S8MBG036

60V 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
60 V	36 mΩ	12.5 A
-60 V	70 mΩ	-9.7 A

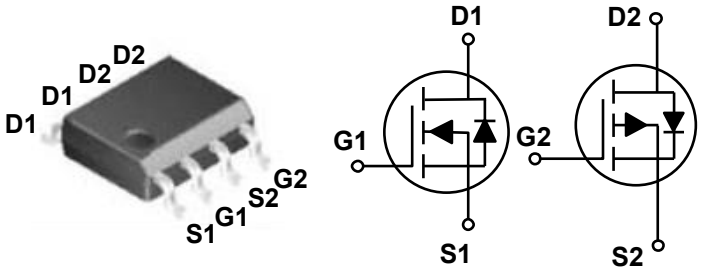
Features

- Fast Switching
- Green Device Available

Applications

- Boost Driver
- Brushless Motor

SOP-8 Pin Configuration



Absolute Maximum Ratings T_C=25°C unless otherwise noted

Symbol	Parameter	Rating		Units
V_{DS}	Drain-Source Voltage	60	-60	V
V_{GS}	Gate-Source Voltage	±20	±20	V
I_D	Drain Current - Continuous (T_A=25°C)	12.5	-9.7	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	37.5	-22.5	A
P_D	Power Dissipation (T_A=25°C)	1.47		W
T_J	Operating Junction Temperature Range	-55 to 150		°C
T_{STG}	Storage Temperature Range	-55 to 150		°C
Marking Code		BG036 , AP10G06S		

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	85	°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	60	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=48V , 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=4A	---	---	36	mΩ
		V_{GS}=4.5V , I_D=2A	---	---	38	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=250uA	1.2	---	2.5	V
gfs	Forward Transconductance	V_{DS}=5V , I_D=4A	---	21	---	S

Dynamic and Switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge	V_{DS}=48V , V_{GS}=4.5V , I_D=4A	---	12.6	---	nC
Q_{gs}	Gate-Source Charge		---	3.2	---	
Q_{gd}	Gate-Drain Charge		---	6.3	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=30V , V_{GS}=10V , R_G=3.3Ω , I_D=4A	---	8	---	nS
T_r	Rise Time		---	14.2	---	
$T_{d(off)}$	Turn-Off Delay Time		---	24.4	---	
T_f	Fall Time		---	4.6	---	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , F=1MHz	---	1378	---	pF
C_{oss}	Output Capacitance		---	86	---	
C_{rss}	Reverse Transfer Capacitance		---	64	---	
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , F=1MHz	---	3.2	---	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	---	---	4.8	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. Essentially independent of operating temperature.

Characteristics Curves

FIG. 1-Forward Characteristics of Body Diode

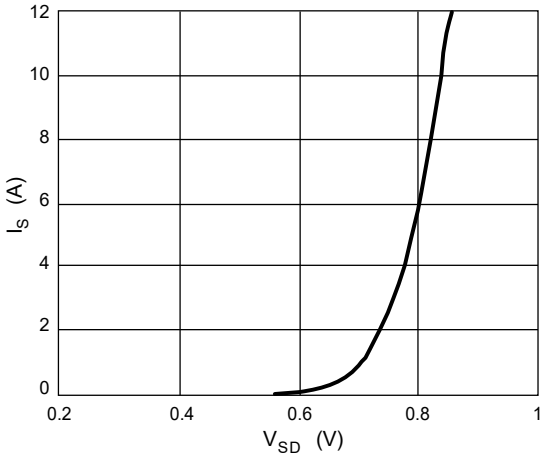


FIG. 2-Normalized $V_{GS(th)}$ vs T_J

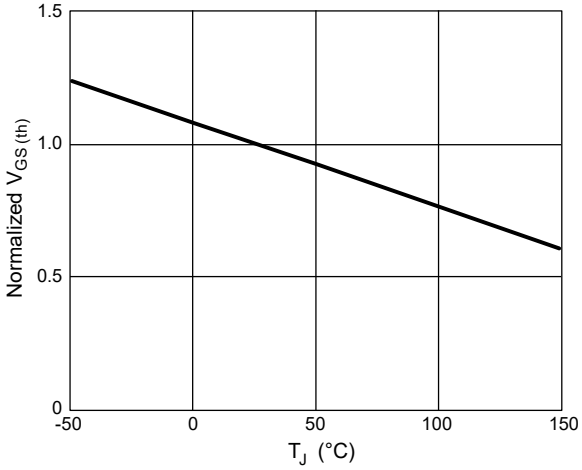


FIG. 2-Normalized $R_{DS(ON)}$ vs T_J

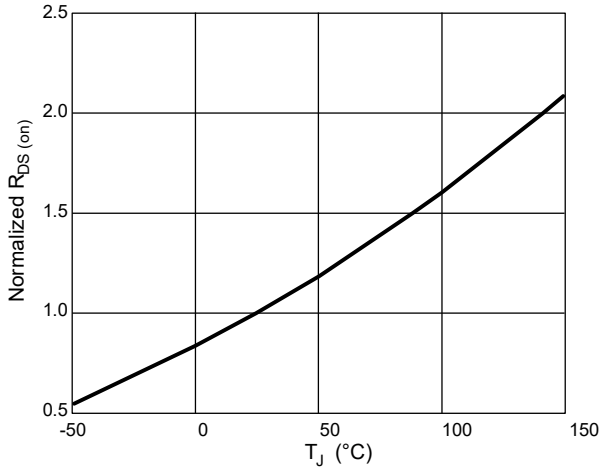


FIG. 4-Gate Charge Characteristics

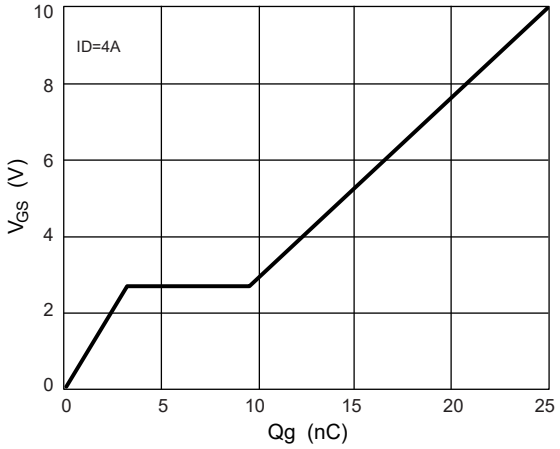


FIG. 5-Safe Operation Area

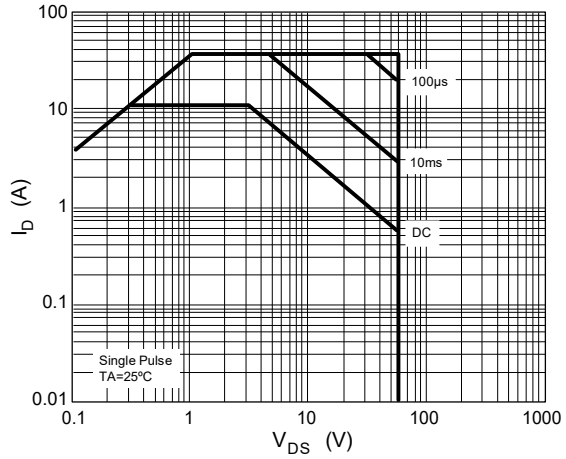
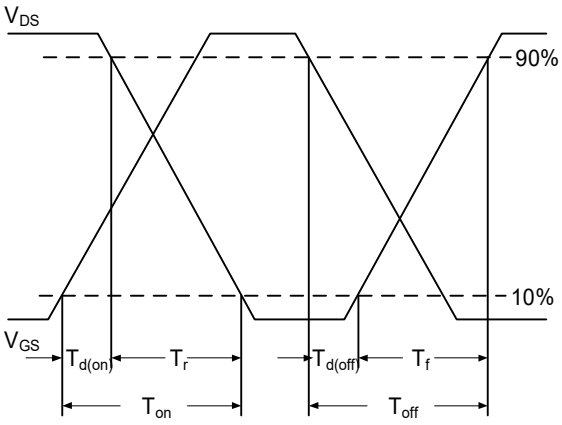


FIG. 6-Switching Time Waveform



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	-60	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}= -48V , 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= -3A	---	---	70	mΩ
		V_{GS}= -4.5V , I_D= -2A	---	---	85	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D= -250uA	-1.2	---	-2.5	V
gfs	Forward Transconductance	V_{DS}= -5V , I_D= -3A	---	15	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge	V_{DS}= -48V , V_{GS}= -4.5V , I_D= -3A	---	9.86	---	nC
Q_{gs}	Gate-Source Charge		---	3.1	---	
Q_{gd}	Gate-Drain Charge		---	2.95	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}= -15V , V_{GS}= -10V , R_G= 3.3Ω , I_D= -1A	---	28.8	---	nS
T_r	Rise Time		---	19.8	---	
$T_{d(off)}$	Turn-Off Delay Time		---	60.8	---	
T_f	Fall Time		---	7.2	---	
C_{iss}	Input Capacitance	V_{DS}= -15V , V_{GS}= 0V , F= 1MHz	---	1447	---	pF
C_{oss}	Output Capacitance		---	97.3	---	
C_{rss}	Reverse Transfer Capacitance		---	70	---	
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , F=1MHz	---	13.5	---	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	---	---	-3.7	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S= -1A	---	---	-1.2	V

NOTES：

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

5. Essentially independent of operating temperature.

Characteristics Curves

FIG. 7-Forward Characteristics of Body Diode

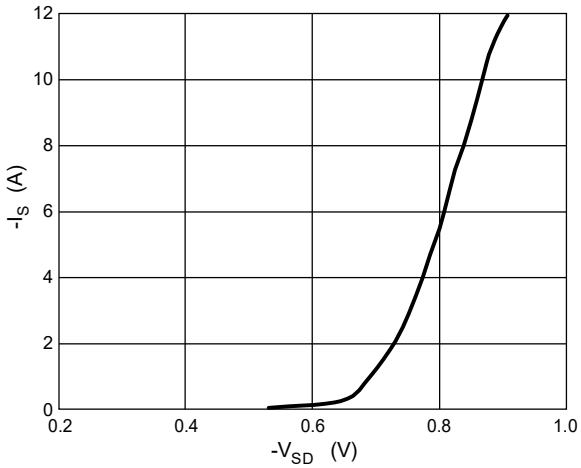


FIG. 8-Normalized $V_{GS(th)}$ vs T_J

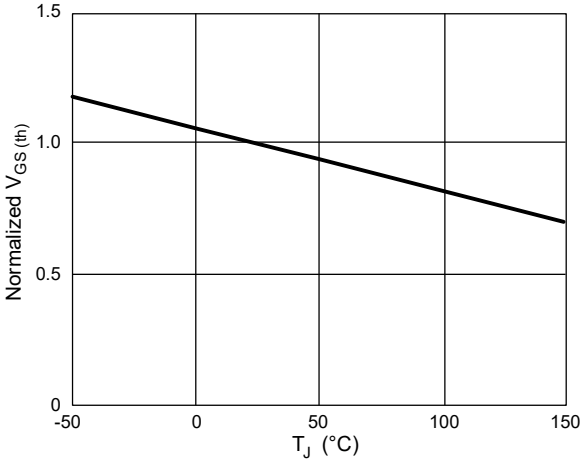


FIG. 9-Normalized $R_{DS(ON)}$ vs T_J

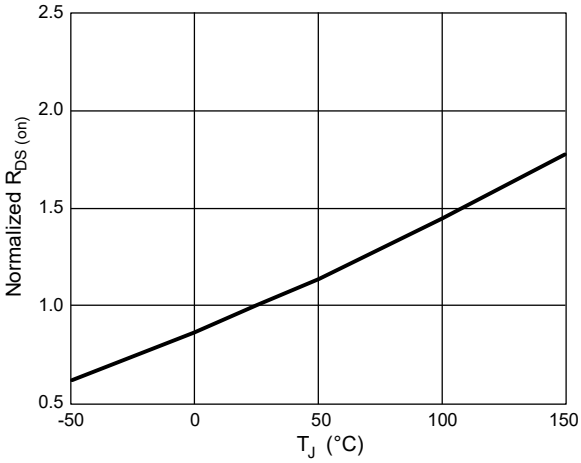


FIG. 10-Gate Charge Characteristics

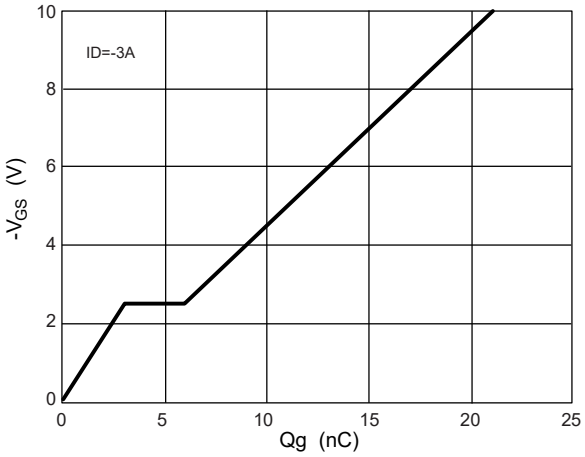


FIG. 11-Safe Operation Area

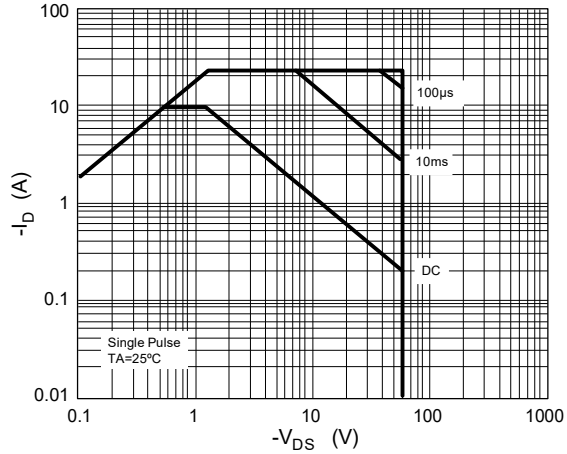
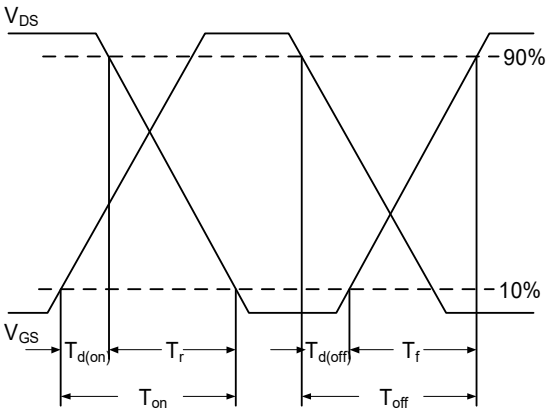
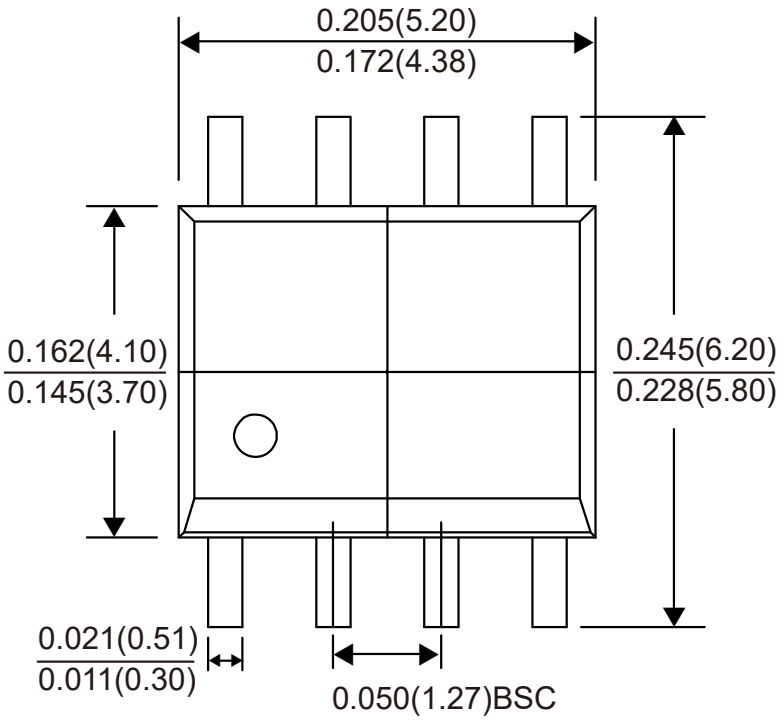
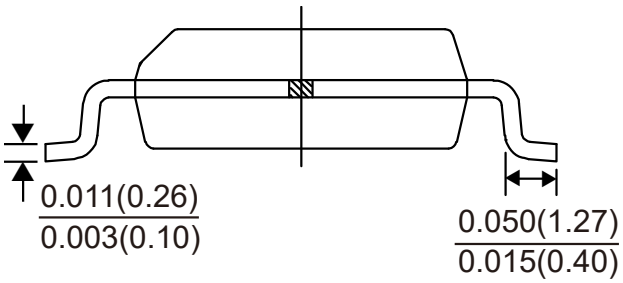


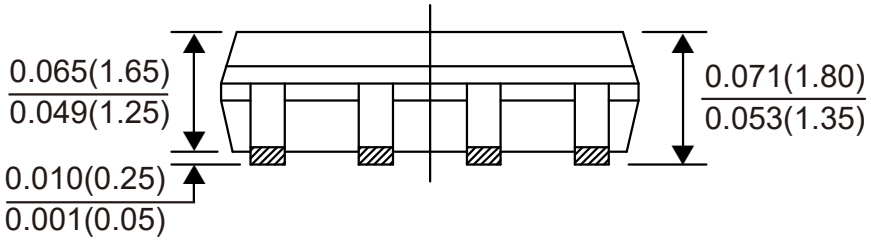
FIG. 12-Switching Time Waveform



Package Outline Dimensions







SOP-8

Dimensions in inches and (millimeters)

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