● General Description

The AGM210MAP 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

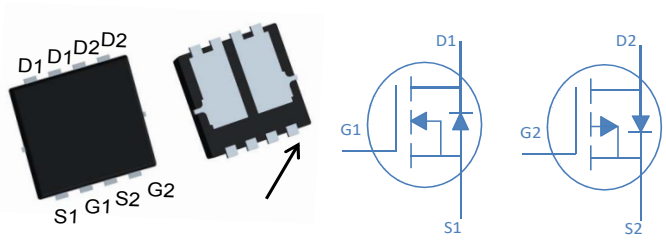
● Application

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

Product Summary

BVDSS	RDSON	ID
20V	11mΩ	25A
-20V	18mΩ	-25A

PDFN3.3*3.3 Pin Configuration



Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM210MAP	AGM210MAP	PDFN3.3*3.3	330mm	12mm	5000

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

Symbol	Parameter	Rating		Units
		N-Ch	P-Ch	
V_{DS}	Drain-Source Voltage (V_{GS}=0V)	20	-20	V
V_{GS}	Gate-Source Voltage (V_{DS}=0V)	±20	±20	V
I_D	Drain Current-Continuous(T_C=25℃) (Note 1)	25	-25	A
	Drain Current-Continuous(TC=100℃)	18	-16	A
IDM (pluse)	Drain Current-Continuous@ Current-Pulsed (Note 2)	70	-50	A
P_D	Total Power Dissipation(T_C=25℃)	35	30.8	W
	Total Power Dissipation(TC=100℃)	14	13	W
EAS	Avalanche energy (Note 3)	72	59	mJ
TJ,TSTG	Operating Junction and Storage Temperature Range	-55 To 150	-55 To 150	℃

Table 2. Thermal Characteristic

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	3.5	℃/W

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV_{DSS}	Drain-Source Breakdown Voltage	VGS=0V ID=250μA	20	--	--	V
IDSS	Zero Gate Voltage Drain Current	VDS=20V,VGS=0V	--	--	1	μA
IGSS	Gate-Body Leakage Current	VGS=±12V,VDS=0V	--	--	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	VDS=VGS,ID=250μA	0.4	0.7	1.0	V
gFS	Forward Transconductance	VDS=5V,ID=5A	--	9	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=4.5V, ID=4A	--	11	16	mΩ
		VGS=2.5V, ID=3A	--	15	20	mΩ
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=10V,VGS=0V, F=1MHZ	--	950	--	pF
Coss	Output Capacitance		--	150	--	pF
Crss	Reverse Transfer Capacitance		--	99	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	--	--	Ω
Switching Times						
td(on)	Turn-on Delay Time	VGS=4.5V,VDS=10V, ID=4A,RGEN=3.3Ω	--	4.0	--	nS
tr	Turn-on Rise Time		--	25	--	nS
td(off)	Turn-Off Delay Time		--	32	--	nS
tf	Turn-Off Fall Time		--	26	--	nS
Qg	Total Gate Charge	VGS=4.5V, VDS=10V, ID=2A	--	23	--	nC
Qgs	Gate-Source Charge		--	2.5	--	nC
Qgd	Gate-Drain Charge		--	4.2	--	nC
Source-Drain Diode Characteristics						
ISD	Source-Drain Current(Body Diode)		--	--	25	A
VSD	Forward on Voltage	VGS=0V,IS=4A	--	--	1.2	V
trr	Reverse Recovery Time	IF=4A , dI/dt=100A/μs , TJ=25℃	--	18	--	ns
Qrr	Reverse Recovery Charge		--	9.5	--	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: T_J=25℃

Table 3. P-Channel Electrical Characteristics (TA=25℃unless otherwisenoted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BVDSS	Drain-Source Breakdown Voltage	VGS=0V ID=-250μA	-20	--	--	V
IDSS	Zero Gate Voltage Drain Current	VDS=-20V,VGS=0V	--	--	-1	μA
IGSS	Gate-Body Leakage Current	VGS=±12V,VDS=0V	--	--	±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS,ID=-250μA	-0.5	-0.7	-1.0	V
gFS	Forward Transconductance	VDS=-5V,ID=-4A	--	7	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=-10V, ID=-3A	--	18	25	mΩ
		VGS=-4.5V, ID=-2A	--	25	32	mΩ
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=-10V,VGS=0V, F=1MHZ	--	900	--	pF
Coss	Output Capacitance		--	170	--	pF
Crss	Reverse Transfer Capacitance		--	140	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	--	--	Ω
Switching Times						
td(on)	Turn-on Delay Time	VGS=-4.5V,VDS=-10V, ID=-3A,RGEN=1Ω	--	7	--	nS
tr	Turn-on Rise Time		--	25	--	nS
td(off)	Turn-Off Delay Time		--	74	--	nS
tf	Turn-Off Fall Time		--	10	--	nS
Qg	Total Gate Charge	VGS=-4.5V, VDS=-10V, ID=-2A	--	16	--	nC
Qgs	Gate-Source Charge		--	26	--	nC
Qgd	Gate-Drain Charge		--	31	--	nC
Source-Drain Diode Characteristics						
ISD	Source-Drain Current(Body Diode)		--	--	-25	A
VSD	Forward on Voltage	VGS=0V,IS=-3A	--	--	-1.2	V
trr	Reverse Recovery Time	IF=-3A , dI/dt=100A/μs , TJ=25℃	--	11	--	ns
Qrr	Reverse Recovery Charge		--	4	--	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℃

Typical Electrical and Thermal Characteristics (Curves)

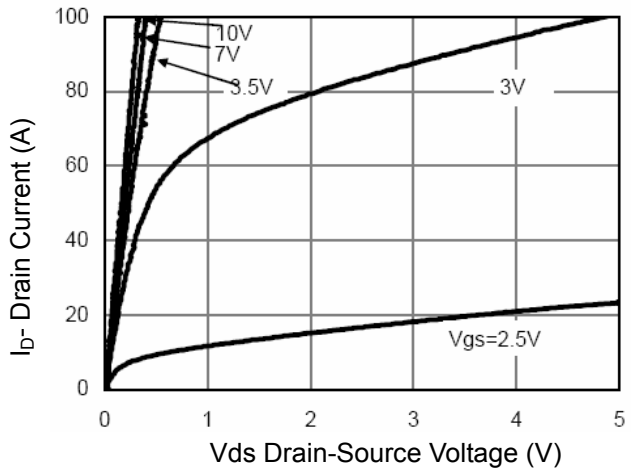


Figure 1 Output Characteristics

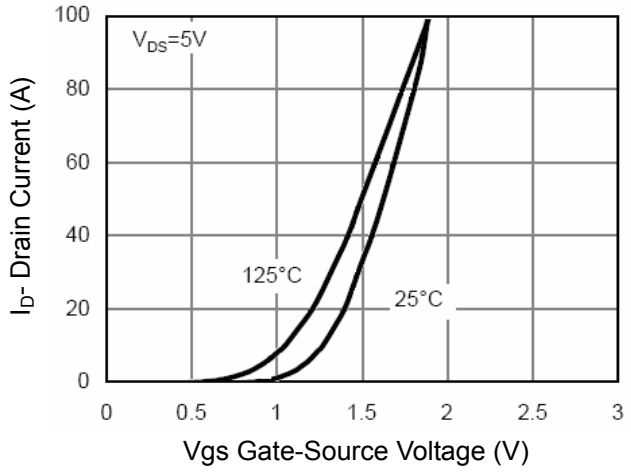


Figure 2 Transfer Characteristics

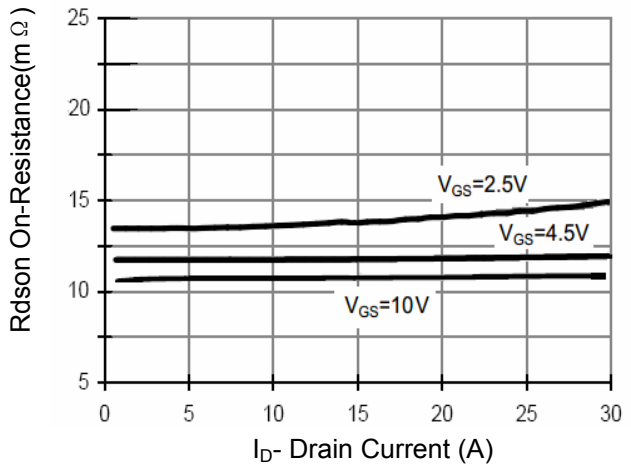


Figure 3 Rdson- Drain Current

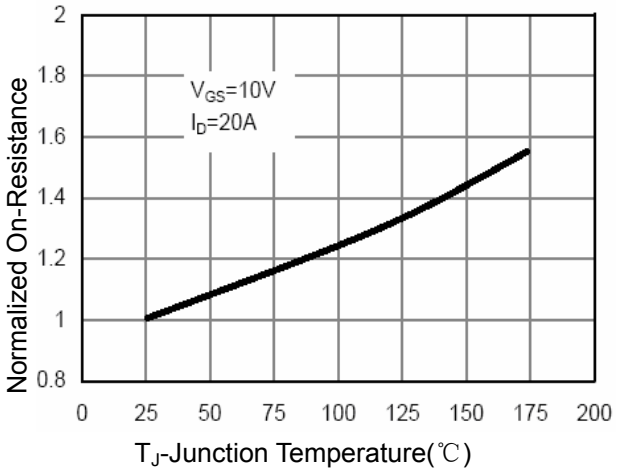


Figure 4 Rdson-Junction Temperature

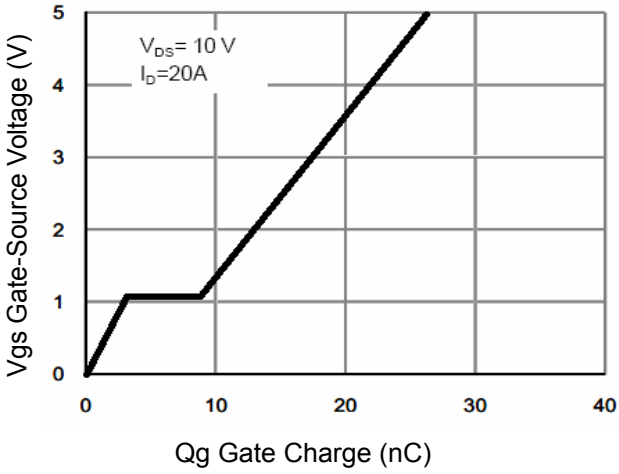


Figure 5 Gate Charge

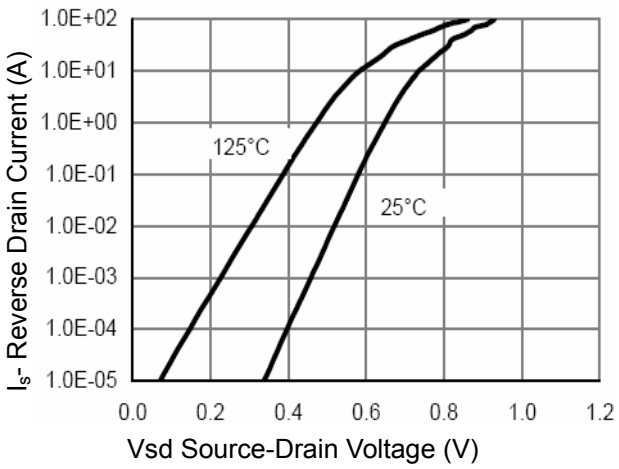


Figure 6 Source- Drain Diode Forward

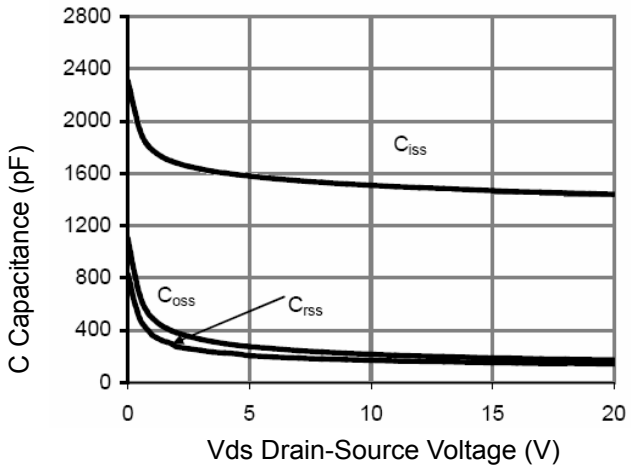


Figure 7 Capacitance vs Vds

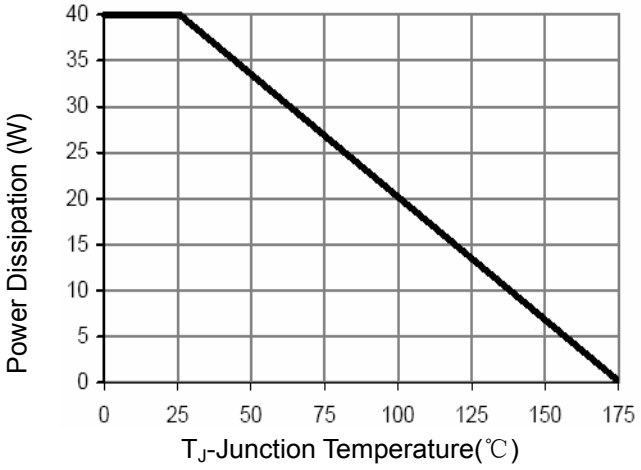


Figure 9 Power De-rating

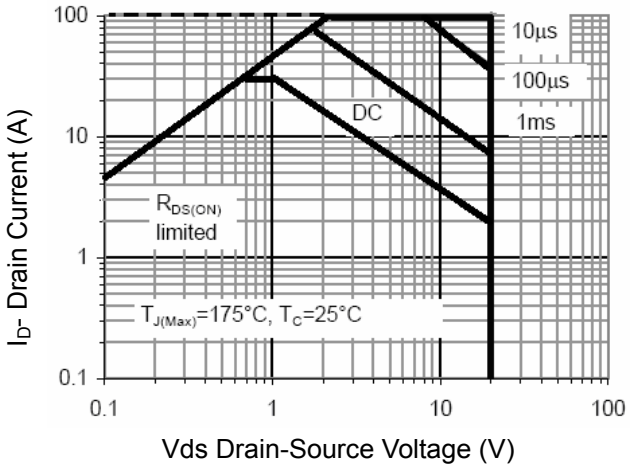


Figure 8 Safe Operation Area

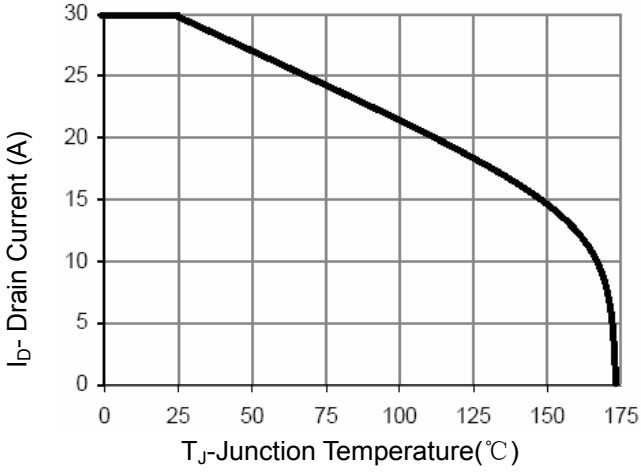


Figure 10 Current De-rating

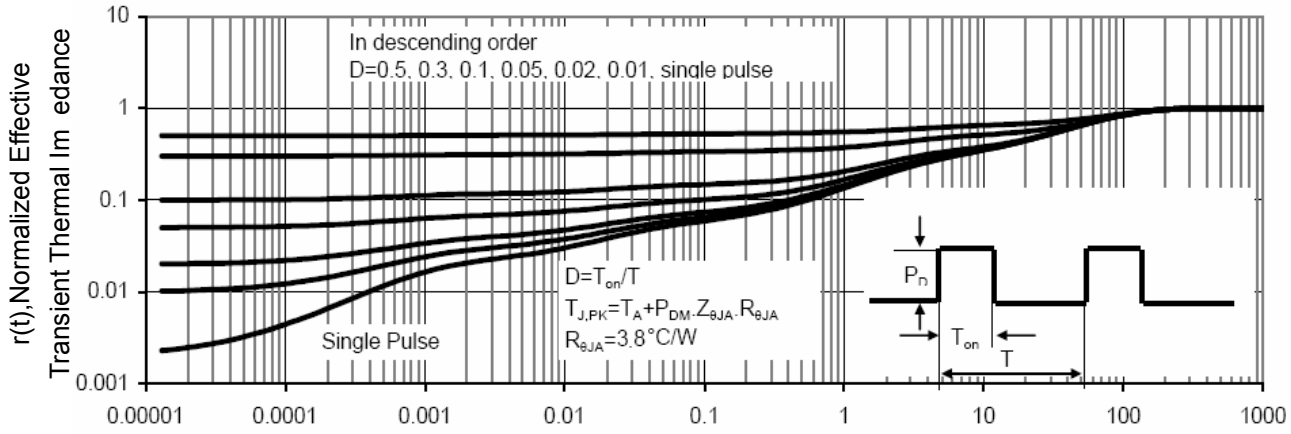


Figure 11 Normalized Maximum Transient Thermal Impedance

Typical Electrical and Thermal Characteristics

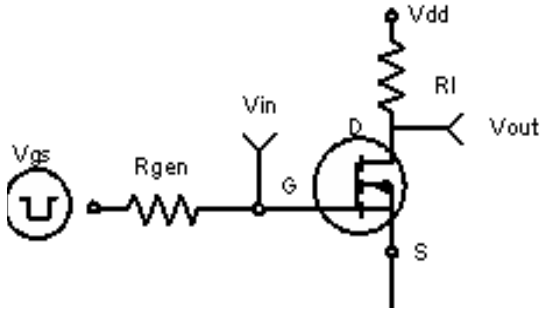


Figure 1:Switching Test Circuit

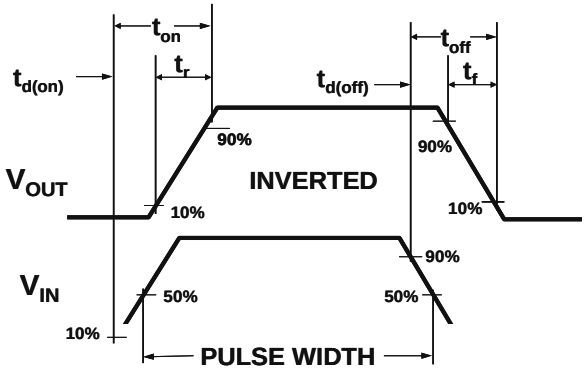


Figure 2:Switching Waveforms

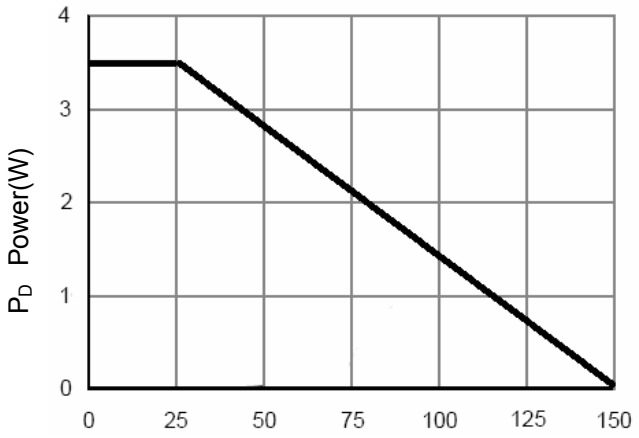


Figure 3 Power Dissipation

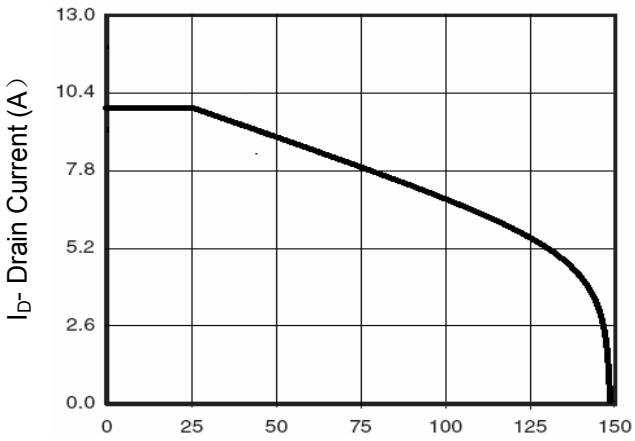


Figure 4 Drain Current

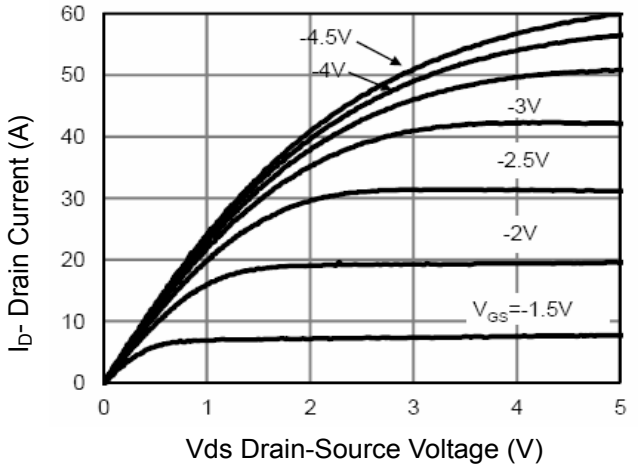


Figure 5 Output Characteristics

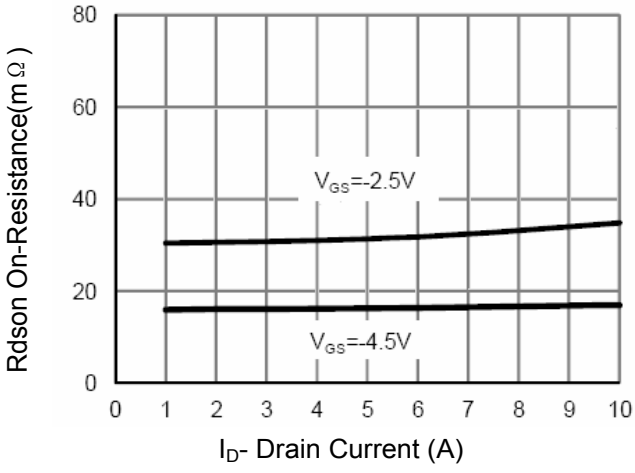


Figure 6 Drain-Source On-Resistance

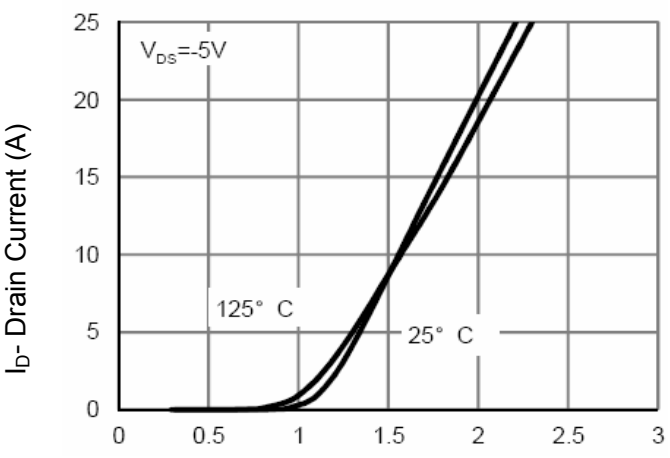


Figure 7 Transfer Characteristics

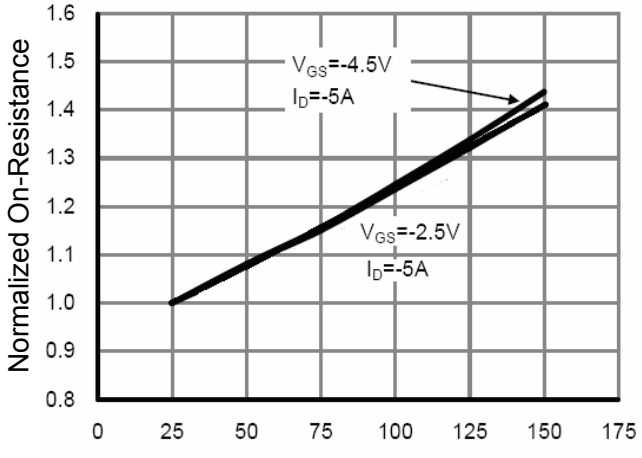


Figure 8 Drain-Source On-Resistance

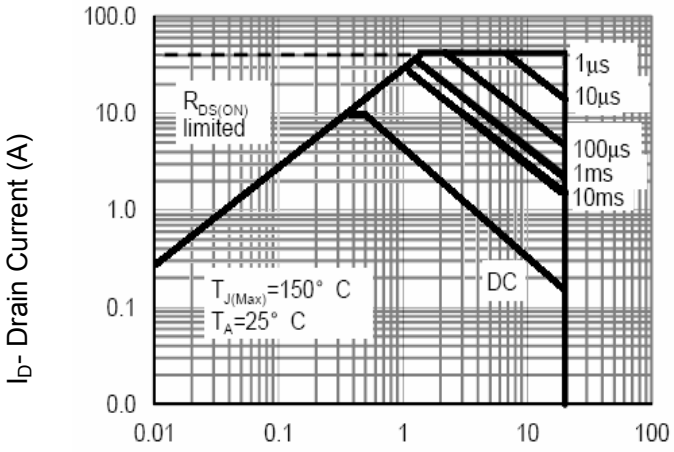


Figure 9 Safe Operation Area

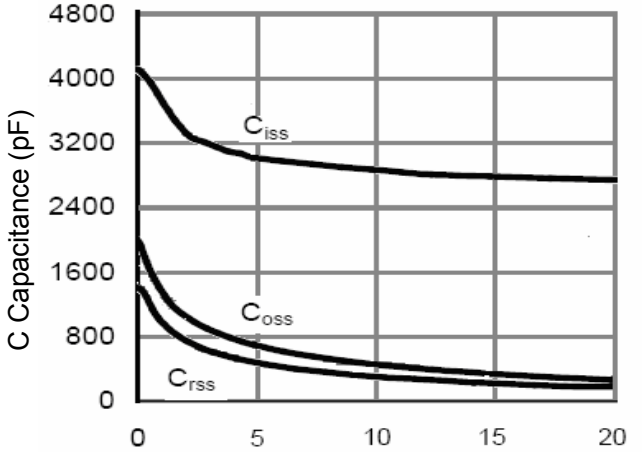


Figure 10 Capacitance vs Vds

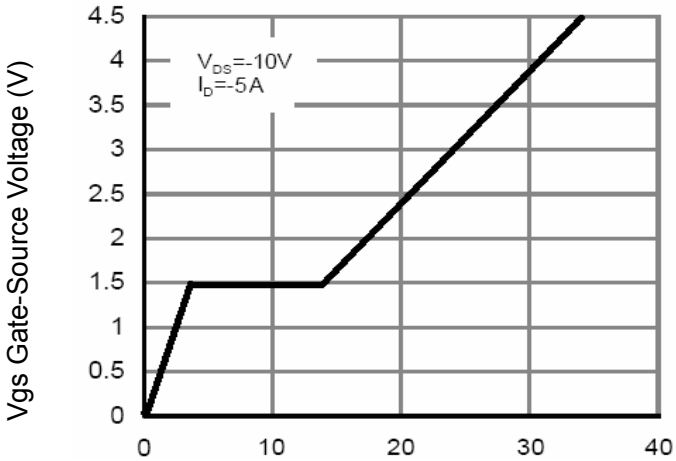


Figure 11 Gate Charge

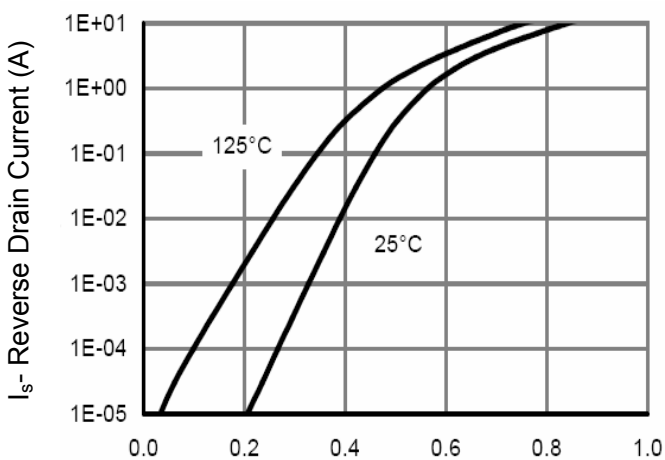
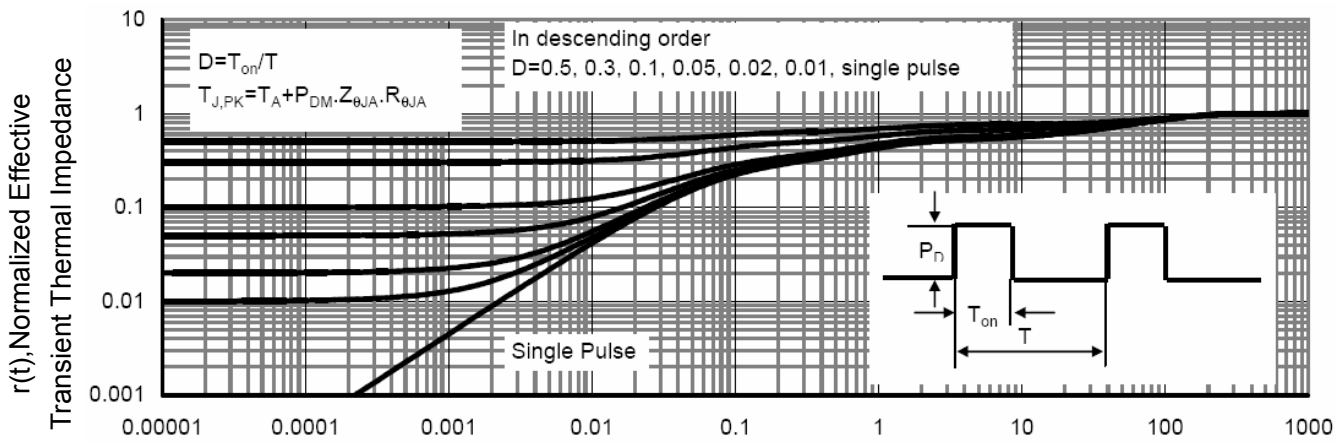


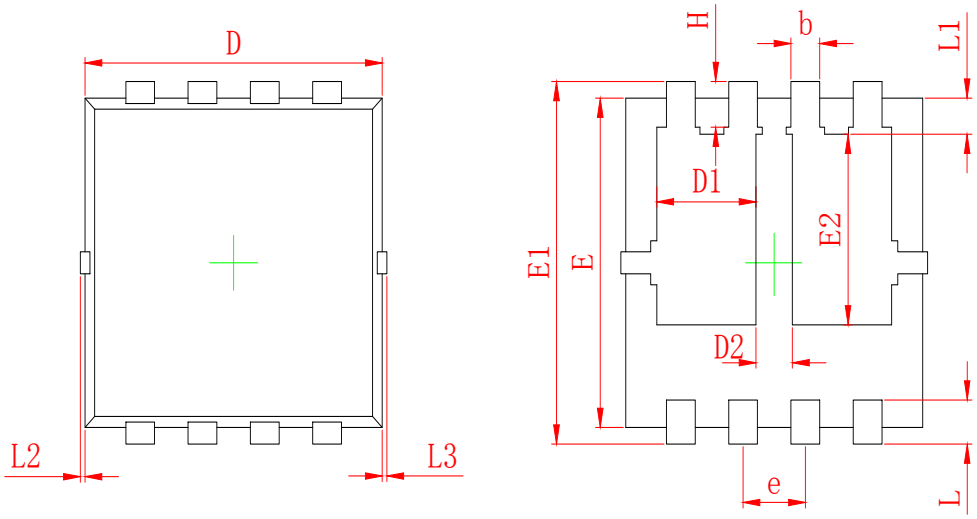
Figure 12 Source- Drain Diode Forward



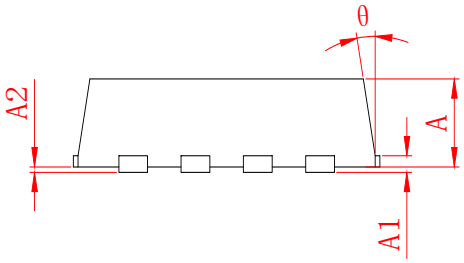
Square Wave Pluse Duration(sec)

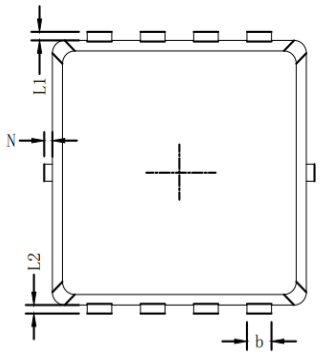
Figure 13 Normalized Maximum Transient Thermal Impedance

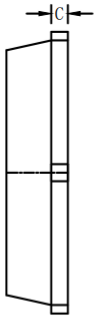
●Dimensions（PDFN3.3×3.3）

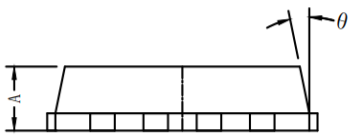


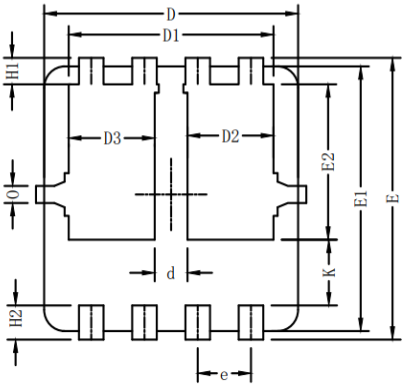
SYMBOL	MILLIMETER	
	MIN	MAX
A	0.700	0.900
A1	0.152 REF.	
A2	0~0.05	
D	3.000	3.200
D1	0.935	1.135
D2	0.280	0.480
E	2.900	3.100
E1	3.150	3.450
E2	1.535	1.935
b	0.200	0.400
e	0.550	0.750
L	0.300	0.500
L1	0.180	0.480
L2	0~0.100	
L3	0~0.100	
H	0.315	0.515
θ	8°	12°











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
O	0.2 REF.		

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

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