

General Description

The AGM20P22E 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% DVDS tested

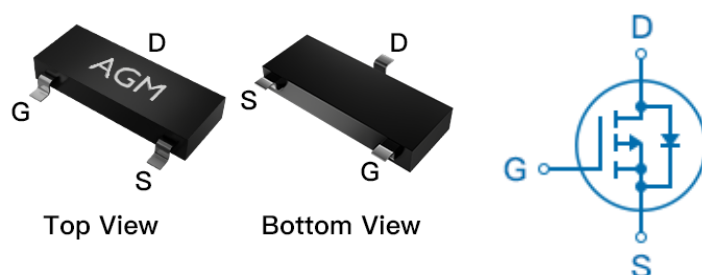
Application

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

Product Summary

BVDSS	RDS(ON)	ID
-20V	18mΩ	-6.2A

SOT23-3 Pin Configuration



Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
20P22	AGM20P22E	SOT23-3	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)	-6.2	A
	Drain Current-Continuous(Tc=100°C)	-4.1	A
IDM (pluse)	Drain Current-Pulsed (Note 2)	-24.8	A
PD	Maximum Power Dissipation(Tc=25°C)	1.25	w
	Maximum Power Dissipation(Tc=100°C)	1.0	w
EAS	Avalanche energy (Note 3)	2.25	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	---	100	°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	-0.6	-1.0	V
gFS	Forward Transconductance	VDS=-5V,ID=-2A	--	12	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=-4.5V, ID=-3A	--	18	24	mΩ
		VGS=-2.5V, ID=-2A	--	23	28	mΩ
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=-10V,VGS=0V, F=1MHZ	--	959	--	pF
Coss	Output Capacitance		--	141	--	pF
Crss	Reverse Transfer Capacitance		--	130	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	11.6	--	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)		--	--	-6.2	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.

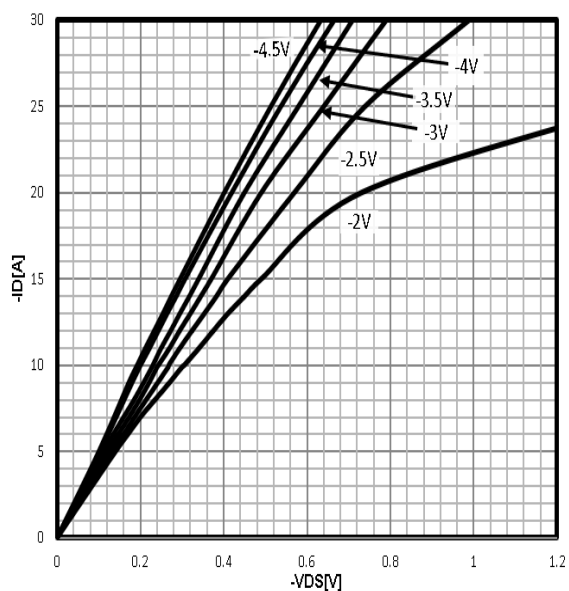
Notes 2.Repetitive Rating: Pulse width limited by maximum junction temperature

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

Characteristics Curve:

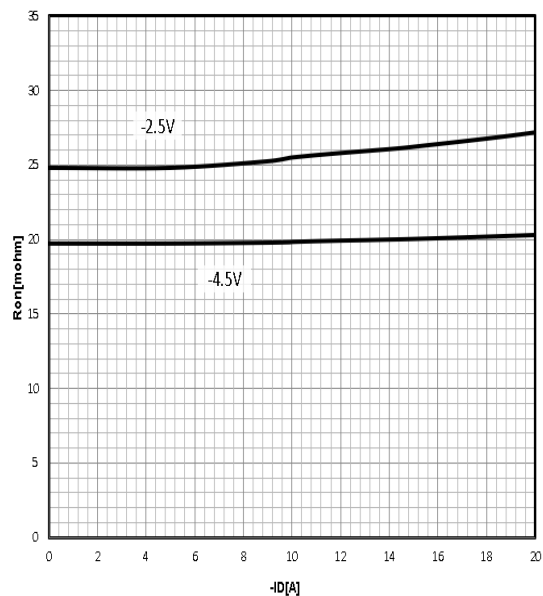
Typ. output characteristics

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



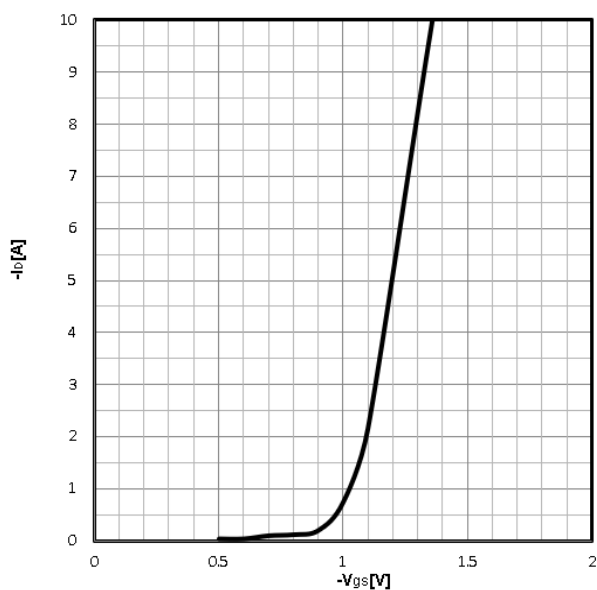
Typ. drain-source on resistance

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



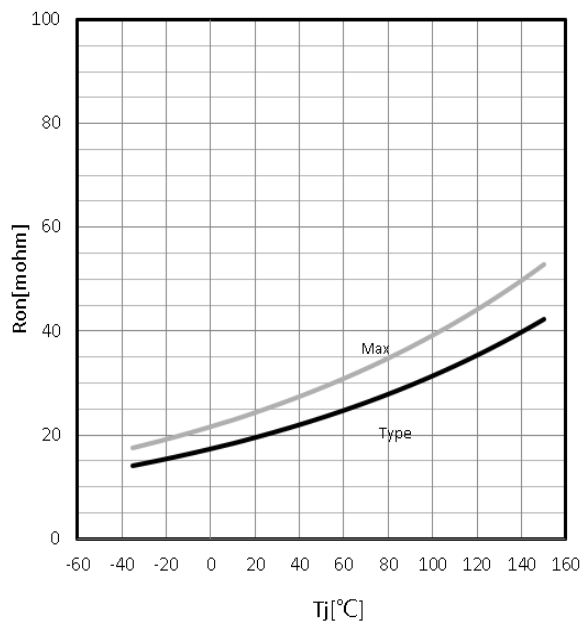
Typ. transfer characteristics

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



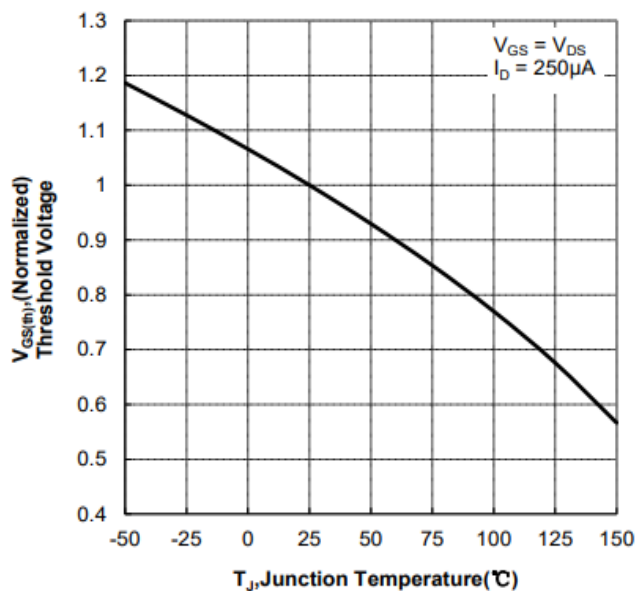
Drain-source on-state resistance

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



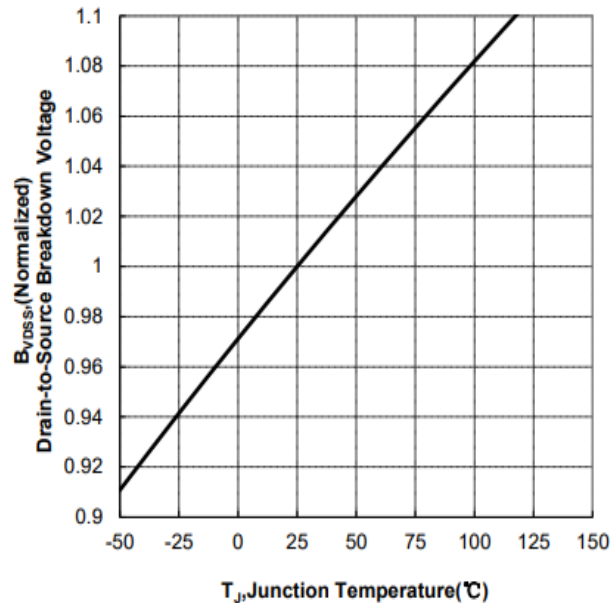
Gate Threshold Voltage

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



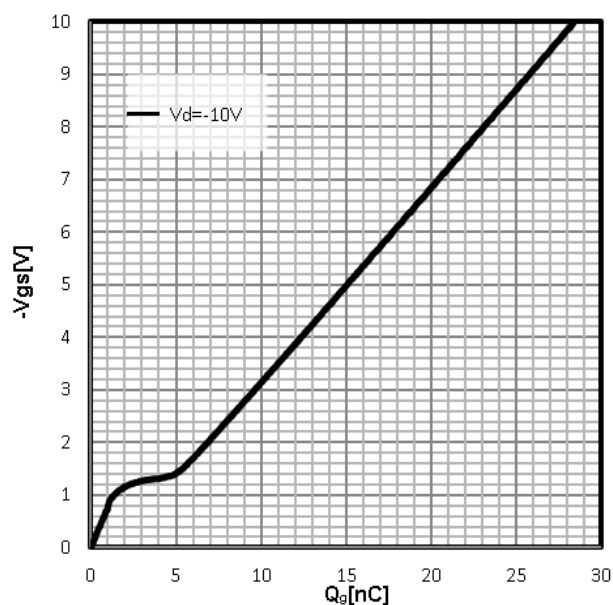
Drain-source breakdown voltage

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



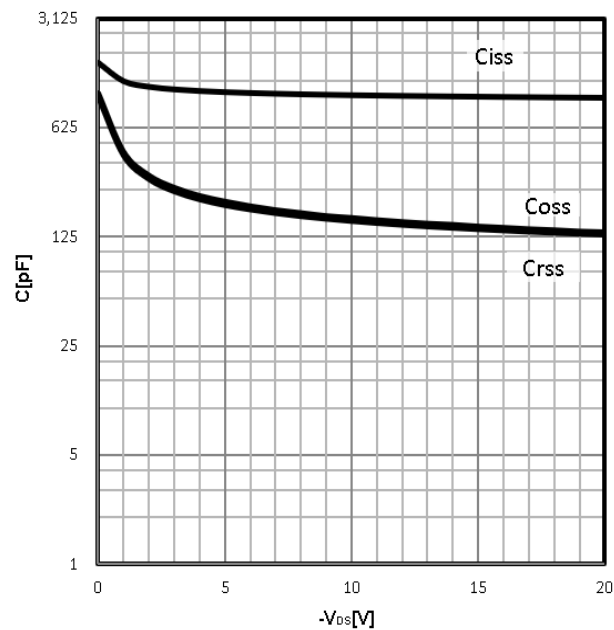
Typ. gate charge

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



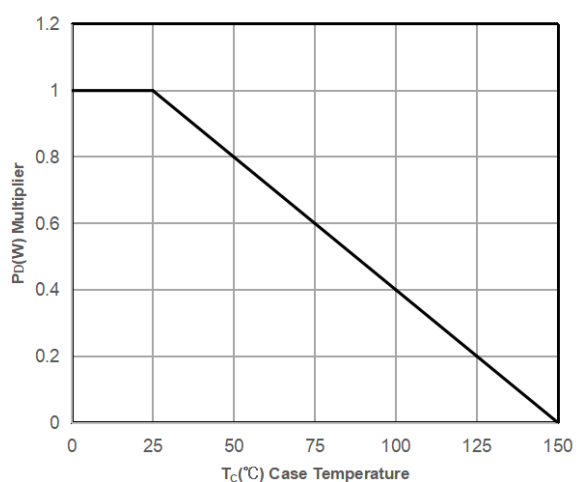
Typ. capacitances

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



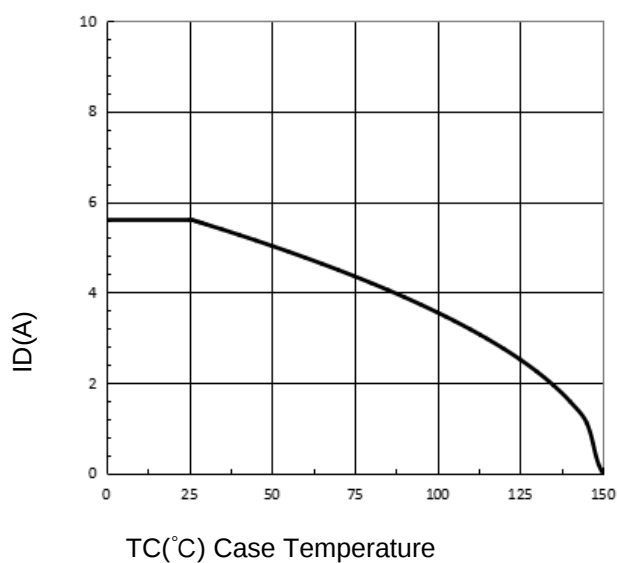
Power Dissipation

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



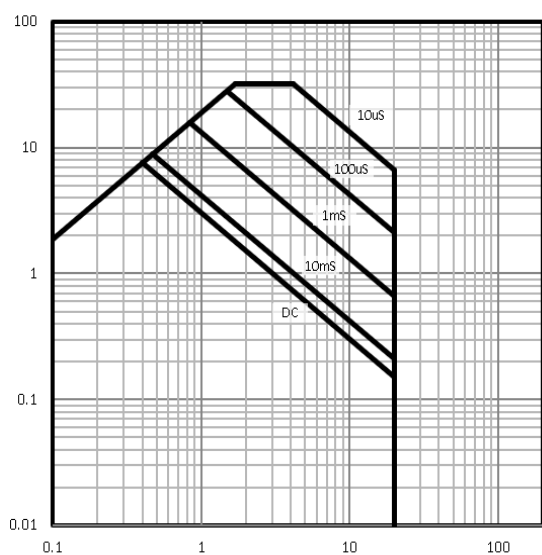
Maximum Drain Current

$$-I_D=f(T_C)$$



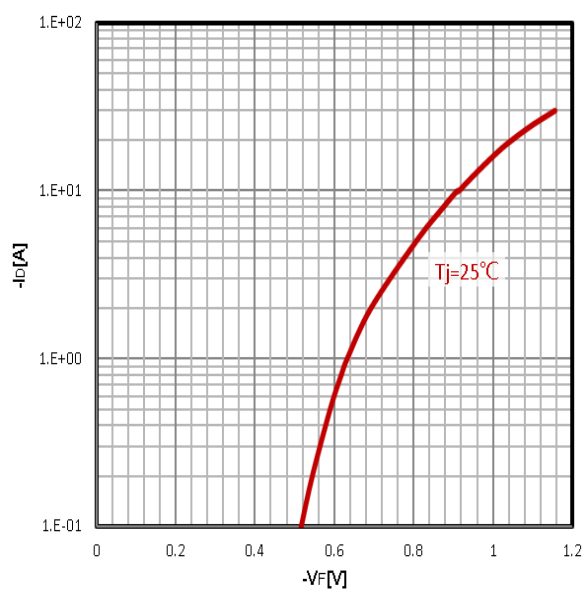
Safe operating area

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



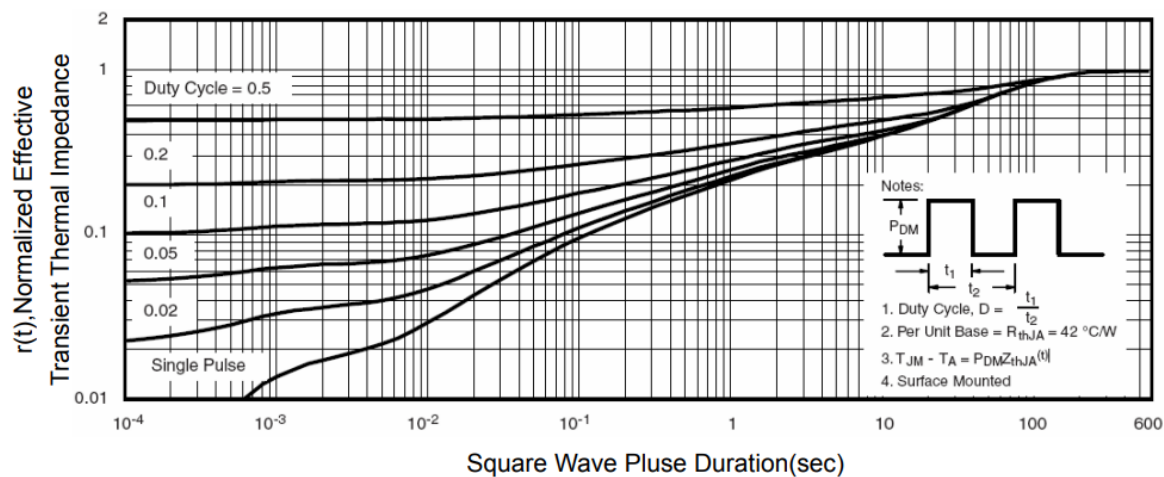
Body Diode Forward Voltage Variation

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

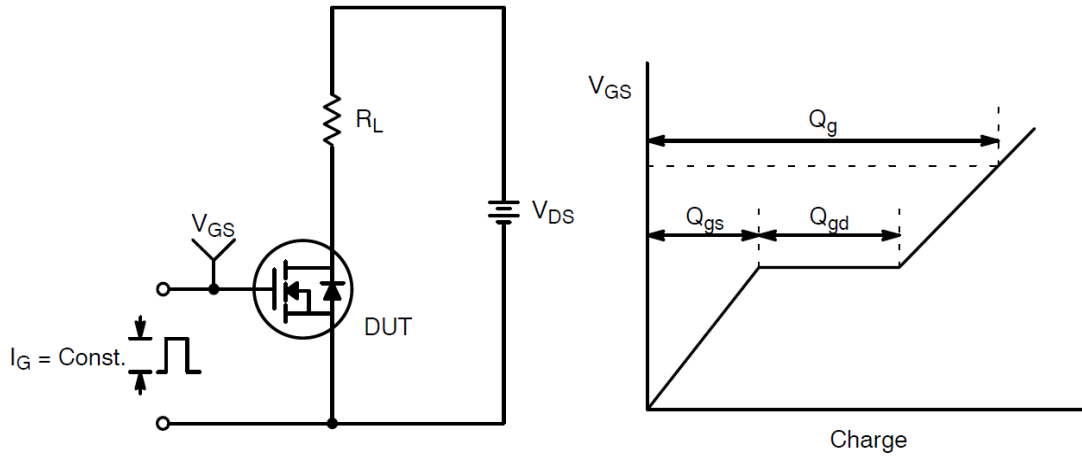


Max. transient thermal impedance

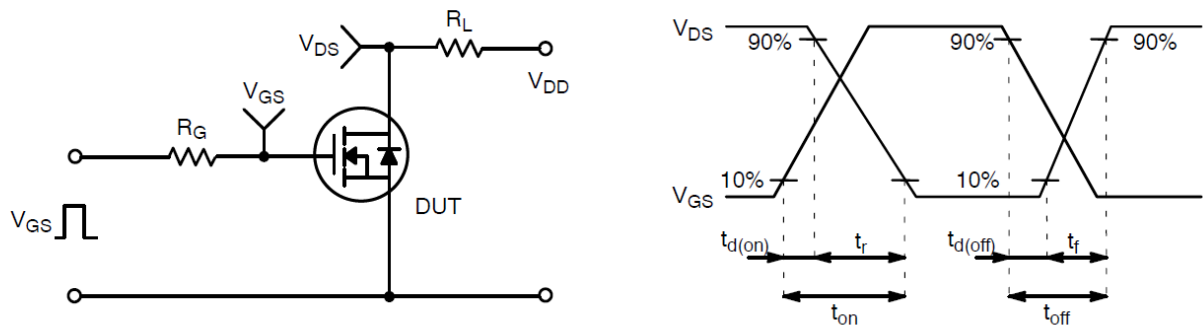
$$Z_{thJC}=f(t_p)$$



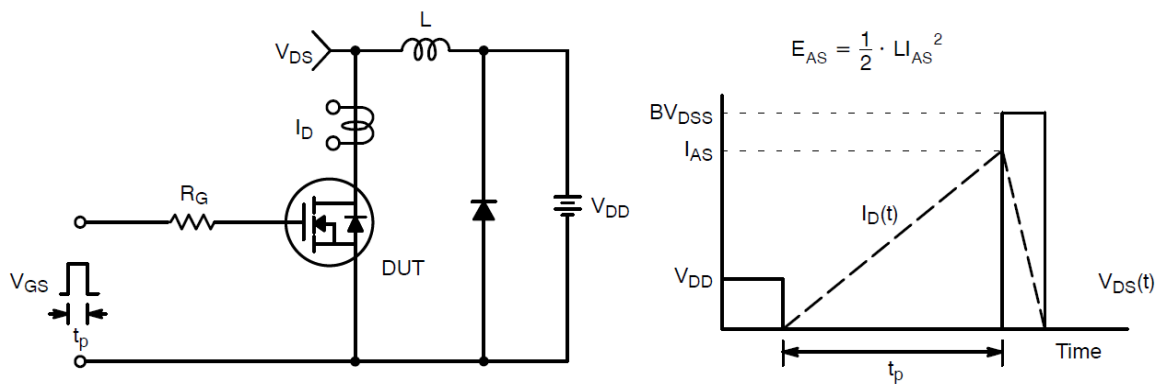
Test Circuit and Waveform:



Gate Charge Test Circuit & Waveform

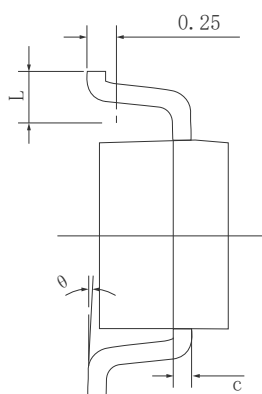
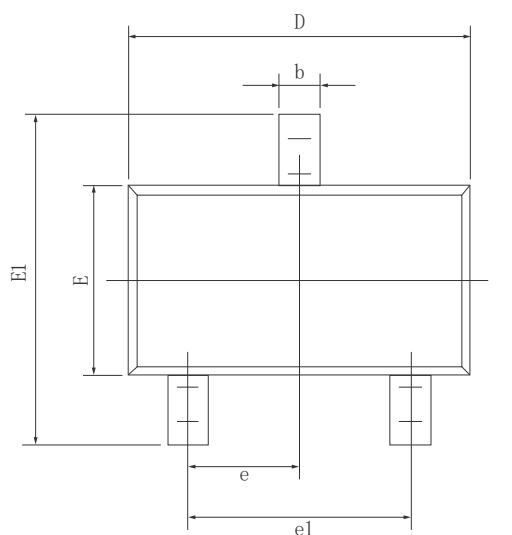


Resistive Switching Test Circuit & Waveforms

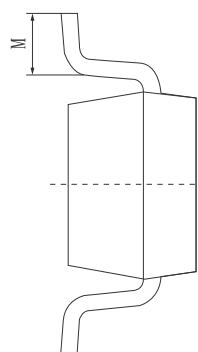
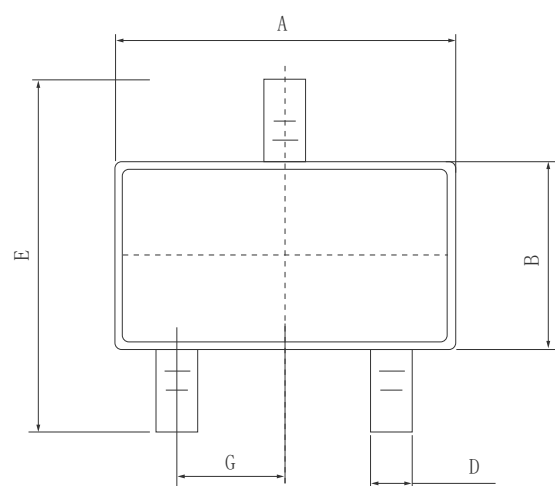
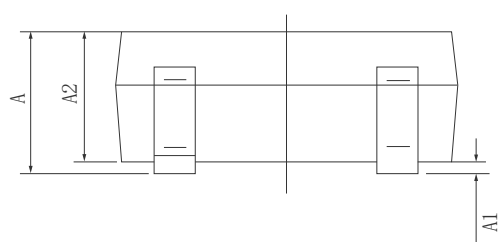


Unclamped Inductive Switching Test Circuit & Waveforms

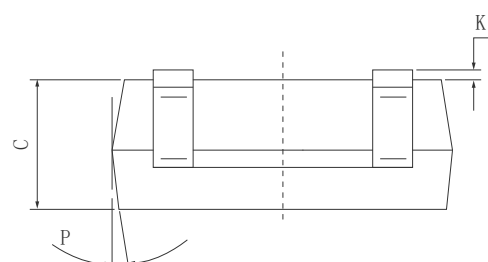
Dimensions (SOT23-3)



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	—	—	1.25
A1	0.03	—	0.10
A2	1.05	1.10	1.15
b	0.30	0.35	0.40
c	0.13	—	0.17
D	2.87	2.92	2.97
E	1.55	1.60	1.65
E1	2.70	2.85	3.00
e	0.95 BSC.		
e1	1.80	—	2.00
L	0.35	0.45	0.55
θ	0°	—	8°

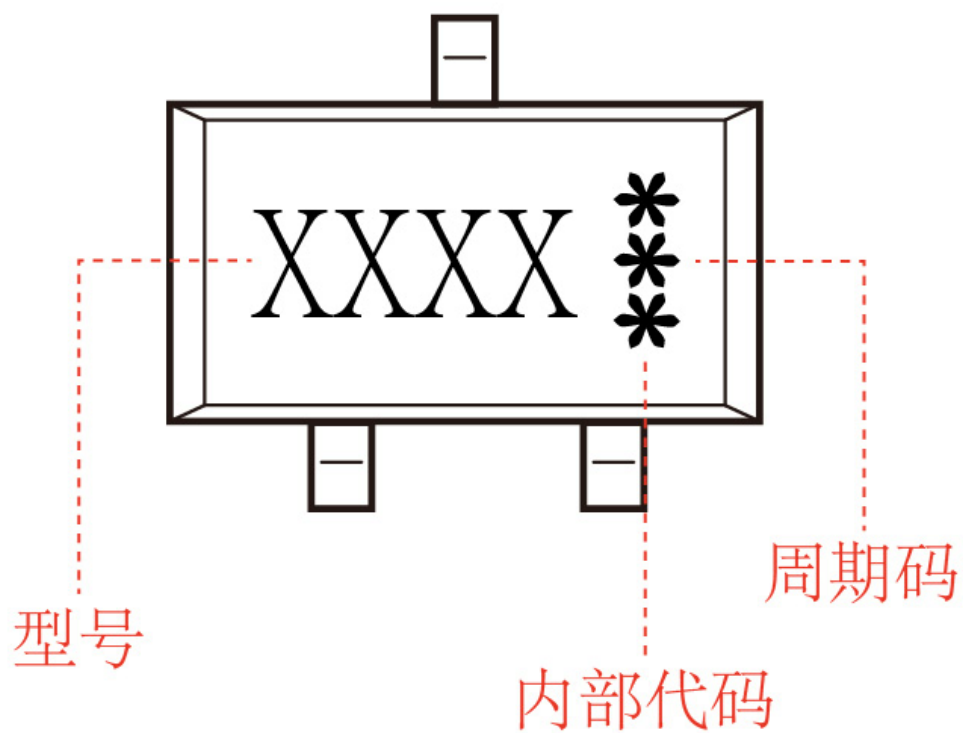


DIM	MILLIMETERS
A	2.82~3.02
B	1.60±0.10
C	1.10±0.05
D	0.40±0.10
E	2.65~2.95
G	0.95typ
K	0.00~0.10
M	0.20MIN
P	9±2°



SOT23-3

Marking Instructions:



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