

### • General Description

The AGM310MA 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

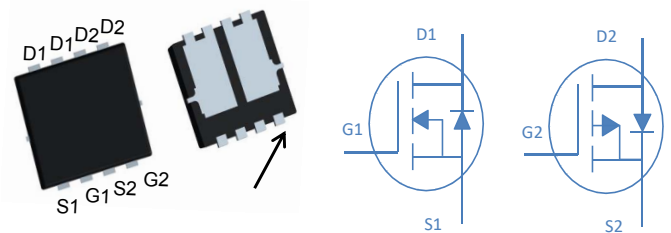
### • Application

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

### Product Summary

BVDSS	RDSON	ID
30V	11mΩ	23A
-30V	23mΩ	-18A

### PDFN5X6 Pin Configuration



### Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM310MA	AGM310MA	PDFN5*6	--mm	--mm	3000

**Table 1. Absolute Maximum Ratings ( $T_A=25^{\circ}\text{C}$ )**

Symbol	Parameter	Rating		Units
		N-Ch	P-Ch	
$V_{DS}$	Drain-Source Voltage ( $V_{GS}=0V$ )	30	-30	V
$V_{GS}$	Gate-Source Voltage ( $V_{DS}=0V$ )	$\pm 20$	$\pm 20$	V
$I_D$	Drain Current-Continuous( $T_c=25^{\circ}\text{C}$ ) (Note 1)	25	-18	A
	Drain Current-Continuous( $T_c=100^{\circ}\text{C}$ )	16	-14	A
IDM (pluse)	Drain Current-Continuous@ Current-Pulsed (Note 2)	45	-35	A
$P_D$	Total Power Dissipation( $T_c=25^{\circ}\text{C}$ )	3.6	3.6	W
	Total Power Dissipation( $T_A=100^{\circ}\text{C}$ )	0.7	0.7	W
EAS	Avalanche energy (Note 3)	45	65	mJ
$T_J, T_{STG}$	Operating Junction and Storage Temperature Range	-55 To 150	-55 To 150	$^{\circ}\text{C}$

**Table 2. Thermal Characteristic**

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient (Steady State) <sup>1</sup>	---	180	$^{\circ}\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	---	34	$^{\circ}\text{C}/\text{W}$

**Table 3. N- Channel 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	30	--	--	V
IDSS	Zero Gate Voltage Drain Current	VDS=30V,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	1.6	2.5	V
gFS	Forward Transconductance	VDS=5V,ID=10A	--	10	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=10V, ID=20A	--	11	16	mΩ
		VGS=4.5V, ID=10A	--	15	25	mΩ
<b>Dynamic Characteristics</b>						
Ciss	Input Capacitance	VDS=15V,VGS=0V, F=1MHZ	--	850	--	pF
Coss	Output Capacitance		--	130	--	pF
Crss	Reverse Transfer Capacitance		--	98	--	pF
Rg	Gate resistance	VGS=0V, VDS=-0V,f=1.0MHz	--	1.9	--	Ω
<b>Switching Times</b>						
td(on)	Turn-on Delay Time	VGS=10V,VDS=15V, RL=0.75Ω,RGEN=6Ω	--	4.7	--	nS
tr	Turn-on Rise Time		--	11	--	nS
td(off)	Turn-Off Delay Time		--	17	--	nS
tf	Turn-Off Fall Time		--	5.6	--	nS
Qg	Total Gate Charge	VGS=10V, VDS=15V, ID=10A	--	16	--	nC
Qgs	Gate-Source Charge		--	3	--	nC
Qgd	Gate-Drain Charge		--	3.8	--	nC
<b>Source-Drain Diode Characteristics</b>						
ISD	Source-Drain Current(Body Diode)		--	--	23	A
VSD	Forward on Voltage	VGS=0V,IS=20A	--	--	1.2	V
trr	Reverse Recovery Time	IF=-25A , dl/dt=100A/μs ,	--	--	--	ns
Qrr	Reverse Recovery Charge	TJ=25°C	--	--	--	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=15V,VG=10V, RG=25Ω

**Table 3. P-Channel 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	-30	--	--	V
IDSS	Zero Gate Voltage Drain Current	VDS=-30V,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	-1.7	-2.3	V
gFS	Forward Transconductance	VDS=-5V,ID=-10A	--	5	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=-10V, ID=-10A	--	24	35	mΩ
		VGS=-4.5V, ID=-5A	--	34	55	mΩ
<b>Dynamic Characteristics</b>						
Ciss	Input Capacitance	VDS=-15V,VGS=0V, F=1MHZ	--	860	--	pF
Coss	Output Capacitance		--	94	--	pF
Crss	Reverse Transfer Capacitance		--	32	--	pF
Rg	Gate resistance	VGS=0V, VDS=-0V,f=1.0MHz	--	9	--	Ω
<b>Switching Times</b>						
td(on)	Turn-on Delay Time	VGS=-10V,VDS=-15V, ID=-15A,RGEN=3.3Ω	--	8	--	nS
tr	Turn-on Rise Time		--	18	--	nS
td(off)	Turn-Off Delay Time		--	31.8	--	nS
tf	Turn-Off Fall Time		--	18.4	--	nS
Qg	Total Gate Charge	VGS=-10V, VDS=-25V, ID=-12A	--	12	--	nC
Qgs	Gate-Source Charge		--	2.0	--	nC
Qgd	Gate-Drain Charge		--	2.9	--	nC
<b>Source-Drain Diode Characteristics</b>						
ISD	Source-Drain Current(Body Diode)		--	--	-18	A
VSD	Forward on Voltage	VGS=0V,IS=-10A	--	--	-1.2	V
trr	Reverse Recovery Time	IF=-25A , dl/dt=100A/μs , TJ=25°C	--	--	--	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: TJ=25°C,VDD=15V,VG=10V, RG=25Ω

●N Channel characteristics curve

Fig.1 Power Dissipation Derating Curve

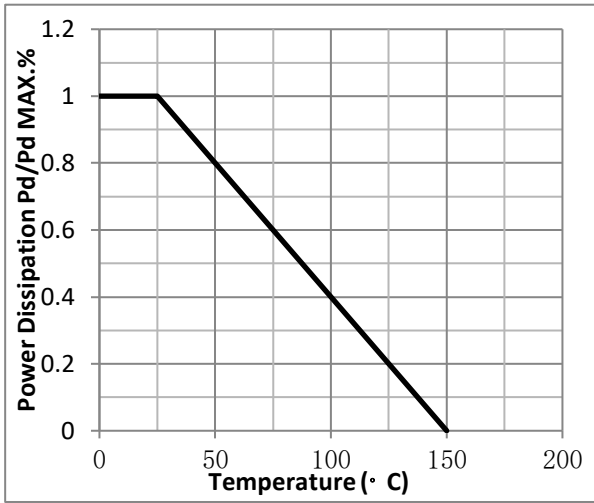


Fig.2 Typical output Characteristics

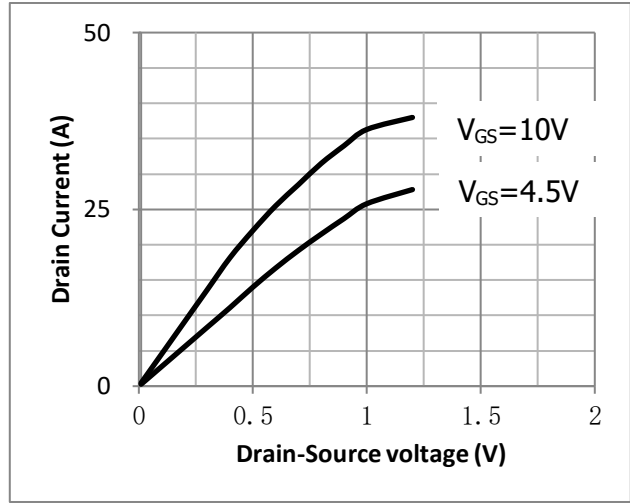


Fig.3 Threshold Voltage V.S Junction Temperature

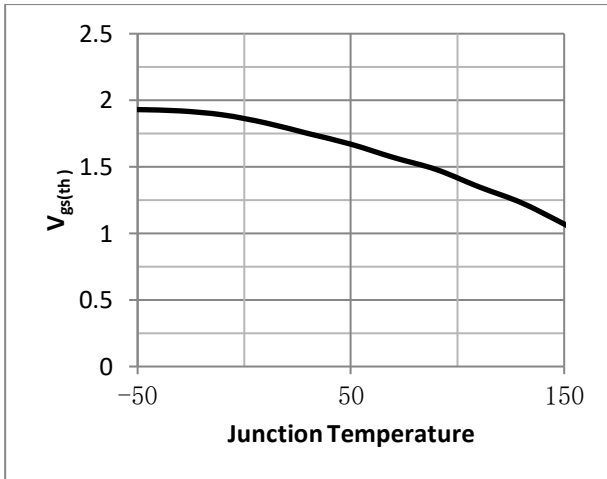


Fig.4 Resistance V.S Drain Current

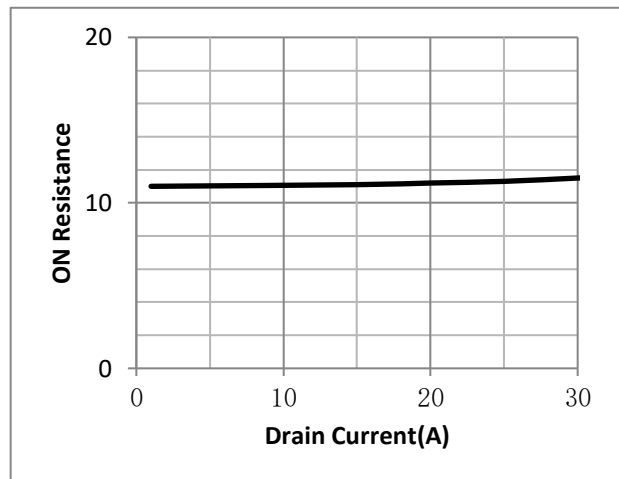


Fig.5 On-Resistance VS Gate Source Voltage

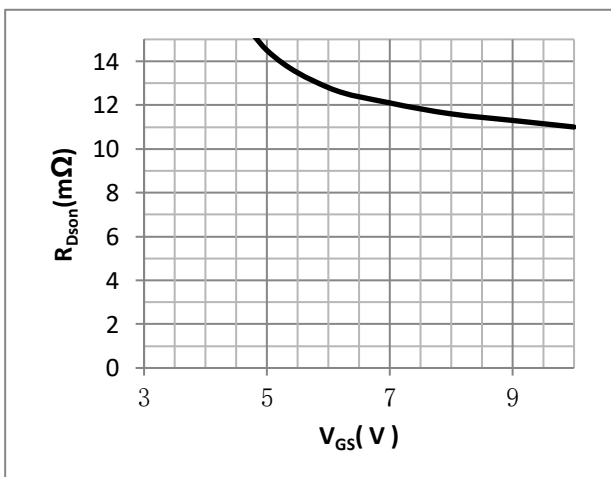
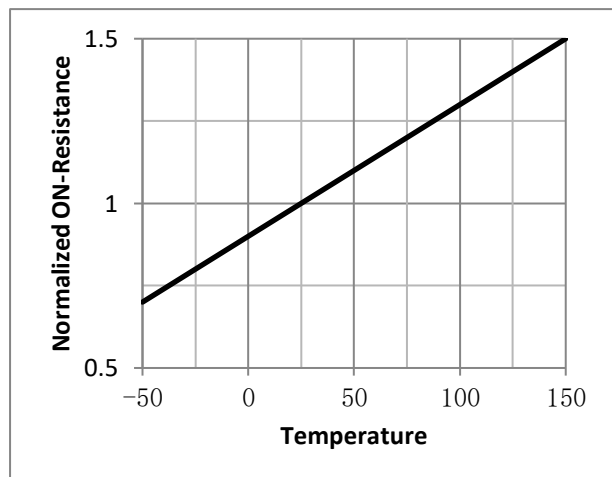


Fig.6 On-Resistance V.S Junction Temperature



● P Channel characteristics curve

Fig.1 Power Dissipation Derating Curve

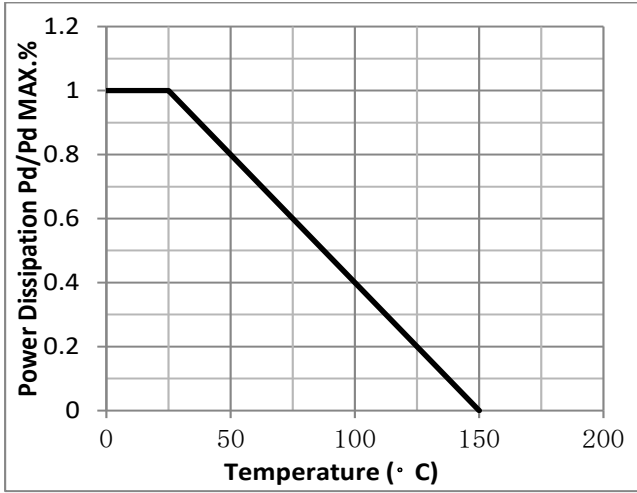


Fig.2 Typical output Characteristics

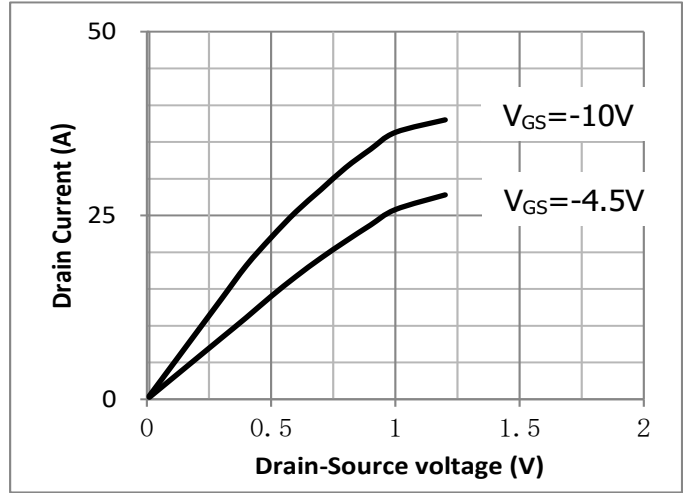


Fig.3 Threshold Voltage V.S Junction Temperature

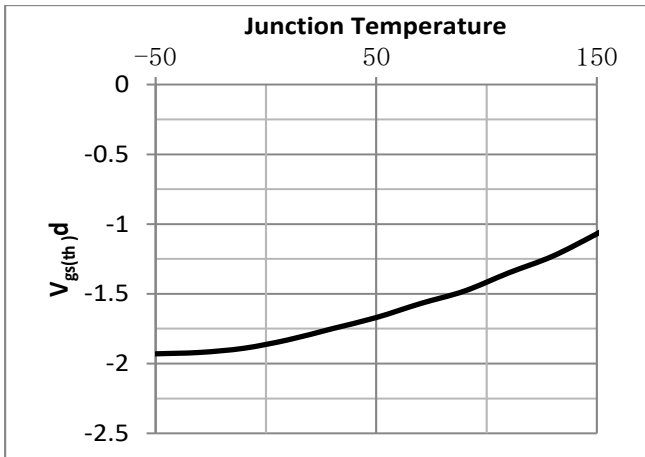


Fig.4 Resistance V.S Drain Current

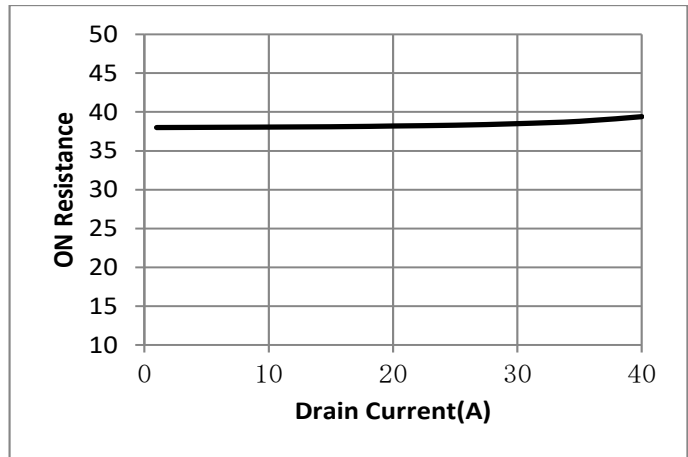


Fig.5 On-Resistance VS Gate Source Voltage

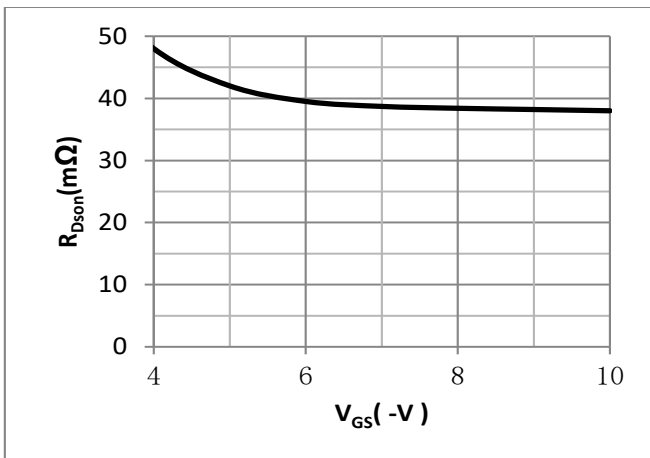
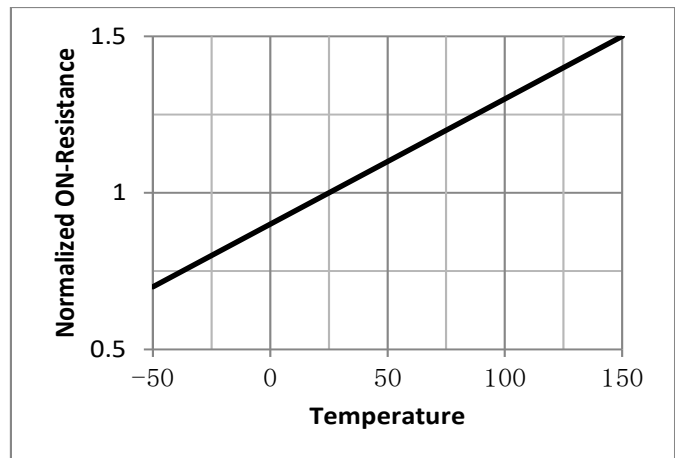


Fig.6 On-Resistance V.S Junction Temperature



●Test Circuit

Fig.1 Switching Time Measurement Circuit

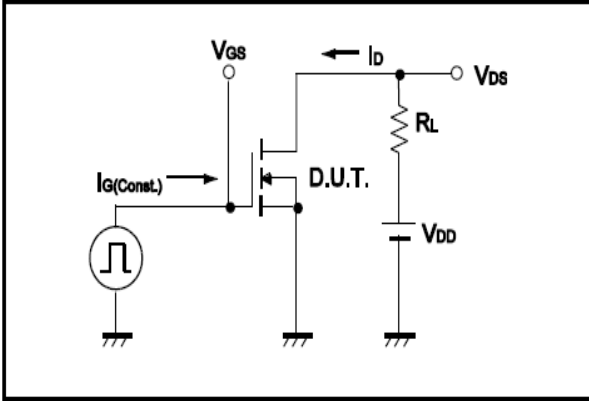


Fig.2 Gate Charge Waveform

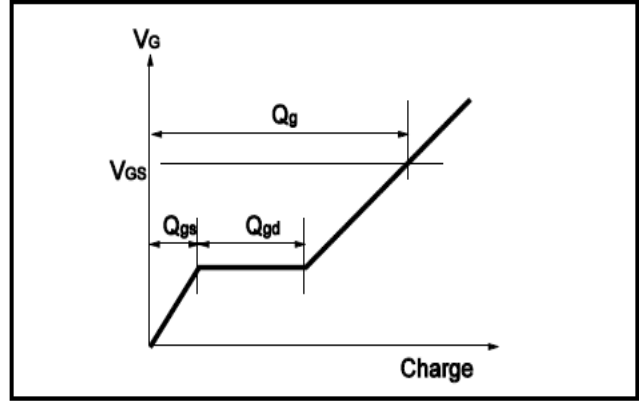


Fig.3 Switching Time Measurement Circuit

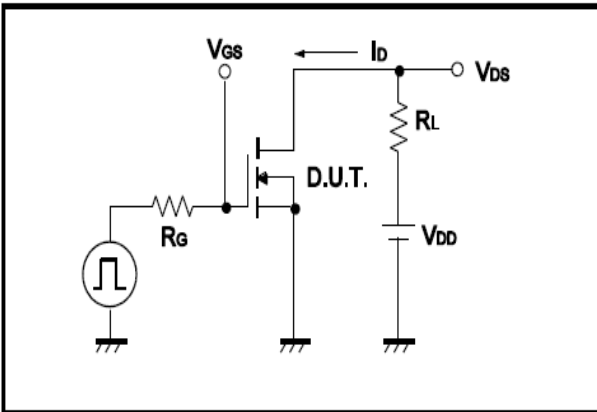


Fig.4 Gate Charge Waveform

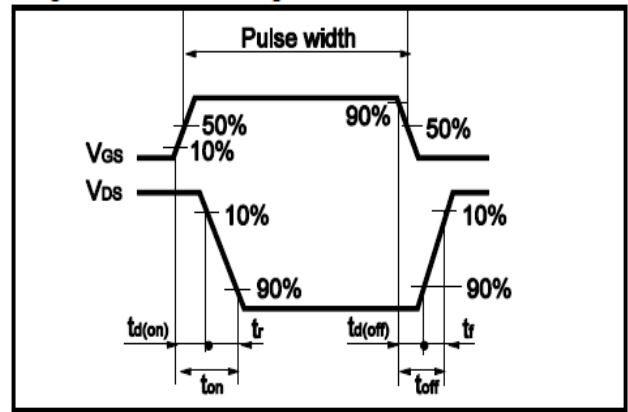


Fig.5 Avalanche Measurement Circuit

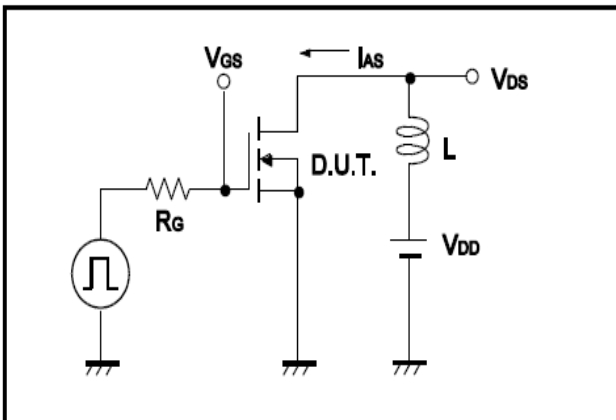
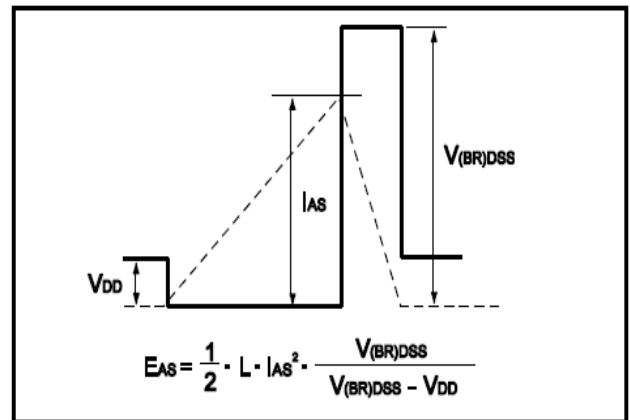


Fig.6 Avalanche Waveform




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