

### ● General Description

The AGM404D 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

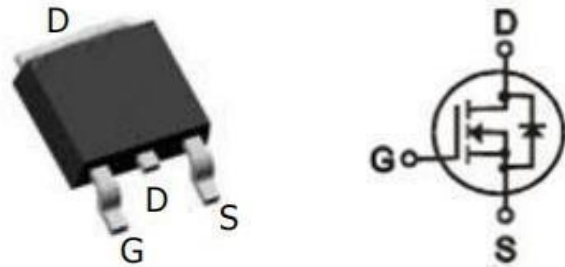
### ● Application

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

### Product Summary

BVDSS	RDSON	ID
40V	4.5mΩ	82A

### TO-252 Pin Configuration



### Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM404D	AGM404D	TO-252	----	----	2500

**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>	82	A
	Drain Current-Continuous(Tc=100°C)	50	A
IDM (pluse)	Drain Current-Continuous@ Current-Pulsed <b>(Note 2)</b>	300	A
PD	Maximum Power Dissipation(Tc=25°C)	25.5	w
	Maximum Power Dissipation(Tc=100°C)	10	w
EAS	Avalanche energy <b>(Note 3)</b>	56	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>	---	--	°C/W
RθJC	Thermal Resistance Junction-Case <sup>1</sup>	---	4.9	°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	1.1	1.6	2.5	V
gFS	Forward Transconductance	VDS=10V,ID=15A	--	10	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=10V, ID=20A	--	4.5	6.0	mΩ
		VGS=4.5V, ID=10A	--	6.5	9.0	mΩ
<b>Dynamic Characteristics</b>						
Ciss	Input Capacitance	VDS=20V,VGS=0V, F=1MHZ	--	2820	--	pF
Coss	Output Capacitance		--	241	--	pF
Crss	Reverse Transfer Capacitance		--	201	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	3.3	--	Ω
<b>Switching Times</b>						
td(on)	Turn-on Delay Time	VGS=10V,VDS=20V, RL=1Ω,RGEN=3Ω	--	7.5	--	nS
tr	Turn-on Rise Time		--	2.0	--	nS
td(off)	Turn-Off Delay Time		--	23	--	nS
tf	Turn-Off Fall Time		--	3.0	--	nS
Qg	Total Gate Charge	VGS=10V, VDS=20V, ID=20A	--	20	--	nC
Qgs	Gate-Source Charge		--	5.5	--	nC
Qgd	Gate-Drain Charge		--	3.0	--	nC
<b>Source-Drain Diode Characteristics</b>						
ISD	Source-Drain Current(Body Diode)		--	--	82	A
VSD	Forward on Voltage	VGS=0V,IS=20A	--	--	1.2	V
trr	Reverse Recovery Time	IF=20A , dI/dt=100A/μs , TJ=25°C	--	11	--	ns
Qrr	Reverse Recovery Charge		--	21	--	nc

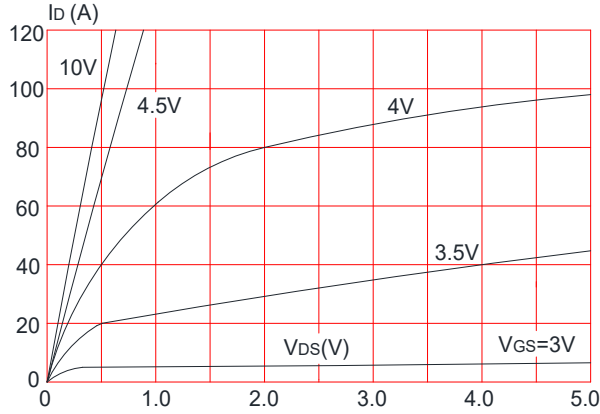
Notes 1.The maximum current rating is package limited.

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

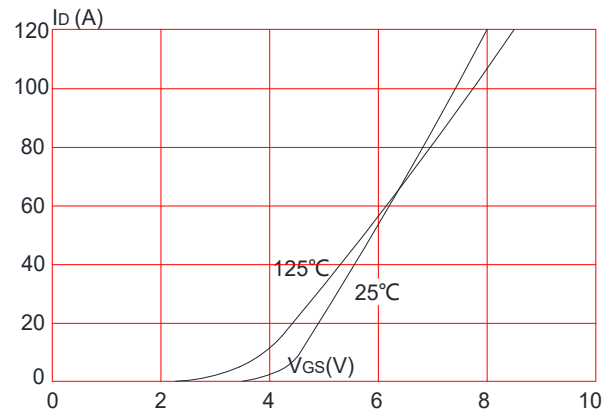
Notes 3.EAS condition: TJ=25°C

## Typical Performance Characteristics

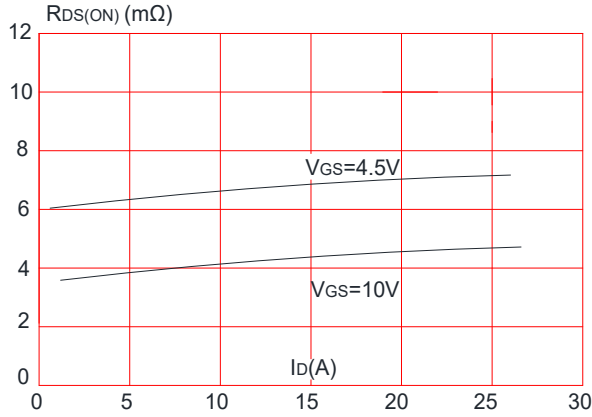
**Figure 1: Output Characteristics**



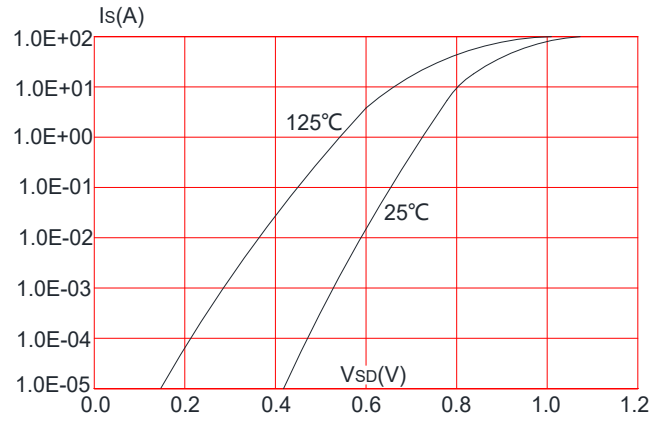
**Figure 2: Typical Transfer Characteristics**



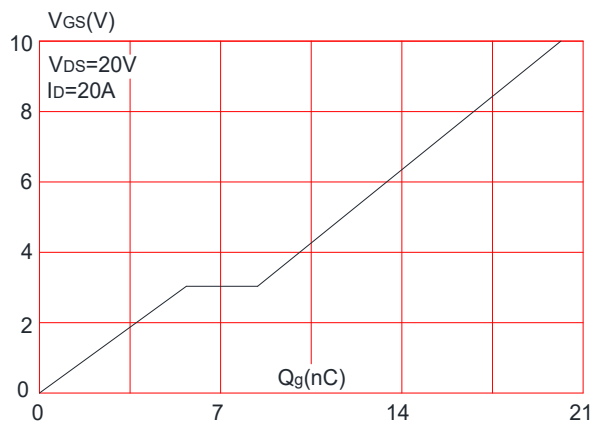
**Figure 3: On-resistance vs. Drain Current**



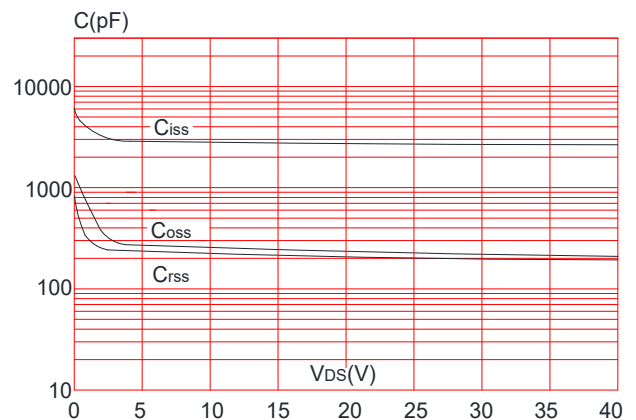
**Figure 4: Body Diode Characteristics**



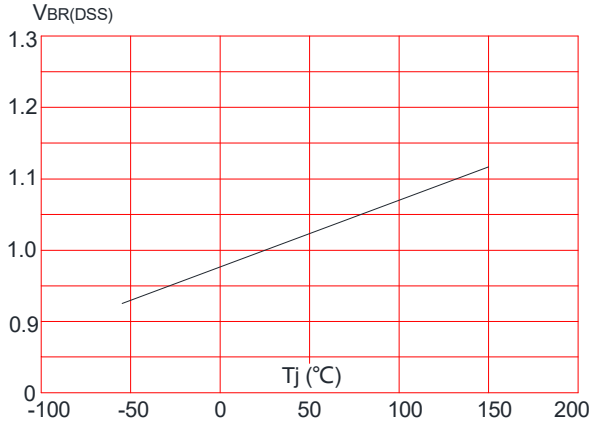
**Figure 5: Gate Charge Characteristics**



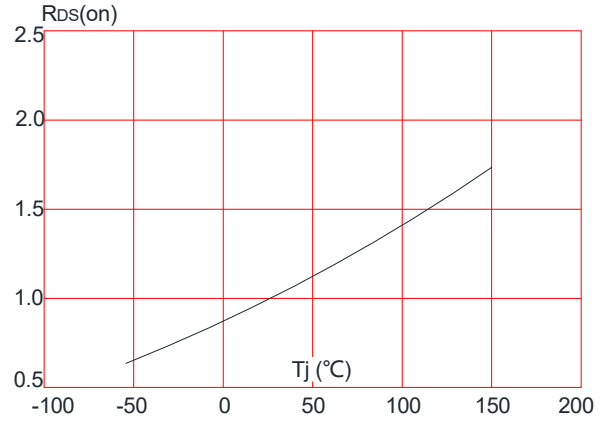
**Figure 6: Capacitance Characteristics**



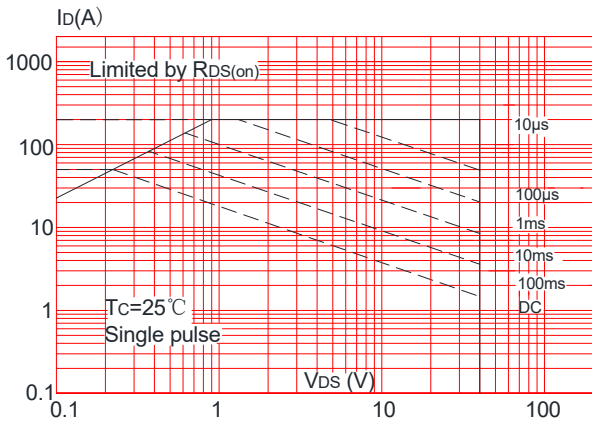
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



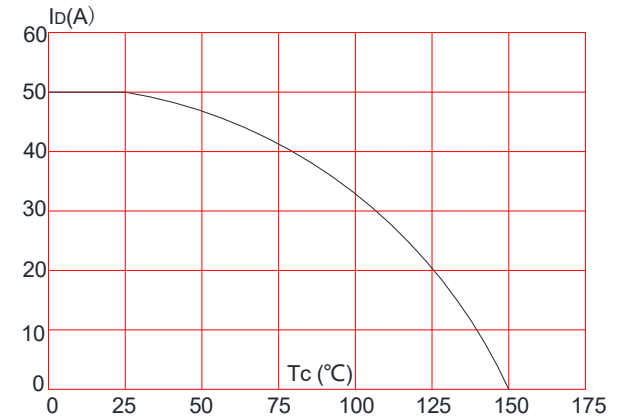
**Figure 8:** Normalized on Resistance vs. Junction Temperature



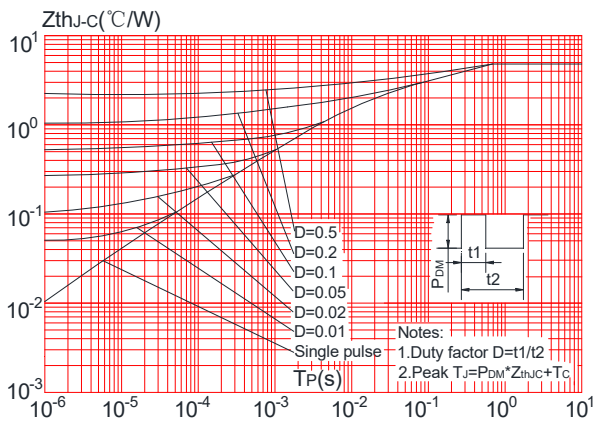
**Figure 9:** Maximum Safe Operating Area



**Figure 10:** Maximum Continuous Drain Current vs. Case Temperature



**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Case



## Test Circuit

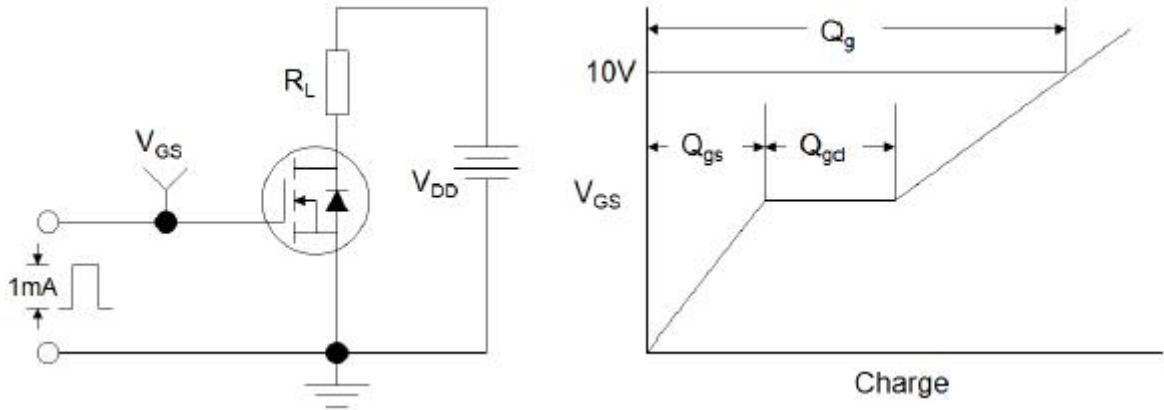


Figure 1: Gate Charge Test Circuit & Waveform

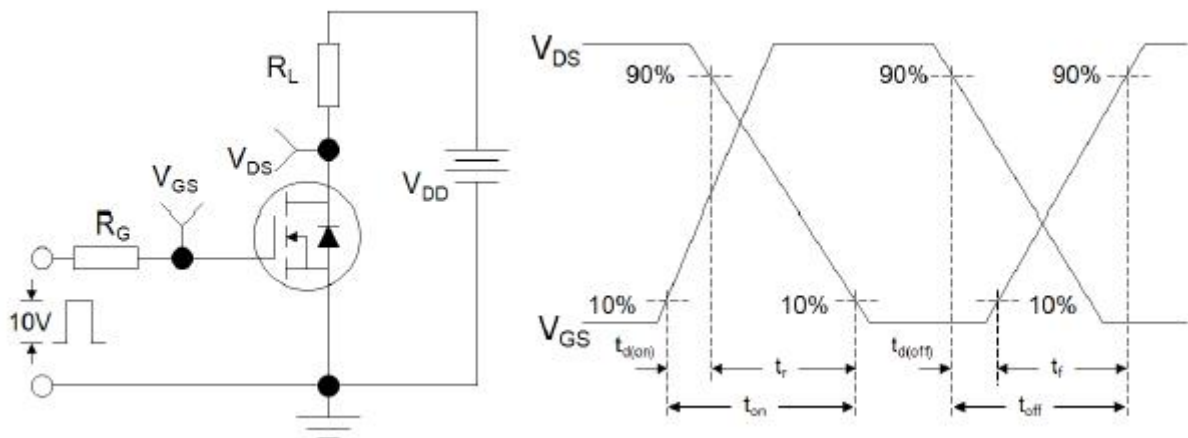


Figure 2: Resistive Switching Test Circuit & Waveforms

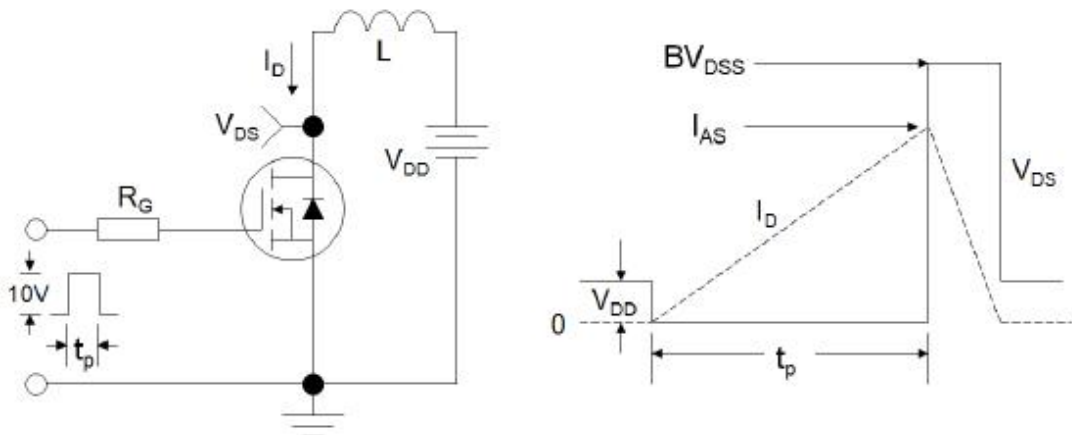
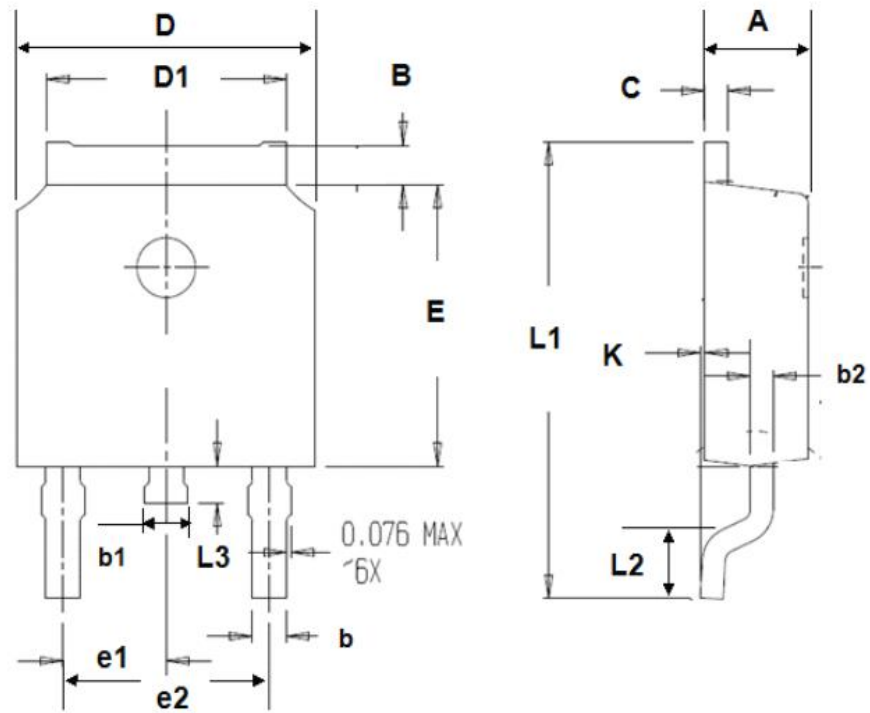


Figure 3: Unclamped Inductive Switching Test Circuit & Waveforms

**• Dimensions**

SYMBOL	min	max	SYMBOL	min	max
A	2.10	2.50	B	0.85	1.25
b	0.50	0.80	b1	0.50	0.90
b2	0.45	0.70	C	0.45	0.70
D	6.30	6.75	D1	5.10	5.50
E	5.30	6.30	e1	2.25	2.35
L1	9.20	10.60	e2	4.45	4.75
L2	0.90	1.75	L3	0.60	1.10
K	0.00	0.23			




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