



30V N+P Dual Channel MOSFETs

General Description

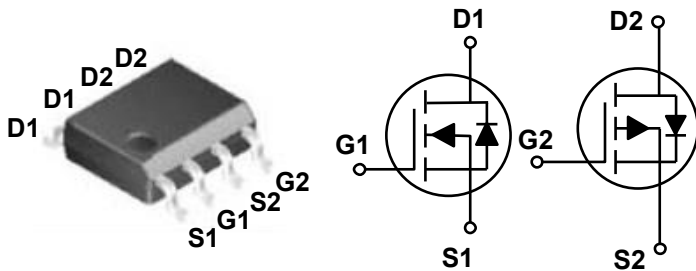
These N+P dual Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.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

BV_{DSS}	$R_{DS(ON)}$	I_D
30 V	12 mΩ	12 A
-30 V	25 mΩ	-9.8 A

Features

- Fast Switching
- Green Device Available

SOP-8 Pin Configuration



Applications

- Battery Protection
- Load Switch
- Uninterruptible Power Supply

Absolute Maximum Ratings $T_C=25^{\circ}C$ unless otherwise noted

Symbol	Parameter	Rating		Units
V_{DS}	Drain-Source Voltage	30	-30	V
V_{GS}	Gate-Source Voltage	± 20	± 20	V
I_D	Drain Current - Continuous ($T_A=25^{\circ}C$)	12	-9.8	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	36	-26	A
P_D	Power Dissipation ($T_A=25^{\circ}C$)	1.47		W
T_J	Operating Junction Temperature Range	-55 to 150		$^{\circ}C$
T_{STG}	Storage Temperature Range	-55 to 150		$^{\circ}C$
Marking Code		BC012 , AP10G03S		

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	85	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance Junction to Case	25	$^{\circ}C/W$

**30V N+P Dual Channel MOSFETs****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	30	---	---	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =24V, V _{GS} =0V, T _J =25°C	---	---	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 =8A	---	---	12	mΩ
		V _{GS} =4.5V, I _D =6A	---	---	18	
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 =8A	---	24	---	S

Dynamic and Switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =4.5V, I _D =8A	---	9.63	---	nC
Q _{gs}	Gate-Source Charge		---	3.88	---	
Q _{gd}	Gate-Drain Charge		---	3.44	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =15V, V _{GS} =10V, R _G =1.5Ω, I _D =8A	---	4.2	---	nS
T _r	Rise Time		---	8.2	---	
T _{d(off)}	Turn-Off Delay Time		---	31	---	
T _f	Fall Time		---	4	---	
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, F=1MHz	---	940	---	pF
C _{oss}	Output Capacitance		---	131	---	
C _{rss}	Reverse Transfer Capacitance		---	109	---	
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, F=1MHz	---	1.8	---	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	---	---	9	A
I _{SM}	Pulsed Source Current		---	---	36	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =1A	---	---	1	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.



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Characteristics Curves

FIG. 1-Forward Characteristics of Body Diode

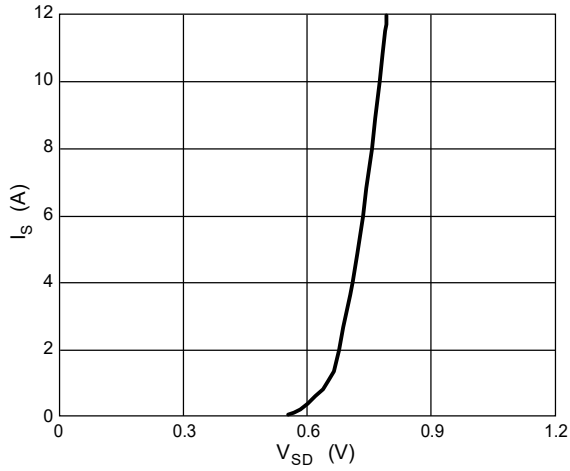


FIG. 2-Normalized $V_{GS(th)}$ vs T_J

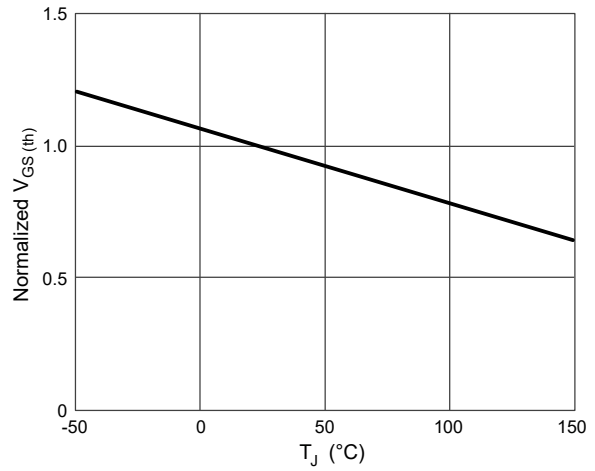


FIG. 2-Normalized $R_{DS(on)}$ vs T_J

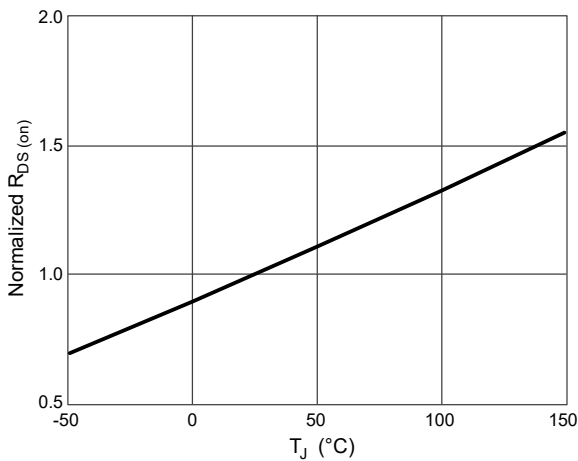


FIG. 4-Gate Charge Characteristics

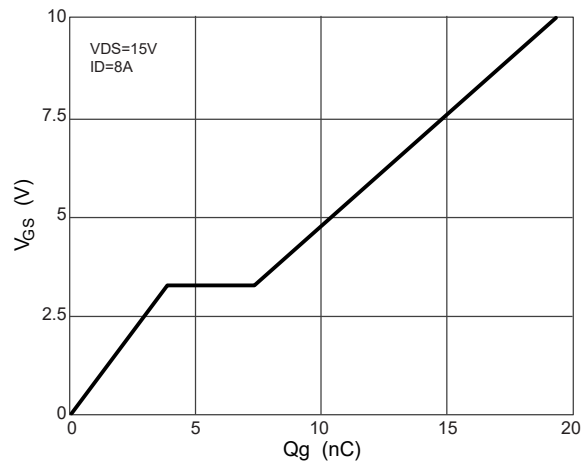


FIG. 5-Safe Operation Area

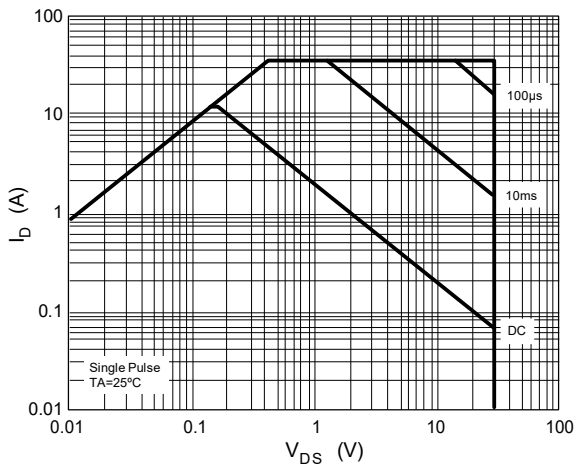
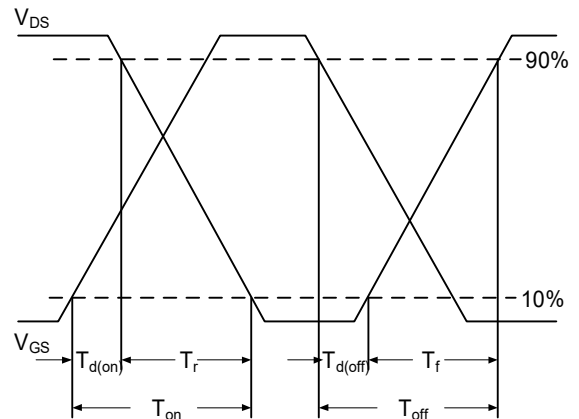


FIG. 6-Switching Time Waveform



**30V N+P Dual Channel MOSFETs****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	-30	---	---	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} = -24V , 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 = -6A	---	---	25	mΩ
		V _{GS} = -4.5V , I _D = -4A	---	---	42	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D = -250uA	-1.0	---	-2.5	V
gfs	Forward Transconductance	V _{DS} = -5V , I _D = -6A	---	17	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q _g	Total Gate Charge	V _{DS} = -15V , V _{GS} = -4.5V , I _D = -6A	---	12.6	---	nC
Q _{gs}	Gate-Source Charge		---	4.8	---	
Q _{gd}	Gate-Drain Charge		---	4.8	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} = -15V , V _{GS} = -10V , R _G = 3.3Ω , I _D = -6A	---	4.6	---	nS
T _r	Rise Time		---	14.8	---	
T _{d(off)}	Turn-Off Delay Time		---	41	---	
T _f	Fall Time		---	19.6	---	
C _{iss}	Input Capacitance	V _{DS} = -15V , V _{GS} = 0V , F= 1MHz	---	1345	---	pF
C _{oss}	Output Capacitance		---	194	---	
C _{rss}	Reverse Transfer Capacitance		---	158	---	
R _g	Gate Resistance	V _{DS} =0V , V _{GS} =0V , F=1MHz	---	13	---	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	---	---	-6.5	A
I _{SM}	Pulsed Source Current		---	---	-26	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V , I _S = -1A	---	---	-1.2	V

NOTES :

- The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
- Essentially independent of operating temperature.



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Characteristics Curves

FIG. 7-Forward Characteristics of Body Diode

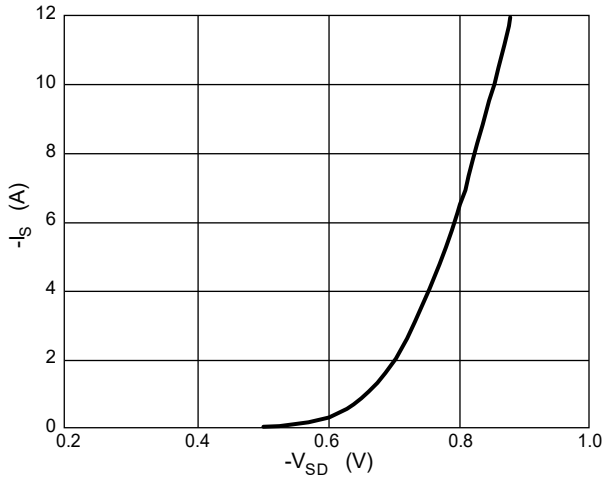


FIG. 8-Normalized $V_{GS(th)}$ vs T_J

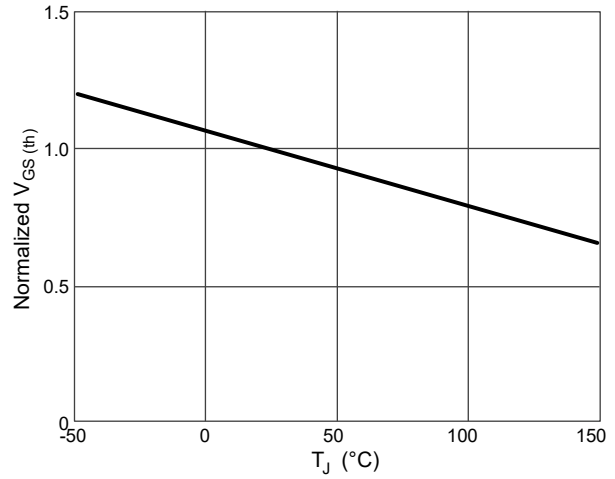


FIG. 9-Normalized $R_{DS(on)}$ vs T_J

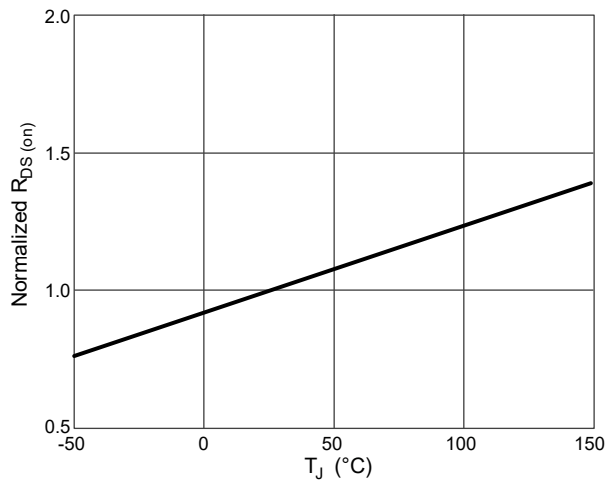


FIG. 10-Gate Charge Characteristics

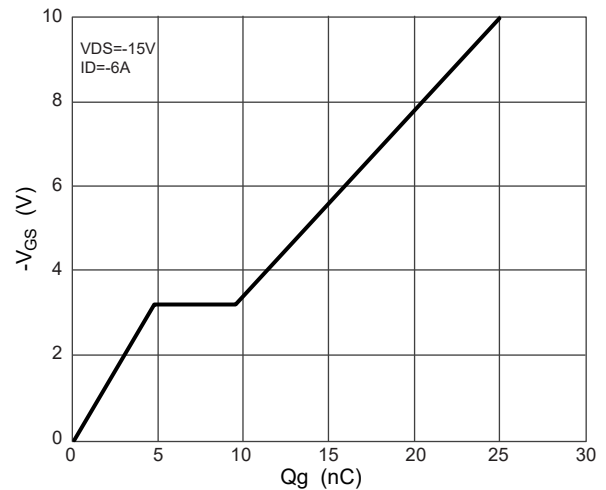


FIG. 11-Safe Operation Area

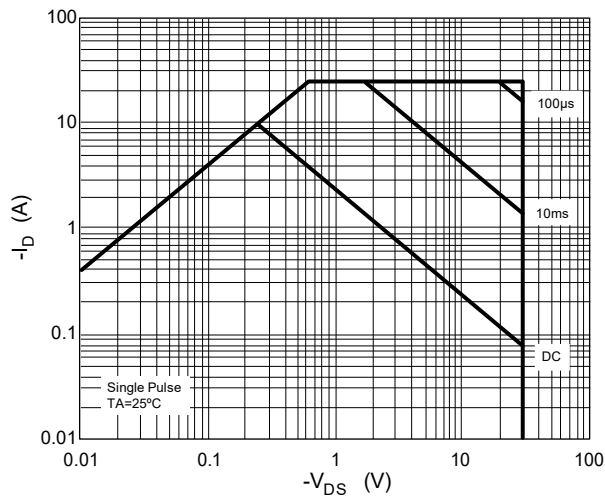
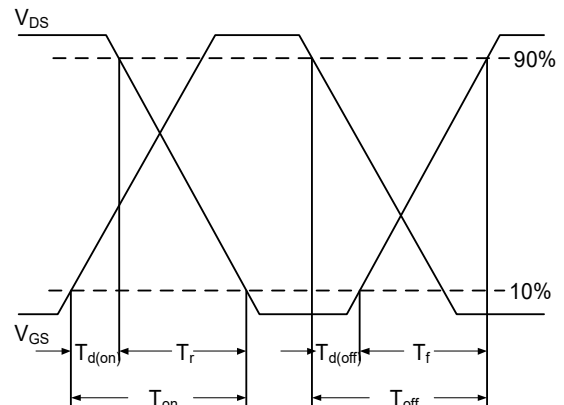


FIG. 12-Switching Time Waveform



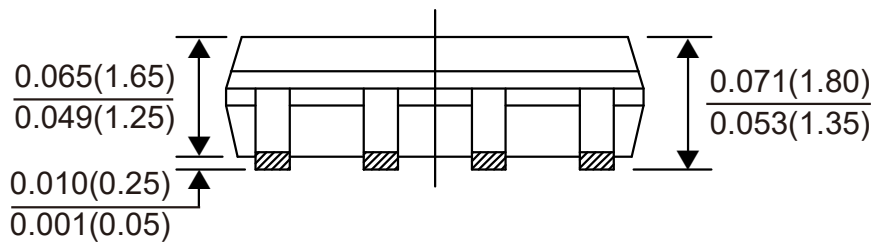
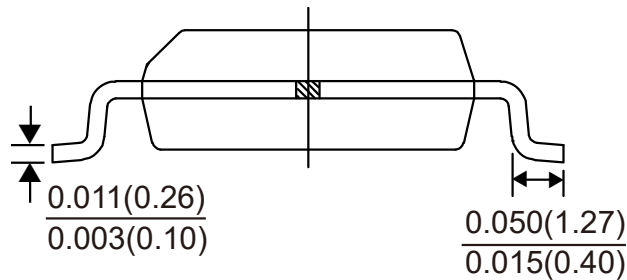
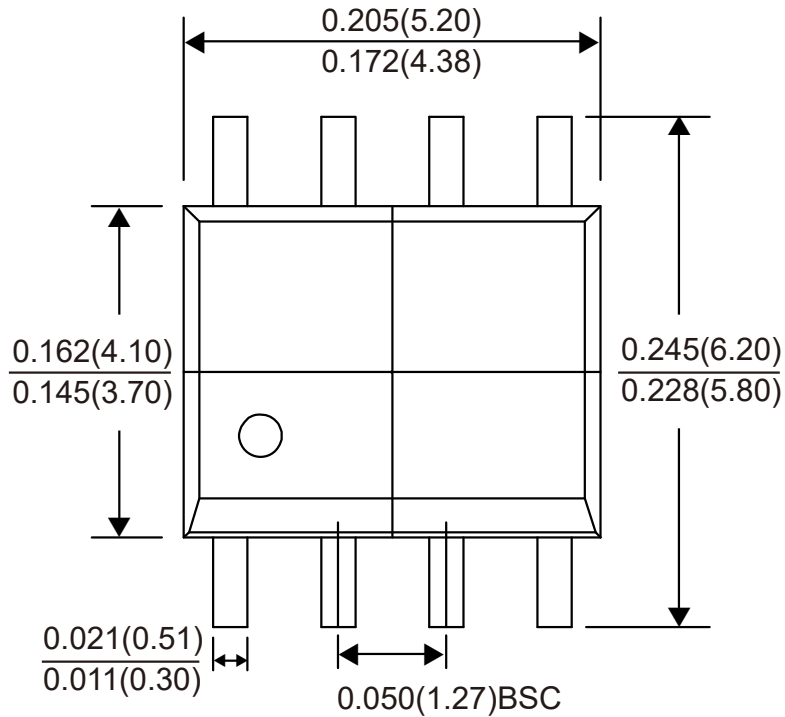


S8MBC012



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Package Outline Dimensions



SOP-8

Dimensions in inches and (millimeters)



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