



S8MBG030



60V N+P Dual Channel MOSFETs

General Description

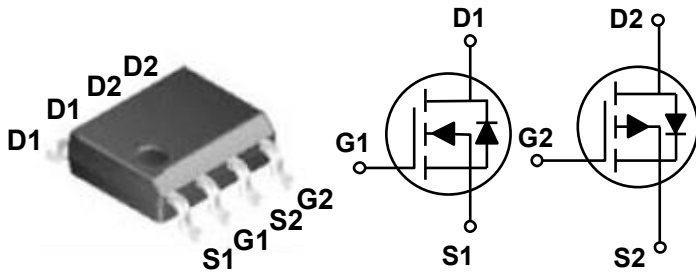
These N+P dual Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.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

BV_{DSS}	$R_{DS(ON)}$	I_D
60 V	30 mΩ	5.9 A
-60 V	48 mΩ	-4.7 A

Features

- Fast switching
- Green Device Available
- Suit for 4.5V Gate Drive Applications

SOP-8 Pin Configuration



Applications

- DC Fan
- Motor Drive Applications
- Networking
- Half / Full Bridge Topology

Absolute Maximum Ratings $T_c=25^\circ\text{C}$ 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 ($T_A=25^\circ\text{C}$)	5.9	-4.7	A
	Drain Current - Continuous ($T_A=70^\circ\text{C}$)	4.7	-3.8	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	23.6	-18.8	A
EAS	Single Pulse Avalanche Energy (NOTE 2)	26.4	54.4	mJ
IAS	Single Pulse Avalanche Current (NOTE 2)	23	33	A
P_D	Power Dissipation ($T_A=25^\circ\text{C}$)	2.01		W
	Power Dissipation - Derate above 25°C	0.02		W/ $^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150		$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150		$^\circ\text{C}$
Marking Code		BG030 , DS6701		

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	---	62	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	38	$^\circ\text{C}/\text{W}$

**60V 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	60	---	---	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =60V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =48V, V _{GS} =0V, T _J =125°C	---	---	10	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	---	25	30	mΩ
		V _{GS} =4.5V, I _D =3A	---	28	36	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.2	1.6	2.5	V
g _{fs}	Forward Transconductance	V _{DS} =10V, I _D =3A	---	10	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q _g	Total Gate Charge	V _{DS} =30V, V _{GS} =10V, I _D =5A (NOTE 3、4)	---	16.6	24	nC
Q _{gs}	Gate-Source Charge		---	2.2	4.4	
Q _{gd}	Gate-Drain Charge		---	3.9	8	
T _{d(on)}	Turn-On Delay Time	V _{DD} =30V, V _{GS} =10V, R _G =6Ω, I _D =1A (NOTE 3、4)	---	4.6	9	nS
T _r	Rise Time		---	14.8	28	
T _{d(off)}	Turn-Off Delay Time		---	27.2	52	
T _f	Fall Time		---	7.8	15	
C _{iss}	Input Capacitance	V _{DS} =30V, V _{GS} =0V, F=1MHz	---	1180	1720	pF
C _{oss}	Output Capacitance		---	68	100	
C _{rss}	Reverse Transfer Capacitance		---	45	70	
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	---	2.1	4.2	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	---	---	5.9	A
I _{SM}	Pulsed Source Current		---	---	11.8	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =1A, T _J =25°C	---	---	1	V

NOTES :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V, V_{GS}=10V, L=0.1mH, N-CH I_{AS}=23A, P-CH I_{AS}=33A, R_G=25, Starting T_J=25°C.
3. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
4. Essentially independent of operating temperature.



Characteristics Curves

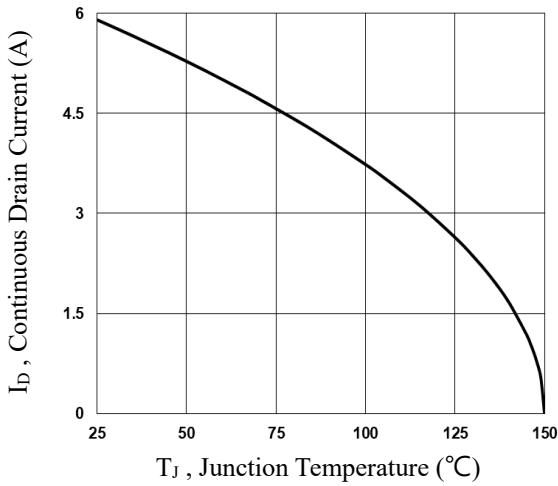


Fig.1 Continuous Drain Current vs. T_c

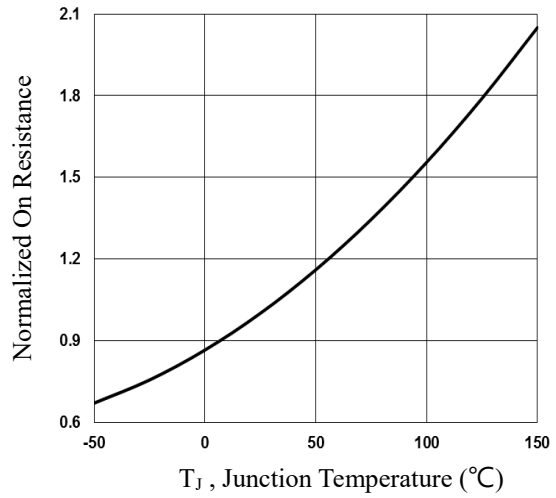


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

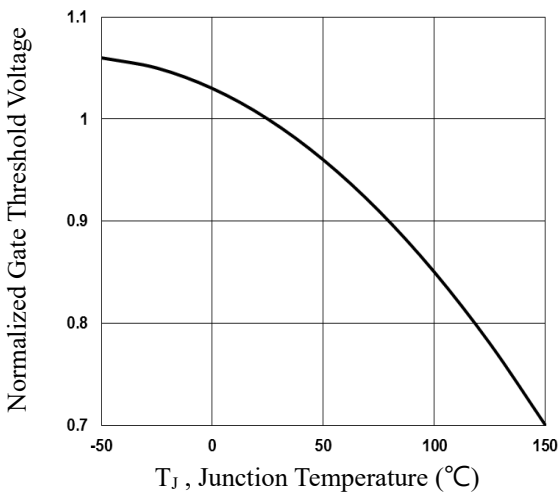


Fig.3 Normalized V_{th} vs. T_J

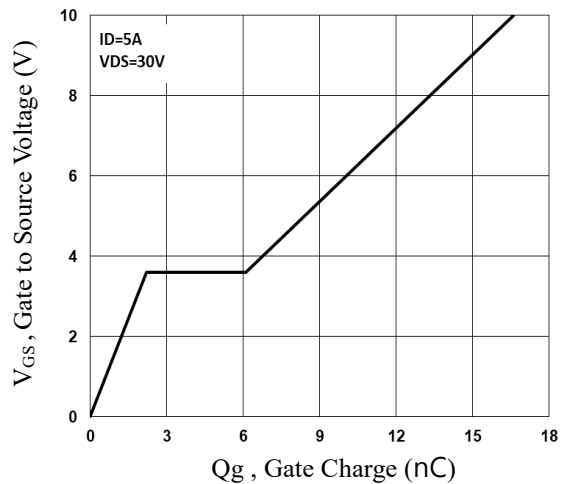


Fig.4 Gate Charge Waveform

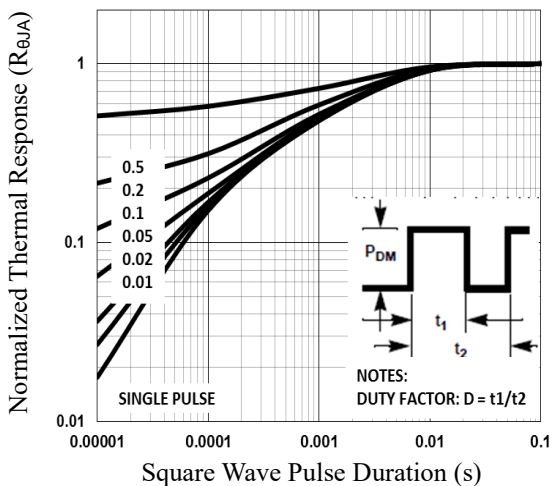


Fig.5 Normalized Transient Impedance

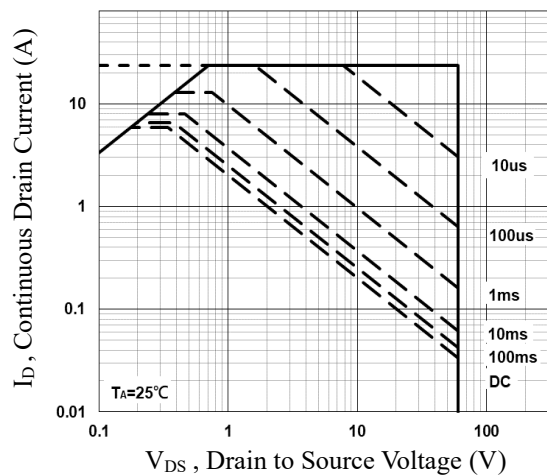


Fig.6 Maximum Safe Operation Area

**60V 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	-60	---	---	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} = -60V , V _{GS} = 0V , T _J =25°C	---	---	-1	uA
		V _{DS} = -48V , V _{GS} = 0V , T _J =125°C	---	---	-10	
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	---	40	48	mΩ
		V _{GS} = -4.5V , I _D = -3A	---	53	68	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D = -250uA	-1.2	-1.6	-2.5	V
g _{fs}	Forward Transconductance	V _{DS} = -10V , I _D = -3A	---	10	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q _g	Total Gate Charge	V _{DS} = -30V , V _{GS} = -10V , I _D = -4A (NOTE 2、3)	---	22.4	31	nC
Q _{gs}	Gate-Source Charge		---	4.1	6	
Q _{gd}	Gate-Drain Charge		---	5.2	7	
T _{d(on)}	Turn-On Delay Time	V _{DD} = -30V , V _{GS} = -10V , R _G = 6Ω , I _D = -1A (NOTE 2、3)	---	13	25	nS
T _r	Rise Time		---	42.4	81	
T _{d(off)}	Turn-Off Delay Time		---	64.6	123	
T _f	Fall Time		---	16.4	31	
C _{iss}	Input Capacitance	V _{DS} = -30V , V _{GS} = 0V , F= 1MHz	---	1250	1810	pF
C _{oss}	Output Capacitance		---	85	125	
C _{rss}	Reverse Transfer Capacitance		---	65	95	
R _g	Gate resistance	V _{GS} =0V , V _{DS} =0V , F=1MHz	---	15	30	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	---	---	-4.7	A
I _{SM}	Pulsed Source Current		---	---	-9.4	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V , I _S = -1A , T _J =25°C	---	---	-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.



Characteristics Curves

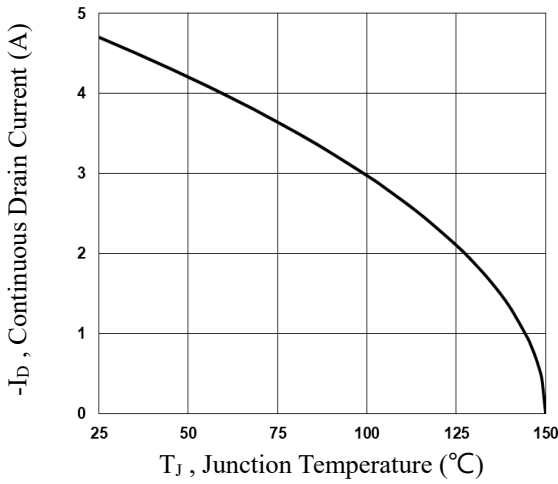


Fig.7 Continuous Drain Current vs. T_c

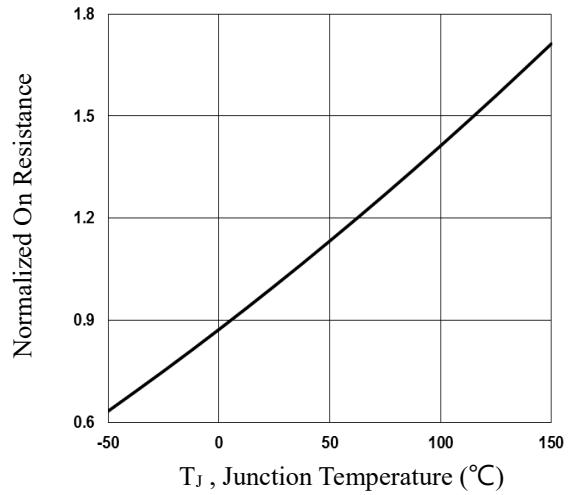


Fig.8 Normalized RDSON vs. T_J

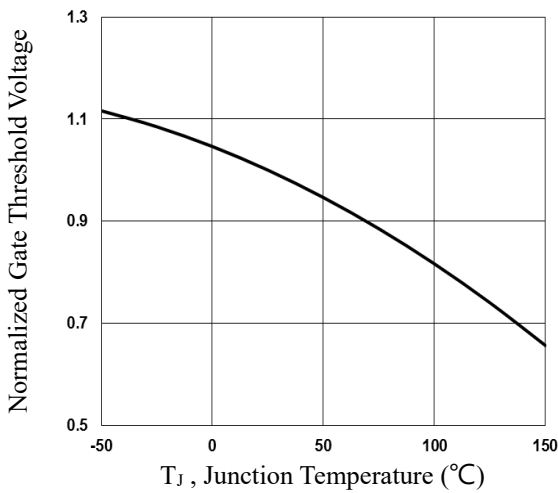


Fig.9 Normalized V_{th} vs. T_J

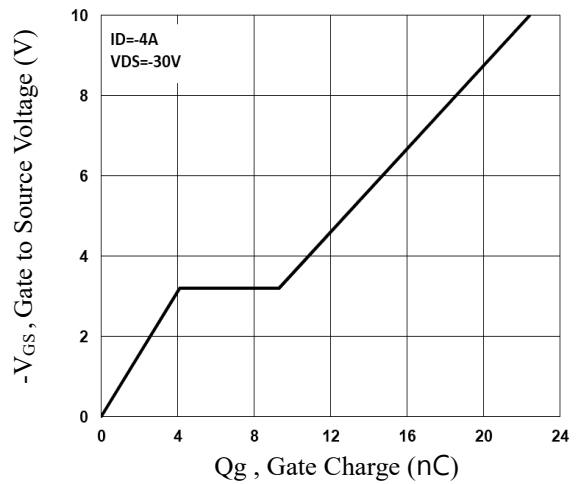


Fig.10 Gate Charge Waveform

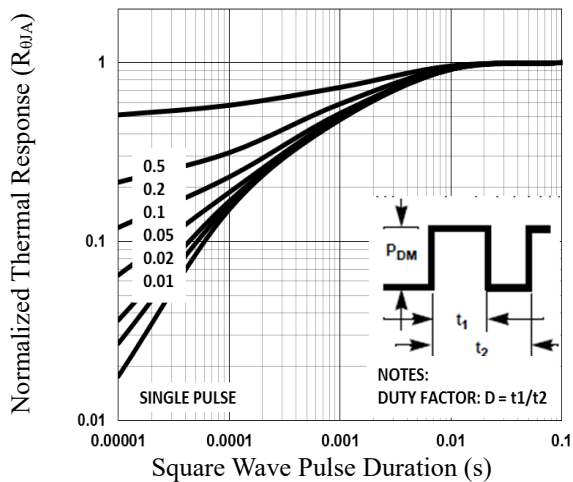


Fig.11 Normalized Transient Impedance

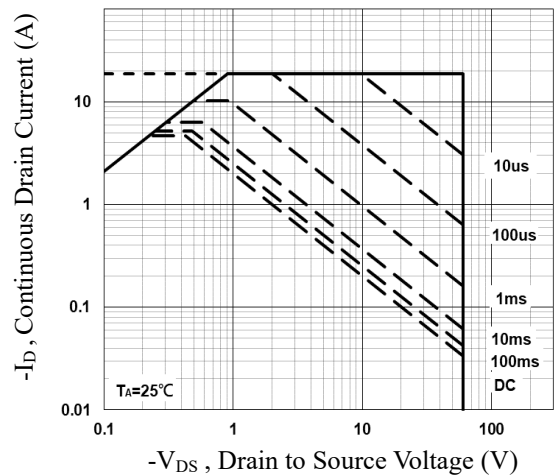


Fig.12 Maximum Safe Operation Area

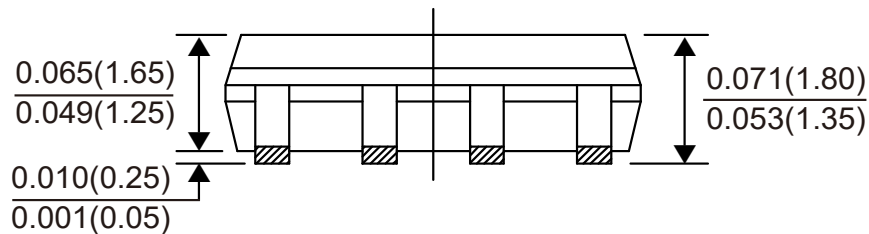
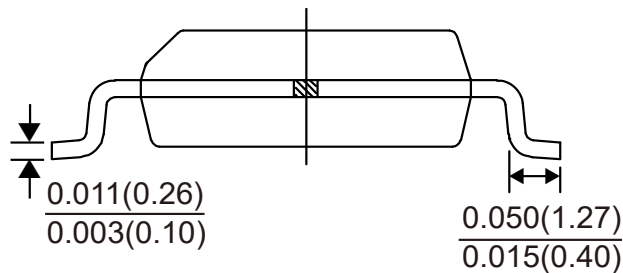
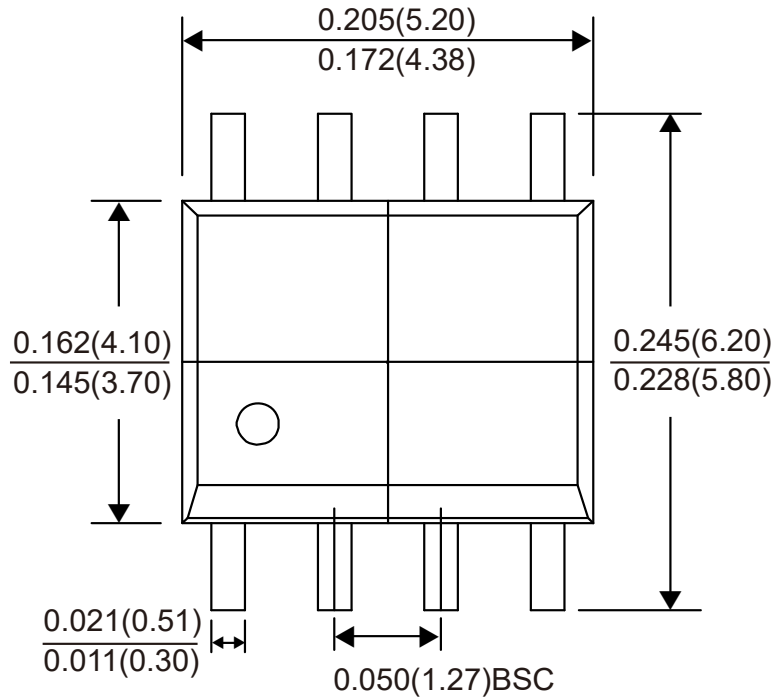


S8MBG030



60V N+P Dual Channel MOSFETs

Package Outline Dimensions



SOP-8

Dimensions in inches and (millimeters)



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