



S8MBC020A



30V N+P Dual Channel MOSFETs

General Description

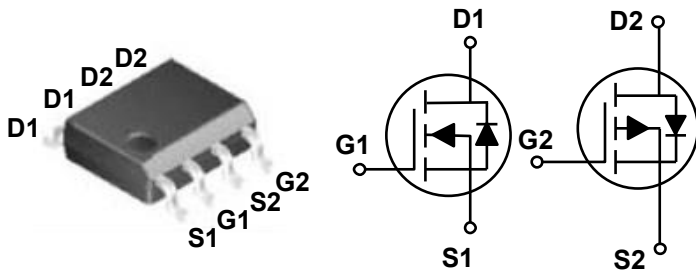
These N+P dual Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.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

BV_{DSS}	$R_{DS(ON)}$	I_D
30 V	20 m Ω	7.5 A
-30 V	32 m Ω	-6 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	30	-30	V
V_{GS}	Gate-Source Voltage	± 20	± 20	V
I_D	Drain Current - Continuous ($T_C=25^\circ\text{C}$)	7.5	-6	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	30	-26	A
P_D	Power Dissipation ($T_C=25^\circ\text{C}$)	2.1		W
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		BC020A , DS3710		

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	---	62.5	$^\circ\text{C}/\text{W}$

**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} =30V, 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 =6A	---	---	20	mΩ
		V _{GS} =4.5V, I _D =3A	---	---	30	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.2	1.5	2.5	V
gfs	Forward Transconductance	V _{DS} =10V, I _D =6A	---	13	---	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 =5A (NOTE 2、3)	---	4.1	---	nC
Q _{gs}	Gate-Source Charge		---	1	---	
Q _{gd}	Gate-Drain Charge		---	2.1	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =15V, V _{GS} =10V, R _G =6Ω, I _D =1A (NOTE 2、3)	---	2.6	---	nS
T _r	Rise Time		---	7.2	---	
T _{d(off)}	Turn-Off Delay Time		---	15.8	---	
T _f	Fall Time		---	4.6	---	
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, F=1MHz	---	345	---	pF
C _{oss}	Output Capacitance		---	55	---	
C _{rss}	Reverse Transfer Capacitance		---	32	---	
R _g	Gate resistance	V _{GS} =0V, V _{DS} =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	---	---	7.5	A
I _{SM}	Pulsed Source Current		---	---	15	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

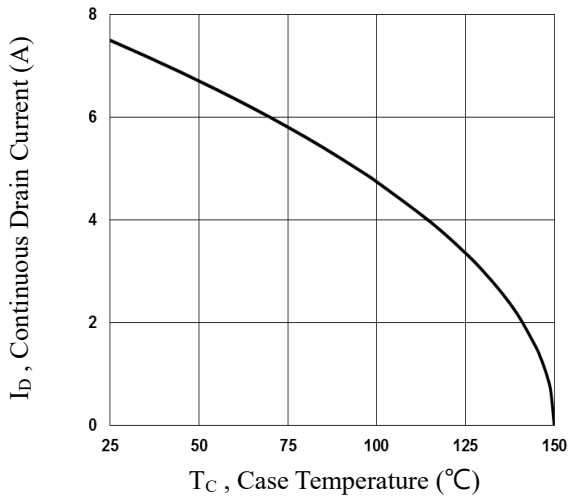


Fig.1 Continuous Drain Current vs. T_c

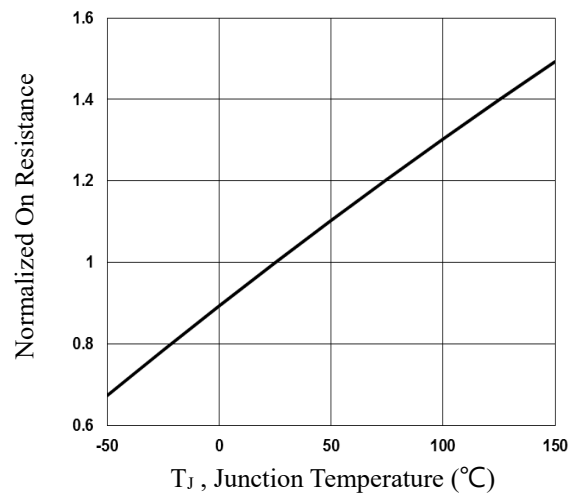


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

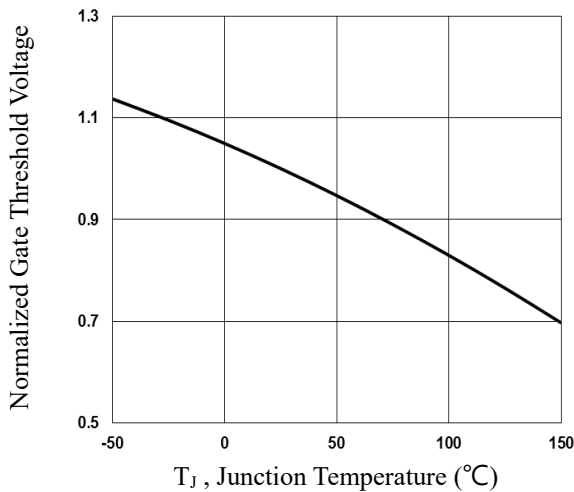


Fig.3 Normalized V_{th} vs. T_j

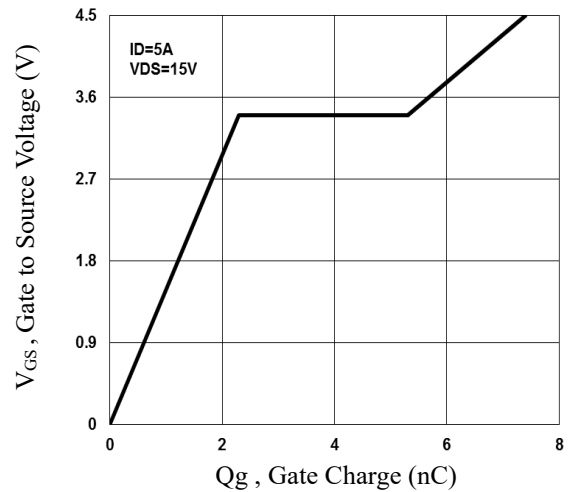


Fig.4 Gate Charge Waveform

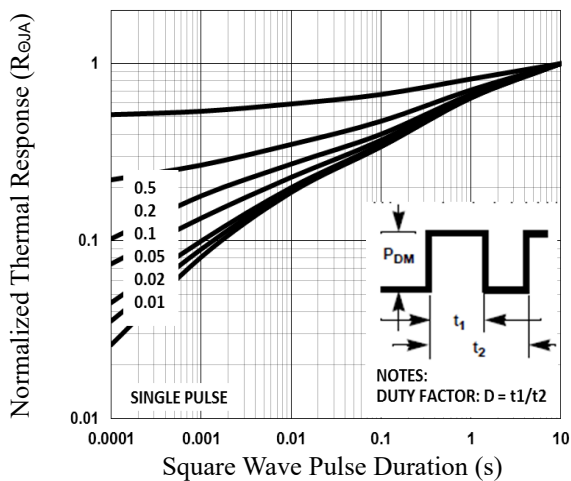


Fig.5 Normalized Transient Response

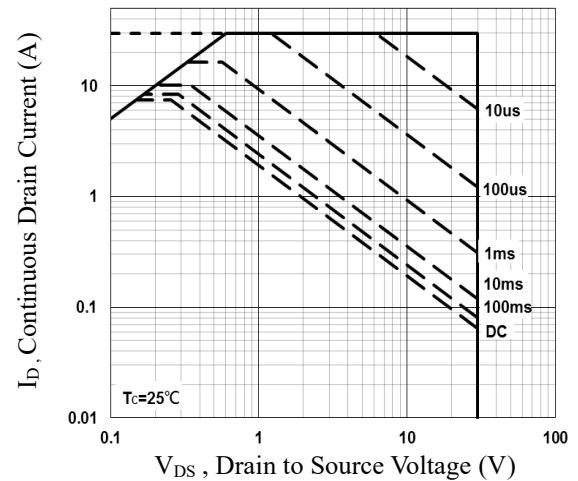


Fig.6 Maximum Safe Operation Area

**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 , 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 = -2.5A	---	---	32	mΩ
		V _{GS} = -4.5V , I _D = -1.2A	---	---	46	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D = -250uA	-1	---	-2.5	V
g _{fs}	Forward Transconductance	V _{DS} = -5V , I _D = -6A	---	10	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q _g	Total Gate Charge	V _{DS} = -20V , V _{GS} = -4.5V , I _D = -6A (NOTE 4、5)	---	9.8	---	nC
Q _{gs}	Gate-Source Charge		---	2.2	---	
Q _{gd}	Gate-Drain Charge		---	3.4	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} = -24V , V _{GS} = -10V , R _G = 3.3Ω , I _D = -1A (NOTE 4、5)	---	16.4	---	nS
T _r	Rise Time		---	20.2	---	
T _{d(off)}	Turn-Off Delay Time		---	55	---	
T _f	Fall Time		---	10	---	
C _{iss}	Input Capacitance	V _{DS} = -15V , V _{GS} = 0V , F= 1MHz	---	930	---	pF
C _{oss}	Output Capacitance		---	148	---	
C _{rss}	Reverse Transfer Capacitance		---	115	---	
R _g	Gate resistance	V _{GS} =0V , V _{DS} =0V , F=1MHz	---	15	---	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	A
I _{SM}	Pulsed Source Current		---	---	-12	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V , I _S = -2.3A , T _J =25°C	---	---	-1.2	V

NOTES :

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



Characteristics Curves

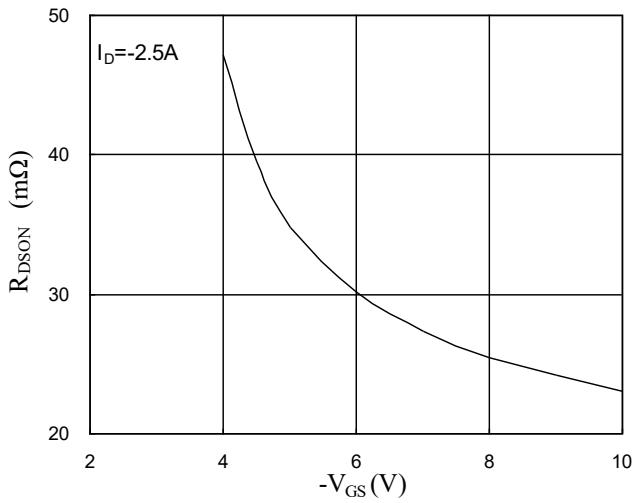


Fig.7 On-Resistance v.s Gate-Source

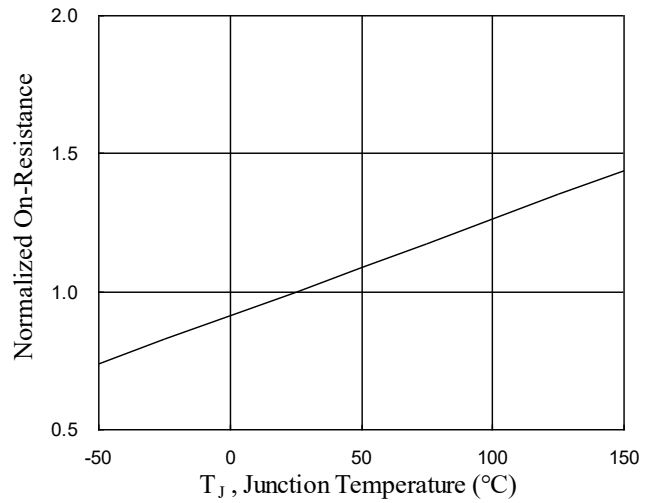


Fig.8 Normalized $R_{DS(on)}$ vs. T_J

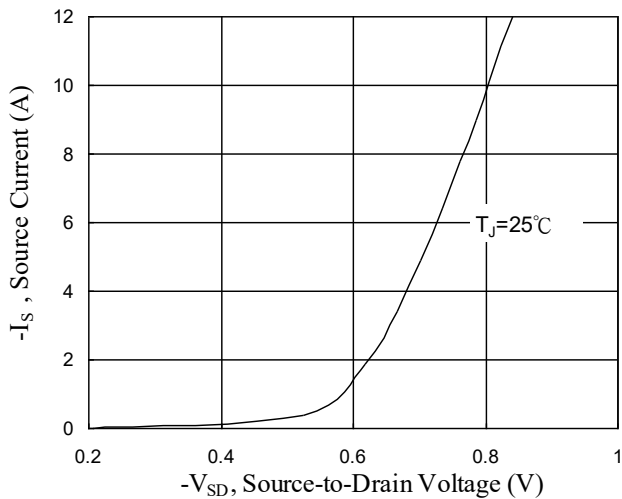


Fig.9 Forward Characteristics

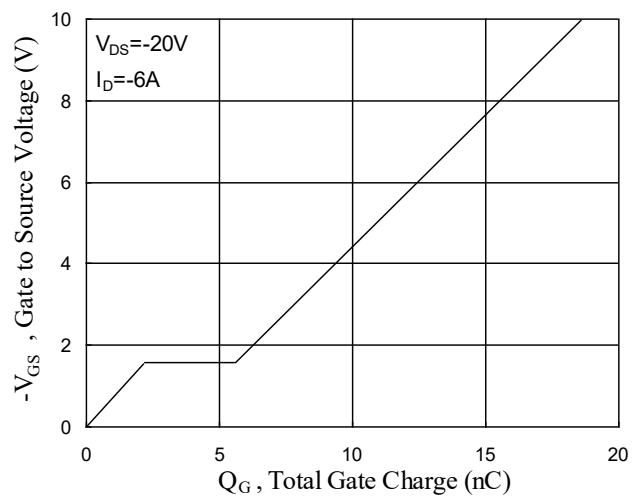


Fig.10 Gate Charge Waveform

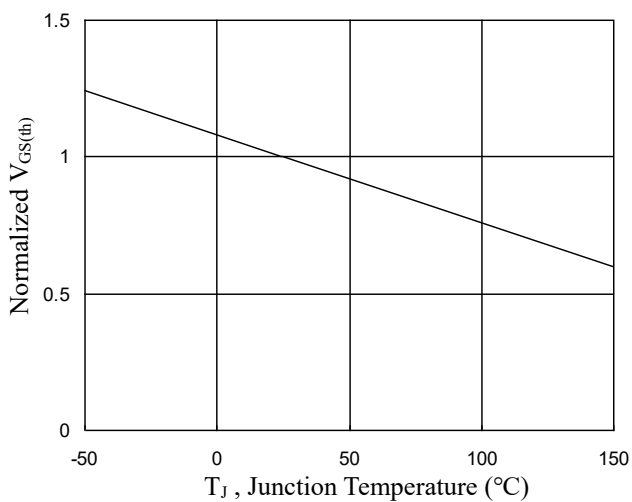


Fig.11 Normalized V_{th} vs. T_J

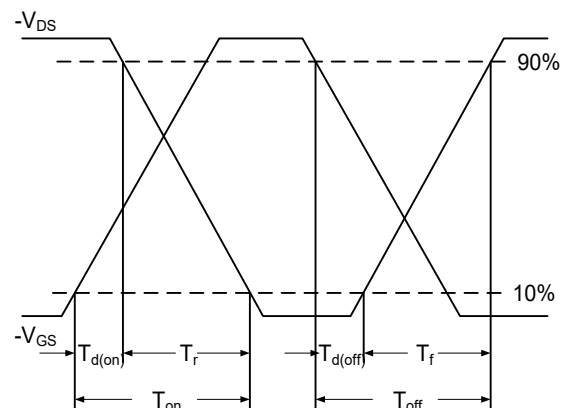


Fig.12 Switching Time Waveform

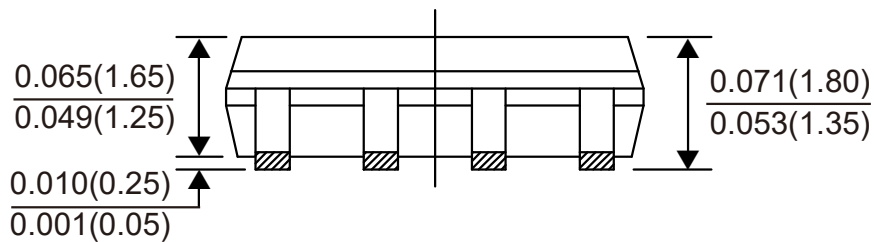
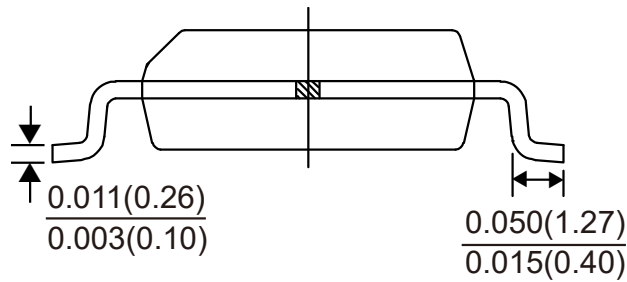
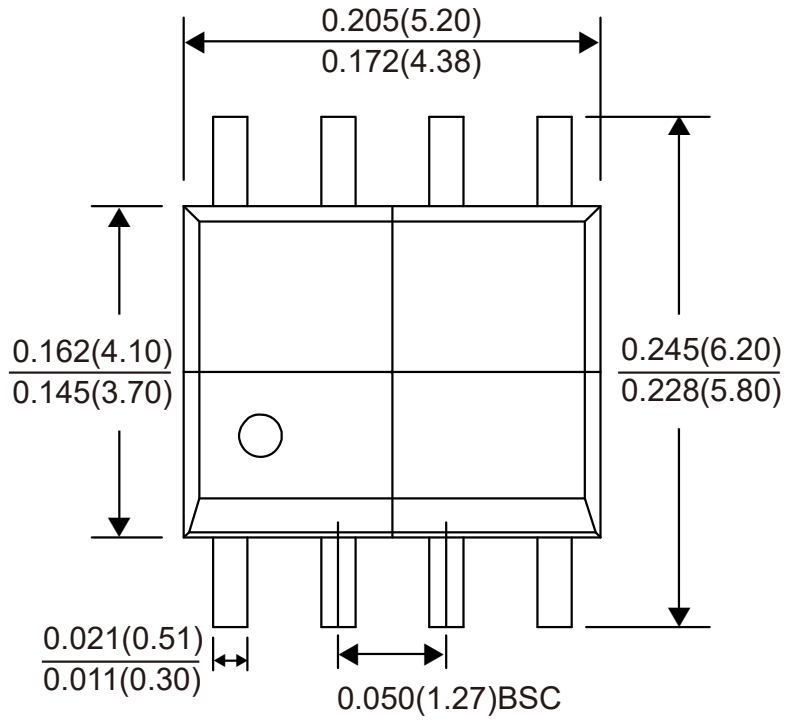


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Package Outline Dimensions



SOP-8

Dimensions in inches and (millimeters)



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