● General Description

The AGM401C 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

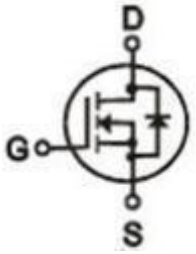
● Application

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

Product Summary

BVDSS	RDSON	ID
40V	1.8mΩ	220A

TO-220 Pin Configuration



Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM401C	AG401C	TO-220	----	----	1000

Table 1. Absolute Maximum Ratings (TA=25℃)

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℃) **(Note 1)**	220	A
	Drain Current-Continuous(Tc=100℃)	154	A
IDM (pluse)	Drain Current-Continuous@ Current-Pulsed **(Note 2)**	700	A
PD	Maximum Power Dissipation(Tc=25℃)	200	w
	Maximum Power Dissipation(Tc=100℃)	100	w
EAS	Avalanche energy **(Note 3)**	693	mJ
TJ,TSTG	Operating Junction and Storage Temperature Range	-55 To 150	℃

Table 2. Thermal Characteristic

Symbol	Parameter	Typ	Max	Unit
RθJA	Thermal Resistance Junction-ambient (Steady State)[1]	---	62.5	℃/W
RθJC	Thermal Resistance Junction-Case[1]	---	0.75	℃/W

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV_{DSS}	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	2.0	V
gFS	Forward Transconductance	VDS=5V,ID=12A	--	--	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=10V, ID=60A	--	1.8	2.3	mΩ
		VGS=4.5V, ID=7A	--	--	--	mΩ
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=25V,VGS=0V, F=1MHZ	--	5755	--	pF
Coss	Output Capacitance		--	820	--	pF
Crss	Reverse Transfer Capacitance		--	650	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	4.6	--	Ω
Switching Times						
td(on)	Turn-on Delay Time	VGS=20V,VDS=20V, ID=20A,RGEN=4Ω	--	17	--	nS
tr	Turn-on Rise Time		--	79	--	nS
td(off)	Turn-Off Delay Time		--	127	--	nS
tf	Turn-Off Fall Time		--	97	--	nS
Qg	Total Gate Charge	VGS=10V, VDS=32V, ID=60A	--	134.2	--	nC
Qgs	Gate-Source Charge		--	29.6	--	nC
Qgd	Gate-Drain Charge		--	48.3	--	nC
Source-Drain Diode Characteristics						
ISD	Source-Drain Current(Body Diode)		--	--	220	A
VSD	Forward on Voltage	VGS=0V,IS=60A	--	0.9	1.2	V
trr	Reverse Recovery Time	IF=-25A , dI/dt=100A/μs , TJ=25℃	--	29	--	ns
Qrr	Reverse Recovery Charge		--	26	--	nc

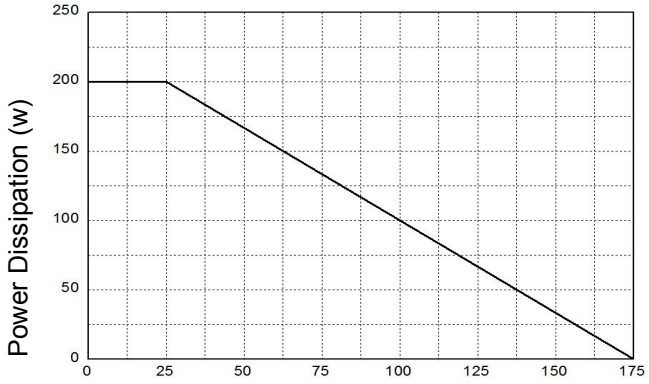
Notes 1.The maximum current rating is package limited.

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

Notes 3.EAS condition: TJ=25℃,VDD=15V,VG=10V, RG=25Ω

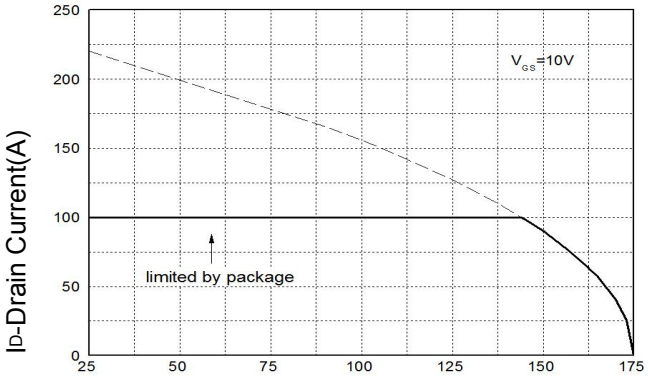
Typical Operating Characteristics

Figure 1: Power Dissipation



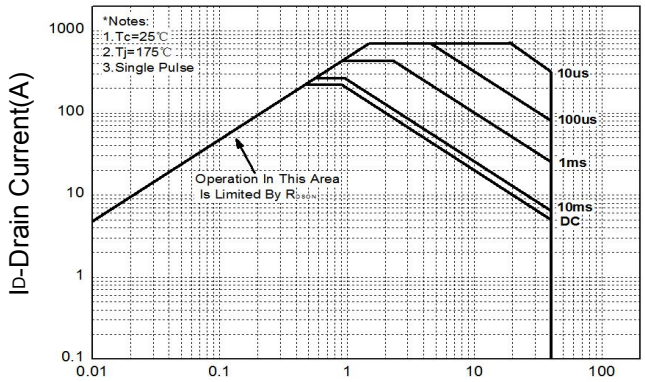
Tc-Case Temperature(℃)

Figure 2: Drain Current



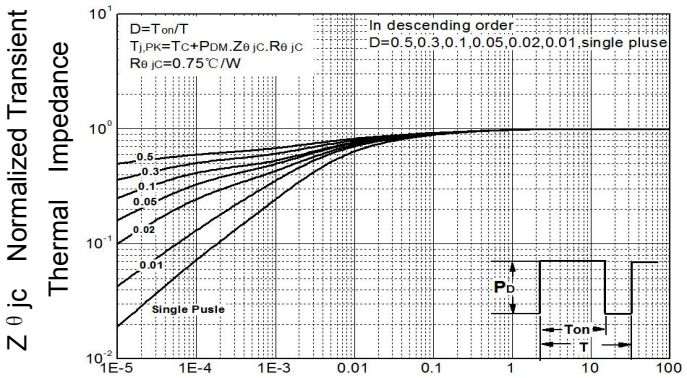
Tc-Case Temperature(℃)

Figure 3: Safe Operation Area



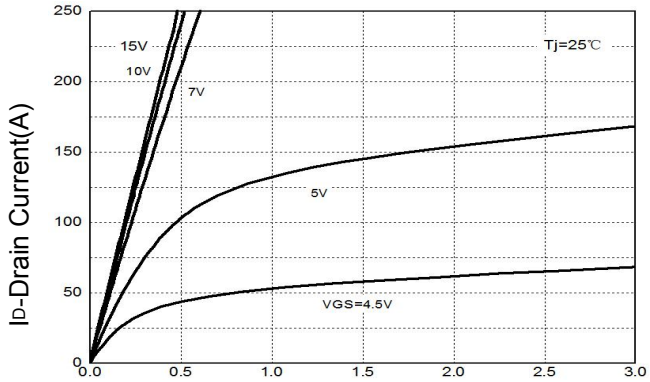
VDS-Drain-Source Voltage(V)

Figure 4: Thermal Transient Impedance



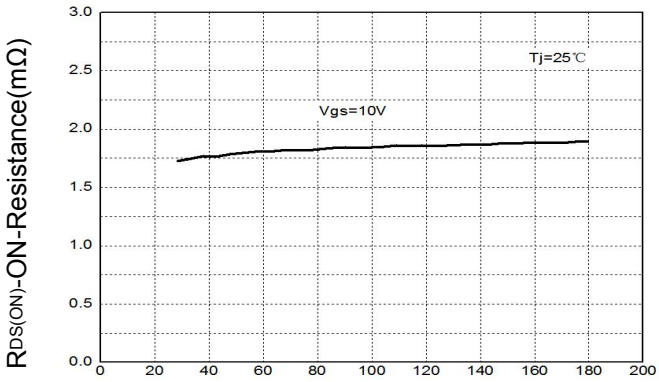
Maximum Effective Transient Thermal Impedance, Junction-to-Case

Figure 5: Output Characteristics



VDS-Drain-Source Voltage (V)

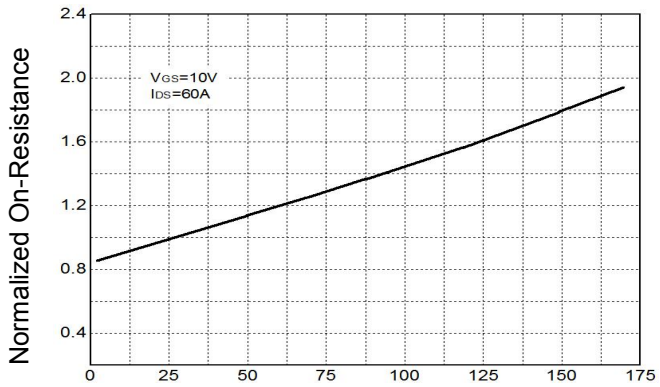
Figure 6: Drain-Source On Resistance



ID-Drain Current(A)

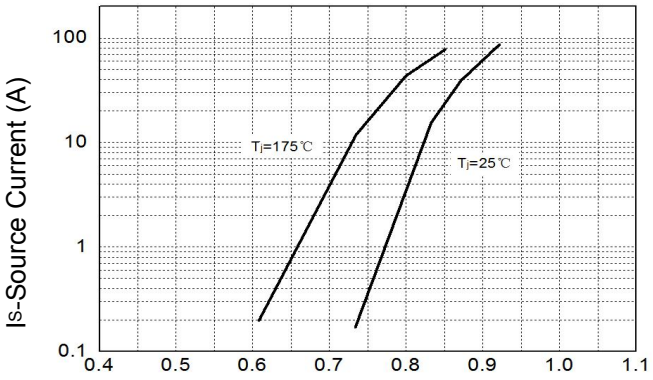
Typical Operating Characteristics(Cont.)

Figure 7: On-Resistance vs. Temperature



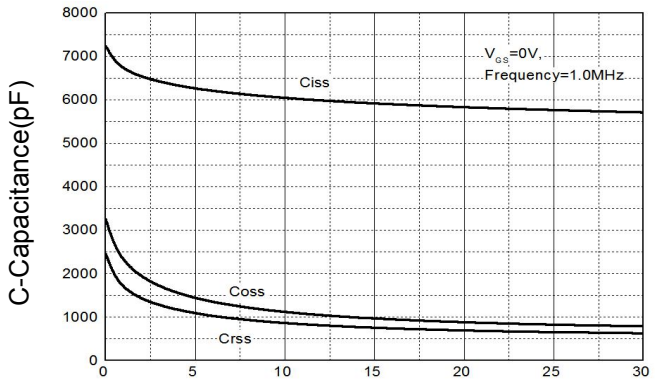
Tj-Junction Temperature (℃)

Figure 8: Source-Drain Diode Forward



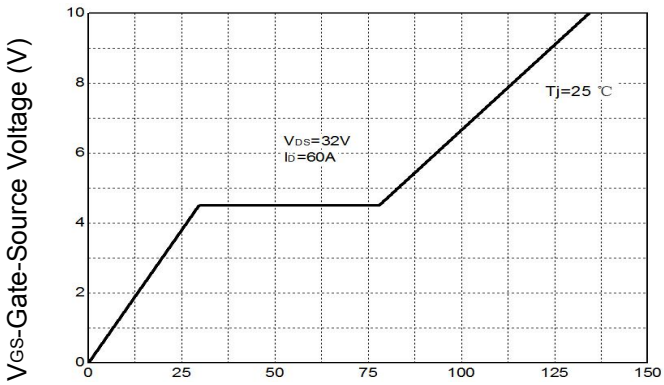
VSD-Source-Drain Voltage(V)

Figure 9: Capacitance Characteristics



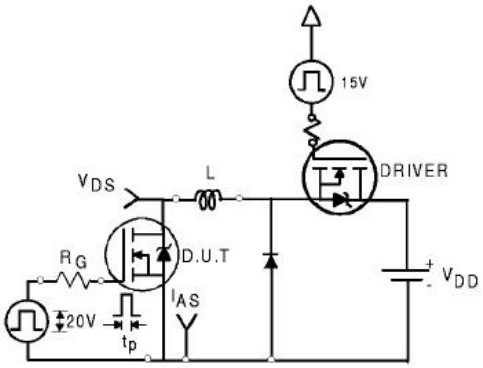
VDS-Drain-Source Voltage (V)

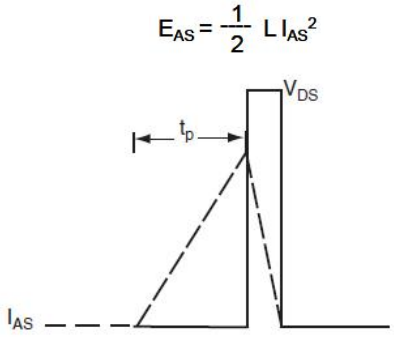
Figure 10: Gate Charge Characteristics



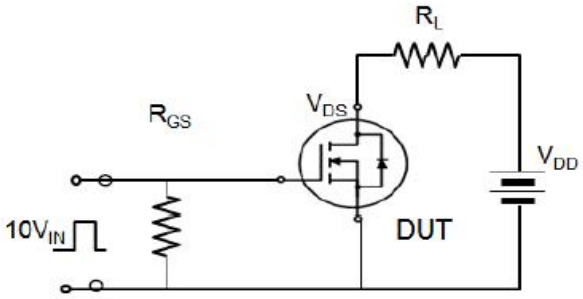
QG-Gate Charge (nC)

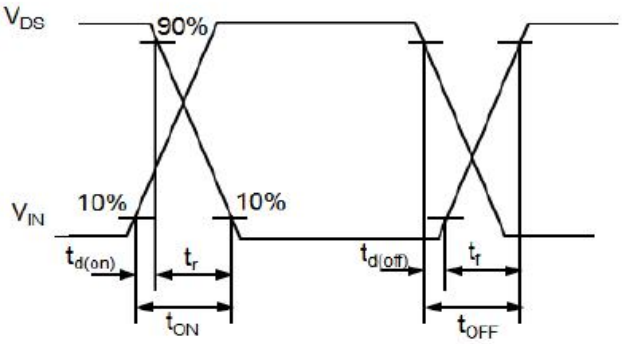
Avalanche Test Circuit



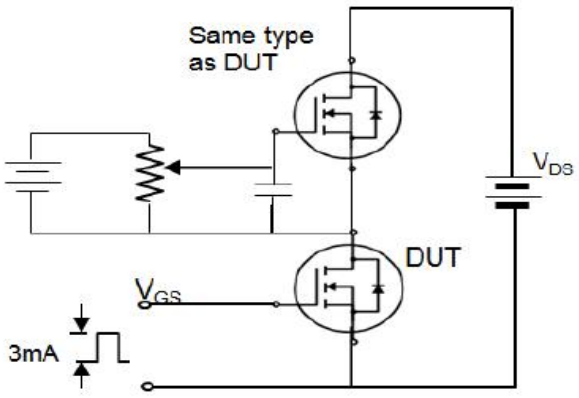


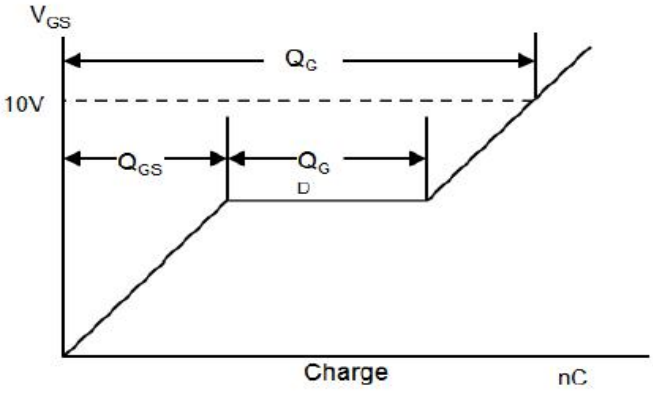
Switching Time Test Circuit



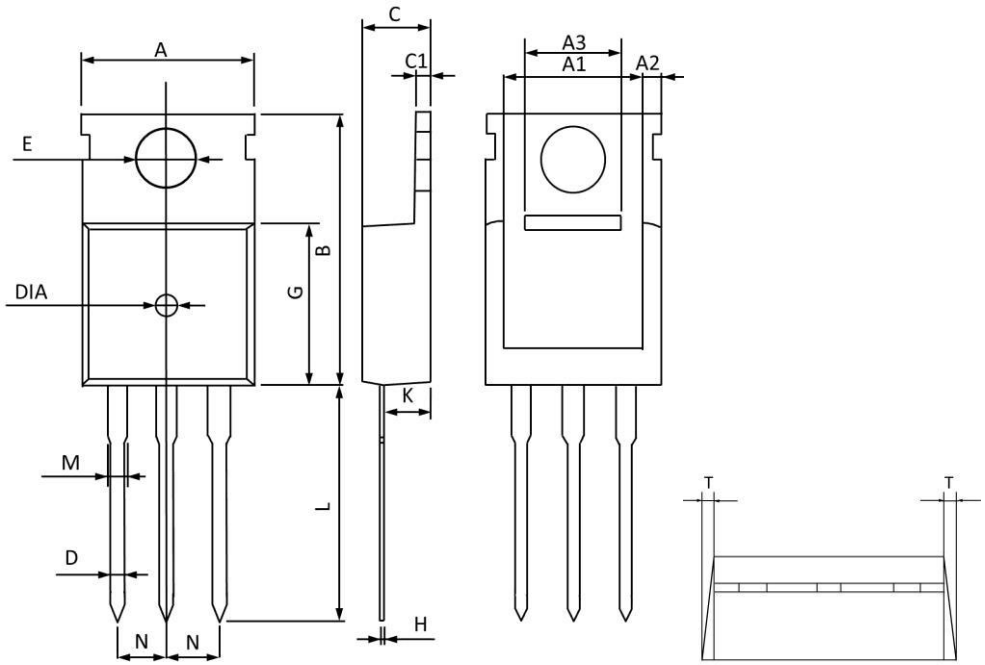


Gate Charge Test Circuit





TO220 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	10.300	9.700	0.406	0.382
A1	8.840	8.440	0.348	0.332
A2	1.250	1.050	0.049	0.041
A3	5.300	5.100	0.209	0.201
B	16.200	15.400	0.638	0.606
C	4.680	4.280	0.184	0.169
C1	1.500	1.100	0.059	0.043
D	1.000	0.600	0.039	0.024
E	3.800	3.400	0.150	0.134
G	9.300	8.700	0.366	0.343
H	0.600	0.400	0.024	0.016
K	2.700	2.100	0.106	0.083
L	13.600	12.800	0.535	0.504
M	1.500	1.100	0.059	0.043
N	2.590	2.490	0.102	0.098
T	W0.35		W0.014	
DIA	Φ1.5 TYP.	deep0.2 TYP.	Φ0.059 TYP.	deep0.008 TYP.

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