

### ● General Description

The AGM618MA 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

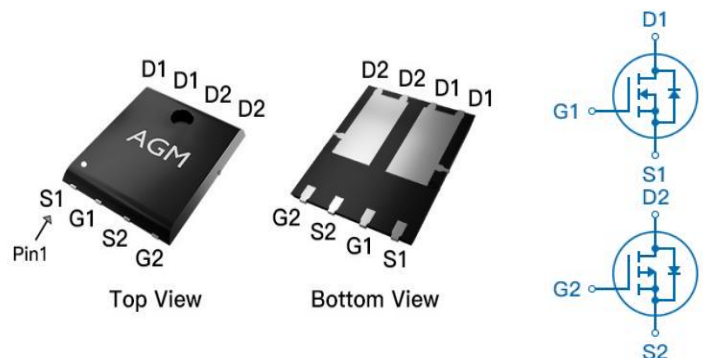
### ● Application

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

### Product Summary

BVDSS	RDSON	ID
60V	14mΩ	41A
-60V	26mΩ	-30A

### PDFN5\*6 Pin Configuration



### Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM618MA	AGM618MA	PDFN5*6	330mm	12mm	3000

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

Symbol	Parameter	Rating		Units
		N-Ch	P-Ch	
VDS	Drain-Source Voltage (VGS=0V)	60	-60	V
VGS	Gate-Source Voltage (VDS=0V)	±20	±20	V
ID	Drain Current-Continuous(Tc=25°C) (Note 1)	41	-30	A
	Drain Current-Continuous(Tc=100°C)	26	-19	A
IDM (pluse)	Drain Current-Pulsed (Note 2)	164	-120	A
PD	Maximum Power Dissipation(Tc=25°C)	51	51	w
	Maximum Power Dissipation(Tc=100°C)	20	20	w
EAS	Avalanche energy (Note 3)	66	154	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
RθJA	Thermal Resistance Junction-ambient (Steady State) <sup>1</sup>	---	20	°C/W
RθJC	Thermal Resistance Junction-Case <sup>1</sup>	---	2.45	°C/W

**Table 3. Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>On/Off States</b>						
BVDSS	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V I <sub>D</sub> =250μA	60	--	--	V
IDSS	Zero Gate Voltage Drain Current	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V	--	--	1	μA
IGSS	Gate-Body Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	--	--	±100	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.2	--	2.2	V
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =20A	--	15	--	S
R <sub>DS(on)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =15A	--	14	18	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =10A	--	17	22	mΩ
<b>Dynamic Characteristics</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V, F=1MHZ	--	1480	--	pF
C <sub>oss</sub>	Output Capacitance		--	74	--	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		--	70	--	pF
R <sub>g</sub>	Gate resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1.0MHz	--	1.6	--	Ω
<b>Switching Times</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>GS</sub> =10V, V <sub>DS</sub> =30V, R <sub>L</sub> =6.7Ω, R <sub>GEN</sub> =3Ω	--	7.5	--	nS
t <sub>r</sub>	Turn-on Rise Time		--	5.1	--	nS
t <sub>d(off)</sub>	Turn-Off Delay Time		--	28	--	nS
t <sub>f</sub>	Turn-Off Fall Time		--	5.5	--	nS
Q <sub>g</sub>	Total Gate Charge	V <sub>GS</sub> =10V, V <sub>DS</sub> =30V, I <sub>D</sub> =20A	--	50	--	nC
Q <sub>gs</sub>	Gate-Source Charge		--	6.0	--	nC
Q <sub>gd</sub>	Gate-Drain Charge		--	15	--	nC
<b>Source-Drain Diode Characteristics</b>						
I <sub>SD</sub>	Source-Drain Current(Body Diode)		--	--	41	A
V <sub>SD</sub>	Forward on Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =20A	--	--	1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> =20A , dI/dt=100A/μs , T <sub>J</sub> =25°C	--	28	--	ns
Q <sub>rr</sub>	Reverse Recovery Charge		--	40	--	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<sub>J</sub>=25°C, V<sub>DD</sub>=30V, V<sub>gs</sub>=10V, I<sub>D</sub>=21A, L=0.3mH, R<sub>G</sub>=25ohm

**Table 3. Electrical Characteristics (T<sub>J</sub>=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	-60	--	--	V
IDSS	Zero Gate Voltage Drain Current	VDS=-60V,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=-20A	--	27	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=-10V, ID=-15A	--	26	30	mΩ
		VGS=-4.5V, ID=-10A	--	31	36	mΩ
<b>Dynamic Characteristics</b>						
Ciss	Input Capacitance	VDS=-30V,VGS=0V, F=1MHZ	--	3600	--	pF
Coss	Output Capacitance		--	136	--	pF
Crss	Reverse Transfer Capacitance		--	124	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	5.1	--	Ω
<b>Switching Times</b>						
td(on)	Turn-on Delay Time	VGS=-10V,VDS=-30V, RL=1.5Ω, RGEN=3Ω	--	15	--	nS
tr	Turn-on Rise Time		--	13	--	nS
td(off)	Turn-Off Delay Time		--	94	--	nS
tf	Turn-Off Fall Time		--	37	--	nS
Qg	Total Gate Charge	VGS=-10V, VDS=-30V, ID=-20A	--	68	--	nC
Qgs	Gate-Source Charge		--	11	--	nC
Qgd	Gate-Drain Charge		--	13	--	nC
<b>Source-Drain Diode Characteristics</b>						
ISD	Source-Drain Current(Body Diode)		--	--	-30	A
VSD	Forward on Voltage	VGS=0V,IS=-20A	--	--	-1.2	V
trr	Reverse Recovery Time	IF=-20A , dl/dt=100A/μs , TJ=25°C	--	23	--	ns
Qrr	Reverse Recovery Charge		--	21	--	nc

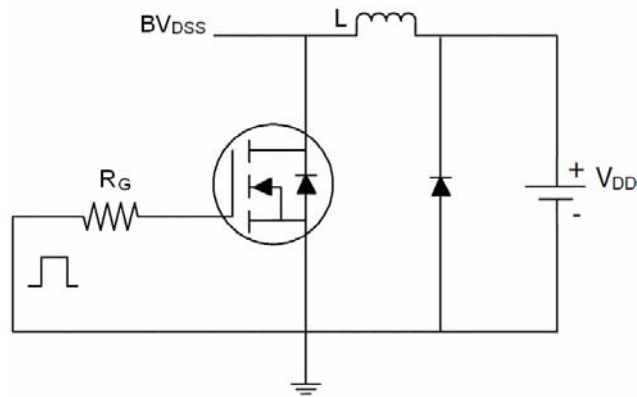
Notes 1.The maximum current rating is package limited.

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

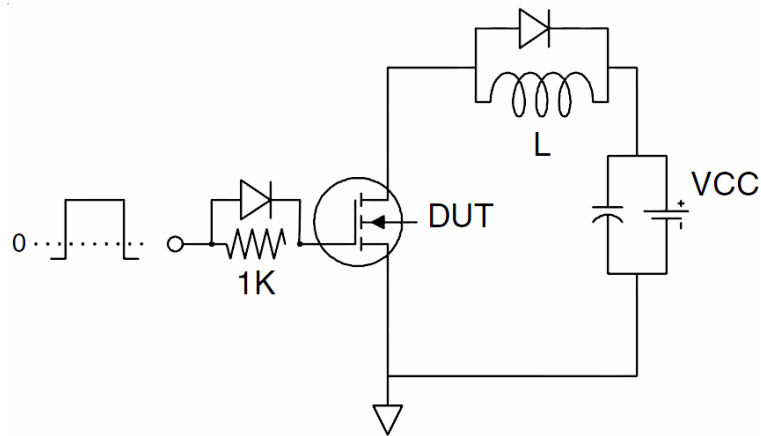
Notes 3.EAS condition: T<sub>J</sub>=25°C ,VDD=30V,Vgs=10V,ID=32A, L=0.3mH, RG=25ohm

**Test Circuit**

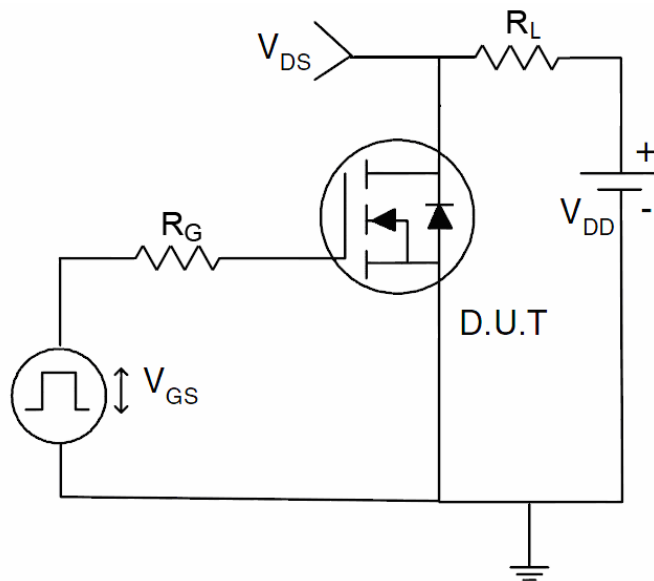
**1)  $E_{AS}$  test Circuit**

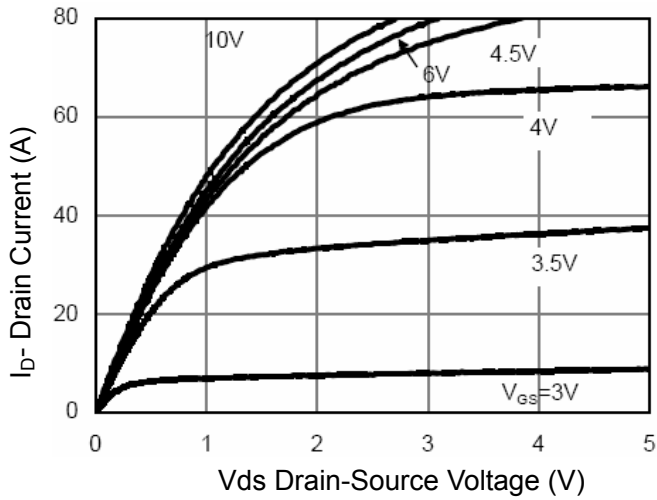
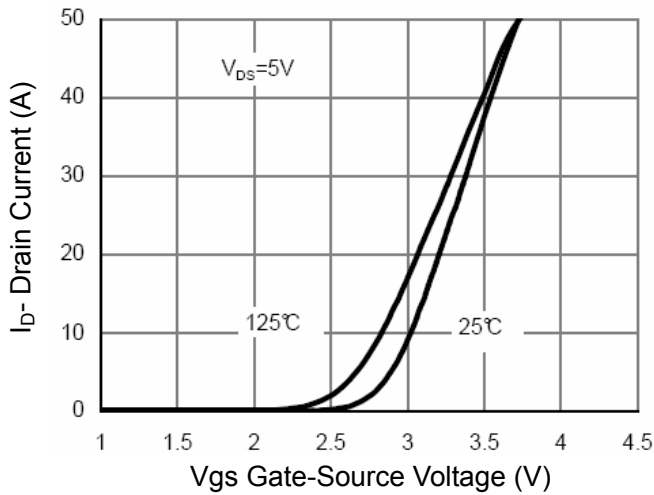
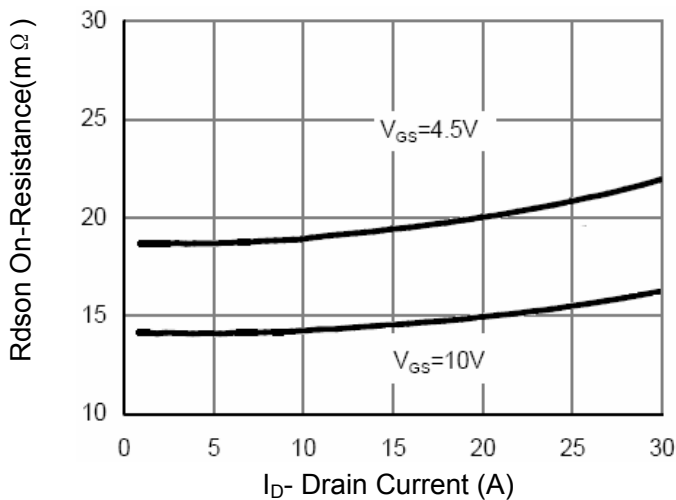
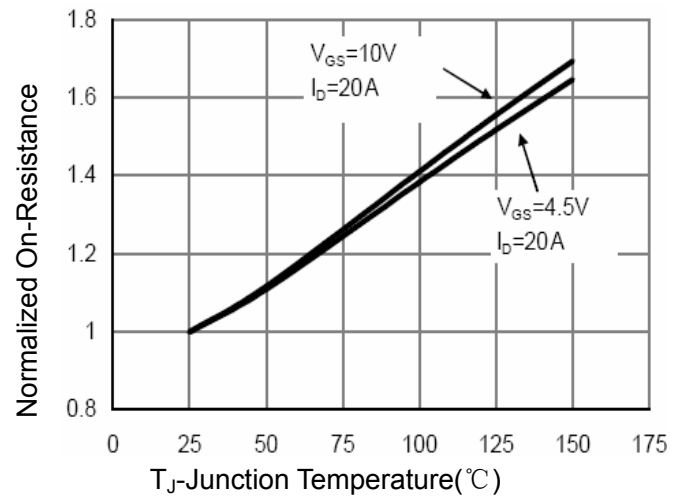
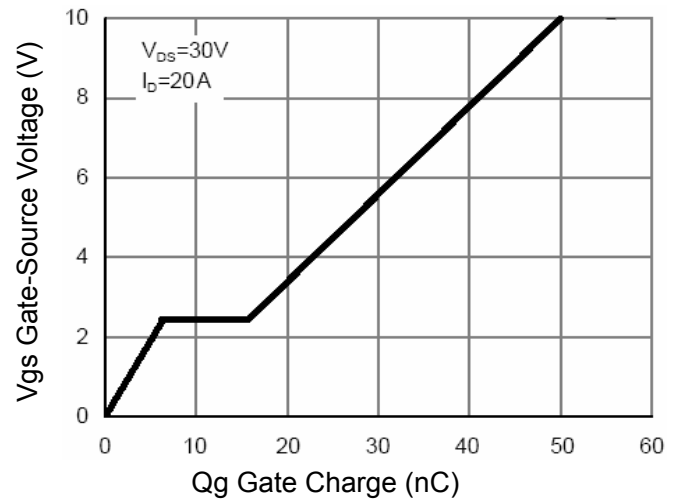
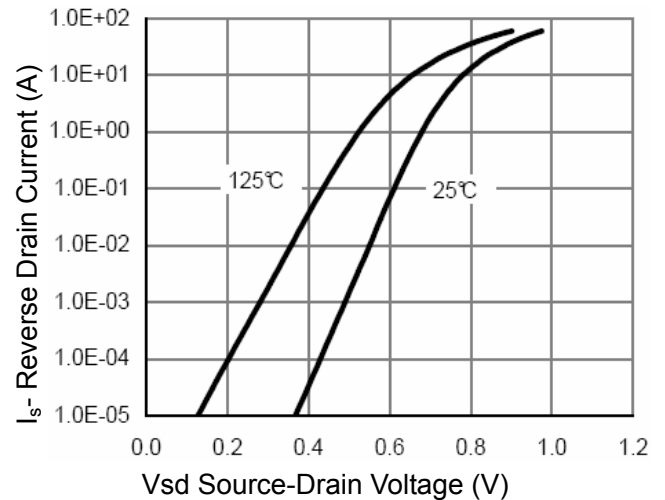


**2) Gate charge test Circuit**



**3) Switch Time Test Circuit**



**N-Channel Typical Characteristics**

**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**

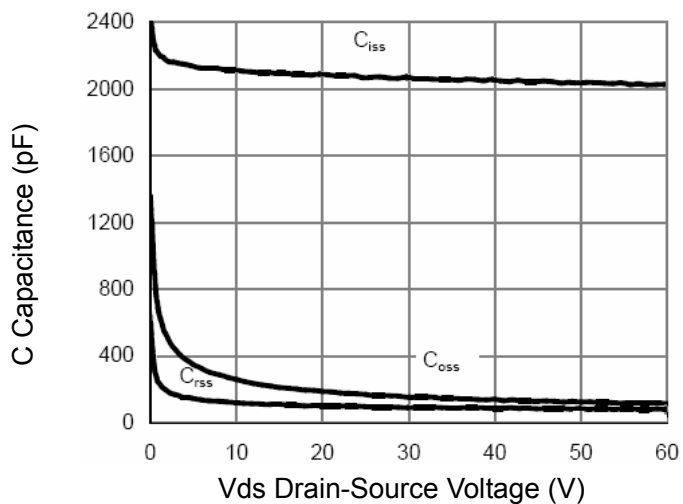


Figure 7 Capacitance vs Vds

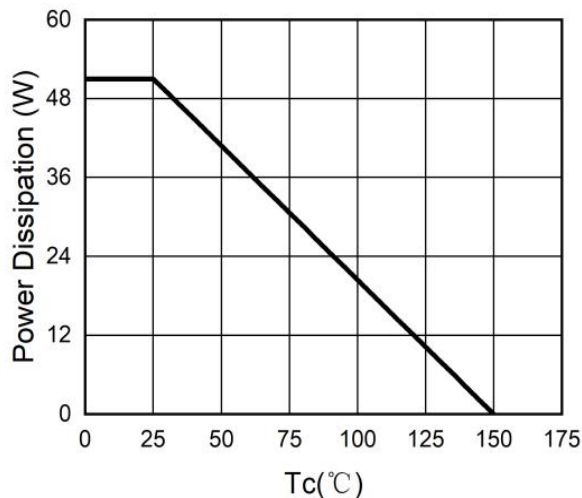


Figure 9 Power De-rating

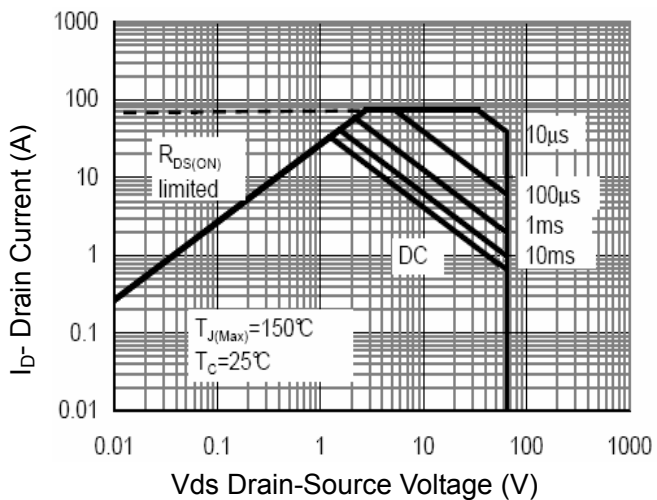


Figure 8 Safe Operation Area

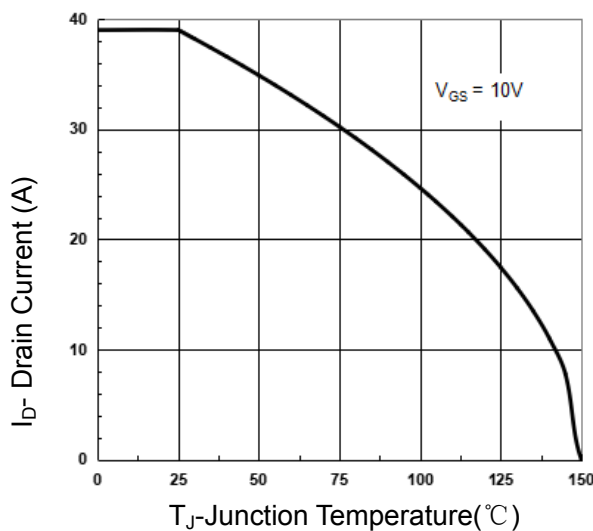


Figure 10 Current De-rating

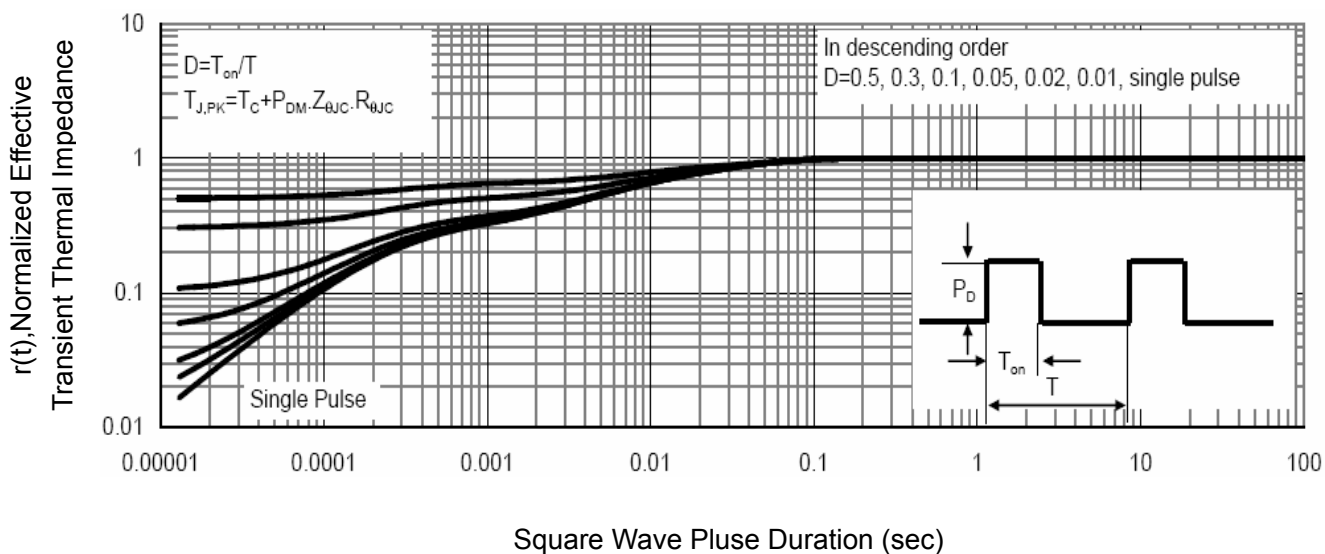


Figure 11 Normalized Maximum Transient Thermal Impedance

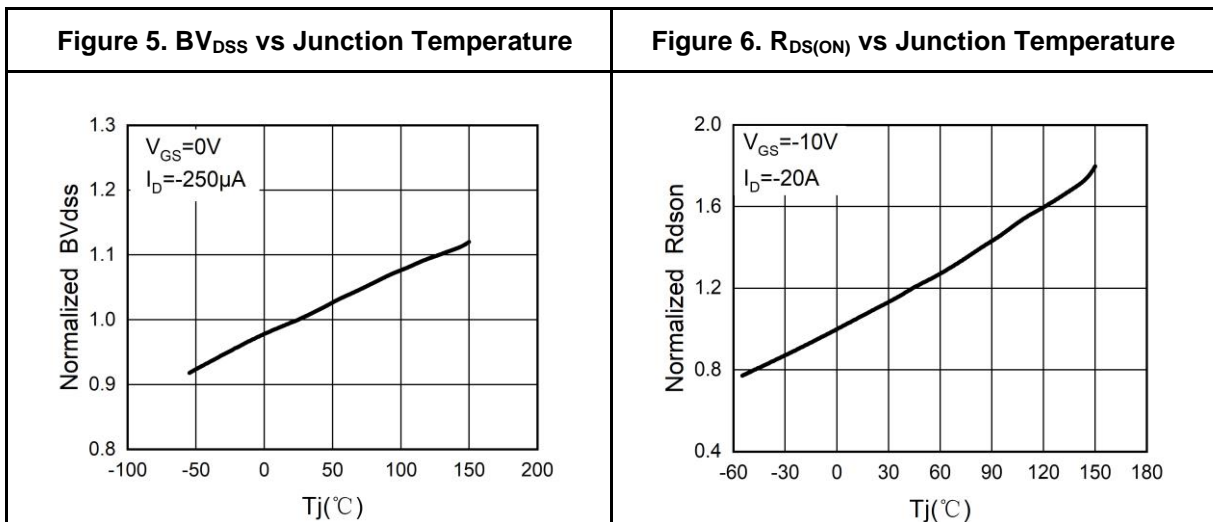
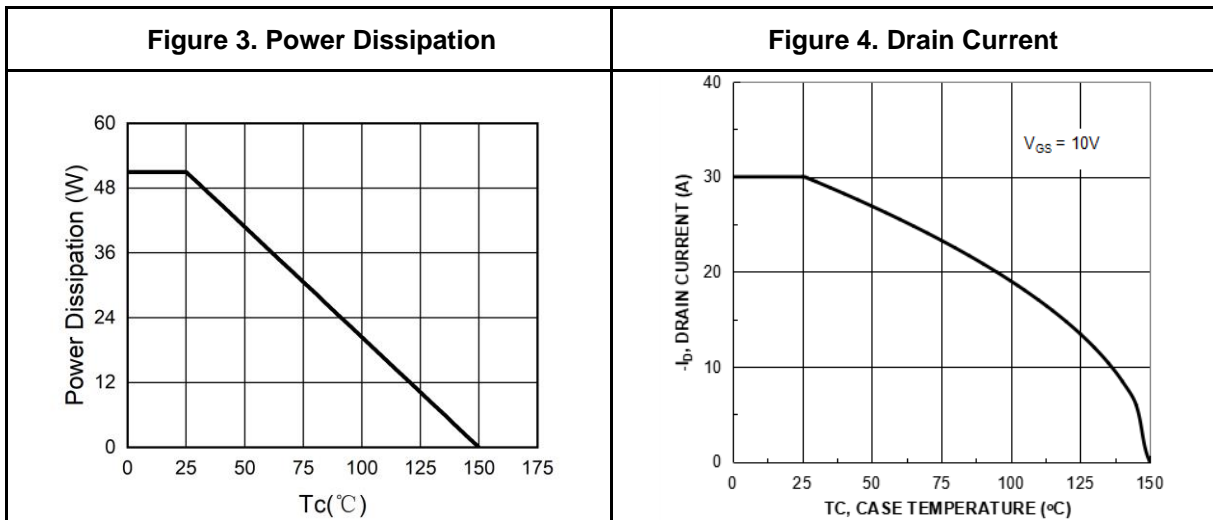
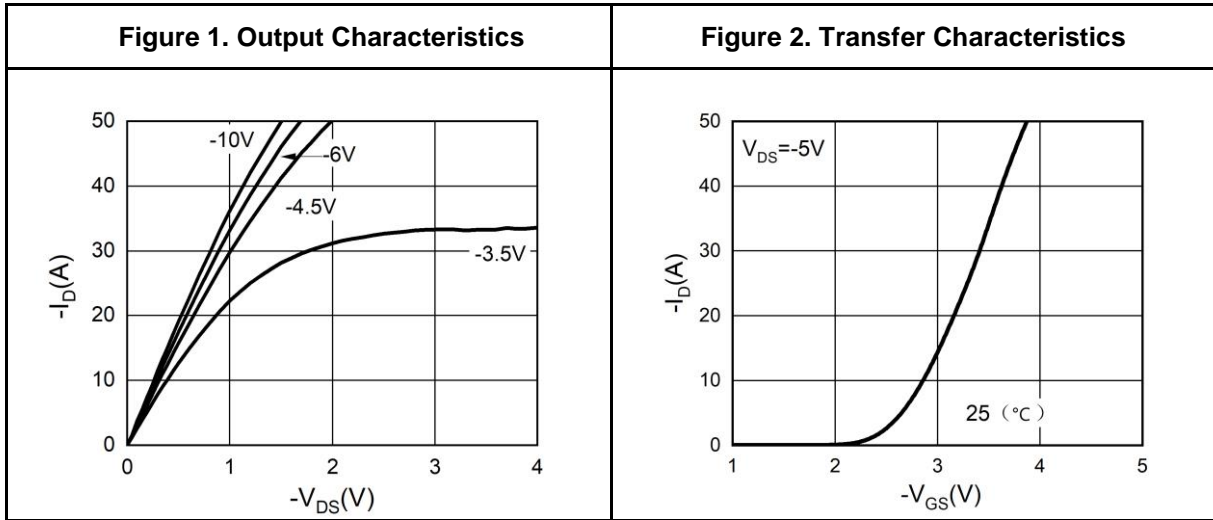
**P-Channel Typical Characteristics**


Figure 7. Gate Charge Waveforms

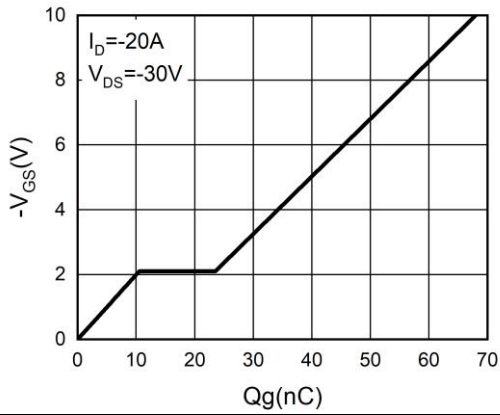


Figure 8. Capacitance

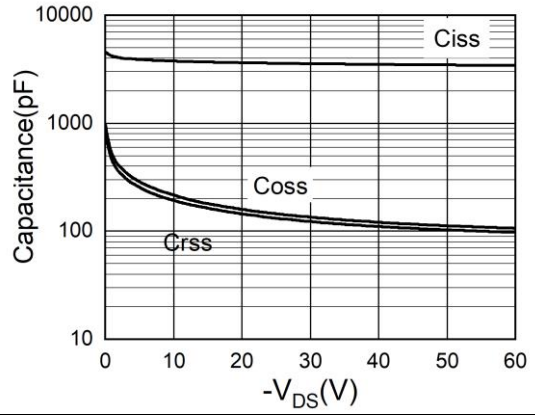


Figure 9. Body-Diode Characteristics

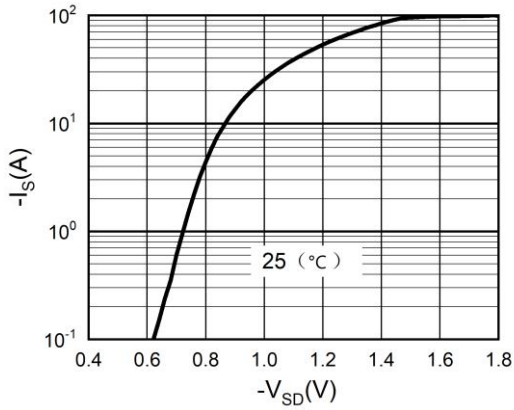
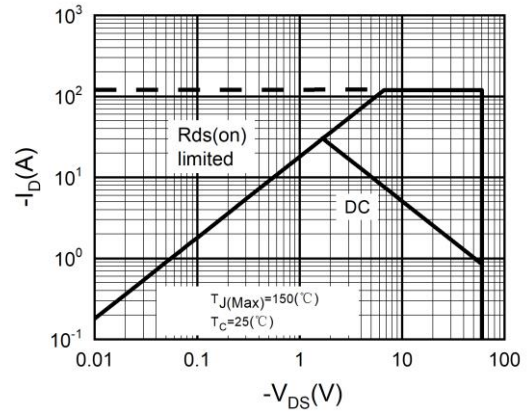
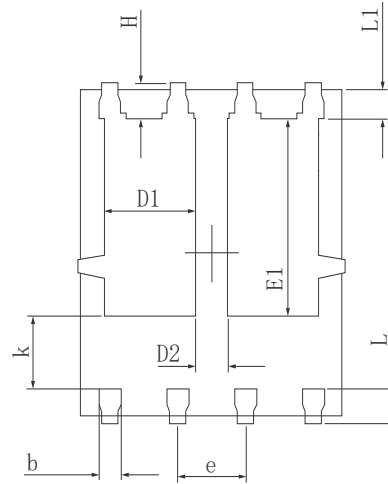
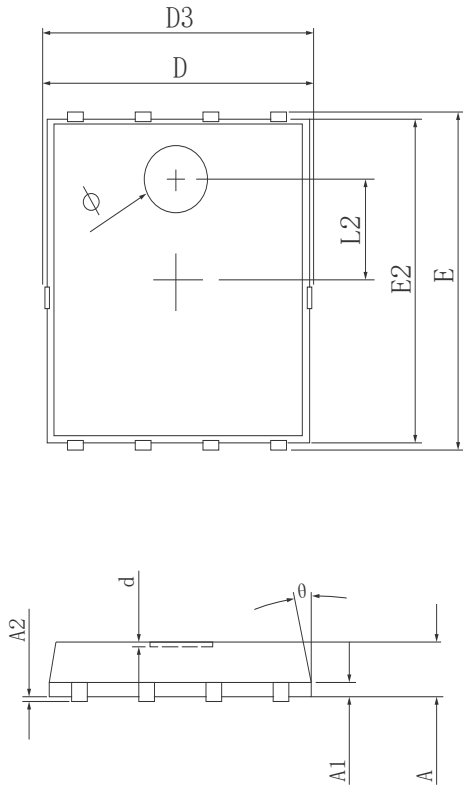
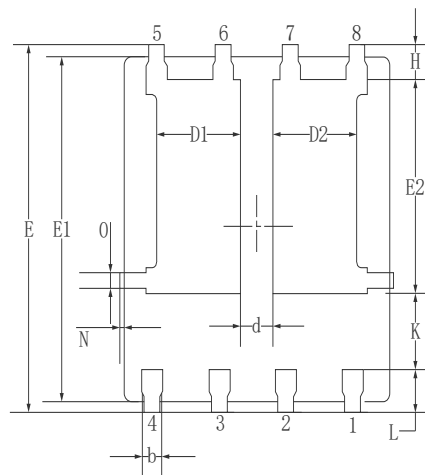
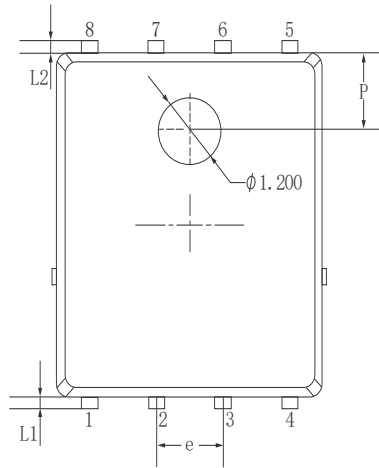


Figure 10. Maximum Safe Operating Area



**•Dimensions (PDFN5\*6)**


SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	0.900	1.000	1.100
A1	0.254 REF.		
A2	0°0.05		
D	4.824	4.900	4.976
D1	1.605	1.705	1.805
D2	0.500	0.600	0.700
D3	4.924	5.000	5.076
E	5.924	6.000	6.076
E1	3.375	3.475	3.575
E2	5.674	5.750	5.826
b	0.350	0.400	0.450
e	1.270 TYP.		
L	0.534	0.610	0.686
L1	0.424	0.500	0.576
L2	1.800 REF.		
k	1.190	1.290	1.390
H	0.549	0.625	0.701
θ	8°	10°	12°
φ	1.100	1.200	1.300
d			0.100



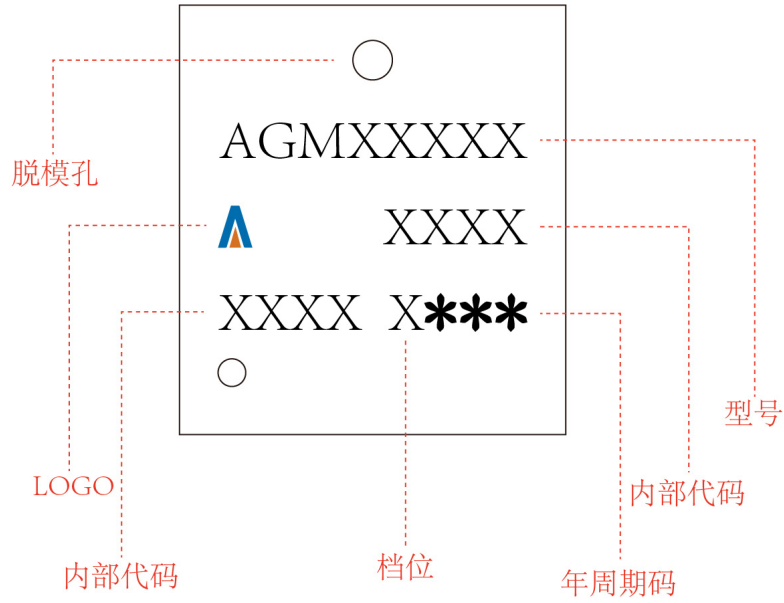
Symbol	Millimeters		
	MIN.	NOM.	MAX.
A	0.90	1.05	1.20
b	0.35	0.40	0.50
C	0.20	0.25	0.35
D	4.90	5.05	5.20
D1/D2	1.51	1.61	1.71
d	0.50	0.60	0.70
E	6.00	6.15	6.30
E1	5.60	5.75	5.90
E2	3.47	3.57	3.67
e	1.27 BSC.		
H	0.48	0.58	0.68
K	1.17	1.27	1.37
L	0.64	0.74	0.84
L1/L2	0.20 REF.		
θ	8°	10°	12°
M	0.08 REF.		
N	0	-	0.15
O	0.25 REF.		
P	1.28 REF.		



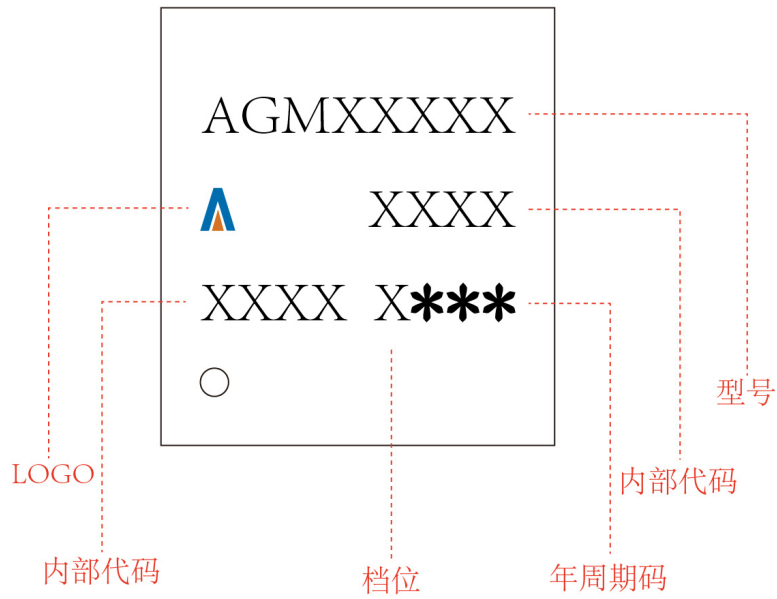
## PDFN5\*6

## Marking Instructions:

## Model1:



## Model2:




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