General Description

The WSD40200DN56G use advanced SGT MOSFET technology to provide low $R_{DS(ON)}$, low gate charge, fast switching and excellent avalanche characteristics. This device is specially designed to get better ruggedness and suitable

Product Summery

BV_{DSS}	R_{DSON}	I_D
40V	1.15mΩ	180A

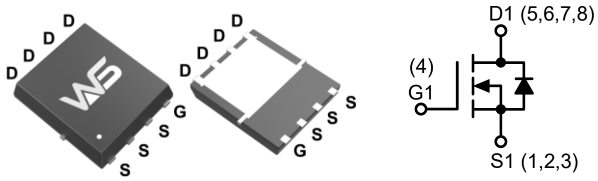
Applications

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

Features

- Low $R_{DS(on)}$ & FOM
- Extremely low switching loss
- Excellent stability and uniformity or Invertors

DFN5X6-8L Pin Configuration



Absolute Maximum Ratings at T_J=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]	180	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	125	A
I_{DM}	Pulsed Drain Current[2]	750	A
EAS	Single Pulse Avalanche Energy[3]	420	mJ
I_{AS}	Avalanche Current	70	A
P_D@T_C=25℃	Total Power Dissipation[4]	68	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]	---	25	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	1.4	℃/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=30A	---	1.15	1.5	mΩ
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=4.5V , I_D=20A	---	1.7	2.5	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.1	1.8	2.5	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=85A	---	127	---	nC
Q_{gs}	Gate-Source Charge		---	35	---	
Q_{gd}	Gate-Drain Charge		---	26	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=20V , V_{GEN}=10V , R_G=1.6Ω, I_D=85A .	---	8	---	ns
T_r	Rise Time		---	23	---	
$T_{d(off)}$	Turn-Off Delay Time		---	27	---	
T_f	Fall Time		---	81	---	
C_{iss}	Input Capacitance	V_{DS}=20V , V_{GS}=0V , f=1MHz	---	8300	---	pF
C_{oss}	Output Capacitance		---	1510	---	
C_{rss}	Reverse Transfer Capacitance		---	130	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	180	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=30A , 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 V_{DD}=20V,V_{GS}=10V,L=0.5mH,I_{AS}=70A

4.The power dissipation is limited by 150℃ 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

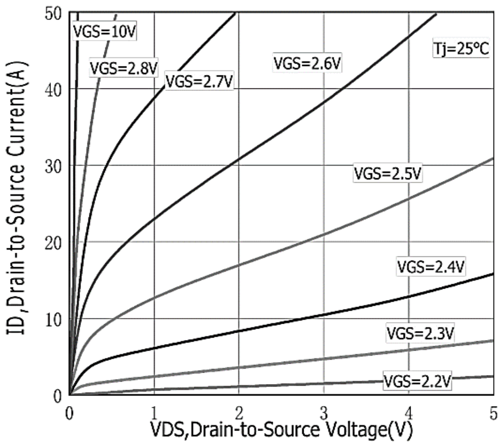


Figure1: Typical Output Characteristics

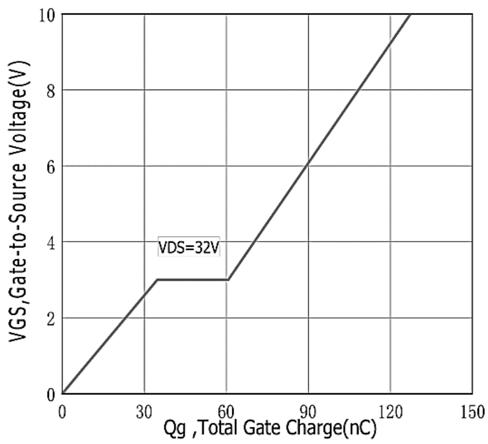


Figure 2: Typical GateCharge vs Gate to Source Voltage

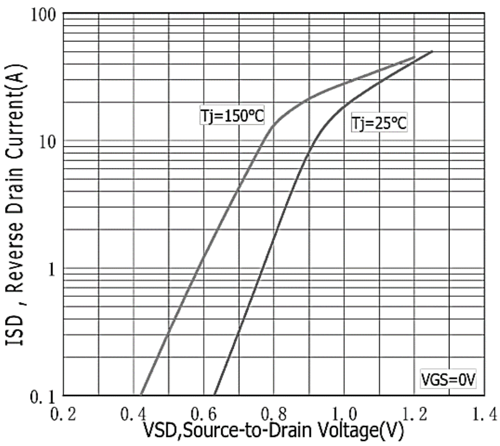


Figure 3: Typical Body Diode Transfer Characteristics

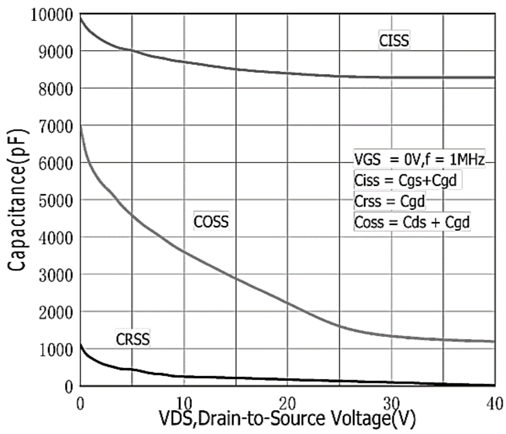


Figure 4: Typical Capacitance vs Drain to Source Voltage

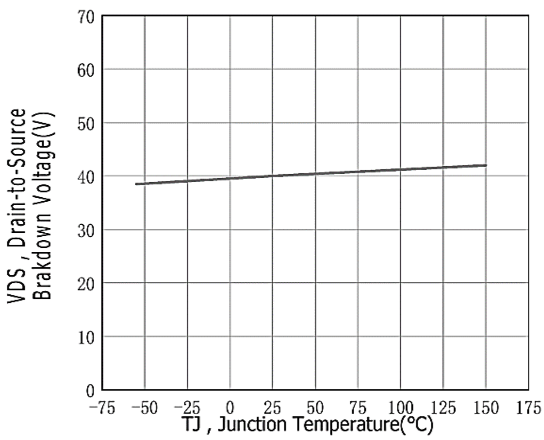


Figure 5: Typical Breakdown Voltage vs Junction Temperature

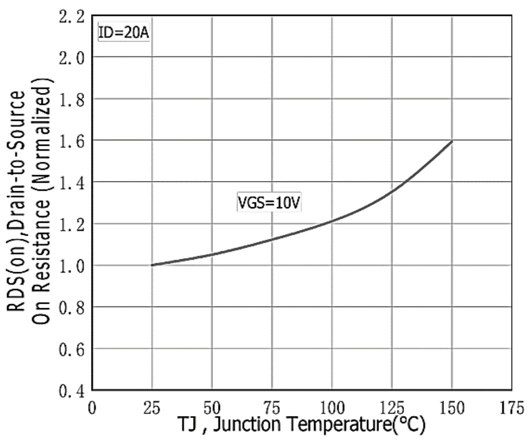


Figure 6: Typical Drain to Source on Resistance vs Junction Temperature

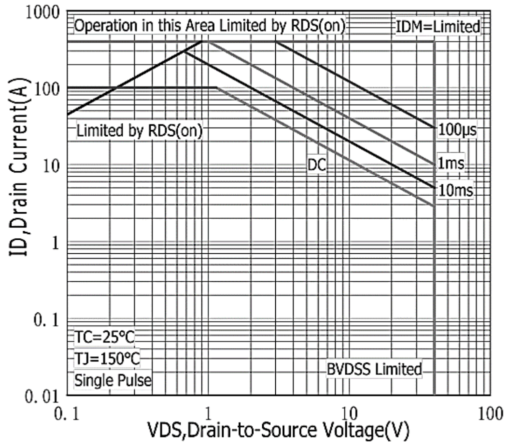


Figure 7: Maximum Forward Bias Safe Operating Area.

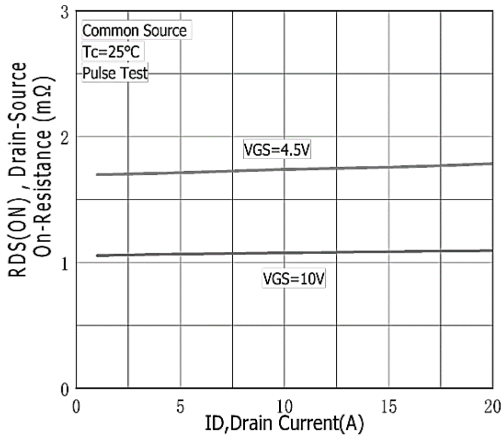


Figure 8: Typical Drain to Source ON Resistance vs Drain Current

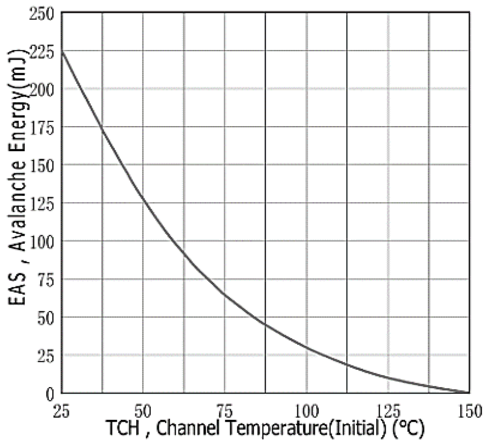


Figure 9: Maximum EAS vs Channel Temperature

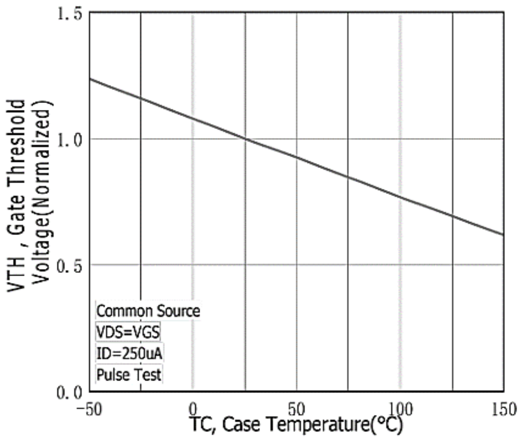


Figure 10: Typical Threshold Voltage vs Case Temperature

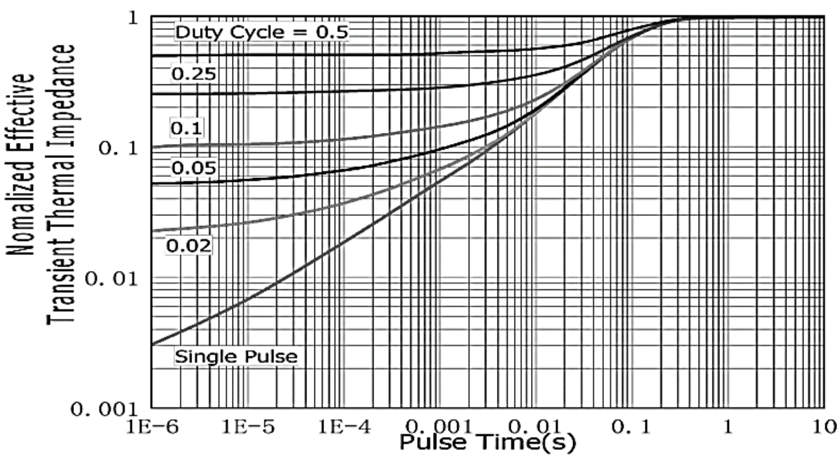
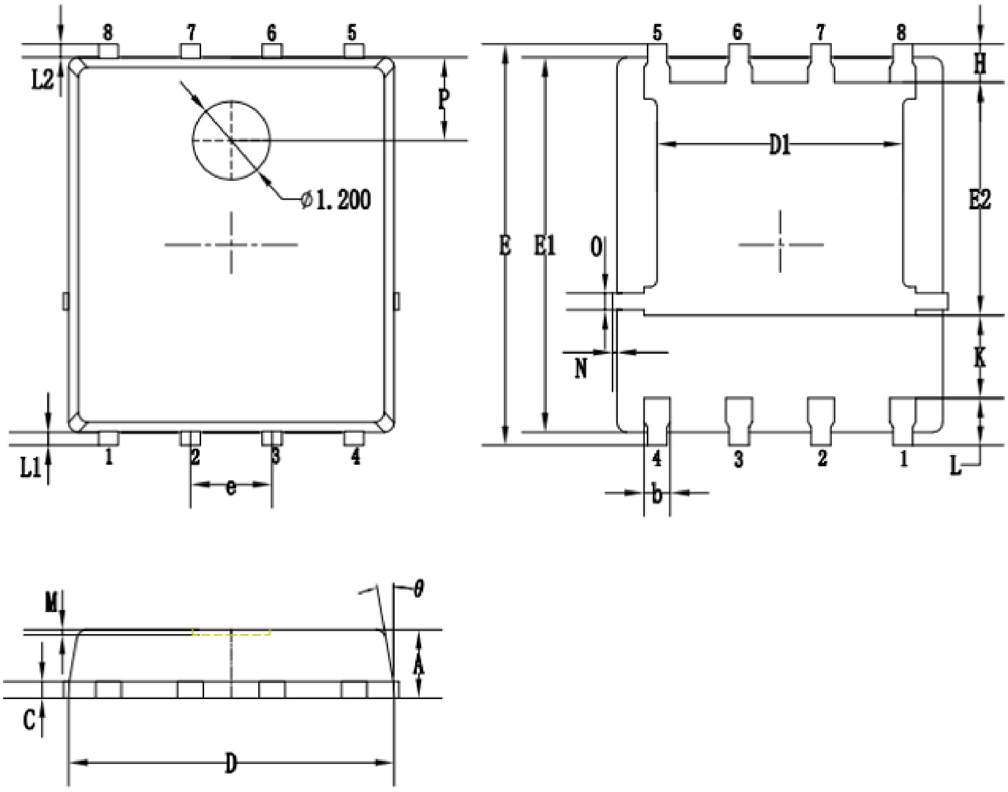


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Cas

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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