General Description

The WSD40120DN use advanced SGT MOSFET technology to provide low RDS(ON), low gate charge, fast switching and excellent avalanche characteristics.
This device is specially designed to get better ruggedness and suitable to use in

Product Summery

BVDSS	RDSON	ID
40V	2.5mΩ	110A

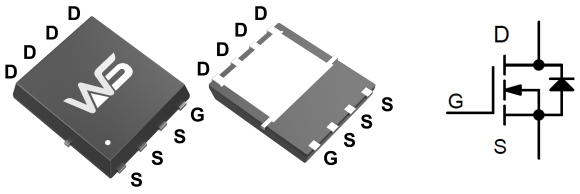
Applications

- Consumer electronic power supply
- Synchronous-rectification
- Synchronous-rectification applications

Features

Low RDS(on) & FOM
Extremely low switching loss
Excellent stability and uniformity or Invertors

DFN5X6-8 Pin Configuration



Absolute Maximum Ratings at Tj=25℃ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	110	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	71	A
I_{DM}	Pulsed Drain Current[2]	240	A
EAS	Single Pulse Avalanche Energy[3]	145	mJ
I_{AS}	Avalanche Current	54	A
P_D@T_C=25℃	Total Power Dissipation[4]	36	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	55	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	3.4	℃/W

Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	40	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.043	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=20A	---	2.5	3.5	mΩ
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=4.5V , I_D=15A	---	3.5	4.5	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.1	1.5	2.3	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-6.94	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=32V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=32V , V_{GS}=0V , T_J=55℃	---	---	5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=20A	---	75	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	1.5	---	Ω
Q_g	Total Gate Charge (10V)	V_{DS}=20V , V_{GS}=4.5V , I_D=20A	---	23	---	nC
Q_{gs}	Gate-Source Charge		---	7.5	---	
Q_{gd}	Gate-Drain Charge		---	5.5	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=20V , V_{GEN}=10V , R_G=3.0 Ω, I_D=20A .	---	10	---	ns
T_r	Rise Time		---	5	---	
$T_{d(off)}$	Turn-Off Delay Time		---	33	---	
T_f	Fall Time		---	6.5	---	
C_{iss}	Input Capacitance	V_{DS}=20V , V_{GS}=0V , f=1MHz	---	2810	---	pF
C_{oss}	Output Capacitance		---	850	---	
C_{rss}	Reverse Transfer Capacitance		---	85	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	30	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.2	V

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 ≦ 300us , duty cycle ≦ 2%

3.The EAS data shows Max. rating . The test condition is VDD=20V,VGS=10V,L=0.5mH,IAS=54A 4.The power dissipation is limited by 150℃ 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

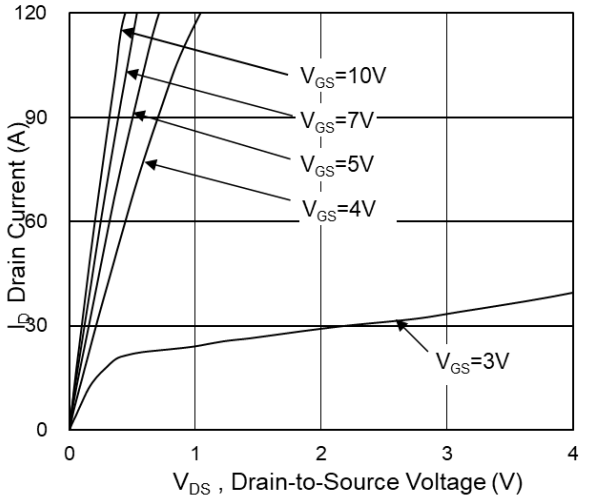


Fig.1 Typical Output Characteristics

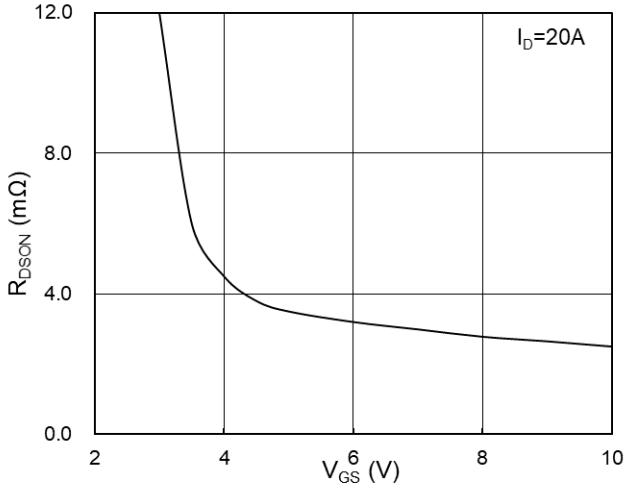


Fig.2 On-Resistance vs G-S Voltage

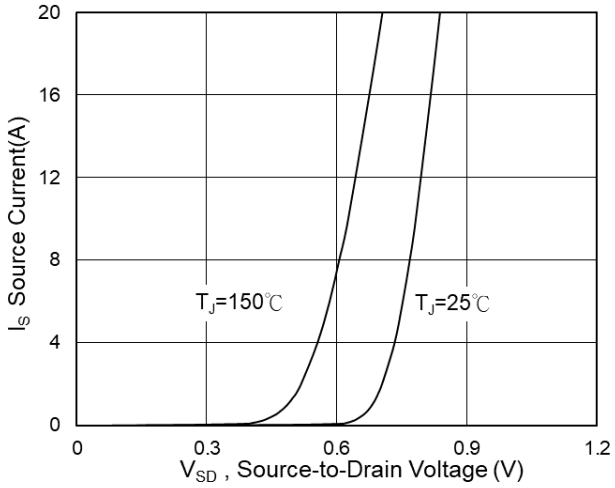


Fig.3 Source Drain Forward Characteristics

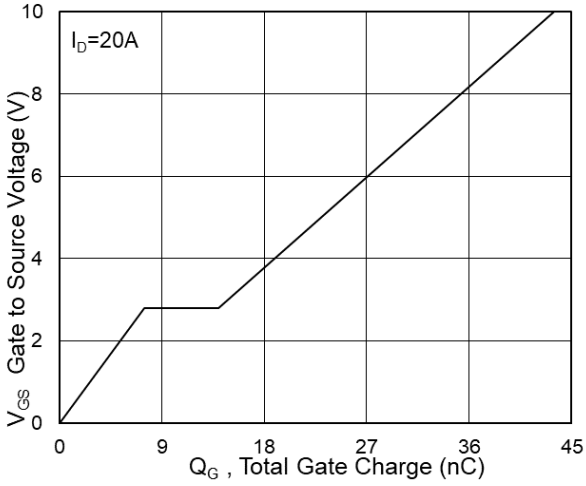


Fig.4 Gate-Charge Characteristics

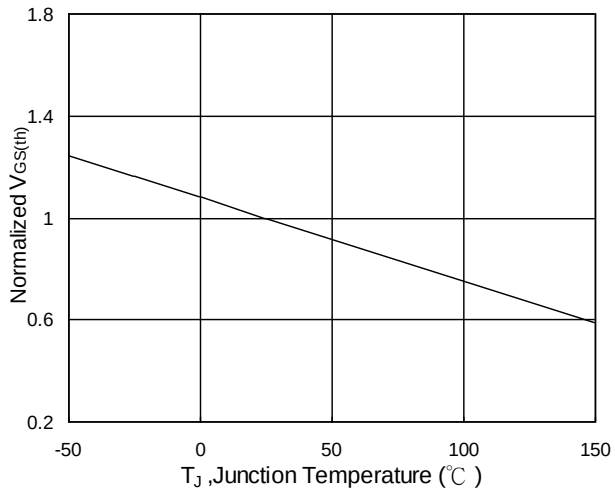


Fig.5 Normalized $V_{GS(th)}$ vs T_J

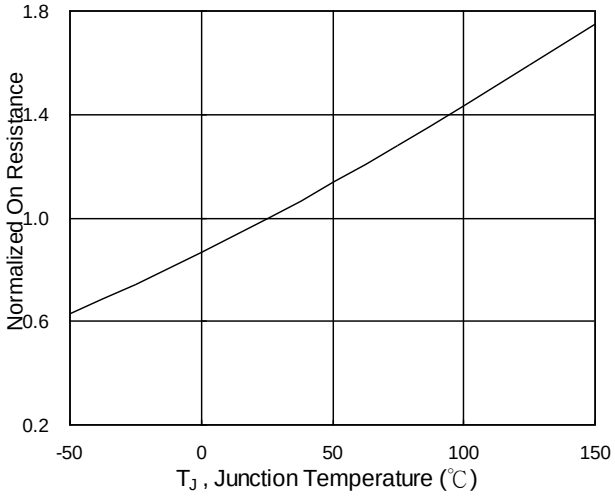


Fig.6 Normalized R_{DSON} vs T_J

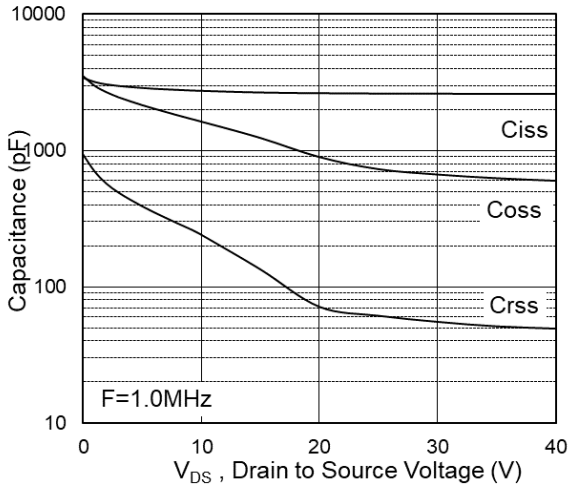


Fig.7 Capacitance

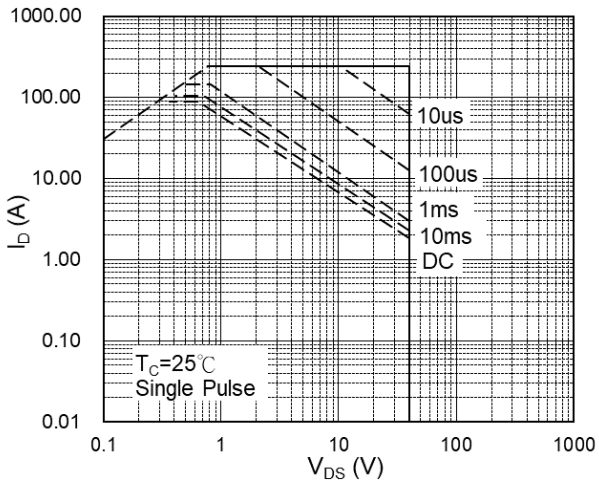


Fig.8 Safe Operating Area

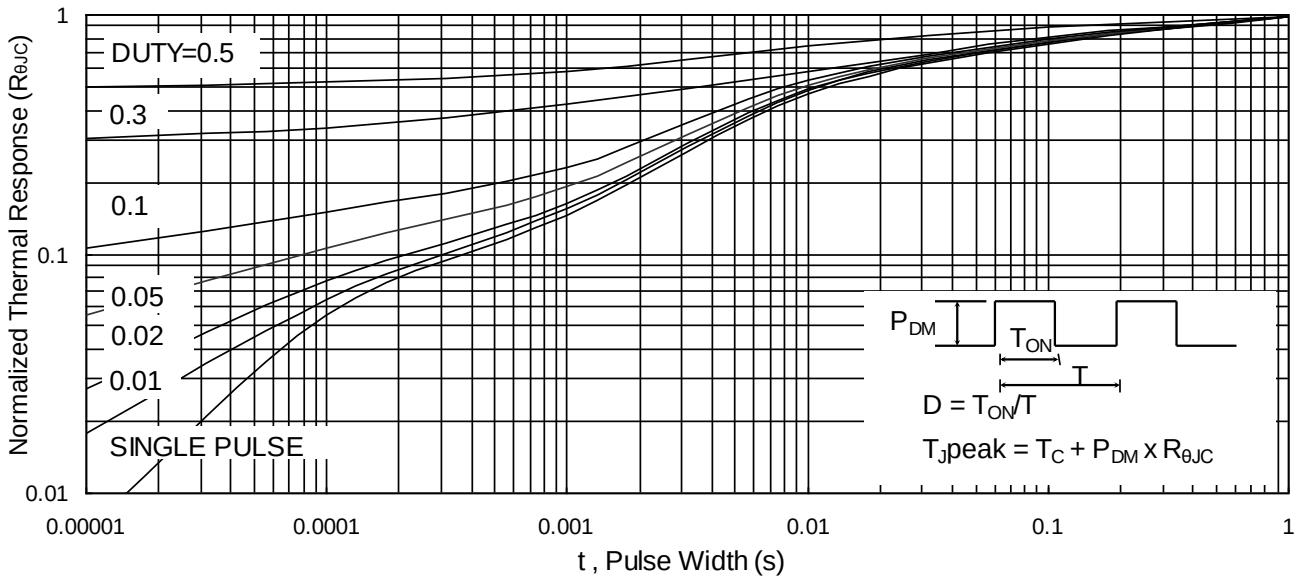


Fig.9 Normalized Maximum Transient Thermal Impedance

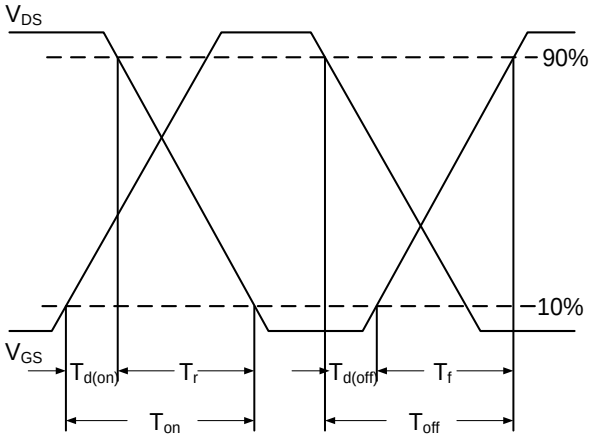


Fig.10 Switching Time Waveform

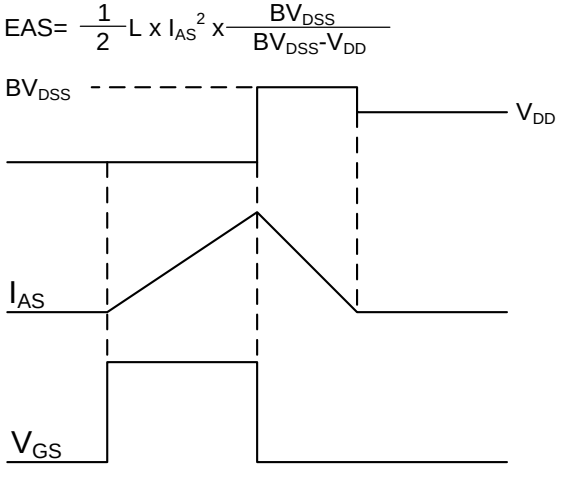


Fig.11 Unclamped Inductive Switching Wave

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