

• General Description

The AGM403A1 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

• Application

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

Product Summary

BVDSS	RDSON	ID
40V	2.7mΩ	120A

PRPAK5X6 Pin Configuration

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM403A1	AGM403A1	PDFN5*6	325mm	16mm	3000

Table 1. Absolute Maximum Ratings (T_A=25°C)

Symbol	Parameter	Value	Unit
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°C) (Note 1)	120	A
	Drain Current-Continuous(T _c =100°C)	72	A
I _{DM (pluse)}	Drain Current-Continuous@ Current-Pulsed (Note 2)	420	A
P _D	Maximum Power Dissipation(T _c =25°C)	105	W
	Maximum Power Dissipation(T _c =100°C)	41	W
E _{AS}	Avalanche energy (Note 3)	360	mJ
T _J , T _{STG}	Operating Junction and Storage Temperature Range	-55 To 150	°C

Table 2. Thermal Characteristic

Symbol	Parameter	Typ	Max	Unit
R _{θJA}	Thermal Resistance Junction-ambient (Steady State) ¹	---	45	°C/W
R _{θJC}	Thermal Resistance Junction-Case ¹	---	1.2	°C/W

Table 3. Electrical Characteristics (TA=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	40			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =40V, V _{GS} =0V			1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±20V, V _{DS} =0V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1.1	1.5	2.1	V
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =20A		16		S
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =10V, I _D =20A		2.7	3.6	mΩ
		V _{GS} =4.5V, I _D =15A		3.4	4.6	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, F=1MHZ		3000		pF
C _{oss}	Output Capacitance			370		pF
C _{rss}	Reverse Transfer Capacitance			170		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1.0MHz		1.7		Ω
Switching Times						
t _{d(on)}	Turn-on Delay Time	V _{GS} =10V, V _{DS} =15V, R _L =0.75Ω, R _{GEN} =3.3Ω		6.9		nS
t _r	Turn-on Rise Time			1.7		nS
t _{d(off)}	Turn-Off Delay Time			30		nS
t _f	Turn-Off Fall Time			15		nS
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =20V, I _D =12A		20		nC
Q _{gs}	Gate-Source Charge			9		nC
Q _{gd}	Gate-Drain Charge			11		nC
Source-Drain Diode Characteristics						
I _S	Continuous Source Current	V _G =V _D =0V, Force Current			120	A
V _{SD}	Forward on Voltage	V _{GS} =0V, I _S =20A			1.2	V

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, V_{DD}=20V, V_G=10V, R_G=25Ω

Fig.1 Power Dissipation

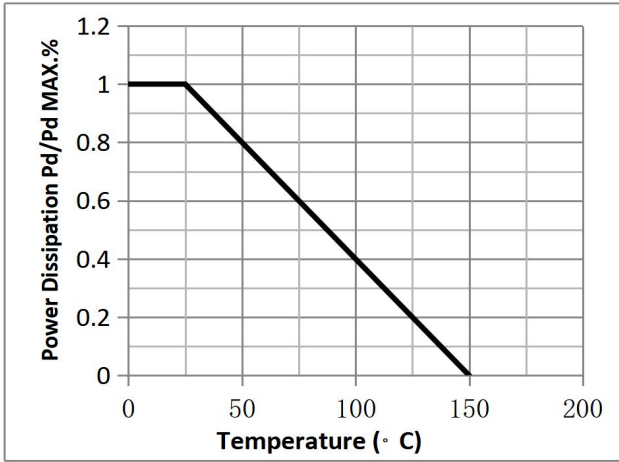


Fig.2 Typical output Characteristics

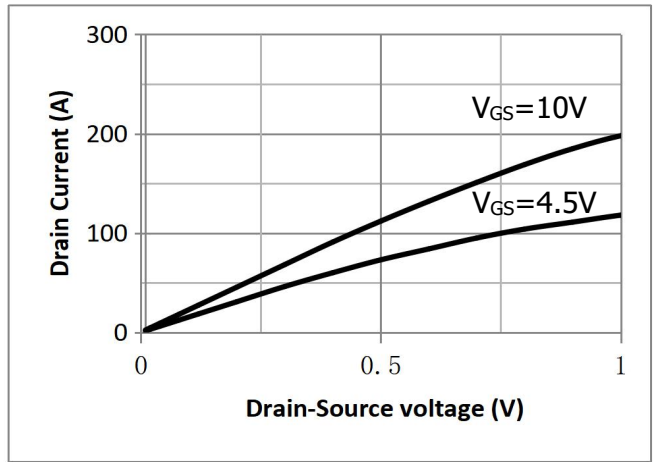


Fig.3 Threshold Voltage V.S Junction Temperature

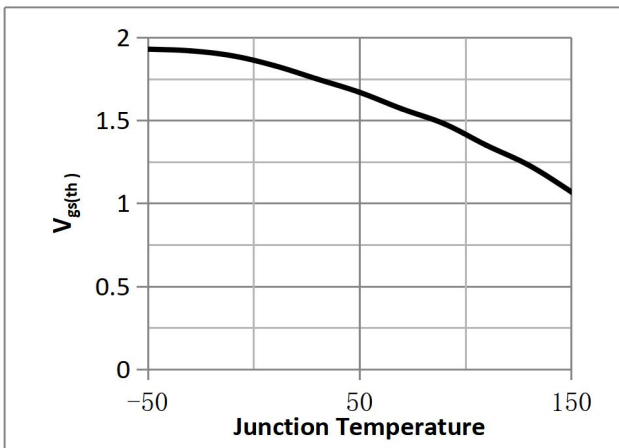


Fig.4 Resistance V.S Drain Current

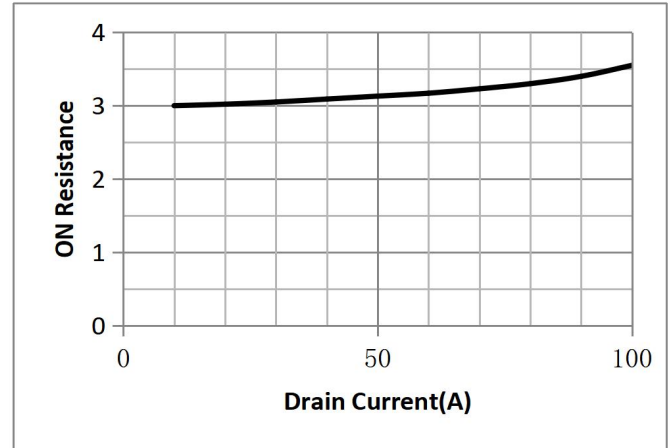


Fig.5 On-Resistance VS Gate Source Voltage

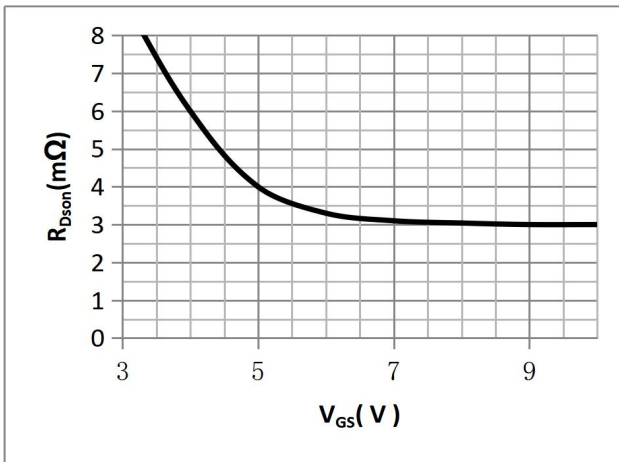


Fig.6 On-Resistance V.S Junction Temperature

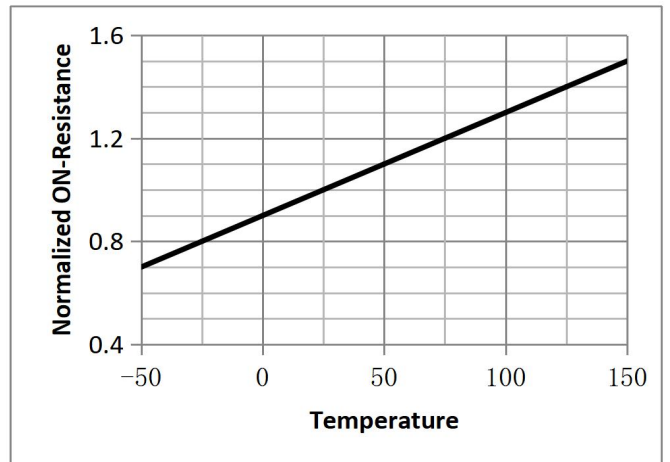


Fig.7 Switching Time Measurement Circuit

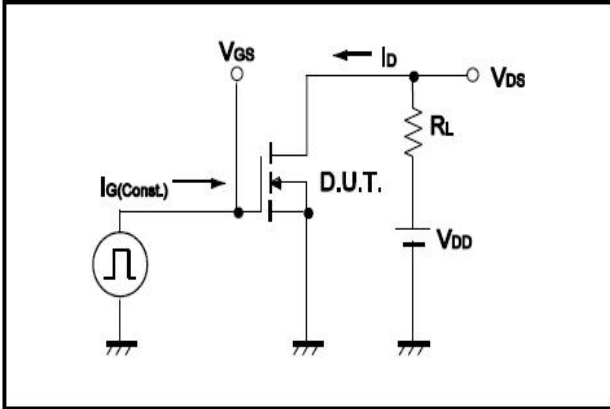


Fig.8 Gate Charge Waveform

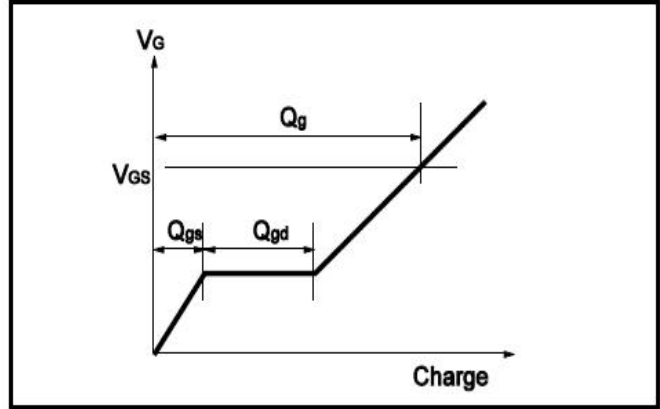


Fig.9 Switching Time Measurement Circuit

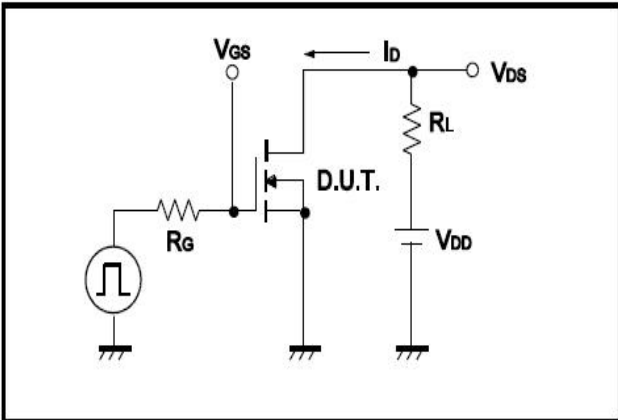


Fig.10 Gate Charge Waveform

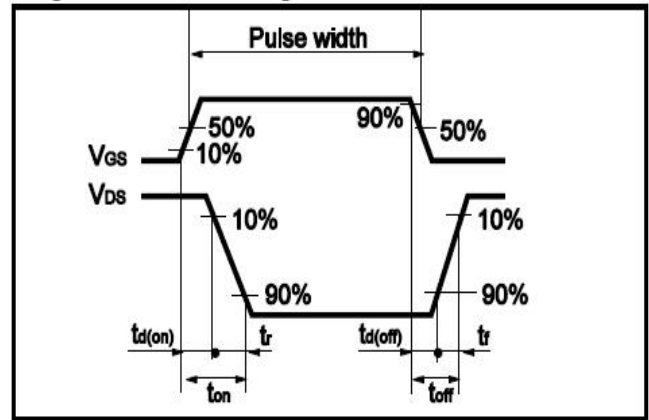


Fig.11 Avalanche Measurement Circuit

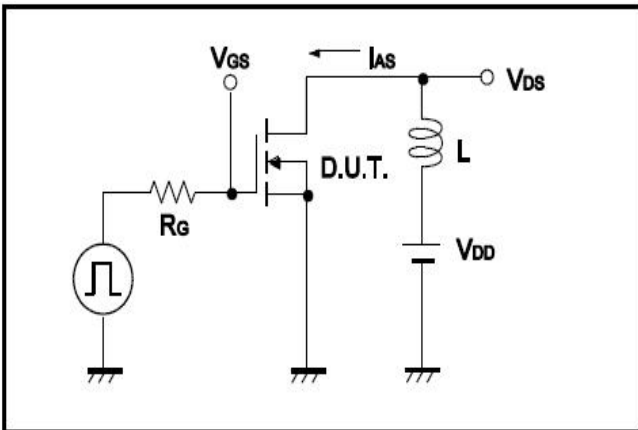
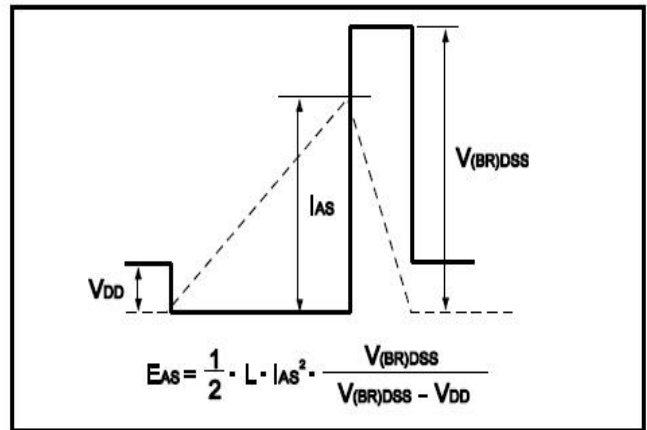


Fig.12 Avalanche Waveform



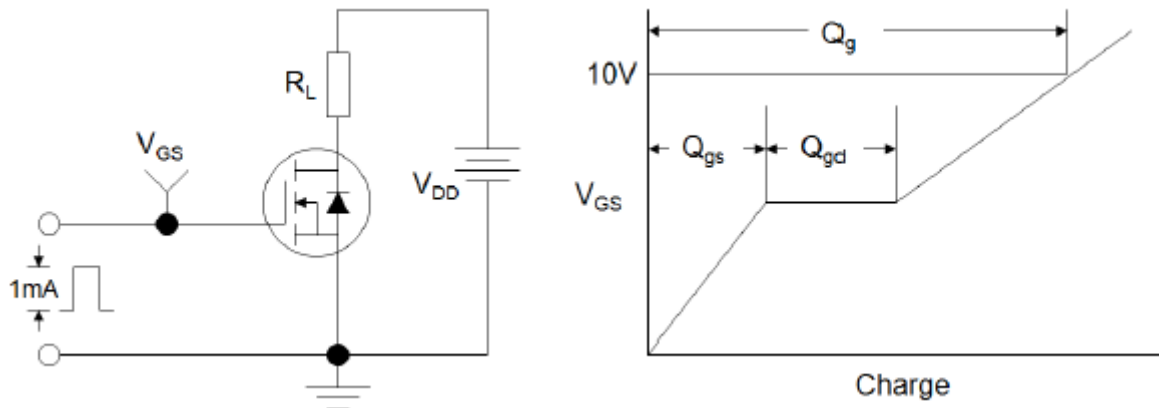


Figure1:Gate Charge Test Circuit & Waveform

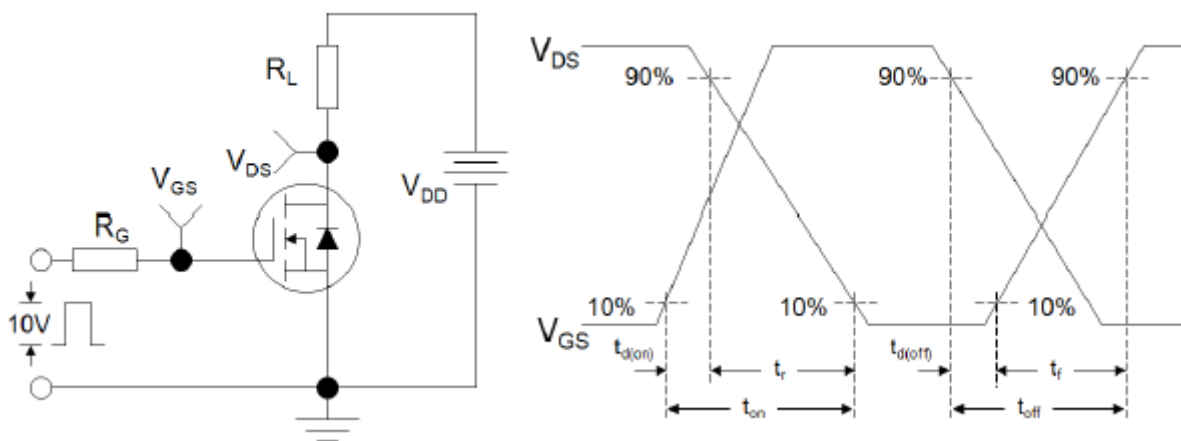


Figure 2: Resistive Switching Test Circuit & Waveforms

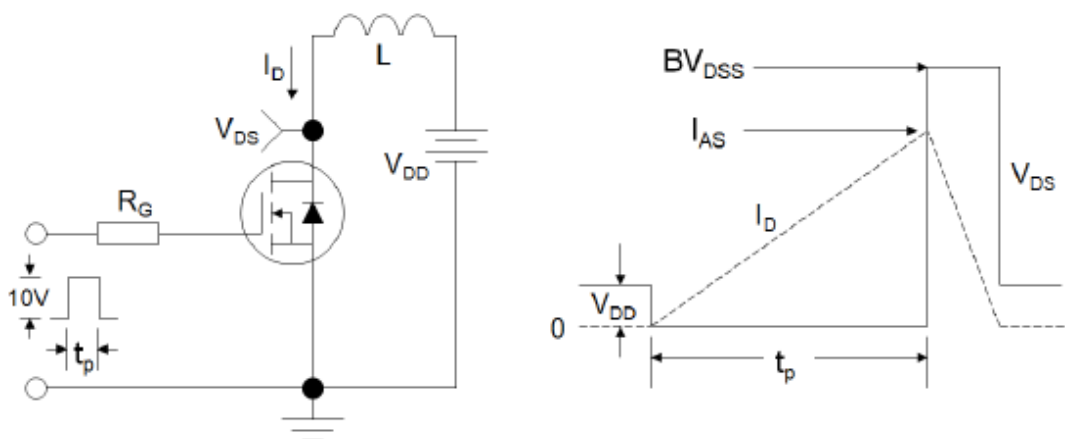
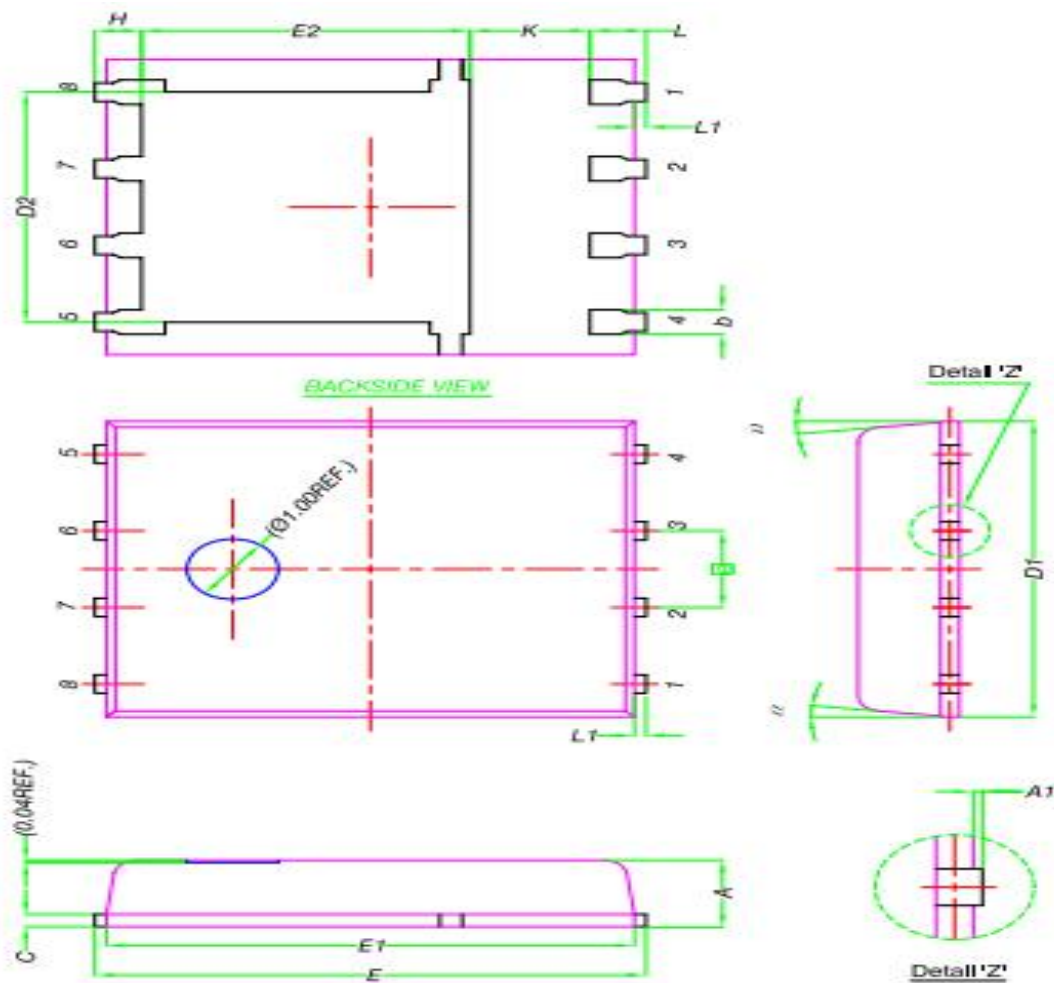


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

•Dimensions (DFN5×6)


DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
A1	0	-	0.05
b	0.33	0.41	0.51
C	0.20	0.25	0.30
D1	4.80	4.90	5.00
D2	3.61	3.81	3.96
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	3.38	3.58	3.78
e	1.27 BSC		
H	0.41	0.51	0.61
K	1.10	-	-
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
α	0°	-	12°


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