

General Description

The AGM314MA 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

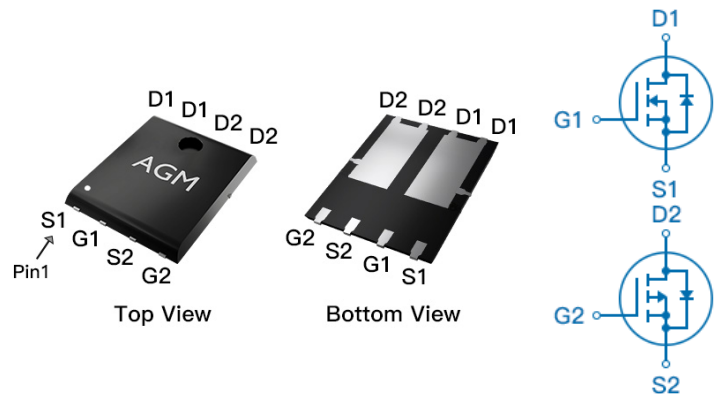
Application

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

Product Summary

BVDSS	RDSON	ID
30V	10mΩ	30A
-30V	21mΩ	-20A

PDFN5*6 Pin Configuration



Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM314MA	AGM314MA	PDFN5*6	330mm	12mm	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 ($V_{DS}=0V$)	± 20	± 20	V
I_D	Drain Current-Continuous($T_C=25^{\circ}\text{C}$) (Note 1)	30	-20	A
	Drain Current-Continuous($T_C=100^{\circ}\text{C}$)	21	-14	A
I_{DM} (pluse)	Drain Current-Pulsed (Note 2)	120	-80	A
P_D	Total Power Dissipation($T_C=25^{\circ}\text{C}$)	29.7	29.7	W
	Total Power Dissipation($T_C=100^{\circ}\text{C}$)	11.9	11.9	W
EAS	Avalanche energy (Note 3)	56	56	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) ¹	---	20	$^{\circ}\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	4.2	$^{\circ}\text{C/W}$

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	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	2.2	V
gFS	Forward Transconductance	VDS=5V,ID=5A	--	7	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=10V, ID=10A	--	10	15	mΩ
		VGS=4.5V, ID=5A	--	16	24	mΩ
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=15V,VGS=0V, F=1MHZ	--	618	--	pF
Coss	Output Capacitance		--	95	--	pF
Crss	Reverse Transfer Capacitance		--	85	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	2.7	--	Ω
Switching Times						
td(on)	Turn-on Delay Time	VDS=15V,VGS=10V, RGEN=6.8Ω, RL=3.5Ω	--	12	--	nS
tr	Turn-on Rise Time		--	25	--	nS
td(off)	Turn-Off Delay Time		--	38	--	nS
tf	Turn-Off Fall Time		--	16	--	nS
Qg	Total Gate Charge	VGS=10V, VDS=15V, ID=15A	--	11.7	--	nC
Qgs	Gate-Source Charge		--	3.8	--	nC
Qgd	Gate-Drain Charge		--	2.3	--	nC
Source-Drain Diode Characteristics						
ISD	Source-Drain Current(Body Diode)		--	--	30	A
VSD	Forward on Voltage	VGS=0V,IS=10A	--	--	1.2	V
trr	Reverse Recovery Time	IF=10A , dI/dt=100A/μs , TJ=25℃	--	17	--	ns
Qrr	Reverse Recovery Charge		--	31	--	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, Vgs=10V, ID=15A, L=0.5mH, RG=25ohm

Table 3. P-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	-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	-1.5	-2.2	V
gFS	Forward Transconductance	VDS=-10V,ID=-5A	--	6	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=-10V, ID=-10A	--	21	26	mΩ
		VGS=-4.5V, ID=-5A	--	30	39	mΩ
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=-15V,VGS=0V, F=1MHZ	--	695	--	pF
Coss	Output Capacitance		--	98	--	pF
Crss	Reverse Transfer Capacitance		--	92	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	11.5	--	Ω
Switching Times						
td(on)	Turn-on Delay Time	VGS=-10V,VDS=-15V, RL=1Ω,RGEN=3Ω	--	9	--	nS
tr	Turn-on Rise Time		--	5	--	nS
td(off)	Turn-Off Delay Time		--	21	--	nS
tf	Turn-Off Fall Time		--	3.3	--	nS
Qg	Total Gate Charge	VGS=-10V, VDS=-25V, ID=-5A	--	13.2	--	nC
Qgs	Gate-Source Charge		--	26	--	nC
Qgd	Gate-Drain Charge		--	3.3	--	nC
Source-Drain Diode Characteristics						
ISD	Source-Drain Current(Body Diode)		--	--	-20	A
VSD	Forward on Voltage	VGS=0V,IS=-10A	--	--	-1.2	V
trr	Reverse Recovery Time	IF=-10A , dI/dt=100A/μs , TJ=25℃	--	13	--	ns
Qrr	Reverse Recovery Charge		--	8.5	--	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, Vgs=-10V, ID=-15A, L=0.5mH, RG=25ohm

N-Channel Electrical Characteristics Diagrammes

Figure 1. On-Regin Characteristics

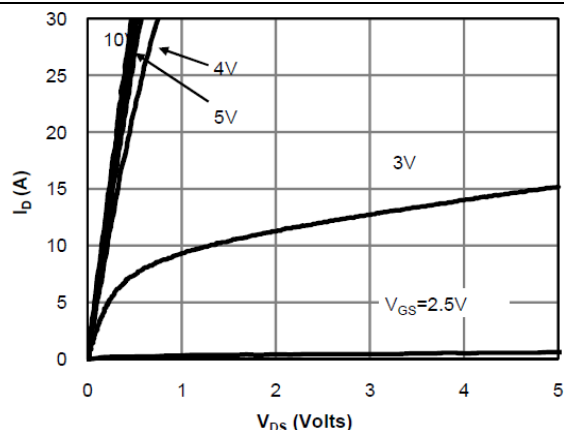


Figure 2. Transfer Characteristics

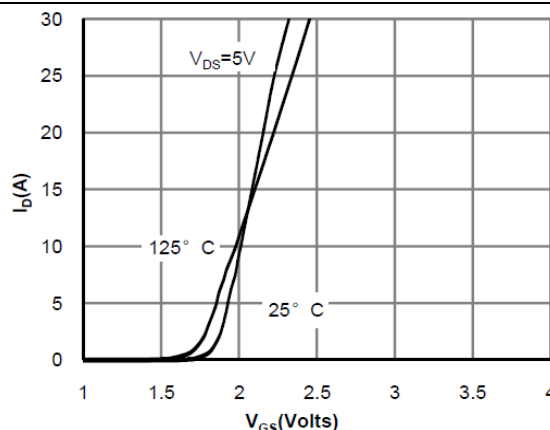


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

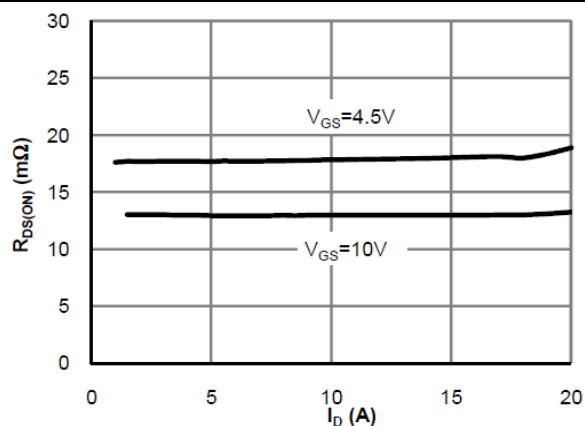


Figure 4. On-Resistance vs. Junction Temperature

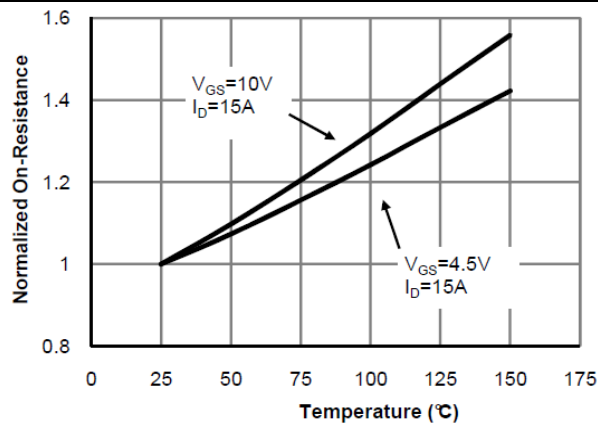


Figure 5. On-Resistance vs. Gate-Source Voltage

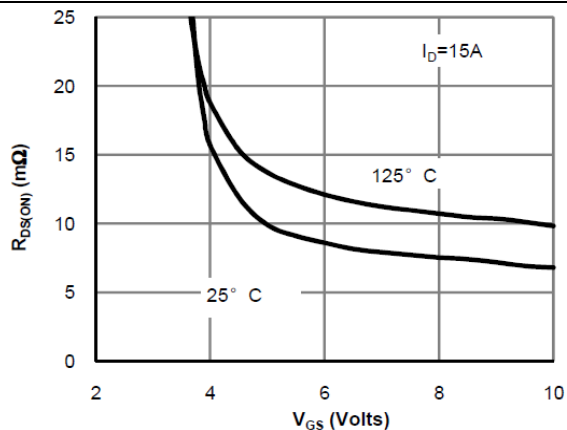


Figure 6. Body-Diode Characteristics

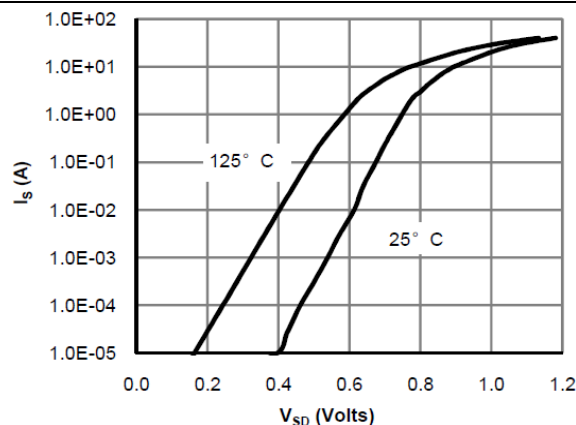


Figure 7. Gate-Charge Characteristics

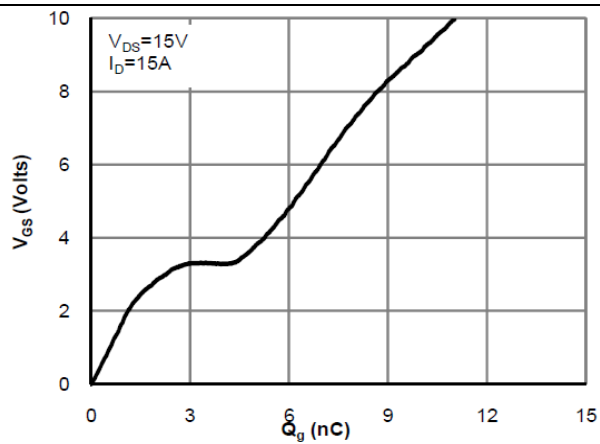


Figure 8. Capacitance Characteristics

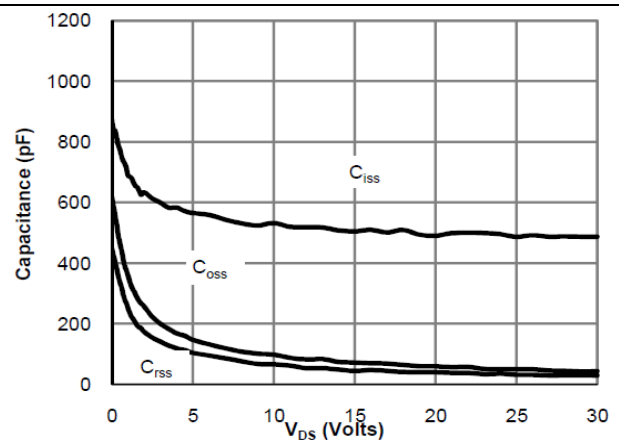


Figure 9. Maximum Forward Biased Safe Operating Area

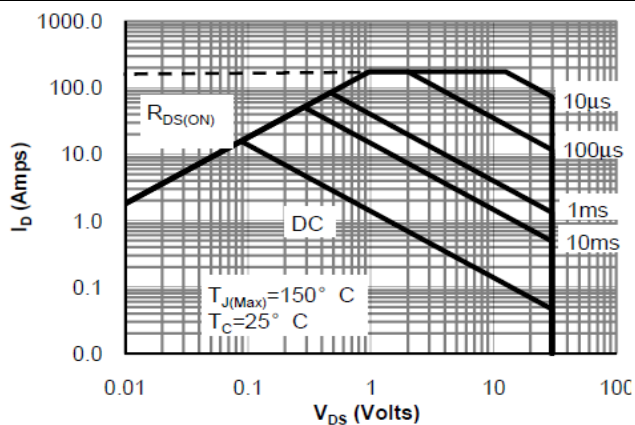


Figure 10. Single Pulse Power Rating Junction-to-Ambient

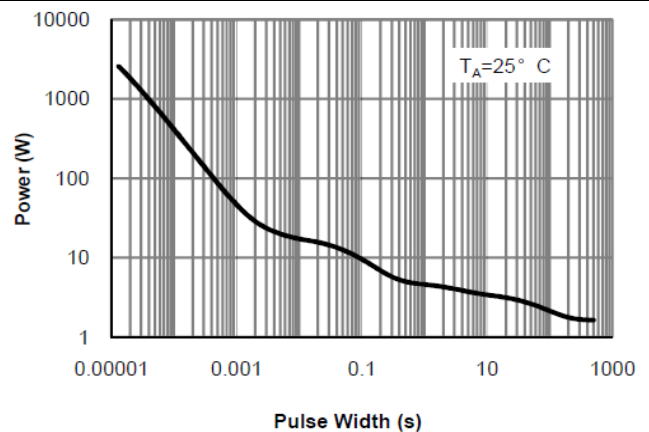
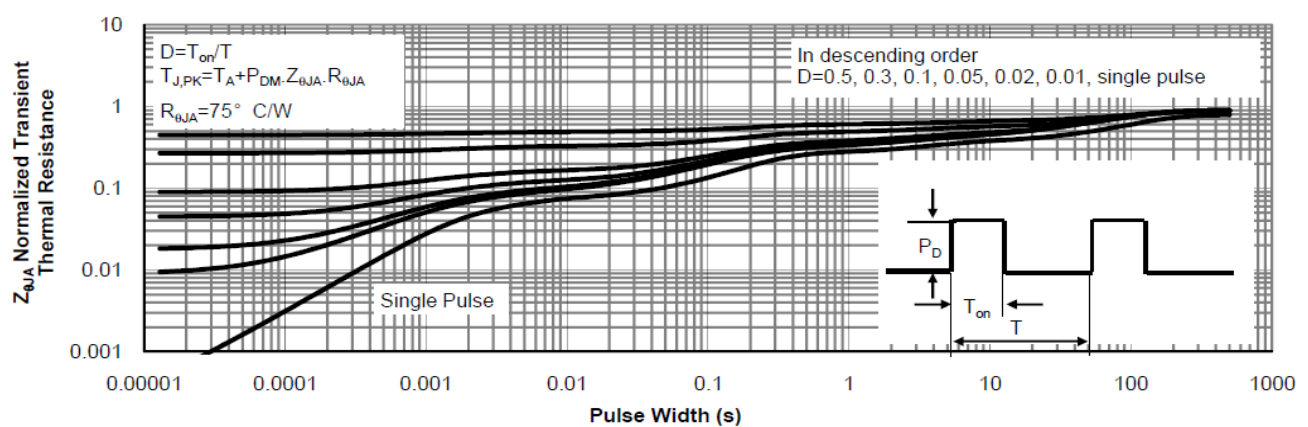


Figure 11. Normalized Maximum Transient Thermal Impedance



P-Channel Electrical Characteristics Diagrames

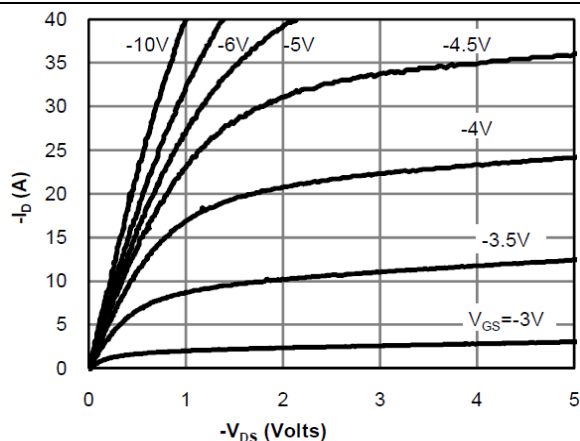
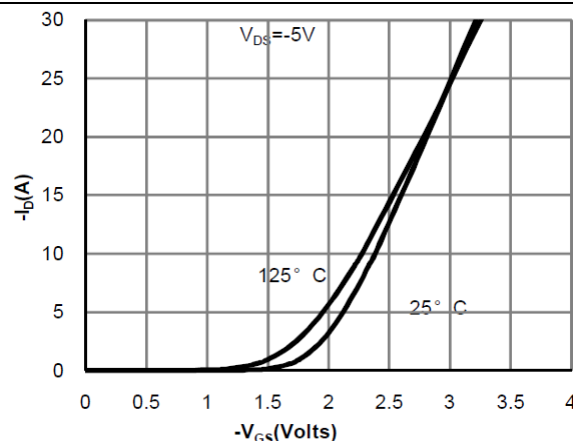
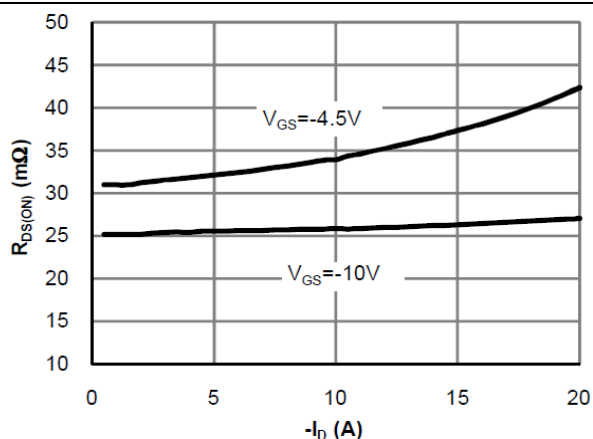
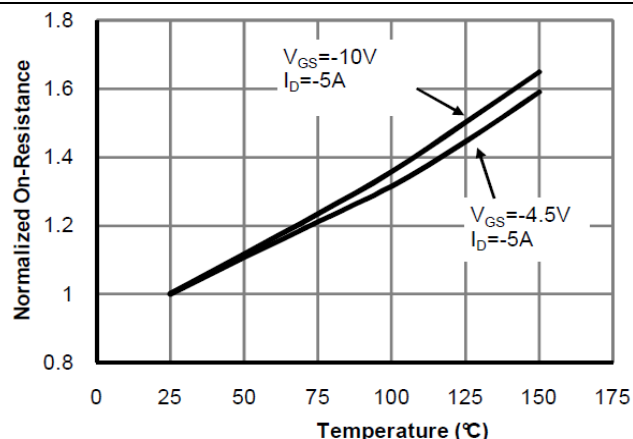
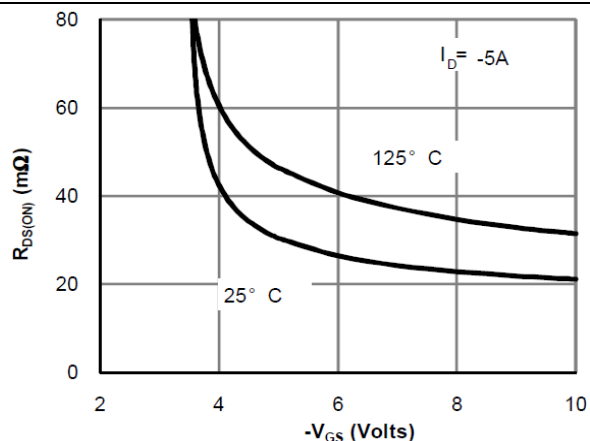
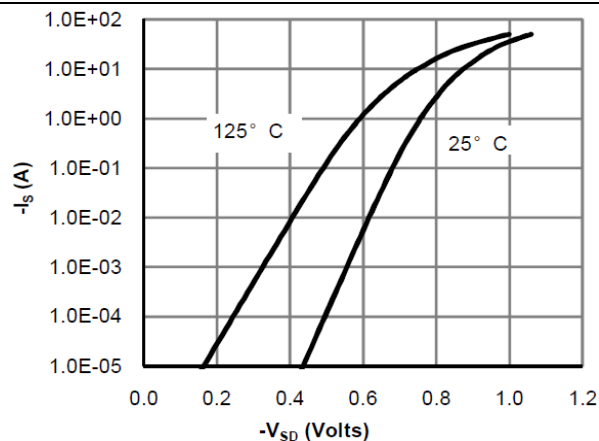
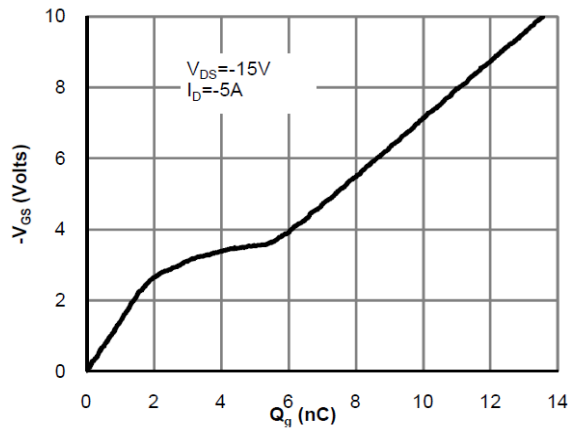
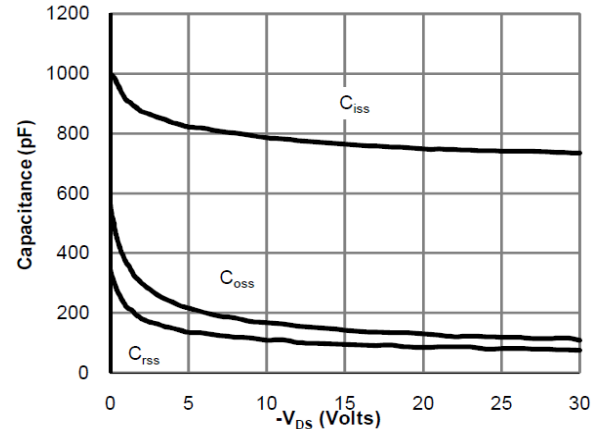
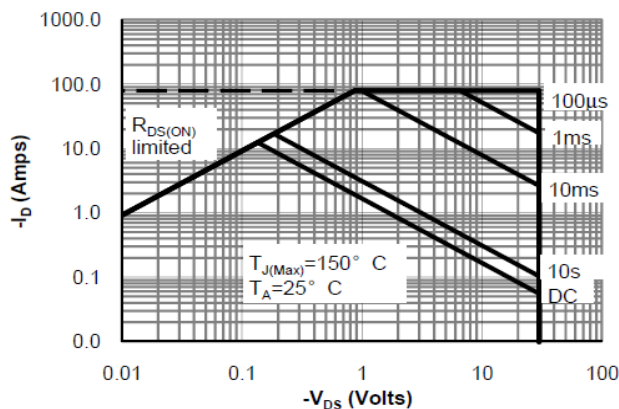
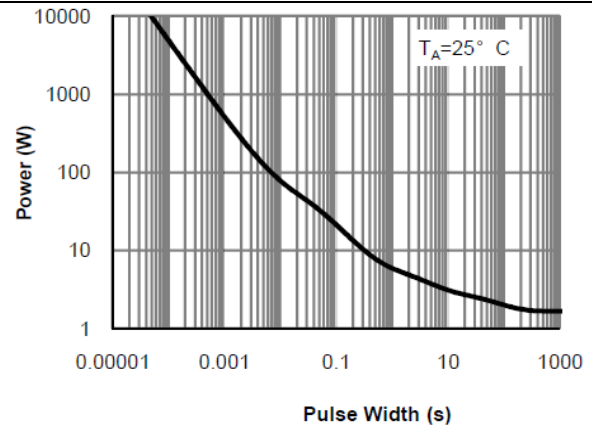
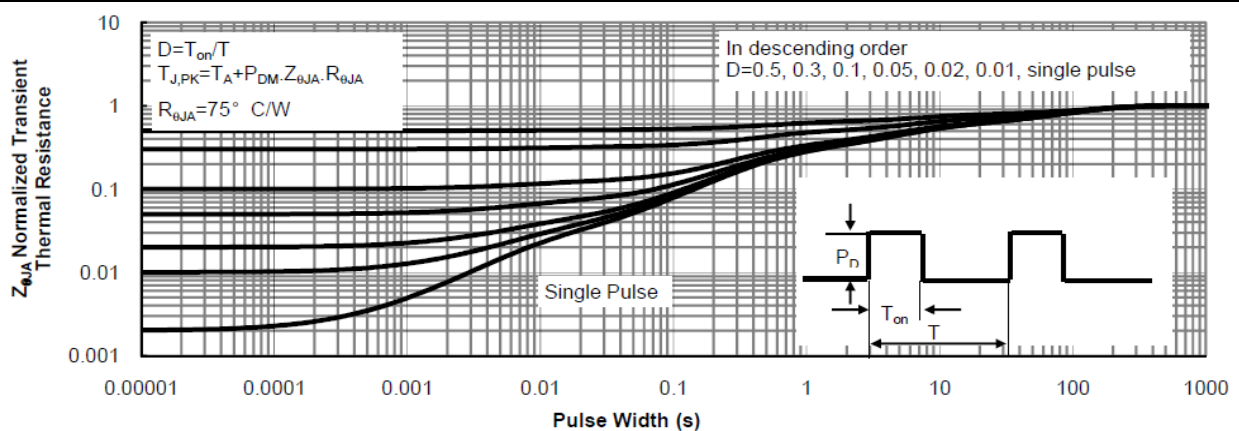
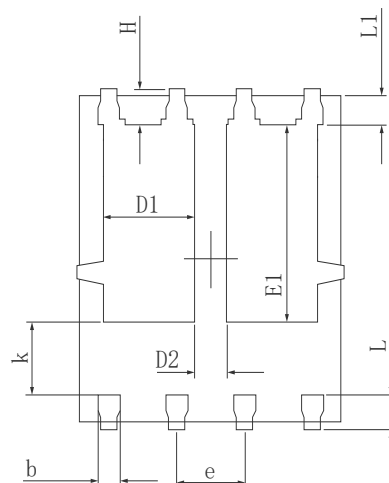
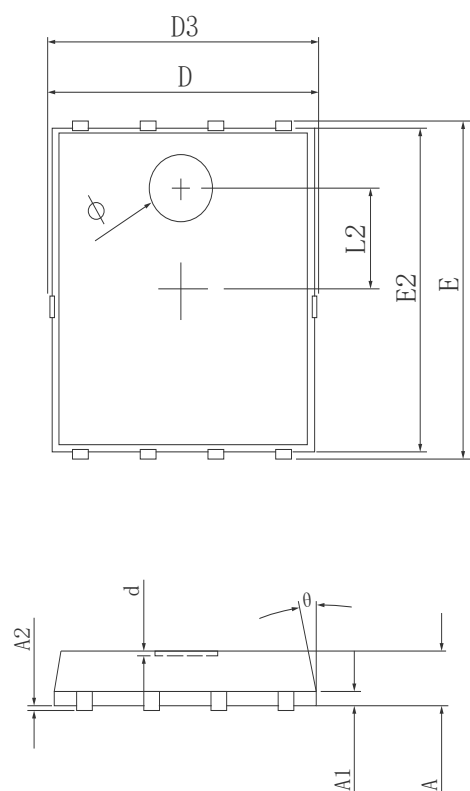
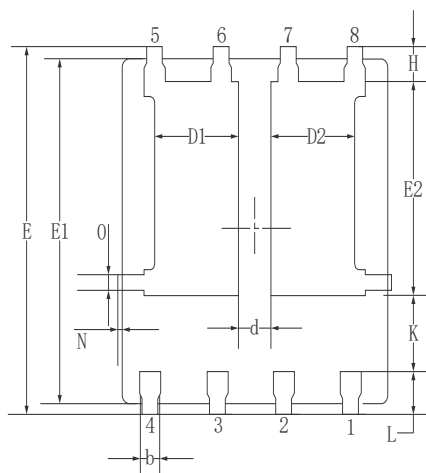
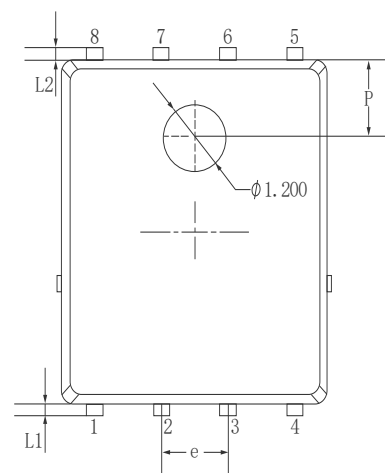
Figure 1. On-Regin Characteristics

Figure 2. Transfer Characteristics

Figure 3. On-Resistance vs. Drain Current and Gate Voltage

Figure 4. On-Resistance vs. Junction Temperature

Figure 5. On-Resistance vs. Gate-Source Voltage

Figure 6. Body-Diode Characteristics


Figure 7. Gate-Charge Characteristics

Figure 8. Capacitance Characteristics

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Figure 10. Single Pulse Power Rating Junction-to-Ambient

Figure 11. Normalized Maximum Transient Thermal Impedance


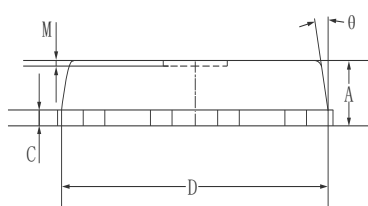
Dimensions (PDFN5*6)



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



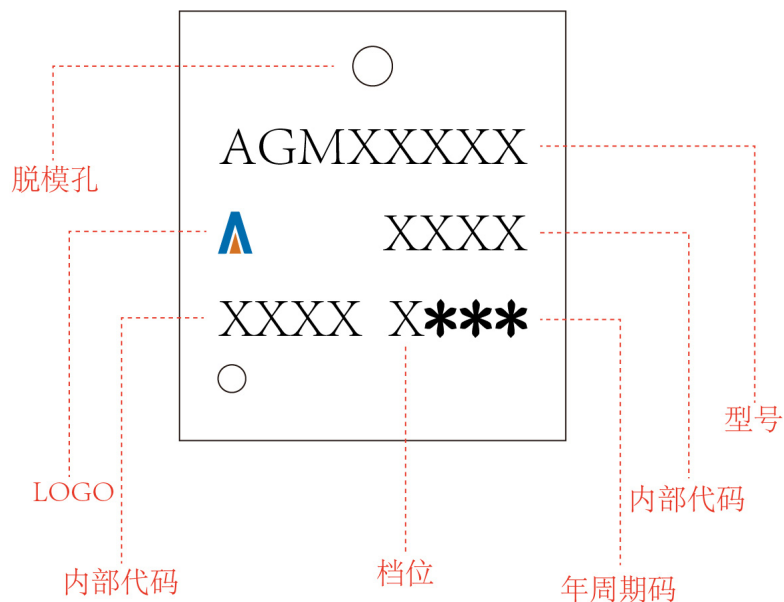
Symbol	Millimeters		
	MIN.	NOM.	MAX.
A	0.90	1.05	1.20
b	0.35	0.40	0.50
C	0.20	0.25	0.35
D	4.90	5.05	5.20
D1/D2	1.51	1.61	1.71
d	0.50	0.60	0.70
E	6.00	6.15	6.30
E1	5.60	5.75	5.90
E2	3.47	3.57	3.67
e	1.27 BSC.		
H	0.48	0.58	0.68
K	1.17	1.27	1.37
L	0.64	0.74	0.84
L1/L2	0.20 REF.		
θ	8°	10°	12°
M	0.08 REF.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



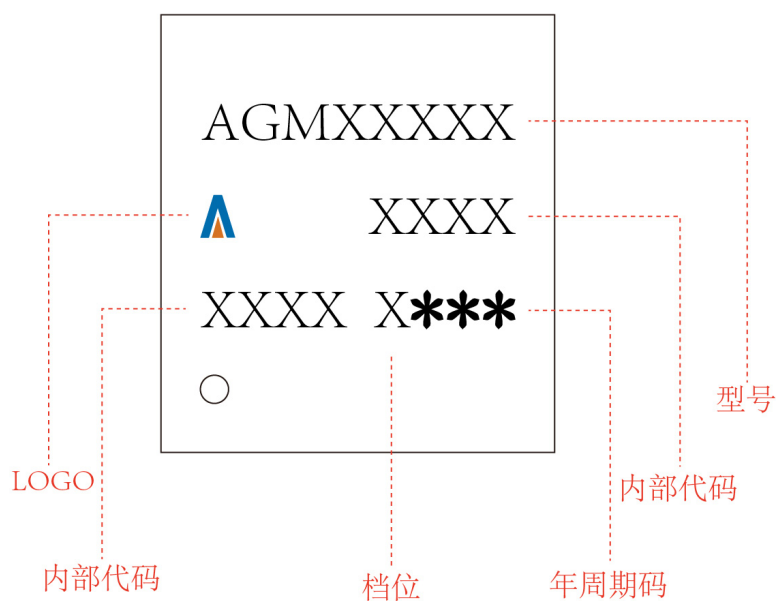
PDFN5*6

Marking Instructions:

Model1:



Model2:




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