General Description

The AGM4012A 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

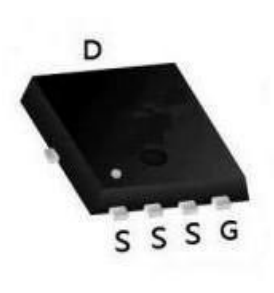
Application

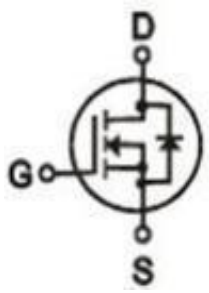
- MB/VGA Vcore
- SMPS 2nd Synchronous Rectifier
- POL application
- BLDC Motor driver

Product Summary

BVDSS	RDSON	ID
40V	1.1mΩ	160A

PDFN5*6 Pin Configuration





Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM4012A	AGM4012A	PDFN5*6	330mm	12mm	3000

Table 1. Absolute Maximum Ratings (TA=25℃)

Symbol	Parameter	Value	Unit
VDS	Drain-Source Voltage (VGS=0V)	40	V
VGS	Gate-Source Voltage (VDS=0V)	±20	V
ID	Drain Current-Continuous(Tc=25℃) **(Note 1)**	160	A
	Drain Current-Continuous(Tc=100℃)	112	A
IDM (pluse)	Drain Current-Continuous@ Current-Pulsed **(Note 2)**	640	A
PD	Maximum Power Dissipation(Tc=25℃)	114	w
	Maximum Power Dissipation(Tc=100℃)	45	w
EAS	Avalanche energy **(Note 3)**	205	mJ
TJ,TSTG	Operating Junction and Storage Temperature Range	-55 To 150	℃

Table 2. Thermal Characteristic

Symbol	Parameter	Typ	Max	Unit
RθJA	Thermal Resistance Junction-ambient (Steady State)[1]	---	20	℃/W
RθJC	Thermal Resistance Junction-Case[1]	---	1.1	℃/W

Table 3. Electrical Characteristics (TJ=25℃unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV_{DSS}	Drain-Source Breakdown Voltage	VGS=0V ID=250μA	40	48	--	V
IDSS	Zero Gate Voltage Drain Current	VDS=40V,VGS=0V	--	--	1	μA
IGSS	Gate-Body Leakage Current	VGS=±20V,VDS=0V	--	--	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	VDS=VGS,ID=250μA	1.2	1.5	2.5	V
gFS	Forward Transconductance	VDS=5V,ID=15A	--	35	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=10V, ID=20A	--	1.1	1.4	mΩ
		VGS=4.5V, ID=15A	--	1.7	2.3	mΩ
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=25V,VGS=0V, F=1MHZ	--	8300	--	pF
Coss	Output Capacitance		--	1510	--	pF
Crss	Reverse Transfer Capacitance		--	1306	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	2.7	--	Ω
Switching Times						
td(on)	Turn-on Delay Time	VGS=10V,VDS=20V, ID=25A,RGEN=2Ω	--	22.5	--	nS
tr	Turn-on Rise Time		--	6.7	--	nS
td(off)	Turn-Off Delay Time		--	80.3	--	nS
tf	Turn-Off Fall Time		--	26.9	--	nS
Qg	Total Gate Charge	VGS=10V, VDS=32V, ID=20A	--	127	--	nC
Qgs	Gate-Source Charge		--	35	--	nC
Qgd	Gate-Drain Charge		--	26	--	nC
Source-Drain Diode Characteristics						
ISD	Source-Drain Current(Body Diode)		--	--	160	A
VSD	Forward on Voltage	VGS=0V,IS=20A	--	--	1.2	V
trr	Reverse Recovery Time	IF=20A , dI/dt=100A/μs , TJ=25℃	--	163	--	ns
Qrr	Reverse Recovery Charge		--	100	--	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 Performance Characteristics

Figure.1 Typical Output Characteristics

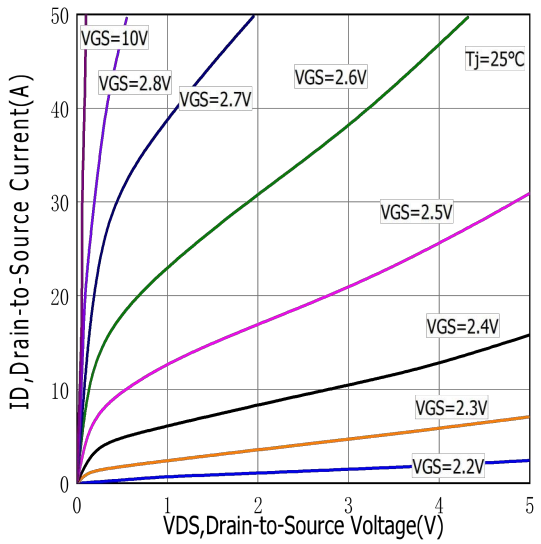


Figure.2 Typical Gate Charge vs Gate to Source Voltage

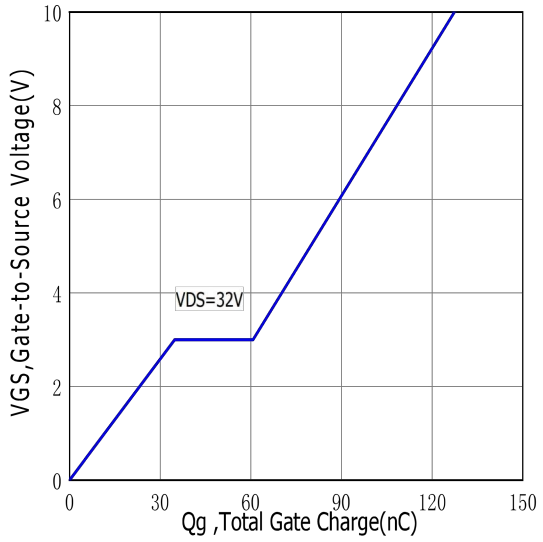


Figure.3 Typical Body Diode Transfer Characteristics

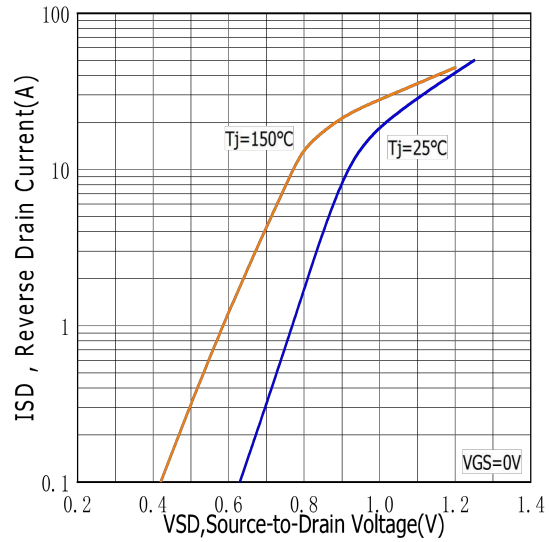
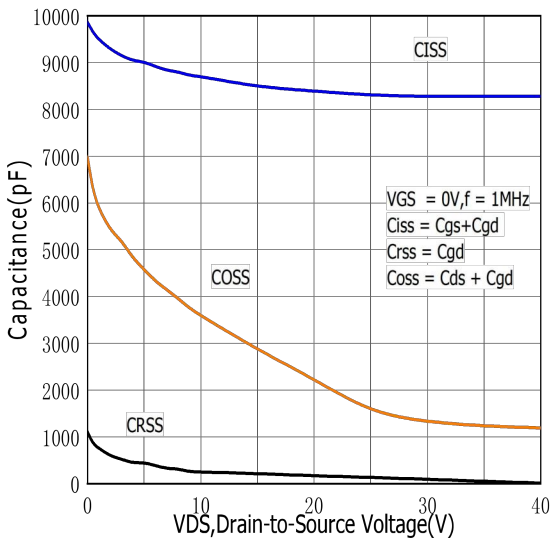


Figure.4 Typical Capacitance vs Drain to Source Voltage



■ Typical Performance Characteristics

Figure.5 Typical Breakdown Voltage vs Junction Temperature

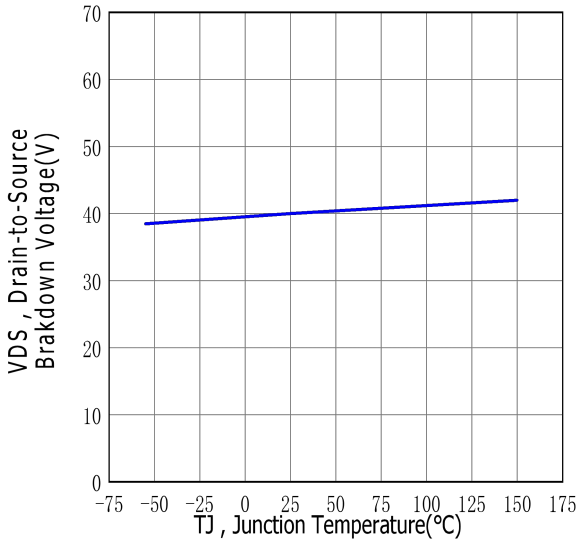


Figure.6 Typical Drain to Source on Resistance vs Junction Temperature

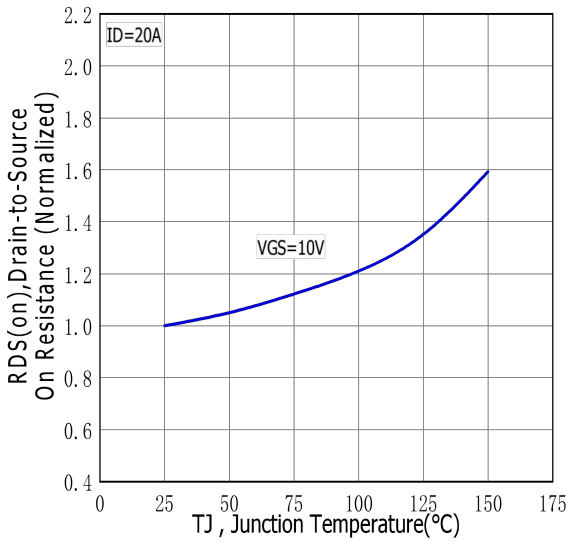


Figure.7 Maximum Forward Bias Safe Operating Area

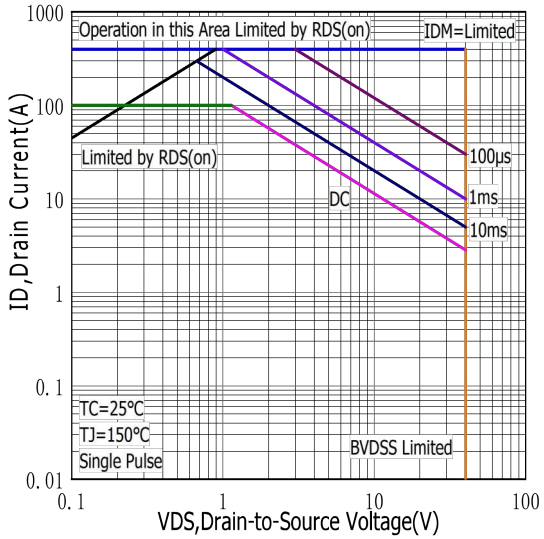
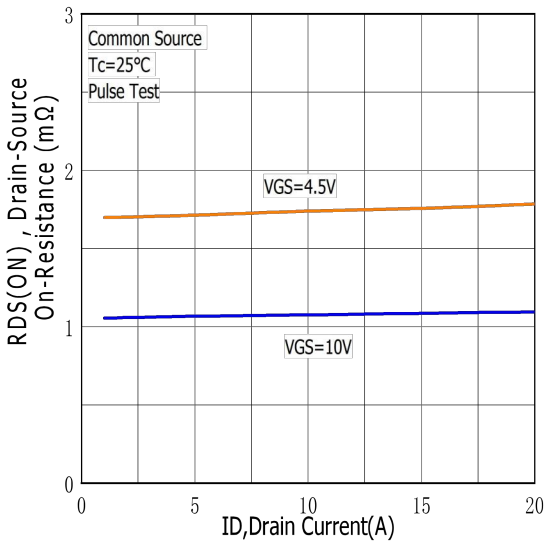


Figure.8 Typical Drain to Source ON Resistance vs Drain Current



■ Typical Performance Characteristics

Figure.9 Maximum EAS vs Channel Temperature

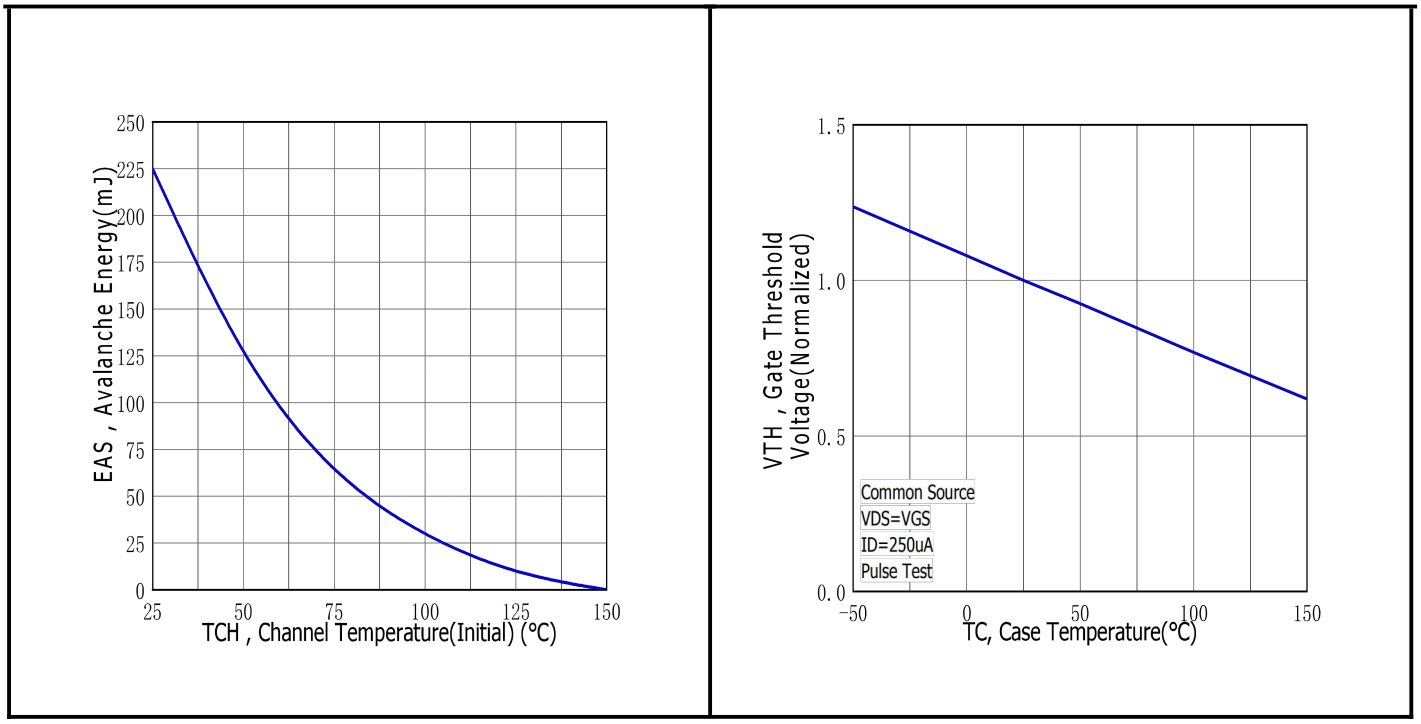


Figure.10 Typical Threshold Voltage vs Case Temperature

Figure.11 Typical Transfer Characteristics

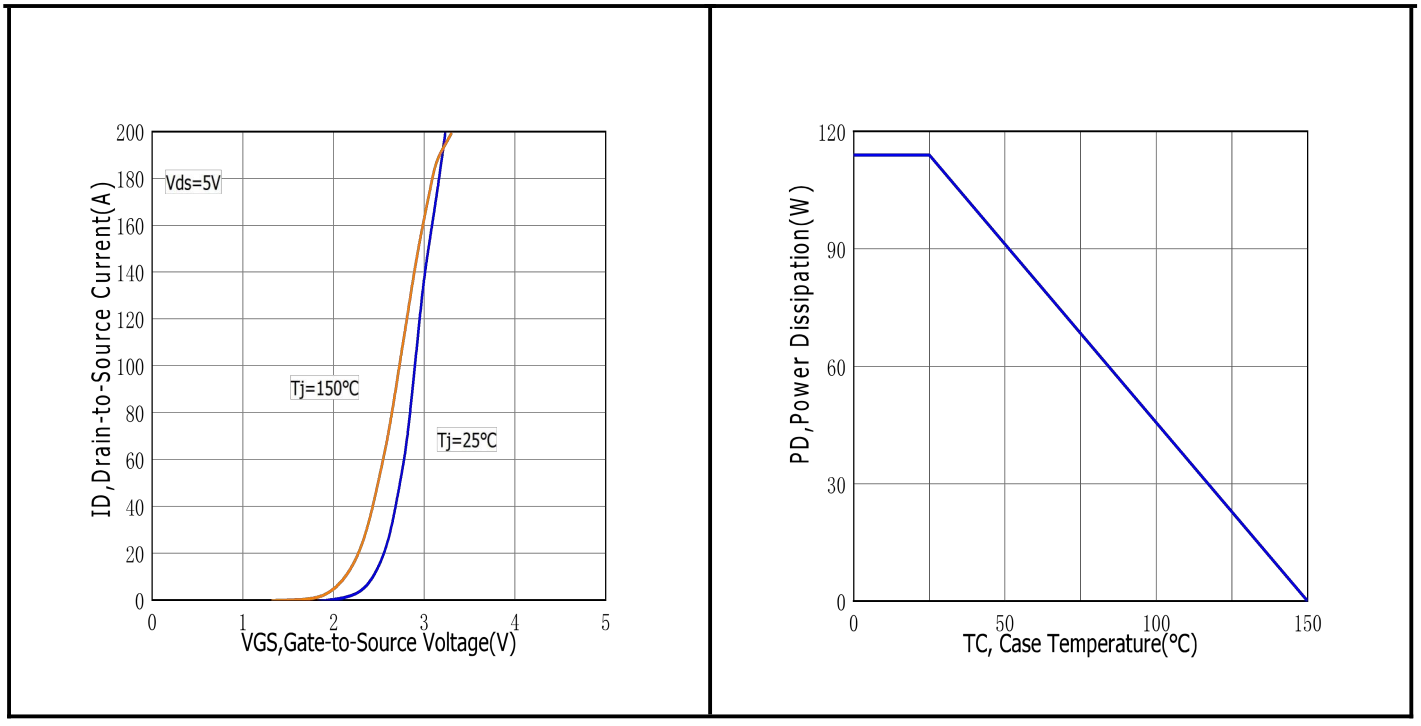
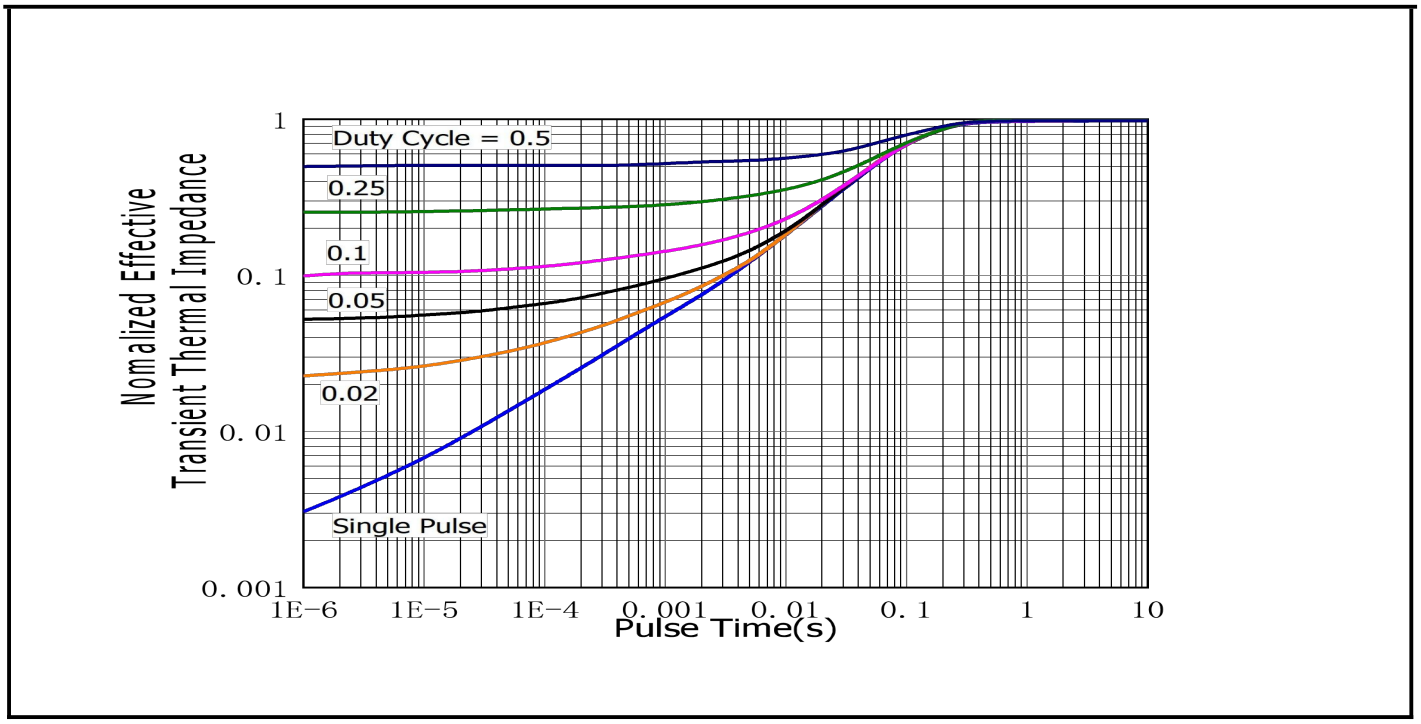


Figure.12 Maximum Power Dissipation vs Case Temperature

Figure.13 Maximum Effective Thermal Impedance , Junction to Case



■ Test circuits and waveforms

Figure A: Gate Charge Test Circuit & Waveforms

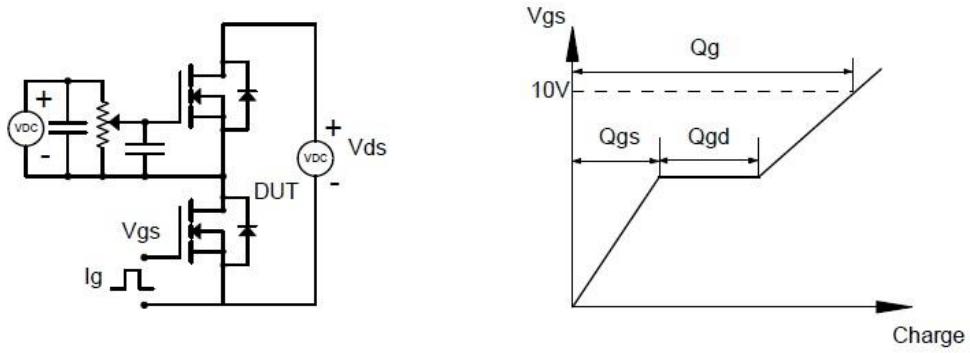


Figure B: Resistive Switching Test Circuit & Waveforms

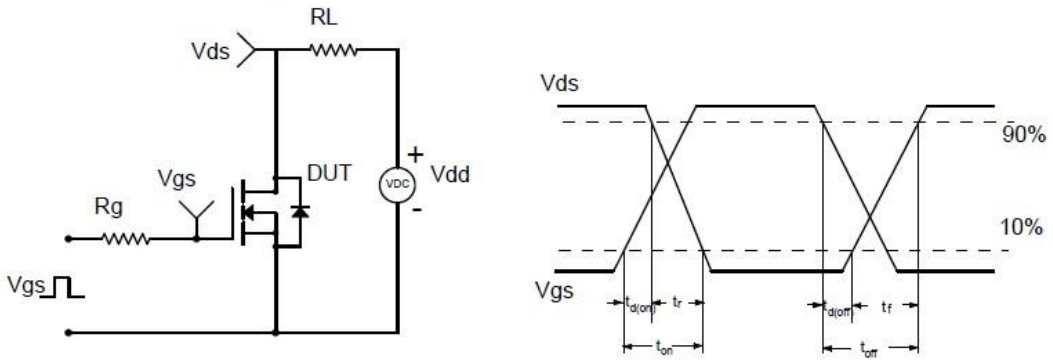


Figure C: Unclamped Inductive Switching (UIS) Test

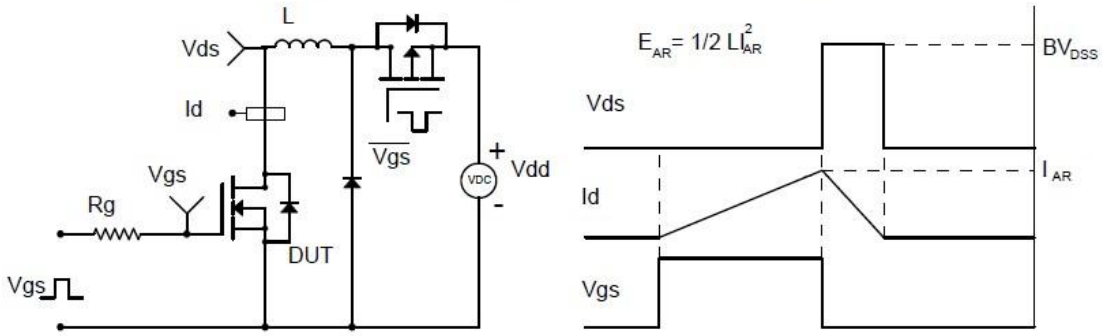
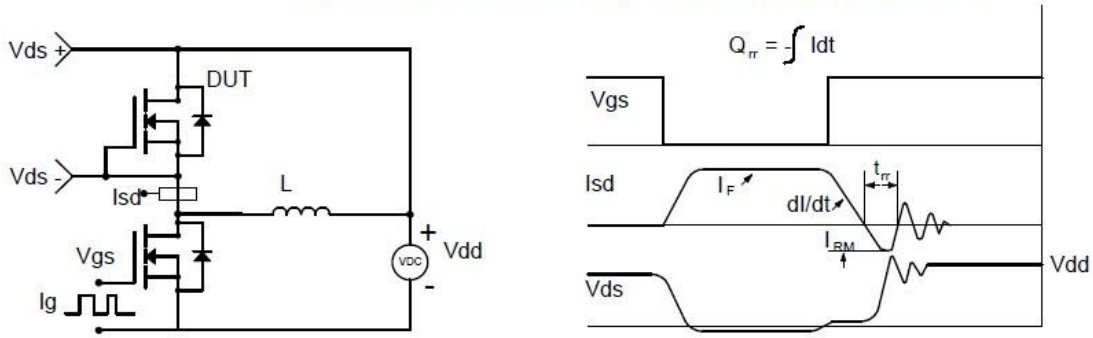
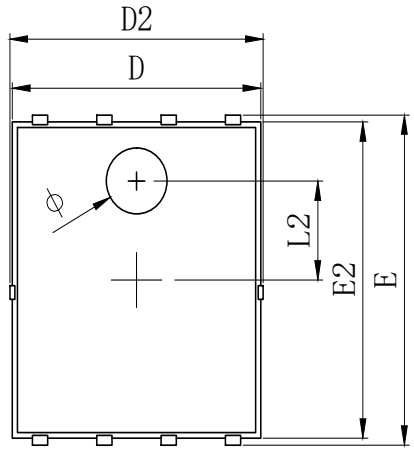
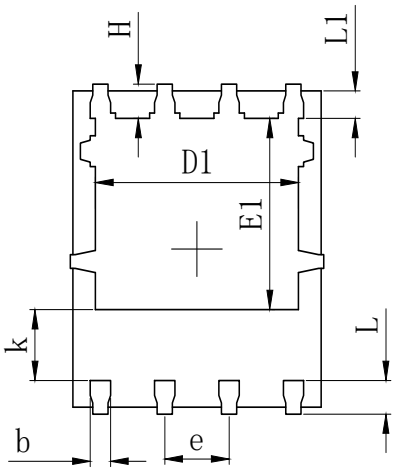


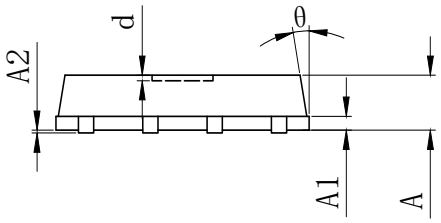
Figure D: Diode Recovery Test Circuit & Waveforms



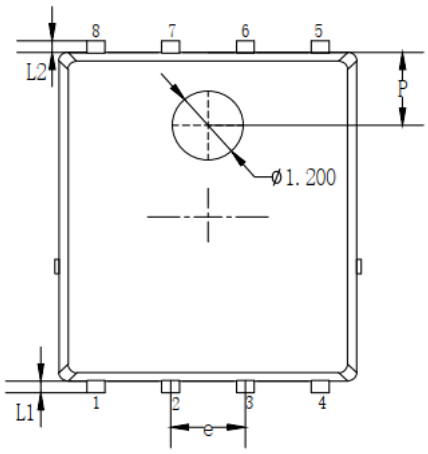
●Dimensions（PDFN5*6）

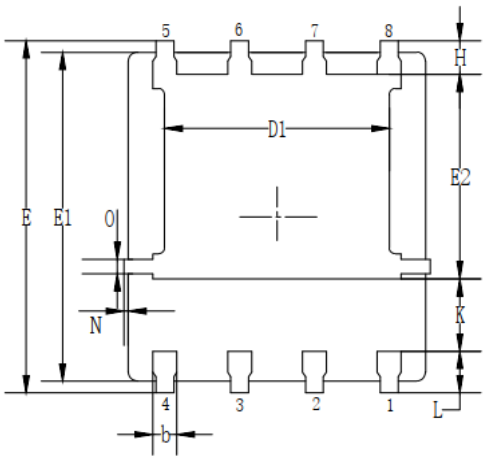


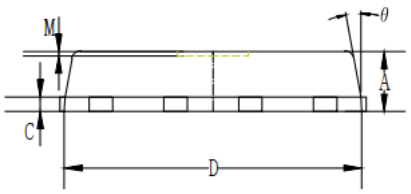




SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	0.900	1.000	1.100
A1	0.254 REF.		
A2	0~0.05		
D	4.824	4.900	4.976
D1	3.910	4.010	4.110
D2	4.924	5.000	5.076
E	5.924	6.000	6.076
E1	3.375	3.475	3.575
E2	5.674	5.750	5.826
b	0.350	0.400	0.450
e	1.270 TYP.		
L	0.534	0.610	0.686
L1	0.424	0.500	0.576
L2	1.800 REF.		
k	1.190	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







Symbols	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	3.72	3.82	3.92
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.		

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