P3MBC013A

30V N+P Dual Channel MOSFETs

General Description

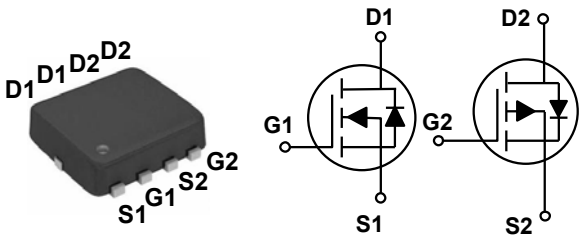
These N+P dual Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.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

BV_{DSS}	$R_{DS(ON)}$	I_D
30 V	13 mΩ	28 A
-30 V	25 mΩ	-19.7 A

Features

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

PPAK3x3 Dual Pin Configuration



Applications

- Wireless Charging
- Boost Driver
- Brushless Motor

Absolute Maximum Ratings T_C=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 (T_C=25°C)	28	-19.7	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	84	-59.1	A
EAS	Single Pulse Avalanche Energy	60	60	mJ
P_D	Power Dissipation (T_C=25°C)	25		W
T_J	Operating Junction Temperature Range	-55 to 150		°C
T_{STG}	Storage Temperature Range	-55 to 150		°C

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	62	°C/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	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}=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=15A	---	---	13	mΩ
		V_{GS}=4.5V , I_D=10A	---	---	16	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=250uA	1.2	---	2.5	V

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=15A	---	9.8	---	nC
Q_{gs}	Gate-Source Charge		---	4.2	---	
Q_{gd}	Gate-Drain Charge		---	3.6	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=15V , V_{GS}=10V , R_G=3.3Ω , I_D=15A	---	4	---	nS
T_r	Rise Time		---	8	---	
$T_{d(off)}$	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	---	
Rg	Gate Resistance	V_{GS}=0V , V_{DS}=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	---	---	28	A
I_{SM}	Pulsed Source Current		---	---	56	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. The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation.

Characteristics Curves

FIG. 1-Output Characteristics

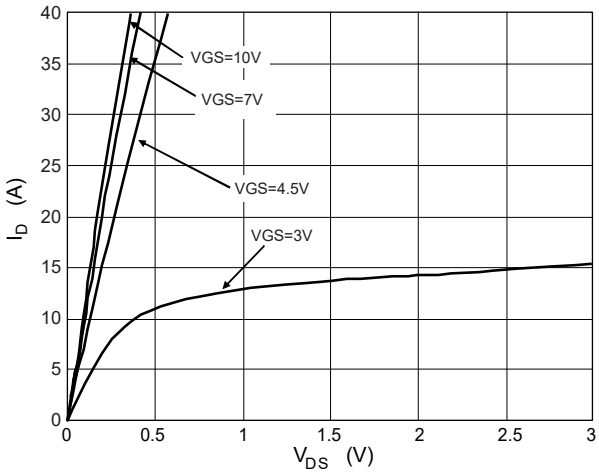


FIG. 2-$R_{DS(ON)}$ vs. V_{GS}

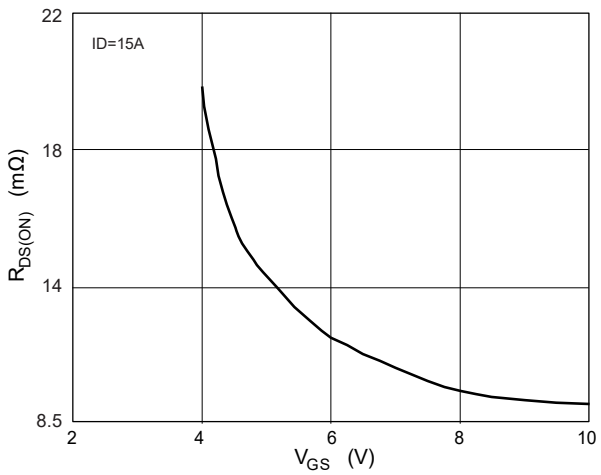


FIG. 3-I_S vs. V_{SD}

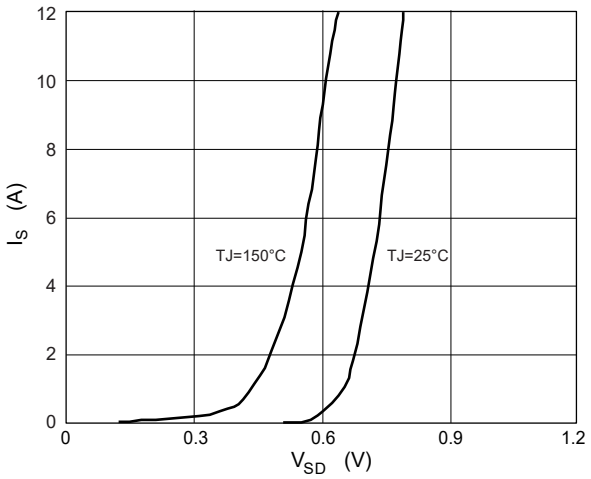


FIG. 4-Gate Charge Characteristics

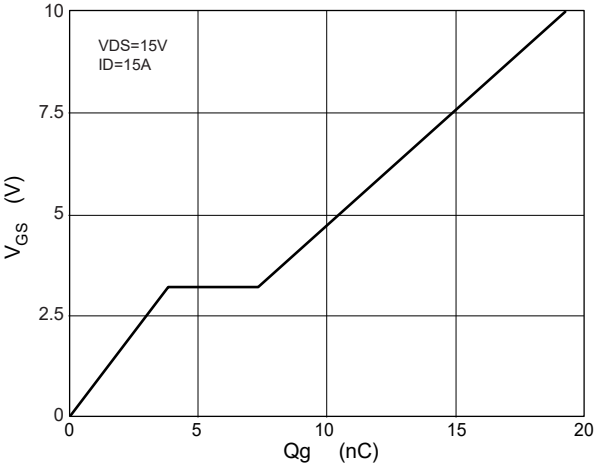


FIG. 5-Normalized $R_{DS(ON)}$ vs. T_J

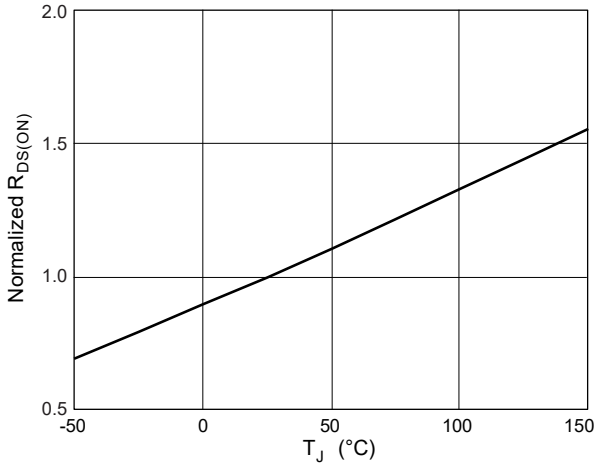
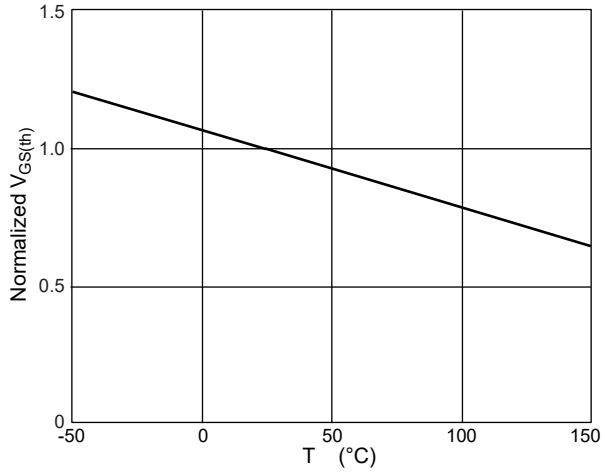


FIG. 6-Normalized $V_{GS(th)}$ vs. T_J



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= -15A	---	---	25	mΩ
		V_{GS}= -4.5V , I_D= -10A	---	---	38	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D= -250uA	-1.0	---	-2.5	V

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	---	

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	---	---	-19.7	A
I_{SM}	Pulsed Source Current		---	---	-39.4	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S= -1A , T_J=25°C	---	---	-1.2	V

NOTES：

4. Repetitive Rating：Pulsed width limited by maximum junction temperature.
5. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
6. The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation.

Characteristics Curves

FIG. 7-Output Characteristics

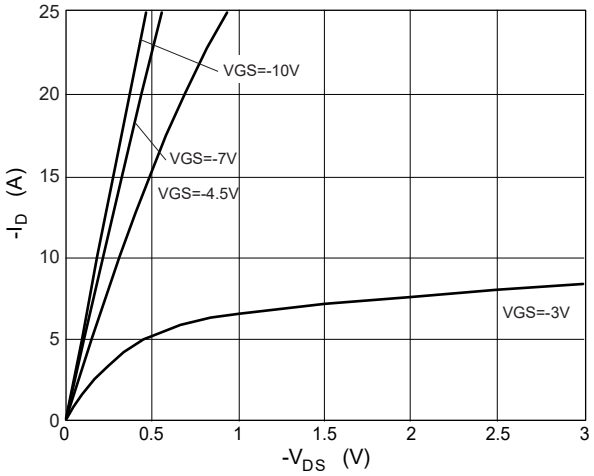


FIG. 8-$R_{DS(ON)}$ vs. V_{GS}

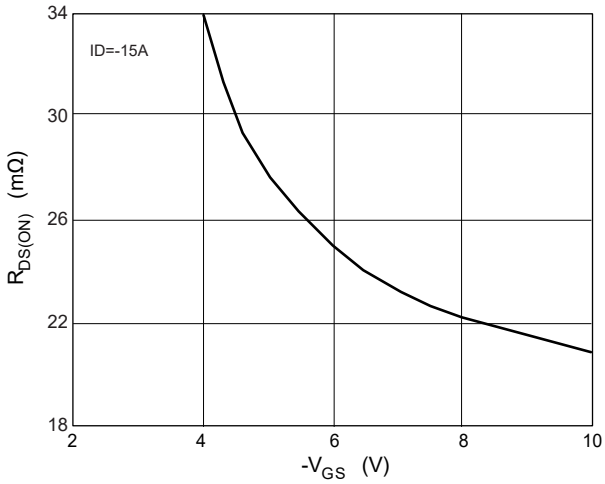


FIG. 9-I_S vs. V_{SD}

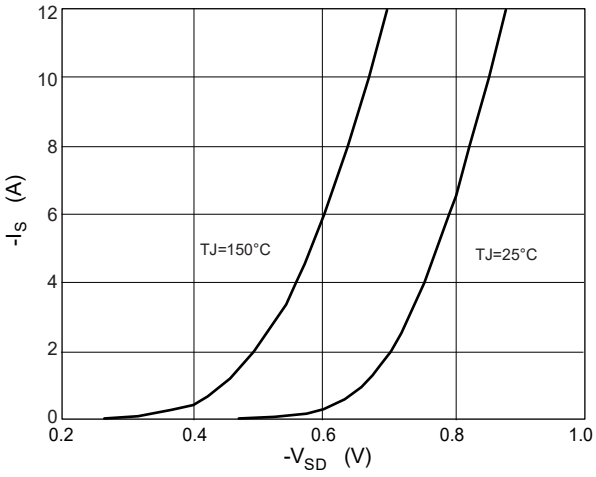


FIG. 10-Gate Charge Characteristics

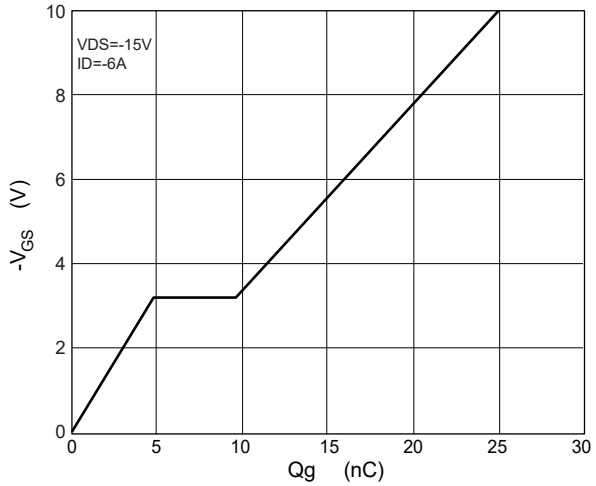


FIG. 11-Normalized $R_{DS(ON)}$ vs. T_J

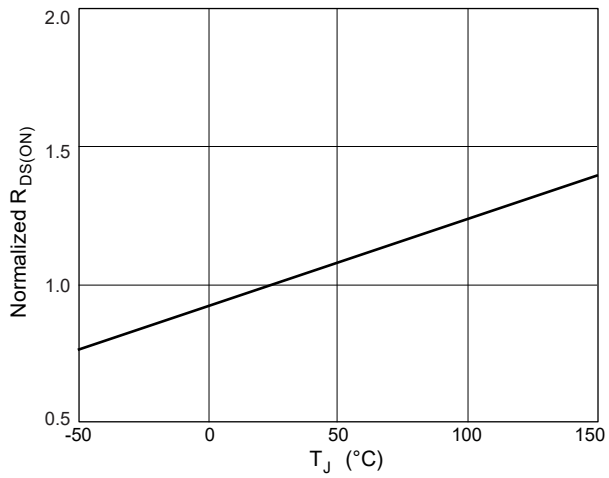
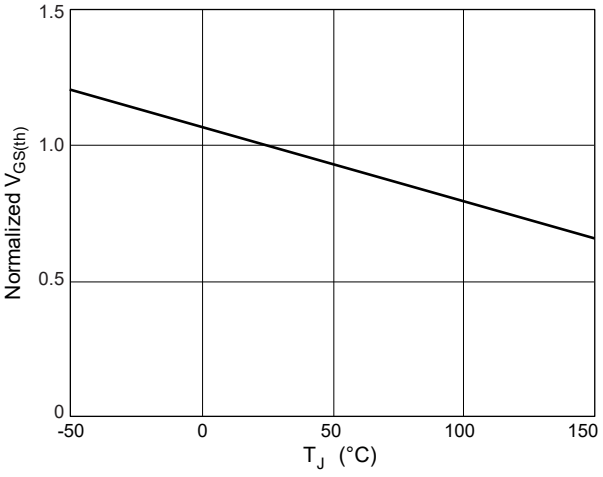
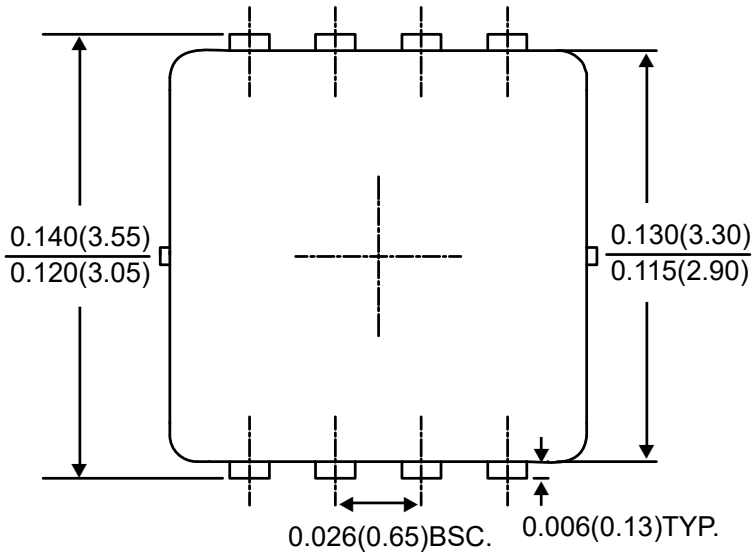
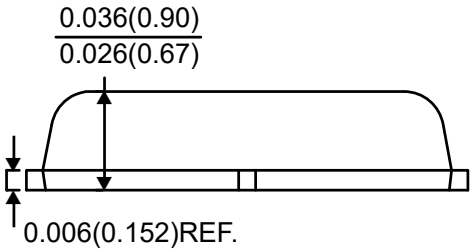


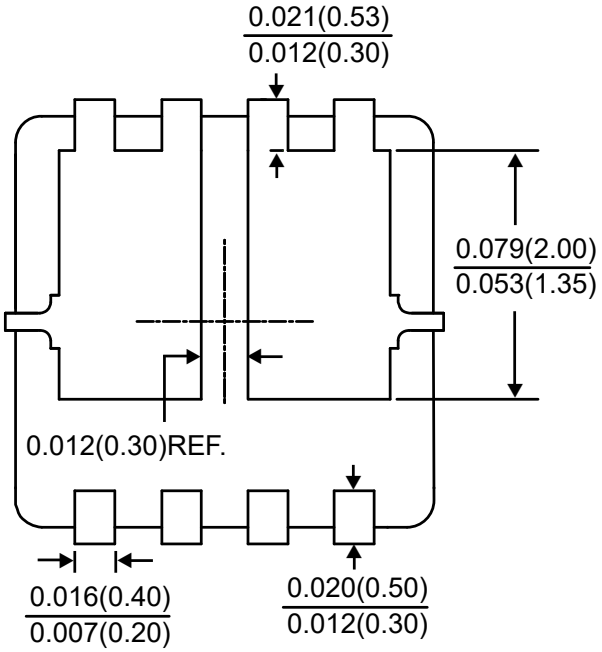
FIG. 12-Normalized $V_{GS(th)}$ vs. T_J

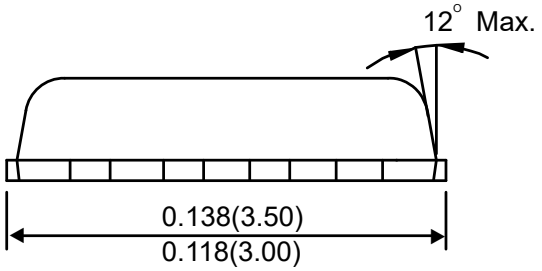


Package Outline Dimensions









PPAK3x3 Dual

Dimensions in inches and (millimeters)

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