}$	I_D
60V	3.0mΩ	100A

Applications

- Secondary Side Synchronous Rectification
- DC-DC Converter
- Motor Control
- Load Switching

DFN5X6-8L Pin Configuration



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

Symbol	Parameter		Rating	Units
V_{DS}	Drain-Source Voltage		60	V
V_{GS}	Gate-Source Voltage		±20	
I_D [1,6]	Continuous Drain Current	T_C=25°C	100	A
		T_C=100°C	65	
I_{DM} [2]	Pulsed Drain Current	T_C=25°C	240	
P_D	Maximum Power Dissipation	T_C=25°C	83	W
		T_C=100°C	50	
I_{AS}	Avalanche Current, Single pulse		45	A
E_{AS} [3]	Single Pulse Avalanche Energy		101	mJ
T_{STG}	Storage Temperature Range		-55 to 150	°C
T_J	Operating Junction Temperature Range		150	

Thermal Data

Symbol	Parameter		Rating	Units
$R_{\theta JA}$ [1]	Thermal Resistance Junction to ambient	Steady State	55	°C/W
$R_{\theta JC}$ [1]	Thermal Resistance-Junction to Case	Steady State	1.5	

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
Static						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250μA	60	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=48V , V_{GS}=0V	---	---	1.0	μA
		T_J=85°C	---	---	30	
I_{GSS}	Gate Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_{DS}=250μA	1.2	1.8	2.5	V
$R_{DS(ON)}$ [2]	Drain-Source On-state Resistance	V_{GS}=10V , I_D=20A	---	3.0	3.6	mΩ
		V_{GS}=4.5V , I_D=15A	---	4.4	5.4	
Switching						
Q_g	Total Gate Charge	V_{DS}=30V , V_{GS}=10V , I_D=20A	---	58	---	nC
Q_{gs}	Gate-Source Charge		---	16	---	
Q_{gd}	Gate-Drain Charge		---	4.0	---	
$T_{d(on)}$	Turn-on Delay Time	V_{GEN}=10V , V_{DD}=30V , I_D=20A , R_G=3Ω	---	18	---	ns
T_r	Turn-on Rise Time		---	8	---	
$T_{d(off)}$	Turn-off Delay Time		---	50	---	
T_f	Turn-on Fall Time		---	11	---	
R_g	Gat resistance	V_{GS}=0V , V_{DS}=0V , f=1.0MHz	---	0.7	---	Ω
Dynamic						
C_{iss}	Input Capacitance	V_{GS}=0V , V_{DS}=30V , f=1.0MHz	---	3458	---	pF
C_{oss}	Output Capacitance		---	1522	---	
C_{rss}	Reverse Transfer Capacitance		---	22	---	
Drain-Source Diode Characteristics and Maximum Ratings						
I_S [1,5]	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	55	A
I_{SM}	Pulsed Source Curren		---	---	240	
V_{SD} [2]	Diode Forward Voltage	I_{SD}=1A , V_{GS}=0V	---	0.8	1.3	V
t_{rr}	Reverse Recovery Time	I_{SD}=20A , dI_{SD}/dt=100A/μs	---	27	---	ns
Q_{rr}	Reverse Recovery Charge		---	33	---	nC

Note:

1. The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper, t≤10sec.
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, V_{GS}=10V, L=0.5mH, I_{AS}=40A
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.
6. The maximum current rating is package limited.

Typical Characteristics

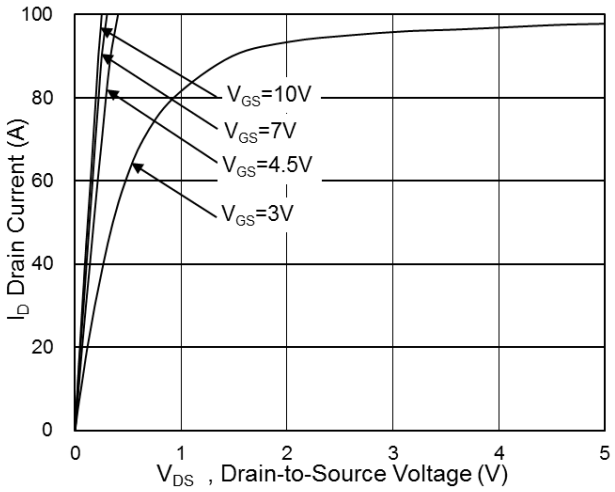


Fig.1 Typical Output Characteristics

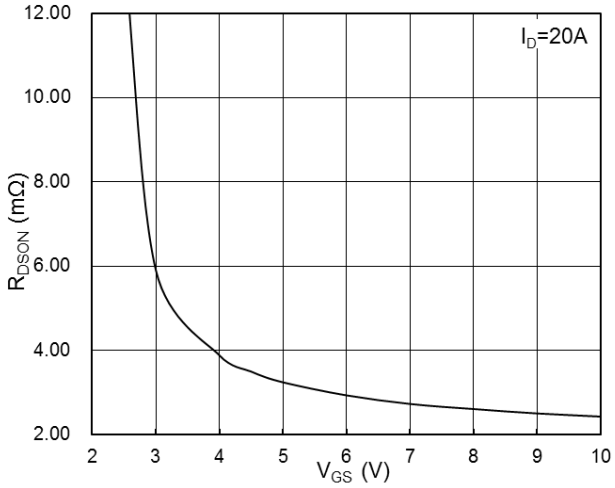


Fig.2 On-Resistance vs G-S Voltage

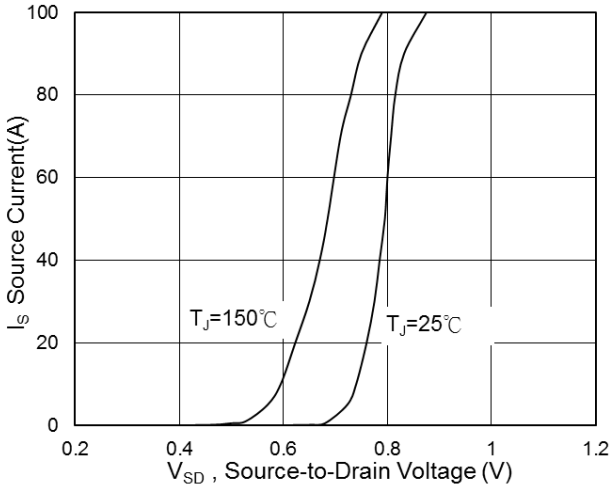


Fig.3 Diode Forward Voltage vs. Current

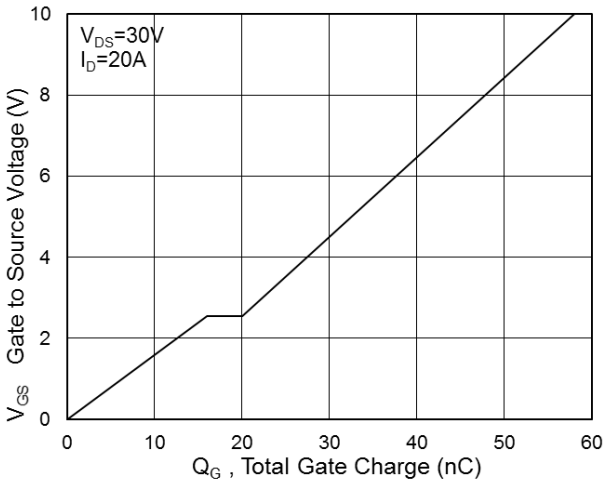


Fig.4 Gate-Charge Characteristics

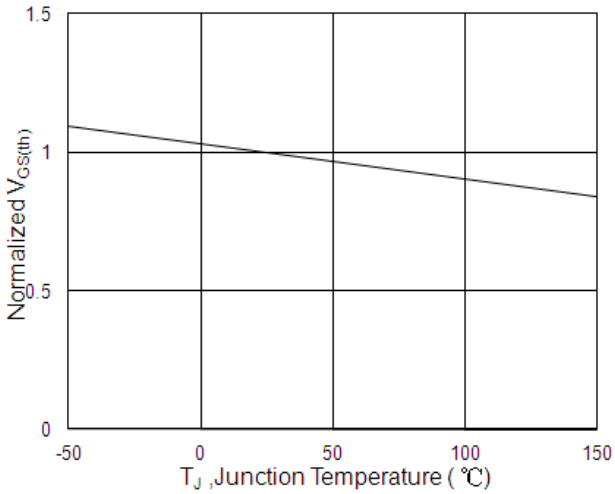


Fig.5 Normalized $V_{GS(th)}$ vs T_J

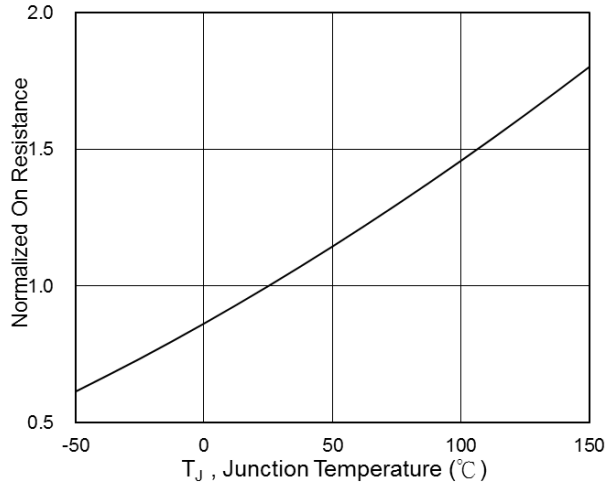


Fig.6 Normalized R_{DSON} vs T_J

Typical Characteristics (Cont.)

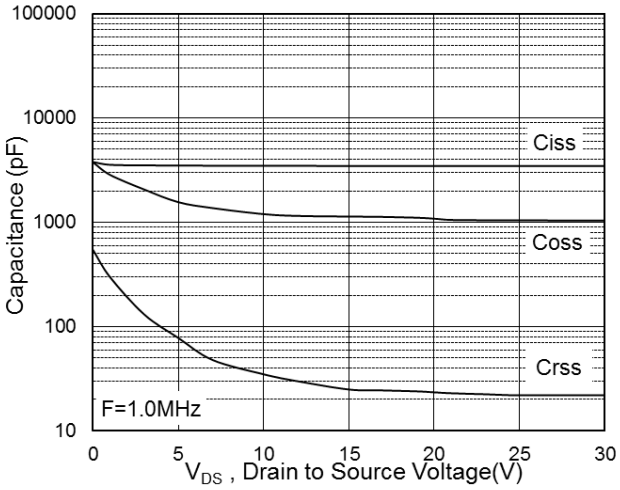


Fig.7 Capacitance

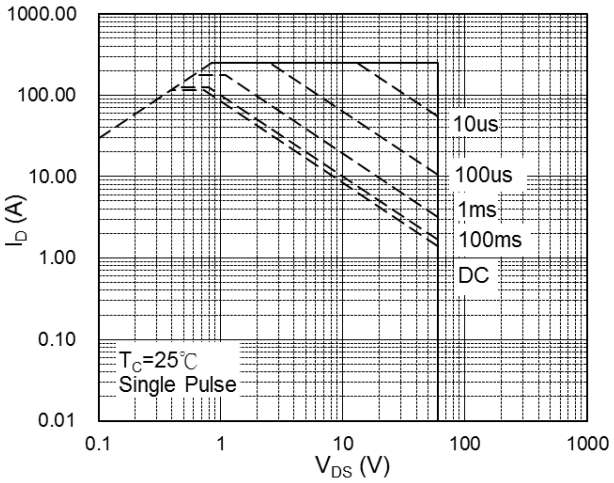


Fig.8 Safe Operating Area

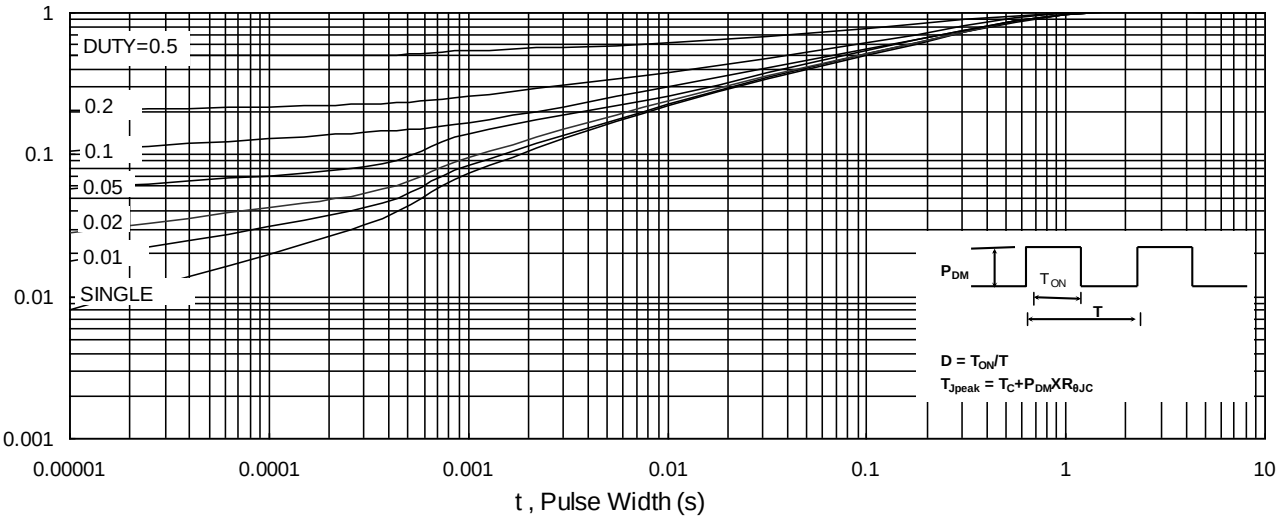


Fig.9 Normalized Maximum Transient Thermal Impedance

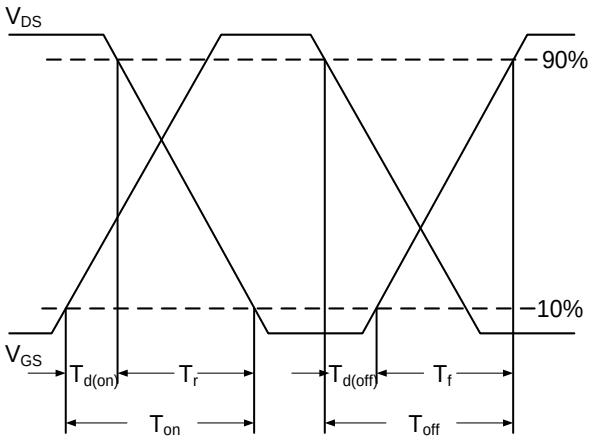


Fig.10 Switching Time Waveform

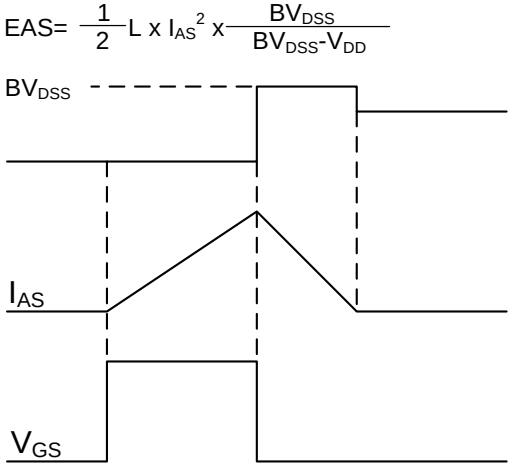
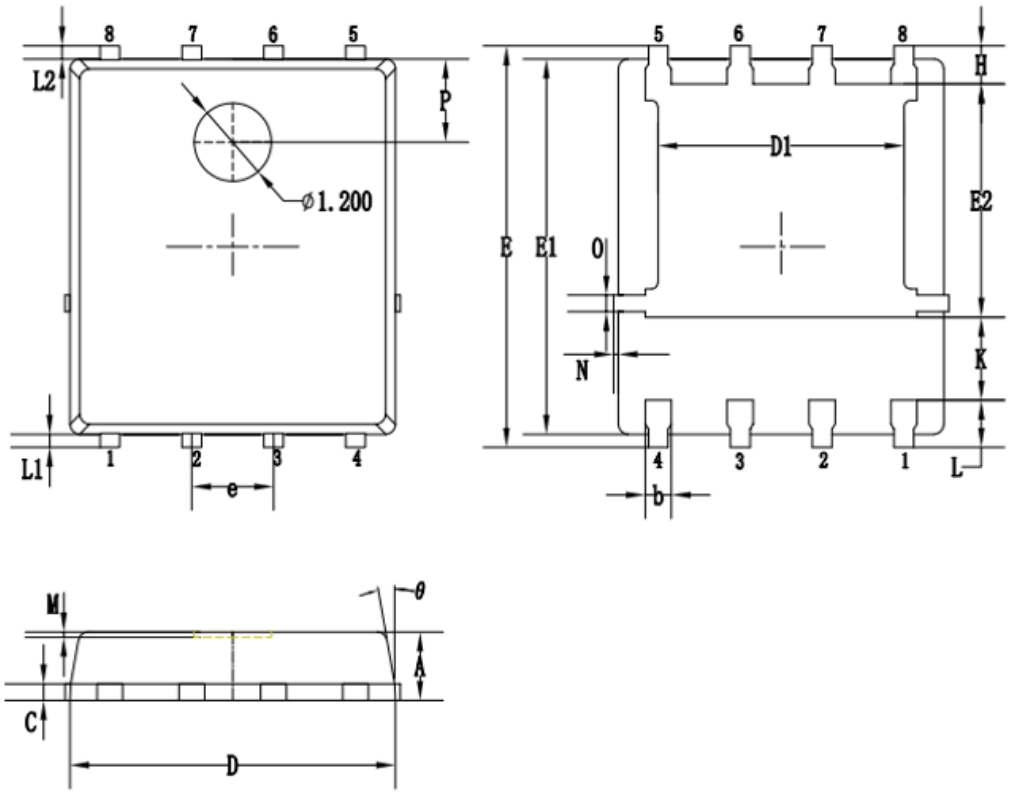


Fig.11 Unclamped Inductive Switching Waveform

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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