● **General Description**

The AGM628MAP 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
60V	30mΩ	25A
-60V	44mΩ	-25A

PDFN3.3*3.3 Pin Configuration

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM628MAP	AGM628MAP	PDFN3.3*3.3	330mm	12mm	5000

Table 1. Absolute Maximum Ratings (T$_A$=25℃)

Symbol	Parameter	Rating		Units
		N-Ch	**P-Ch**	
V_{DS}	Drain-Source Voltage ($V_{GS=0V}$）	60	-60	V
V_{GS}	Gate-Source Voltage ($V_{DS=0V}$)	±20	±20	V
I_D	Drain Current-Continuous(Tc=25℃) (Note 1)	25	-25	A
	Drain Current-Continuous(Tc=100℃)	16	-16	A
IDM (pluse)	Drain Current-Pulsed (Note 2)	100	-100	A
P_D	Total Power Dissipation(Tc=25℃)	35	35	W
	Total Power Dissipation(Tc=100℃)	13.8	13.8	W
EAS	Avalanche energy (Note 3)	49	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$_{θJA}$	Thermal Resistance Junction-ambient (Steady State)[1]	---	62	℃/W
R$_{θJC}$	Thermal Resistance Junction-Case[1]	---	3.6	℃/W

Table 3. N- Channel Electrical Characteristics (TJ=25℃ unless otherwisenoted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
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	1.5	2.2	V
gFS	Forward Transconductance	VDS=5V,ID=10A	--	12	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=10V, ID=15A	--	30	36	mΩ
		VGS=4.5V, ID=10A	--	37	45	mΩ
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=30V,VGS=0V, F=1MHZ	--	868	--	pF
Coss	Output Capacitance		--	67	--	pF
Crss	Reverse Transfer Capacitance		--	56	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	1.3	--	Ω
Switching Times						
td(on)	Turn-on Delay Time	VGS=10V,VDS=30V, RL=2.5Ω,RGEN=3Ω	--	4.5	--	nS
tr	Turn-on Rise Time		--	18	--	nS
td(off)	Turn-Off Delay Time		--	14.5	--	nS
tf	Turn-Off Fall Time		--	18	--	nS
Qg	Total Gate Charge	VGS=10V, VDS=30V, ID=3A	--	19	--	nC
Qgs	Gate-Source Charge		--	4.2	--	nC
Qgd	Gate-Drain Charge		--	2.5	--	nC
Source-Drain Diode Characteristics						
ISD	Source-Drain Current(Body Diode)		--	--	25	A
VSD	Forward on Voltage	VGS=0V,IS=15A	--	0.8	1.2	V
trr	Reverse Recovery Time	IF=15A , dI/dt=100A/μs , TJ=25℃	--	--	--	ns
Qrr	Reverse Recovery Charge		--	--	--	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℃, VDD=30V,Vgs=10V,ID=14A, L=0.5mH,RG=25ohm
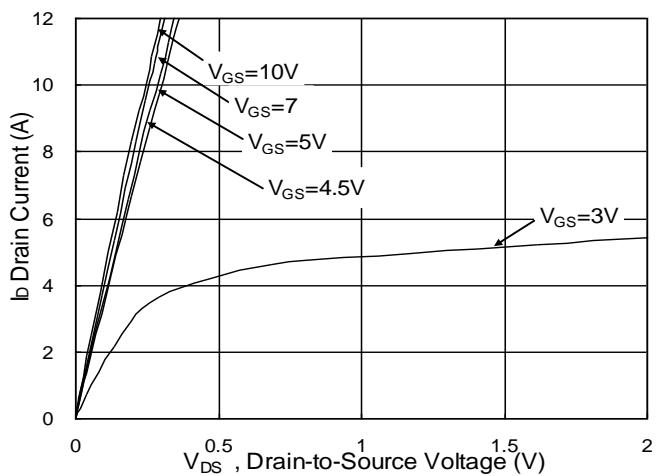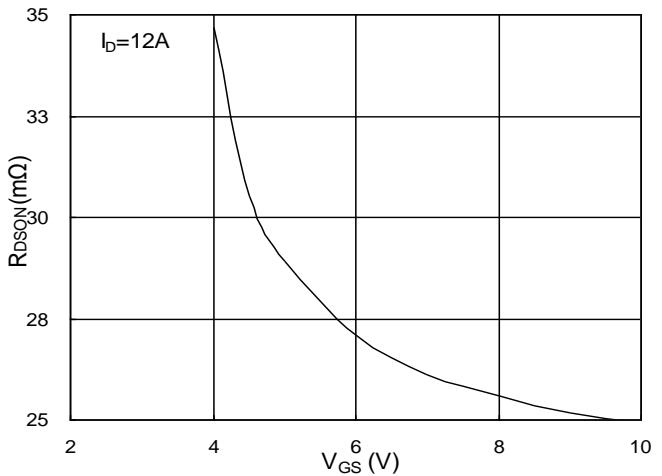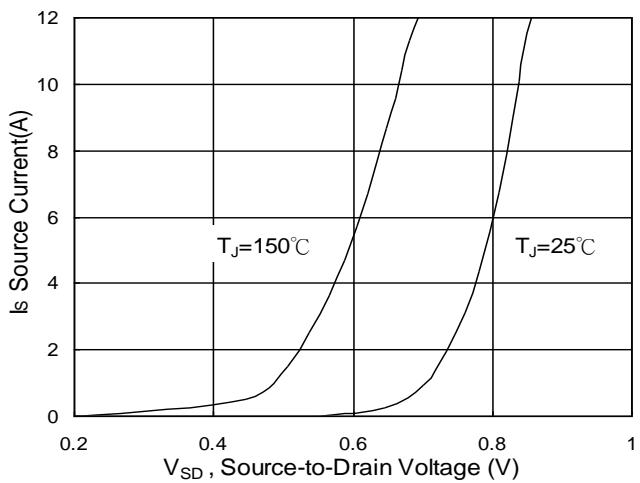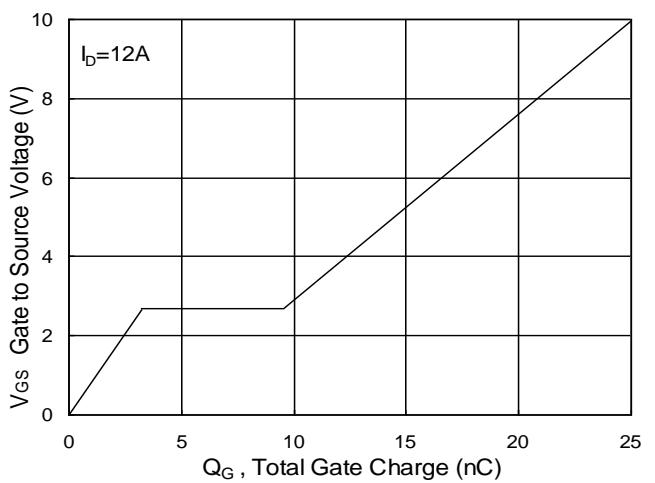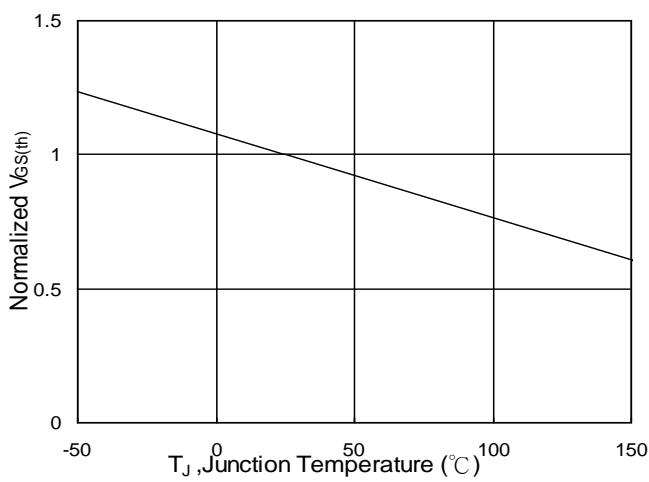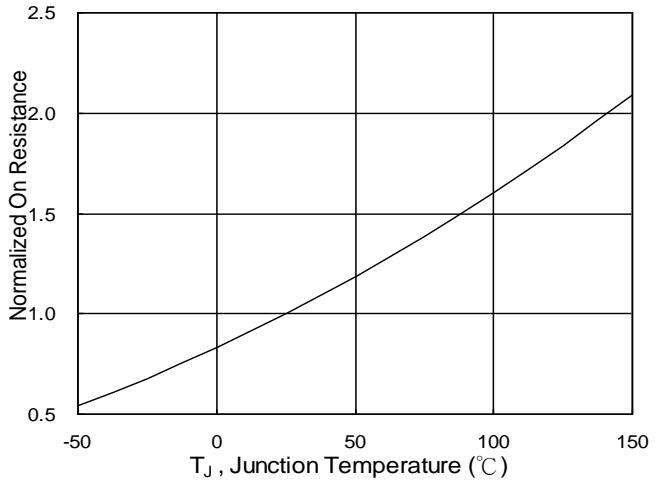
Table 3. P-Channel Electrical Characteristics (TJ=25℃ unless otherwise noted)
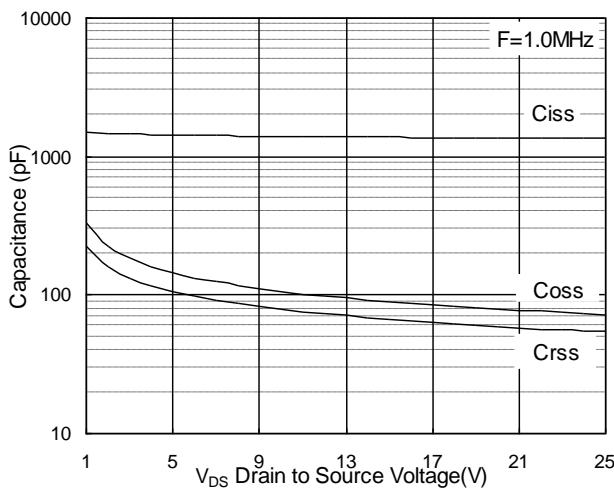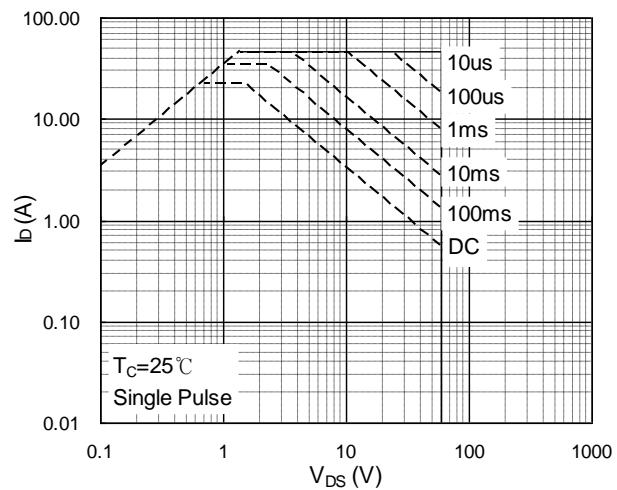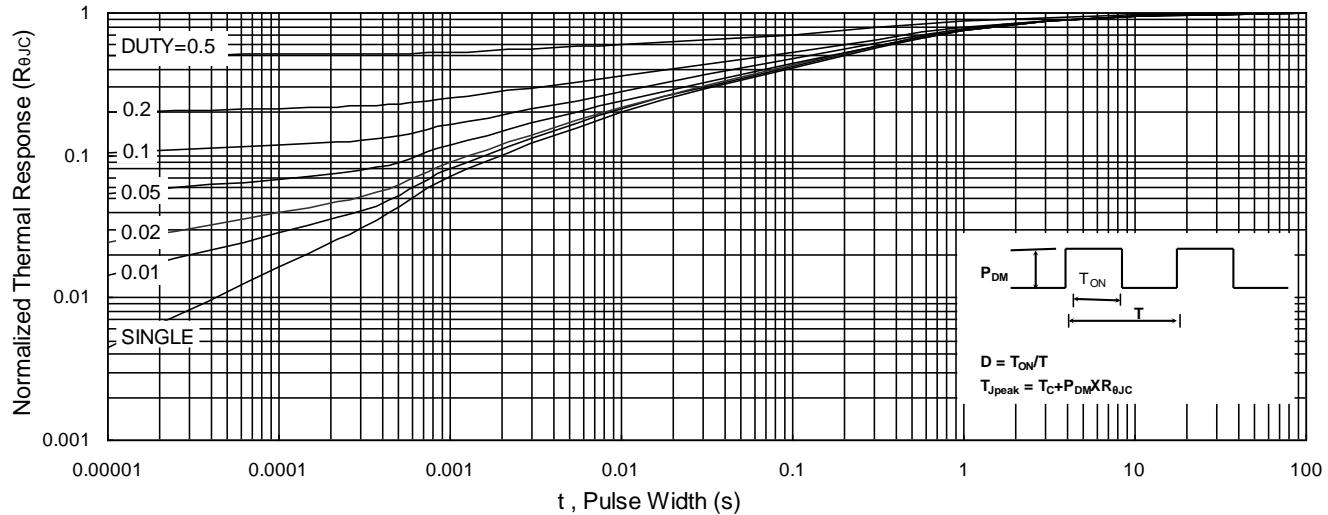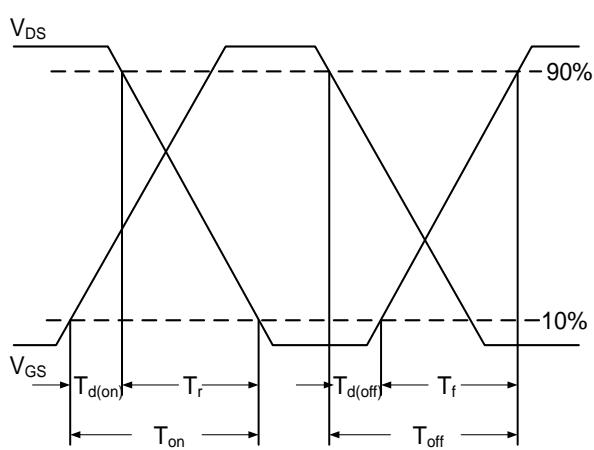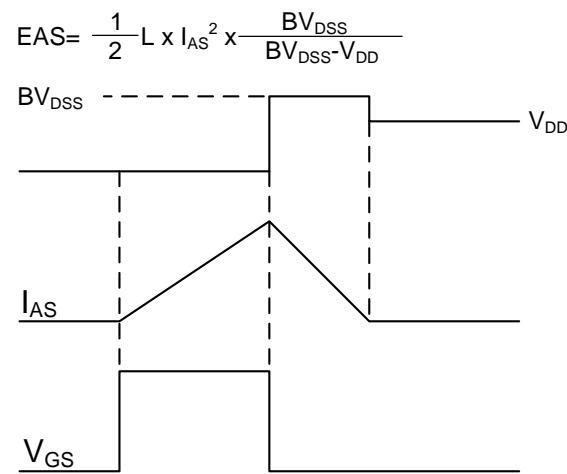
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BVDSS	Drain-Source Breakdown Voltage	VGS=0V ID=-250µA	-60	--	--	V
IDSS	Zero Gate Voltage Drain Current	VDS=-60V,VGS=0V	--	--	-1	µA
IGSS	Gate-Body Leakage Current	VGS=±20V,VDS=0V	--	--	±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS,ID=-250µA	-1.2	-1.7	-2.2	V
gFS	Forward Transconductance	VDS=-5V,ID=-10A	--	12	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=-10V, ID=-15A	--	44	67	mΩ
		VGS=-4.5V, ID=-10A	--	56	88	mΩ
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=-30V,VGS=0V, F=1MHZ	--	748	--	pF
Coss	Output Capacitance		--	120	--	pF
Crss	Reverse Transfer Capacitance		--	12	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	4.2	--	Ω
Switching Times						
td(on)	Turn-on Delay Time	VGS=-10V,VDS=-30V, RGEN=3Ω	--	10	--	nS
tr	Turn-on Rise Time		--	6.0	--	nS
td(off)	Turn-Off Delay Time		--	40	--	nS
tf	Turn-Off Fall Time		--	13	--	nS
Qg	Total Gate Charge	VGS=-10V, VDS=-30V, ID=-3A	--	25	--	nC
Qgs	Gate-Source Charge		--	5.8	--	nC
Qgd	Gate-Drain Charge		--	3.1	--	nC
Source-Drain Diode Characteristics						
ISD	Source-Drain Current(Body Diode)		--	--	-25	A
VSD	Forward on Voltage	VGS=0V,IS=-15A	--	-0.8	-1.2	V
trr	Reverse Recovery Time	IF=-15A , dI/dt=100A/µs , TJ=25℃	--	--	--	ns
Qrr	Reverse Recovery Charge		--	--	--	nc
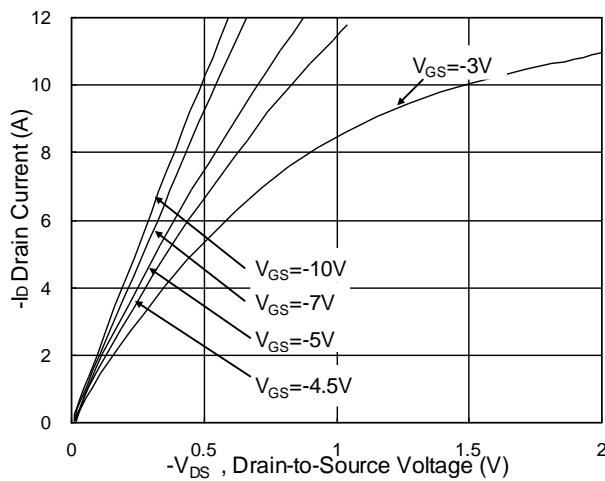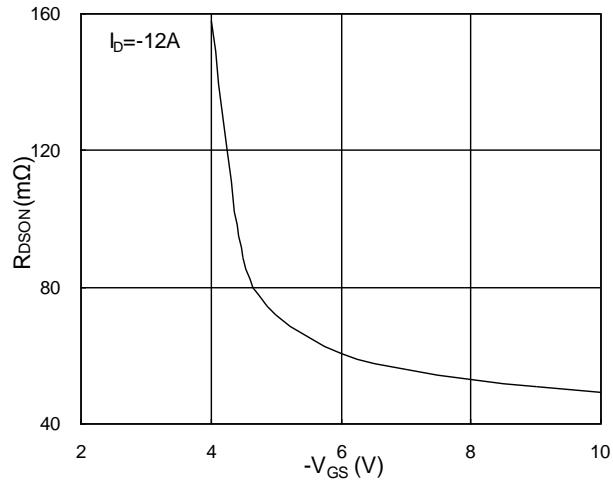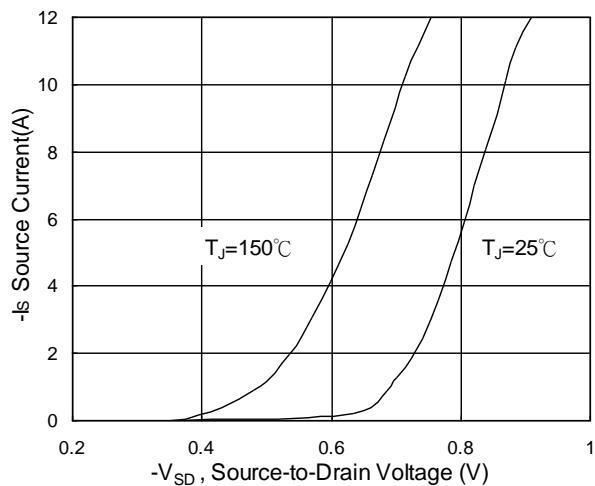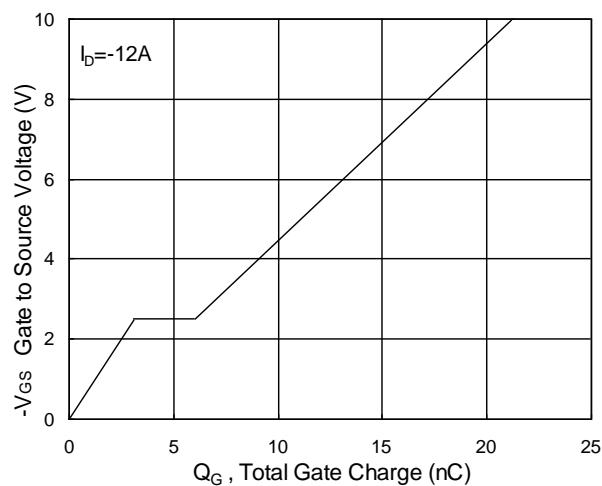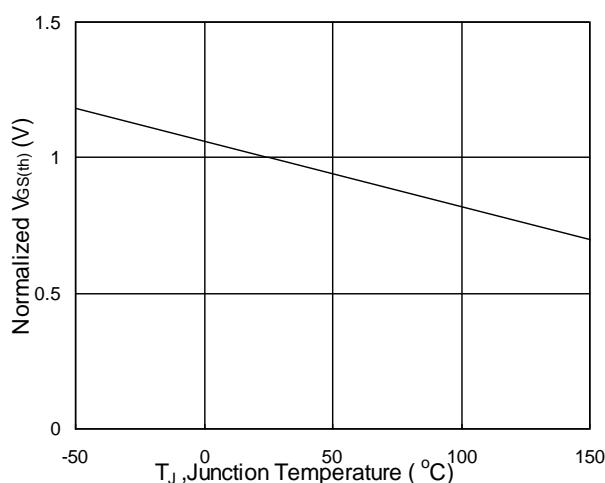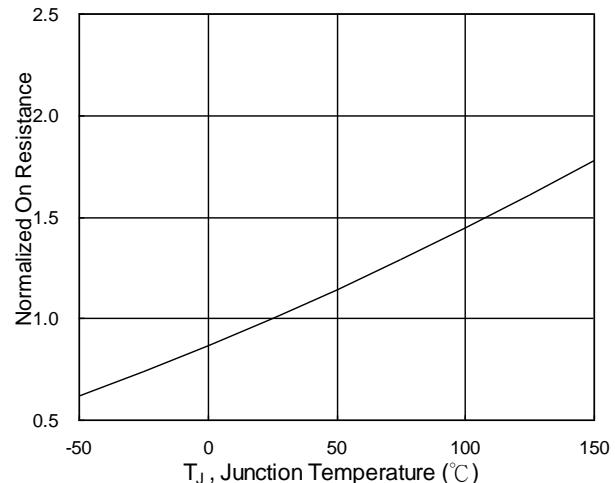
Notes 1.The maximum current rating is package limited.

Notes 2.Repetitive Rating: Pulse width limited by maximum junction temperature Notes
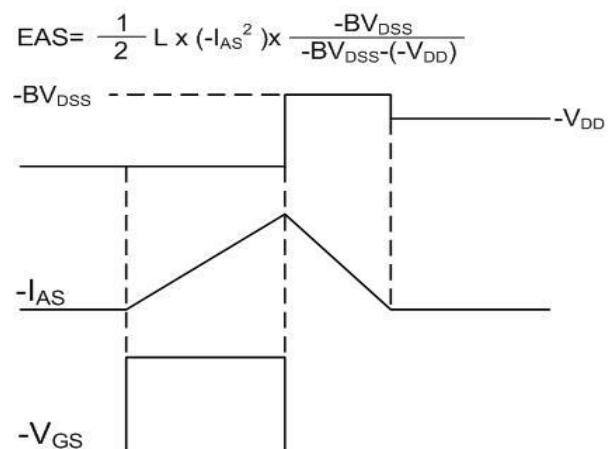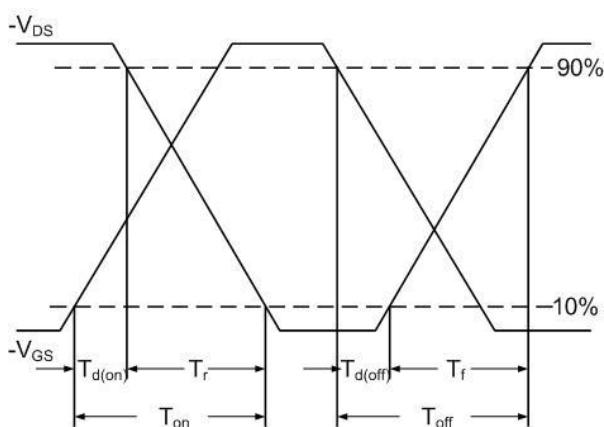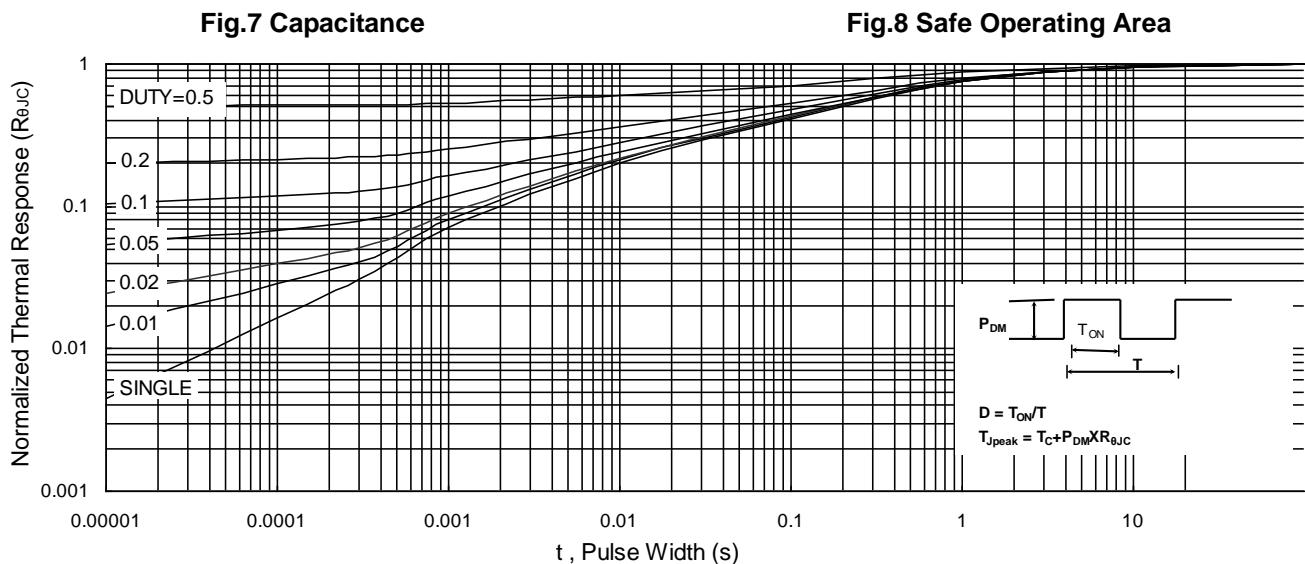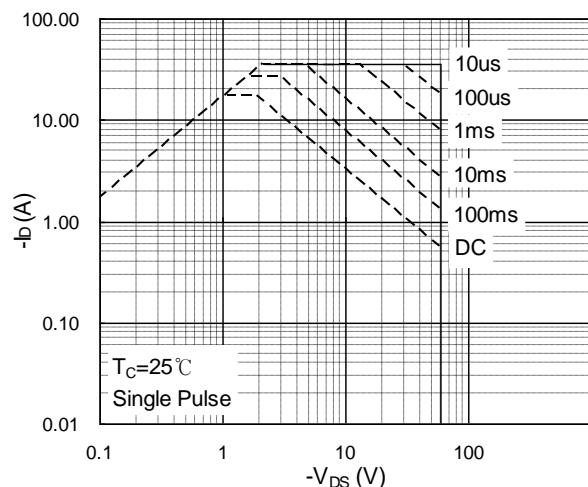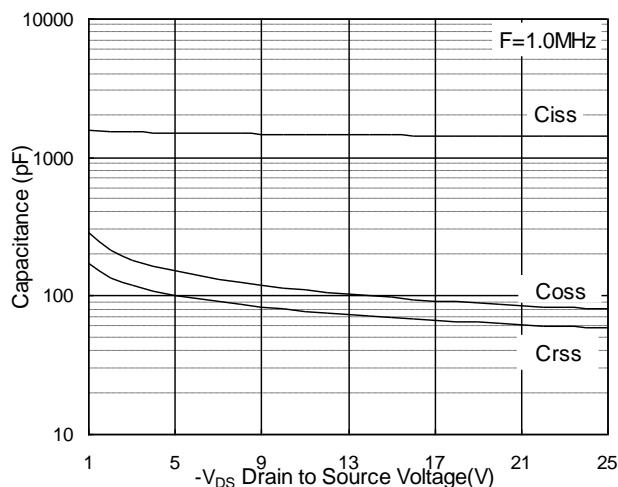
3.EAS condition: TJ=25℃,VDD=-30V,Vgs=-10V,ID=-16A, L=0.5mH,RG=25ohm

N-Channel Typical Characteristics

Fig.1 Typical Output Characteristics

**Fig.2 On-Resistance v.s Gate-Source**

Fig.3 Forward Characteristics of Reverse

Fig.4 Gate-Charge Characteristics

Fig.5 Normalized $V_{GS(th)}$ v.s T_J

Fig.6 Normalized R_{DSON} v.s T_J

Capacitance (pF)

F=1.0MHz

Ciss

Coss

Crss

V_{DS} Drain to Source Voltage(V)

Fig.7 Capacitance

I_D (A)

10us
100us
1ms
10ms
100ms
DC

T_C=25℃
Single Pulse

V_{DS} (V)

Fig.8 Safe Operating Area

Normalized Thermal Response ($R_{\theta JC}$)

DUTY=0.5

0.2

0.1

0.05

0.02

0.01

SINGLE

P_{DM}

T_{ON}

T

$D = T_{ON}/T$

$T_{Jpeak} = T_C + P_{DM} \times R_{\theta JC}$

t , Pulse Width (s)

Fig.9 Normalized Maximum Transient Thermal Impedance

V_{DS}

90%

10%

V_{GS}

$T_{d(on)}$ T_r $T_{d(off)}$ T_f

T_{on} T_{off}

Fig.10 Switching Time Waveform

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

BV_{DSS}

V_{DD}

I_{AS}

V_{GS}

Fig.11 Unclamped Inductive Waveform

P-Channel Typical Characteristics

Fig.1 Typical Output Characteristics

Fig.2 On-Resistance v.s Gate-Source

Fig.3 Forward Characteristics of Reverse

**Fig.4 Gate-Charge Characteristics**

Fig.5 Normalized $V_{GS(th)}$ v.s T_J

**Fig.6 Normalized R_{DSON} v.s T_J**

P-Channel Typical Characteristics

Fig.7 Capacitance

Fig.8 Safe Operating Area

$D = T_{ON}/T$

$T_{Jpeak} = T_C + P_{DM} \times R_{\theta JC}$

Fig.9 Normalized Maximum Transient Thermal Impedance

Fig.10 Switching Time Waveform

$$EAS = \frac{1}{2} L \times (-I_{AS}^2) \times \frac{-BV_{DSS}}{-BV_{DSS} - (-V_{DD})}$$

Fig.11 Unclamped Inductive Waveform
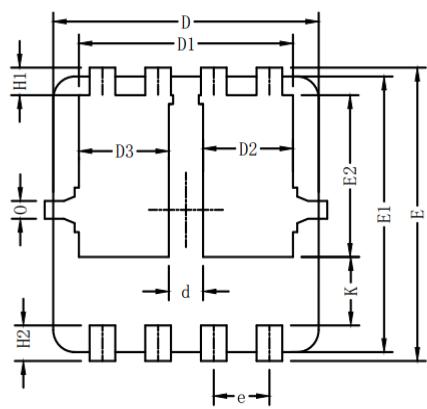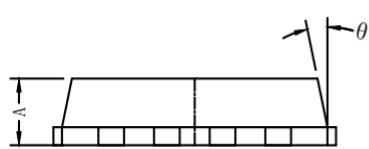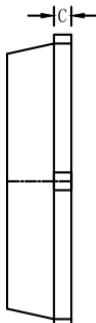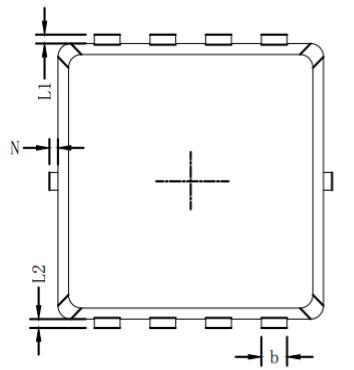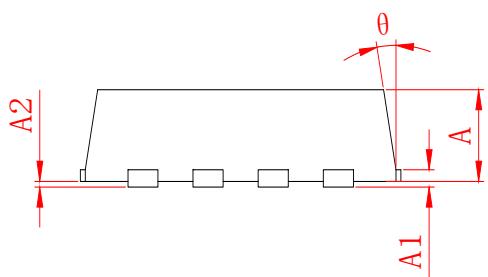
●Dimensions（PDFN3.3×3.3）

SYMBOL	MILLIMETER	
	MIN	MAX
A	0.700	0.900
A1	0.152 REF.	
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.		

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This document is the first version issued on October 10th, 2023. This document replaces all previously provided information.

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