

### ● General Description

The AGM12N10D 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

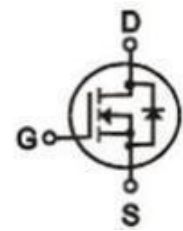
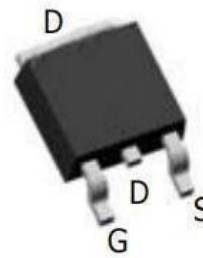
### ● Application

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

### Product Summary

BVDSS	RDSON	ID
100V	9.3mΩ	55A

### TO-252 Pin Configuration



### Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM12N10D	AGM12N10D	TO-252	330mm	16mm	2500

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

Symbol	Parameter	Value	Unit
VDS	Drain-Source Voltage (VGS=0V)	100	V
VGS	Gate-Source Voltage (VDS=0V)	±20	V
ID	Drain Current-Continuous(Tc=25°C) (Note 1)	55	A
	Drain Current-Continuous(Tc=100°C)	35	A
IDM (pluse)	Drain Current-Continuous@ Current-Pulsed (Note 2)	220	A
PD	Maximum Power Dissipation(Tc=25°C)	83	w
	Maximum Power Dissipation(Tc=100°C)	33	w
EAS	Avalanche energy (Note 3)	121	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>	---	94	°C/W
RθJC	Thermal Resistance Junction-Case <sup>1</sup>	---	1.5	°C/W

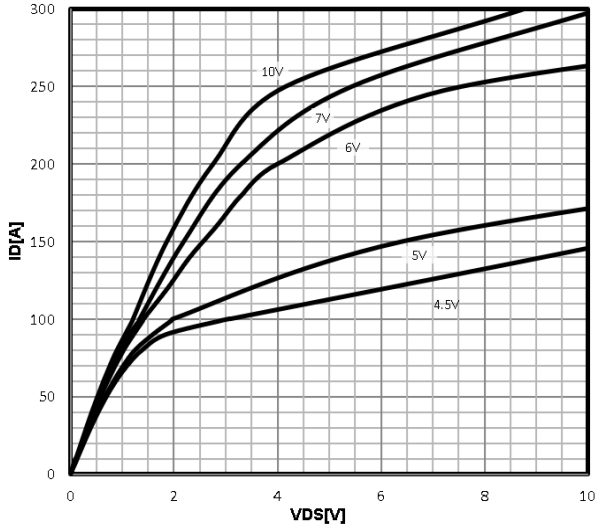
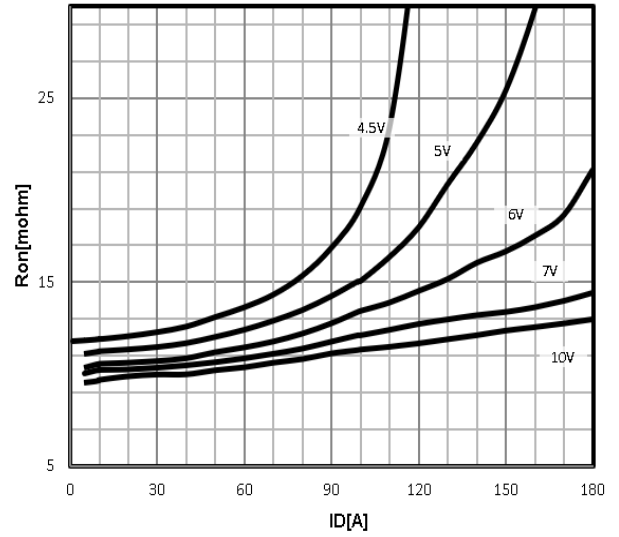
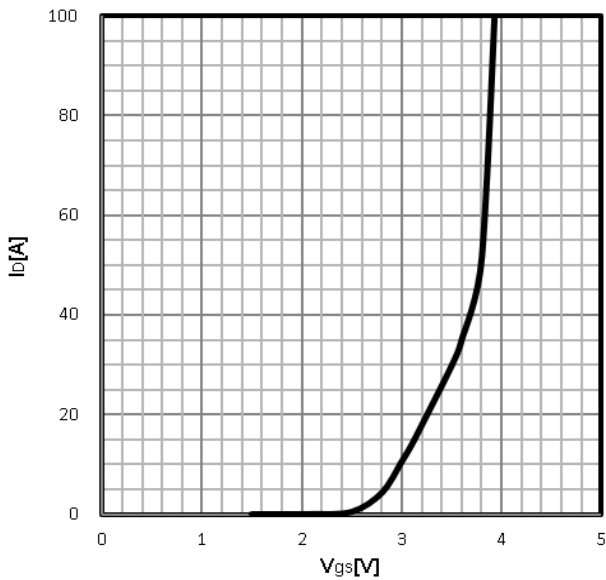
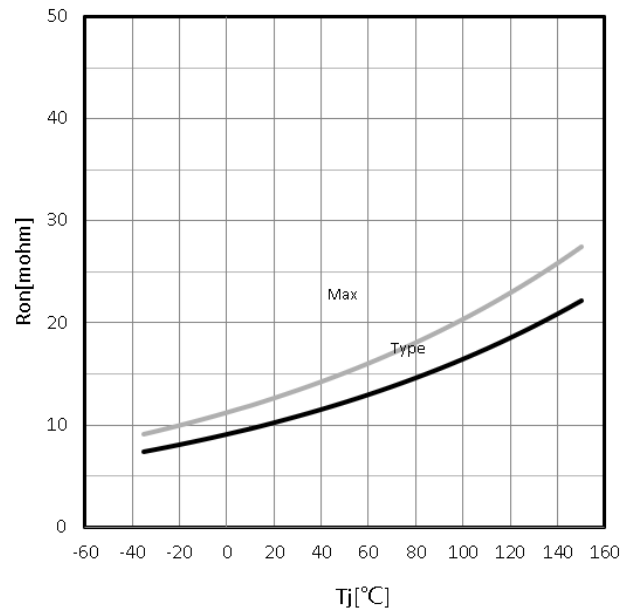
**Table 3. Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>On/Off States</b>						
BVDSS	Drain-Source Breakdown Voltage	VGS=0V ID=250μA	100	--	--	V
IDSS	Zero Gate Voltage Drain Current	VDS=100V,VGS=0V	--	--	1.0	μA
IGSS	Gate-Body Leakage Current	VGS=±20V,VDS=0V	--	--	±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS,ID=250μA	1.2	1.8	2.5	V
gFS	Forward Transconductance	VDS=5V,ID=15A	--	25	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=10V, ID=20A	--	9.3	13	mΩ
		VGS=4.5V, ID=15A	--	12	16	mΩ
<b>Dynamic Characteristics</b>						
Ciss	Input Capacitance	VDS=50V,VGS=0V, F=1MHZ	--	1080	--	pF
Coss	Output Capacitance		--	460	--	pF
Crss	Reverse Transfer Capacitance		--	9.0	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	11.5	--	Ω
<b>Switching Times</b>						
td(on)	Turn-on Delay Time	VGS=10V,VDS=50V, ID=10A, RGEN=5Ω	--	16	--	nS
tr	Turn-on Rise Time		--	18	--	nS
td(off)	Turn-Off Delay Time		--	32	--	nS
tf	Turn-Off Fall Time		--	10	--	nS
Qg	Total Gate Charge	VGS=10V, VDS=50V, ID=10A	--	22	--	nC
Qgs	Gate-Source Charge		--	3.7	--	nC
Qgd	Gate-Drain Charge		--	5.0	--	nC
<b>Source-Drain Diode Characteristics</b>						
ISD	Source-Drain Current(Body Diode)		--	--	55	A
VSD	Forward on Voltage	VGS=0V,IS=20A	--	--	1.2	V
trr	Reverse Recovery Time	Is=20A ,	--	43	--	ns
Qrr	Reverse Recovery Charge	VDD=50V,dI/dt=100A/μs	--	90	--	nc

Notes 1.The maximum current rating is package limited.

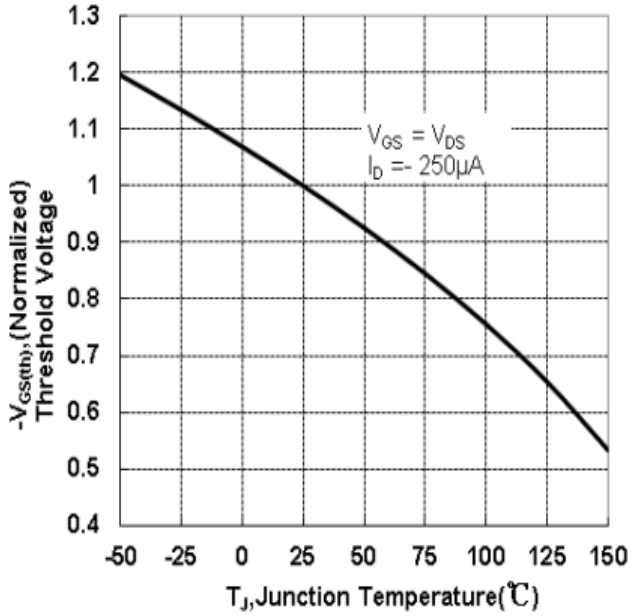
Notes 2.Repetitive Rating: Pulse width limited by maximum junction temperature

Notes 3.EAS condition: T<sub>J</sub>=25°C,VDD=50V,Vgs=10V, ID=22A, L=0.5mH, RG=25ohm

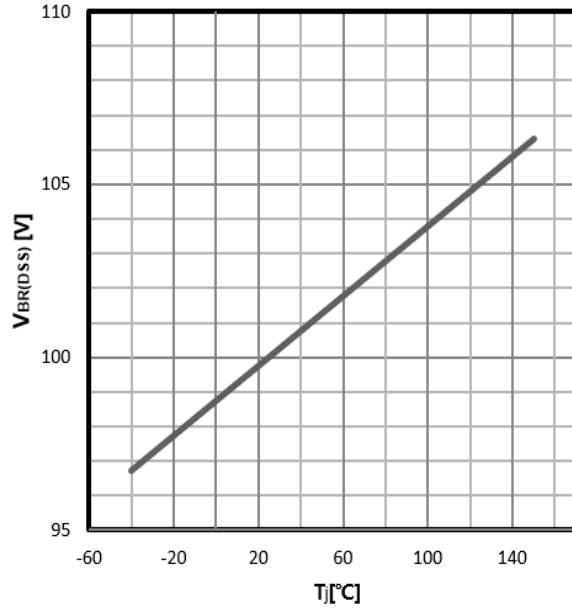
**Characteristics Curve:**
**Typ. output characteristics**  
 $I_D = f(V_{DS})$ 

**Typ. drain-source on resistance**  
 $R_{DS(on)} = f(I_D)$ 

**Typ. transfer characteristics**  
 $I_D = f(V_{GS})$ 

**Drain-source on-state resistance**  
 $R_{DS(on)} = f(T_j); I_D = 20A; V_{GS} = 10V$ 


**Gate Threshold Voltage**

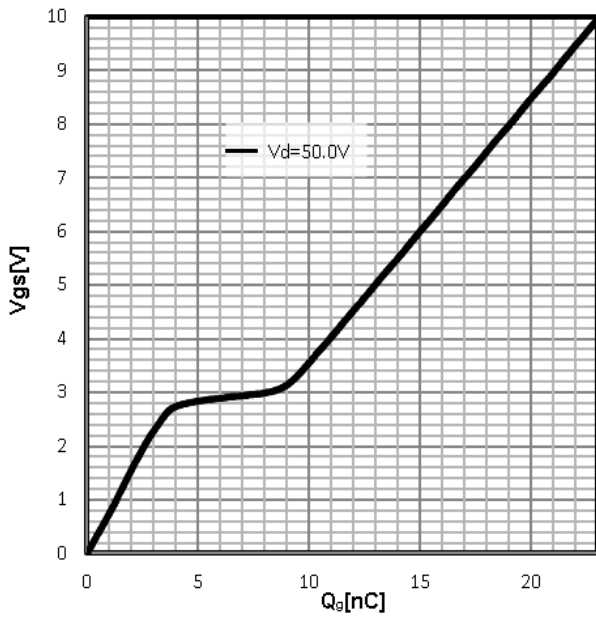
$$V_{TH}=f(T_j); I_D=250\mu A$$


**Drain-source breakdown voltage**

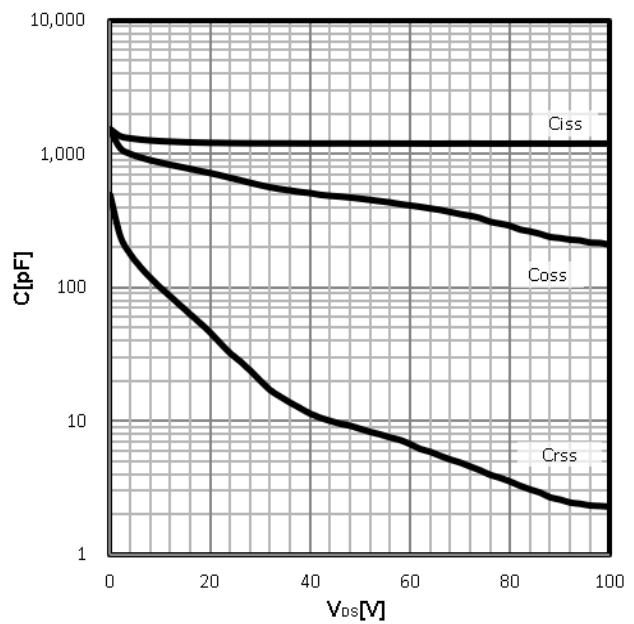
$$V_{BR(DSS)}=f(T_j); I_D=250\mu A$$


**Typ. gate charge**

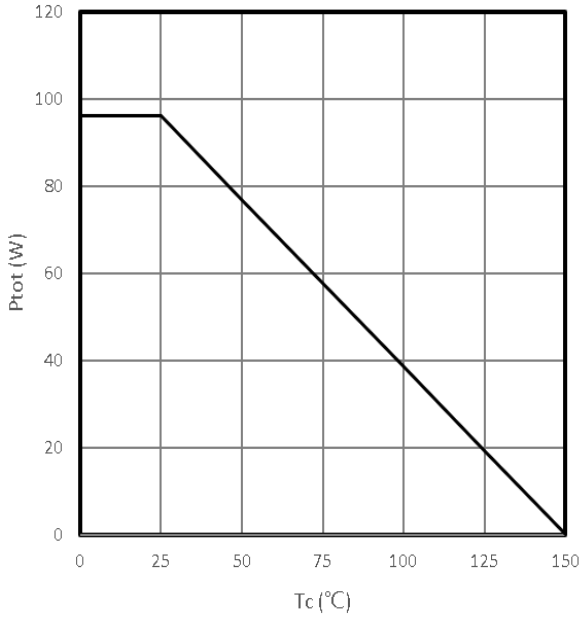
$$V_{GS}=f(Q_g); I_D=10A$$


**Typ. capacitances**

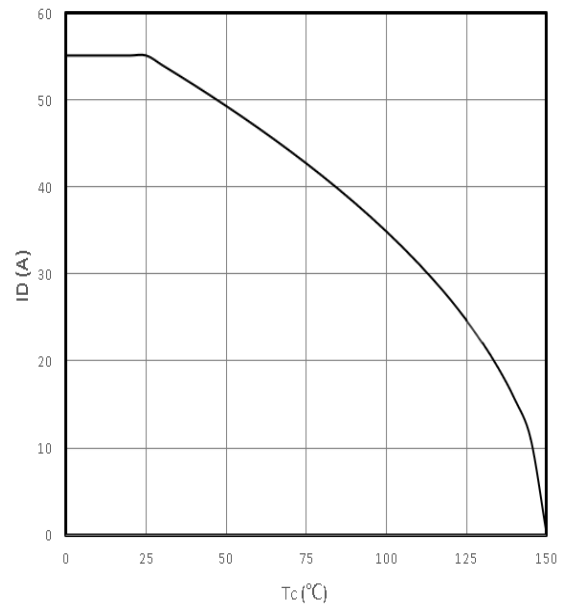
$$C=f(V_{DS}); V_{GS}=0V; f=1MHz$$



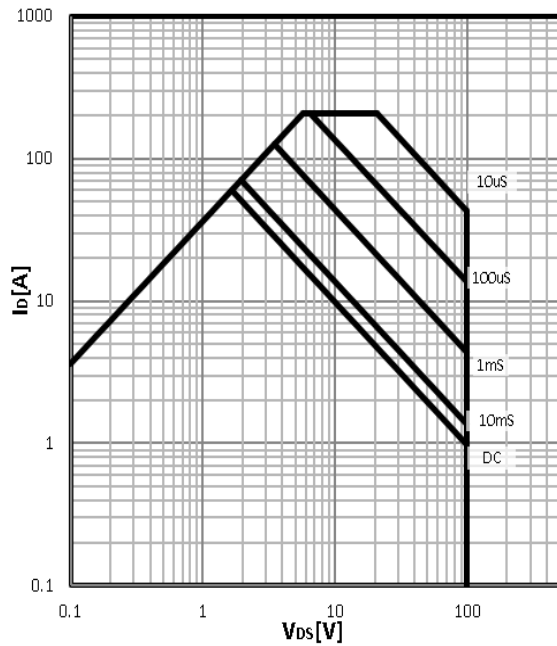
**Power Dissipation**  
 $P_{tot}=f(T_C)$



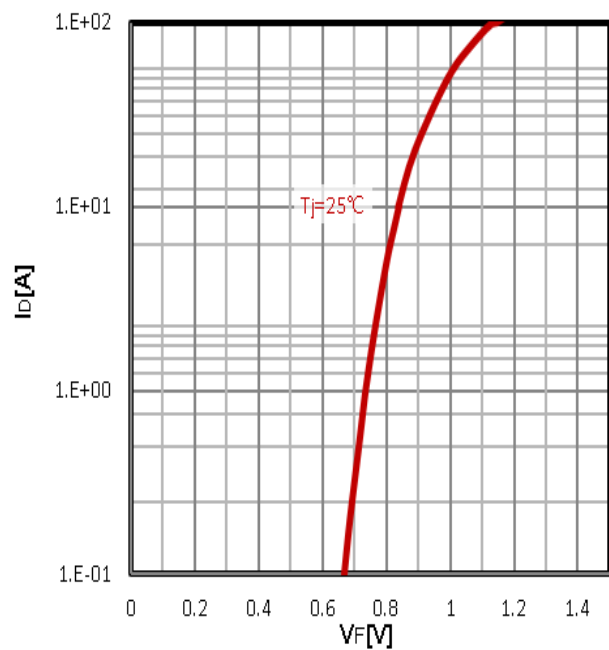
**Maximum Drain Current**  
 $I_D=f(T_C)$



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

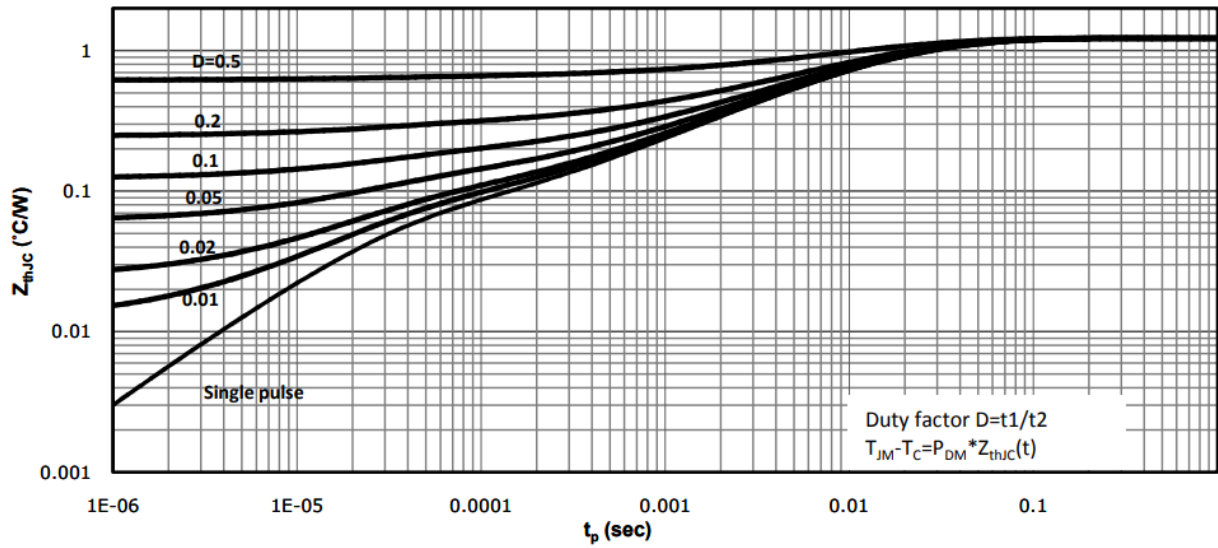


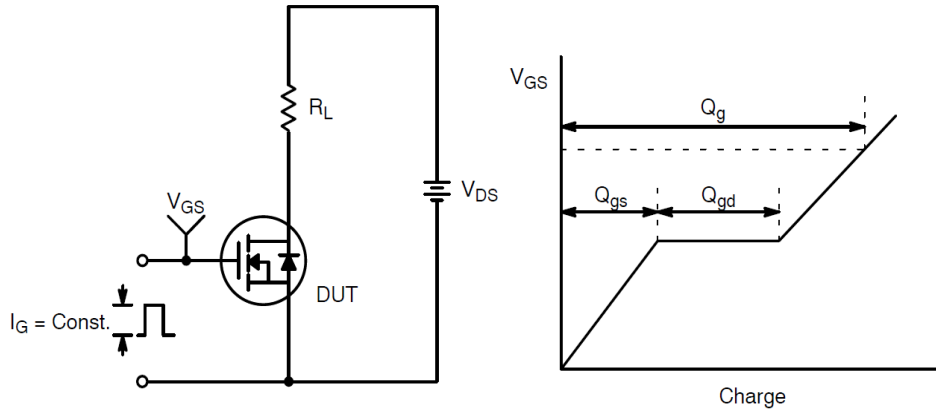
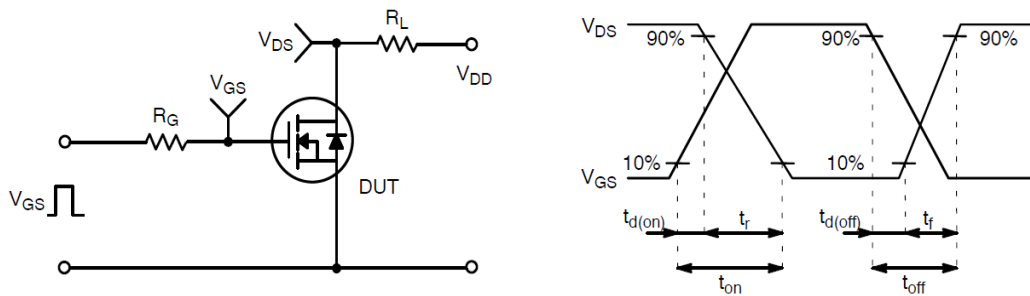
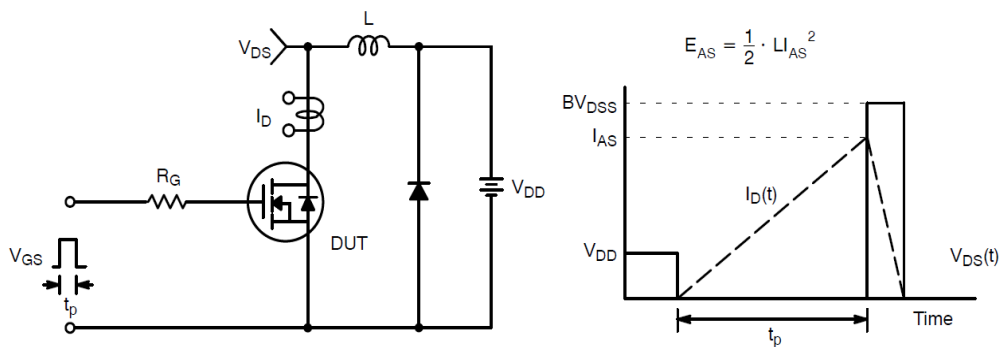
**Body Diode Forward Voltage Variation**  
 $I_F=f(V_{GS})$



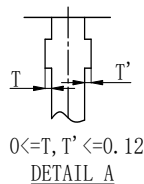
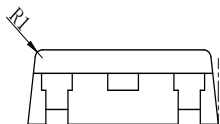
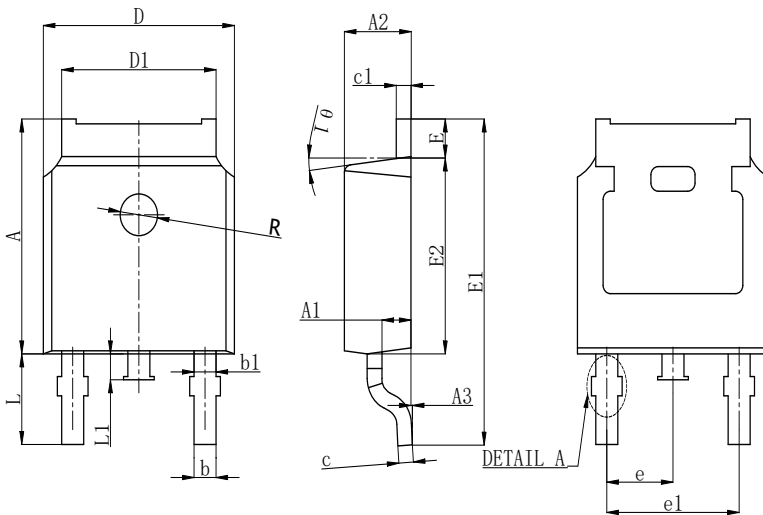
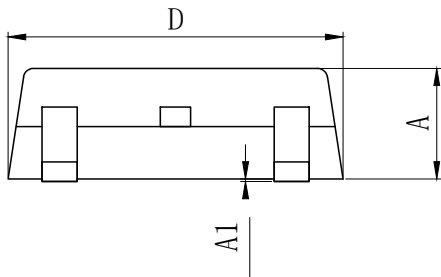
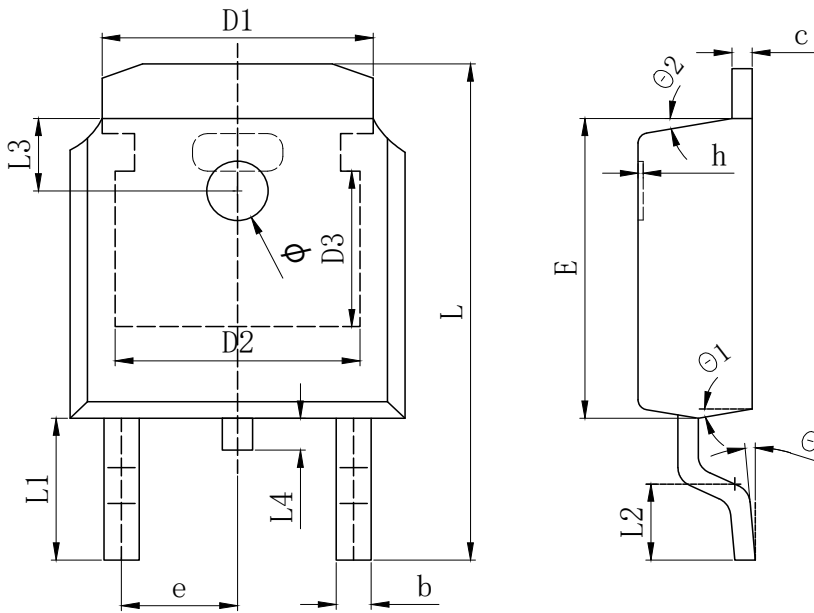
Max. transient thermal impedance

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



**Test Circuit and Waveform:**

**Gate Charge Test Circuit & Waveform**

**Resistive Switching Test Circuit & Waveforms**

**Unclamped Inductive Switching Test Circuit & Waveforms**

## TO-252 Package Outline Data



SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	2.200	2.300	2.400
A1	0.000		0.127
b	0.640	0.690	0.740
c (电镀后)	0.460	0.520	0.580
D	6.500	6.600	6.700
D1	5.334 REF		
D2	4.826 REF		
D3	3.166 REF		
E	6.000	6.100	6.200
e	2.286 TYP		
h	0.000	0.100	0.200
L	9.900	10.100	10.300
L1	2.888 REF		
L2	1.400	1.550	1.700
L3	1.600 REF		
L4	0.600	0.800	1.000
Φ	1.100	1.200	1.300
θ	0°		8°
θ 1	9° TYP		
θ 2	9° TYP		

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	7.050	7.100	7.150
A1	0.960	1.010	1.060
A2	2.250	2.300	2.350
A3	0.000	0.050	0.100
b	0.760REF.		
b1	1.000REF.		
c	0.508REF.		
c1	0.508REF.		
D	6.550	6.600	6.650
D1	5.220	5.320	5.420
E	0.950	1.000	1.050
E1	9.700	9.900	10.100
E2	6.050	6.100	6.150
e	2.286BSC		
e1	4.572REF.		
L	2.650	2.800	2.950
L1	0.700	0.800	0.900
θ 1	7° REF.		
R	1.300REF.		
R1	0.250REF.		




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