

● General Description

The AGMS5N50D 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

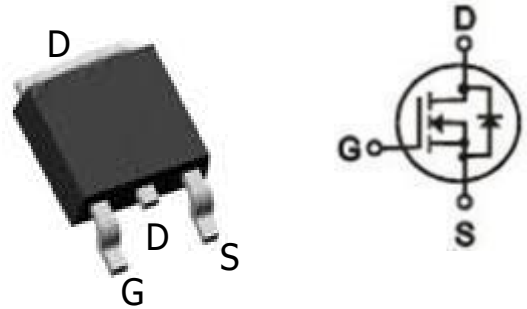
● Application

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

Product Summary

BVDSS	RDSON	ID
500V	1.4Ω	5A

TO-252 Pin Configuration



Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGMS5N50D	AGMS5N50D	TO-252	330mm	16mm	2500

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

Symbol	Parameter	Value	Unit
VDS	Drain-Source Voltage (VGS=0V)	500	V
VGSS	Gate-Source Voltage (VDS=0V)	±30	V
ID	Drain Current-Continuous(Tc=25°C) (Note 1)	5	A
	Drain Current-Continuous(Tc=100°C)	2.6	A
IDM (pluse)	Drain Current-Continuous@ Current-Pulsed (Note 2)	20	A
PD	Maximum Power Dissipation(Tc=25°C)	24.5	w
	Maximum Power Dissipation(Tc=100°C)	12	w
EAS	Avalanche energy (Note 3)	167	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	---	48.2	°C/W
RθJC	Thermal Resistance Junction-Case ¹	---	4.2	°C/W

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BVDSS	Drain-Source Breakdown Voltage	VGS=0V ID=250μA	500	--	--	V
IDSS	Zero Gate Voltage Drain Current	VDS=500V,VGS=0V	--	--	1	μA
IGSSF	Gate-Body Leakage Current	VGS=±30V,VDS=0V	--	--	±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS,ID=250μA	2.4	--	4.0	V
gFS	Forward Transconductance	VDS=40V,ID=2.5A	--	2.9	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=10V, ID=2.5A	--	1.4	1.6	Ω
		VGS=4.5V, ID=2.5A	--	--	--	Ω
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=25V,VGS=0V, F=1MHZ	--	415	--	pF
Coss	Output Capacitance		--	58	--	pF
Crss	Reverse Transfer Capacitance		--	1.4	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	--	--	Ω
Switching Times						
td(on)	Turn-on Delay Time	VGS=10V,VDS=250V, ID=5A,RGEN=25Ω	--	7	--	nS
tr	Turn-on Rise Time		--	22	--	nS
td(off)	Turn-Off Delay Time		--	15	--	nS
tf	Turn-Off Fall Time		--	23	--	nS
Qg	Total Gate Charge	VGS=10V, VDS=400V, ID=5A	--	13	--	nC
Qgs	Gate-Source Charge		--	4.9	--	nC
Qgd	Gate-Drain Charge		--	2.3	--	nC
Source-Drain Diode Characteristics						
ISD	Source-Drain Current(Body Diode)		--	--	5	A
VSD	Forward on Voltage	VGS=0V,IS=5A	--	--	1.2	V
trr	Reverse Recovery Time	IS=5A , di/dt=100A/μs , TJ=25°C	--	289	--	ns
Qrr	Reverse Recovery Charge		--	1.2	--	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

Typical Characteristics

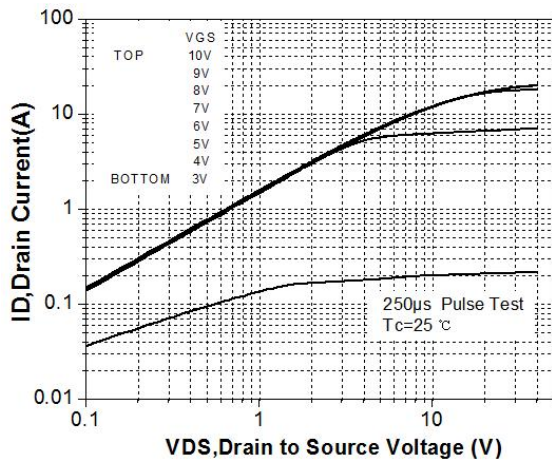


Figure 1. On-Region Characteristics

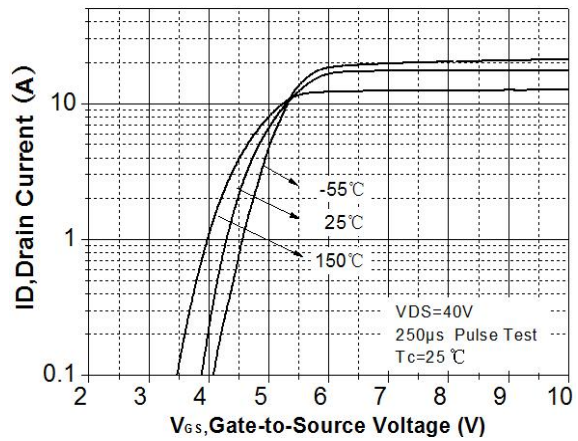


Figure 2. Transfer Characteristics

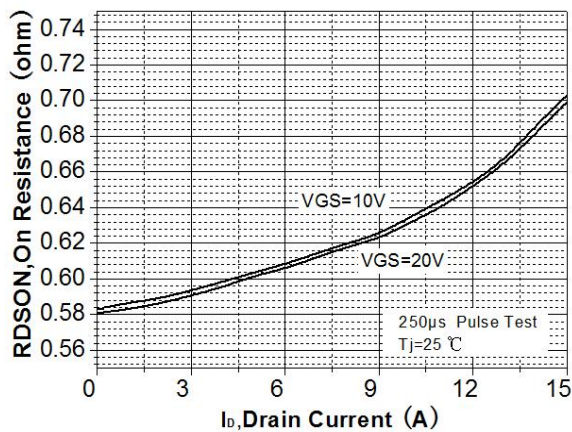


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

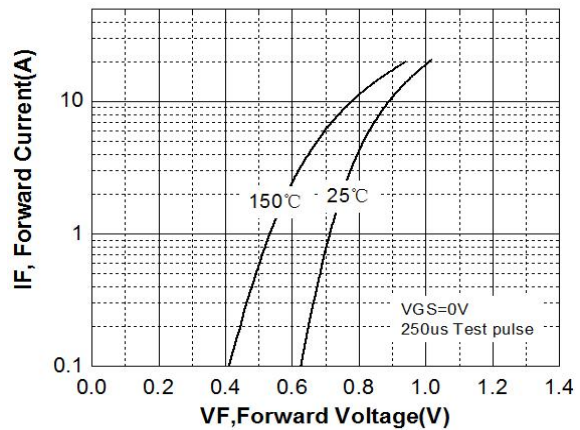


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

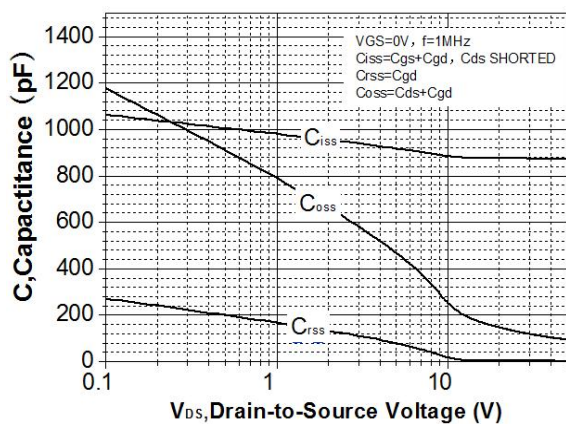


Figure 5. Capacitance Characteristics

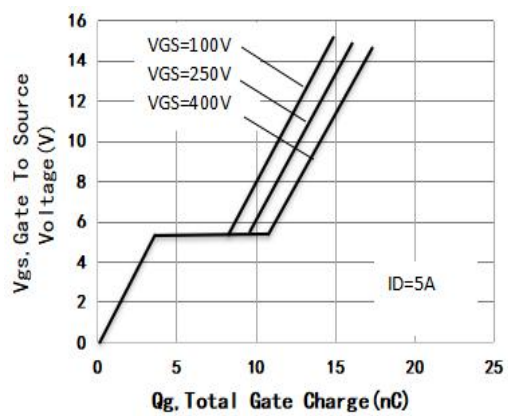


Figure 6. Gate Charge Characteristics

Typical Characteristics (Continued)

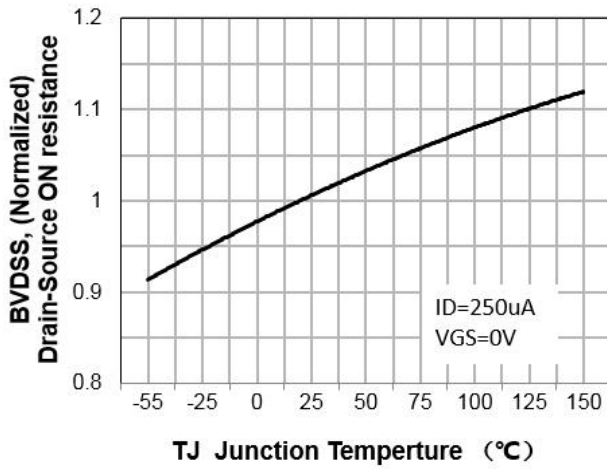


Figure 7. Breakdown Voltage Variation vs Temperature

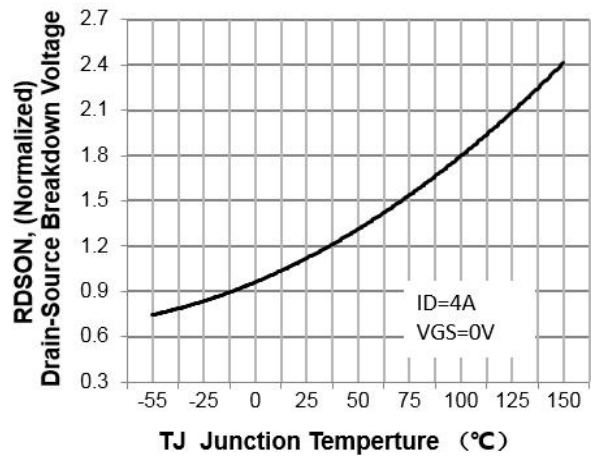


Figure 8. On-Resistance Variation vs Temperature

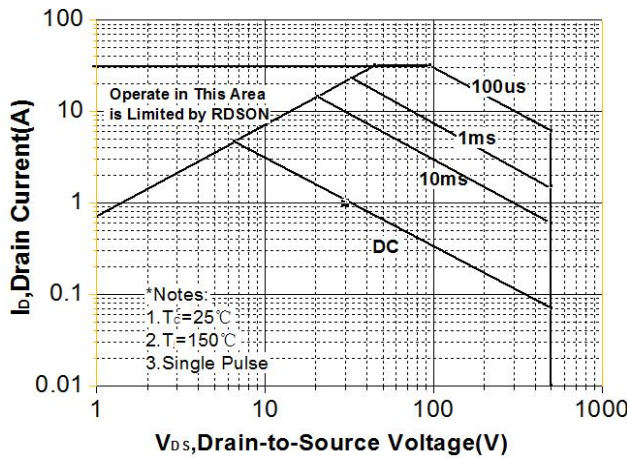


Figure 9. Maximum Safe Operating Area

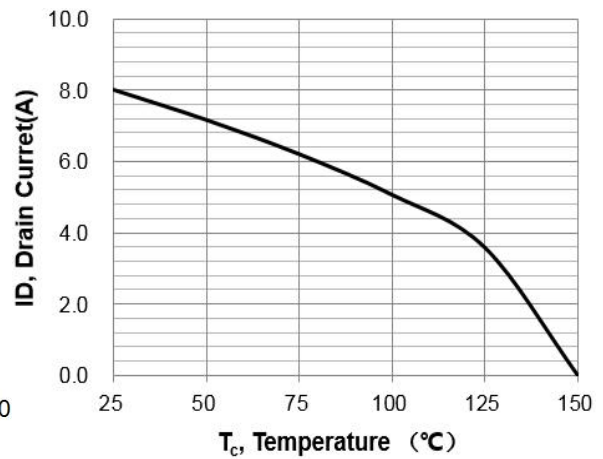


Figure 10. Maximum Drain Current vs Case Temperature

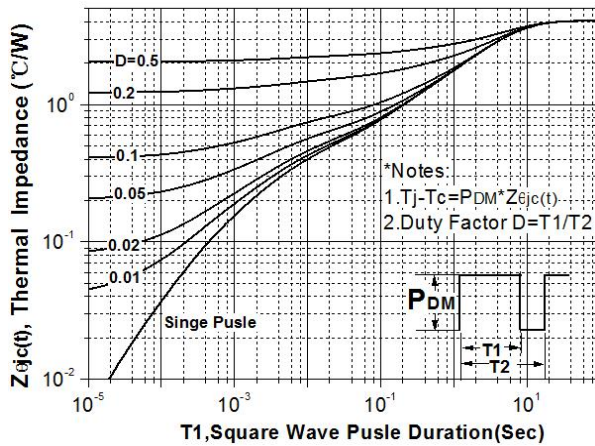
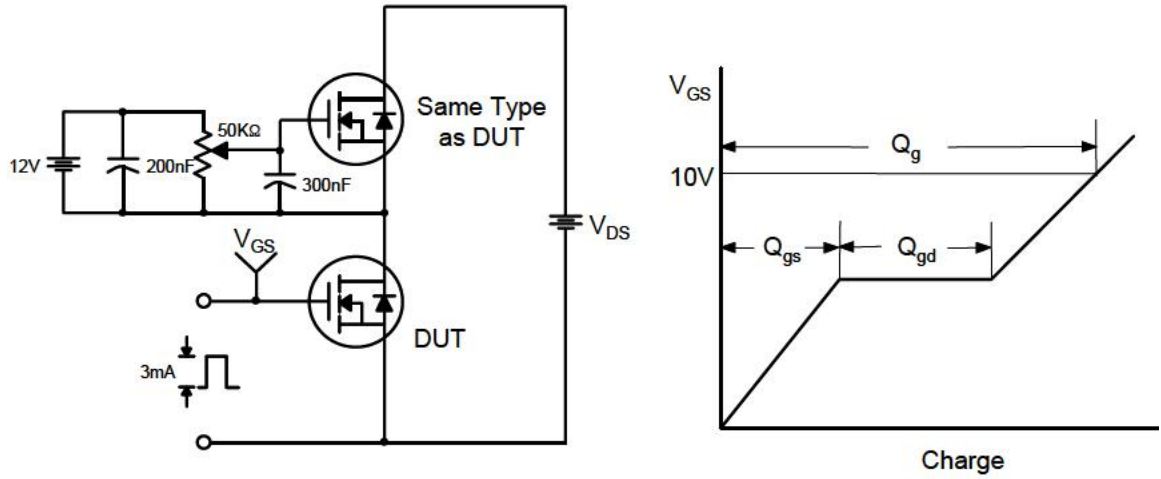
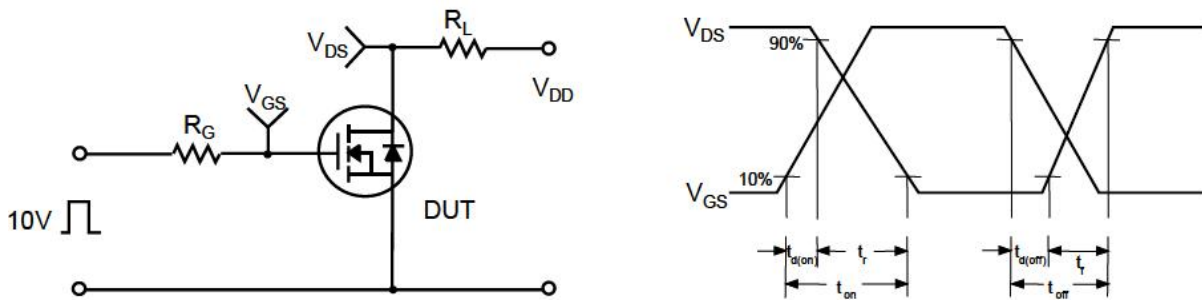


Figure 11. Transient Thermal Response Curve

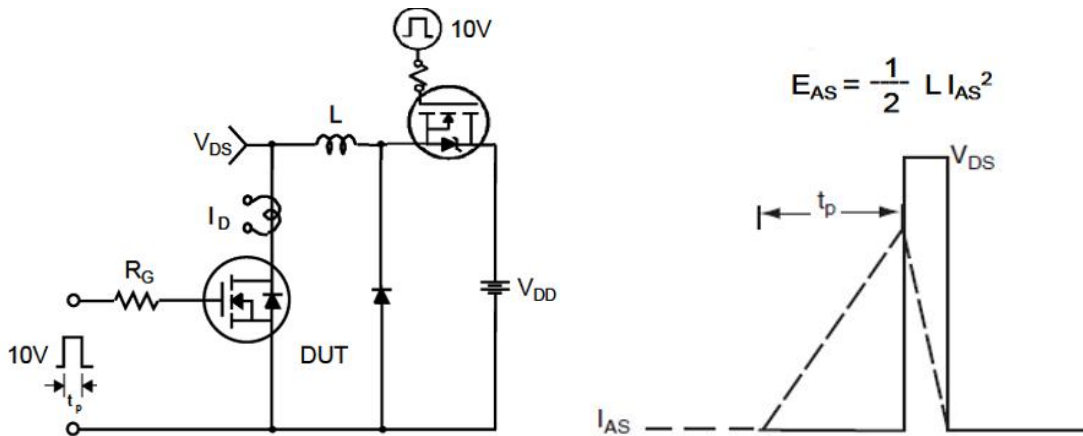
Gate Charge Test Circuit & Waveform



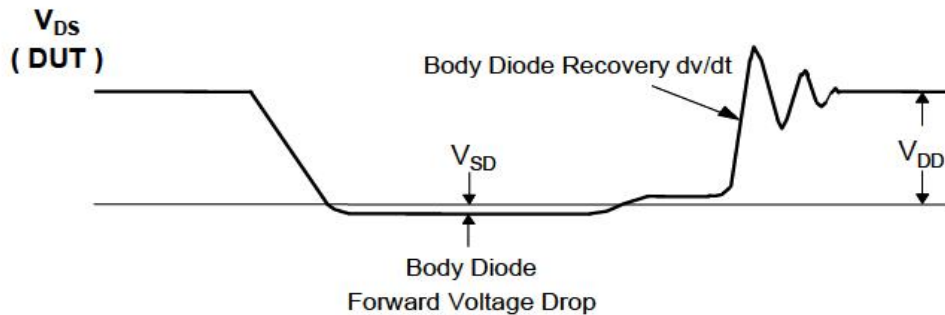
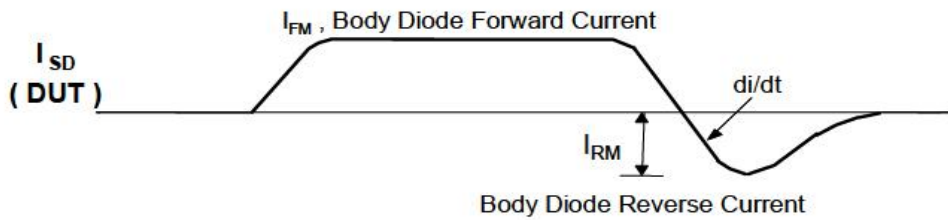
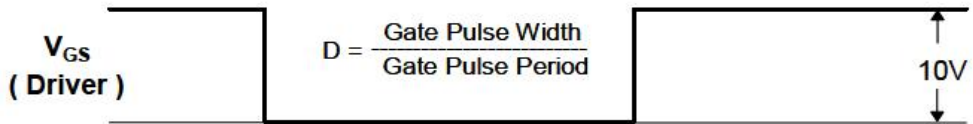
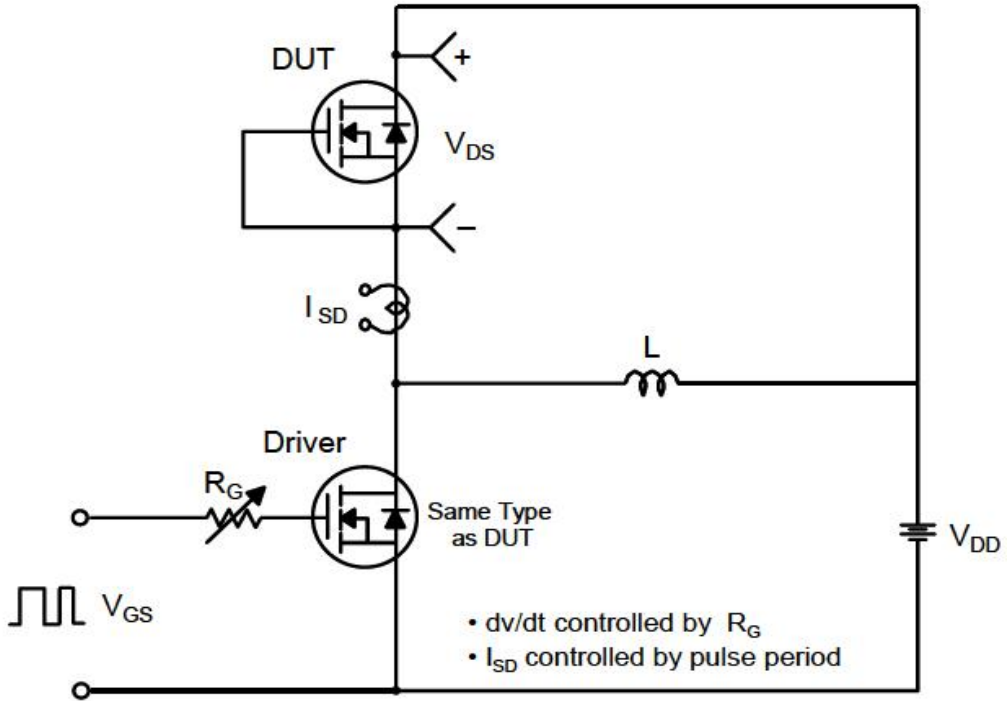
Resistive Switching Test Circuit & Waveforms



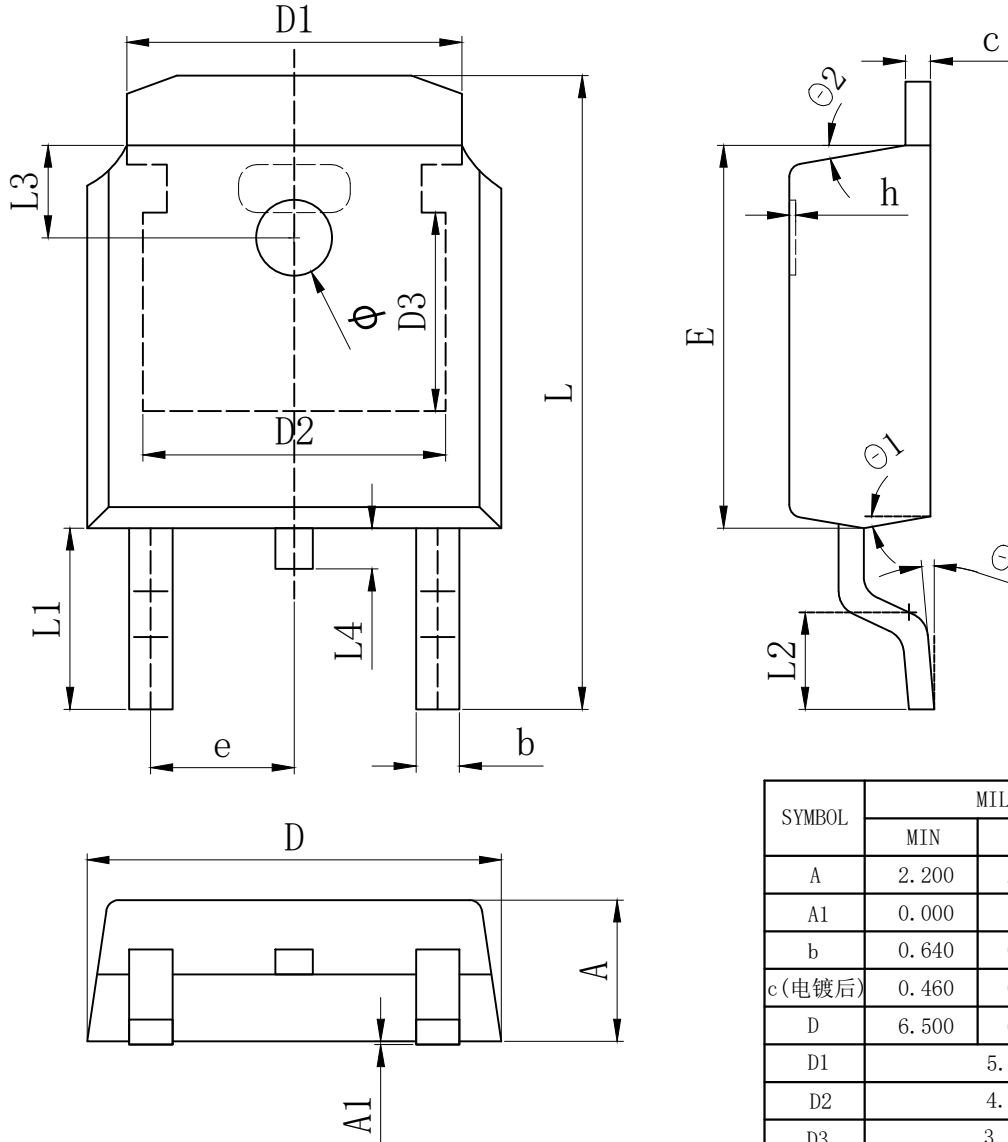
Unclamped Inductive Switching Test Circuit & Waveforms



Peak Diode Recovery dv/dt 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
phi	1.100	1.200	1.300
theta	0°		8°
theta 1	9° TYP		
theta 2	9° TYP		


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Revision History

Revision	Date	Major changes
Ver1.1	2023/4/3	Chang RDSON 10V(max) to 1.6Ω

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