



S8MBG054



60V N+P Dual Channel MOSFETs

General Description

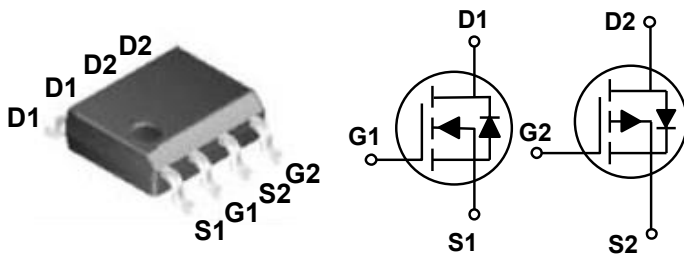
These N+P dual Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.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

BV_{DSS}	$R_{DS(ON)}$	I_D
60 V	54 m Ω	4.5 A
-60 V	105 m Ω	-3.5 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 ($T_c=25^\circ\text{C}$)	4.5	-3.5	A
	Drain Current - Continuous ($T_c=100^\circ\text{C}$)	2.85	-2.21	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	18	-14	A
P_D	Power Dissipation ($T_c=25^\circ\text{C}$)	3.57		W
	Power Dissipation - Derate above 25°C	0.028		W/ $^\circ\text{C}$
T_J	Operating Junction Temperature Range	-50 to 150		$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-50 to 150		$^\circ\text{C}$
Marking Code		DS6710 , BG054		

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	---	75	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	35	$^\circ\text{C}/\text{W}$

**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 =6A	---	45	54	mΩ
		V _{GS} =4.5V, I _D =3A	---	52	63	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.2	1.8	2.5	V
g _{fs}	Forward Transconductance	V _{DS} =10V, I _D =4A	---	4.2	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q _g	Total Gate Charge (NOTE 2、3)	V _{DS} =30V, V _{GS} =10V, I _D =4A	---	14	21	nC
Q _{gs}	Gate-Source Charge (NOTE 2、3)		---	2.9	5	
Q _{gd}	Gate-Drain Charge (NOTE 2、3)		---	2.3	4	
T _{d(on)}	Turn-On Delay Time (NOTE 2、3)	V _{DD} =30V, V _{GS} =10V, R _G =3.3Ω, I _D =1A	---	3.9	7	ns
T _r	Rise Time (NOTE 2、3)		---	12.6	24	
T _{d(off)}	Turn-Off Delay Time (NOTE 2、3)		---	23.1	44	
T _f	Fall Time (NOTE 2、3)		---	6.7	13	
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, F=1MHz	---	800	1160	pF
C _{oss}	Output Capacitance		---	380	550	
C _{rss}	Reverse Transfer Capacitance		---	115	170	
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	---	1.7	3.4	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	---	---	4.5	A
I _{SM}	Pulsed Source Current		---	---	9	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

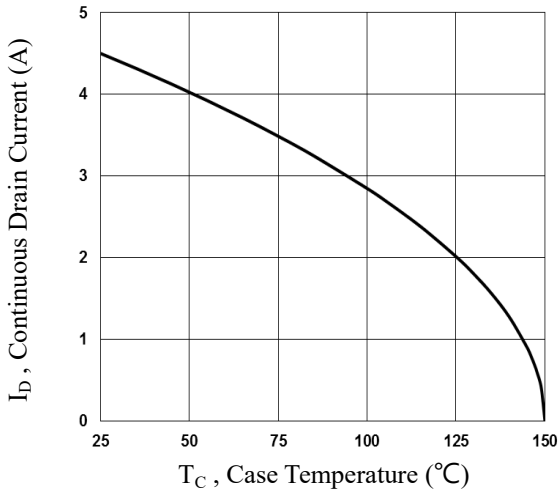


Fig.1 Continuous Drain Current vs. T_c

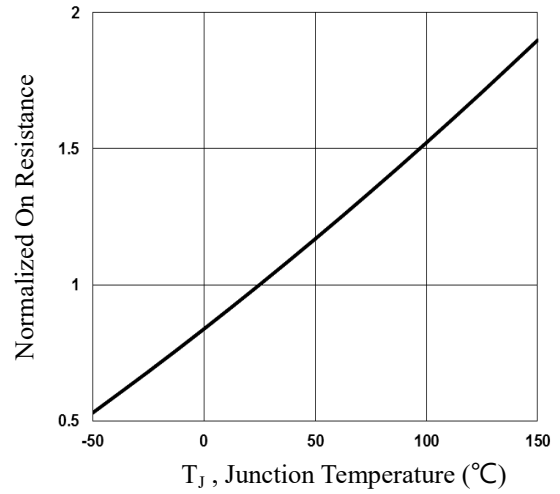


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

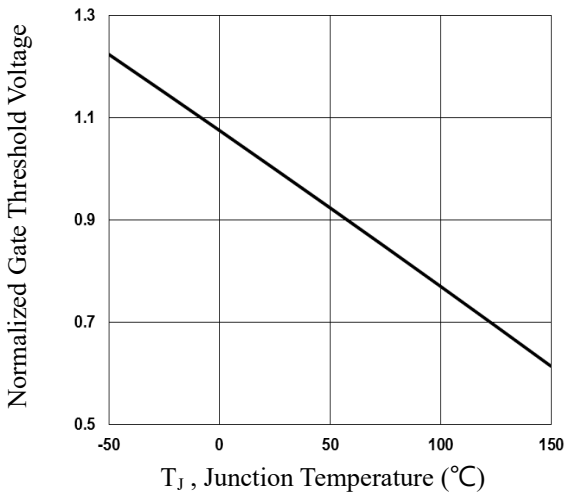


Fig.3 Normalized V_{th} vs. T_j

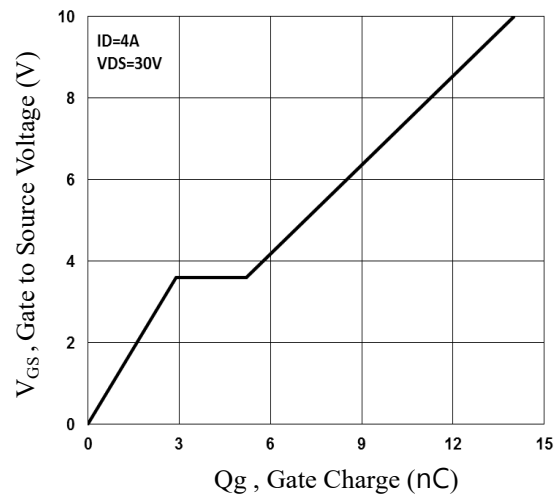


Fig.4 Gate Charge Waveform

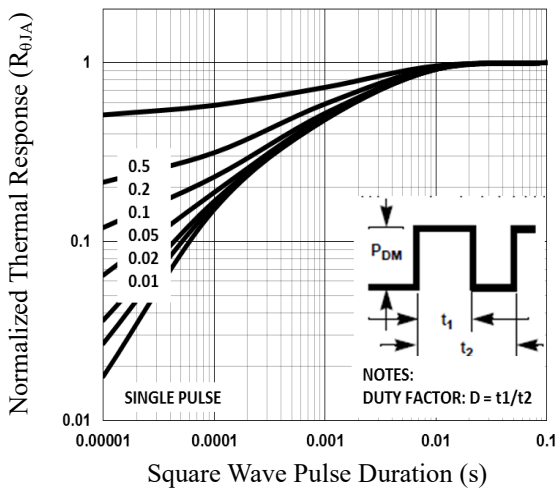


Fig.5 Normalized Transient Impedance

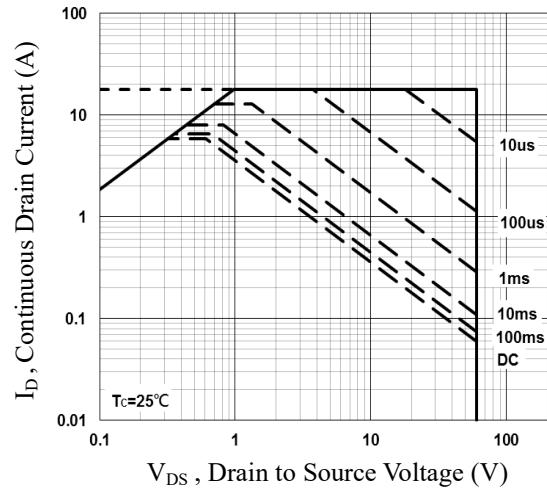


Fig.6 Maximum Safe Operation Area

**60V N+P Dual Channel MOSFETs****P Channel Electrical Characteristics (TA=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 = -6A	---	87	105	mΩ
		V _{GS} = -4.5V , I _D = -3A	---	120	145	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D = -250uA	-1.0	-1.6	-2.5	V
g _{fs}	Forward Transconductance	V _{DS} = -10V , I _D = -6A	---	5.5	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q _g	Total Gate Charge (NOTE 2、3)	V _{DS} = -30V , V _{GS} = -10V , I _D = -4A	---	10	15	nC
Q _{gs}	Gate-Source Charge (NOTE 2、3)		---	1.6	3.2	
Q _{gd}	Gate-Drain Charge (NOTE 2、3)		---	3	6	
T _{d(on)}	Turn-On Delay Time (NOTE 2、3)	V _{DD} = -30V , V _{GS} = -10V , R _G = 6Ω , I _D = -1A	---	8	16	ns
T _r	Rise Time (NOTE 2、3)		---	15.4	30	
T _{d(off)}	Turn-Off Delay Time (NOTE 2、3)		---	42.8	80	
T _f	Fall Time (NOTE 2、3)		---	8.4	16	
C _{iss}	Input Capacitance	V _{DS} = -30V , V _{GS} = 0V , F= 1MHz	---	785	1300	pF
C _{oss}	Output Capacitance		---	175	300	
C _{rss}	Reverse Transfer Capacitance		---	112	220	

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	---	---	-3.5	A
I _{SM}	Pulsed Source Current		---	---	-7	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

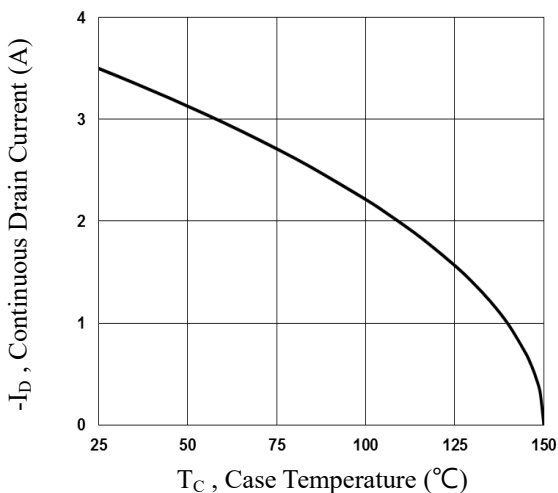


Fig.7 Continuous Drain Current vs. T_c

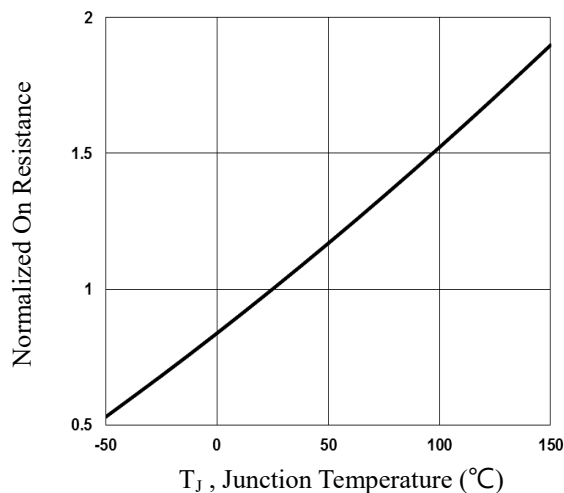


Fig.8 Normalized R_{DS(on)} vs. T_j

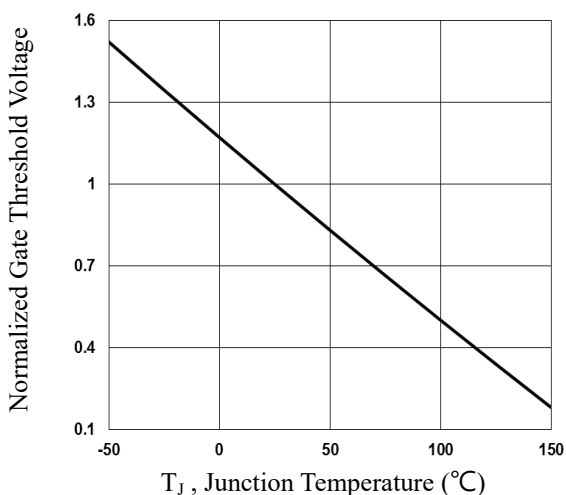


Fig.9 Normalized V_{th} vs. T_j

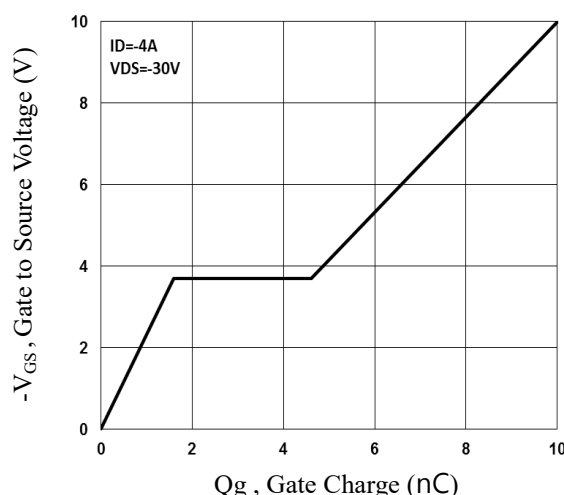


Fig.10 Gate Charge Waveform

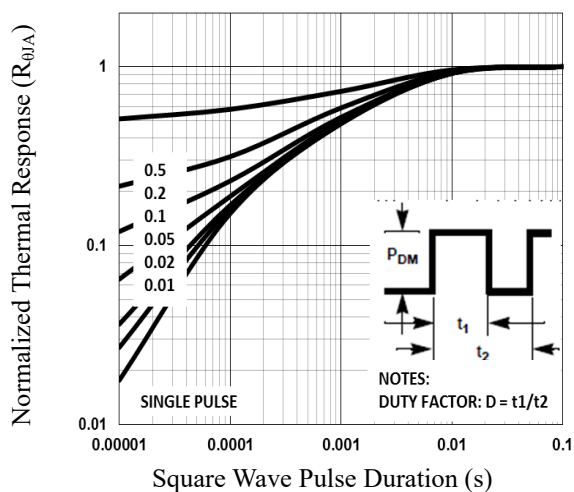


Fig.11 Normalized Transient Impedance

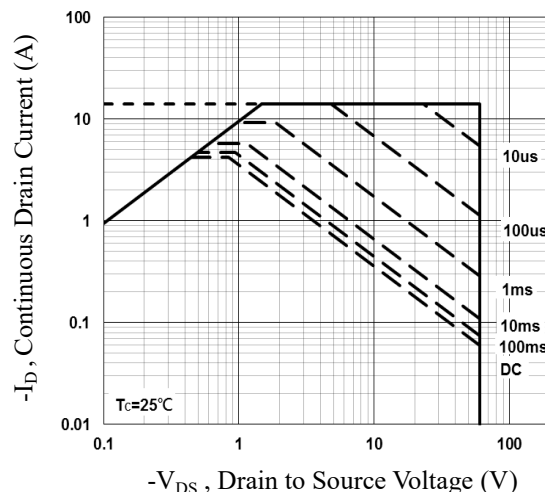


Fig.12 Maximum Safe Operation Area

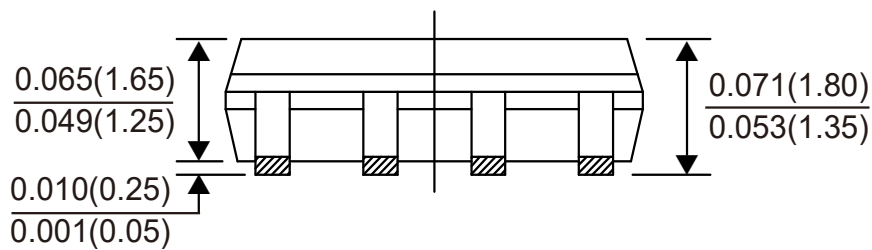
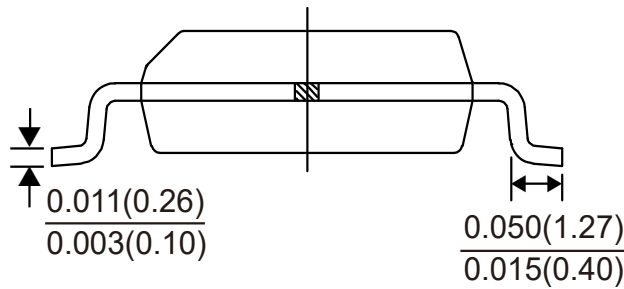
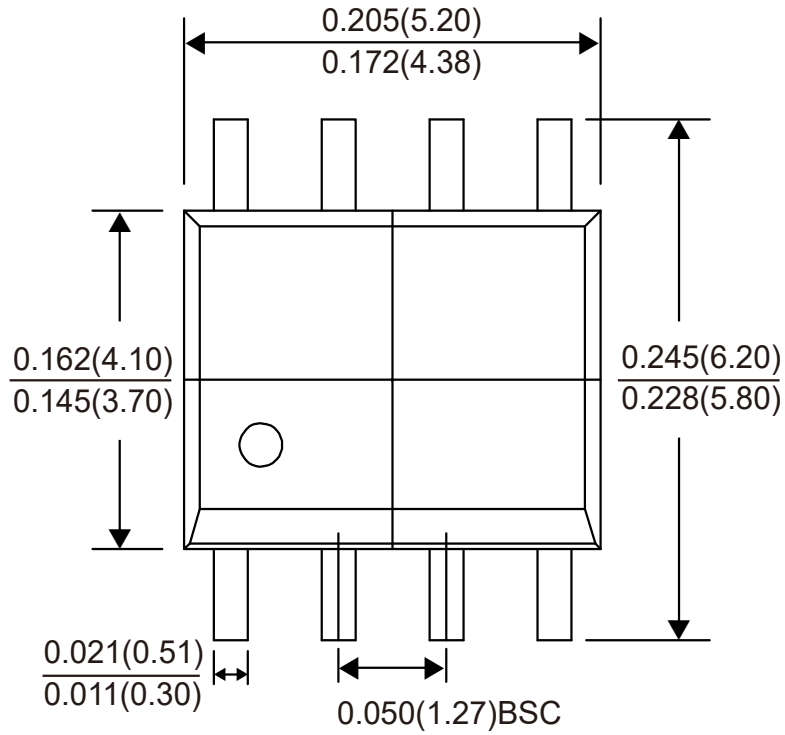


S8MBG054



60V N+P Dual Channel MOSFETs

Package Outline Dimensions



SOP-8

Dimensions in inches and (millimeters)



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