

### ● General Description

The AGM409A 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

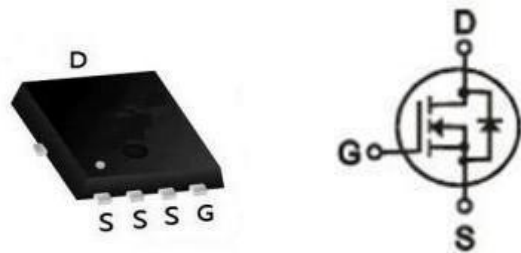
### ● Application

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

### Product Summary

BVDSS	RDSON	ID
40V	6.5mΩ	63A

### PDFN5\*6 Pin Configuration



### Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM409A	AGM409A	PDFN5*6	----	----	3000

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

Symbol	Parameter	Value	Unit
VDS	Drain-Source Voltage (VGS=0V)	40	V
VGS	Gate-Source Voltage (VDS=0V)	±20	V
ID	Drain Current-Continuous(Tc=25°C) <b>(Note 1)</b>	63	A
	Drain Current-Continuous(Tc=100°C)	41	A
IDM (pluse)	Drain Current-Continuous@ Current-Pulsed <b>(Note 2)</b>	190	A
PD	Maximum Power Dissipation(Tc=25°C)	54	w
	Maximum Power Dissipation(Tc=100°C)	21	w
EAS	Avalanche energy <b>(Note 3)</b>	141	mJ
TJ,TSTG	Operating Junction and Storage Temperature Range	-55 To 150	°C

**Table 2. Thermal Characteristic**

Symbol	Parameter	Typ	Max	Unit
RθJA	Thermal Resistance Junction-ambient (Steady State) <sup>1</sup>	---	40	°C/W
RθJC	Thermal Resistance Junction-Case <sup>1</sup>	---	2.3	°C/W

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

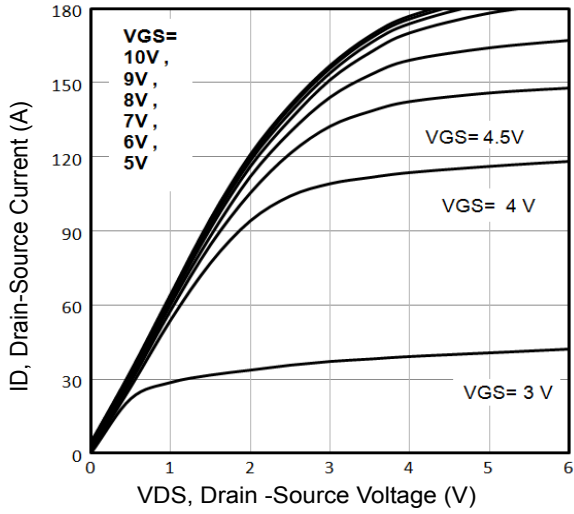
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>On/Off States</b>						
BVDSS	Drain-Source Breakdown Voltage	VGS=0V ID=250μA	40	--	--	V
IDSS	Zero Gate Voltage Drain Current	VDS=40V,VGS=0V	--	--	1	μA
IGSS	Gate-Body Leakage Current	VGS=±20V,VDS=0V	--	--	±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS,ID=250μA	1.0	1.5	2.5	V
gFS	Forward Transconductance	VDS=5V,ID=12A	--	--	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=10V, ID=25A	--	6.5	8.9	mΩ
		VGS=4.5V, ID=15A	--	8.5	12	mΩ
<b>Dynamic Characteristics</b>						
Ciss	Input Capacitance	VDS=30V,VGS=0V, F=1MHZ	--	1490	--	pF
Coss	Output Capacitance		--	170	--	pF
Crss	Reverse Transfer Capacitance		--	125	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	2.3	--	Ω
<b>Switching Times</b>						
td(on)	Turn-on Delay Time	VGS=10V,VDS=20V, ID=10A,RGEN=3.5Ω	--	8	--	nS
tr	Turn-on Rise Time		--	21	--	nS
td(off)	Turn-Off Delay Time		--	34	--	nS
tf	Turn-Off Fall Time		--	19	--	nS
Qg	Total Gate Charge	VGS=10V, VDS=20V, ID=20A	--	28.5	--	nC
Qgs	Gate-Source Charge		--	5.8	--	nC
Qgd	Gate-Drain Charge		--	7.3	--	nC
<b>Source-Drain Diode Characteristics</b>						
ISD	Source-Drain Current(Body Diode)		--	--	63	A
VSD	Forward on Voltage	VGS=0V,IS=2A	--	0.86	1.2	V
trr	Reverse Recovery Time	IF=20A , dI/dt=100A/μs , TJ=25°C	--	38	--	ns
Qrr	Reverse Recovery Charge		--	26	--	nc

Notes 1.The maximum current rating is package limited.

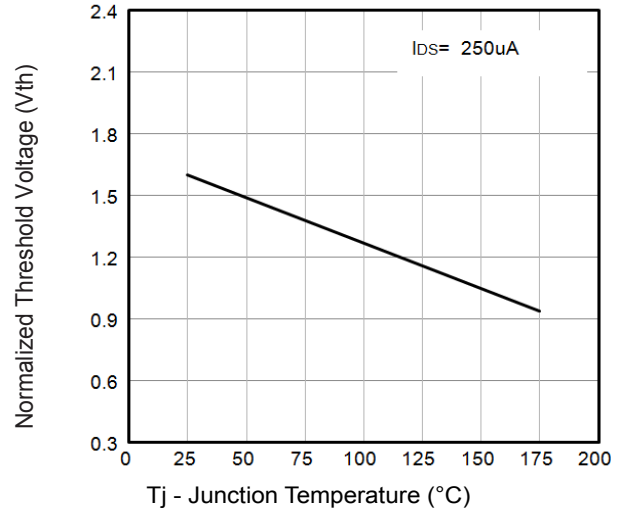
Notes 2.Repetitive Rating: Pulse width limited by maximum junction temperature

Notes 3.EAS condition: TJ=25°C

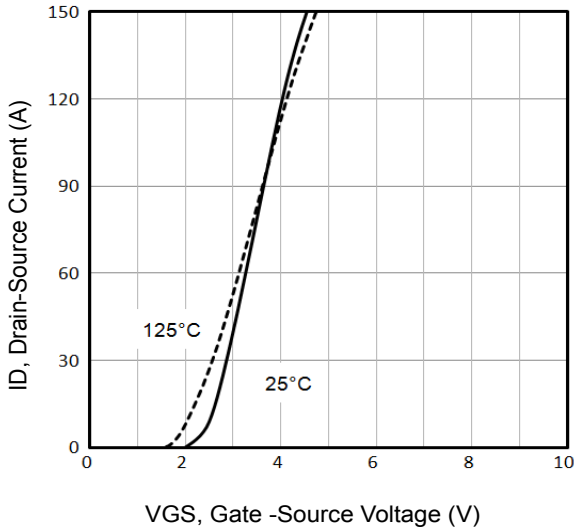
## Typical Characteristics



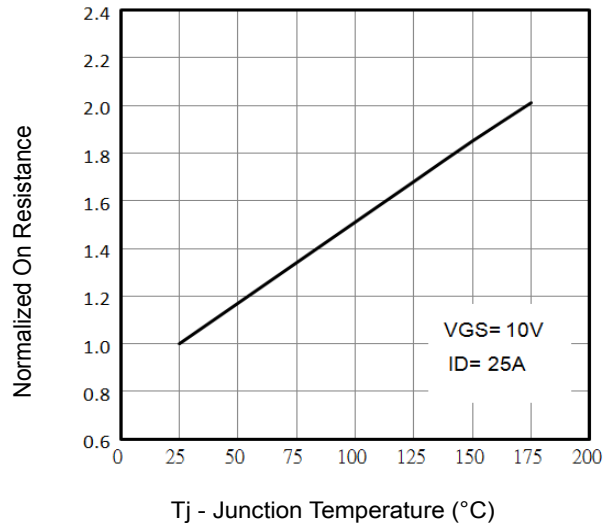
**Fig1.** Typical Output Characteristics



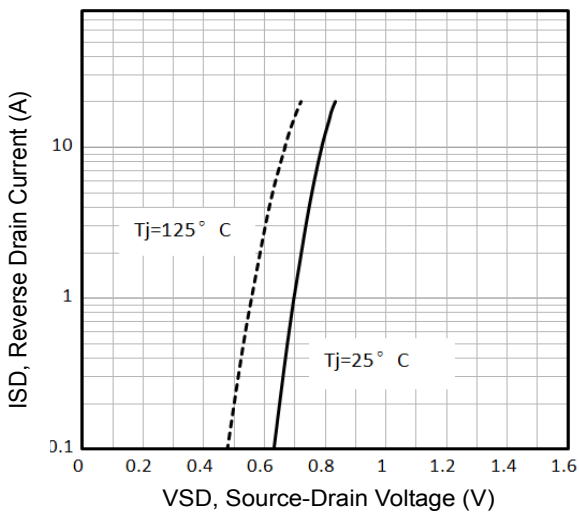
**Fig2.**  $V_{GS(TH)}$  Gate -Source Voltage Vs.  $T_j$



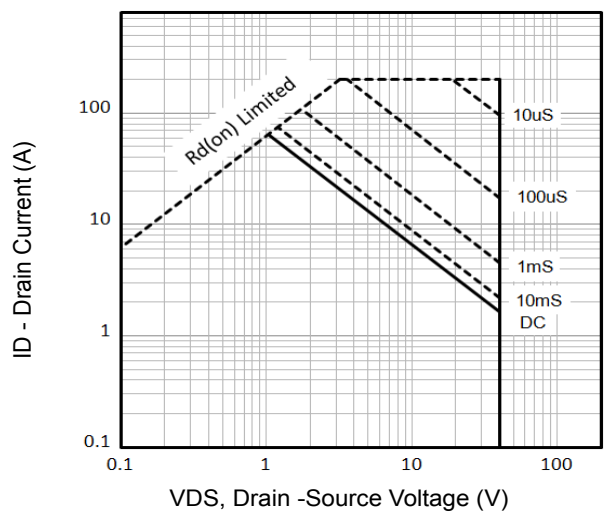
**Fig3.** Typical Transfer Characteristics



**Fig4.** Normalized On-Resistance Vs.  $T_j$



**Fig5.** Typical Source-Drain Diode Forward Voltage



**Fig6.** Maximum Safe Operating Area

### Typical Characteristics

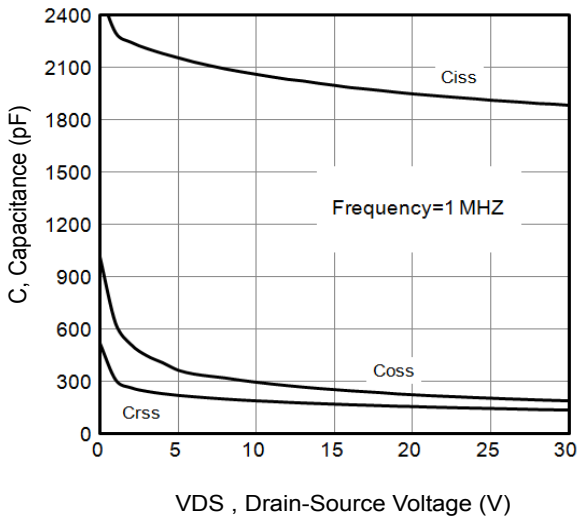


Fig7. Typical Capacitance Vs. Drain-Source Voltage

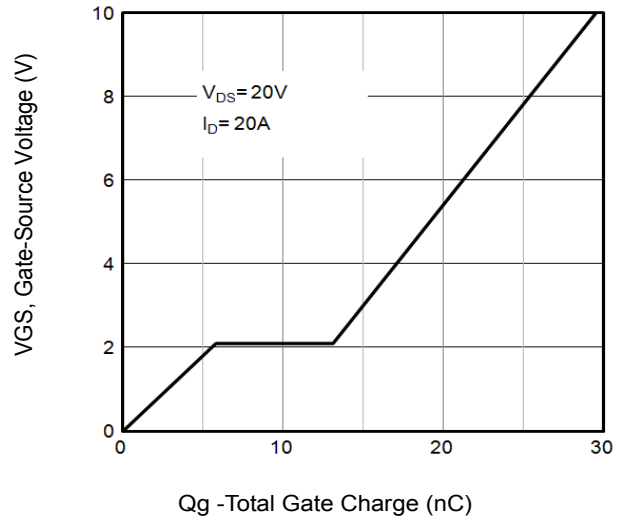


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

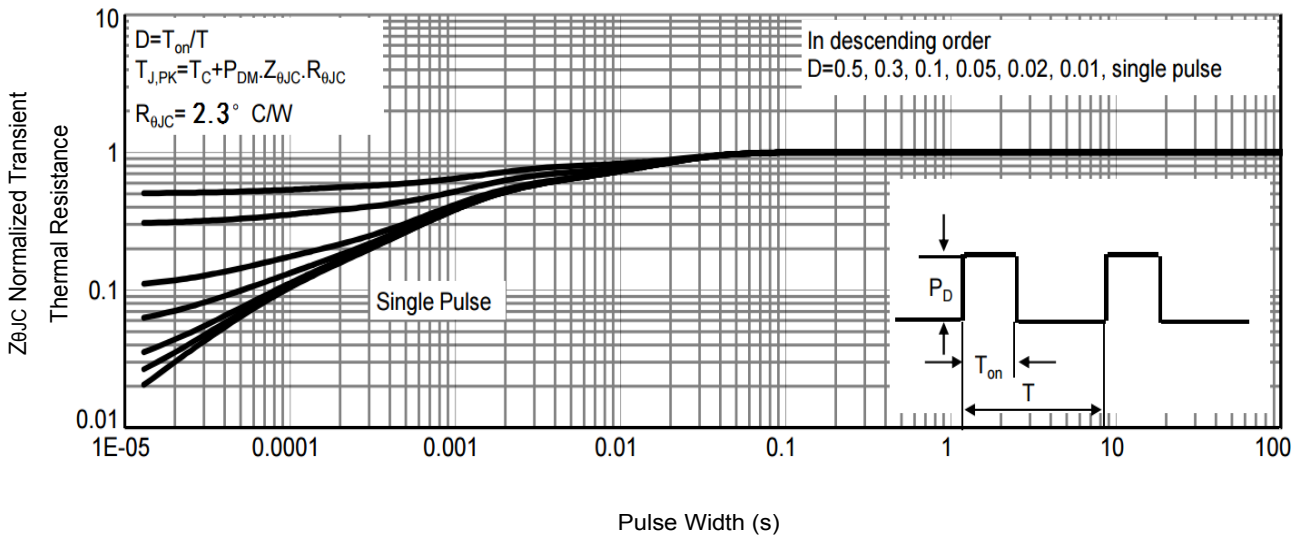


Fig9 . Normalized Maximum Transient Thermal Impedance

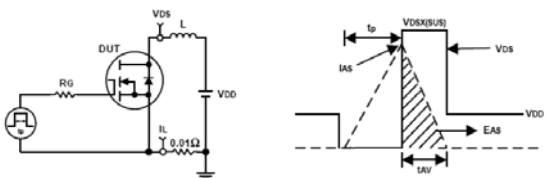


Fig10. Unclamped Inductive Test Circuit and waveforms

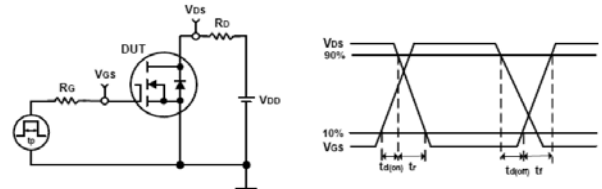
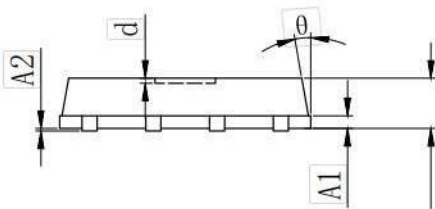
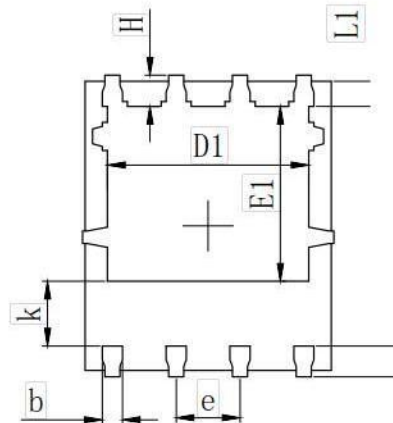
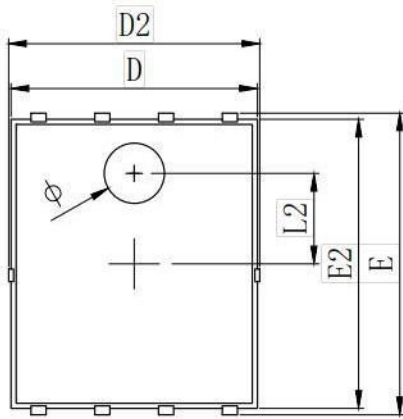


Fig11. Switching Time Test Circuit and waveforms

**•Dimensions (DFN5×6)**


SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	0.900	1.000	1.100
A1	0.254 REF.		
A2	0~0.05		
D	4.824	4.900	4.976
D1	3.910	4.010	4.110
D2	4.924	5.000	5.076
E	5.924	6.000	6.076
E1	3.375	3.475	3.575
E2	5.674	5.750	5.826
b	0.350	0.400	0.450
e	1.270 TYP.		
L	0.534	0.610	0.686
L1	0.424	0.500	0.576
L2	1.800 REF.		
k	1.190	1.290	1.390
H	0.549	0.625	0.701
θ	8°	10°	12°
Ø	1.100	1.200	1.300
d			0.100


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