

## General Description

The AGM13T05A 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

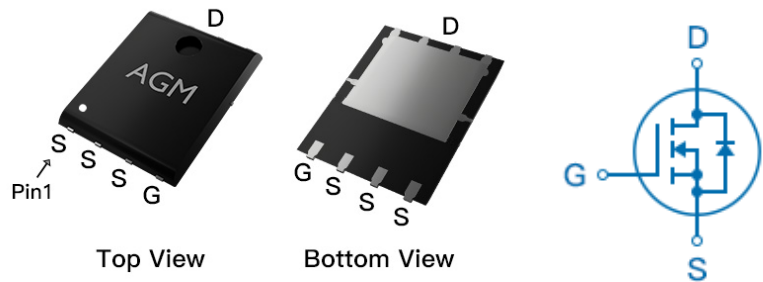
## Application

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

## Product Summary

BVDSS	RDSON	ID
140V	5.5mΩ	120A

## PDFN5\*6 Pin Configuration



## Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM13T05A	AGM13T05A	PDFN5*6	330mm	12mm	3000

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

Symbol	Parameter	Value	Unit
VDS	Drain-Source Voltage (VGS=0V)	140	V
VGS	Gate-Source Voltage (VDS=0V)	±20	V
ID	Drain Current-Continuous(Tc=25°C) (Note 1)	120	A
	Drain Current-Continuous(Tc=100°C)	85	A
IDM (pluse)	Drain Current-Pulsed (Note 2)	480	A
PD	Maximum Power Dissipation(Tc=25°C)	105	w
	Maximum Power Dissipation(Tc=100°C)	42	w
EAS	Avalanche energy (Note 3)	450	mJ
TJ,TSTG	Operating Junction and Storage Temperature Range	-55 To 150	°C

**Table 2. Thermal Characteristic**

Symbol	Parameter	Typ	Max	Unit
RθJA	Thermal Resistance Junction-ambient (Steady State) <sup>1</sup>	---	20	°C/W
RθJC	Thermal Resistance Junction-Case <sup>1</sup>	---	1.2	°C/W

**Table 3. 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	140	145	--	V
IDSS	Zero Gate Voltage Drain Current	VDS=135V,VGS=0V	--	--	1	μA
IGSS	Gate-Body Leakage Current	VGS=±20V,VDS=0V	--	--	±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS,ID=250μA	2	--	4	V
gFS	Forward Transconductance	VDS=5V,ID=10A	--	20	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=10V, ID=20A	--	5.5	7.5	mΩ
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=40V,VGS=0V ,F=1MHZ	--	3566	--	pF
Coss	Output Capacitance		--	730	--	pF
Crss	Reverse Transfer Capacitance		--	41	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	--	--	Ω
Switching Times						
td(on)	Turn-on Delay Time	VGS=10V,VDS=30V, ID=40A,RGEN=2.5Ω RL=15Ω	--	19	--	nS
tr	Turn-on Rise Time		--	5	--	nS
td(off)	Turn-Off Delay Time		--	24	--	nS
tf	Turn-Off Fall Time		--	10	--	nS
Qg	Total Gate Charge	VGS=10V, VDS=75V, ID=70A	--	57	--	nC
Qgs	Gate-Source Charge		--	14	--	nC
Qgd	Gate-Drain Charge		--	11	--	nC
Source-Drain Diode Characteristics						
ISD	Source-Drain Current(Body Diode)		--	--	120	A
VSD	Forward on Voltage	VGS=0V,IS=20A	--	0.9	1.2	V
trr	Reverse Recovery Time	IF=20A , dI/dt=100A/μs , TJ=25℃	--	85	--	ns
Qrr	Reverse Recovery Charge		--	120	--	nc

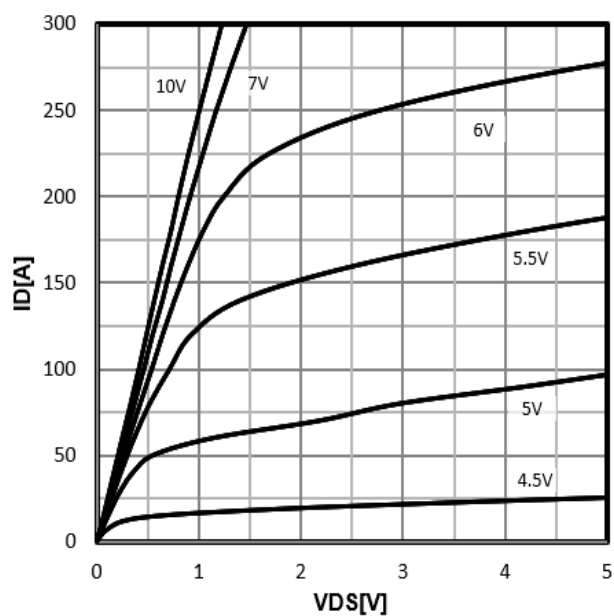
Notes 1.The maximum current rating is package limited.

Notes 2.Repetitive Rating: Pulse width limited by maximum junction temperature

Notes 3.EAS condition: TJ=25°C

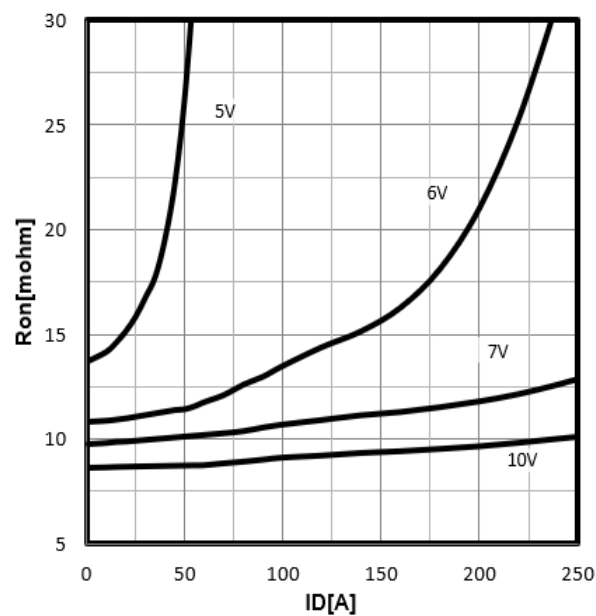
Typ. output characteristics

$$I_D = f(V_{DS})$$



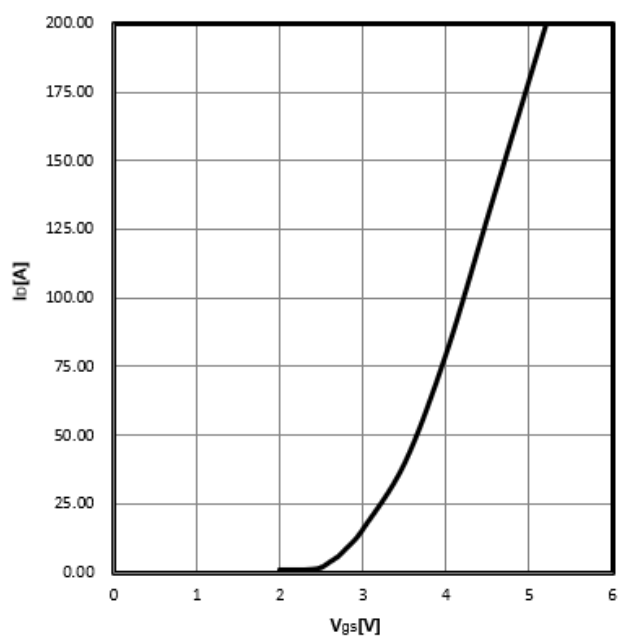
Typ. drain-source on resistance

$$R_{DS(on)} = f(I_D)$$



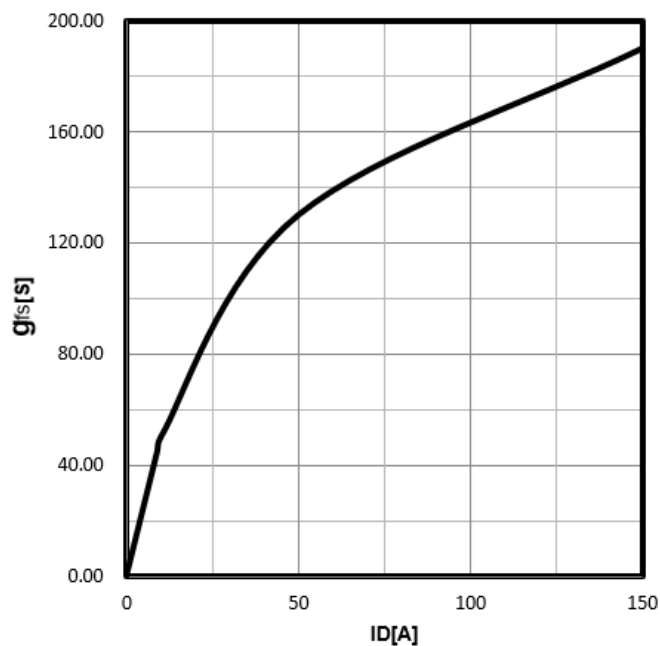
Typ. transfer characteristics

$$I_D = f(V_{GS})$$



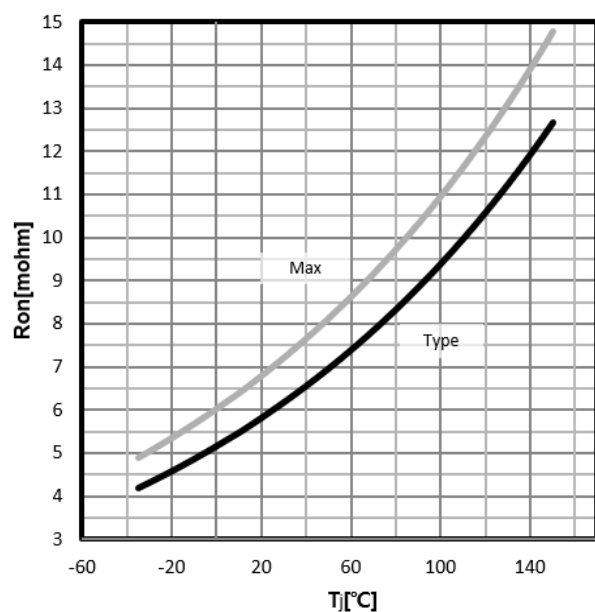
Typ. forward transconductance

$$g_{fs} = f(I_D)$$



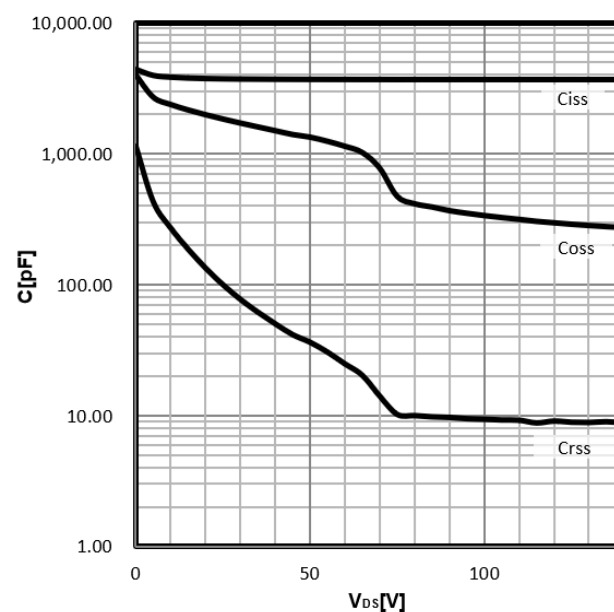
### Drain-source on-state resistance

$$R_{DS(on)} = f(T_j); I_D = 20A; V_{GS} = 10V$$



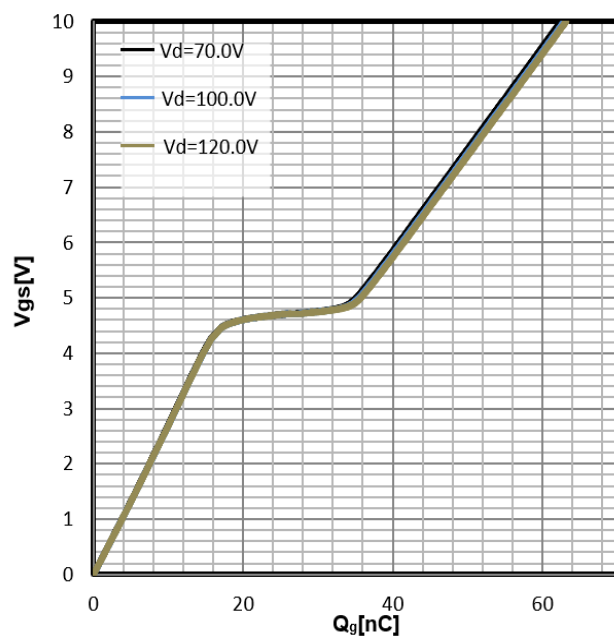
### Typ. capacitances

$$C = f(V_{DS}); V_{GS} = 0V; f = 1MHz$$



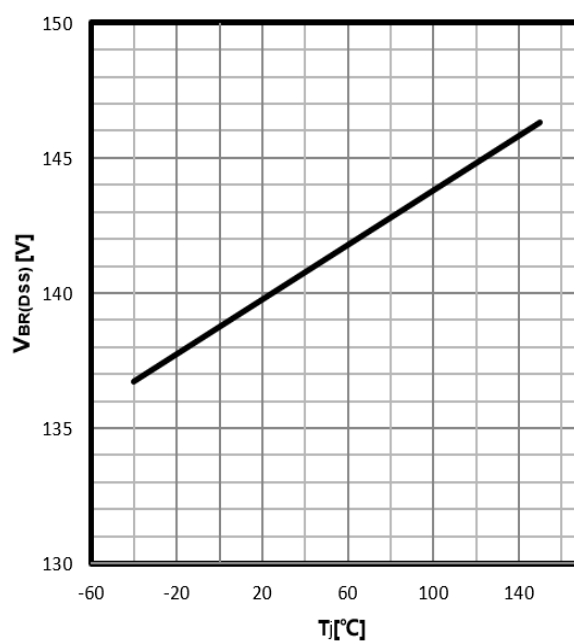
### Typ. gate charge

$$V_{GS} = f(Q_{gate})$$

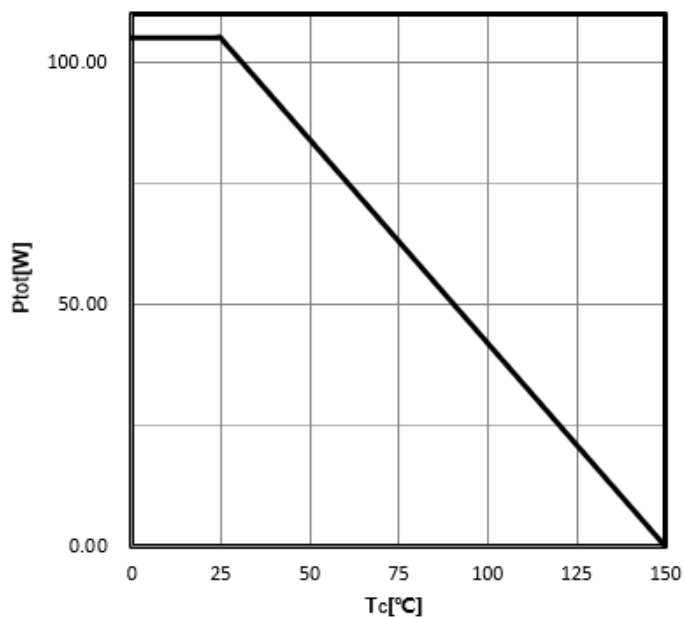


### Drain-source breakdown voltage

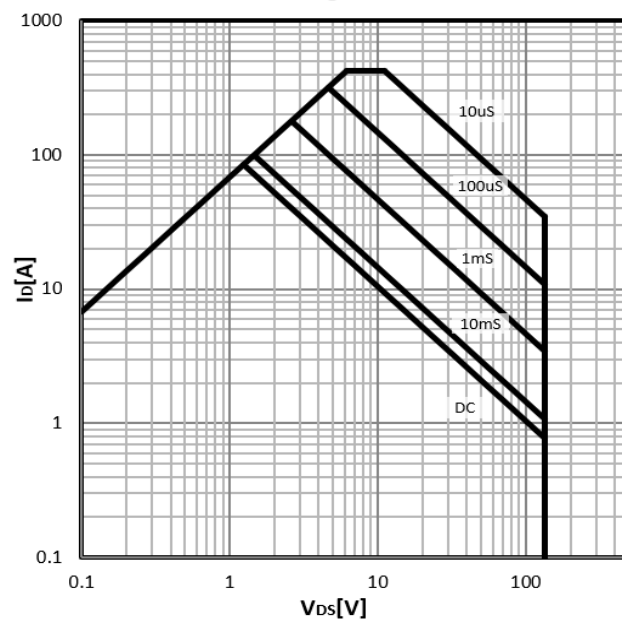
$$V_{BR(DSS)} = f(T_j); I_D = 250uA$$



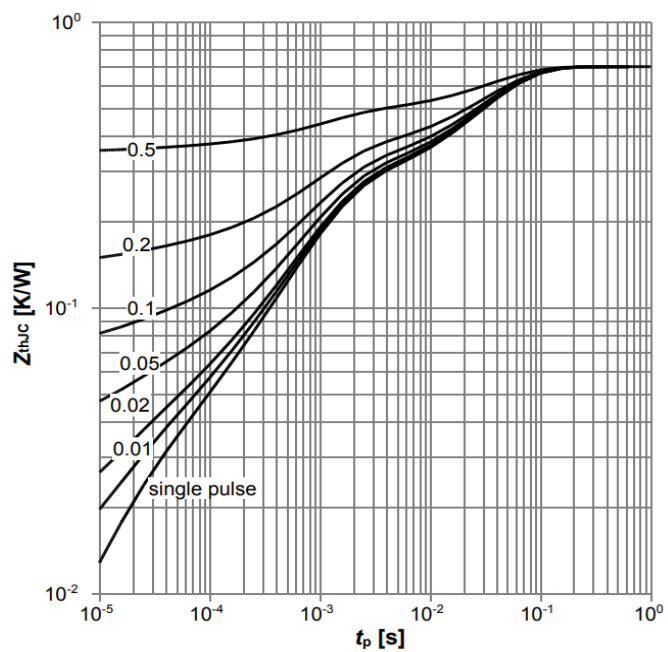
**Power Dissipation**  
 $P_{tot}=f(T_j)$



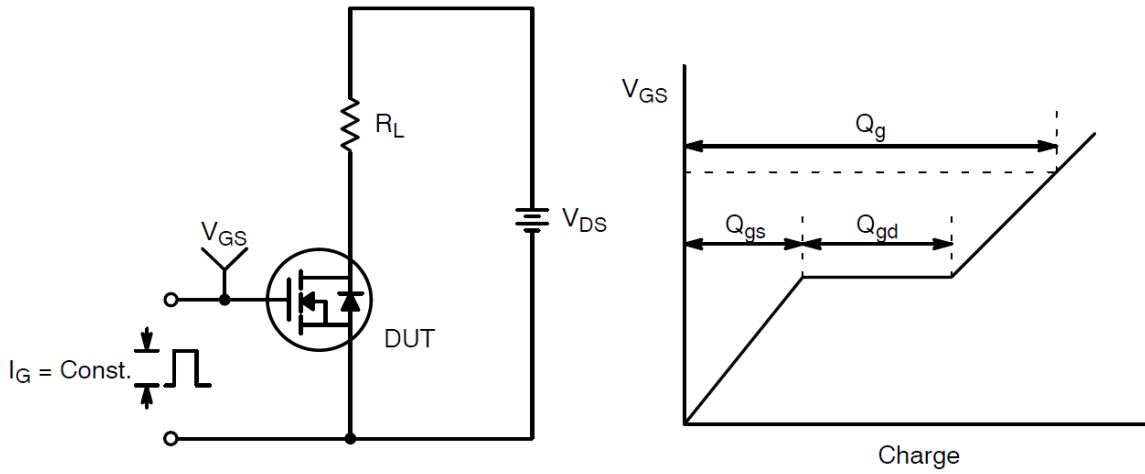
**Safe operating area**  
 $I_D=f(V_{DS})$



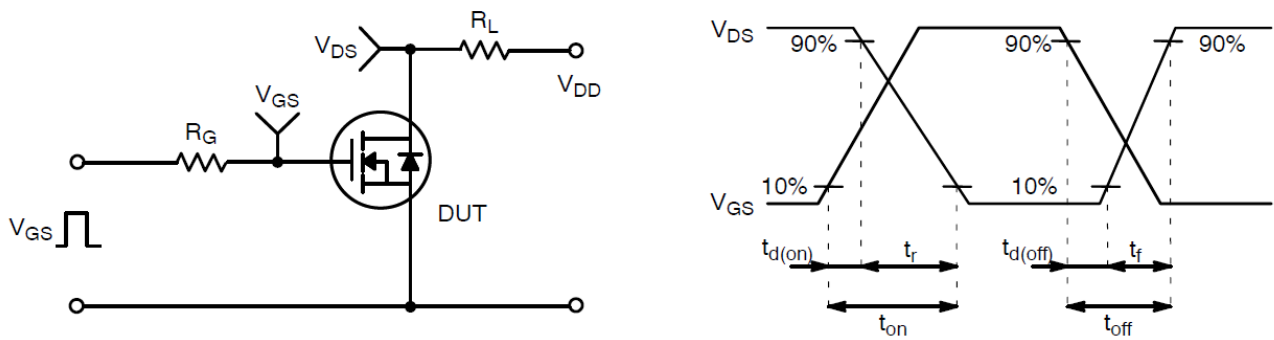
**Max. transient thermal impedance**  
 $Z_{thJC}=f(t_p)$



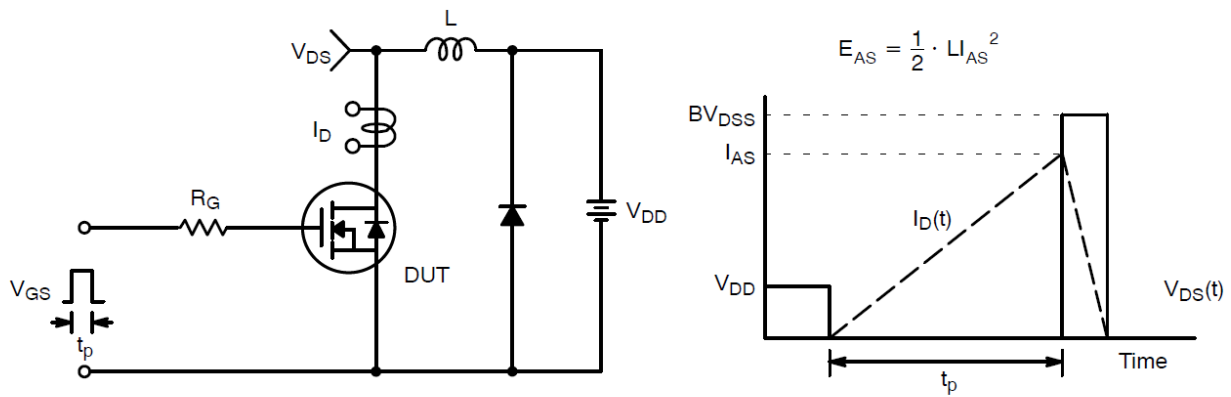
## Test Circuit and Waveform:



Gate Charge Test Circuit & Waveform

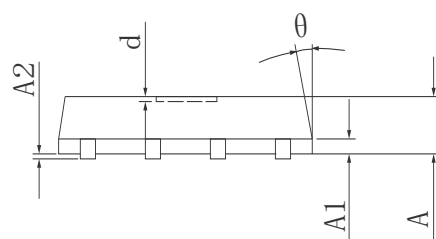
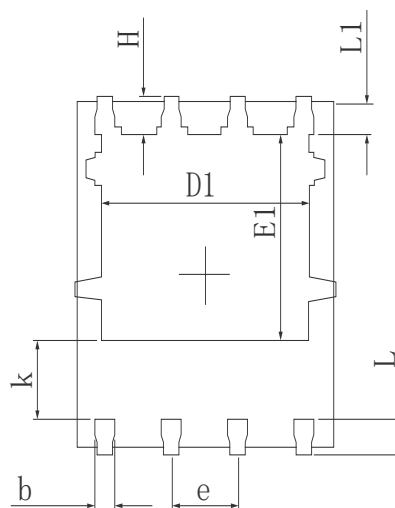
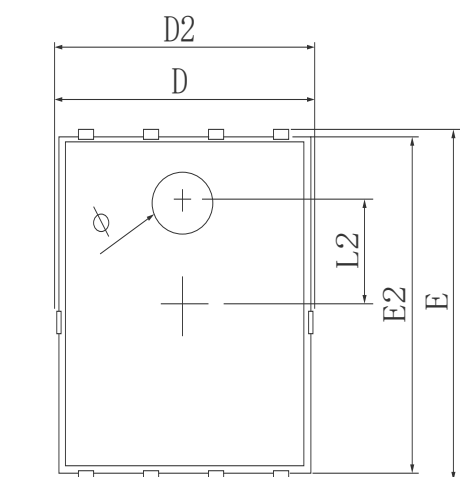


Resistive Switching Test Circuit & Waveforms

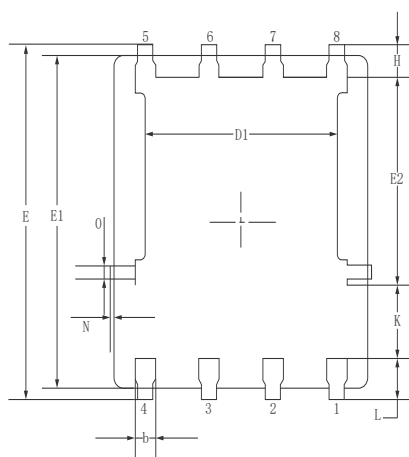
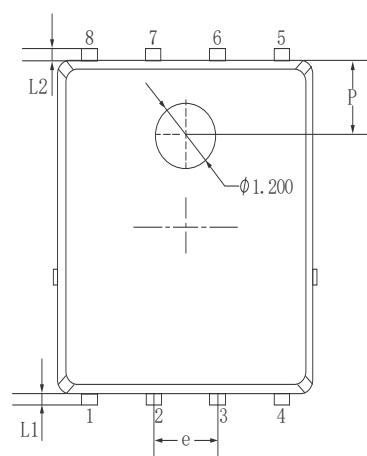


Unclamped Inductive Switching Test Circuit & Waveforms

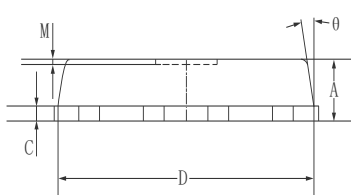
# Dimensions (PDFN5\*6)



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



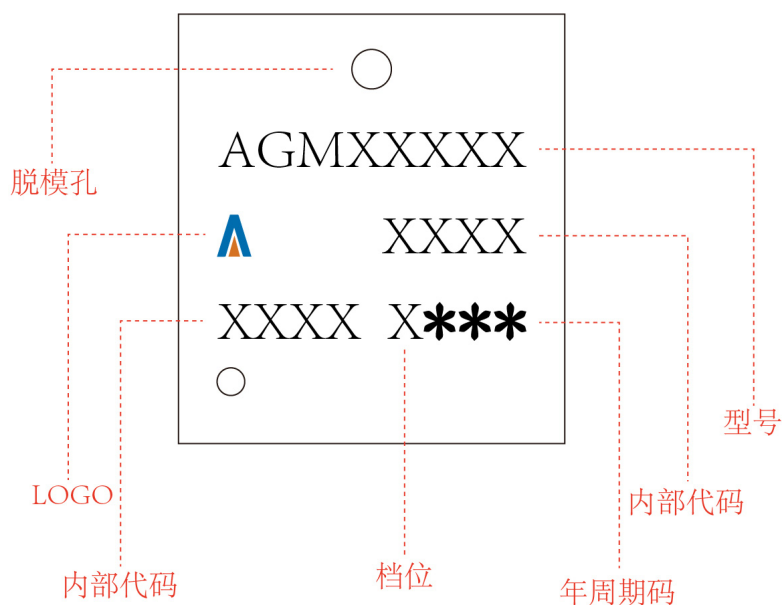
Symbol	Millimeters		
	MIN.	NOM.	MAX.
A	0.90	1.05	1.20
b	0.35	0.40	0.50
C	0.20	0.25	0.35
D	4.90	5.05	5.20
D1	3.72	3.82	3.92
E	6.00	6.15	6.30
E1	5.60	5.75	5.90
E2	3.47	3.57	3.67
e	1.27 BSC.		
H	0.48	0.58	0.68
K	1.17	1.27	1.37
L	0.64	0.74	0.84
L1/L2	0.20 REF.		
θ	8°	10°	12°
M	0.08 REF.		
N	0	-	0.15
O	0.25 REF.		
P	1.28 REF.		



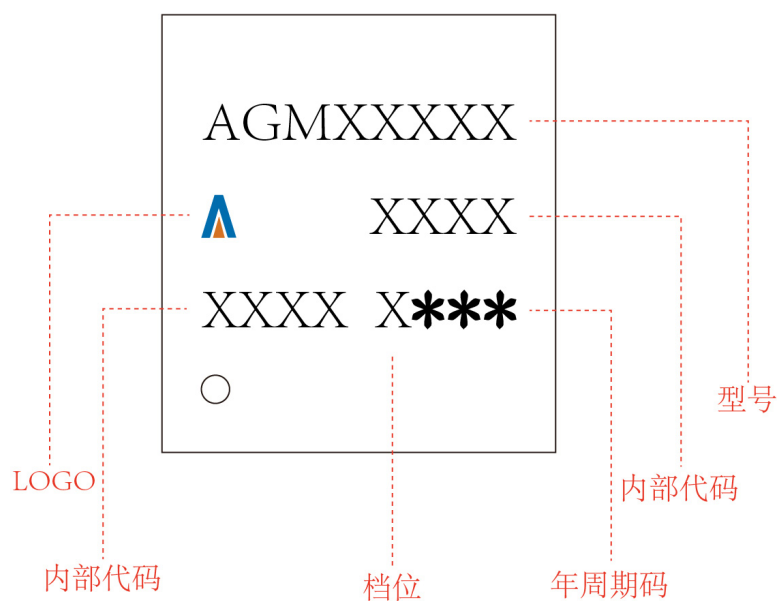
# PDFN5\*6

## Marking Instructions:

### Model1:



### Model2:






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