S8MBC021

30V N+P Dual Channel MOSFETs

General Description

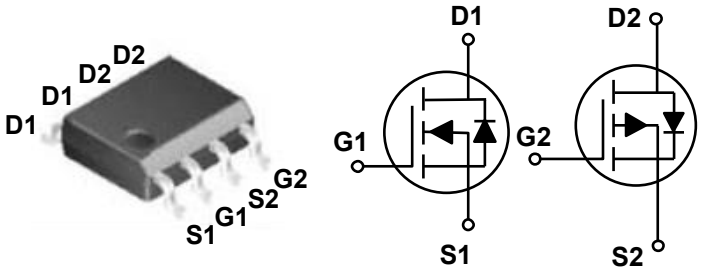
These N+P dual Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.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

BV_{DSS}	$R_{DS(ON)}$	I_D
30 V	21 mΩ	7 A
-30 V	35 mΩ	-6 A

Features

- Fast Switching
- Green Device Available

SOP-8 Pin Configuration



Applications

- DC Fan
- Inverter
- Synchronous Buck

Absolute Maximum Ratings T_A=25°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	7	-6	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	30	-30	A
P_D	Power Dissipation	2		W
T_J	Operating Junction Temperature Range	-55 to 150		°C
T_{STG}	Storage Temperature Range	-55 to 150		°C
Marking Code		BC021 , 3047EM		

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	---	62.5	°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	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	---	---	21	mΩ
		V_{GS}=4.5V , I_D=5A	---	---	31	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=250uA	1.0	---	3.0	V
gfs	Forward Transconductance	V_{DS}=10V , I_D=5A	---	4.6	---	S

Dynamic and Switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge	V_{DS}=24V , V_{GS}=4.5V , I_D=7A	---	10	---	nC
Q_{gs}	Gate-Source Charge		---	2	---	
Q_{gd}	Gate-Drain Charge		---	6	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=15V , V_{GS}=10V , R_{GEN}=3.3 Ω , I_D=1A	---	8	---	nS
T_r	Rise Time		---	7	---	
$T_{d(off)}$	Turn-Off Delay Time		---	20	---	
T_f	Fall Time		---	6	---	
C_{iss}	Input Capacitance	V_{DS}=10V , V_{GS}=0V , F=1MHz	---	1700	---	pF
C_{oss}	Output Capacitance		---	380	---	
C_{rss}	Reverse Transfer Capacitance		---	260	---	

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current		---	---	4.3	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.

Characteristics Curves

FIG. 1-Drain Current

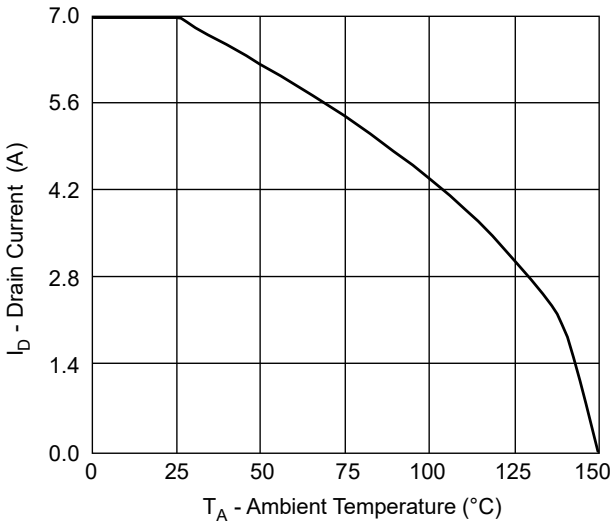


FIG. 2-Normalized $V_{GS(th)}$ vs T_J

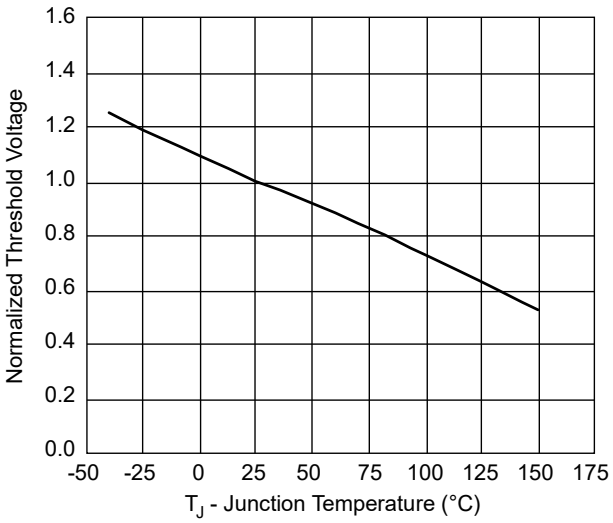


FIG. 2-Normalized $R_{DS(ON)}$ vs T_J

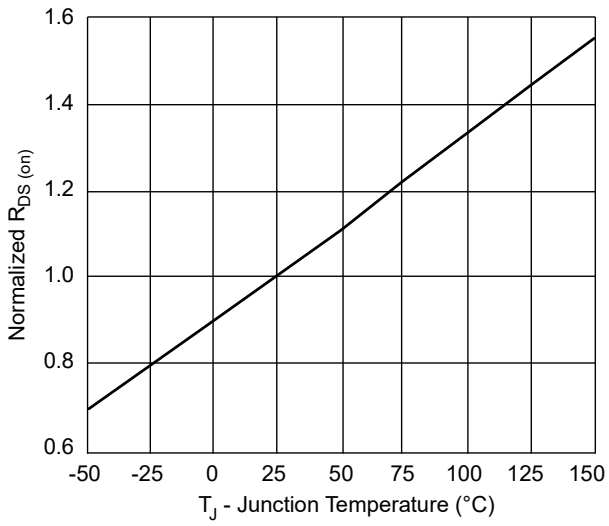


FIG. 4-Transfer Characteristics

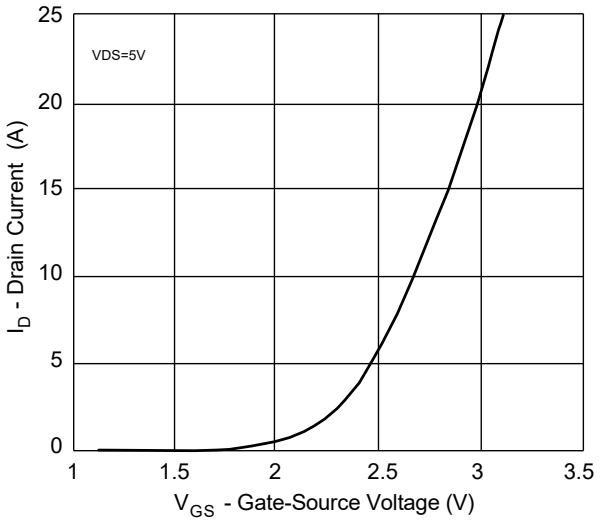
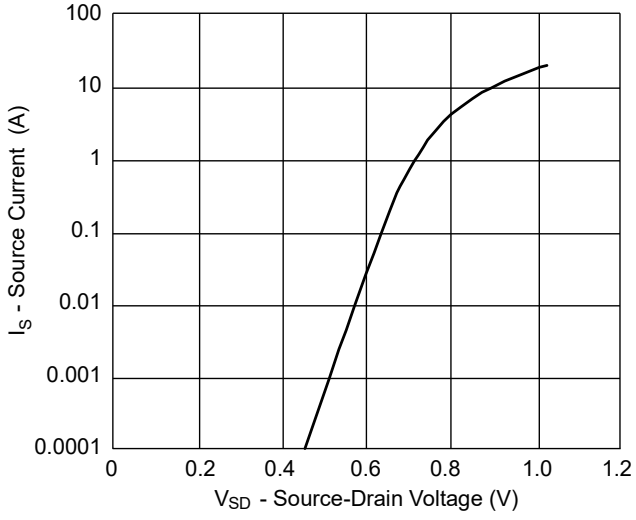


FIG. 5-Forward Characteristics



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}= -30V , 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= -5A	---	---	35	mΩ
		V_{GS}= -4.5V , I_D= -4A	---	---	55	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D= -250uA	-1.0	---	-3.0	V
gfs	Forward Transconductance	V_{DS}= -10V , I_D= -5A	---	4.9	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge	V_{DS}= -24V , V_{GS}= -4.5V , I_D= -6A	---	9	---	nC
Q_{gs}	Gate-Source Charge		---	2	---	
Q_{gd}	Gate-Drain Charge		---	6	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}= -15V , V_{GS}= -10V , R_{GEN}= 3.3Ω , I_D= -1A	---	10	---	nS
T_r	Rise Time		---	8	---	
$T_{d(off)}$	Turn-Off Delay Time		---	25	---	
T_f	Fall Time		---	13	---	
C_{iss}	Input Capacitance	V_{DS}= -10V , V_{GS}= 0V , F= 1MHz	---	970	---	pF
C_{oss}	Output Capacitance		---	370	---	
C_{rss}	Reverse Transfer Capacitance		---	180	---	

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current		---	---	-2.6	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S= -2.6A	---	---	-1.3	V

NOTES：

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

5. Essentially independent of operating temperature.

Characteristics Curves

FIG. 6-Drain Current

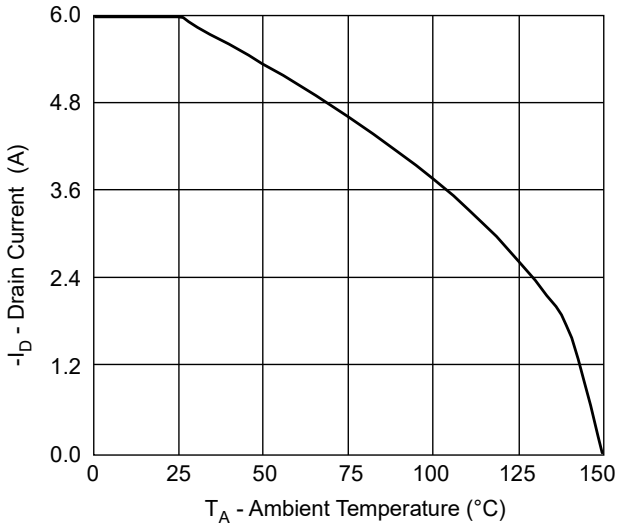


FIG. 7-Normalized $V_{GS(th)}$ vs T_J

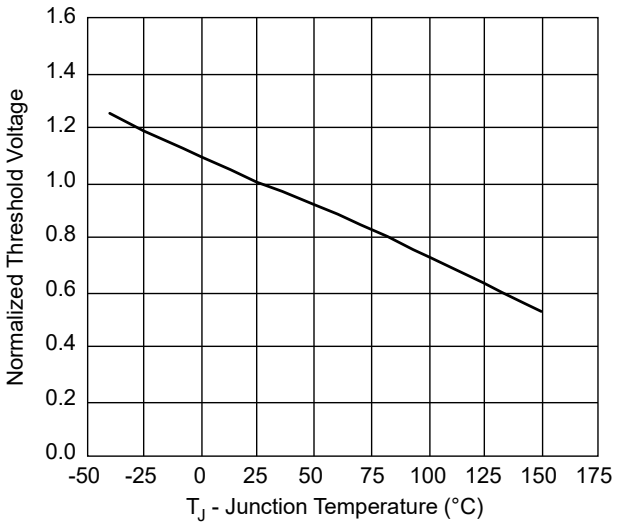


FIG. 8-Normalized $R_{DS(ON)}$ vs T_J

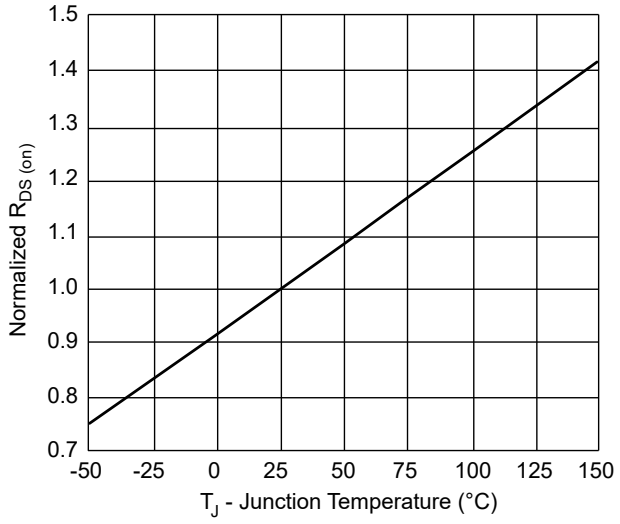


FIG. 9-Transfer Characteristics

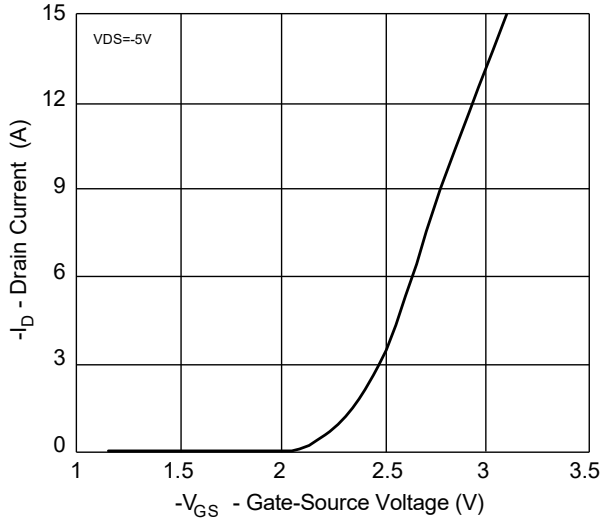
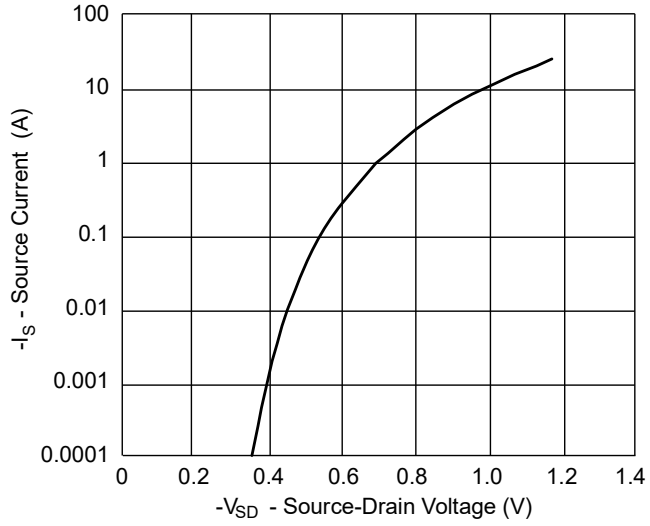
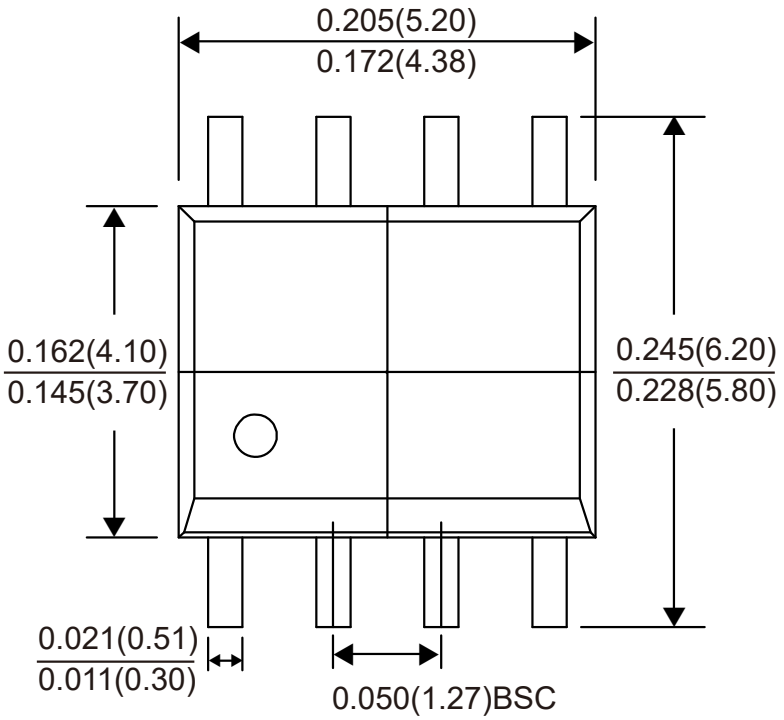
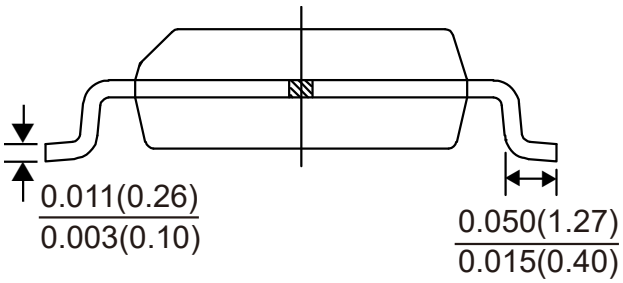


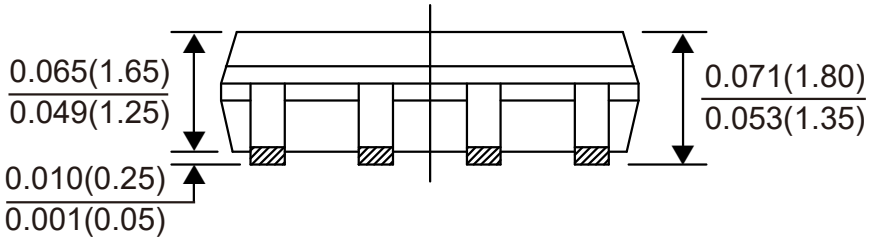
FIG. 10-Forward Characteristics



Package Outline Dimensions







SOP-8

Dimensions in inches and (millimeters)

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