S8MBM120

100V N+P Dual Channel MOSFETs

General Description

These N+P dual Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

BV_{DSS}	$R_{DS(ON)}$	I_D
100 V	120 mΩ	8.8 A
-100 V	300 mΩ	-4.8 A

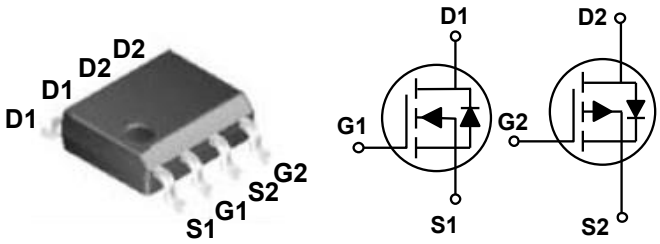
Features

- Fast Switching
- Green Device Available

Applications

- BLDC

SOP-8 Pin Configuration



Absolute Maximum Ratings T_C=25°C unless otherwise noted

Symbol	Parameter	Rating		Units
V_{DS}	Drain-Source Voltage	100	-100	V
V_{GS}	Gate-Source Voltage	±20	±20	V
I_D	Drain Current - Continuous (T_C=25°C)	8.8	-4.8	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	28	-14.8	A
P_D	Power Dissipation (T_C=25°C)	23.1		W
T_J	Operating Junction Temperature Range	-55 to 150		°C
T_{STG}	Storage Temperature Range	-55 to 150		°C
Marking Code		BM120 , AP5G10S		

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	62.5	°C/W
$R_{\theta JC}$	Thermal Resistance Junction to Ambient	5.4	°C/W

N Channel Electrical Characteristics (T_J=25°C, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	100	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=100V , V_{GS}=0V	---	---	1	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=5A	---	---	120	mΩ
		V_{GS}=4.5V , I_D=3A	---	---	150	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=250uA	1.2	---	2.5	V
gfs	Forward Transconductance	V_{DS}=5V , I_D=5A	---	14	---	S

Dynamic and Switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge	V_{DS}=50V , V_{GS}=10V , I_D=5A	---	11.9	---	nC
Q_{gs}	Gate-Source Charge		---	2.8	---	
Q_{gd}	Gate-Drain Charge		---	1.7	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DS}=30V , V_{GS}=10V , R_G=1.8Ω , I_D=5A	---	3.8	---	nS
T_r	Rise Time		---	25.8	---	
$T_{d(off)}$	Turn-Off Delay Time		---	16	---	
T_f	Fall Time		---	8.8	---	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , F=1MHz	---	1100	---	pF
C_{oss}	Output Capacitance		---	55	---	
C_{rss}	Reverse Transfer Capacitance		---	40	---	
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , F=1MHz	---	3	---	Ω

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	8.8	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=1A	---	---	1.2	V

NOTES：

1. Repetitive Rating：Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width ≦ 300us, duty cycle ≦ 2%.
3. The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Characteristics Curves

FIG. 1-Output Characteristics

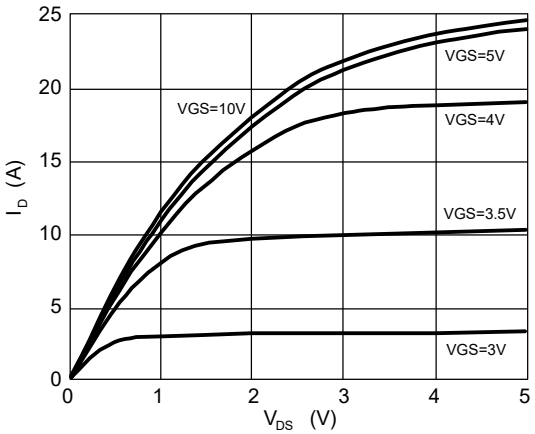


FIG. 2-Transfer Characteristics

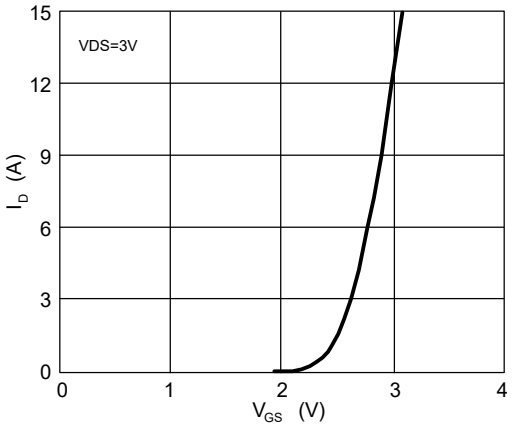


FIG. 3-Forward Characteristics of Body Diode

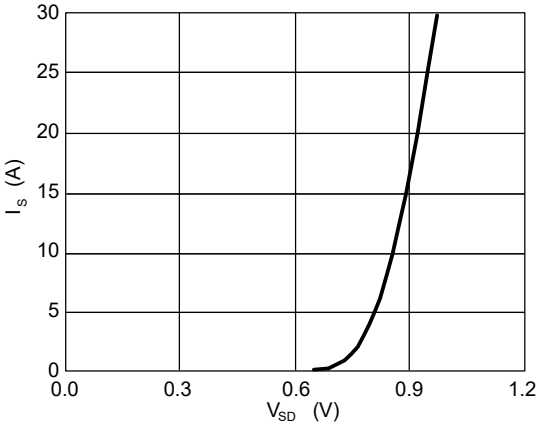


FIG. 4-Gate Charge Characteristics

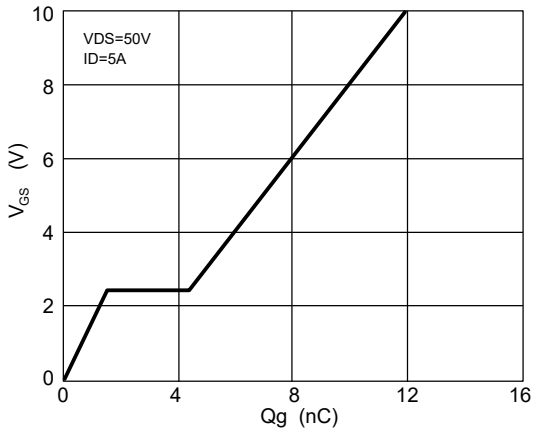


FIG. 5-$R_{DS(ON)}$ vs V_{GS}

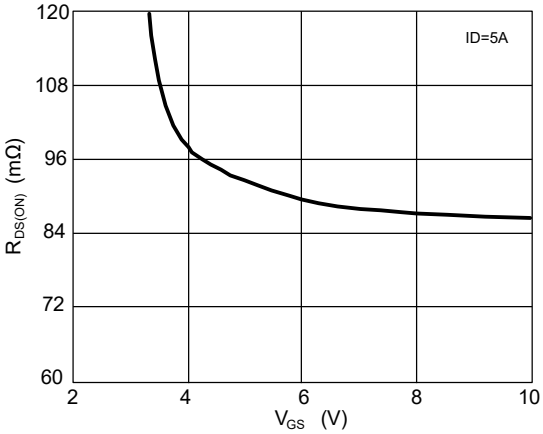
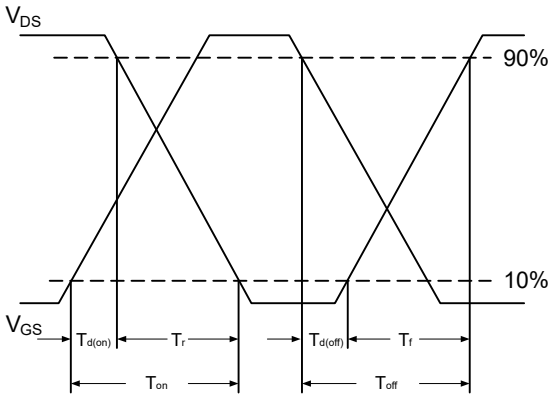


FIG. 6-Switching Time Waveform



P Channel Electrical Characteristics (T_J=25°C, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}= 0V , I_D= -250uA	-100	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}= -100V , V_{GS}= 0V	---	---	-1	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}= ±20V , V_{DS}= 0V	---	---	±100	nA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}= -10V , I_D= -5A	---	---	300	mΩ
		V_{GS}= -4.5V , I_D= -3A	---	---	340	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D= -250uA	-1.2	---	-2.5	V

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge	V_{DD}= -50V , V_{GS}= -10V , I_D= -5A	---	11.5	---	nC
Q_{gs}	Gate-Source Charge		---	1.3	---	
Q_{gd}	Gate-Drain Charge		---	2.9	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DS}= -50V , V_{GEN}= -10V , R_G= 4.5Ω , R_L=25 Ω , I_D= -5A	---	12	---	nS
T_r	Rise Time		---	5	---	
$T_{d(off)}$	Turn-Off Delay Time		---	35	---	
T_f	Fall Time		---	20	---	
C_{iss}	Input Capacitance	V_{DS}= -50V , V_{GS}= 0V , F= 1MHz	---	760	---	pF
C_{oss}	Output Capacitance		---	25	---	
C_{rss}	Reverse Transfer Capacitance		---	12	---	

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	-4.8	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S= -1A	---	---	-1.3	V
t_{rr}	Reverse Recovery Time	V_{GS}=0V , I_{SD}= -3A , di/dt=100A/us	---	25	---	nS
Q_{rr}	Reverse Recovery Charge		---	20	---	nC

NOTES：

4. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.

5. The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Characteristics Curves

FIG. 7-Output Characteristics

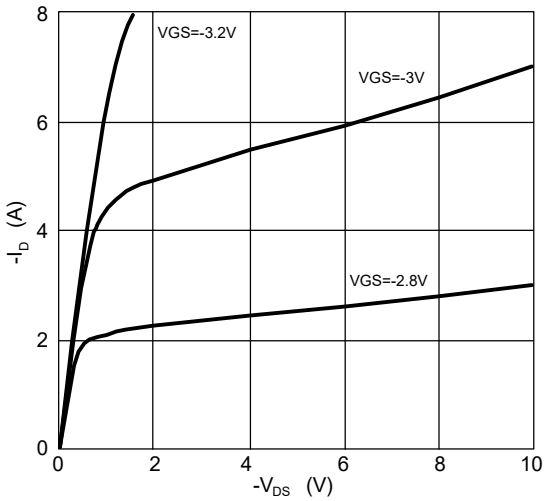


FIG. 8-I_D vs T_C

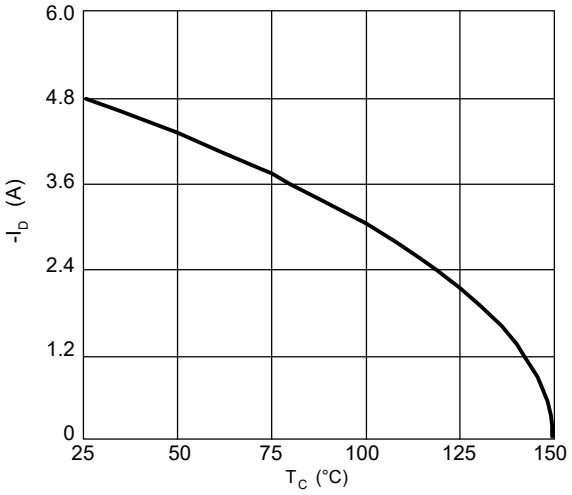


FIG. 9-Normalized $R_{DS(ON)}$ vs T_J

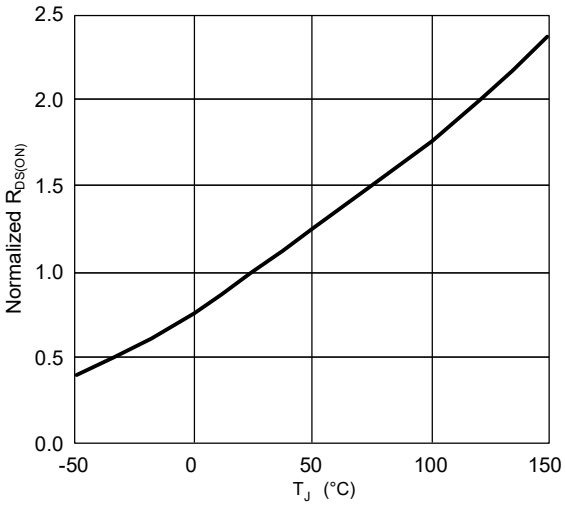


FIG. 10-Normalized $V_{GS(th)}$ vs T_J

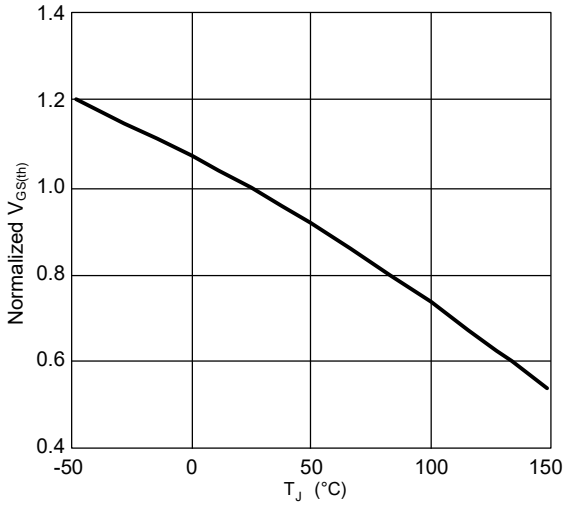


FIG. 11-$R_{DS(ON)}$ vs V_{GS}

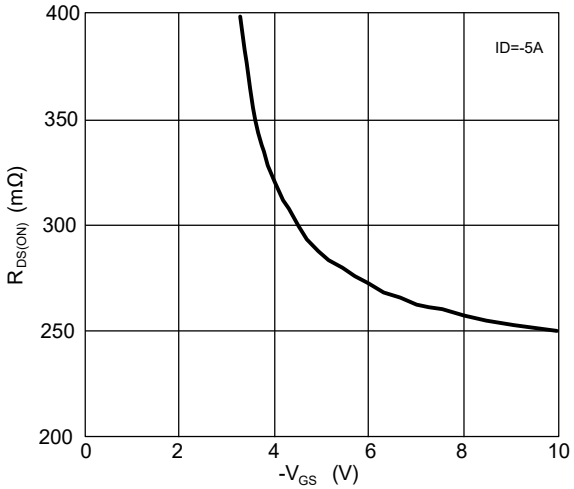
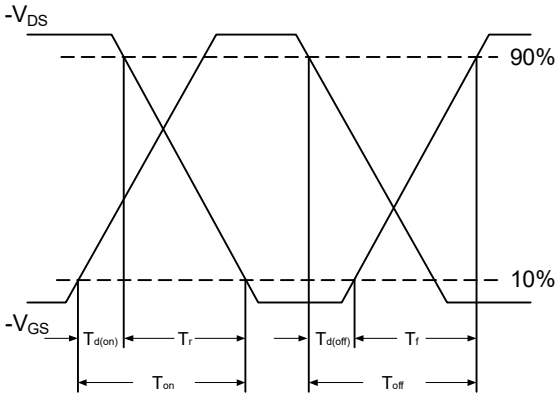
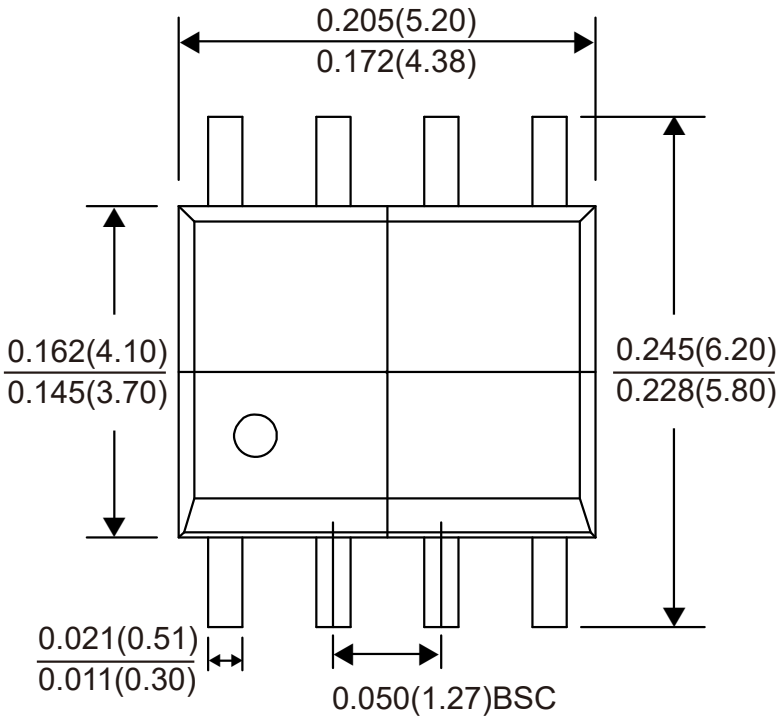
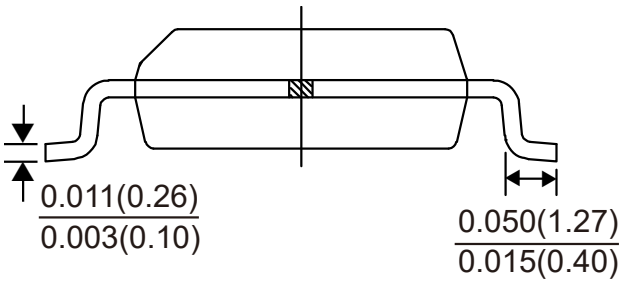


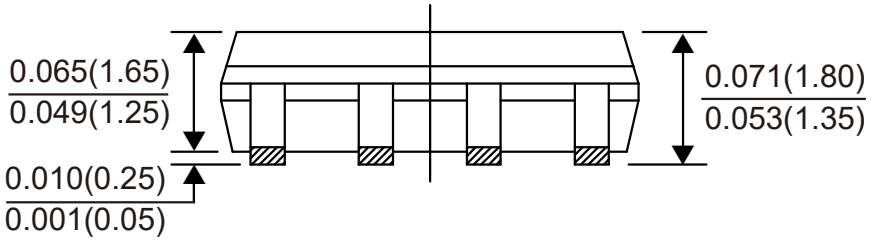
FIG. 12-Switching Time Waveform



Package Outline Dimensions







SOP-8

Dimensions in inches and (millimeters)

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