



30V N+P Dual Channel MOSFETs

General Description

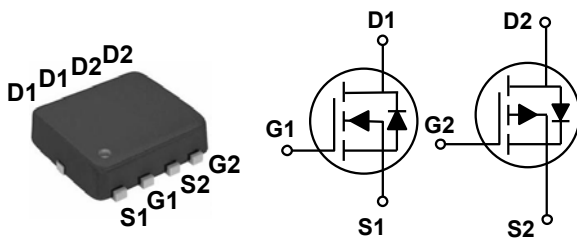
These N+P dual Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.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

BV _{DSS}	R _{DS(ON)}	I _D
30 V	11 mΩ	30 A
-30 V	22 mΩ	-20 A

Features

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

PPAK3x3 Dual Pin Configuration



Applications

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

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)	30	-20	A
	Drain Current - Continuous (T _C =100°C)	19	-13	A
I _{DM}	Drain Current - Pulsed (NOTE 1)	120	-80	A
EAS	Single Pulse Avalanche Energy (NOTE 2 · 6)	11.25	11.25	mJ
IAS	Single Pulse Avalanche Current (NOTE 2)	15	-15	A
P _D	Power Dissipation (T _C =25°C)	22		W
	Power Dissipation - Derate above 25°C	0.18		W/°C
T _J	Operating Junction Temperature Range	-55 to 150		°C
T _{STG}	Storage Temperature Range	-55 to 150		°C
Marking Code		DC3708V		

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
R _{θJA}	Thermal Resistance Junction to Ambient	---	62.5	°C/W
R _{θJC}	Thermal Resistance Junction to Case	---	5.6	°C/W



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N Channel Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30	---	---	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=30V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=8A$	---	---	11	m Ω
		$V_{GS}=4.5V, I_D=6A$	---	---	17.6	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.0	1.6	2.5	V
gfs	Forward Transconductance	$V_{DS}=10V, I_D=3A$	---	6	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge	$V_{DS}=15V, V_{GS}=10V, I_D=15A$ (NOTE 3 & 4)	---	11.5	---	nC
Q_{gs}	Gate-Source Charge		---	2	---	
Q_{gd}	Gate-Drain Charge		---	3	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=15V, V_{GS}=10V, R_G=6\Omega,$ $I_D=15A$ (NOTE 3 & 4)	---	5	---	nS
T_r	Rise Time		---	13	---	
$T_{d(off)}$	Turn-Off Delay Time		---	28	---	
T_f	Fall Time		---	8.5	---	
C_{iss}	Input Capacitance	$V_{DS}=15V, V_{GS}=0V, F=1\text{MHz}$	---	850	---	pF
C_{oss}	Output Capacitance		---	130	---	
C_{rss}	Reverse Transfer Capacitance		---	80	---	
R_g	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	---	2.9	---	Ω

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{SD}	Diode Forward Voltage	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	---	1	V
T_{rr}	Reverse Recovery Time	$V_R=30V, I_S=10A,$	---	120	---	nS
Q_{rr}	Reverse Recovery Charge	$di/dt=100A/\mu s, T_J=25^\circ\text{C}$	---	150	---	nC

NOTES :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $V_{DD}=25V, V_{GS}=10V, L=0.1\text{mH}, I_{AS}=15A, R_G=25\Omega,$ Starting $T_J=25^\circ\text{C}$.
3. The data tested by pulsed, pulse width $\leq 300\mu s,$ duty cycle $\leq 2\%$.
4. Essentially independent of operating temperature.



Characteristics Curves

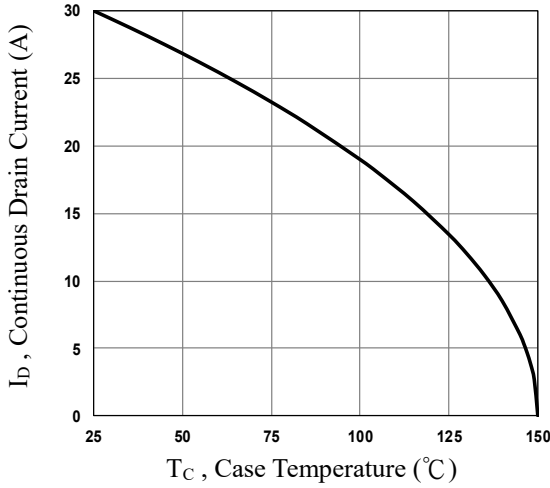


Fig.1 Continuous Drain Current vs. T_c

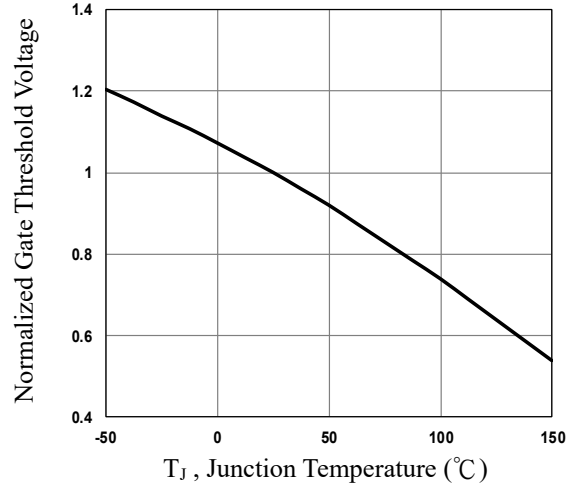


Fig.2 Normalized V_{th} vs. T_j

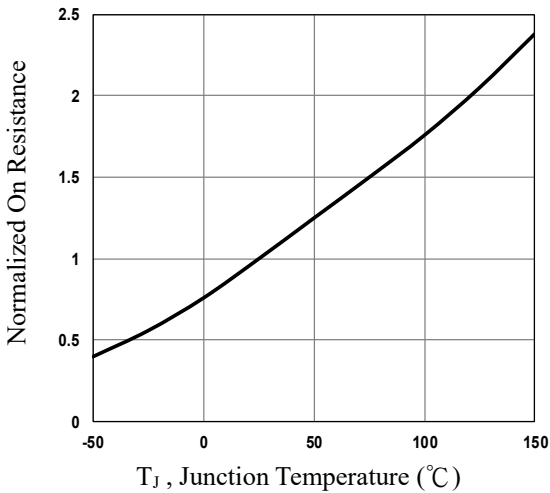


Fig.3 Normalized $R_{DS(on)}$ vs. T_j

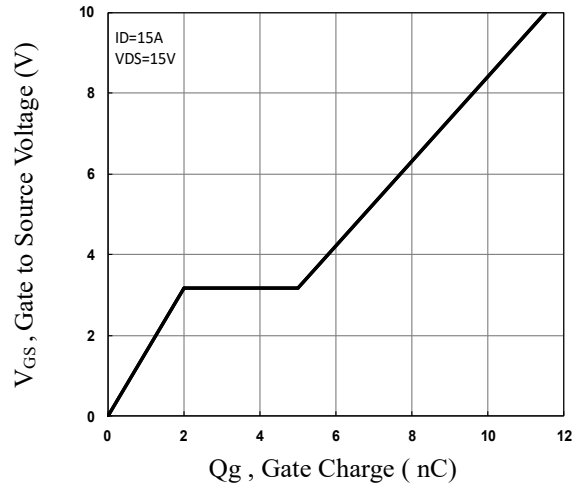


Fig.4 Gate Charge Characteristics

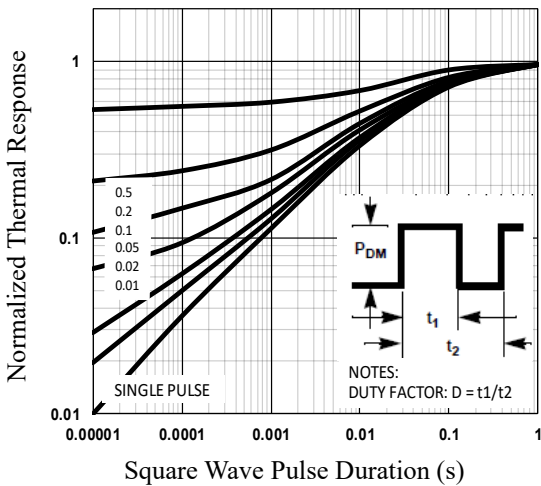


Fig.5 Normalized Transient Impedance

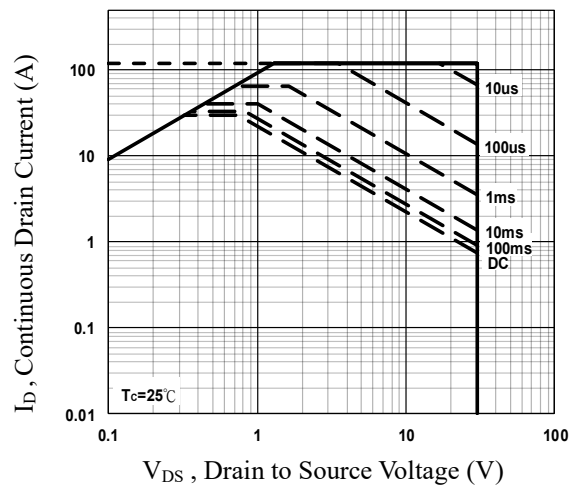


Fig.6 Maximum Safe Operation Area



30V N+P Dual Channel MOSFETs

P Channel Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu\text{A}$	-30	---	---	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-30V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	-1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=-10V, I_D=-5A$	---	---	22	m Ω
		$V_{GS}=-4.5V, I_D=-3A$	---	---	32	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu\text{A}$	-1.0	-1.6	-2.5	V
gfs	Forward Transconductance	$V_{DS}=-10V, I_D=-3A$	---	7	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge	$V_{DS}=-15V, V_{GS}=-10V, I_D=-10A$ (NOTE 7 & 8)	---	18.5	---	nC
Q_{gs}	Gate-Source Charge		---	2.5	---	
Q_{gd}	Gate-Drain Charge		---	4.3	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=-15V, V_{GS}=-10V, R_G=6\Omega, I_D=-10A$ (NOTE 7 & 8)	---	7.2	---	nS
T_r	Rise Time		---	38	---	
$T_{d(off)}$	Turn-Off Delay Time		---	34	---	
T_f	Fall Time		---	8.2	---	
C_{iss}	Input Capacitance	$V_{DS}=-15V, V_{GS}=0V, F=1\text{MHz}$	---	1100	---	pF
C_{oss}	Output Capacitance		---	175	---	
C_{rss}	Reverse Transfer Capacitance		---	130	---	
R_g	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	---	6	---	Ω

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{SD}	Diode Forward Voltage	$V_{GS}=0V, I_S=-1A, T_J=25^\circ\text{C}$	---	---	-1	V
T_{rr}	Reverse Recovery Time	$V_R=-30V, I_S=-10A,$	---	150	---	nS
Q_{rr}	Reverse Recovery Charge	$di/dt=100A/\mu\text{s}, T_J=25^\circ\text{C}$	---	260	---	nC

NOTES :

5. Repetitive Rating : Pulsed width limited by maximum junction temperature.
6. $V_{DD}=-25V, V_{GS}=-10V, L=0.1\text{mH}, I_{AS}=-15A, R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$.
7. The data tested by pulsed, pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
8. Essentially independent of operating temperature.



Characteristics Curves

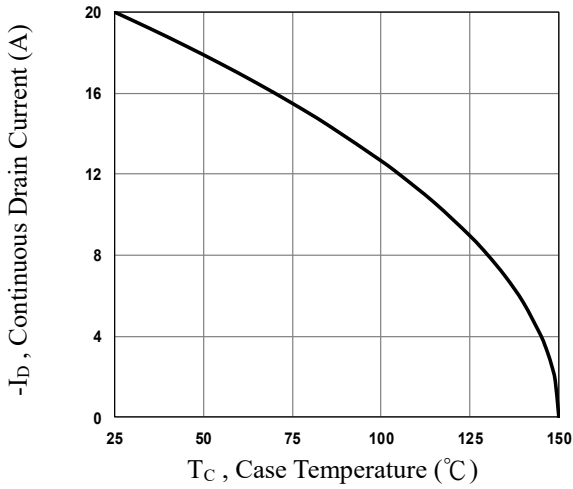


Fig.7 Continuous Drain Current vs. T_c

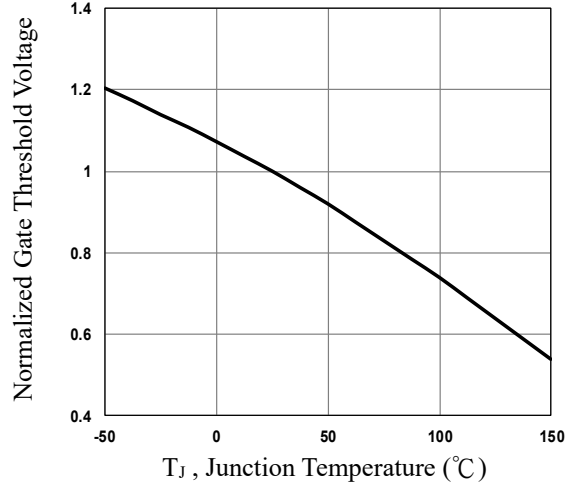


Fig.8 Normalized V_{th} vs. T_j

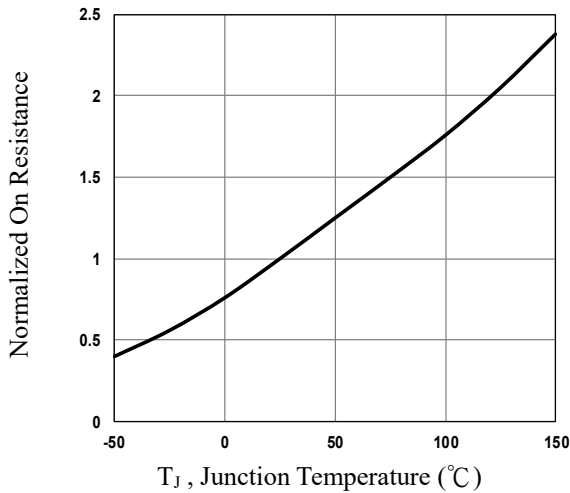


Fig.9 Normalized $R_{DS(on)}$ vs. T_j

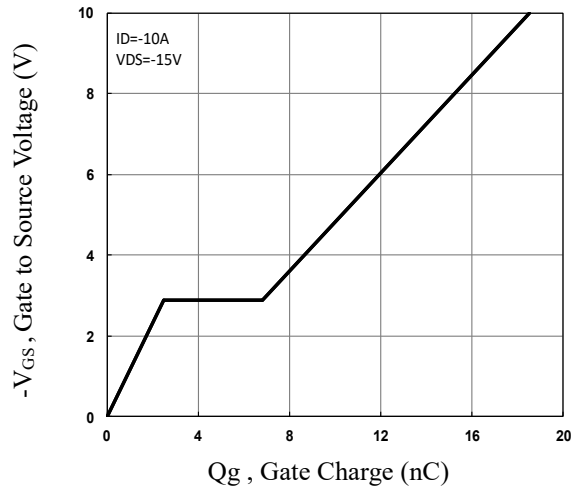


Fig.10 Gate Charge Characteristics

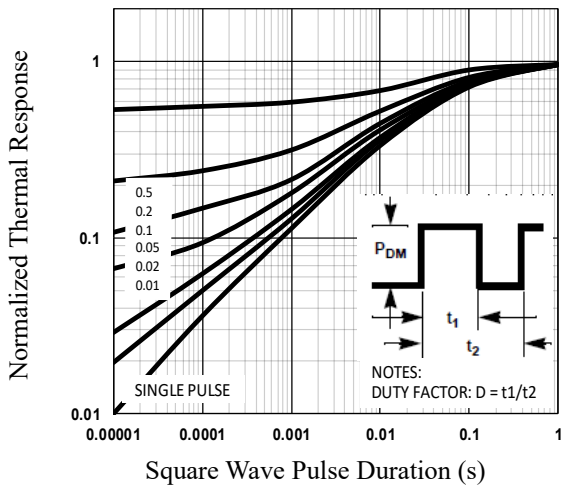


Fig.11 Normalized Transient Impedance

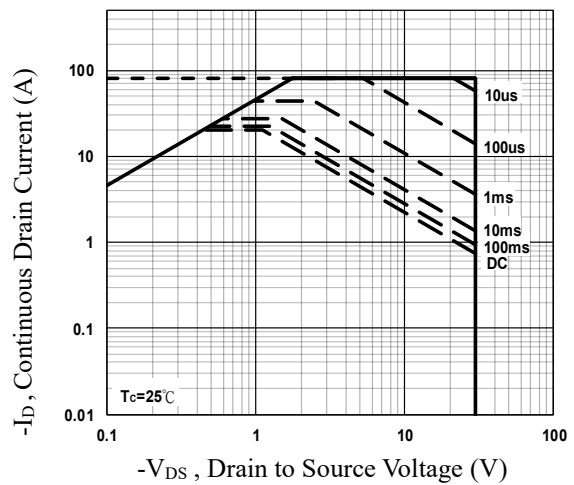


Fig.12 Maximum Safe Operation Area

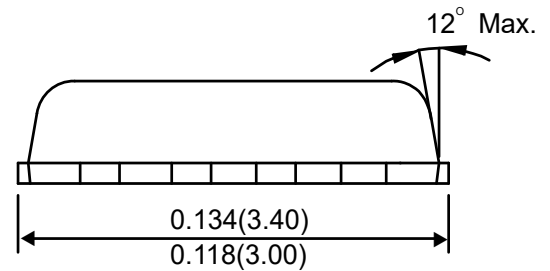
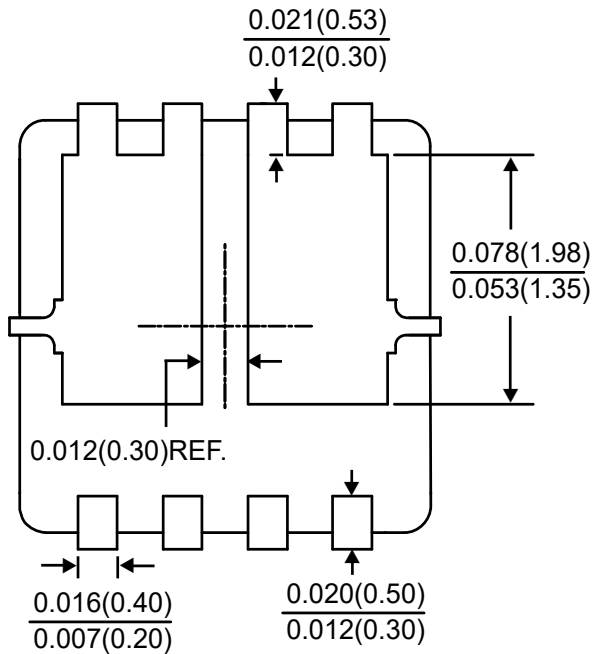
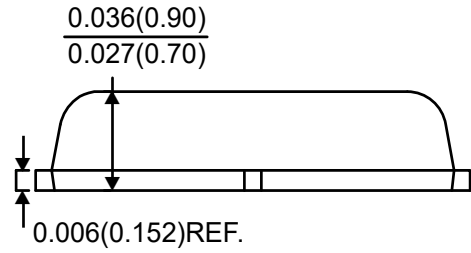
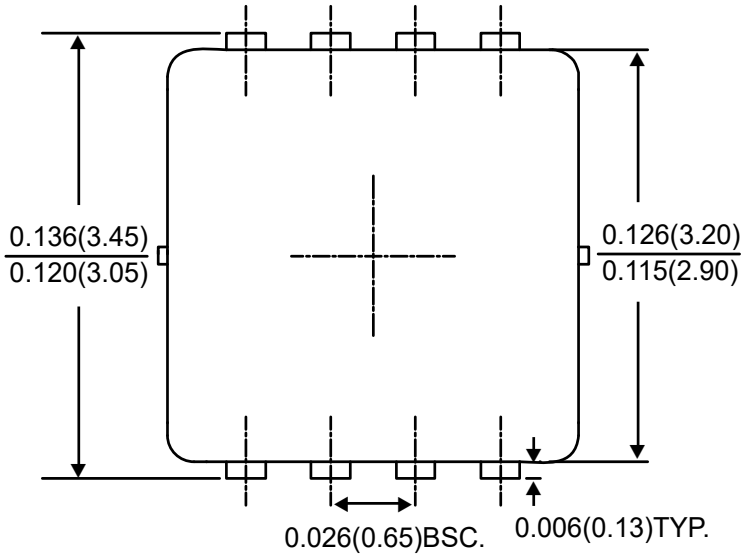


P3MBC011



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Package Outline Dimensions



PPAK3x3 Dual

Dimensions in inches and (millimeters)



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