

General Description

The AGM13T15D 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
- 100% Avalanche tested
- 100% DVDS tested

Application

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

Product Summary

BVDSS	RDSON	ID
135V	15.5mΩ	58A

TO-252 Pin Configuration

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM13T15D	AGM13T15D	TO-252	330mm	16mm	2500

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

Symbol	Parameter	Value	Unit
VDS	Drain-Source Voltage (VGS=0V)	135	V
VGS	Gate-Source Voltage (VDS=0V)	±20	V
ID	Drain Current-Continuous(Tc=25°C) (Note 1)	58	A
	Drain Current-Continuous(Tc=100°C)	39	A
IDM (pluse)	Drain Current-Pulsed (Note 2)	232	A
PD	Maximum Power Dissipation(Tc=25°C)	120	w
	Maximum Power Dissipation(Tc=100°C)	60	w
EAS	Avalanche energy (Note 3)	21	mJ
TJ,TSTG	Operating Junction and Storage Temperature Range	-55 To 175	°C

Table 2. Thermal Characteristic

Symbol	Parameter	Typ	Max	Unit
RθJA	Thermal Resistance Junction-ambient (Steady State) ¹	---	62.5	°C/W
RθJC	Thermal Resistance Junction-Case ¹	---	1.25	°C/W

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BVDSS	Drain-Source Breakdown Voltage	VGS=0V ID=250μA	135	147	--	V
IDSS	Zero Gate Voltage Drain Current	VDS=135V,VGS=0V	--	--	1	μA
IGSS	Gate-Body Leakage Current	VGS=±20V,VDS=0V	--	--	±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS,ID=250μA	2	2.8	4	V
gFS	Forward Transconductance	VDS=5V,ID=5A	--	17	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=10V, ID=10A	--	15.5	21	mΩ
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=40V,VGS=0V, F=1MHZ	--	1255	--	pF
Coss	Output Capacitance		--	510	--	pF
Crss	Reverse Transfer Capacitance		--	21	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	2.8	--	Ω
Switching Times						
td(on)	Turn-on Delay Time	VGS=10V,VDS=75V, RGEN=3Ω, RL=7.5Ω	--	10	--	nS
tr	Turn-on Rise Time		--	6.5	--	nS
td(off)	Turn-Off Delay Time		--	16	--	nS
tf	Turn-Off Fall Time		--	7.0	--	nS
Qg	Total Gate Charge	VGS=10V, VDS=75V, ID=20A	--	33	--	nC
Qgs	Gate-Source Charge		--	7.2	--	nC
Qgd	Gate-Drain Charge		--	7.2	--	nC
Source-Drain Diode Characteristics						
ISD	Source-Drain Current(Body Diode)		--	--	58	A
VSD	Forward on Voltage	VGS=0V,IS=20A	--	--	1.2	V
trr	Reverse Recovery Time	IF=20A , dl/dt=100A/μs ,	--	30	--	ns
Qrr	Reverse Recovery Charge	TJ=25℃	--	135	--	nc

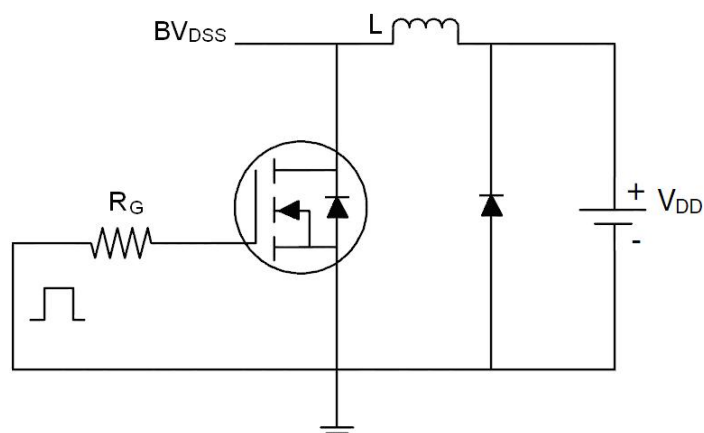
Notes 1.The maximum current rating is package limited.

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

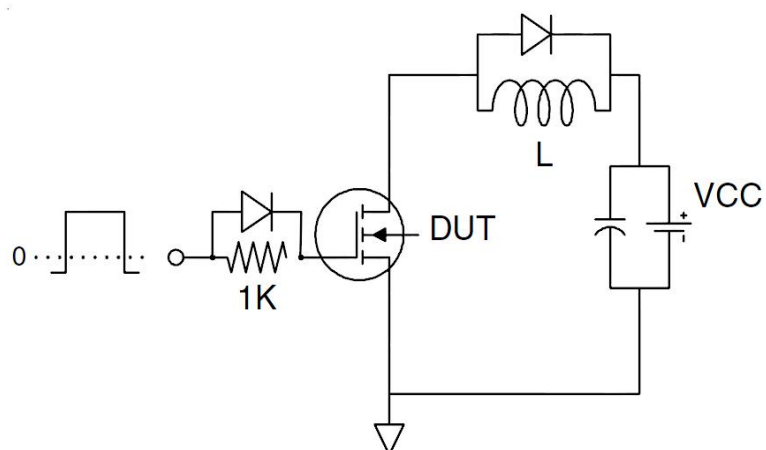
Notes 3.EAS condition: T_J=25°C, V_{DD}=50V, V_{gs}=10V, ID=20.5A, L=0.1mH, R_G=25ohm

Test Circuit

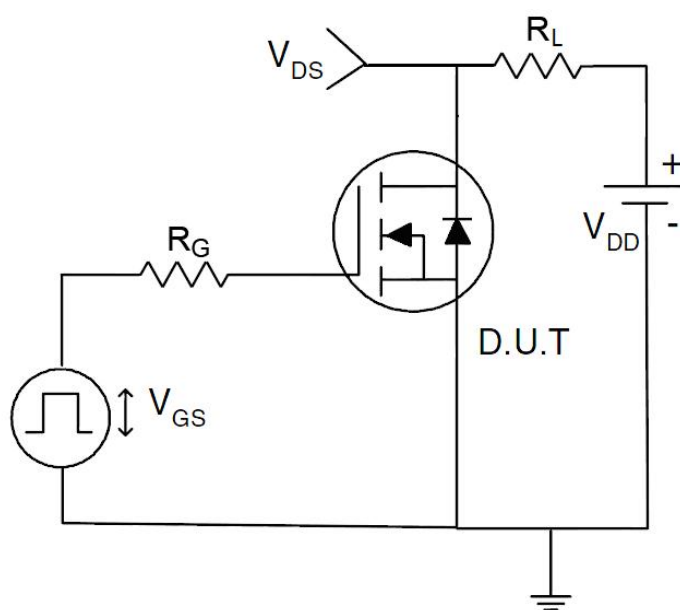
1) E_{AS} test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics

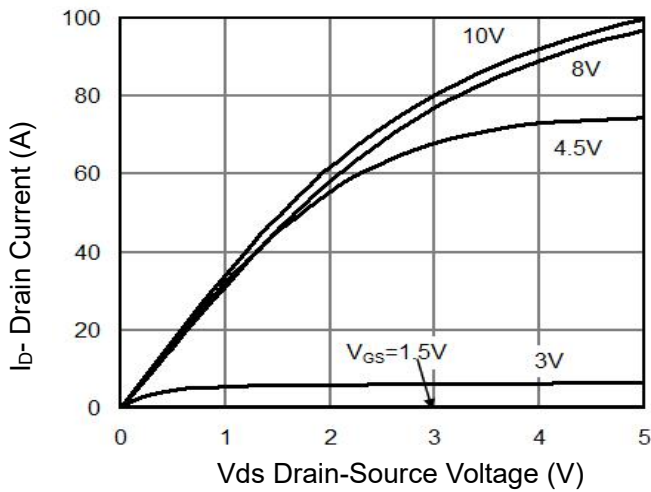


Figure 1 Output Characteristics

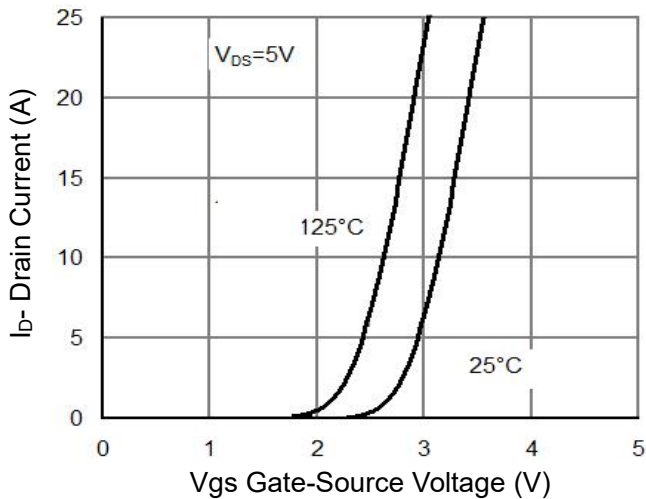


Figure 2 Transfer Characteristics

$R_{DS(on)}$ On-Resistance (m Ω)

I_D - Drain Current (A)

Figure 3 $R_{DS(on)}$ - Drain Current

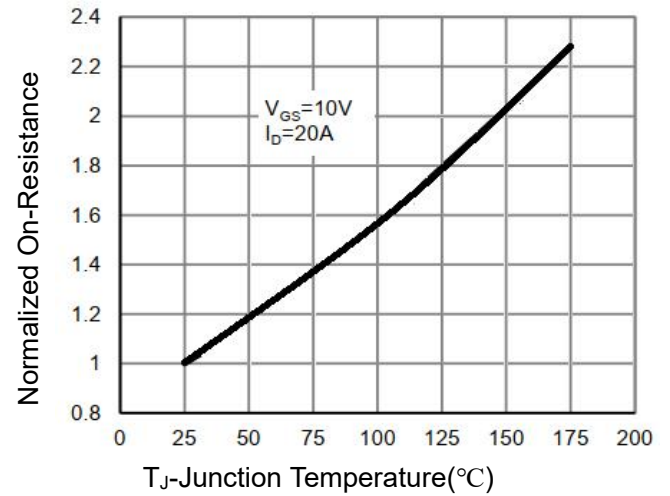


Figure 4 $R_{DS(on)}$ -Junction Temperature

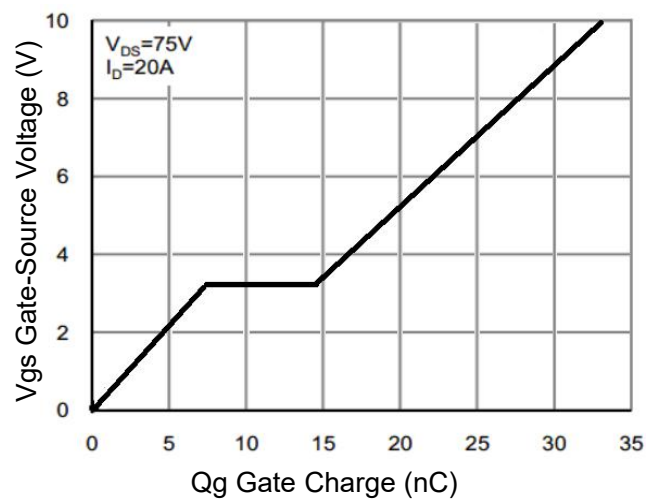


Figure 5 Gate Charge

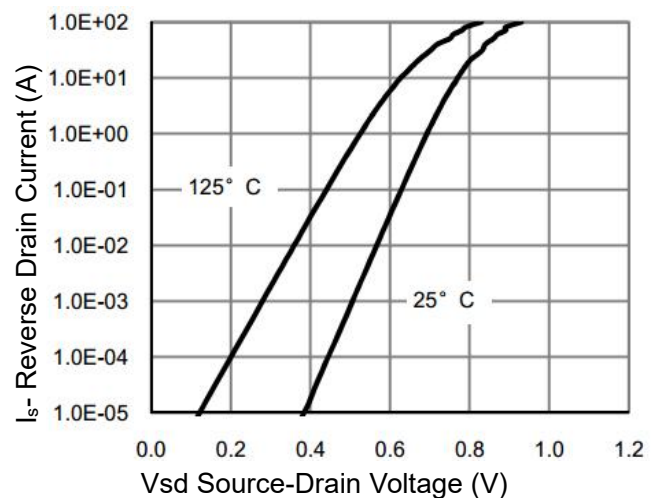


Figure 6 Source- Drain Diode Forward

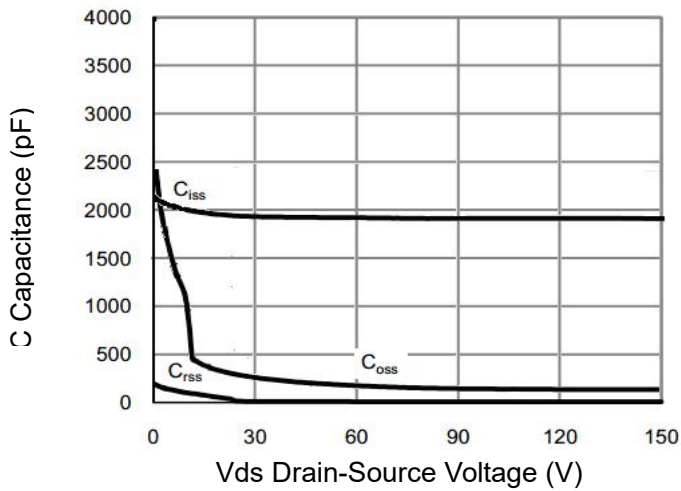


Figure 7 Capacitance vs Vds

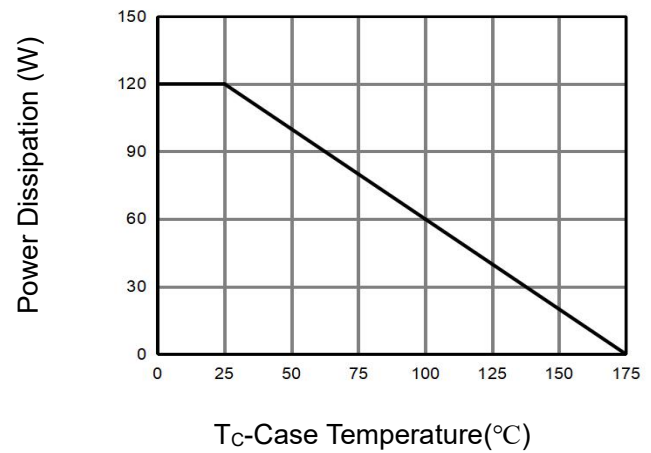


Figure 9 Power De-rating

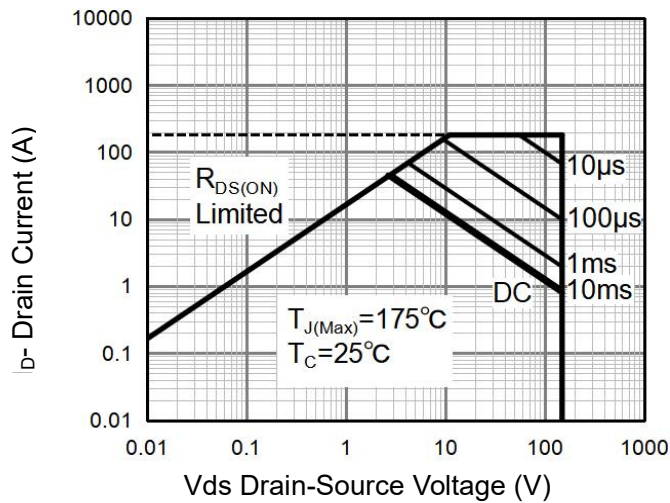


Figure 8 Safe Operation Area (Note3)

Id- Drain Current (A)

Figure 10 Current De-rating

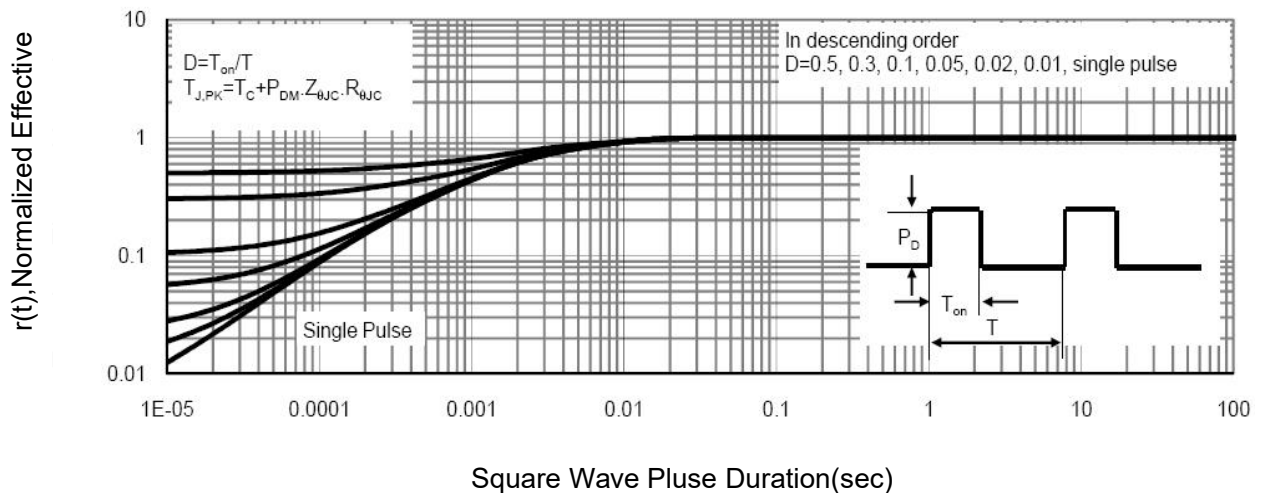


Figure 11 Normalized Maximum Transient Thermal Impedance

Technical drawing of a mechanical part, showing three views: Top View, Front View, and Side View. The drawing includes various dimensions and labels.

Top View:

- Overall width: $D1$
- Overall height: L
- Inner width: $D2$
- Inner height: $D3$
- Distance from top edge to inner width line: $L3$
- Distance from bottom edge to inner width line: $L1$
- Distance from bottom edge to inner height line: $L4$
- Distance from left edge to inner width line: e
- Distance from right edge to inner width line: b
- Central circular feature: ϕ

Front View:

- Overall width: D
- Overall height: A

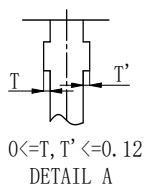
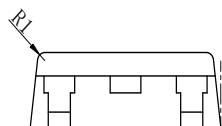
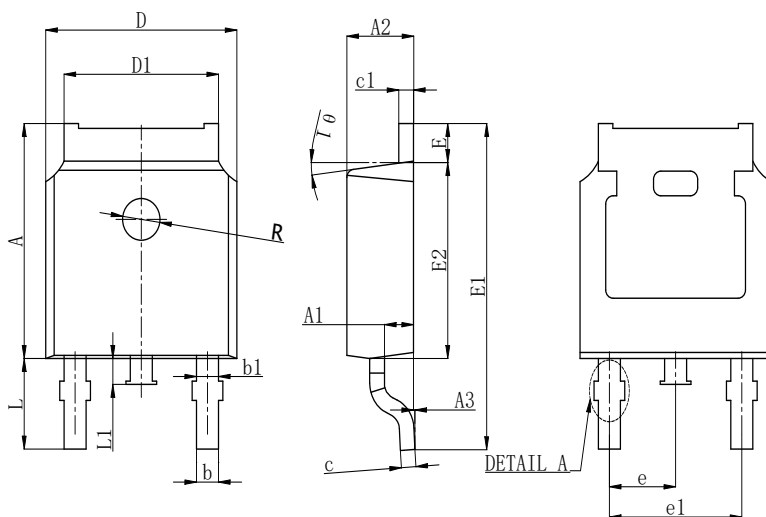
Side View:

- Overall height: E
- Distance from bottom edge to inner width line: $L2$
- Distance from top edge to inner width line: h
- Distance from right edge to inner width line: c
- Feature 1: $\ominus 1$
- Feature 2: $\ominus 2$
- Feature 3: $\ominus 3$

Section Line:

- Section line A-A is indicated at the bottom.

SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	2.200	2.300	2.400
A1	0.000		0.127
b	0.640	0.690	0.740
c (电镀后)	0.460	0.520	0.580
D	6.500	6.600	6.700
D1	5.334 REF		
D2	4.826 REF		
D3	3.166 REF		
E	6.000	6.100	6.200
e	2.286 TYP		
h	0.000	0.100	0.200
L	9.900	10.100	10.300
L1	2.888 REF		
L2	1.400	1.550	1.700
L3	1.600 REF		
L4	0.600	0.800	1.000
Φ	1.100	1.200	1.300
θ	0°		8°
θ 1	9° TYP		
θ 2	9° TYP		



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	7. 050	7. 100	7. 150
A1	0. 960	1. 010	1. 060
A2	2. 250	2. 300	2. 350
A3	0. 000	0. 050	0. 100
b	0. 760REF.		
b1	1. 000REF.		
c	0. 508REF.		
c1	0. 508REF.		
D	6. 550	6. 600	6. 650
D1	5. 220	5. 320	5. 420
E	0. 950	1. 000	1. 050
E1	9. 700	9. 900	10. 100
E2	6. 050	6. 100	6. 150
e	2. 286BSC		
e1	4. 572REF.		
L	2. 650	2. 800	2. 950
L1	0. 700	0. 800	0. 900
θ 1	7° REF.		
R	1. 300REF.		
R1	0. 250REF.		

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