

● General Description

The AGM20P22AS 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	RDS(ON)	ID
-20V	16mΩ	-8.0A

DFN2*2 Pin Configuration

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM20P22	AGM20P22AS	DFN2*2	178mm	8mm	3000

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

Symbol	Parameter	Value	Unit
VDS	Drain-Source Voltage (VGS=0V)	-20	V
VGS	Gate-Source Voltage (VDS=0V)	±10	V
ID	Drain Current-Continuous(Tc=25°C) (Note 1)	-8.0	A
	Drain Current-Continuous(Tc=100°C)	-5.3	A
IDM (pluse)	Drain Current-Continuous@ Current-Pulsed (Note 2)	-32	A
PD	Maximum Power Dissipation(Tc=25°C)	3.0	w
	Maximum Power Dissipation(Tc=100°C)	1.2	w
EAS	Avalanche energy (Note 3)	81	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) ¹	---	41.7	°C/W

Table 3. Electrical Characteristics (T_J=25°C unless otherwise noted)

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=±10V,VDS=0V	--	--	±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS,ID=-250μA	-0.4	-0.5	-1.0	V
gFS	Forward Transconductance	VDS=5V,ID=-2A	--	10	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=-4.5V, ID=-3A	--	16	20	mΩ
		VGS=-2.5V, ID=-2A	--	20	28	mΩ
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=-10V,VGS=0V, F=1MHZ	--	1010	--	pF
Coss	Output Capacitance		--	165	--	pF
Crss	Reverse Transfer Capacitance		--	160	--	pF
Rg	Gate resistance	f=1.0MHz	--	--	--	Ω
Switching Times						
td(on)	Turn-on Delay Time	ID =-5.0A VDS = -10V VGS =-10V RG = 3.0Ω	--	25	--	nS
tr	Turn-on Rise Time		--	30	--	nS
td(off)	Turn-Off Delay Time		--	60	--	nS
tf	Turn-Off Fall Time		--	45	--	nS
Qg	Total Gate Charge	VGS=-10V, VDS=-10V, ID=-5.0A	--	28.5	--	nC
Qgs	Gate-Source Charge		--	1.7	--	nC
Qgd	Gate-Drain Charge		--	3.3	--	nC
Source-Drain Diode Characteristics						
ISD	Source-Drain Current(Body Diode)		--	--	-8.0	A
VSD	Forward on Voltage	VGS=0V,IS=-3A	--	--	-1.2	V
trr	Reverse Recovery Time	Isd=-3A , dI/dt=100A/μs , TJ=25℃	--	--	--	ns
Qrr	Reverse Recovery Charge		--	--	--	nc

Notes 1.The maximum current rating is package limited.

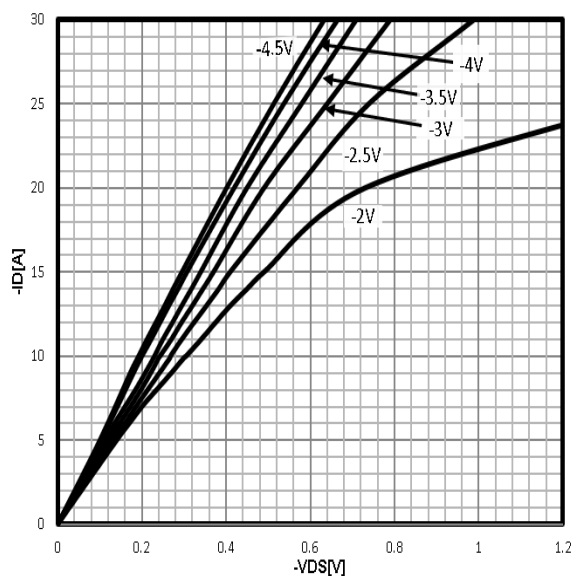
Notes 2.Repetitive Rating: Pulse width limited by maximum junction temperature

Notes 3.EAS condition: T_J=25°C, V_{DD}=-15V, V_{gs}=-10V, I_D=-18A, L=0.5mH, R_G=25ohm

Characteristics Curve:

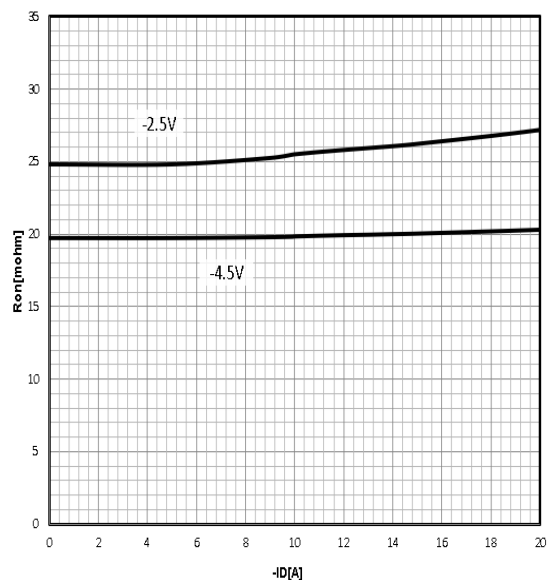
Typ. output characteristics

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



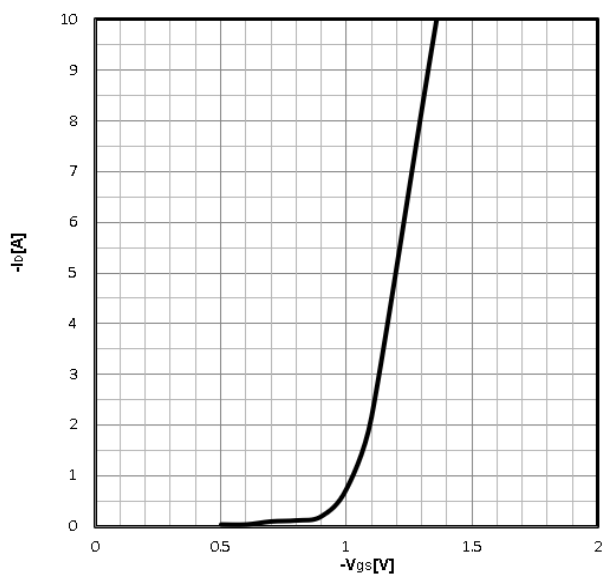
Typ. drain-source on resistance

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



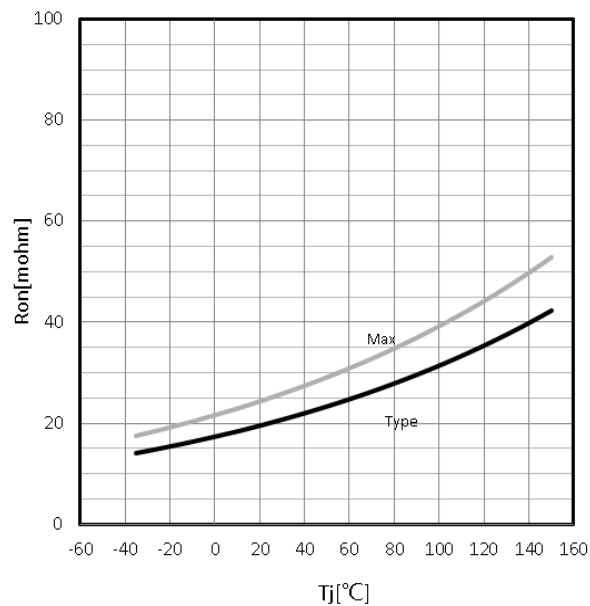
Typ. transfer characteristics

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



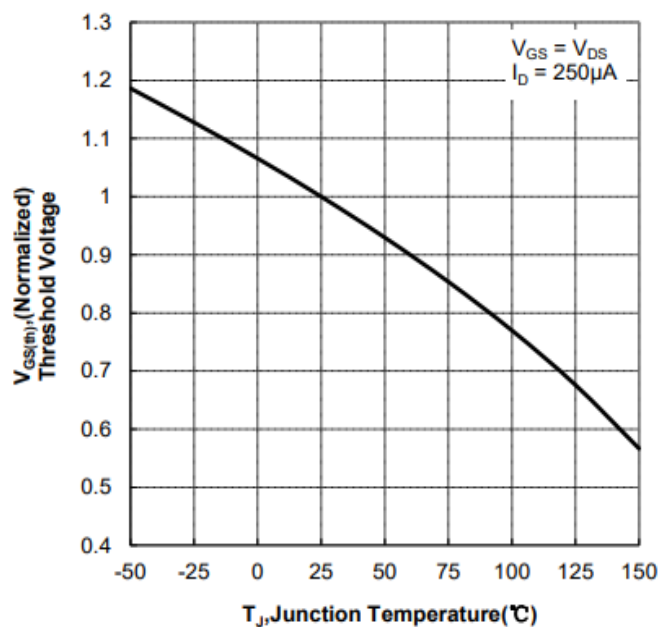
Drain-source on-state resistance

$$R_{DS(on)} = f(T_j); I_D = -5A; V_{GS} = -4.5V$$



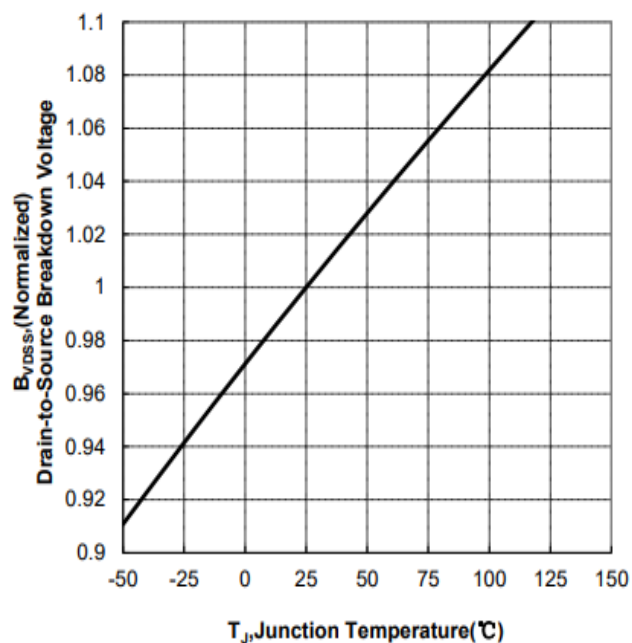
Gate Threshold Voltage

$$-V_{TH}=f(T_j); I_D=-250\mu A$$



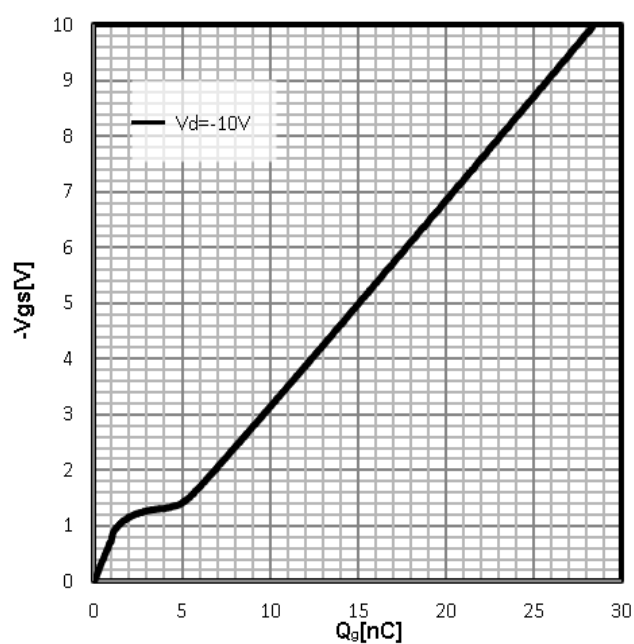
Drain-source breakdown voltage

$$V_{BR(DSS)}=f(T_j); I_D=-250\mu A$$



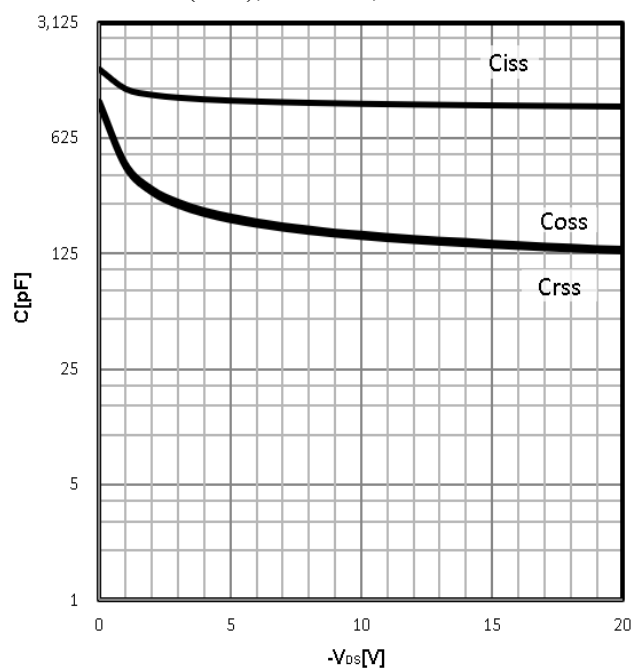
Typ. gate charge

$$V_{GS}=f(Q_{gate}); I_D=-5A$$



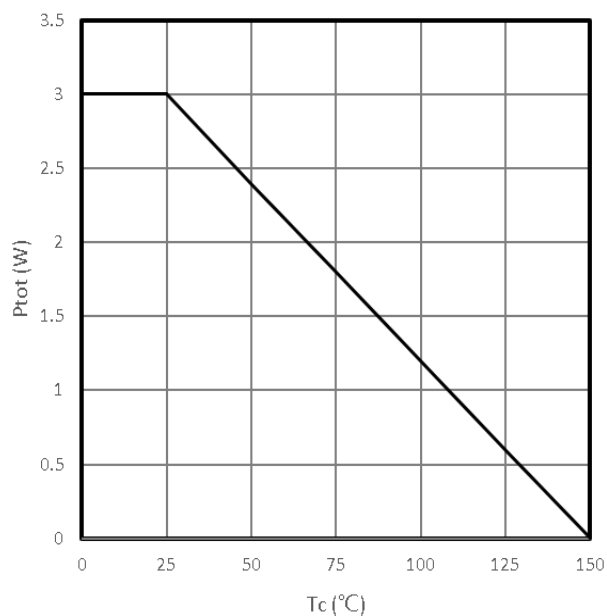
Typ. capacitances

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

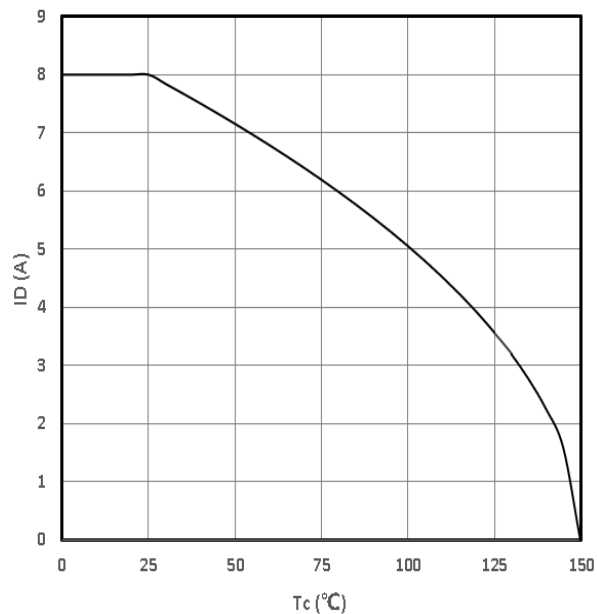


Power Dissipation

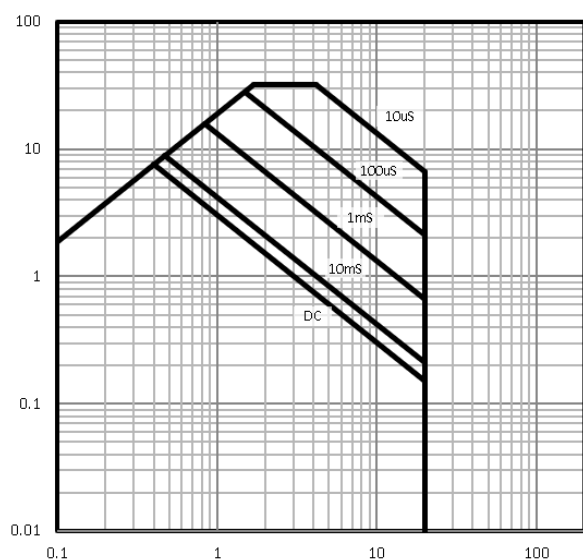
$$P_{\text{tot}} = f(T_C)$$


Maximum Drain Current

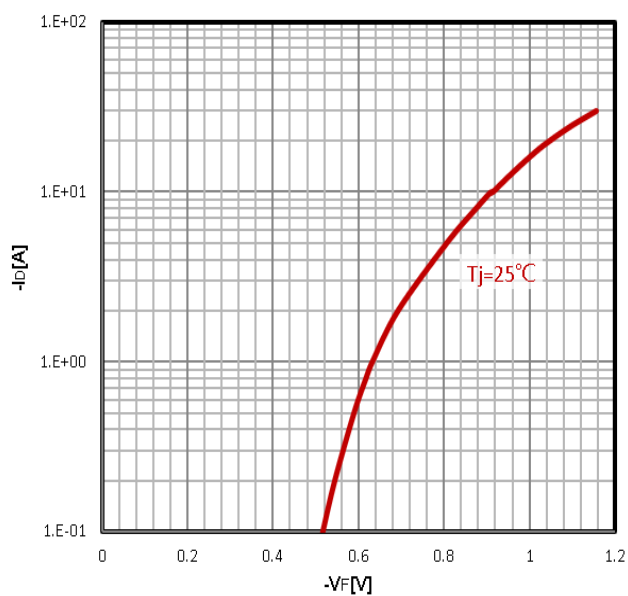
$$-I_D = f(T_C)$$


Safe operating area

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

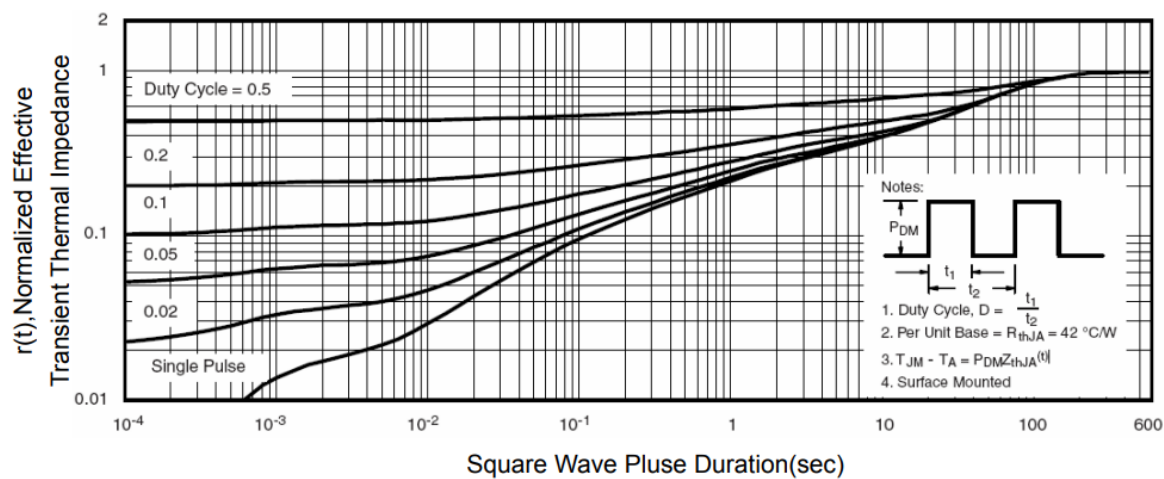

Body Diode Forward Voltage Variation

$$-I_F = f(-V_{DS})$$

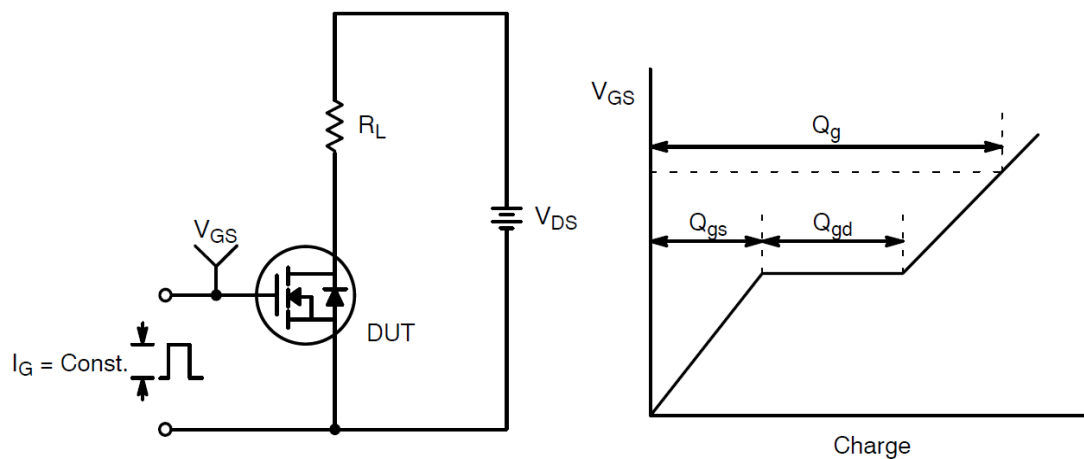


Max. transient thermal impedance

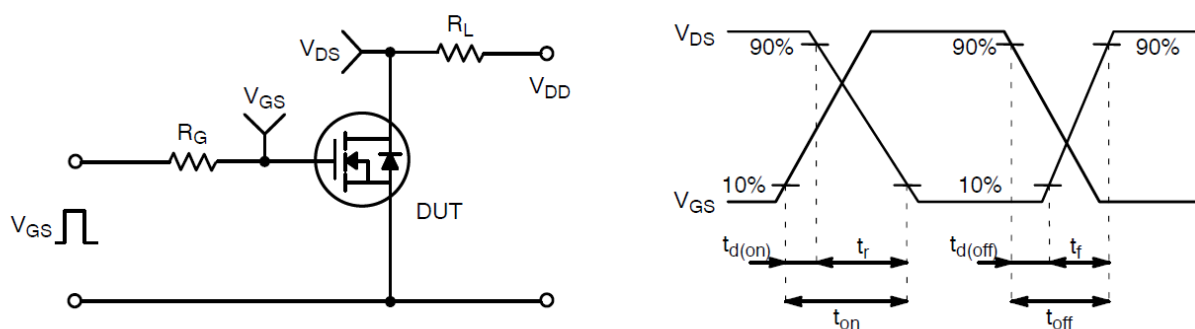
$$Z_{thJC}=f(t_p)$$



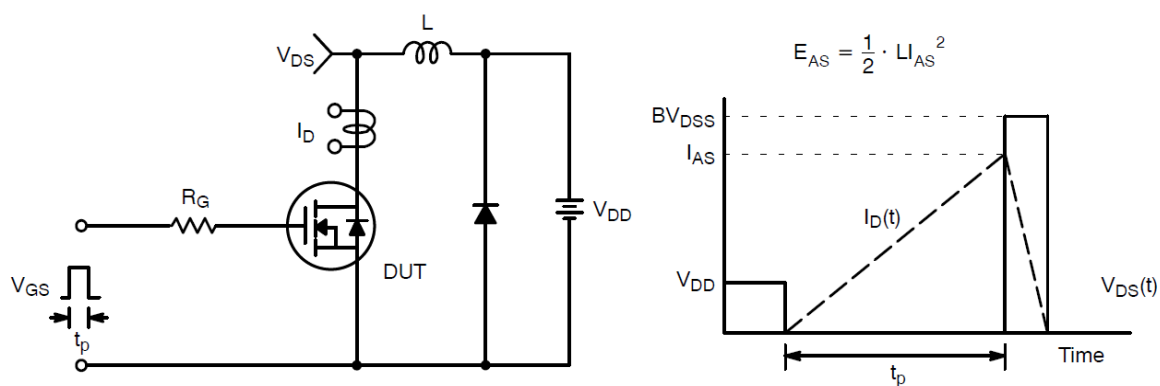
Test Circuit and Waveform:



Gate Charge Test Circuit & Waveform

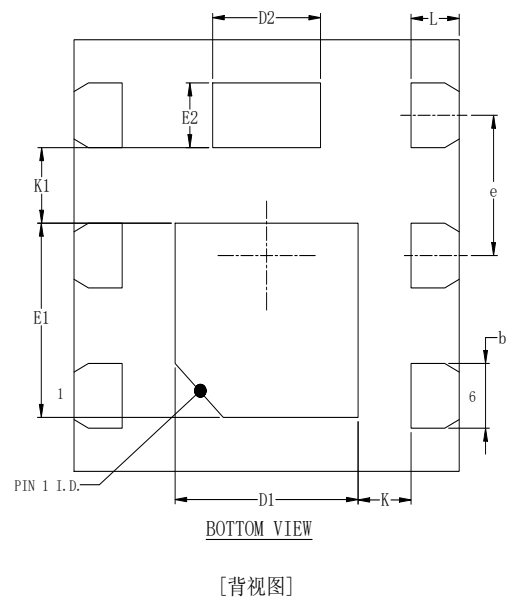
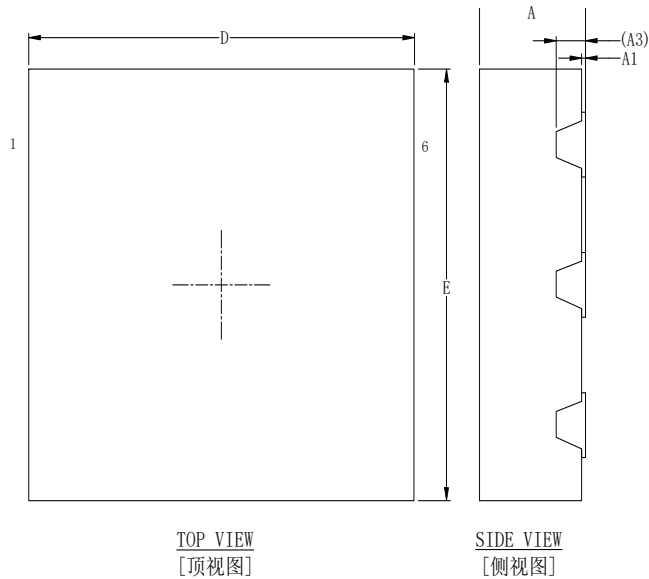


Resistive Switching Test Circuit & Waveforms

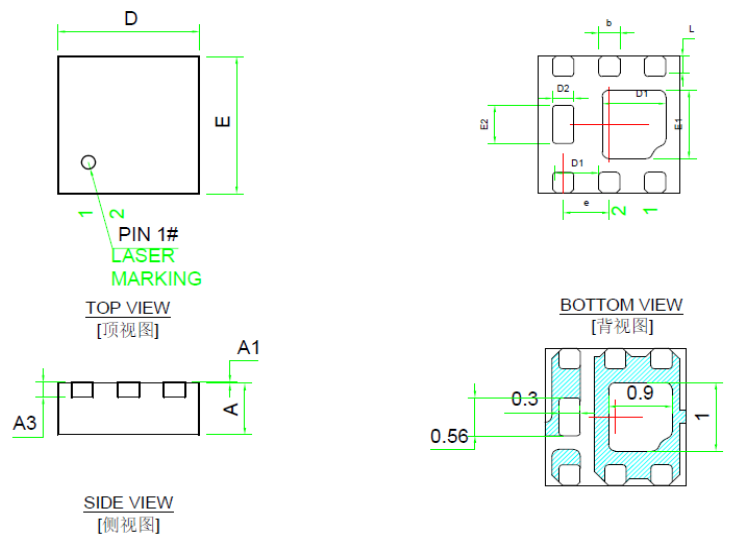


Unclamped Inductive Switching Test Circuit & Waveforms

●Dimensions (DFN2×2)



		SYMBOL	MIN	NOM	MAX
TOTAL THICKNESS		A	0.5	0.55	0.6
STAND OFF		A1	0	0.02	0.05
L/F THICKNESS		A3	0.152 REF		
LEAD WIDTH		b	0.25	0.3	0.35
BODY SIZE	X	D	1.9	2	2.1
	Y	E	1.9	2	2.1
LEAD PITCH		e	0.65 BSC		
EP SIZE	X	D1	0.85	0.95	1.05
		D2	0.46	0.56	0.66
	Y	E1	0.8	0.9	1
		E2	0.2	0.3	0.4
LEAD LENGTH		L	0.2	0.25	0.3
LEAD TIP TO EP EDGE		K	0.275 REF		
EP EDGE TO EP EDGE		K1	0.35 REF		



Symbol	Dimensions In Millimeters		
	Min	Nom	Max
A	0.700	0.750	0.800
A1	0.000	0.020	0.050
A3	0.203REF		
b	0.250	0.300	0.350
D	1.900	2.000	2.100
D1	0.850	0.900	0.950
D2	0.250	0.300	0.350
e	0.650BSC		
E	1.900	2.000	2.100
E1	0.950	1.000	1.050
E2	0.510	0.560	0.610
L	0.250	0.300	0.350

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