

● General Description

The AGM414MBP combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$.

This device is ideal for load switch and battery protection applications.

● Features

- Advance high cell density Trench technology
- Low $R_{DS(ON)}$ to minimize conductive loss
- Low Gate Charge for fast switching
- Low Thermal resistance
- 100% Avalanche tested
- 100% DVDS tested

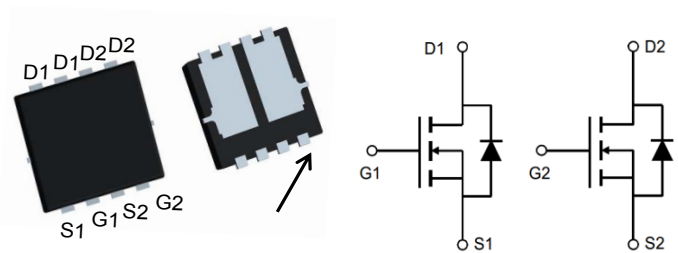
● Application

- MB/VGA Vcore
- SMPS 2nd Synchronous Rectifier
- POL application
- BLDC Motor driver

Product Summary

BVDSS	RDS(ON)	ID
40V	13mΩ	22A

PDFN3.3*3.3 Pin Configuration



Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM414MBP	AGM414MBP	PDFN3.3*3.3	330mm	12mm	5000

Table 1. Absolute Maximum Ratings ($T_A=25^\circ\text{C}$)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage ($V_{GS}=0V$)	40	V
V_{GS}	Gate-Source Voltage ($V_{DS}=0V$)	± 20	V
I_D	Drain Current-Continuous($T_C=25^\circ\text{C}$) (Note 1)	20	A
	Drain Current-Continuous($T_C=100^\circ\text{C}$)	15	A
IDM (pluse)	Drain Current-Continuous@ Current-Pulsed (Note 2)	80	A
P_D	Total Power Dissipation($T_C=25^\circ\text{C}$)	35	W
	Total Power Dissipation($T_C=100^\circ\text{C}$)	14	W
EAS	Avalanche energy (Note 3)	15	mJ
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150	$^\circ\text{C}$

Table 2. Thermal Characteristic

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient (Steady State) ¹	---	50	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	3.5	$^\circ\text{C/W}$

Table 3. N- Channel Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BVDSS	Drain-Source Breakdown Voltage	VGS=0V ID=250μA	40	--	--	V
IDSS	Zero Gate Voltage Drain Current	VDS=40V, VGS=0V	--	--	1	μA
IGSS	Gate-Body Leakage Current	VGS=±20V, VDS=0V	--	--	±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS, ID=250μA	1.0	1.7	2.5	V
gFS	Forward Transconductance	VDS=5V, ID=10A	--	4	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=10V, ID=15A	--	13	18	mΩ
		VGS=4.5V, ID=10A	--	19	26	mΩ
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=15V, VGS=0V, F=1MHZ	--	475	--	pF
Coss	Output Capacitance		--	75	--	pF
Crss	Reverse Transfer Capacitance		--	45	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V, f=1.0MHz	--	--	--	Ω
Switching Times						
td(on)	Turn-on Delay Time	VGS=10V, VDS=15V, ID=10A, RGEN=6.8Ω	--	6.0	--	nS
tr	Turn-on Rise Time		--	12	--	nS
td(off)	Turn-Off Delay Time		--	18	--	nS
tf	Turn-Off Fall Time		--	7.0	--	nS
Qg	Total Gate Charge	VGS=10V, VDS=15V, ID=10A	--	13	--	nC
Qgs	Gate-Source Charge		--	3.5	--	nC
Qgd	Gate-Drain Charge		--	2.5	--	nC
Source-Drain Diode Characteristics						
ISD	Source-Drain Current(Body Diode)		--	--	22	A
VSD	Forward on Voltage	VGS=0V, IS=15A	--	0.86	1.2	V
trr	Reverse Recovery Time	IF=15A , di/dt=100A/μs , TJ=25°C	--	19	--	ns
Qrr	Reverse Recovery Charge		--	26	--	nc

Notes 1. The maximum current rating is package limited.

Notes 2. Repetitive Rating: Pulse width limited by maximum junction temperature

Notes 3. EAS condition: T_J=25°C

Typical Characteristics

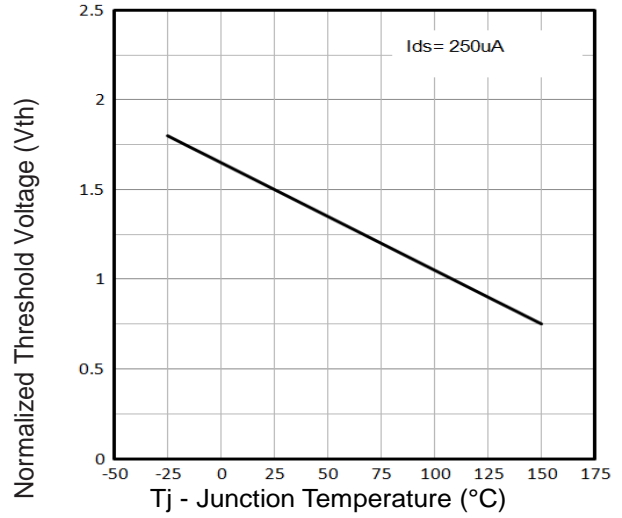
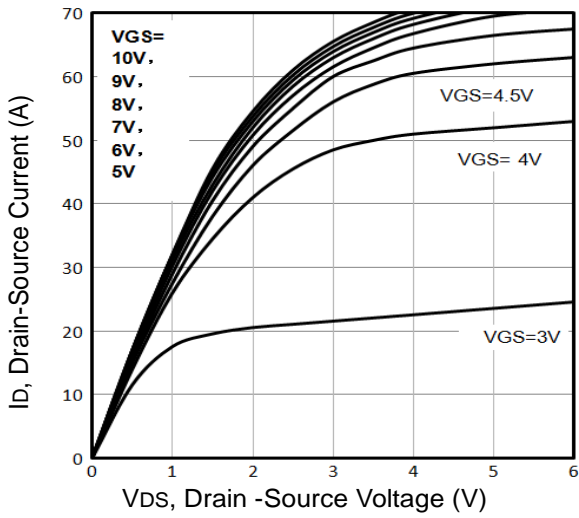


Fig1. Typical Output Characteristics

Fig2. Normalized Threshold Voltage Vs. Temperature

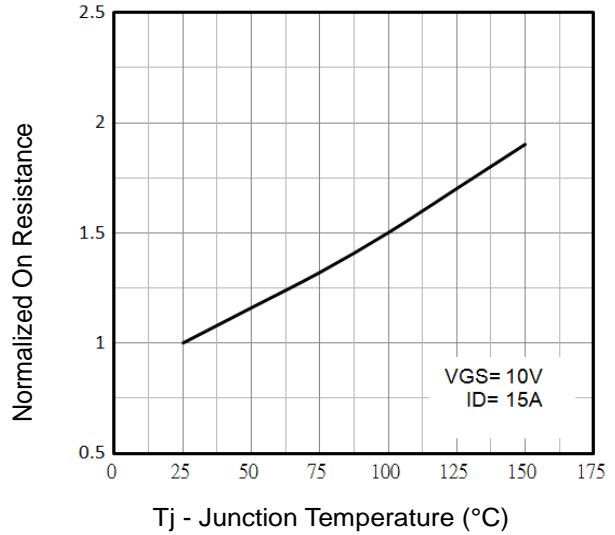
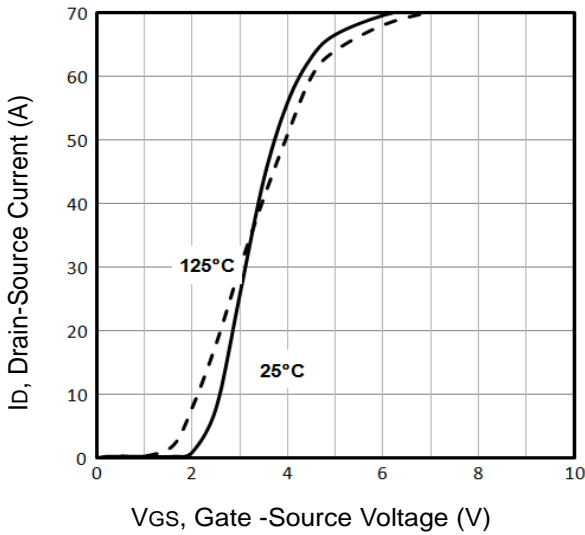


Fig3. Typical Transfer Characteristics

Fig4. Normalized On-Resistance Vs. Temperature

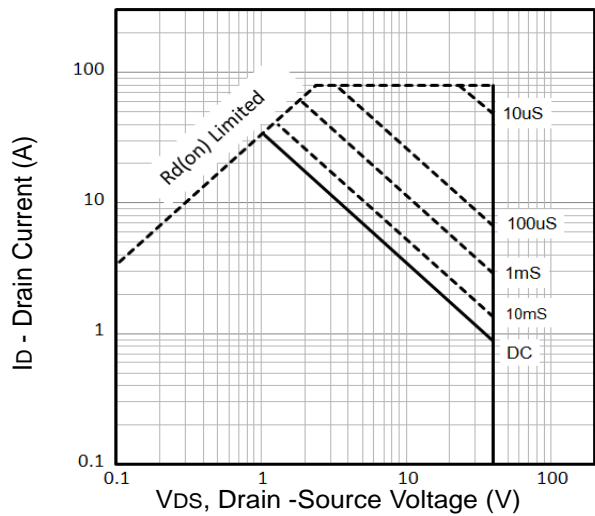
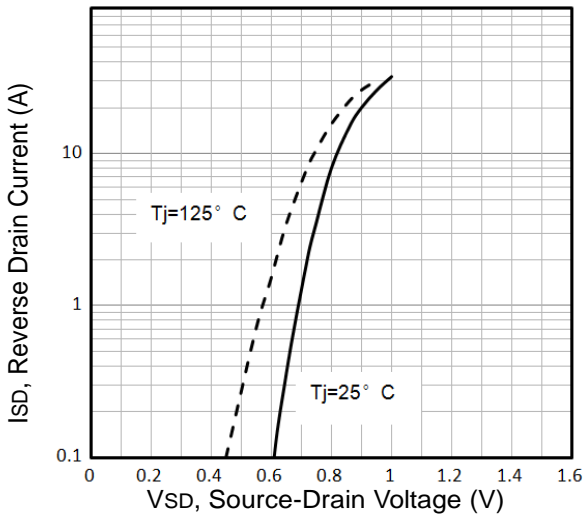


Fig5. Typical Source-Drain Diode Forward Voltage

Fig6. Maximum Safe Operating Area

Typical Characteristics

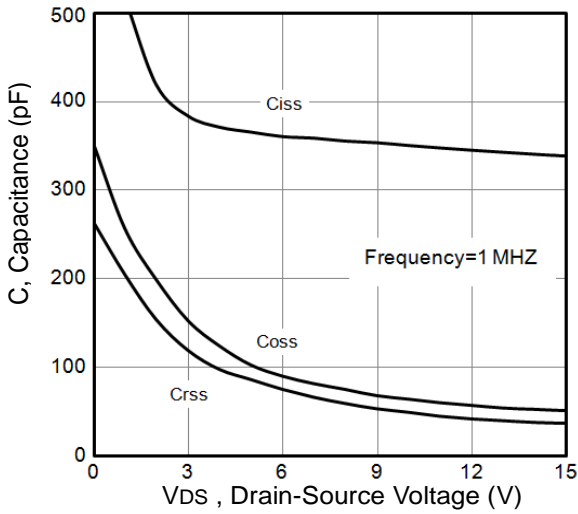


Fig7. Typical Capacitance Vs. Drain-Source Voltage

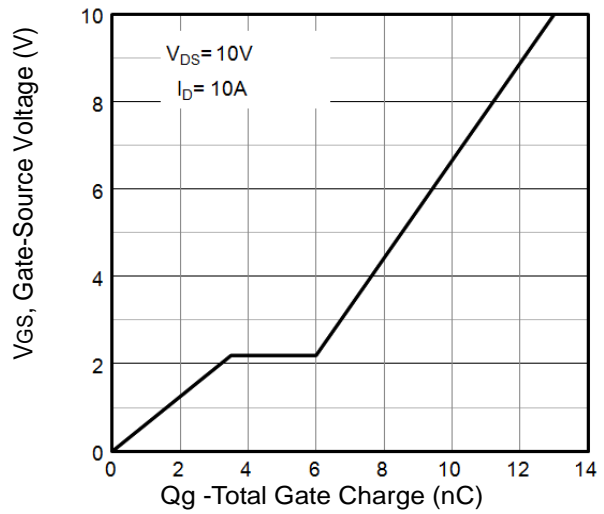


Fig8. Typical Gate Charge Vs. Gate-Source

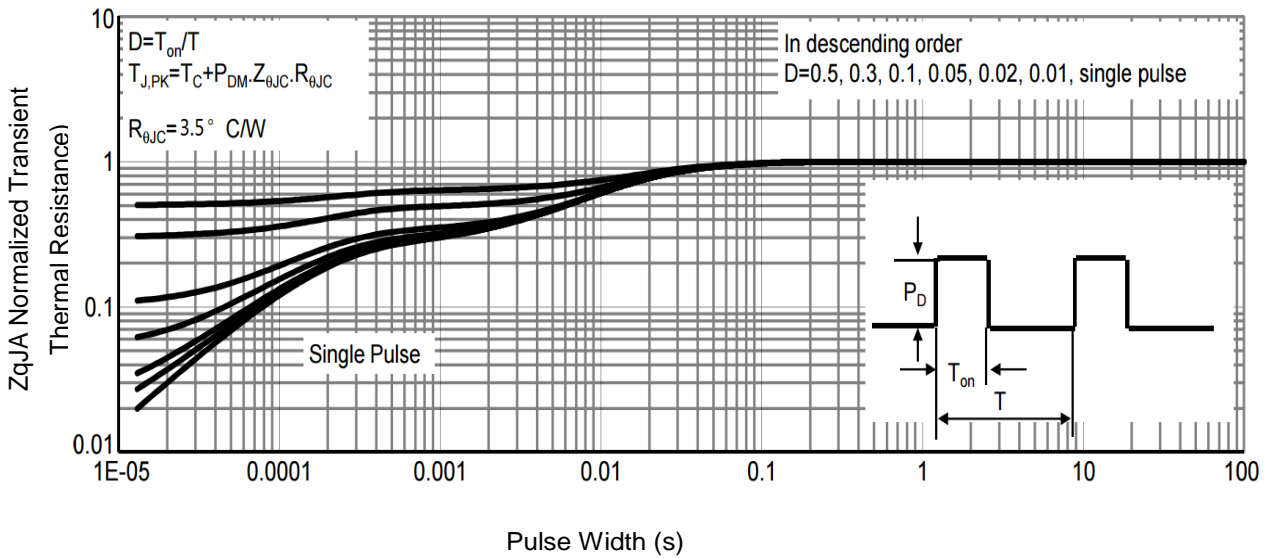


Fig 9 . Normalized Maximum Transient Thermal Impedance

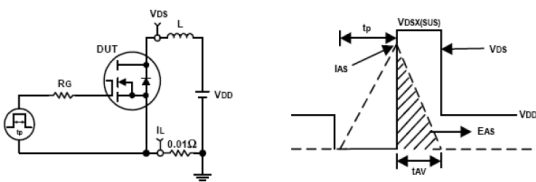


Fig10. Unclamped Inductive Test Circuit and waveforms

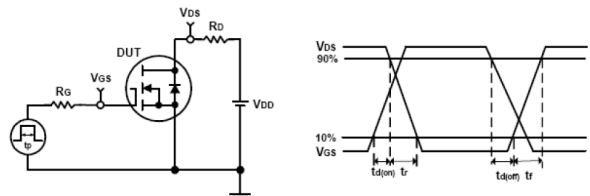
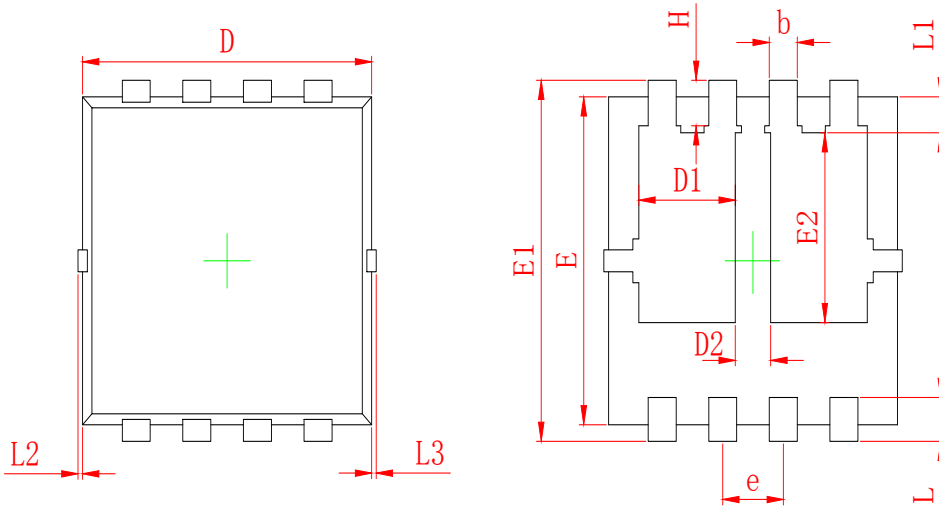
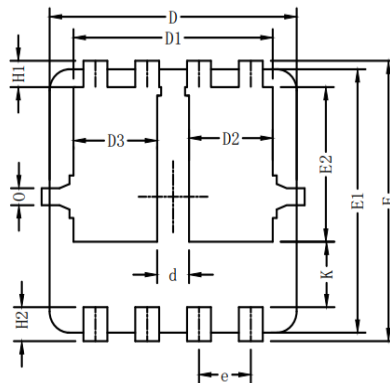
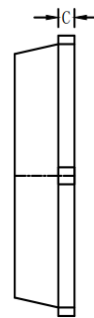
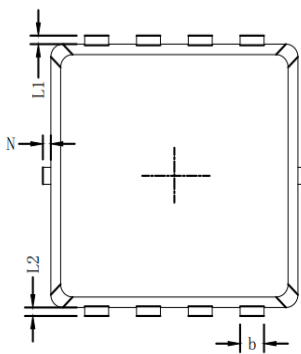
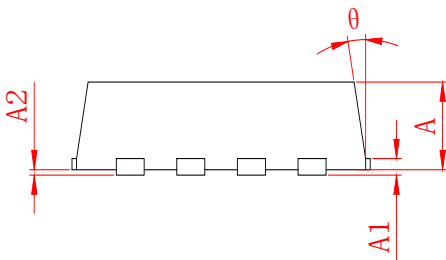


Fig11. Switching Time Test Circuit and waveforms

•Dimensions (PDFN3.3×3.3)


SYMBOL	MILLIMETER	
	MIN	MAX
A	0.700	0.900
A1	0.152 REF.	
A2	0°~0.05	
D	3.000	3.200
D1	0.935	1.135
D2	0.280	0.480
E	2.900	3.100
E1	3.150	3.450
E2	1.535	1.935
b	0.200	0.400
e	0.550	0.750
L	0.300	0.500
L1	0.180	0.480
L2	0°~0.100	
L3	0°~0.100	
H	0.315	0.515
θ	8°	12°



Symbols	Millimeters		
	MIN.	NOM.	MAX.
A	0.65	0.75	0.85
b	0.25	0.30	0.35
C	0.15	0.20	0.25
D	3.00	3.10	3.20
D1	2.40	2.50	2.60
D2/D3	1.00	1.05	1.10
d	0.30	0.40	0.50
E	3.20	3.30	3.40
E1	3.00	3.10	3.20
E2	1.72	1.82	1.92
e	0.65 BSC.		
H1	0.21	0.31	0.41
H2	0.30	0.40	0.50
K	0.67	0.77	0.87
L1/L2	0.10 REF.		
θ	11°	12°	13°
N	0	-	0.15
o	0.2 REF.		


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