

### • 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

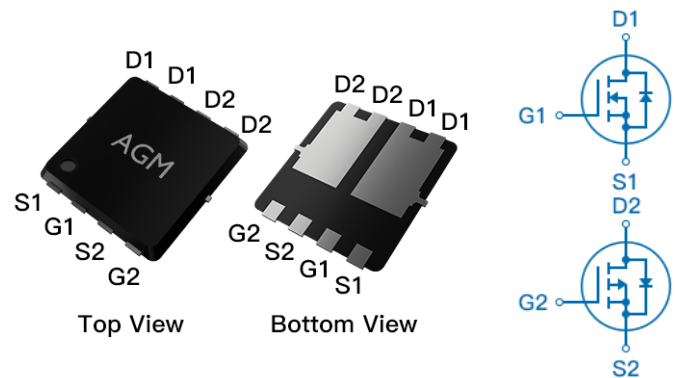
### • Application

- MB/VGA Vcore
- SMPS 2<sup>nd</sup> 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 ( $T_A=25^\circ\text{C}$ )**

Symbol	Parameter	Rating		Units
		N-Ch	P-Ch	
$V_{DS}$	Drain-Source Voltage ( $V_{GS}=0V$ )	60	-60	V
$V_{GS}$	Gate-Source Voltage ( $V_{DS}=0V$ )	$\pm 20$	$\pm 20$	V
$I_D$	Drain Current-Continuous( $T_c=25^\circ\text{C}$ ) (Note 1)	25	-25	A
	Drain Current-Continuous( $T_c=100^\circ\text{C}$ )	16	-16	A
IDM (pluse)	Drain Current-Pulsed (Note 2)	100	-100	A
$P_D$	Total Power Dissipation( $T_c=25^\circ\text{C}$ )	35	35	W
	Total Power Dissipation( $T_c=100^\circ\text{C}$ )	13.8	13.8	W
EAS	Avalanche energy (Note 3)	49	65	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) <sup>1</sup>	---	62	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	---	3.6	$^\circ\text{C/W}$

**Table 3. N- Channel 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	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
<b>Dynamic Characteristics</b>						
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
<b>Switching Times</b>						
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
<b>Source-Drain Diode Characteristics</b>						
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 ,	--	--	--	ns
Qrr	Reverse Recovery Charge	TJ=25°C	--	--	--	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=14A, L=0.5mH,RG=25ohm

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

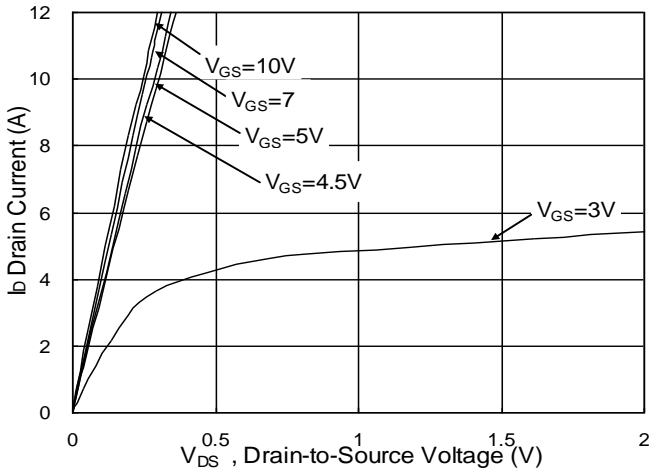
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>On/Off States</b>						
BVDSS	Drain-Source Breakdown Voltage	VGS=0V ID=-250μA	-60	--	--	V
IDSS	Zero Gate Voltage Drain Current	VDS=-60V,VGS=0V	--	--	-1	μA
IGSS	Gate-Body Leakage Current	VGS=±20V,VDS=0V	--	--	±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS,ID=-250μA	-1.2	-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
<b>Dynamic Characteristics</b>						
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
<b>Switching Times</b>						
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
<b>Source-Drain Diode Characteristics</b>						
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 ,	--	--	--	ns
Qrr	Reverse Recovery Charge	TJ=25°C	--	--	--	nc

Notes 1.The maximum current rating is package limited.

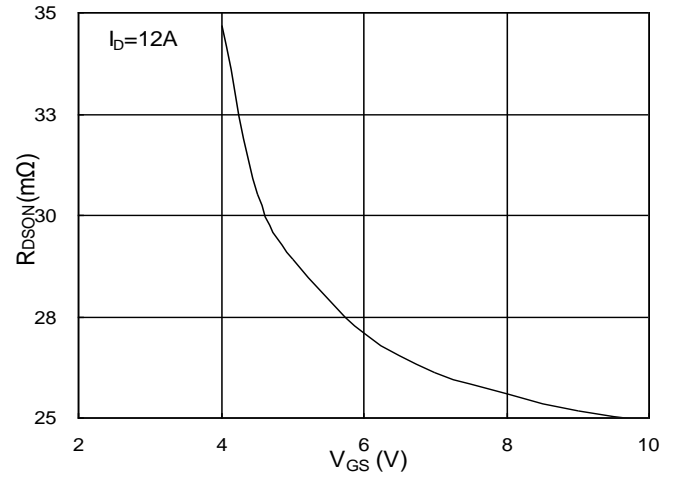
Notes2.Repetitive Rating: Pulse width limited by maximum junction temperature Notes

3.EAS condition: T<sub>J</sub>=25°C,VDD=-30V,Vgs=-10V,ID=-16A,L=0.5mH,RG=25ohm

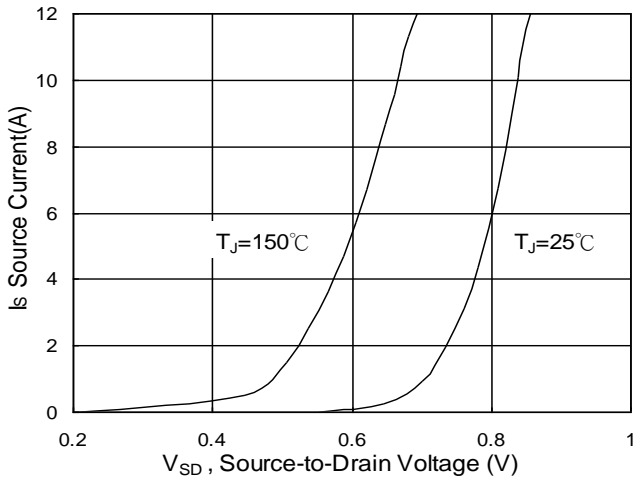
### N-Channel Typical Characteristics



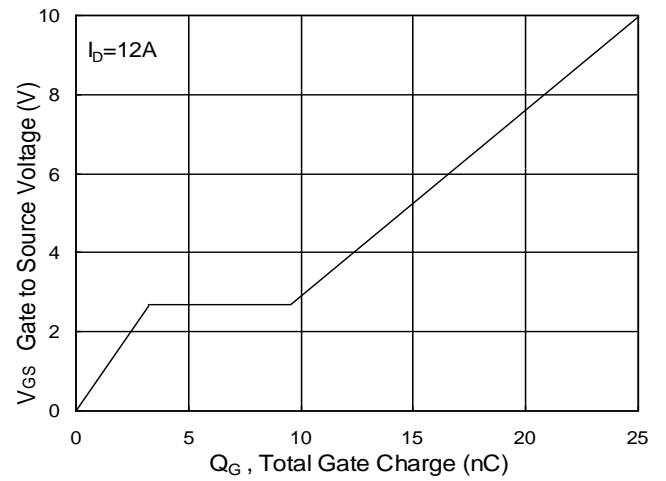
**Fig.1 Typical Output Characteristics**



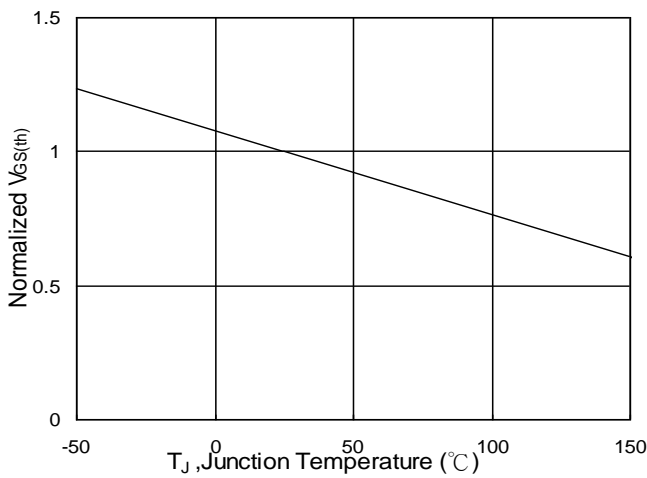
**Fig.2 On-Resistance v.s Gate-Source**



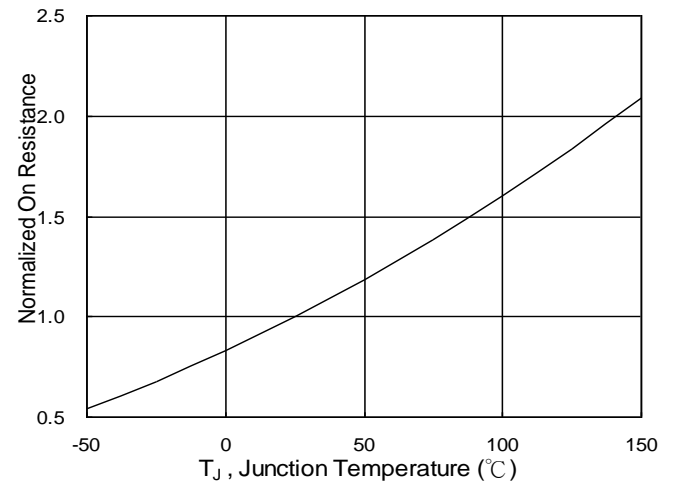
**Fig.3 Forward Characteristics of Reverse**



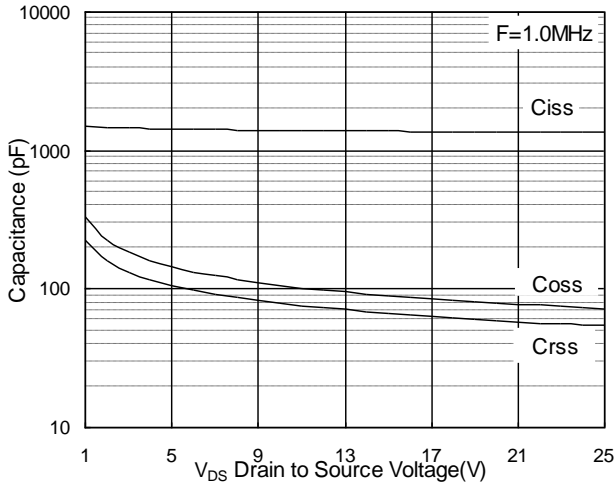
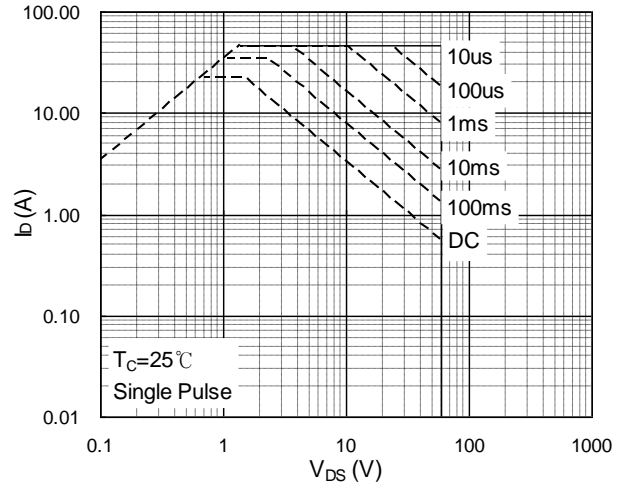
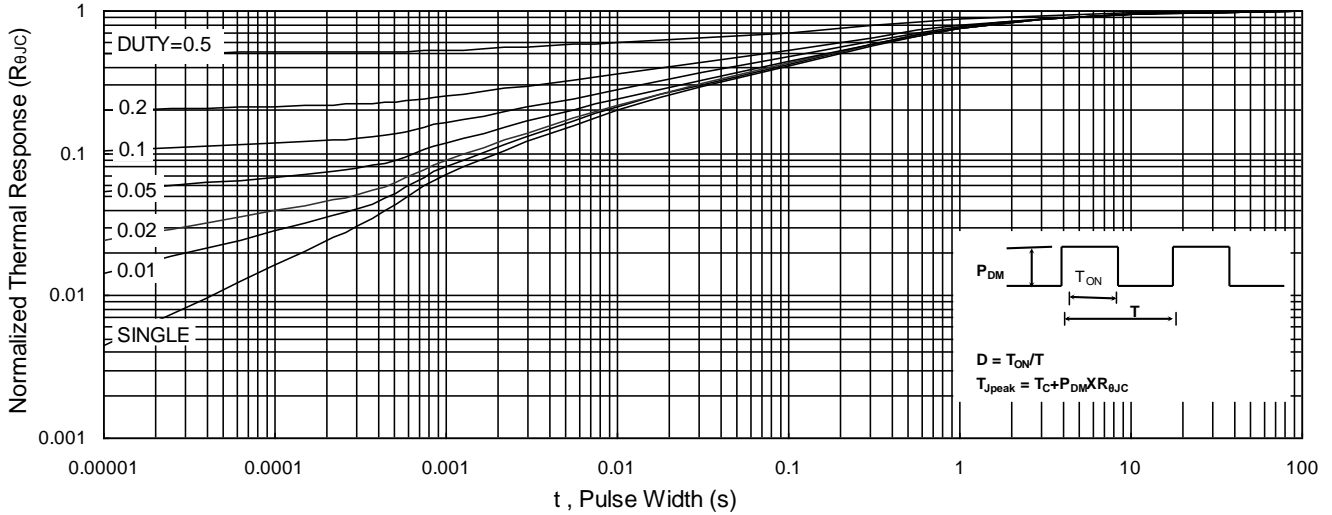
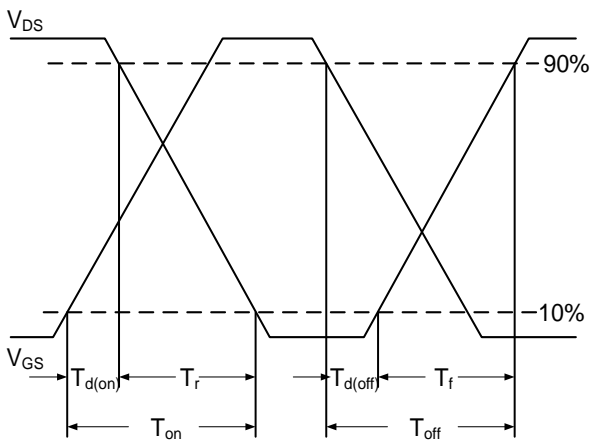
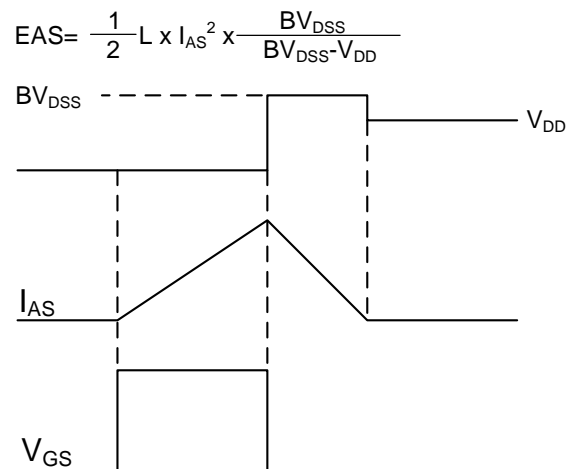
**Fig.4 Gate-Charge Characteristics**



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



**Fig.6 Normalized  $R_{DS(on)}$  v.s  $T_J$**


**Fig.7 Capacitance**

**Fig.8 Safe Operating Area**

**Fig.9 Normalized Maximum Transient Thermal Impedance**

**Fig.10 Switching Time Waveform**

**Fig.11 Unclamped Inductive Waveform**

### P-Channel Typical Characteristics

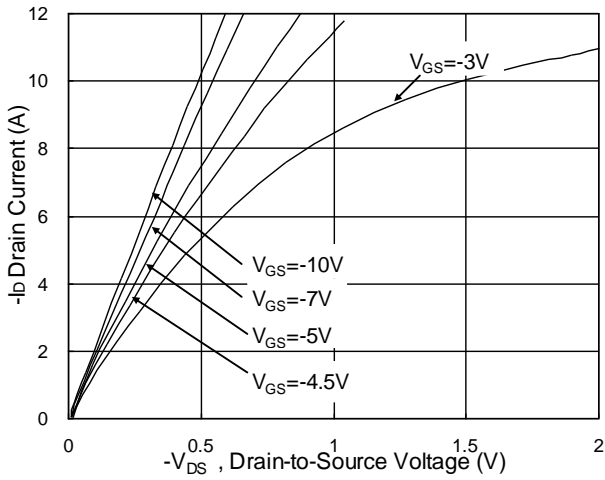


Fig.1 Typical Output Characteristics

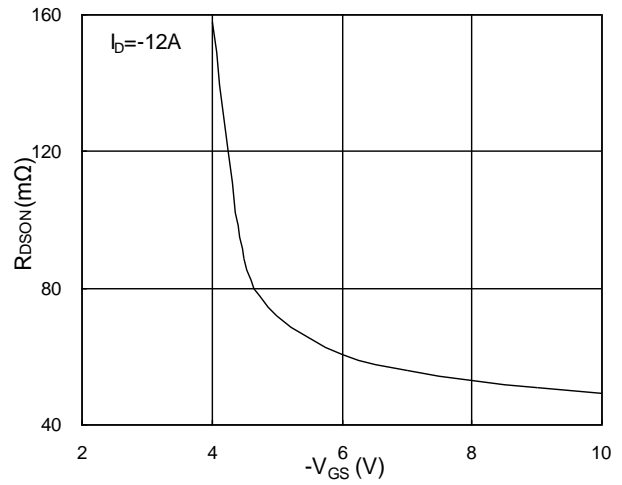


Fig.2 On-Resistance v.s Gate-Source

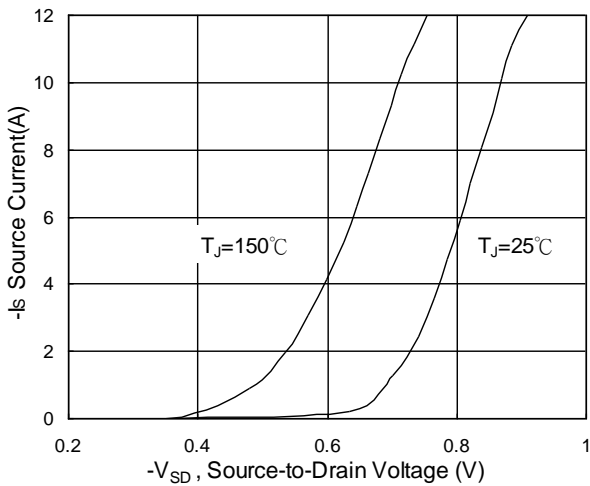


Fig.3 Forward Characteristics of Reverse

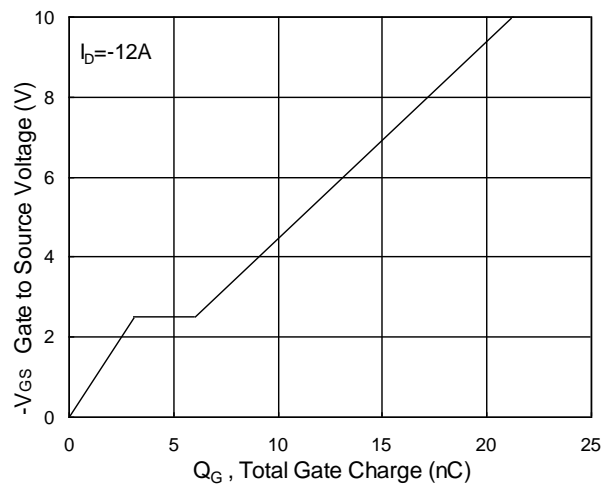


Fig.4 Gate-Charge Characteristics

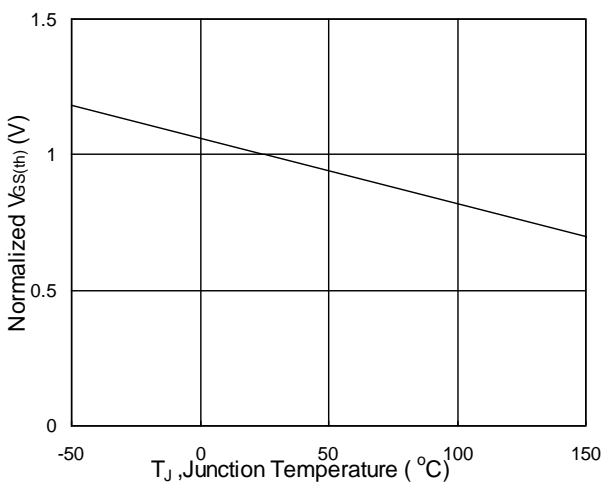


Fig.5 Normalized  $V_{GS(th)}$  v.s  $T_J$

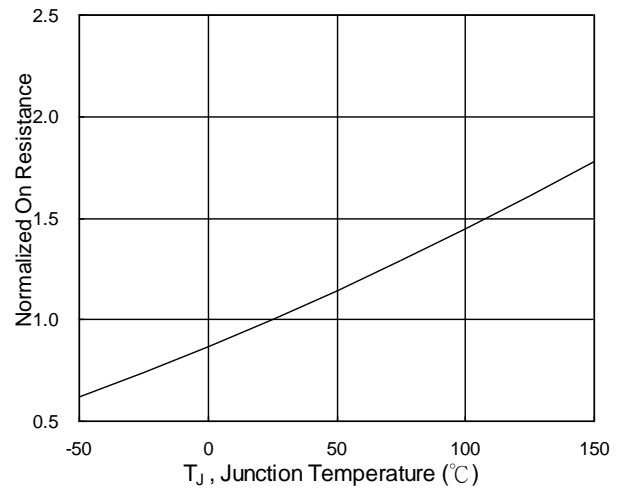


Fig.6 Normalized  $R_{DS(ON)}$  v.s  $T_J$

### P-Channel Typical Characteristics

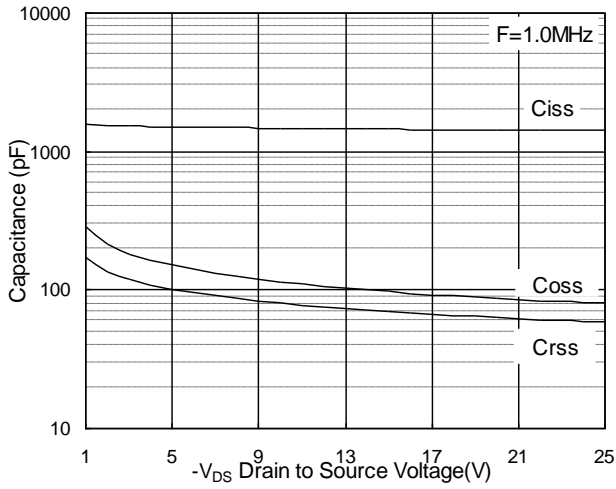


Fig.7 Capacitance

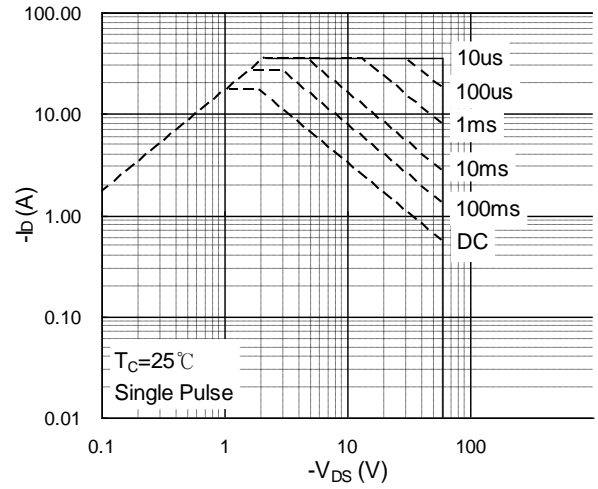


Fig.8 Safe Operating Area

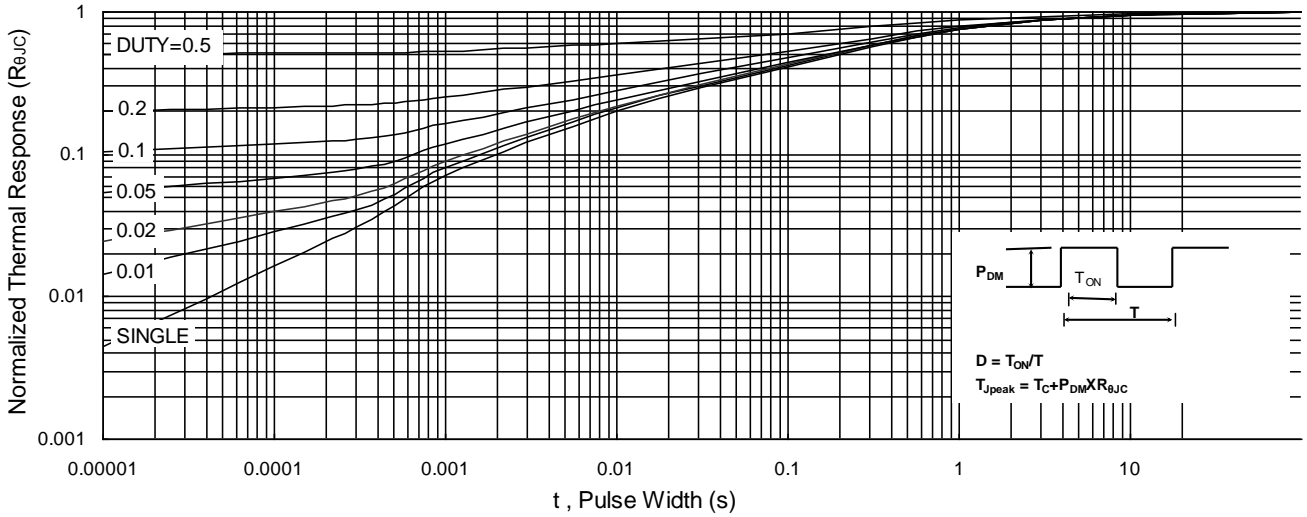


Fig.9 Normalized Maximum Transient Thermal Impedance

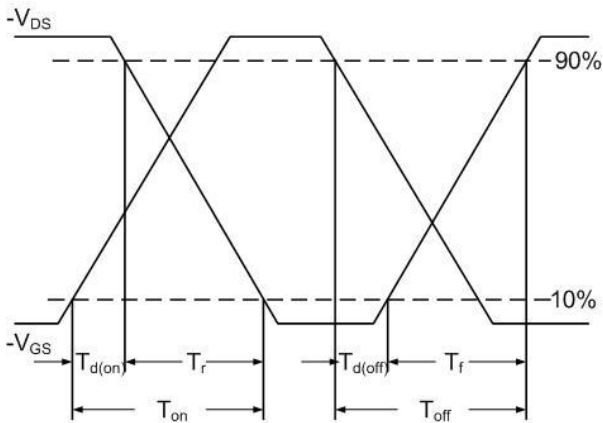


Fig.10 Switching Time Waveform

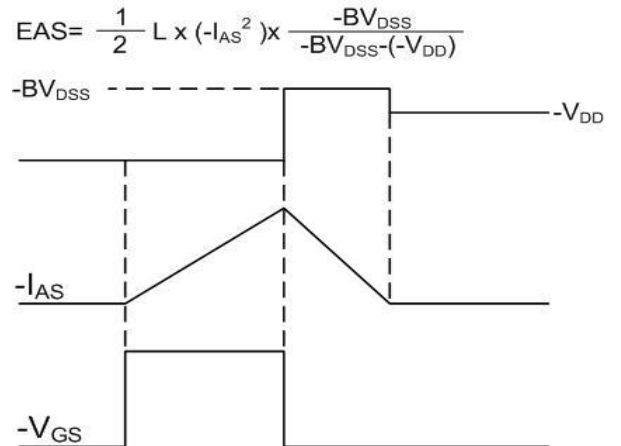
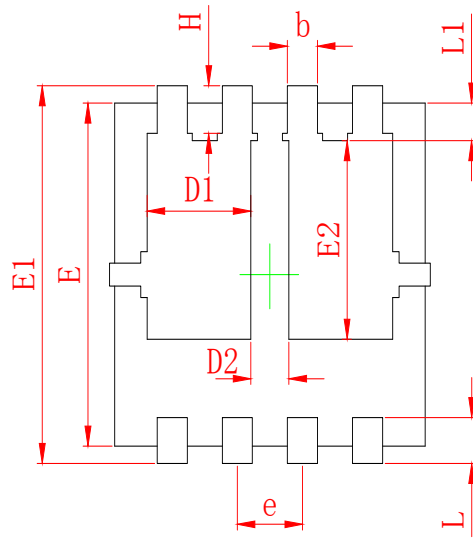
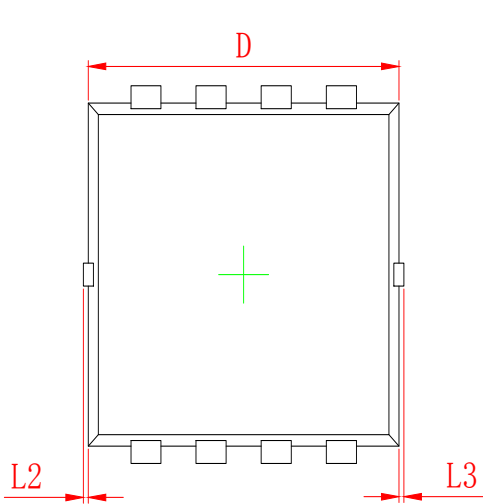
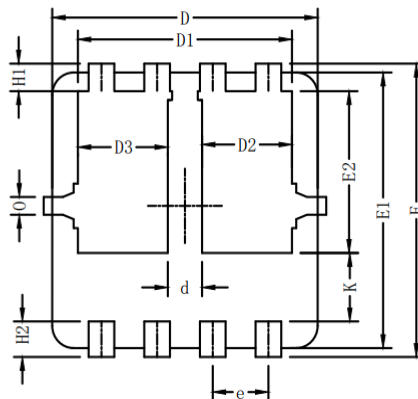
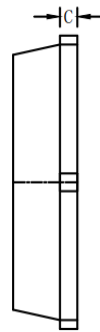
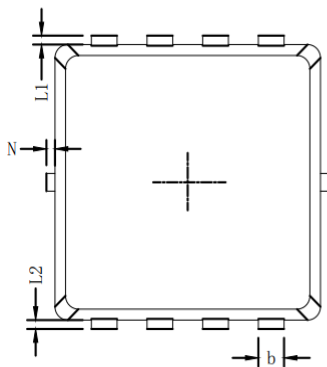
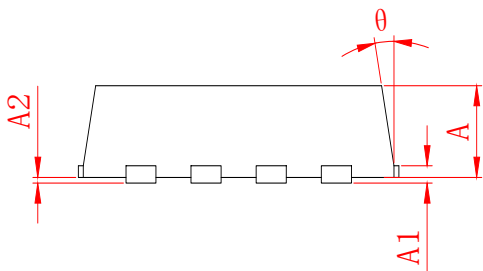


Fig.11 Unclamped Inductive Waveform

**•Dimensions (PDFN3.3×3.3)**


SYMBOL	MILLIMETER	
	MIN	MAX
A	0.700	0.900
A1	0.152 REF.	
A2	0 <sup>~</sup> 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 <sup>~</sup> 0.100	
L3	0 <sup>~</sup> 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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