

• General Description

The AGM405A 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	5.1mΩ	72A

PRPAK5X6 Pin Configuration

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM405A	AGM405A	PDFN5*6	325mm	16mm	2500/3000

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)	72	A
	Drain Current-Continuous(T _c =100°C)	52	A
I _{DM (pulse)}	Drain Current-Continuous@ Current-Pulsed (Note 2)	220	A
P _D	Maximum Power Dissipation(T _c =25°C)	64	W
	Maximum Power Dissipation(T _c =100°C)	27	W
E _{AS}	Avalanche energy (Note 3)	200	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	---	60	°C/W
R _{θJC}	Thermal Resistance Junction-Case ¹	---	4.5	°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	1.2	1.6	2.5	V
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =20A		10		S
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =10V, I _D =20A		5.1	6.8	mΩ
		V _{GS} =4.5V, I _D =15A		7.0	10	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, F=1MHZ		1380		pF
C _{oss}	Output Capacitance			190		pF
C _{rss}	Reverse Transfer Capacitance			37		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} =30V, V _{DS} =20V, I _D =12A		29		nC
Q _{gs}	Gate-Source Charge			4.5		nC
Q _{gd}	Gate-Drain Charge			6.4		nC
Source-Drain Diode Characteristics						
I _S	Continuous Source Current	V _G =V _D =0V, Force Current			100	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}=15V, V_G=10V, R_G=25Ω

Typical Performance Characteristics

Figure 1: Output Characteristics

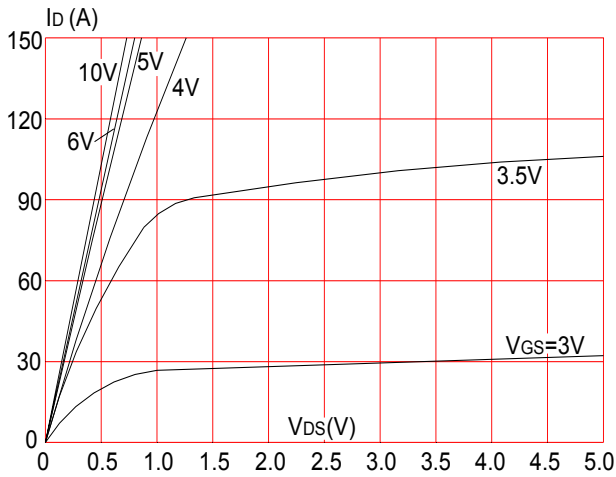


Figure 2: Typical Transfer Characteristics

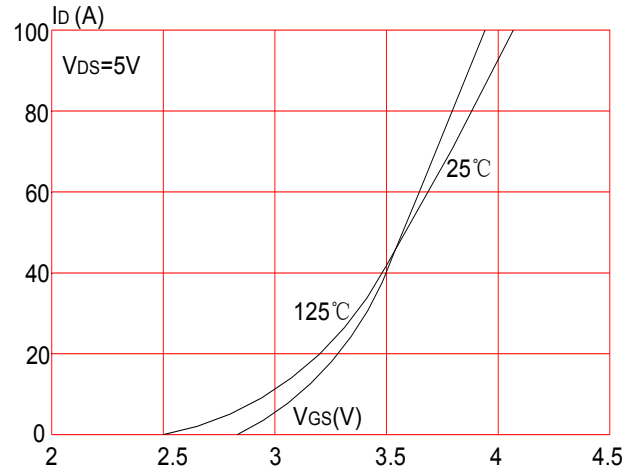


Figure 3: On-resistance vs. Drain Current

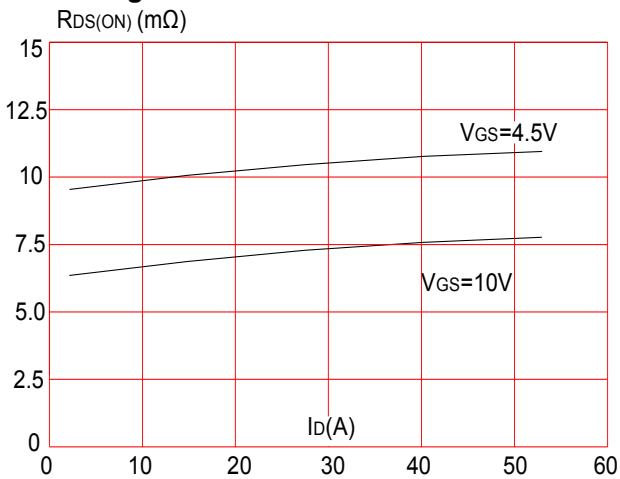


Figure 4: Body Diode Characteristics

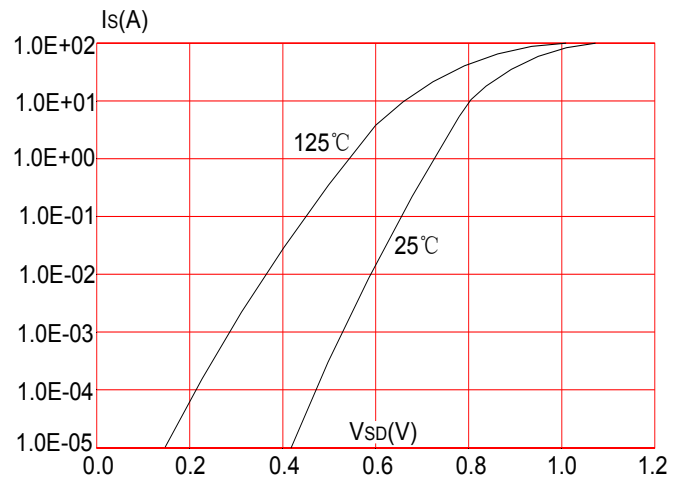


Figure 5: Gate Charge Characteristics

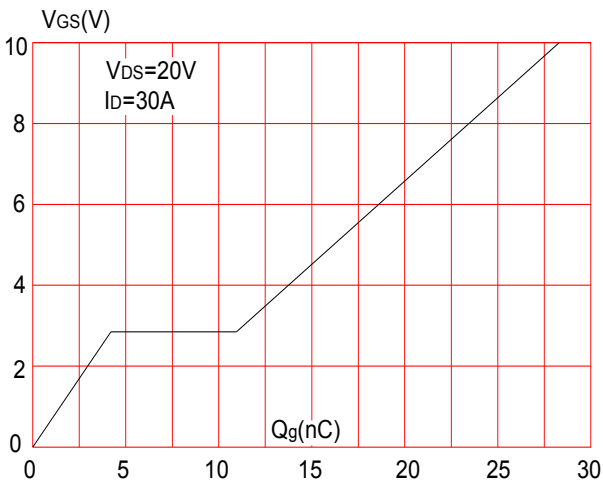


Figure 6: Capacitance Characteristics

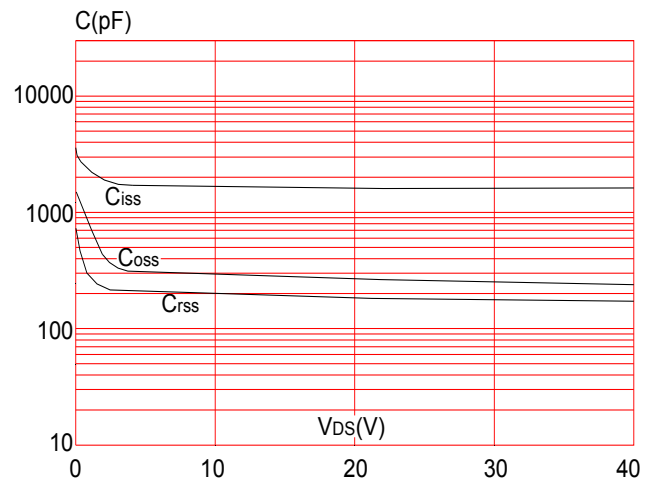


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

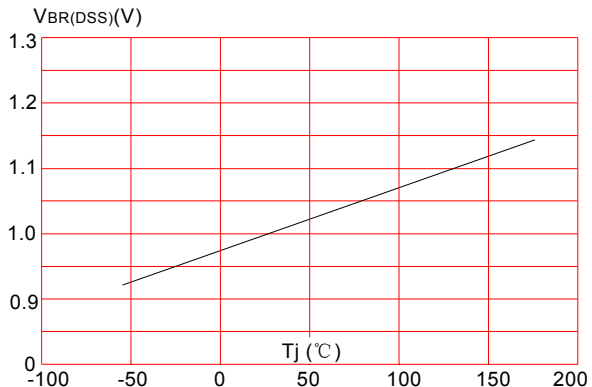


Figure 9: Maximum Safe Operating Area

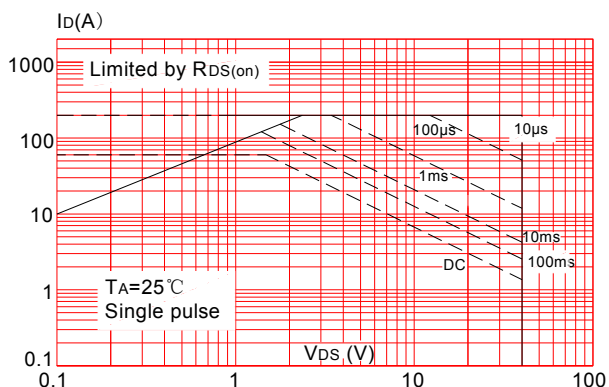


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case (TO-251S,TO-252)

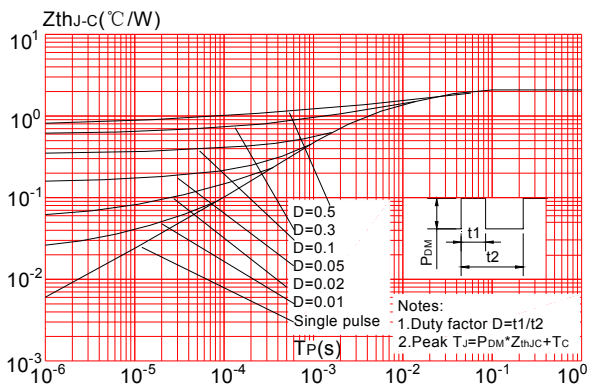


Figure 8: Normalized on Resistance vs. Junction Temperature

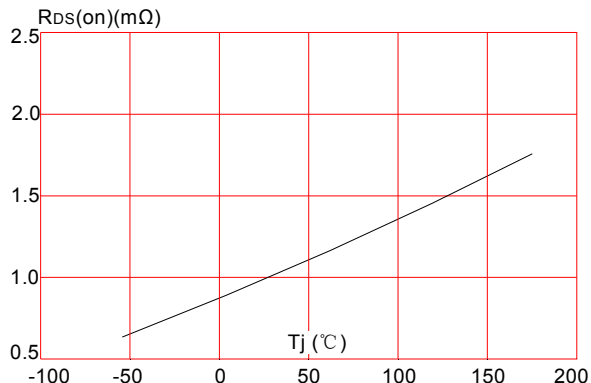
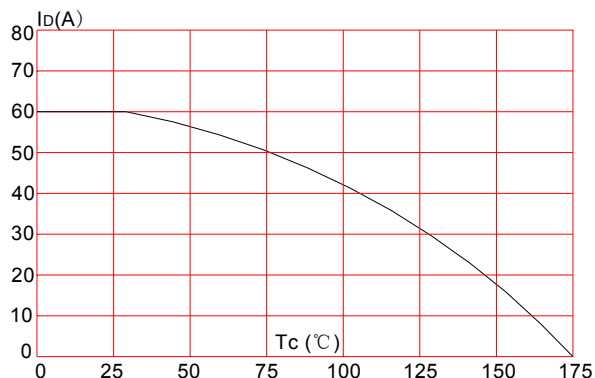


Figure 10: Maximum Continuous Drain Current vs. Case Temperature



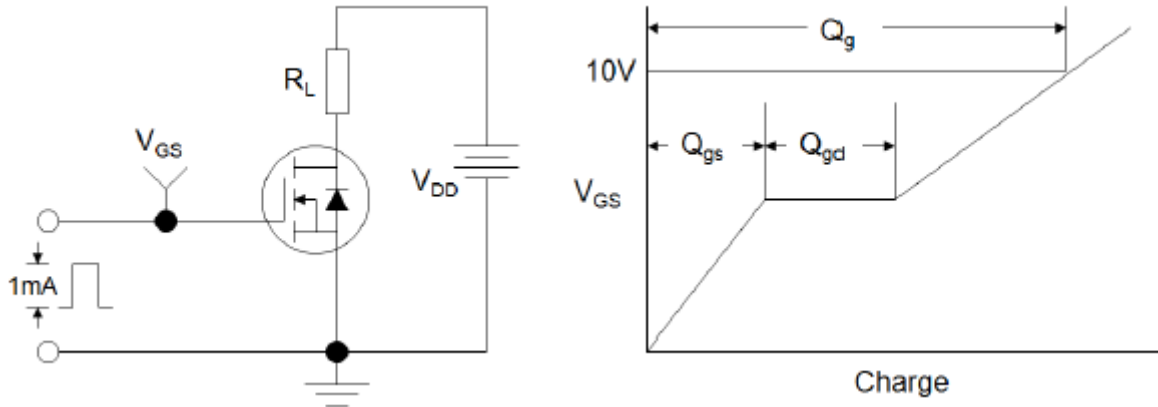


Figure1:Gate Charge Test Circuit & Waveform

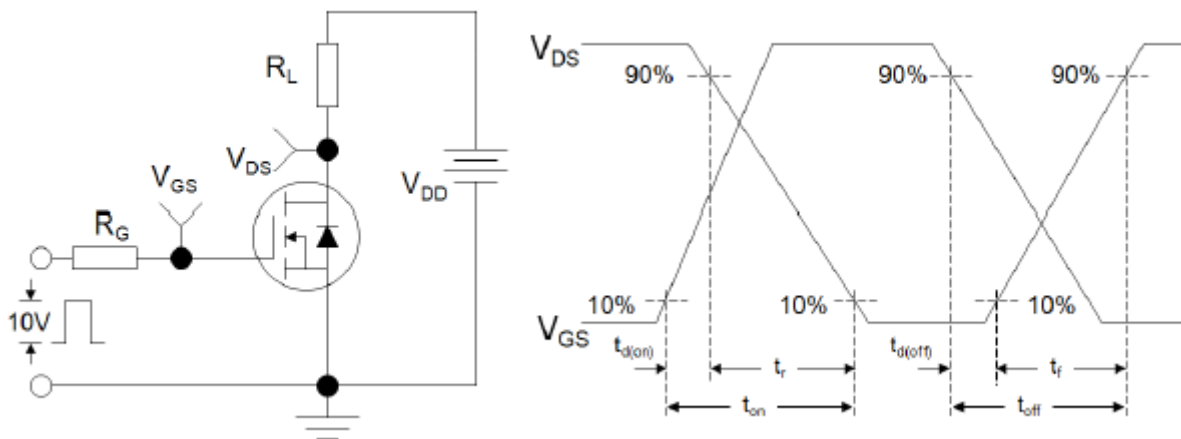


Figure 2: Resistive Switching Test Circuit & Waveforms

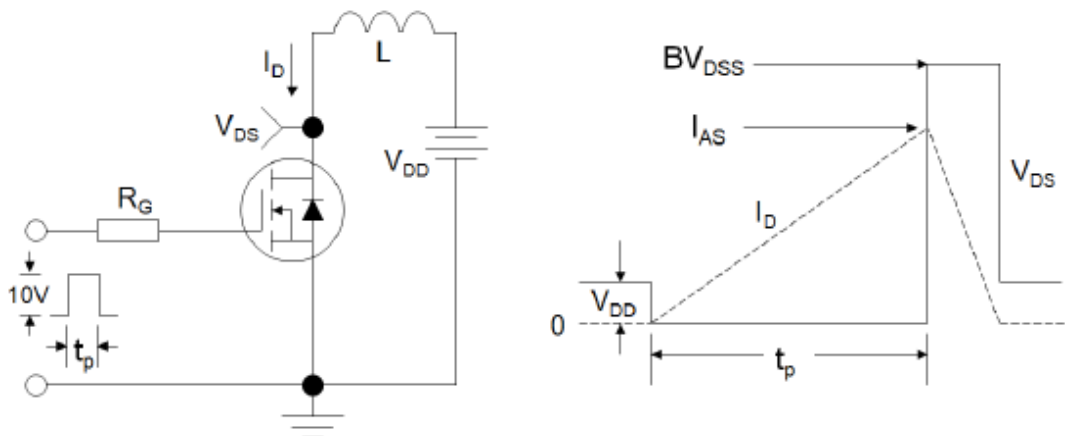
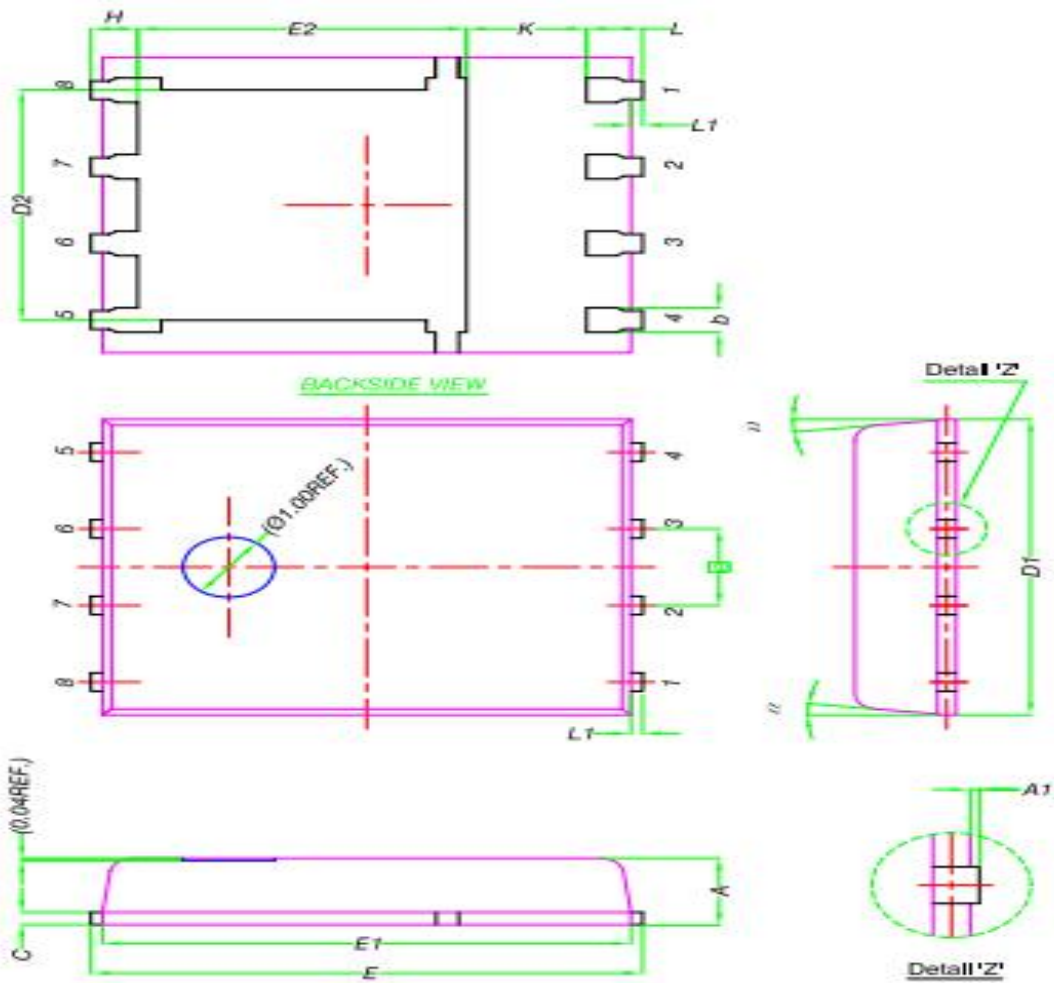


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

●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	3.35	3.55	3.75
\boxed{e}	1.27 BSC		
H	0.41	0.51	0.61
K	1.10	-	-
L	0.51	0.61	0.71
L1	0.05	0.13	0.20
α	0°	-	12°


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