

General Description

The AGM420MBA 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

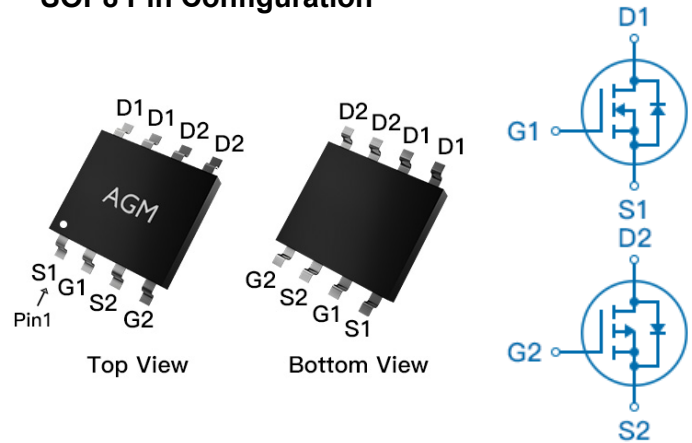
Application

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

Product Summary

BVDSS	RDSON	ID
40V	18mΩ	8.5A
-40V	40mΩ	-6.8A

SOP8 Pin Configuration



Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM420B	AGM420MBA	SOP8	330mm	12mm	3000

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

Symbol	Parameter	Rating		Units
		N-Ch	P-Ch	
V_{DS}	Drain-Source Voltage ($V_{GS}=0V$)	40	-40	V
V_{GS}	Gate-Source Voltage ($V_{DS}=0V$)	±20	±20	V
I_D	Drain Current-Continuous($T_A=25^{\circ}C$) (Note 1)	8.5	-6.8	A
	Drain Current-Continuous($T_A=100^{\circ}C$)	5.1	-4.1	A
IDM (pluse)	Drain Current-Pulsed (Note 2)	34	-27	A
P_D	Total Power Dissipation($T_A=25^{\circ}C$)	2.5	2.5	W
	Total Power Dissipation($T_A=100^{\circ}C$)	1.0	1.0	W
EAS	Avalanche energy (Note 3)	56	49	mJ
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150	-55 To 150	°C

Table 2. Thermal Characteristic

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient (Steady State) ¹	---	50	°C/W

Table 3. N- Channel Electrical Characteristics (TJ=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
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	1.2	1.8	2.2	V
gFS	Forward Transconductance	VDS=5V,ID=5A	--	8	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=10V, ID=5A	--	18	24	mΩ
		VGS=4.5V, ID=4A	--	27	35	mΩ
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=20V,VGS=0V, F=1MHZ	--	516	--	pF
Coss	Output Capacitance		--	82	--	pF
Crss	Reverse Transfer Capacitance		--	43	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	--	--	Ω
Switching Times						
td(on)	Turn-on Delay Time	VGS=10V,VDS=15V, RL=2.5Ω,RGEN=3Ω	--	4.5	--	nS
tr	Turn-on Rise Time		--	2.5	--	nS
td(off)	Turn-Off Delay Time		--	14.5	--	nS
tf	Turn-Off Fall Time		--	3.5	--	nS
Qg	Total Gate Charge	VGS=10V, VDS=20V, ID=6A	--	8.9	--	nC
Qgs	Gate-Source Charge		--	2.4	--	nC
Qgd	Gate-Drain Charge		--	1.4	--	nC
Source-Drain Diode Characteristics						
ISD	Source-Drain Current(Body Diode)		--	--	8.5	A
VSD	Forward on Voltage	VGS=0V,IS=4A	--	0.8	1.2	V
trr	Reverse Recovery Time	IF=6A , dl/dt=100A/μs , TJ=25℃	--	--	--	ns
Qrr	Reverse Recovery Charge		--	--	--	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, VDD=25V, Vgs=10V, ID=15A, L=0.5mH, RG=25ohm

Table 3. P-Channel 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	-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	-1.2	--	-2.2	V
gFS	Forward Transconductance	VDS=-5V,ID=-4A	--	6	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=-10V, ID=-4A	--	40	58	mΩ
		VGS=-4.5V, ID=-3A	--	61	78	mΩ
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=-20V,VGS=0V, F=1MHZ	--	931	--	pF
Coss	Output Capacitance		--	96	--	pF
Crss	Reverse Transfer Capacitance		--	72	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	--	--	Ω
Switching Times						
td(on)	Turn-on Delay Time	VGS=-10V,VDS=-20V, ID=-10A,RGEN=2.5Ω	--	7.2	--	nS
tr	Turn-on Rise Time		--	14	--	nS
td(off)	Turn-Off Delay Time		--	21	--	nS
tf	Turn-Off Fall Time		--	8.1	--	nS
Qg	Total Gate Charge	VGS=-10V, VDS=-20V, ID=-6A	--	18	--	nC
Qgs	Gate-Source Charge		--	3.2	--	nC
Qgd	Gate-Drain Charge		--	3.8	--	nC
Source-Drain Diode Characteristics						
ISD	Source-Drain Current(Body Diode)		--	--	-6.8	A
VSD	Forward on Voltage	VGS=0V,IS=-3A	--	--	-1.2	V
trr	Reverse Recovery Time	IF=-6A , dI/dt=100A/μs , TJ=25℃	--	--	--	ns
Qrr	Reverse Recovery Charge		--	--	--	nc

Notes 1.The maximum current rating is package limited.

Notes2.Repetitive Rating: Pulse width limited by maximum junction temperature Notes

3.EAS condition: T_J=25°C, V_{DD}=-25V, V_{gs}=-10V, I_D=-14A, L=0.5mH, R_G=25ohm

N- Channel Typical Electrical and Thermal Characteristics (Curves)

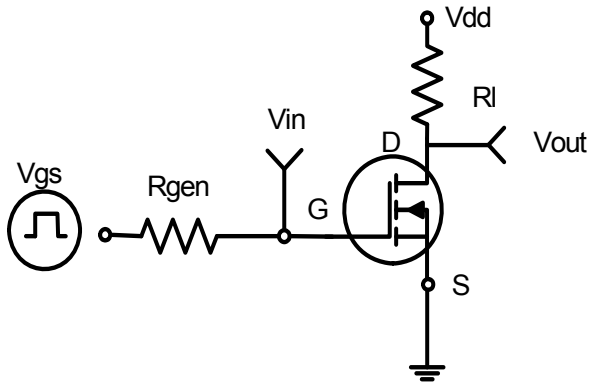


Figure 1: Switching Test Circuit

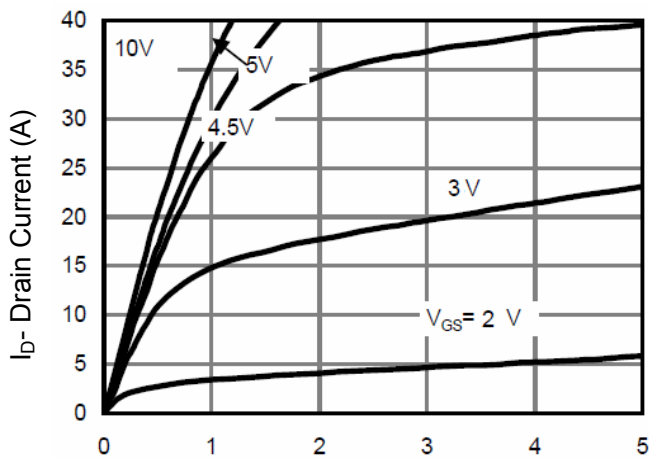


Figure 3 Output Characteristics

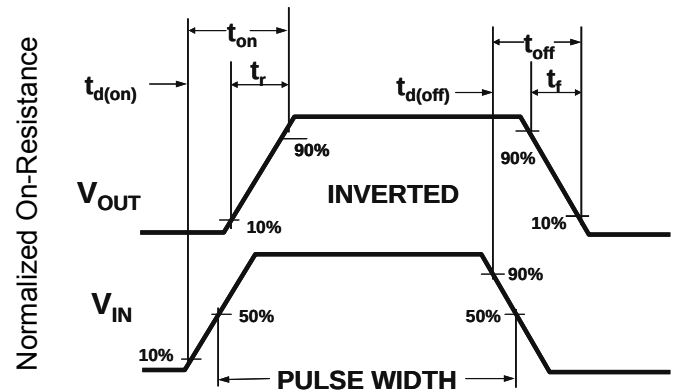


Figure 2: Switching Waveforms

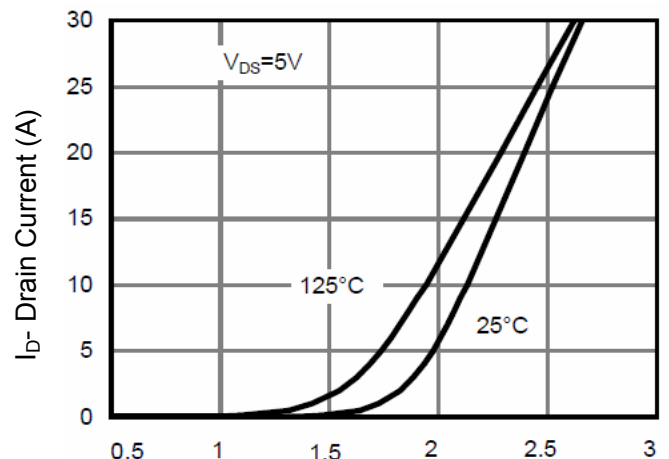


Figure 4 Transfer Characteristics

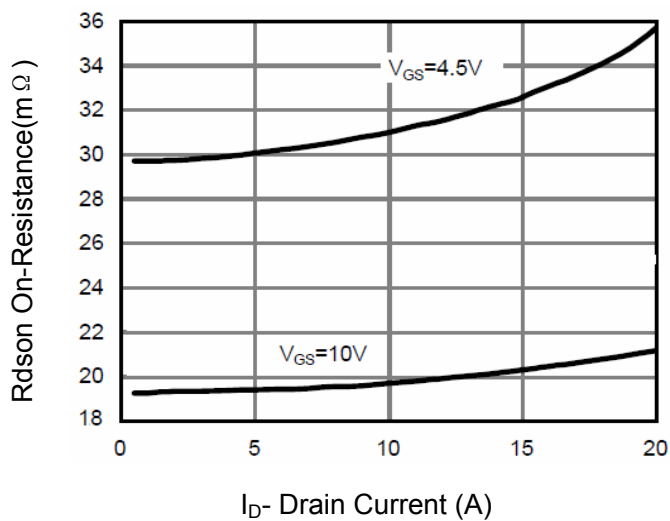


Figure 5 Drain-Source On-Resistance

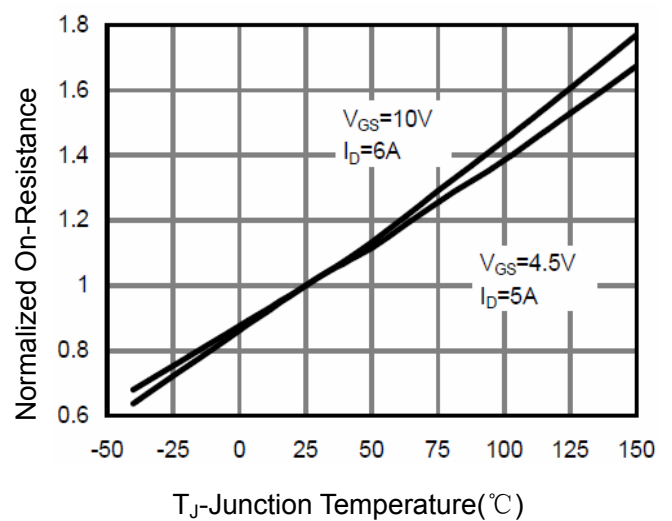


Figure 6 Drain-Source On-Resistance

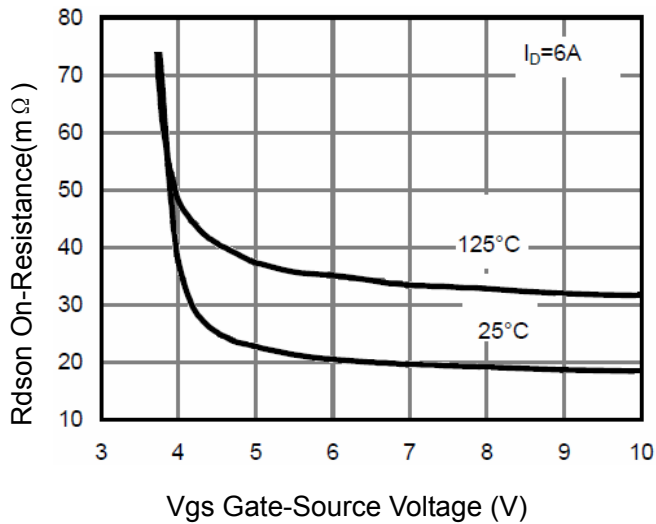


Figure7 Rdson vs Vgs

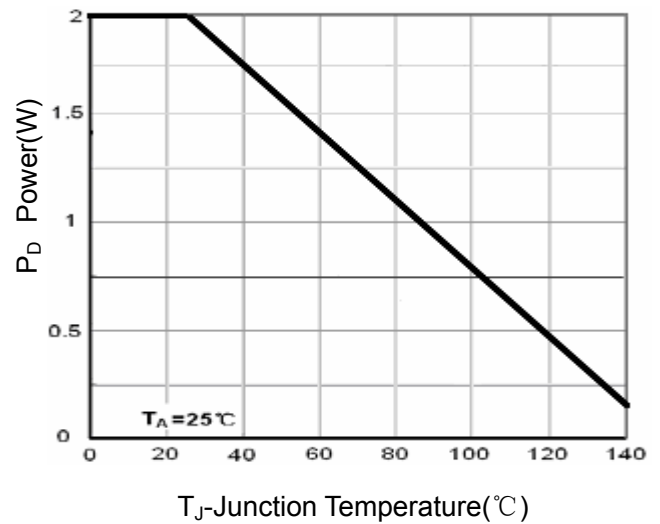


Figure 8 Power Dissipation

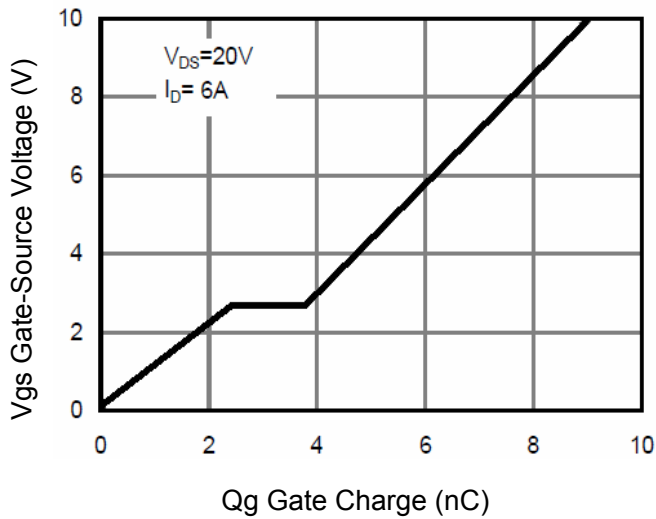


Figure 9 Gate Charge

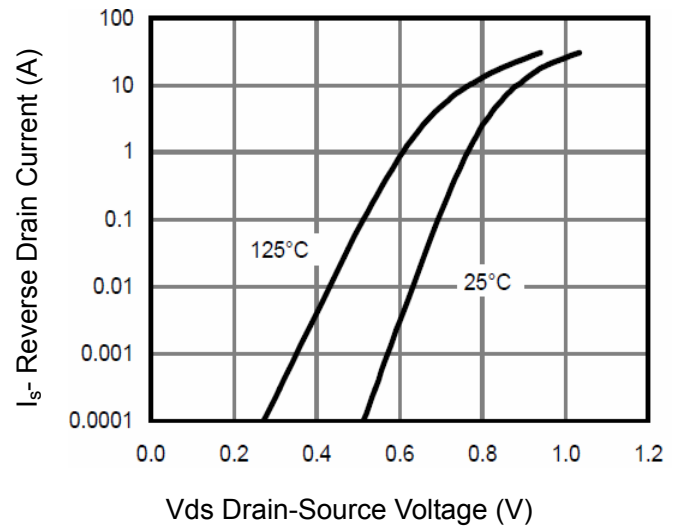


Figure 10 Source- Drain Diode Forward

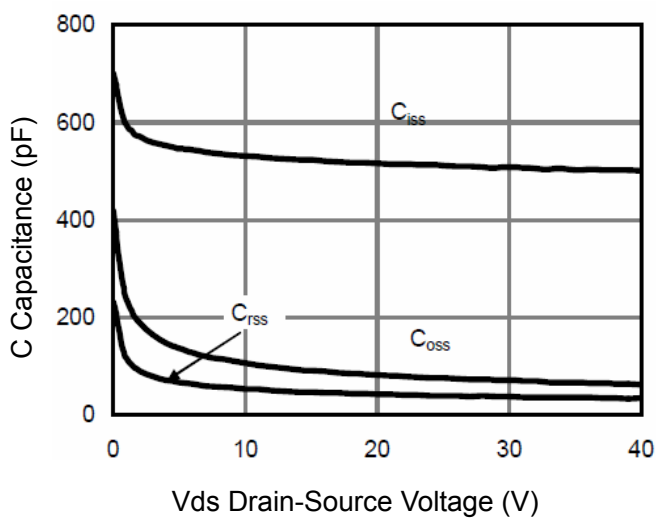


Figure 11 Capacitance vs Vds

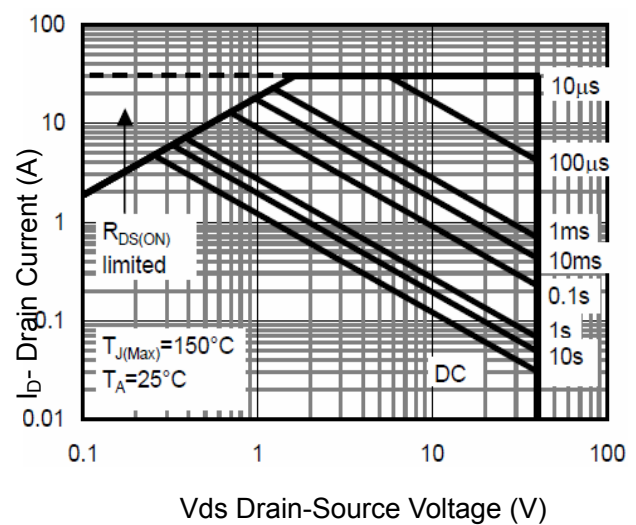


Figure 12 Safe Operation Area

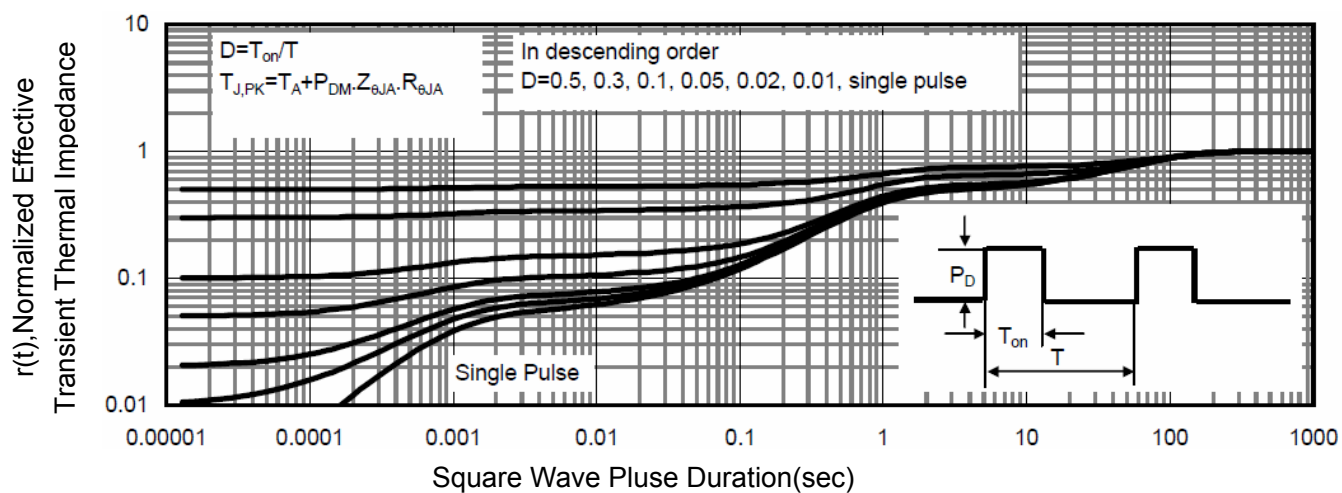


Figure 13 Normalized Maximum Transient Thermal Impedance

Fig.1 Power Dissipation Derating Curve

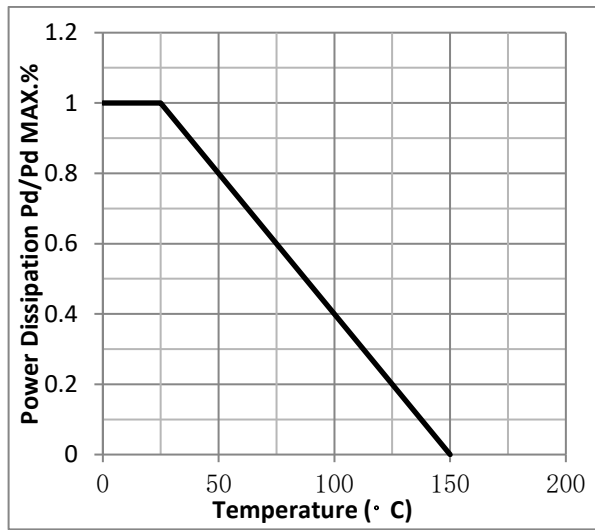


Fig.2 Typical output Characteristics

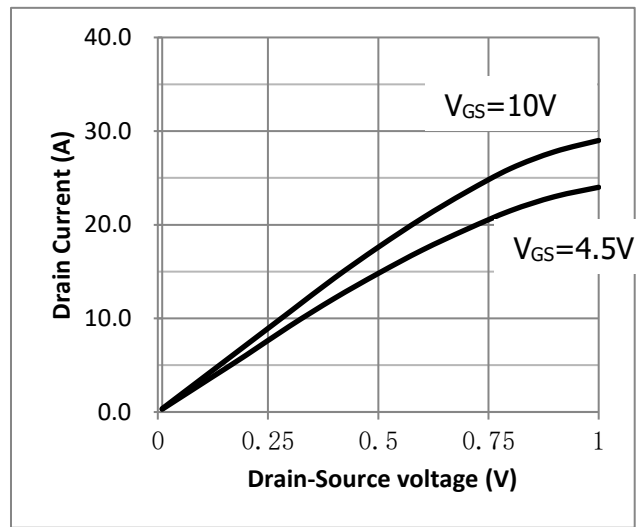


Fig.3 Threshold Voltage V.S Junction Temperature

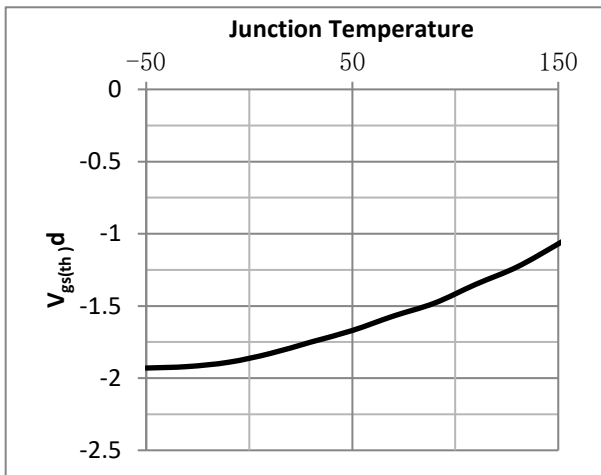


Fig.4 Resistance V.S Drain Current

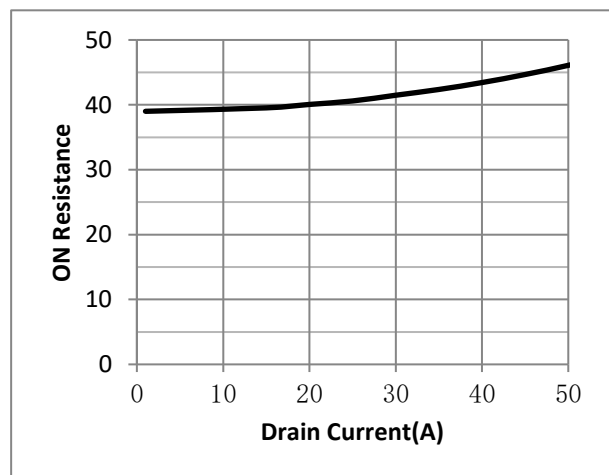


Fig.5 On-Resistance VS Gate Source Voltage

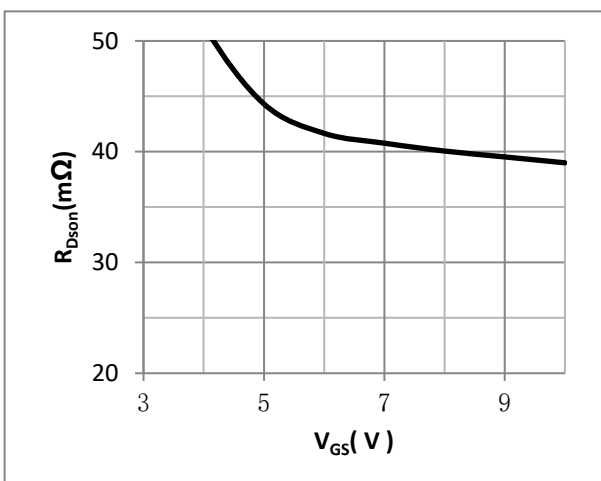


Fig.6 On-Resistance V.S Junction Temperature

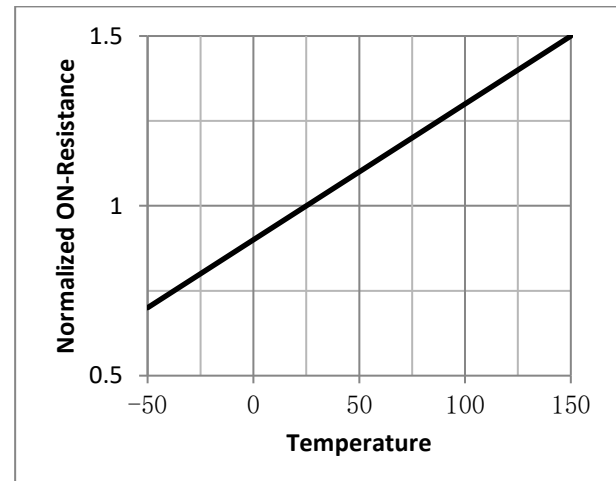


Fig.7 Switching Time Measurement Circuit

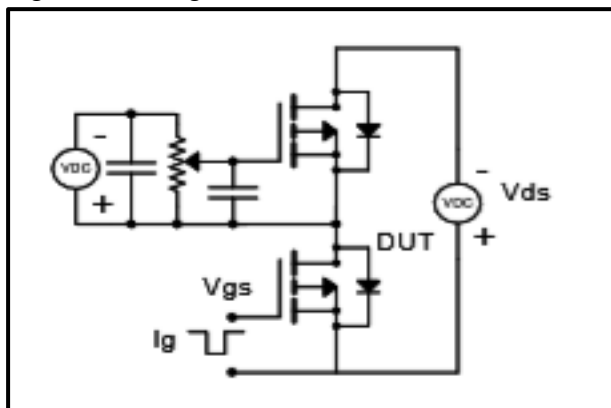


Fig.8 Gate Charge Waveform

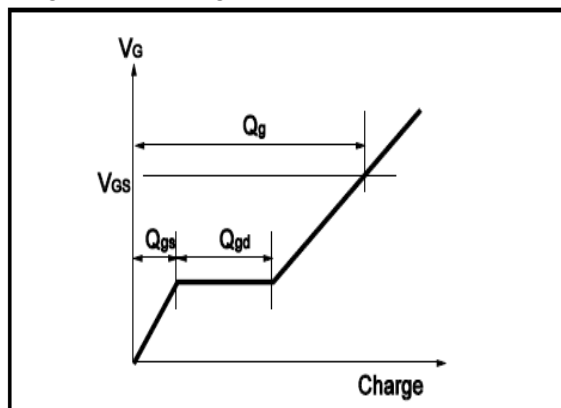


Fig.9 Switching Time Measurement Circuit

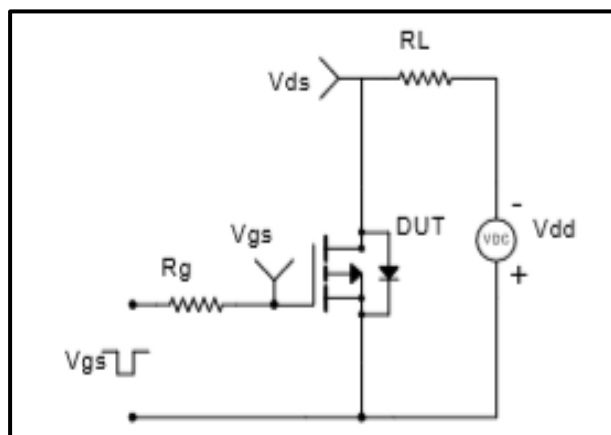


Fig.10 Gate Charge Waveform

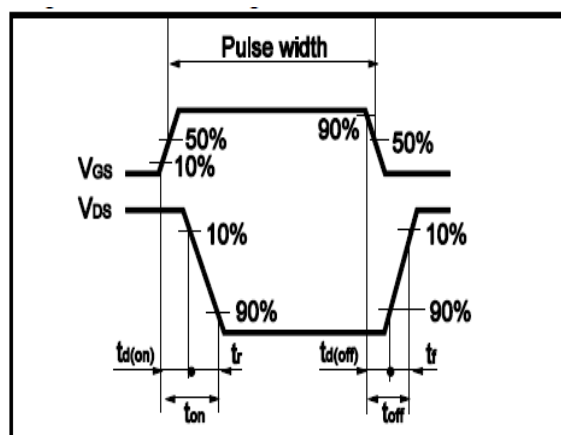


Fig.11 Avalanche Measurement Circuit

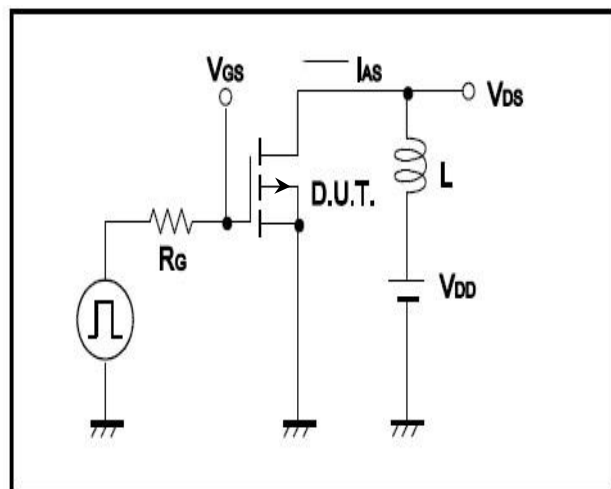
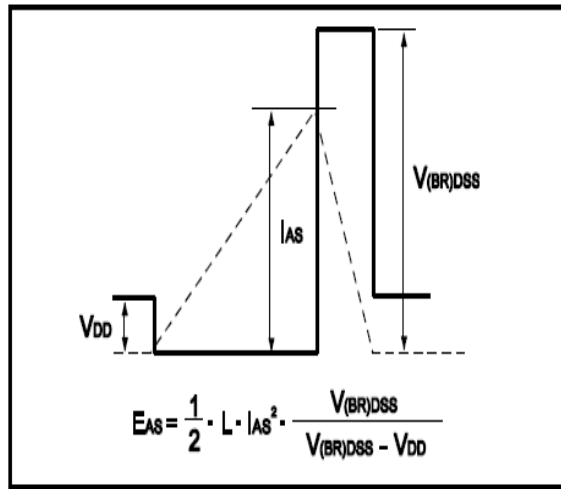
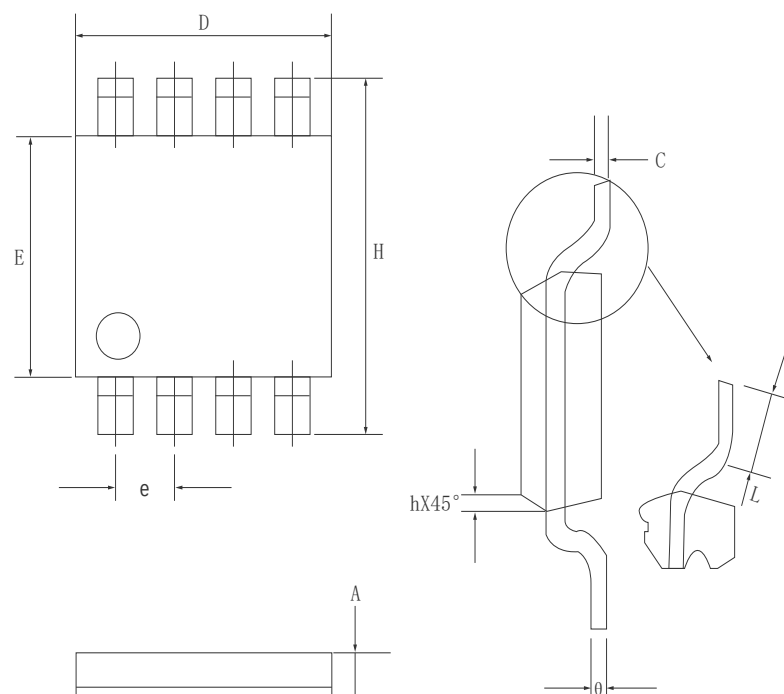


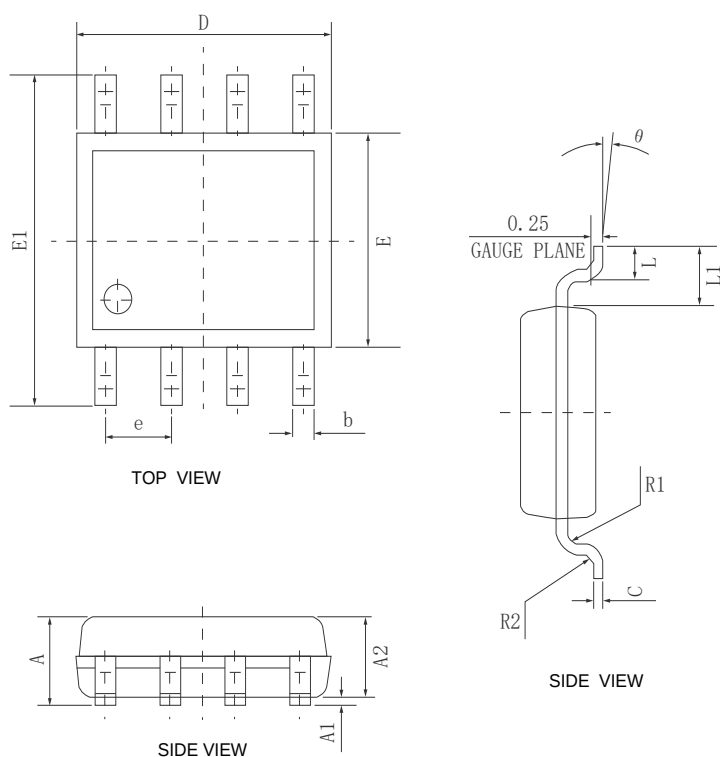
Fig.12 Avalanche Waveform



Dimensions (SOP8)



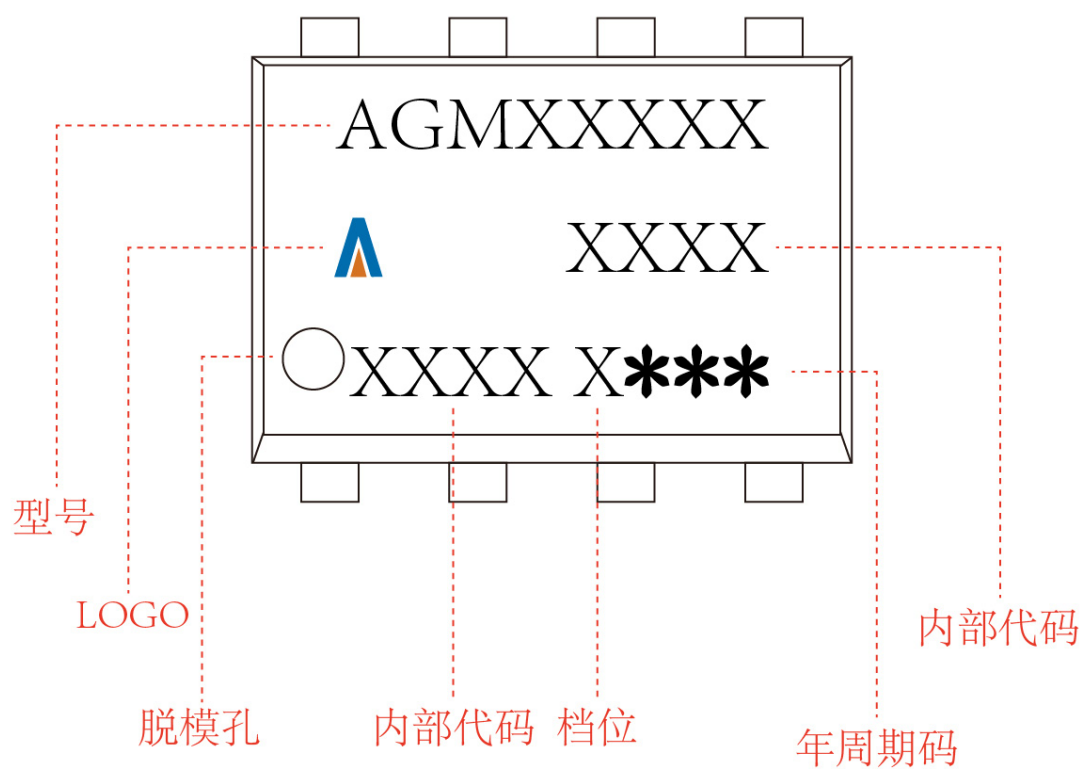
DIM	MILLIMETERS	
	MIN	MAX
A	1.35	1.75
A1	0.02	0.15
B	0.33	0.5
C	0.1	0.25
D	4.8	5
E	3.8	4
e	1.27 (BSC)	
H	5.8	6.2
h	0.25	0.5
I	0.4	1.25
θ	0°	7°



SYMBOL	MIN	NOM	MAX
A	1.40	1.60	1.80
A1	0.05	0.15	0.25
A2	1.35	1.45	1.55
b	0.30	0.40	0.50
c	0.153	0.203	0.253
D	4.80	4.90	5.00
E	3.80	3.90	4.00
E1	5.80	6.00	6.20
L	0.45	0.70	1.00
θ	2°	4°	6°
L1	1.04 REF		
e	1.27 BSC		
R1	0.07 TYP		
R2	0.07 TYP		

SOP8

Marking Instructions:



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