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

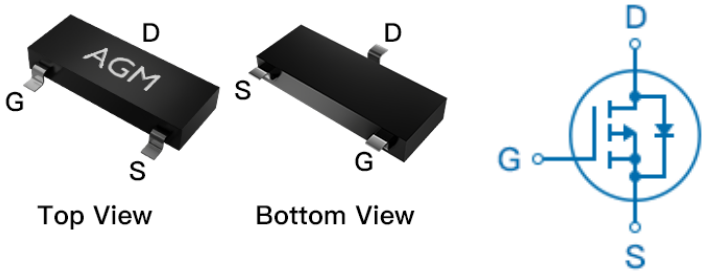
Application

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

Product Summary

BVDSS	RDSON	ID
-20V	18mΩ	-6.2A

SOT-23-3 Pin Configuration



Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
20P22	AGM20P22E	SOT-23-3	178mm	8mm	3000

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

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℃) **(Note 1)**	-6.2	A
	Drain Current-Continuous(Tc=100℃)	-4.1	A
IDM (pluse)	Drain Current-Pulsed **(Note 2)**	-24.8	A
PD	Maximum Power Dissipation(Tc=25℃)	1.7	w
	Maximum Power Dissipation(Tc=100℃)	0.68	w
EAS	Avalanche energy **(Note 3)**	2.25	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]	---	73.5	℃/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	-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
$V_{GS(th)}$	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	f=1.0MHz	--	11.6	--	Ω
Switching Times						
$t_{d(on)}$	Turn-on Delay Time	ID =-5.0A VDS = -10V VGS =-10V RG = 3.0Ω	--	25	--	nS
tr	Turn-on Rise Time		--	30	--	nS
$t_{d(off)}$	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

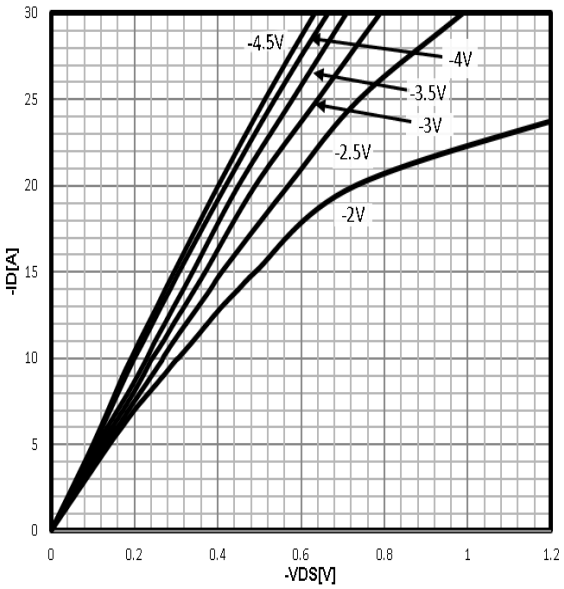
Notes 1.The maximum current rating is package limited.

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

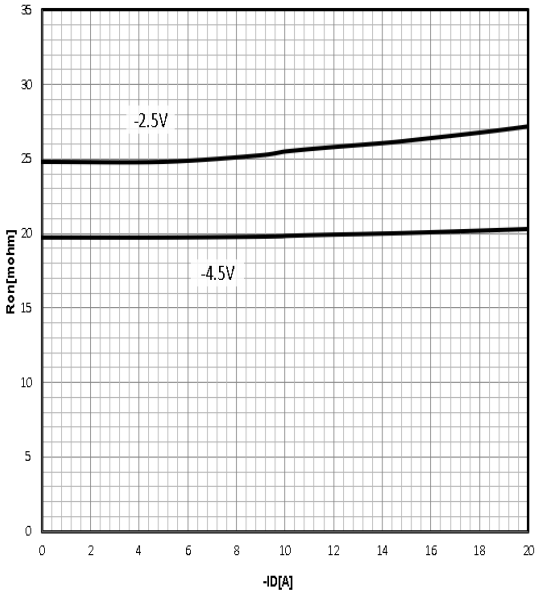
Notes 3.EAS condition: TJ=25℃,VDD=-15V,Vgs=-10V,ID=-3A, L=0.5mH,RG=25ohm

Characteristics Curve:

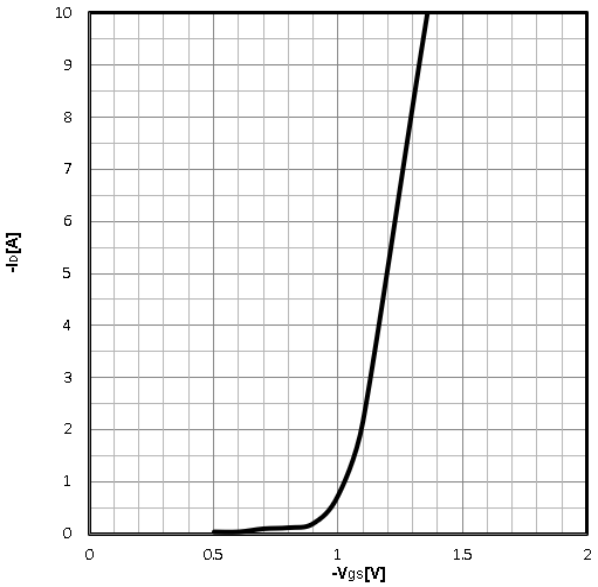
Typ. output characteristics
$I_D=f(V_{DS})$



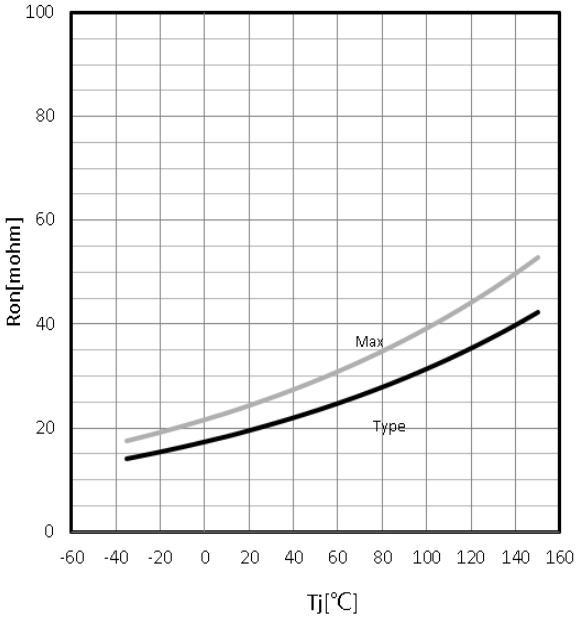
Typ. drain-source on resistance
$R_{DS(on)}=f(I_D)$



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

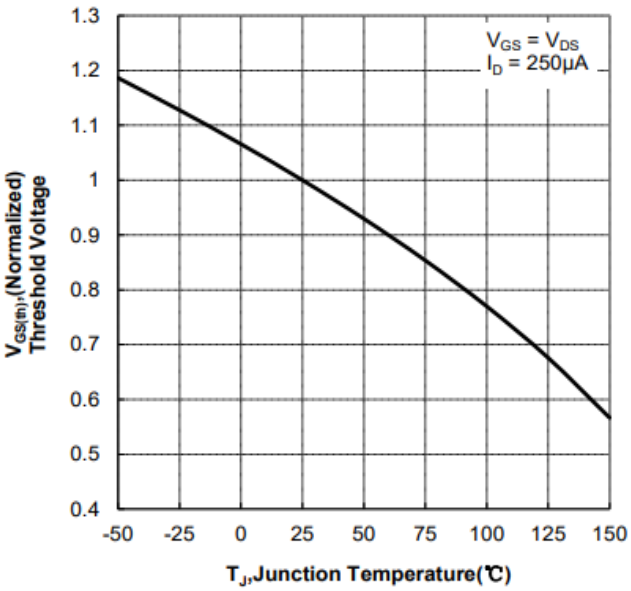


Drain-source on-state resistance
$R_{DS(on)}=f(T_j);I_D=-5A;\ V_{GS}=-4.5V$



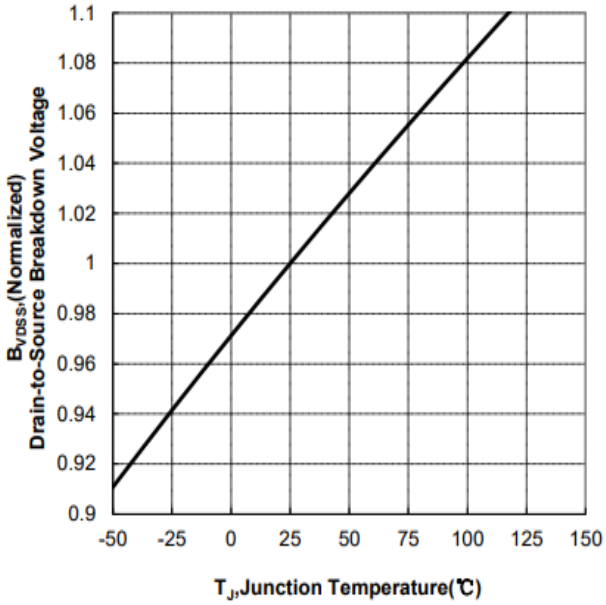
Gate Threshold Voltage

$-V_{TH}=f(T_j)$; I_D=-250uA



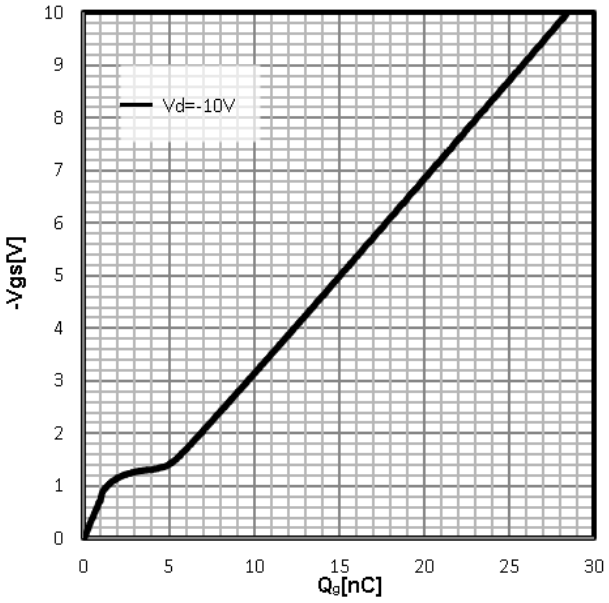
Drain-source breakdown voltage

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



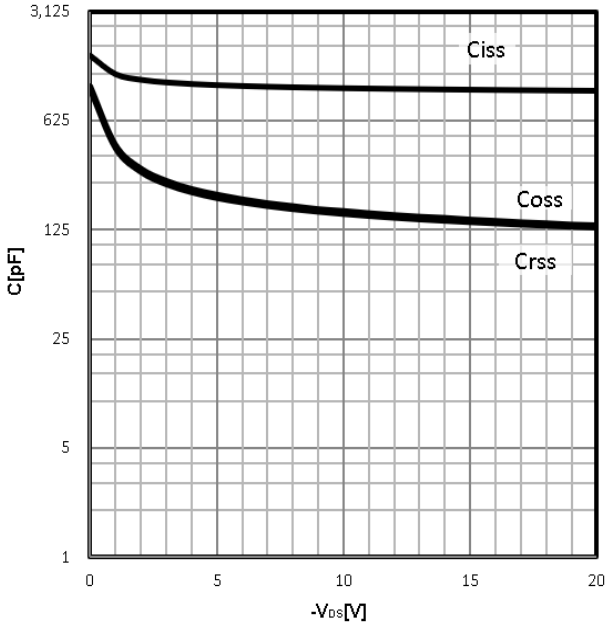
Typ. gate charge

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



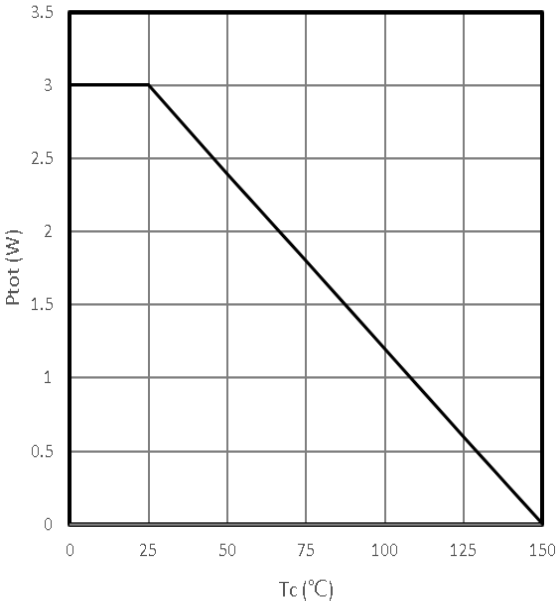
Typ. capacitances

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



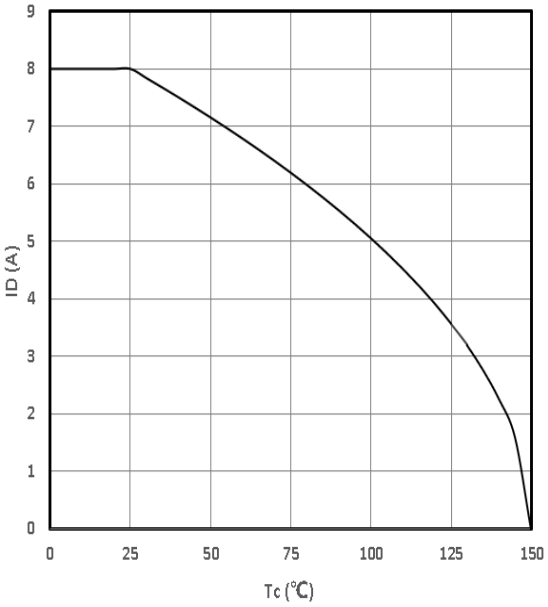
Power Dissipation

$P_{tot}=f(T_C)$



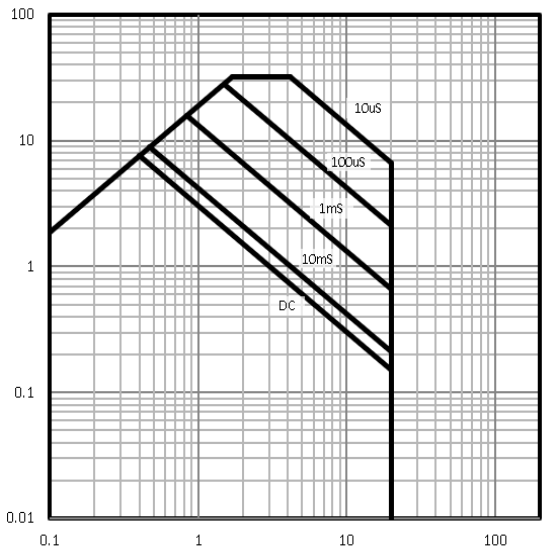
Maximum Drain Current

$-I_D=f(T_C)$



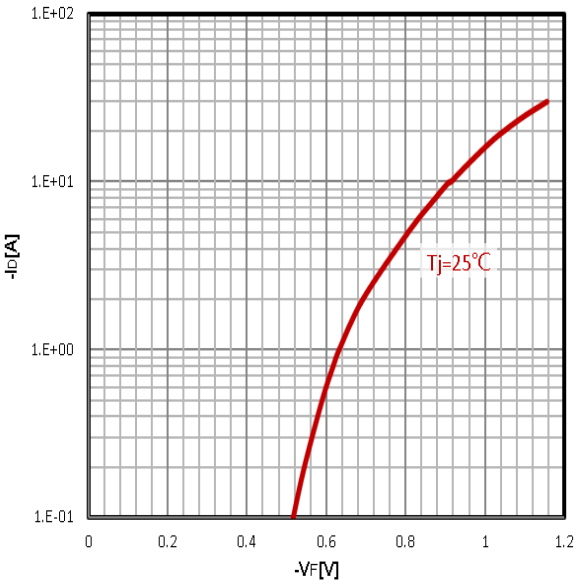
Safe operating area

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



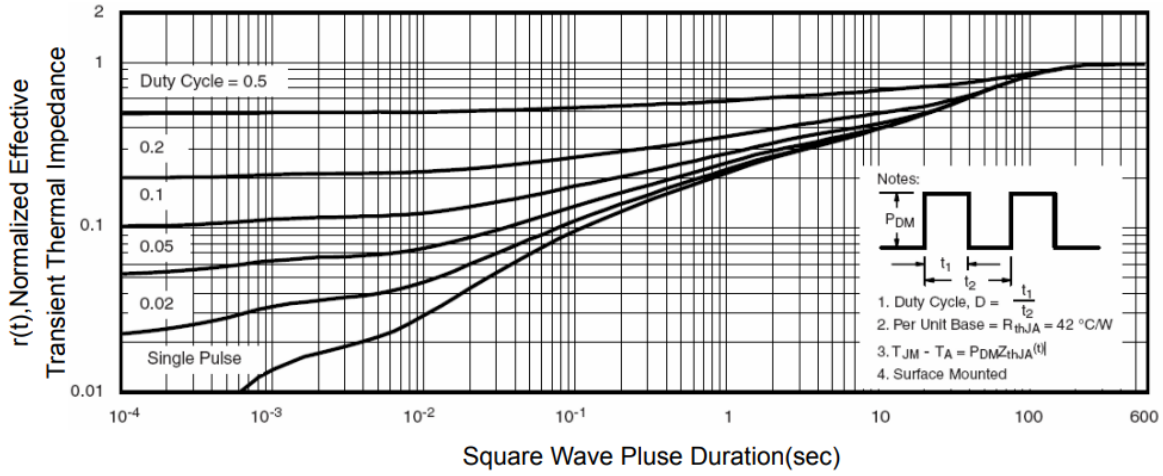
Body Diode Forward Voltage Variation

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

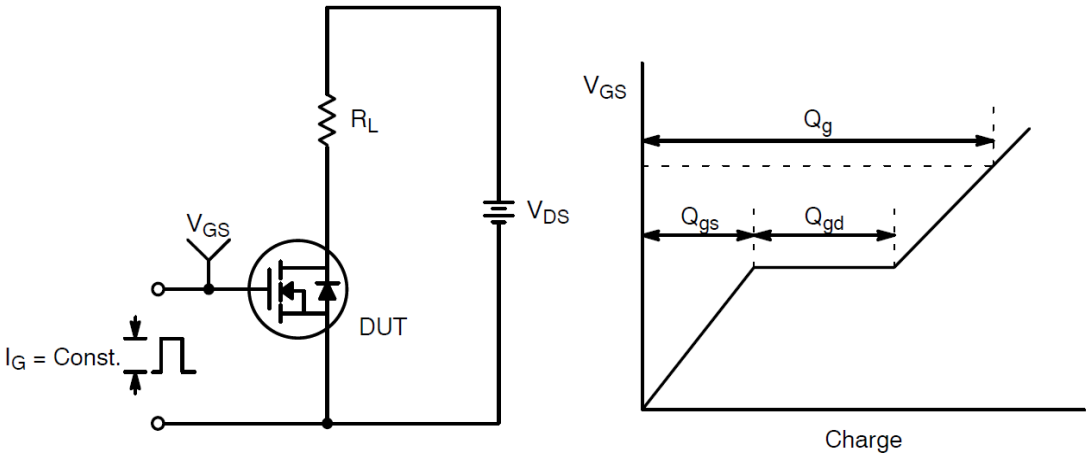


Max. transient thermal impedance

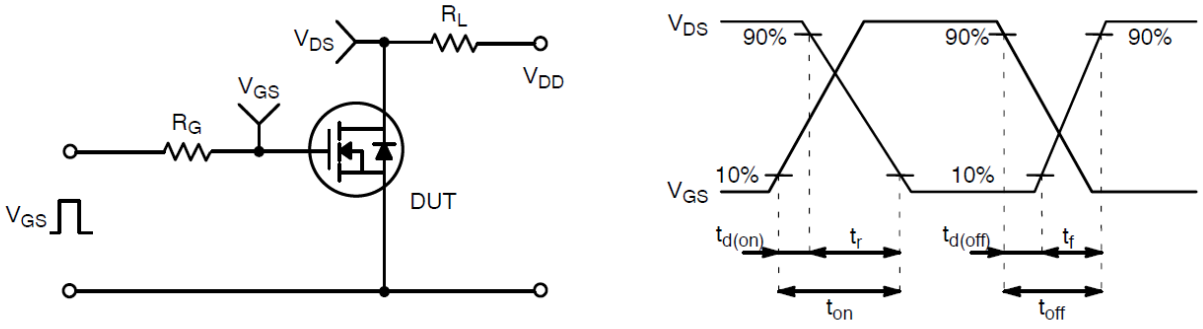
$Z_{thJC}=f(t_p)$



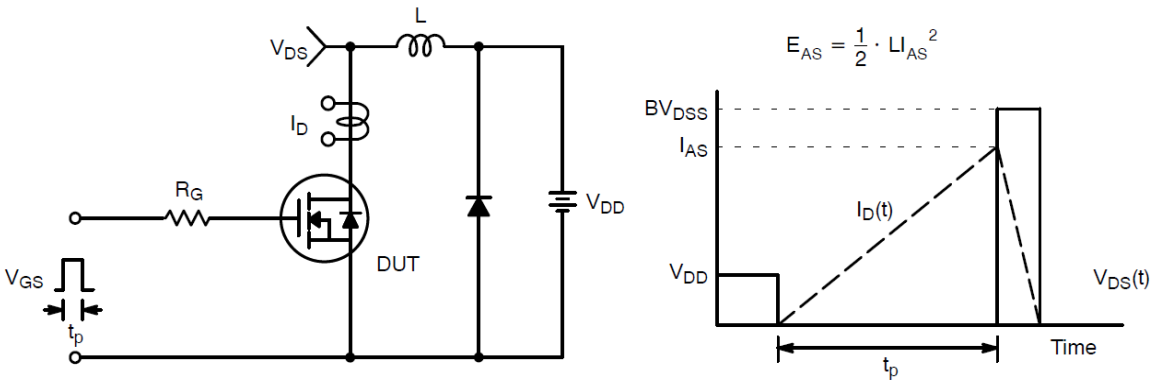
Test Circuit and Waveform:



Gate Charge Test Circuit & Waveform

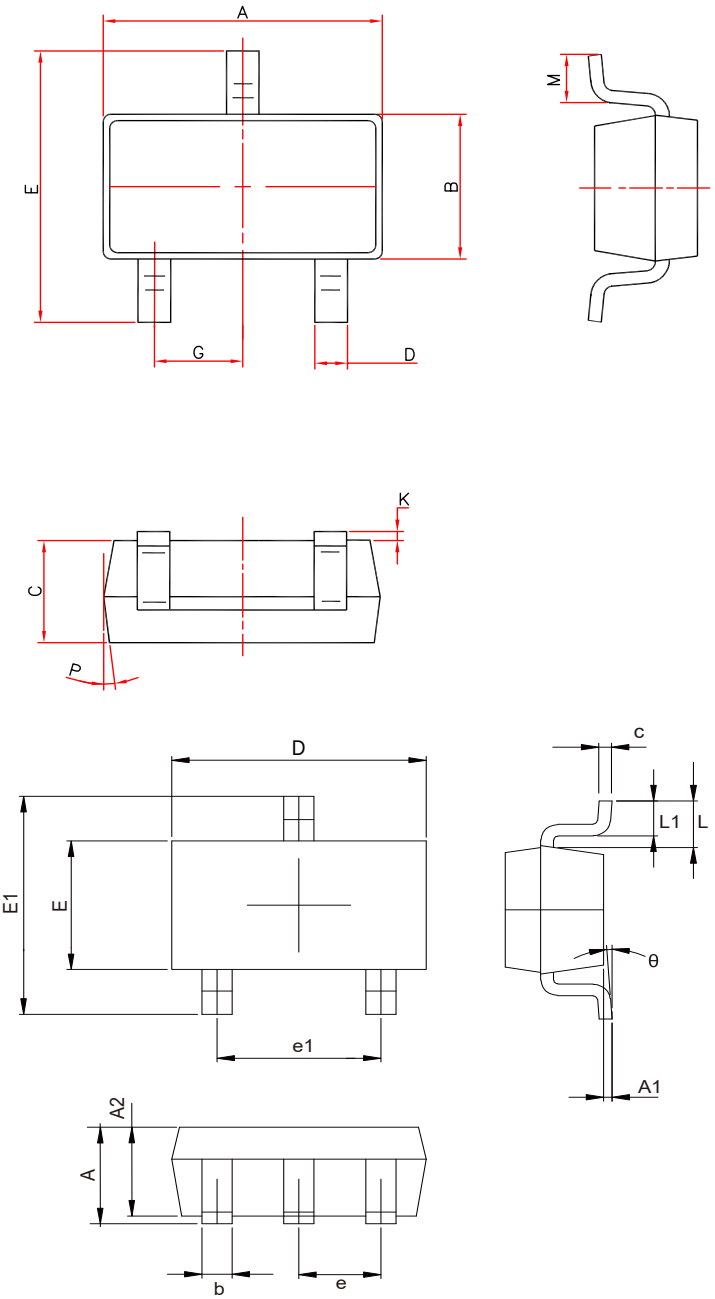


Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

Package Outline Data SOT-23-3



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°

COMMON DIMENSIONS CUNITS MEASURE=MILLIMETER			
SYMBOL			
A	1.050	——	1.300
A1	0.000	——	0.200
b	0.300	0.400	0.500
c	0.100	——	0.200
D	2.820	2.900	3.020
E	1.500	1.600	1.700
E1	2.650	2.800	2.950
e	0.950TYP		
e1	1.800	1.900	2.000
L	0.6REf		
L1	0.300	0.450	0.600
θ	0°	--	8°

Unit:mm

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This document is the first version issued on Dec. 10, 2023. This document replaces all previously provided information.