DASMB500N120BH3

SiC MOSFET Power Module

Preliminary

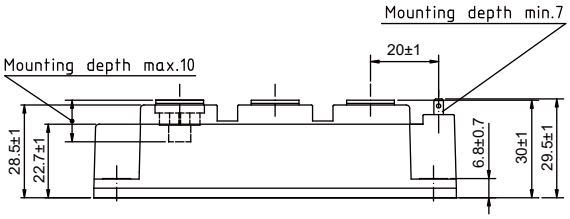
Features

- V_{DSS} = 1200V
- $R_{DS(ON)}$ typ. 3mΩ@ V_{GS} = 15V
- High speed switching with low capacitances
- Easy to parallel and simple to drive
- SiC-Schottky diode
- Pb Free & RoHS Compliant
- Electrically Isolation base plate

HBA-10662

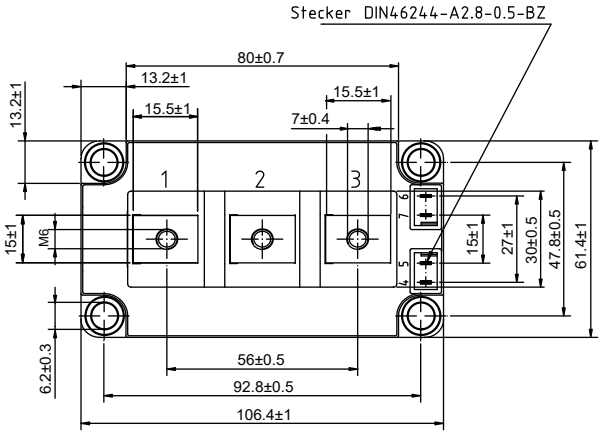


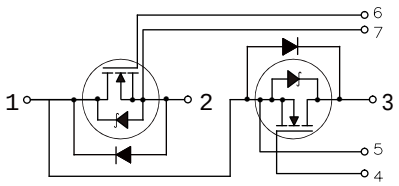
Dimensions in inches and (millimeters)



Applications

- Solar Inverters
- UPS
- Motor Drive
- Induction heating
- Switch Mode Power Supplies
- Battery Chargers
- DC/DC Converters





Absolute Maximum Ratings (Tc=25°C unless otherwise noted)

Parameter		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DS}	1200	V
Gate-Source Voltage (dynamic)		$V_{GS(max)}$	-10/+23	V
Gate-Source Voltage (static)		$V_{GS(OP)}$	-4/+15	V
Drain Current-Continuous	@ T_C =25°C @ T_C =100°C	I_D	750 500	A
Drain Current-Pulsed	@ T_C =25°C	I_{DM}	1500	A
Maximum Power Dissipation		P_D	1875	W
Storage Temperature Range		T_{STG}	-40 to +125	°C
Operating Junction Temperature Range		T_{VJ}	-40 to +175	°C
Thermal Resistance, Junction-to-Case		$R_{\theta JC}$	0.08	°C/W
Isolation Voltage (A.C. 1 minute) between All Terminals and Baseplate		V_{iso}	3000	V
Mounting torque (M6 Screw)	To heatsink To terminals	M_d	3~6 2.5~5	N_m

Electrical Characteristics @ T_{VJ} =25°C (unless otherwise specified)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
OFF Characteristics							
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V，I_{DS}=0.9mA		1200	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS}=0V，V_{DS}=1200V		-	-	200	uA
Gate-Body Leakage	I_{GSS}	V_{GS}=20V，V_{DS}=0V		-	-	500	nA
ON Characteristics							
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}，I_{DS}=100mA		1.7	2.4	3.4	V
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS}=15V，I_{DS}=50A		-	3	3.9	mΩ
Gate Resistance	$R_{G(int)}$	Internal gate resistor	T_{VJ}=25°C	-	2.65	-	Ω
Dynamic Characteristics							
Input Capacitance	C_{iss}	V_{DS}=800V V_{GS}=0V V_{AC}=1V Freq.=100KHz		-	27.1	-	nF
Output Capacitance	C_{oss}			-	3.04	-	
Reverse Transfer Capacitance	C_{rss}			-	0.156	-	
Total Gate Charge	Q_g	V_{DS}=600V V_{GS}=-4V/+15V I_{DS}=500A		-	913	-	nC
Gate to Source Charge	Q_{gs}			-	394	-	
Gate to Drain Charge	Q_{gd}			-	256	-	
Switching Characteristics							
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 600V V_{GS} = -4V/+15V I_{DS}=500A $R_{G(on)}$=4.7Ω $R_{G(off)}$=1.0Ω	T_{VJ}=25°C	-	191	-	ns
			T_{VJ}=150°C	-	168	-	
Rise Time	t_r		T_{VJ}=25°C	-	177	-	
			T_{VJ}=150°C	-	160	-	
Turn-Off Delay Time	$t_{d(off)}$		T_{VJ}=25°C	-	279	-	
			T_{VJ}=150°C	-	334	-	
Fall Time	t_f		T_{VJ}=25°C	-	40	-	
			T_{VJ}=150°C	-	47	-	
Turn-On Switching Energy	E_{on}	V_{DD} = 600V V_{GS} = -4V/+15V I_{DS}=500A $R_{G(on)}$=4.7Ω $R_{G(off)}$=1.0Ω	T_{VJ}=25°C	-	15.8	-	mJ
			T_{VJ}=150°C	-	11.5	-	
Turn-Off Switching Energy	E_{off}		T_{VJ}=25°C	-	33.9	-	
			T_{VJ}=150°C	-	31.4	-	
SiC Schottky Diode Characteristics at T_J = 25° C, unless otherwise specified							
Continuous Diode Fwd Current	I_{SDC}	V_{GS}= 0V		-	500	-	A
Drain-Source Reverse Voltage	V_{SD}	I_{SD} = 450A , V_{GS} = 0V		-	1.8	-	V
MOSFET Forward Recovery Charge	Q_{rr}	V_{DD} = 600V I_{SD} =500A V_{GS}= -4V/+15V di/dt = 4200A/μs	T_{VJ}=25°C	-	1400	-	nC
			T_{VJ}=150°C	-	1728	-	
MOSFET Peak Forward Recovery Current	Irrm		T_{VJ}=25°C	-	60	-	A
			T_{VJ}=150°C	-	60	-	
MOSFET Reverse Recovery Time	T_{rr}		T_{VJ}=25°C	-	44	-	ns
			T_{VJ}=150°C	-	44	-	

Notes:

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle > 2%.

Typical Characteristics

Fig.1 Output Characteristics at T_J = 25°C

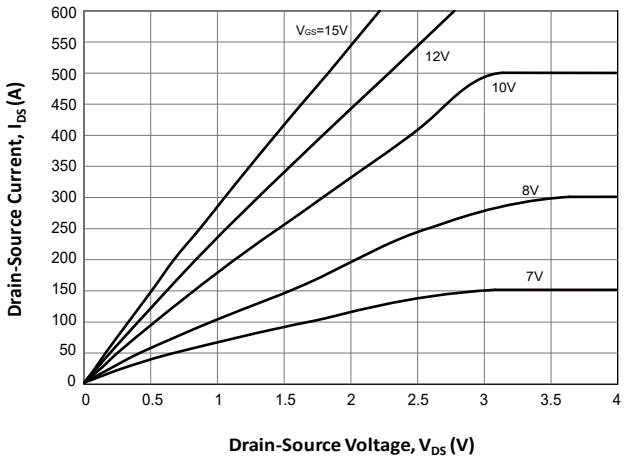


Fig.2 Output Characteristics at T_J =125°C

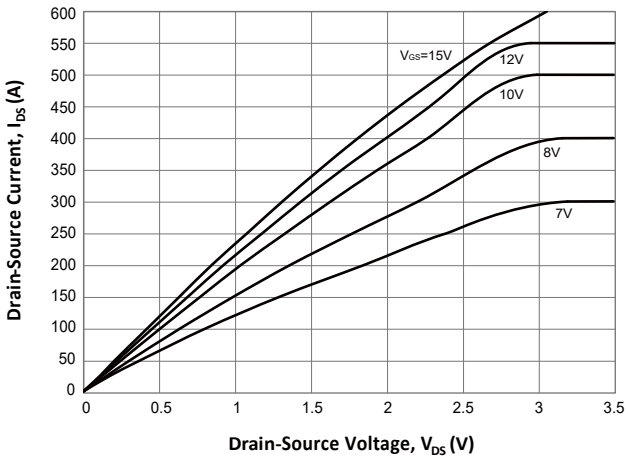


Fig.3 Drain Source on Resistance

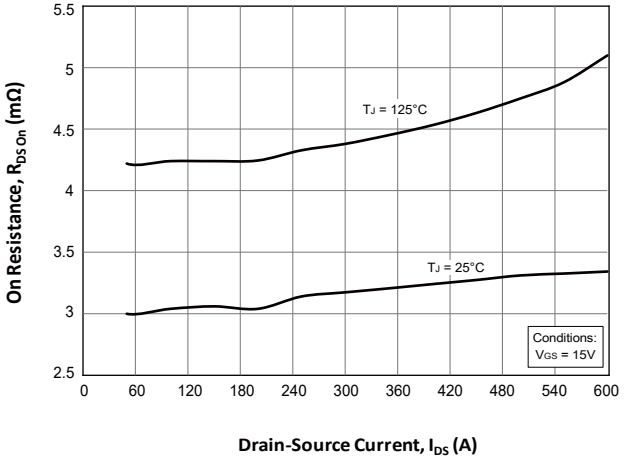


Fig.4 Transfer Characteristics

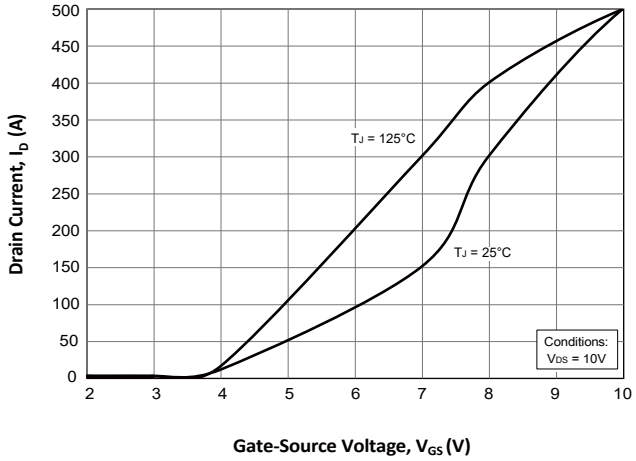


Fig.5 Capacitances vs. Drain-Source Voltage

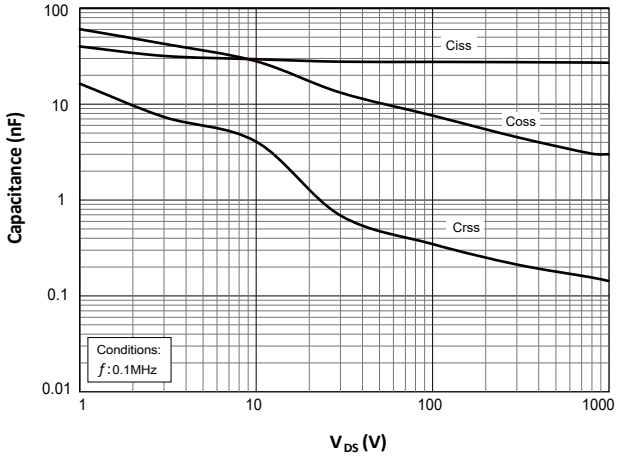
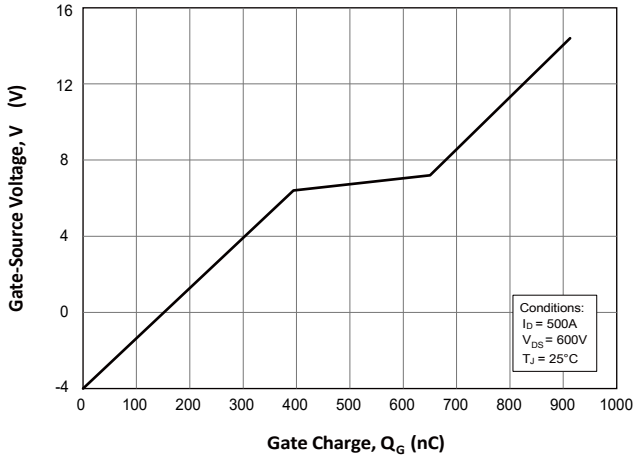


Fig.6 Gate Charge Characteristics



Typical Characteristics

Fig.7 Switching losses vs RG change T_J=125°C

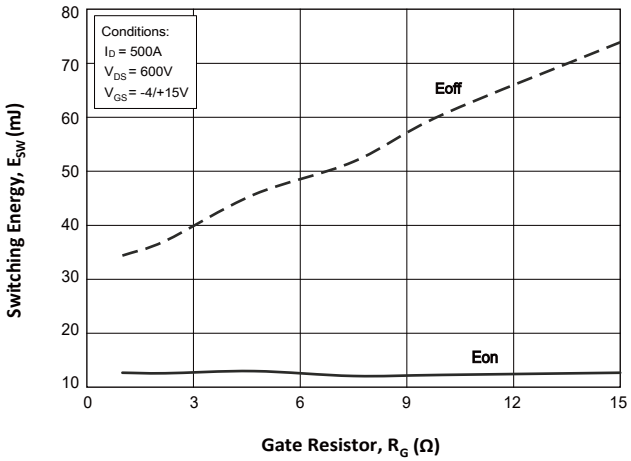


Fig.8 Switching losses vs RG change T_J=150°C

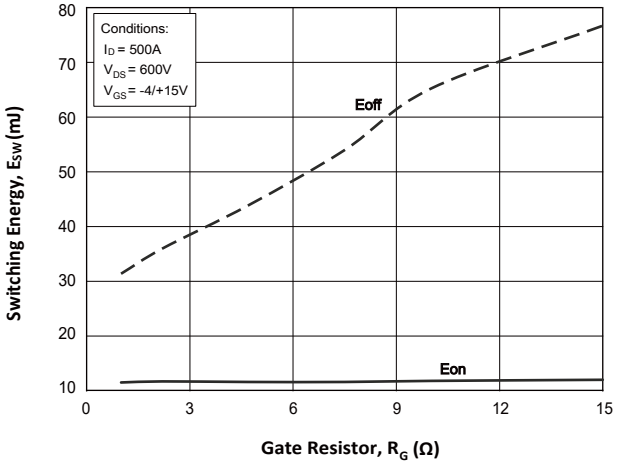


Fig.9 Switching Timer vs RG Change T_J=125°C

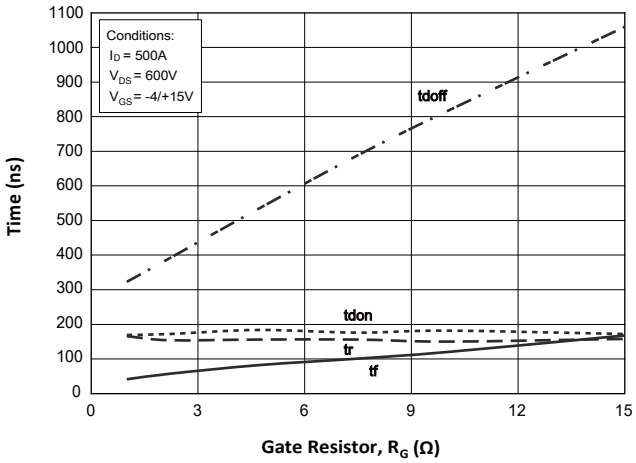


Fig.10 Switching Timer vs RG Change T_J=150°C

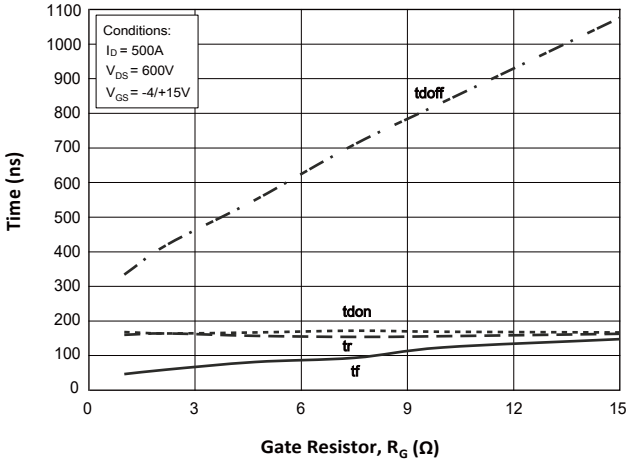


Fig.11 Clamped Inductive Switching Energy vs. Drain Current T_J =125°C

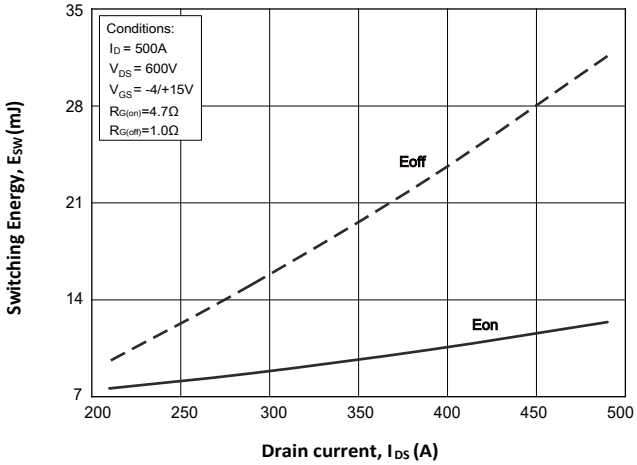
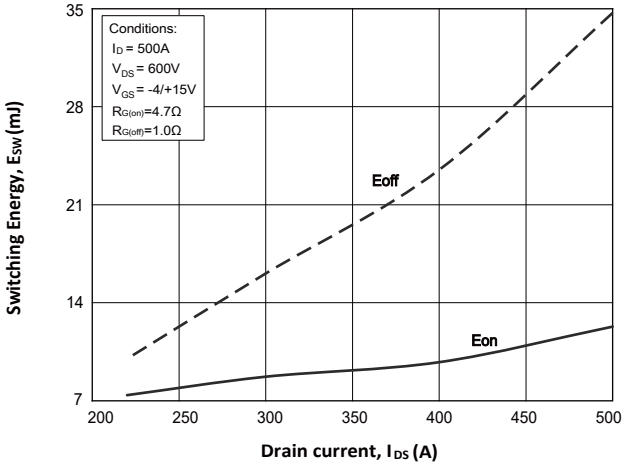


Fig.12 Clamped Inductive Switching Energy vs. Drain Current T_J =150°C



Typical Characteristics

Fig.13 SiC Schottky Diode curves T_J =25°C

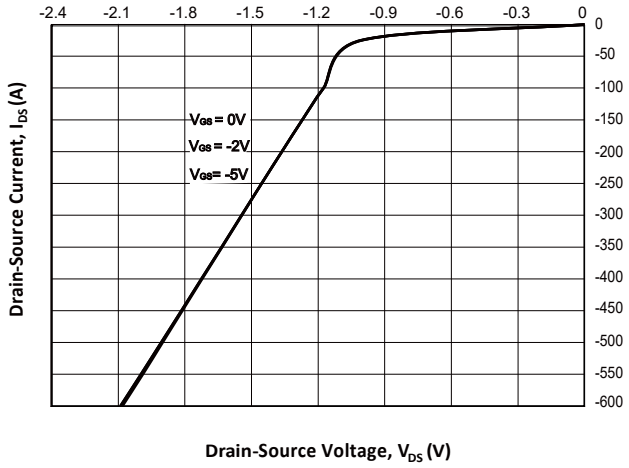


Fig.14 SiC Schottky Diode curves T_J = 125°C

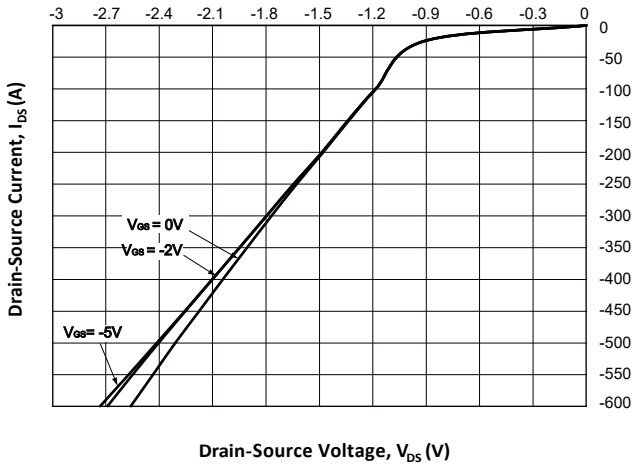


Fig.15 Continuous Drain Current (MOSFET) vs. Case Temperature

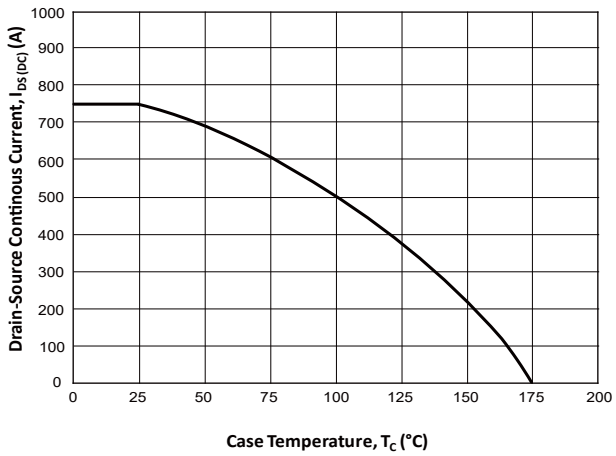
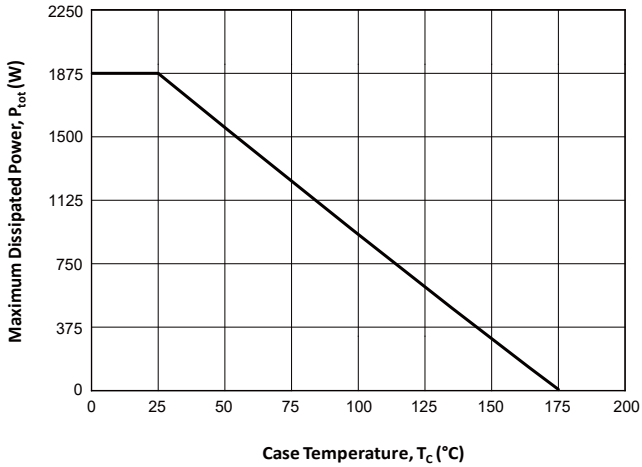


Fig.16 Max. Power Dissipation (MOSFET) Derating vs. Case Temperature



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