

• General Description

The AGM418MAP 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

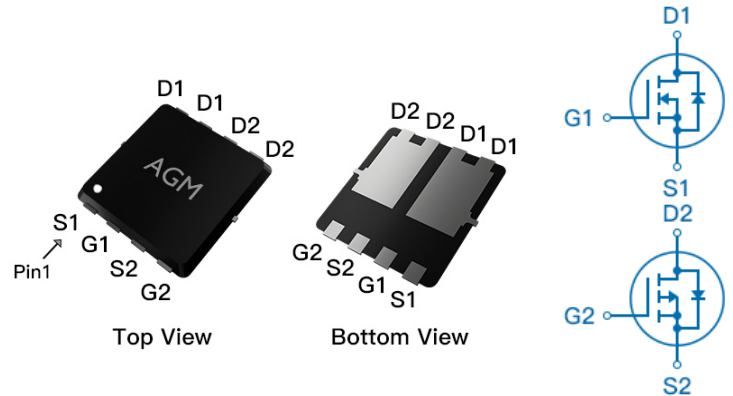
• Application

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

Product Summary

BVDSS	RDSON	ID
40V	18mΩ	18A
-40V	20mΩ	-18A

PDFN3.3*3.3 Pin Configuration



Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM418MAP	AGM418MAP	PDFN3.3*3.3	330mm	12mm	5000

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($T_c=25^\circ C$) (Note 1)	18	-18	A
	Drain Current-Continuous($T_c=100^\circ C$)	12	-12	A
IDM (pluse)	Drain Current-Pulsed (Note 2)	72	-72	A
P_D	Total Power Dissipation($T_c=25^\circ C$)	25	25	W
	Total Power Dissipation($T_c=100^\circ C$)	10	10	W
EAS	Avalanche energy (Note 3)	26	48	mJ
TJ,TSTG	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
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	5.0	°C/W

Table 3. N- 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	1.6	2.2	V
gFS	Forward Transconductance	VDS=5V, ID=4A	--	5	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=10V, ID=5A	--	18	24	mΩ
		VGS=4.5V, ID=4A	--	23	31	mΩ
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=20V, VGS=0V, F=1MHZ	--	616	--	pF
Coss	Output Capacitance		--	82	--	pF
Crss	Reverse Transfer Capacitance		--	43	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V, f=1.0MHz	--	2.7	--	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)		--	--	18	A
VSD	Forward on Voltage	VGS=0V, IS=5A	--	0.8	1.2	V
trr	Reverse Recovery Time	IF=5A , dI/dt=100A/μs , T _J =25°C	--	6.8	--	ns
Qrr	Reverse Recovery Charge		--	1.6	--	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, VDD=25V, Vgs=10V, ID=23A, L=0.1mH, 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	V _{GS} =0V I _D =-250μA	-40	--	--	V
IDSS	Zero Gate Voltage Drain Current	V _{DS} =-40V, V _{GS} =0V	--	--	-1	μA
IGSS	Gate-Body Leakage Current	V _{GS} =±20V, V _{DS} =0V	--	--	±100	nA
VGS(th)	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	-1.2	-1.5	-2.2	V
gFS	Forward Transconductance	V _{DS} =-5V, I _D =-4A	--	13	--	S
RDS(on)	Drain-Source On-State Resistance	V _{GS} =-10V, I _D =-5A	--	20	31	mΩ
		V _{GS} =-4.5V, I _D =-4A	--	24	37	mΩ
Dynamic Characteristics						
Ciss	Input Capacitance	V _{DS} =-20V, V _{GS} =0V, F=1MHZ	--	1572	--	pF
Coss	Output Capacitance		--	115	--	pF
Crss	Reverse Transfer Capacitance		--	95	--	pF
Rg	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1.0MHz	--	8.5	--	Ω
Switching Times						
td(on)	Turn-on Delay Time	V _{GS} =-10V, V _{DS} =-20V, I _D =-10A, RGEN=3Ω	--	8.0	--	nS
tr	Turn-on Rise Time		--	7.0	--	nS
td(off)	Turn-Off Delay Time		--	24	--	nS
tf	Turn-Off Fall Time		--	9.0	--	nS
Qg	Total Gate Charge	V _{GS} =-10V, V _{DS} =-25V, I _D =-5A	--	20	--	nC
Qgs	Gate-Source Charge		--	3.0	--	nC
Qgd	Gate-Drain Charge		--	5.0	--	nC
Source-Drain Diode Characteristics						
ISD	Source-Drain Current(Body Diode)		--	--	-18	A
VSD	Forward on Voltage	V _{GS} =0V, I _S =-5A	--	--	-1.2	V
trr	Reverse Recovery Time	I _F =-5A , dI/dt=100A/μs , T _J =25°C	--	34	--	ns
Qrr	Reverse Recovery Charge		--	30	--	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}=-25V, V_{gs}=-10V, I_D=-31A, L=0.1mH, R_G=25ohm

N- Channel Typical Electrical and Thermal Characteristics (Curves)

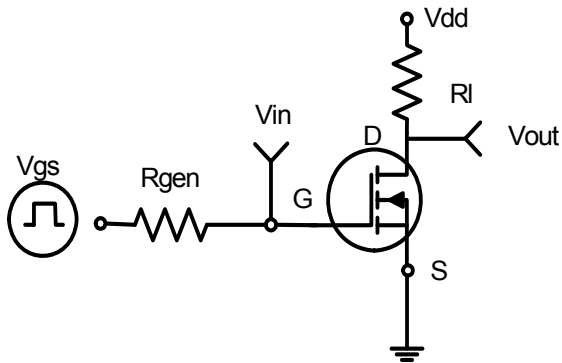


Figure 1: Switching Test Circuit

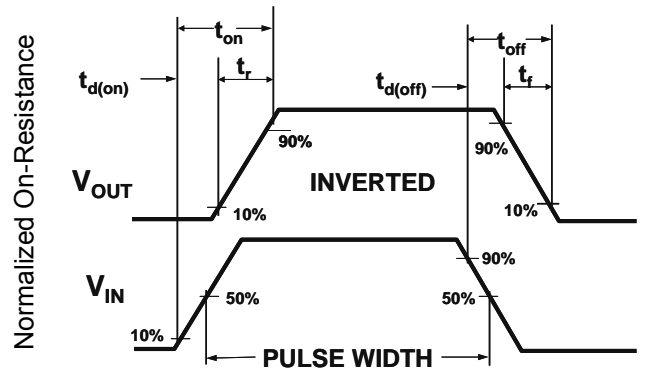


Figure 2: Switching Waveforms

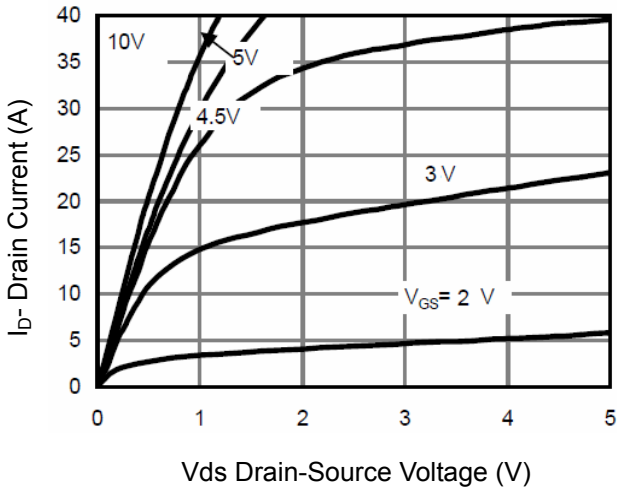


Figure 3 Output Characteristics

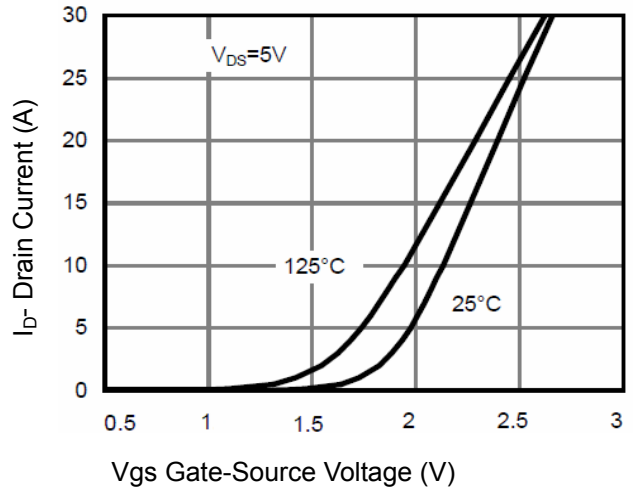


Figure 4 Transfer Characteristics

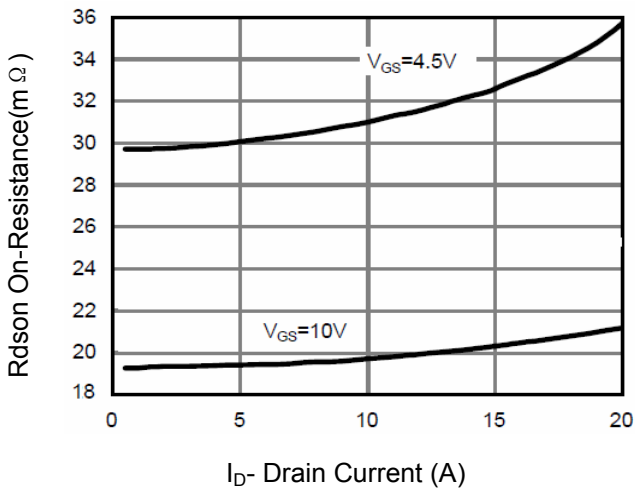


Figure 5 Drain-Source On-Resistance

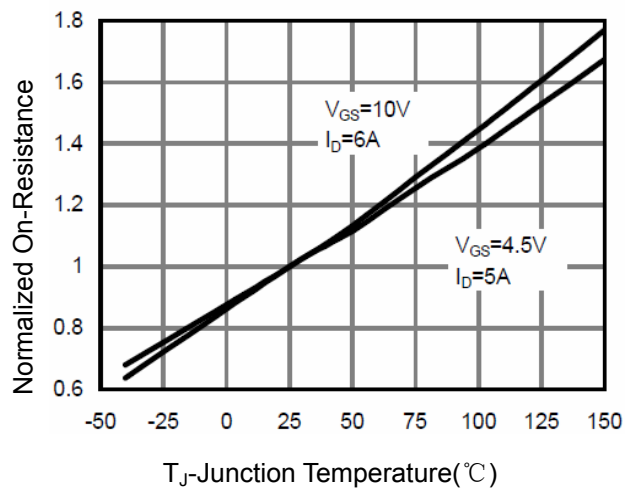
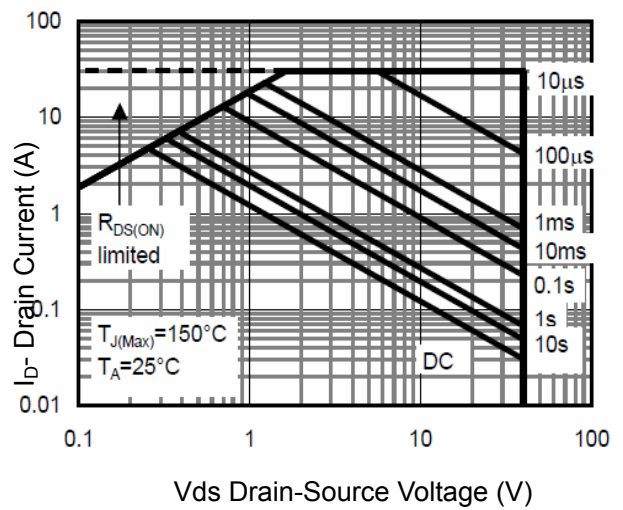
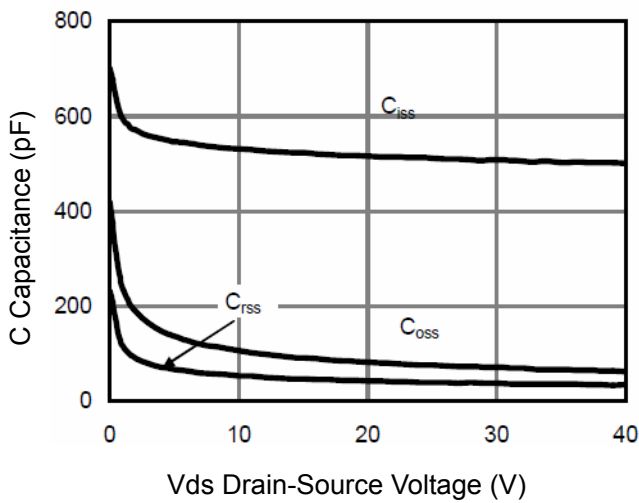
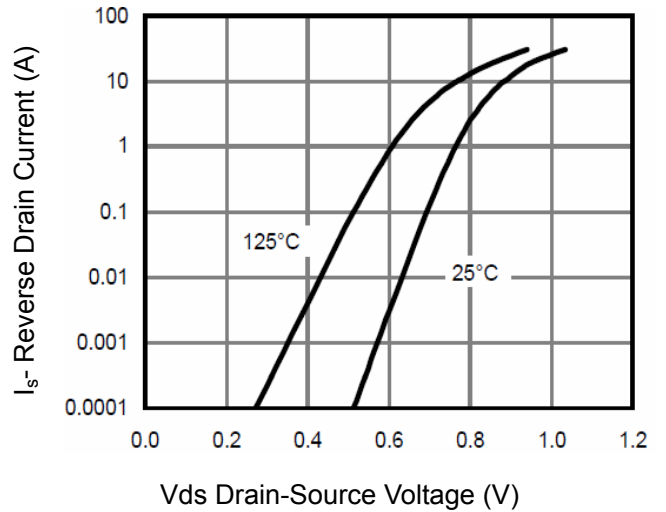
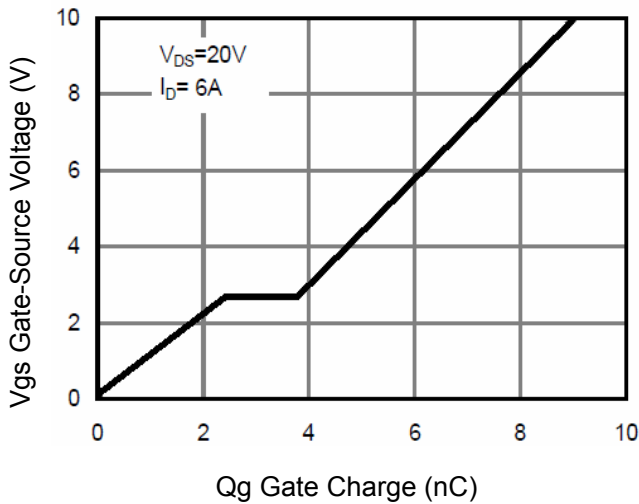
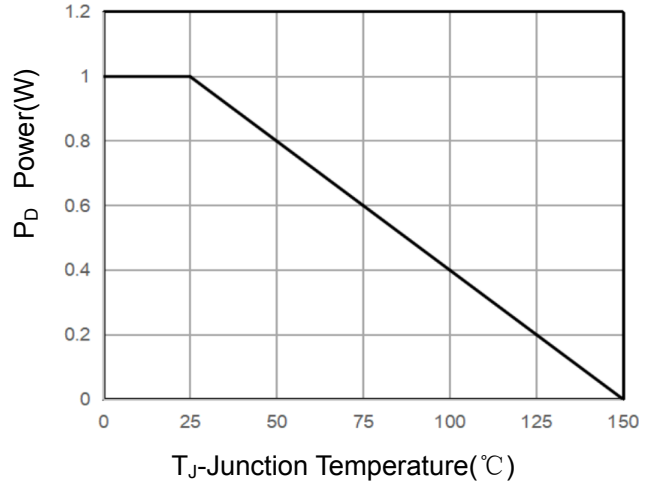
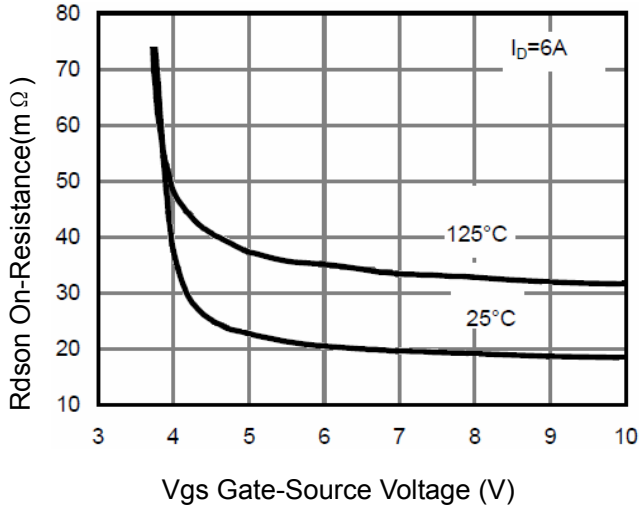


Figure 6 Drain-Source On-Resistance



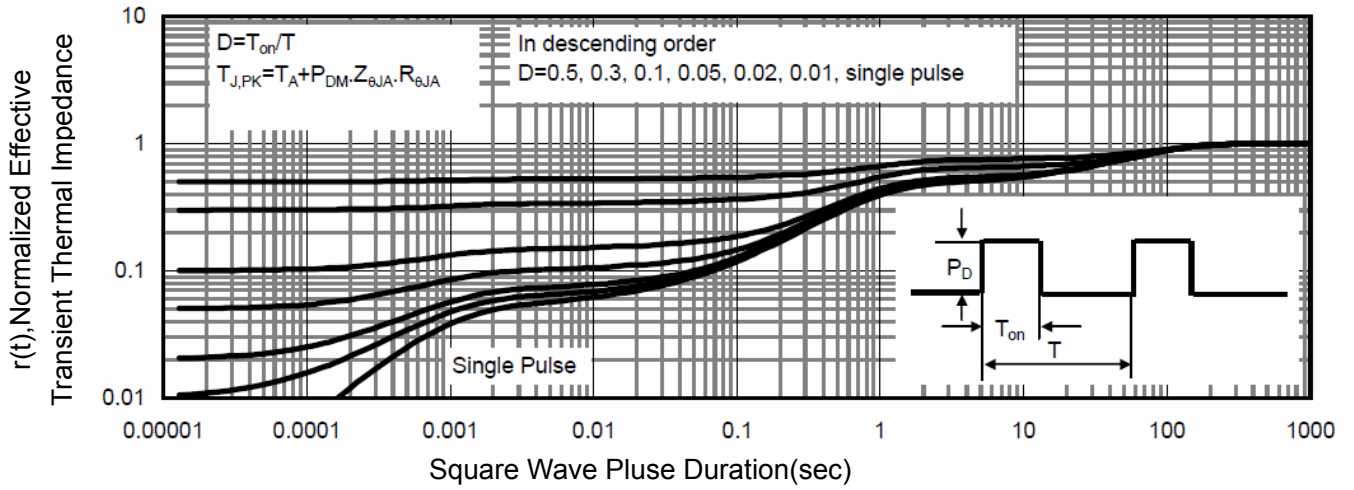


Figure 13 Normalized Maximum Transient Thermal Impedance

P Chanel Typical Electrical and Thermal Characteristics (Curves)

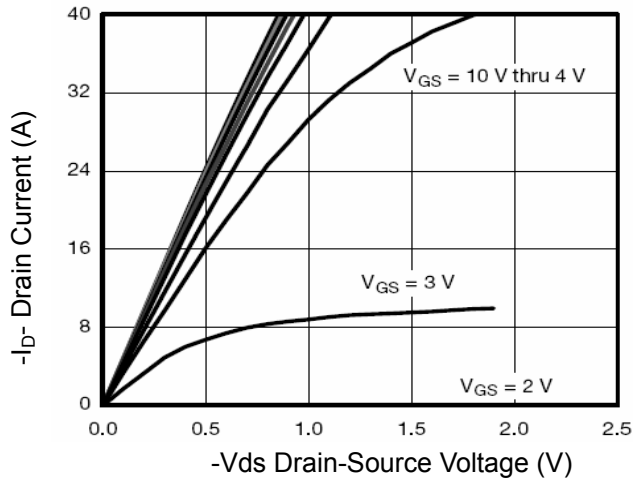


Figure 1 Output Characteristics

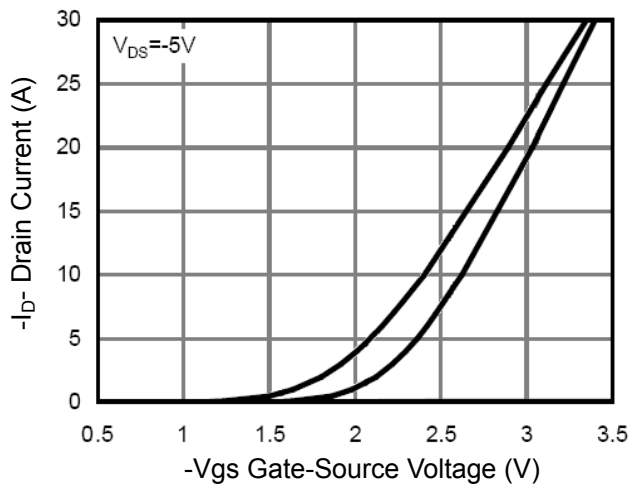


Figure 2 Transfer Characteristics

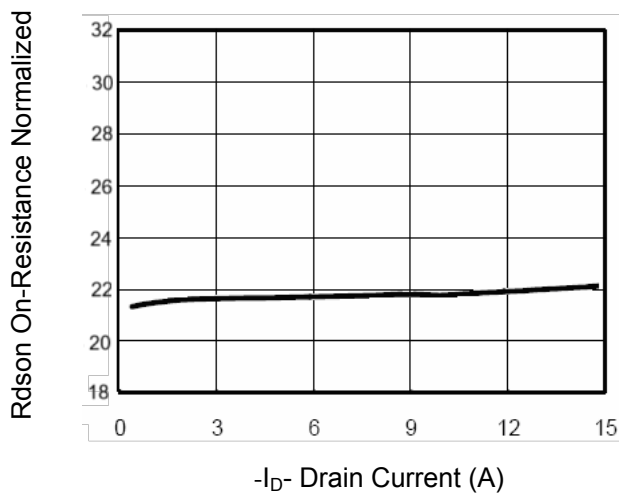


Figure 3 Rdson- Drain Current

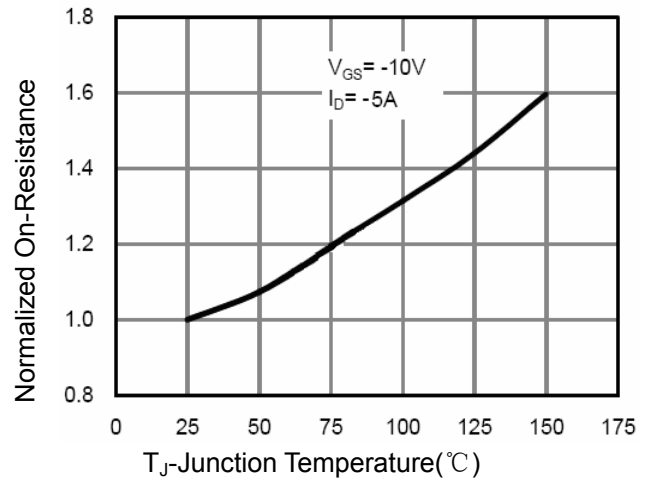


Figure 4 Rdson-Junction Temperature

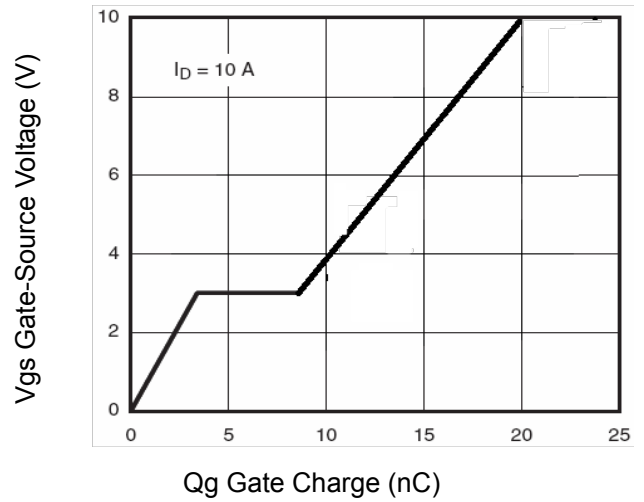


Figure 5 Gate Charge

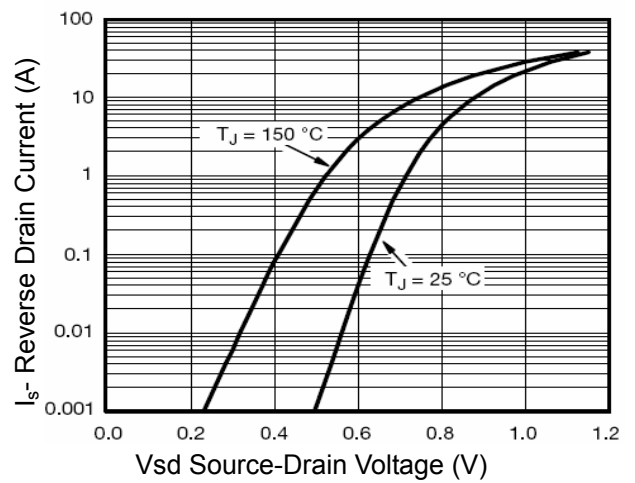


Figure 6 Source- Drain Diode Forward

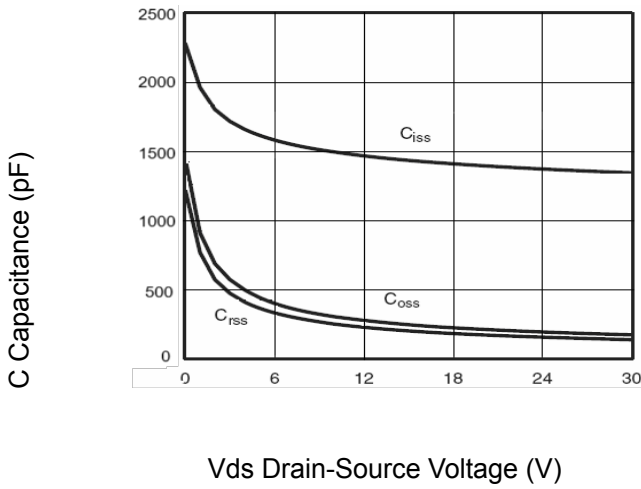


Figure 7 Capacitance vs Vds

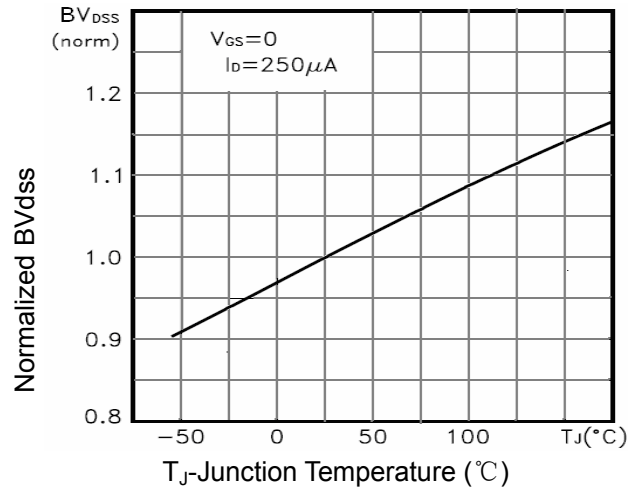


Figure 9 BV_{DSS} vs Junction Temperature

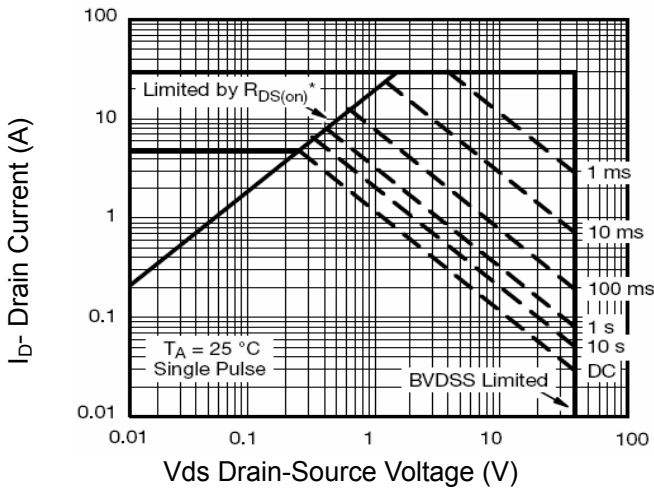


Figure 8 Safe Operation Area

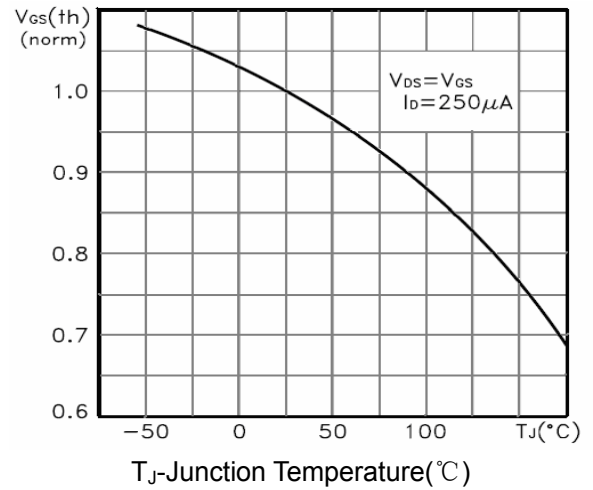


Figure 10 V_{GS(th)} vs Junction Temperature

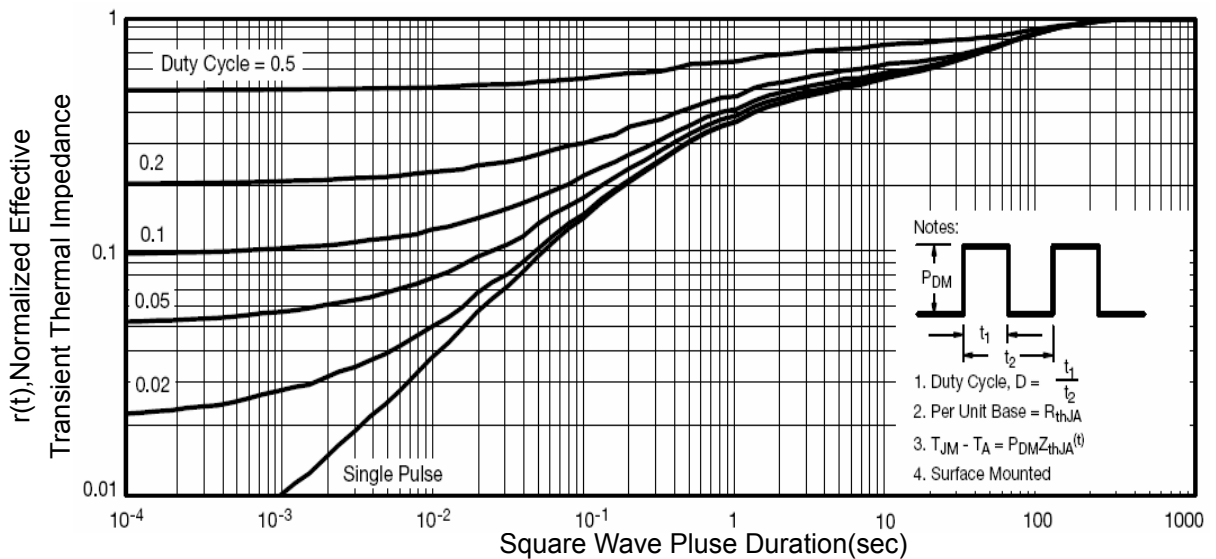
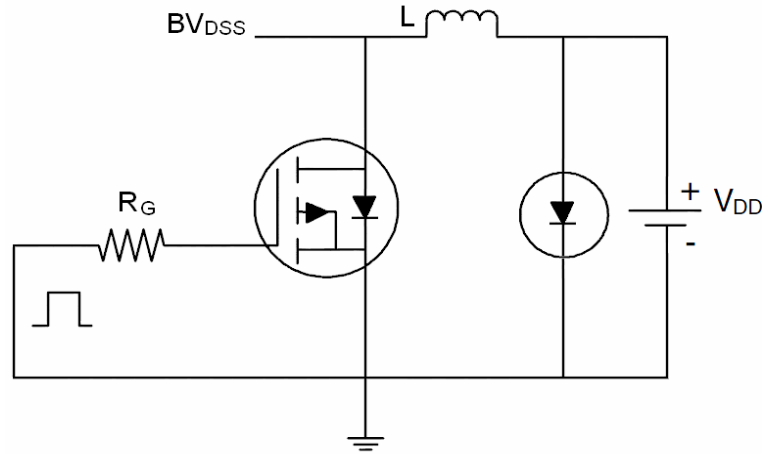


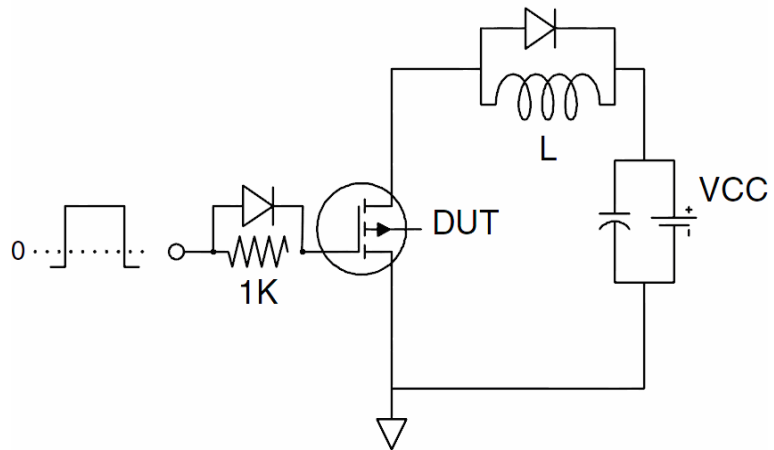
Figure 11 Normalized Maximum Transient Thermal Impedance

Test Circuit

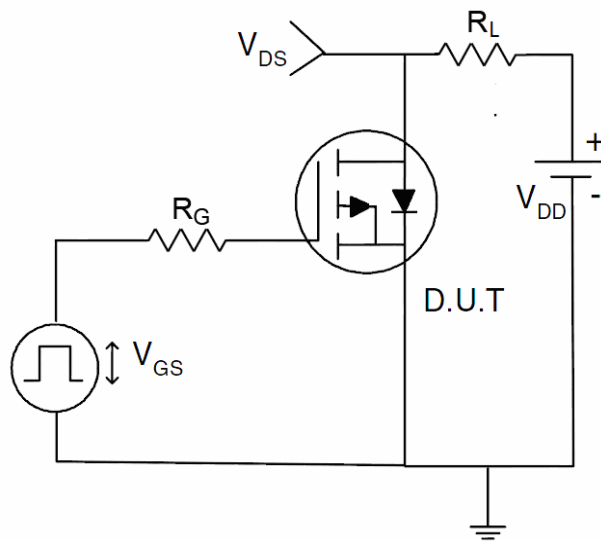
1) E_{AS} Test Circuit

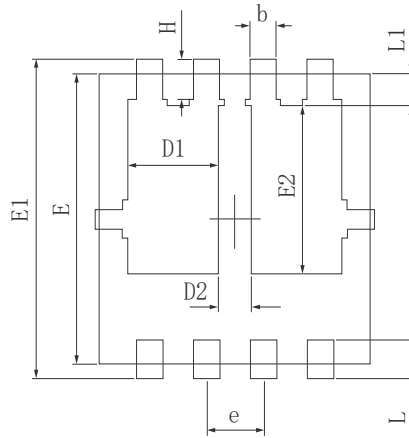
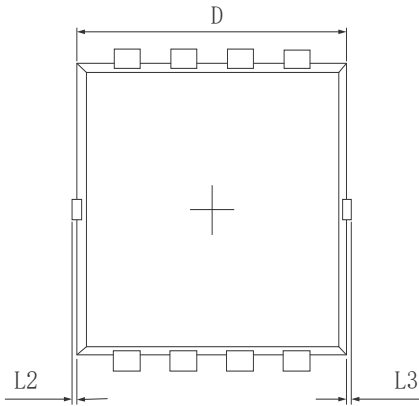


2) Gate Charge Test Circuit

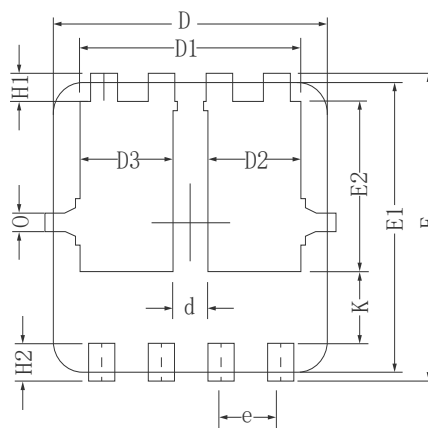
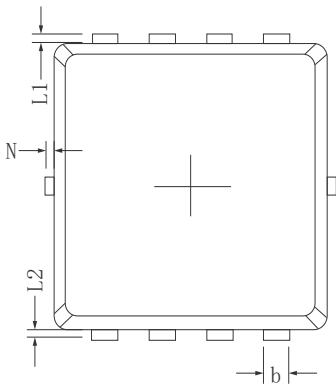
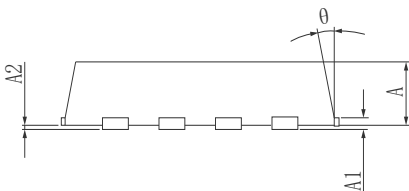


3) Switch Time Test Circuit

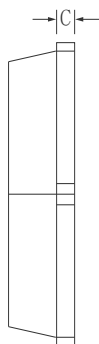
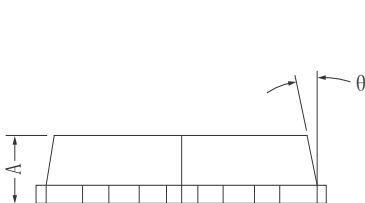


●Dimensions (PDFN3.3*3.3)


SYMBOL	MILLIMETER	
	MIN	MAX
A	0.700	0.900
A1	0.152REF.	
A2	0~0.05	
D	3.000	3.200
D1	0.935	1.135
D2	0.280	0.480
E	2.900	3.100
E1	3.150	3.450
E2	1.535	1.935
b	0.200	0.400
e	0.550	0.750
L	0.300	0.500
L1	0.180	0.480
L2	0~0.100	
L3	0~0.100	
H	0.315	0.515
θ	8°	12°

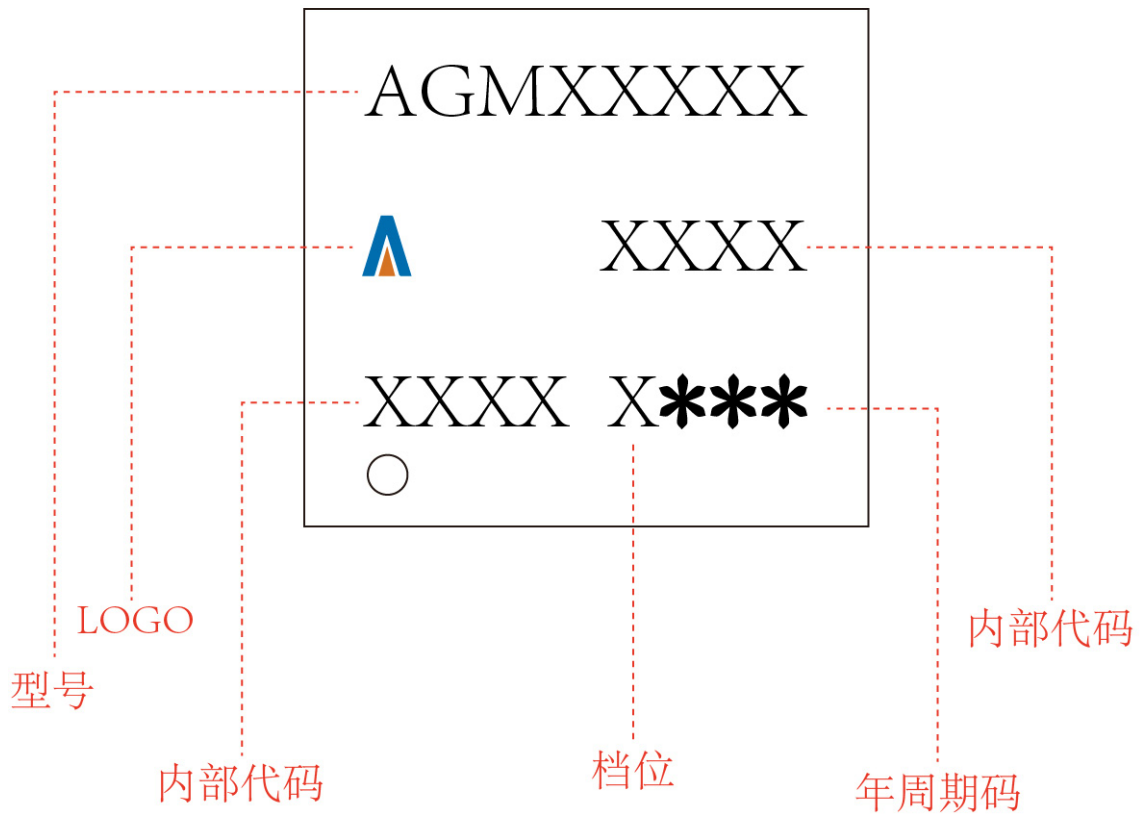


Symbols	Millimeters		
	MIN.	NOM.	MAX.
A	0.65	0.75	0.85
b	0.25	0.30	0.35
C	0.15	0.20	0.25
D	3.00	3.10	3.20
D1	2.40	2.50	2.60
D2/D3	1.00	1.05	1.10
d	0.30	0.40	0.50
E	3.20	3.30	3.40
E1	3.00	3.10	3.20
E2	1.72	1.82	1.92
e	0.65 BSC.		
H1	0.21	0.31	0.41
H2	0.30	0.40	0.50
K	0.67	0.77	0.87
L1/L2	0.10 REF.		
θ	11°	12°	13°
N	0	-	0.15
0	0.2 REF.		



PDFN3.3*3.3

Marking Instructions:




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