● General Description

The AGM310MAP 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

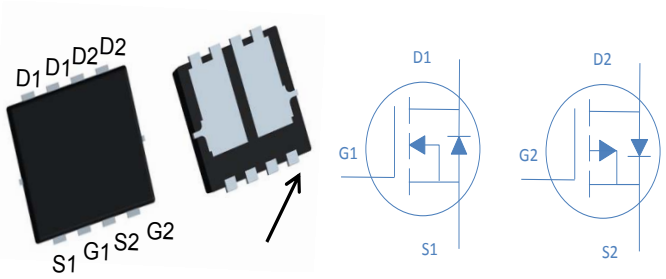
■POL application

■BLDC Motor driver

Product Summary

BVDSS	RDSON	ID
30V	11mΩ	20A
-30V	17mΩ	-18A

PDFN3.3X3.3 Pin Configuration



Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM310MAP	AGM310MAP	DFN3.3*3.3	325mm	16mm	5000

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

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)	±20	±20	V
I_D	Drain Current-Continuous(T_C=25℃) (Note 1)	20	-18	A
	Drain Current-Continuous(Tc=100℃)	15	-14	A
IDM (pluse)	Drain Current-Continuous@ Current-Pulsed (Note 2)	35	-32	A
P_D	Total Power Dissipation(T_C=25℃)	3.6	3.6	W
	Total Power Dissipation(TA=100℃)	0.7	0.7	W
EAS	Avalanche energy (Note 3)	45	65	mJ
TJ,TSTG	Operating Junction and Storage Temperature Range	-55 To 150	-55 To 150	℃

Table 2. Thermal Characteristic

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient (Steady State)[1]	---	180	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	34	℃/W

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=250μA	30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V,V_{GS}=0V			1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V,V_{DS}=0V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	1.2	1.6	2.5	V
g_{FS}	Forward Transconductance	V_{DS}=10V,I_D=5A		10		S
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=15A		11	14	mΩ
		V_{GS}=4.5V, I_D=15A		15	22	mΩ
Dynamic Characteristics						
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	V_{GS}=0V, V_{DS}=0V,f=1.0MHz		1.9		Ω
Switching Times						
$t_{d(on)}$	Turn-on Delay Time	V_{GS}=10V, V_{DS}=15V, R_L=0.75Ω,R_{GEN}=3.3Ω		4.7		nS
t_r	Turn-on Rise Time			11		nS
$t_{d(off)}$	Turn-Off Delay Time			17		nS
t_f	Turn-Off Fall Time			5.6		nS
Q_g	Total Gate Charge	V_{GS}=10V, V_{DS}=15V, I_D=10A		16		nC
Q_{gs}	Gate-Source Charge			3		nC
Q_{gd}	Gate-Drain Charge			3.8		nC
Source-Drain Diode Characteristics						
I_{SD}	Source-Drain Current(Body Diode)				18	A
V_{SD}	Forward on Voltage	V_{GS}=0V,I_S=20A			1.2	V

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℃,VDD=15V,V_G=10V, RG=25Ω

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=250μA	-30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-24V,V_{GS}=0V			-1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V,V_{DS}=0V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	1.2	1.7	2.3	V
g_{FS}	Forward Transconductance	V_{DS}=-5V,I_D=-20A		30		S
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=-10V, I_D=-20A		17	23.1	mΩ
		V_{GS}=-4.5V, I_D=-15A		26	32	mΩ
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=-15V,VGS=0V, F=1MHZ		1380		pF
Coss	Output Capacitance			310		pF
Crss	Reverse Transfer Capacitance			237		pF
Rg	Gate resistance	V_{GS}=0V, V_{DS}=0V,f=1.0MHz		9		Ω
Switching Times						
$t_{d(on)}$	Turn-on Delay Time	V_{GS}=-10V, V_{DD}=-15V, ID=-15A,R_{GEN}=3.3Ω		8		nS
t_r	Turn-on Rise Time			18		nS
$t_{d(off)}$	Turn-Off Delay Time			31.8		nS
t_f	Turn-Off Fall Time			18.4		nS
Q_g	Total Gate Charge	V_{GS}=-10V, V_{DS}=-25V, I_D=-12A		45		nC
Q_{gs}	Gate-Source Charge			6.4		nC
Q_{gd}	Gate-Drain Charge			9.0		nC
Source-Drain Diode Characteristics						
I_S	Continuous Source Current	VG=VD=0V , Force Current			-8	A
V_{SD}	Forward on Voltage	V_{GS}=0V,I_S=-1A			1.2	V

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℃,VDD=15V,V_G=10V, RG=25Ω

●N Channel characteristics curve

Fig.1 Power Dissipation

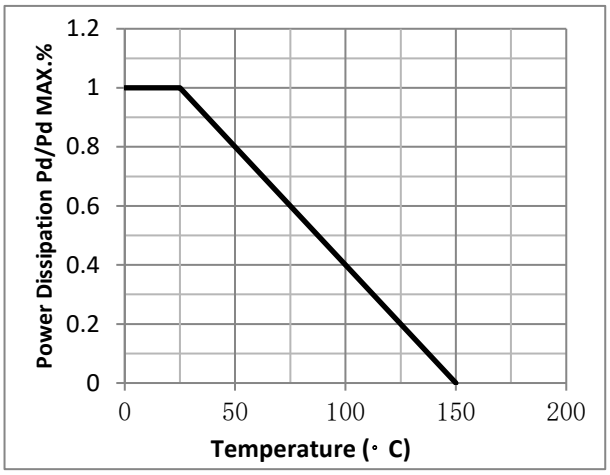


Fig.2 Typical output Characteristics

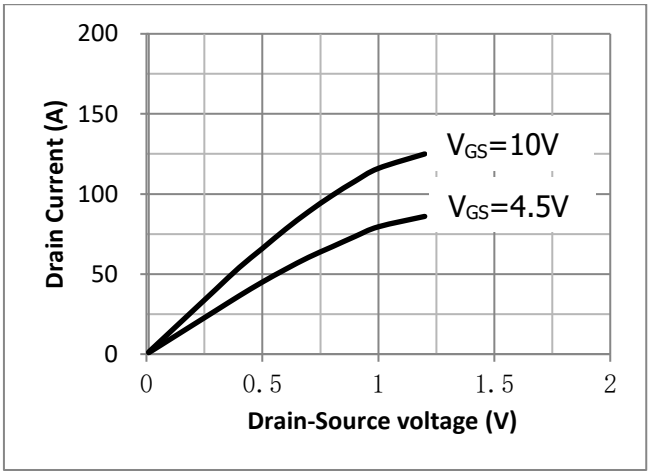


Fig.3 Threshold Voltage V.S Junction Temperature

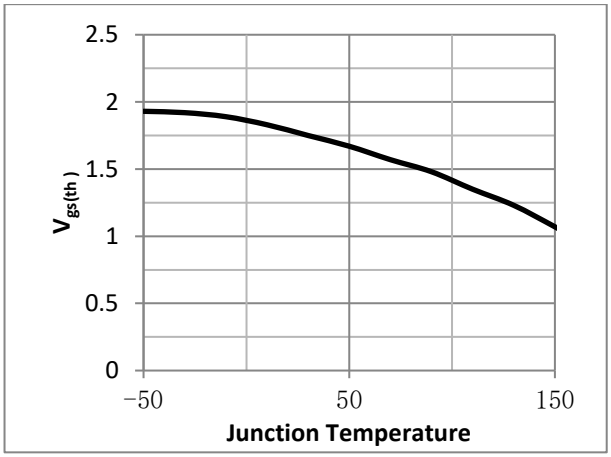


Fig.4 Resistance V.S Drain Current

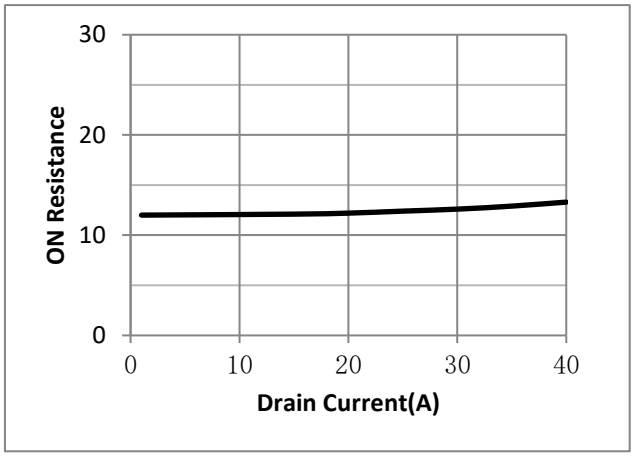


Fig.5 On-Resistance VS Gate Source Voltage

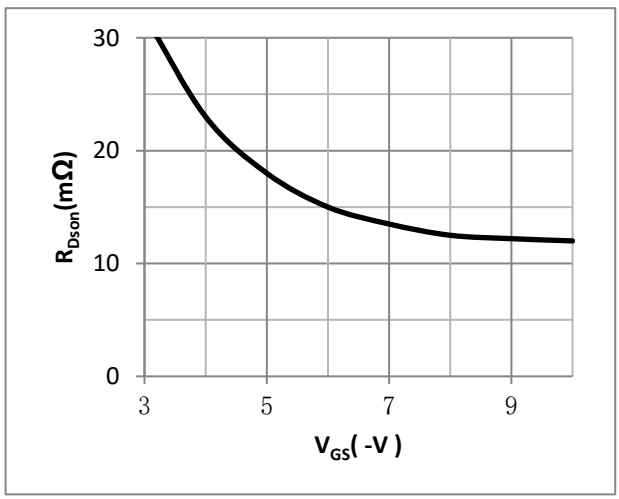
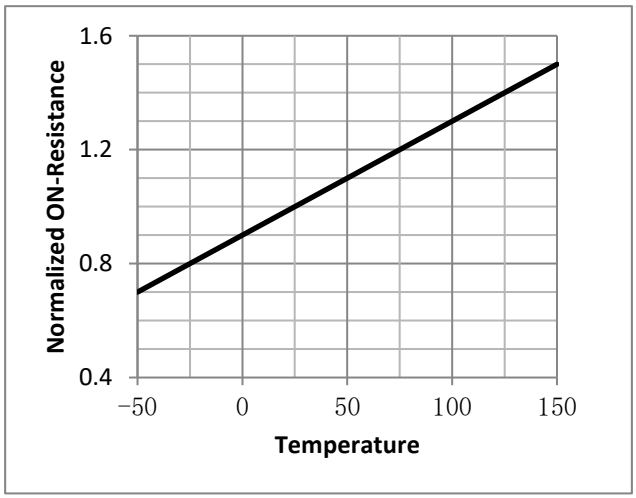


Fig.6 On-Resistance V.S Junction Temperature



●Test Circuit CHANNEL-N

Fig.1 Switching Time Measurement Circuit

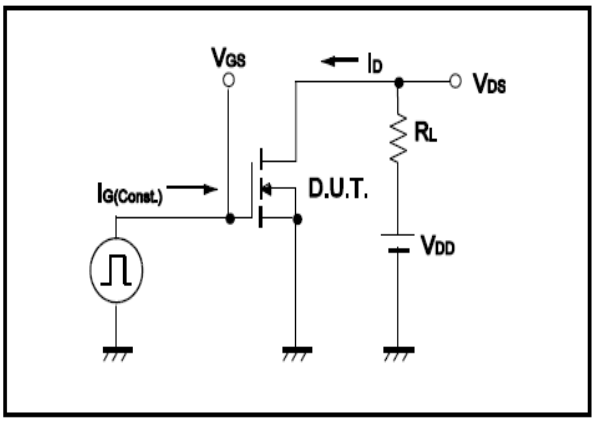


Fig.2 Gate Charge Waveform

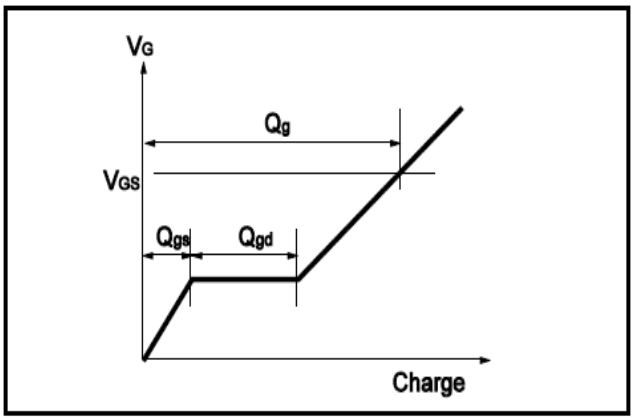


Fig.3 Switching Time Measurement Circuit

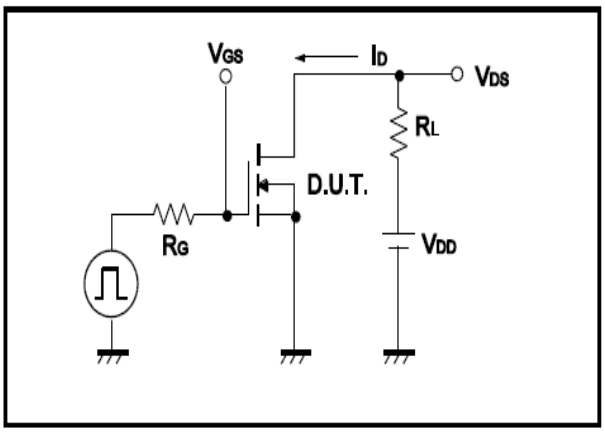


Fig.4 Gate Charge Waveform

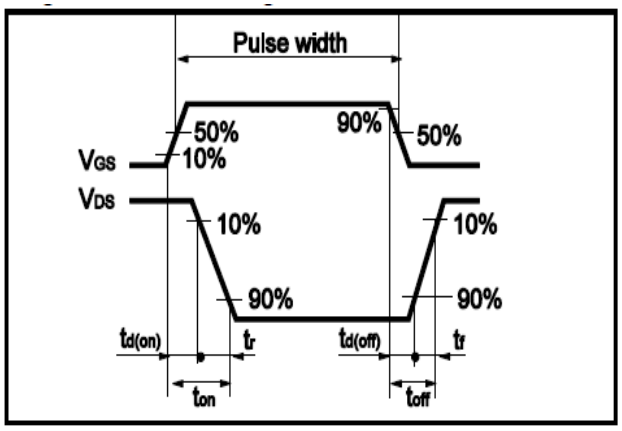


Fig.5 Avalanche Measurement Circuit

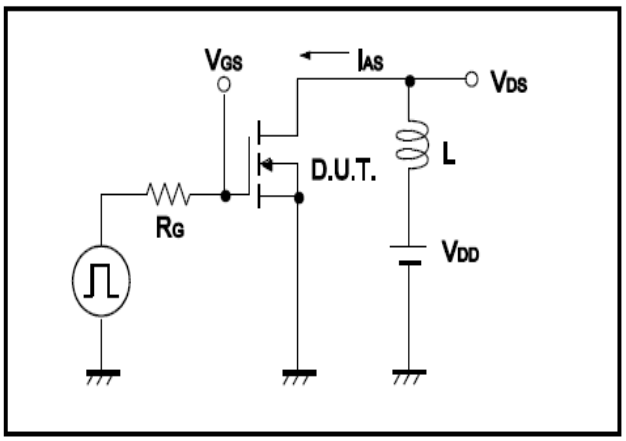
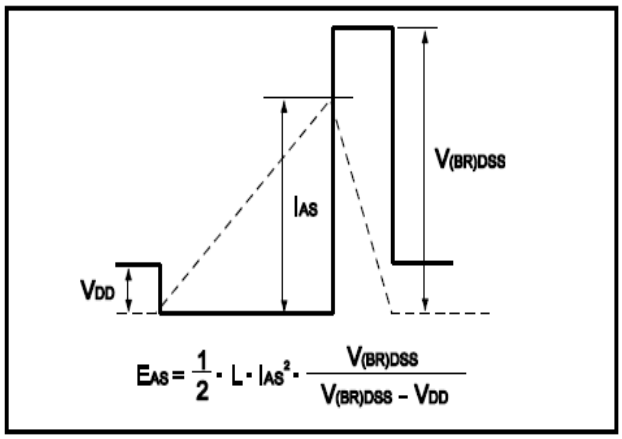


Fig.6 Avalanche Waveform



●P Channel characteristics curve

Fig.1 Power Dissipation Derating Curve

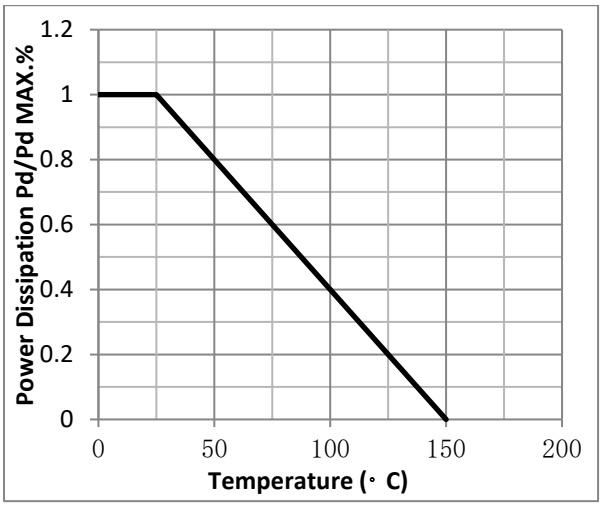


Fig.2 Typical output Characteristics

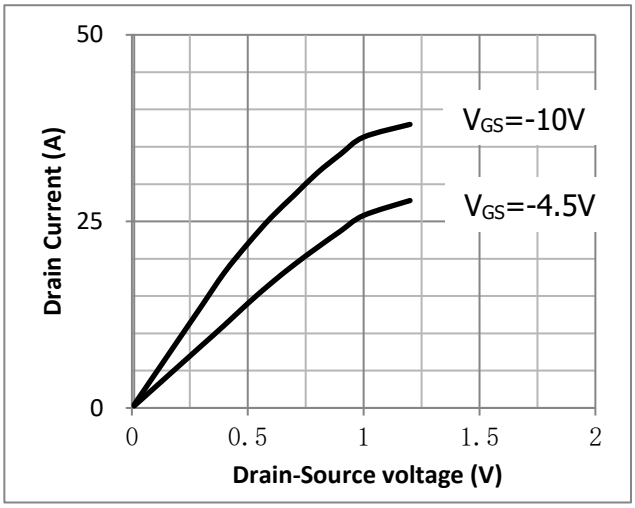


Fig.3 Threshold Voltage V.S Junction Temperature

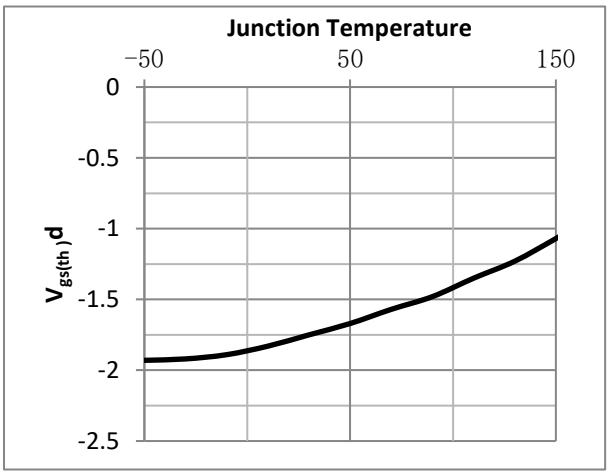


Fig.4 Resistance V.S Drain Current

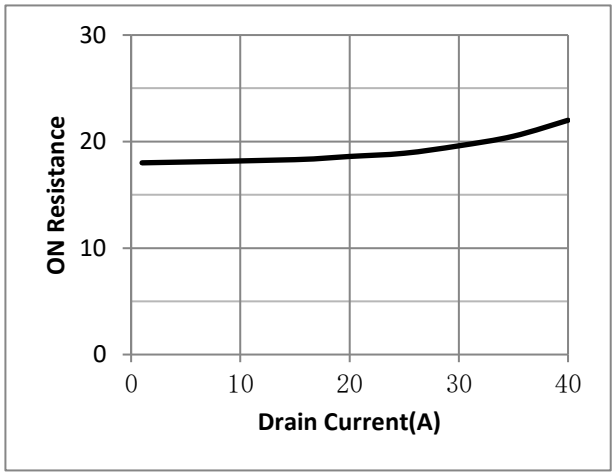


Fig.5 On-Resistance VS Gate Source Voltage

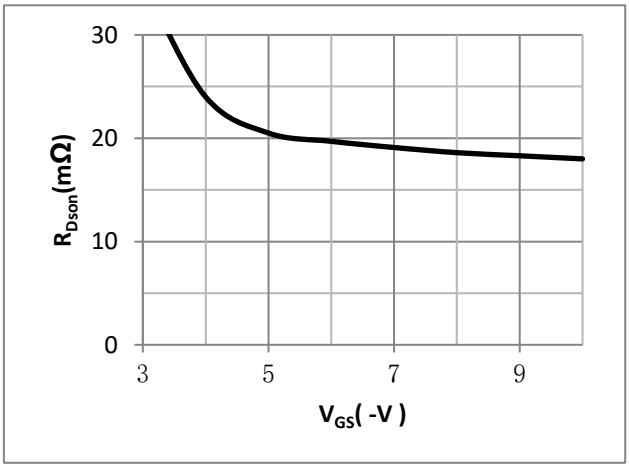
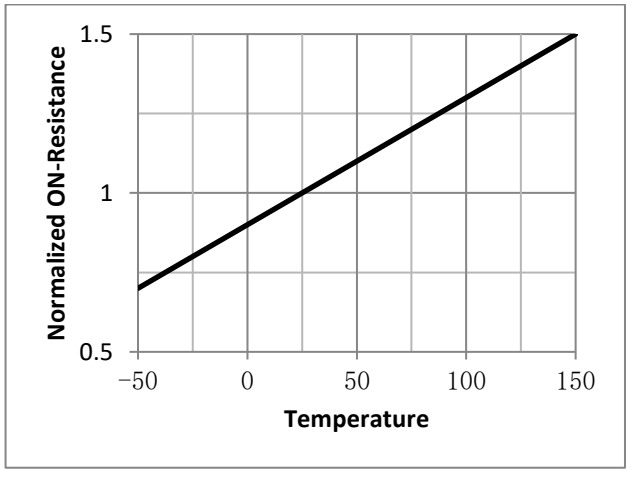


Fig.6 On-Resistance V.S Junction Temperature



●Test Circuit CHANNEL-P

Fig.7 Switching Time Measurement Circuit

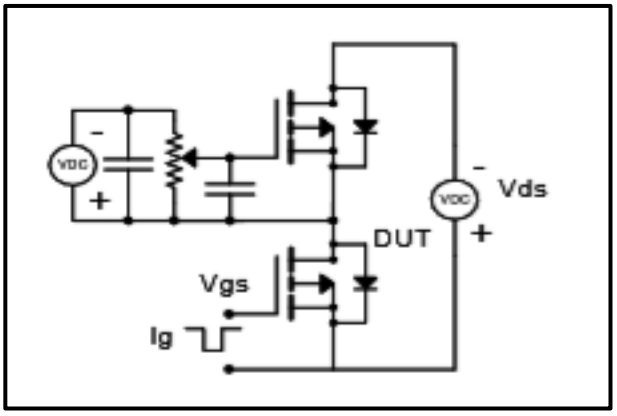


Fig.8 Gate Charge Waveform

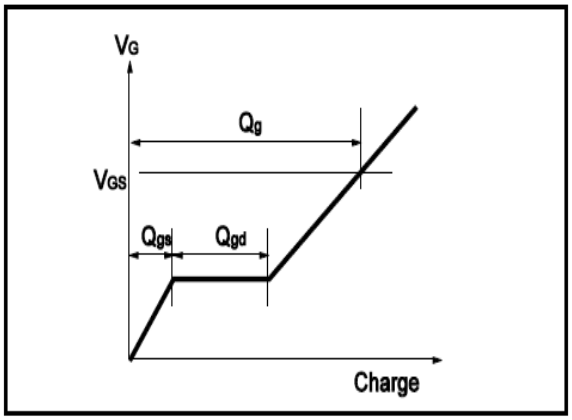


Fig.9 Switching Time Measurement Circuit

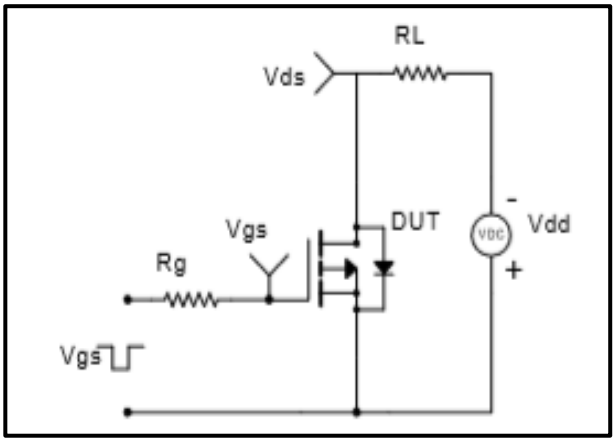


Fig.10 Gate Charge Waveform

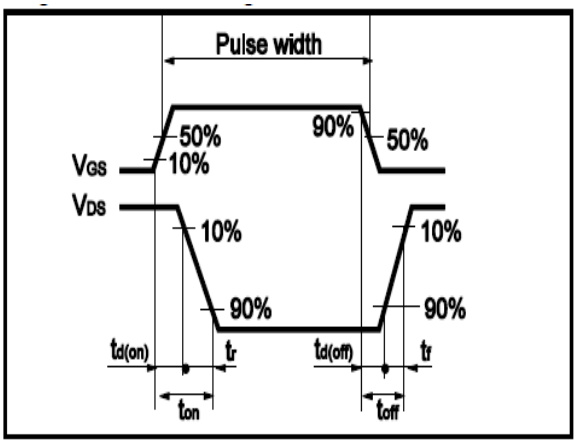


Fig.11 Avalanche Measurement Circuit

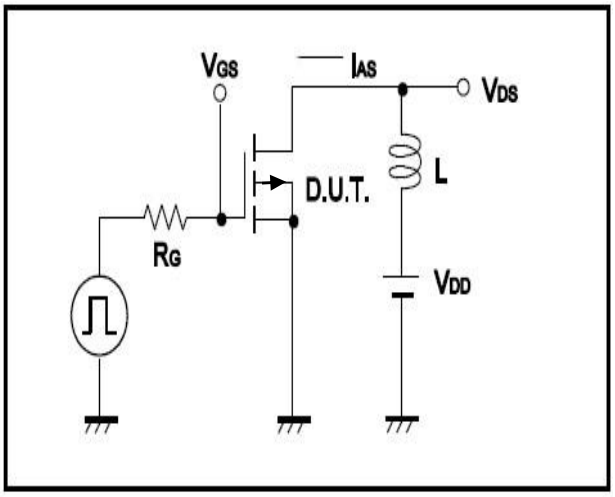
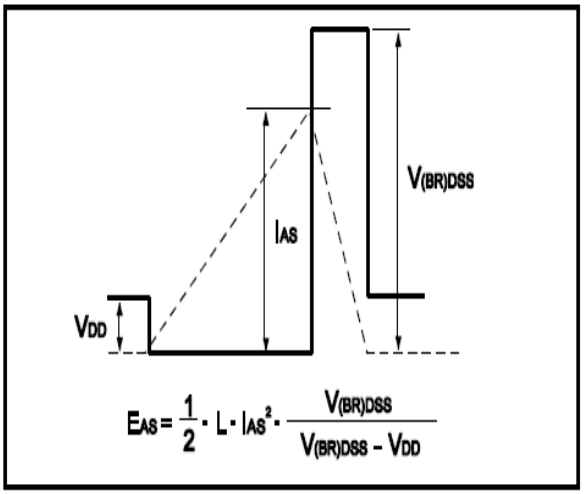
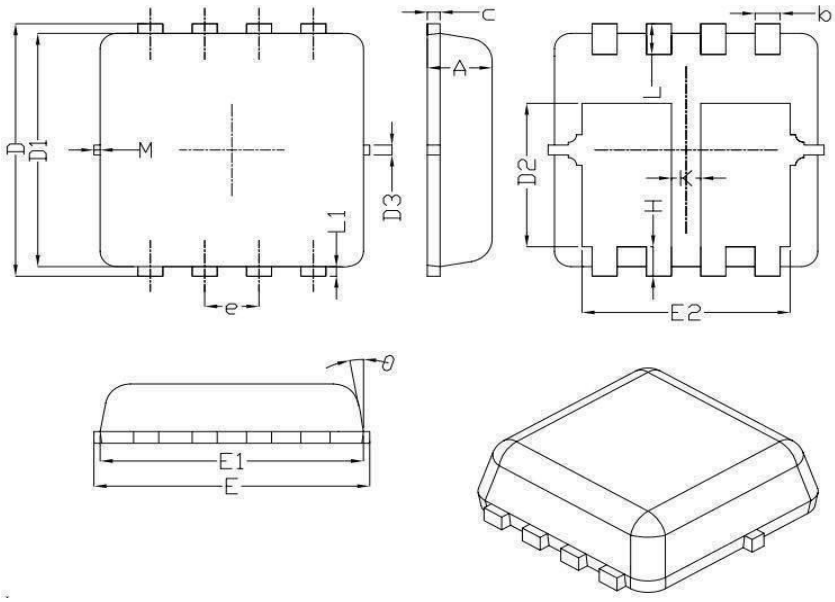


Fig.12 Avalanche Waveform



●Dimensions（DFN3.3×3.3）



Symbol	Dimensions (unit: mm)		
	Min	Typ	Max
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.15	0.25
D	3.25	3.35	3.45
D1	3.00	3.10	3.20
D2	1.78	1.88	1.98
D3	--	0.13	--
E	3.20	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e		0.65 BSC	
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	--	0.13	--
K	0.30	--	--
θ	--	10°	12°
M	*	*	0.15

* Not Specified

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