

General Description

The AGM305MD 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

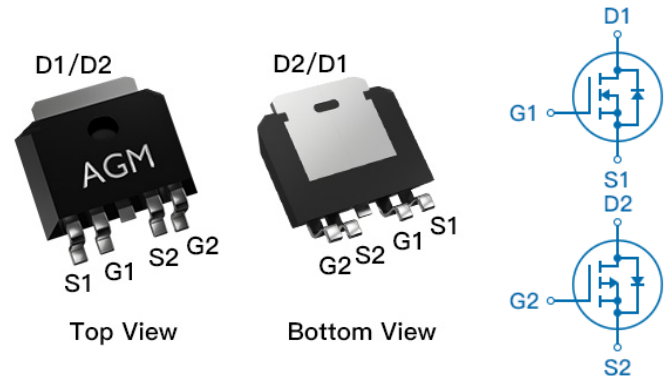
Application

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

Product Summary

BVDSS	RDSON	ID
30V	4.5mΩ	45A
-30V	7.6mΩ	-45A

TO-252-4L Pin Configuration



Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM305MD	AGM305MD	TO-252-4L	330mm	16mm	2500

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

Symbol	Parameter	Rating		Units
		N-Ch	P-Ch	
V _{DS}	Drain-Source Voltage (V _{GS} =0V)	30	-30	V
V _{GS}	Gate-Source Voltage (V _{DS} =0V)	±20	±20	V
I _D	Drain Current-Continuous(TC=25°C) (Note 1)	45	-45	A
	Drain Current-Continuous(TC=100°C)	30	-30	A
IDM (pluse)	Drain Current-Pulsed (Note 2)	180	-180	A
P _D	Total Power Dissipation(TC=25°C)	23	31	W
	Total Power Dissipation(TC=100°C)	9.5	15	W
EAS	Avalanche energy (Note 3)	135	194	mJ
T _J ,TSTG	Operating Junction and Storage Temperature Range	-55 To 150	-55 To 175	°C

Table 2. Thermal Characteristic

Symbol	Parameter	Typ	N-Ch Max	P-Ch Max	Unit
R _{θJA}	Thermal Resistance Junction-ambient (Steady State) ¹	---	75	50	°C/W
R _{θJC}	Thermal Resistance Junction-Case ¹	---	5.4	4.8	°C/W

Table 3. N- Channel Electrical Characteristics (TJ=25℃unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BVDSS	Drain-Source Breakdown Voltage	VGS=0V ID=250μA	30	--	--	V
IDSS	Zero Gate Voltage Drain Current	VDS=30V,VGS=0V	--	--	1	μA
IGSS	Gate-Body Leakage Current	VGS=±20V,VDS=0V	--	--	±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS,ID=250μA	1.2	1.5	2.1	V
gFS	Forward Transconductance	VDS=5V,ID=15A	--	18	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=10V, ID=20A	--	4.5	5.5	mΩ
		VGS=4.5V, ID=15A	--	6.4	8.0	mΩ
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=15V,VGS=0V, F=1MHZ	--	1600	--	pF
Coss	Output Capacitance		--	235	--	pF
Crss	Reverse Transfer Capacitance		--	211	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	1.6	--	Ω
Switching Times						
td(on)	Turn-on Delay Time	VGS=10V,VDS=15V, RL=0.75Ω,RGEN=3Ω	--	8.9	--	nS
tr	Turn-on Rise Time		--	74	--	nS
td(off)	Turn-Off Delay Time		--	17.5	--	nS
tf	Turn-Off Fall Time		--	81	--	nS
Qg	Total Gate Charge	VGS=10V, VDS=15V, ID=20A	--	17	--	nC
Qgs	Gate-Source Charge		--	3.8	--	nC
Qgd	Gate-Drain Charge		--	3.2	--	nC
Source-Drain Diode Characteristics						
ISD	Source-Drain Current(Body Diode)		--	--	45	A
VSD	Forward on Voltage	VGS=0V,IS=20A	--	--	1.2	V
trr	Reverse Recovery Time	IF=20A , dl/dt=100A/μs ,	--	14	--	ns
Qrr	Reverse Recovery Charge	TJ=25℃	--	3.0	--	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=30A, L=0.3mH,RG=25ohm

Table 3. P-Channel Electrical Characteristics (TJ=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BVDSS	Drain-Source Breakdown Voltage	VGS=0V ID=-250μA	-30	--	--	V
IDSS	Zero Gate Voltage Drain Current	VDS=-30V,VGS=0V	--	--	-1	μA
IGSS	Gate-Body Leakage Current	VGS=±20V,VDS=0V	--	--	±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS,ID=-250μA	-1.2	-1.5	-2.2	V
gFS	Forward Transconductance	VDS=-5V,ID=-15A	--	34	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=-10V, ID=-20A	--	7.6	9.0	mΩ
		VGS=-4.5V, ID=-15A	--	11.5	14	mΩ
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=-15V,VGS=0V, F=1MHZ	--	2980	--	pF
Coss	Output Capacitance		--	382	--	pF
Crss	Reverse Transfer Capacitance		--	350	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	4.8	--	Ω
Switching Times						
td(on)	Turn-on Delay Time	VGS=-10V,VDS=-15V, RL=0.75Ω,RGEN=3Ω	--	21	--	nS
tr	Turn-on Rise Time		--	18	--	nS
td(off)	Turn-Off Delay Time		--	26	--	nS
tf	Turn-Off Fall Time		--	8.0	--	nS
Qg	Total Gate Charge	VGS=-10V, VDS=-15V, ID=-20A	--	61	--	nC
Qgs	Gate-Source Charge		--	75	--	nC
Qgd	Gate-Drain Charge		--	15.5	--	nC
Source-Drain Diode Characteristics						
ISD	Source-Drain Current(Body Diode)		--	--	-45	A
VSD	Forward on Voltage	VGS=0V,IS=-20A	--	--	-1.2	V
trr	Reverse Recovery Time	IF=-20A , dI/dt=100A/μs , TJ=25℃	--	15	--	ns
Qrr	Reverse Recovery Charge		--	20	--	nc

Notes 1.The maximum current rating is package limited.

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

3.EAS condition: TJ=25°C, VDD=-15V, Vgs=-10V, ID=-36A, L=0.3mH, RG=25ohm

N-Channel TYPICAL ELECTRICAL AND THERMAL CHARACTERIS

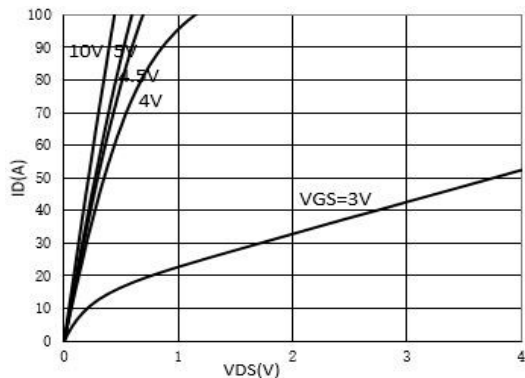


Figure 1: On-Region Characteristics (Note E)

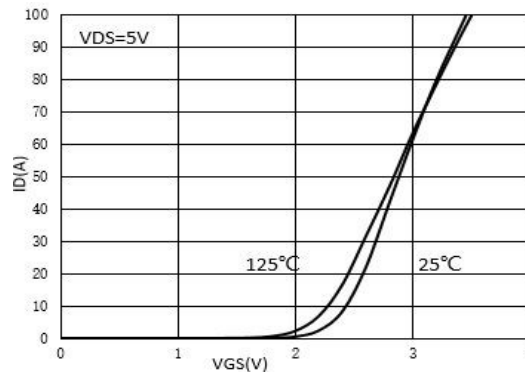


Figure 2: Transfer Characteristics (Note E)

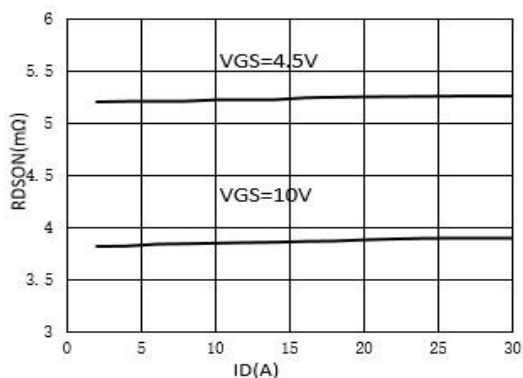


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

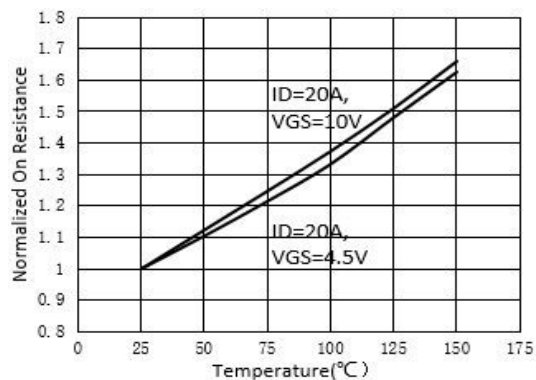


Figure 4: On-Resistance vs. Junction Temperature (Note E)

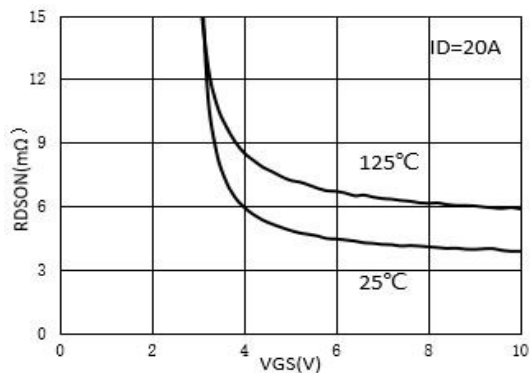


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

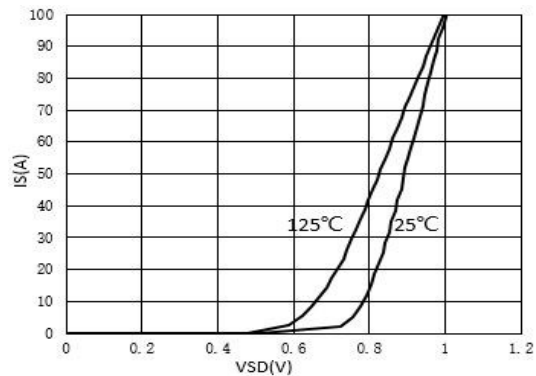


Figure 6: Body-Diode Characteristics (Note E)

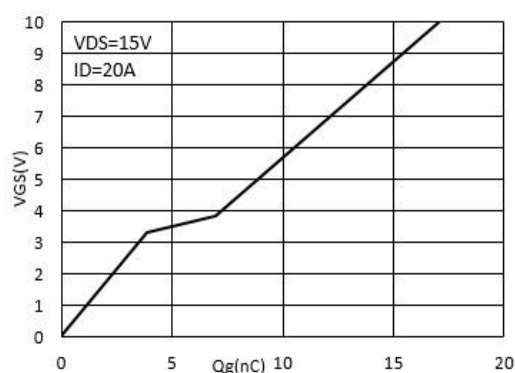


Figure 7: Gate-Charge Characteristics

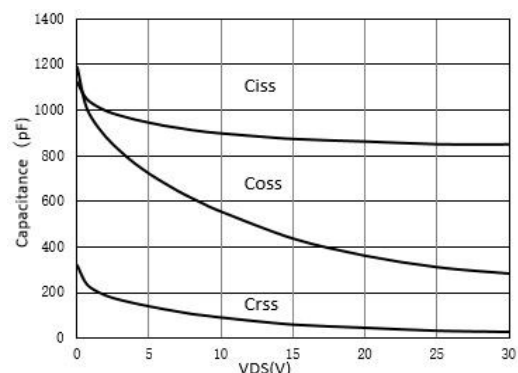


Figure 8: Capacitance Characteristics

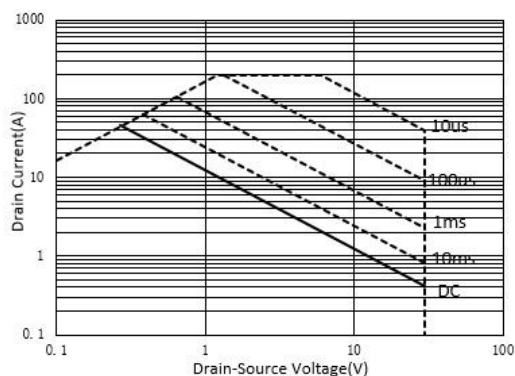
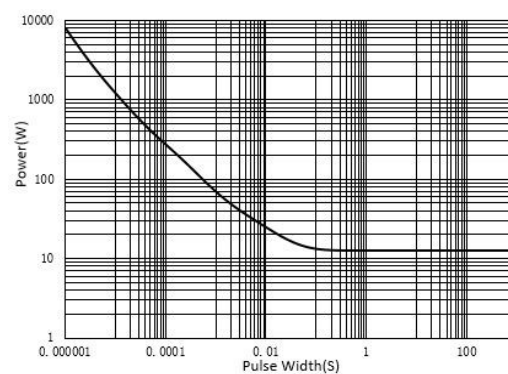
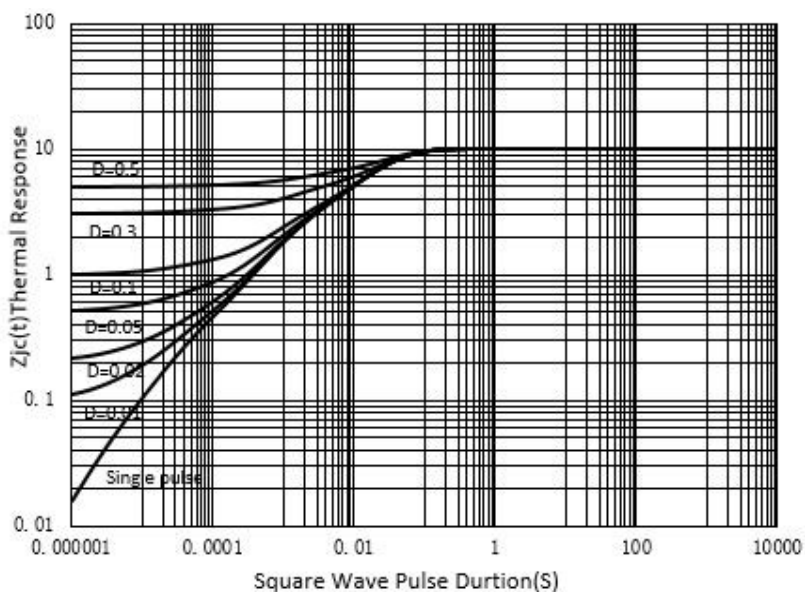
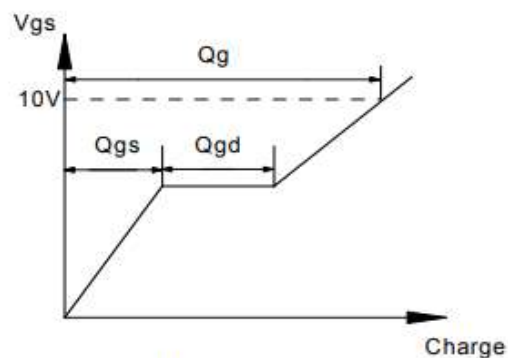
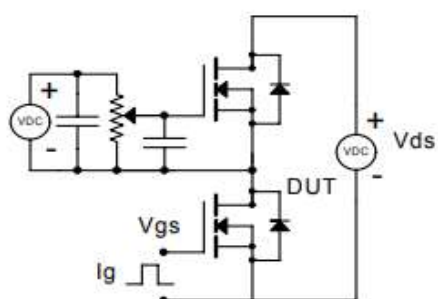
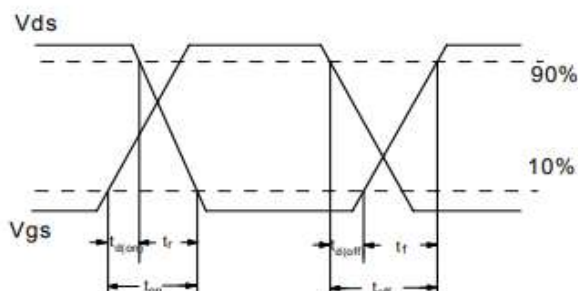
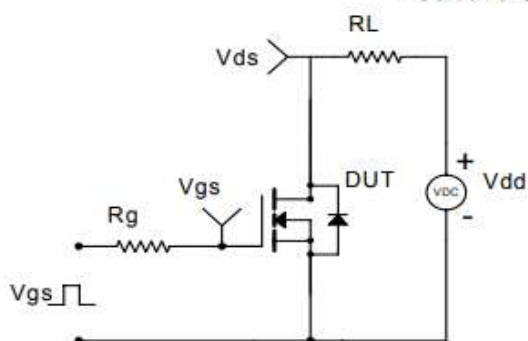

Figure 9: Maximum Forward Biased
Safe Operating Area

Figure 10: Single Pulse Power Rating
Junction-to-Case


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

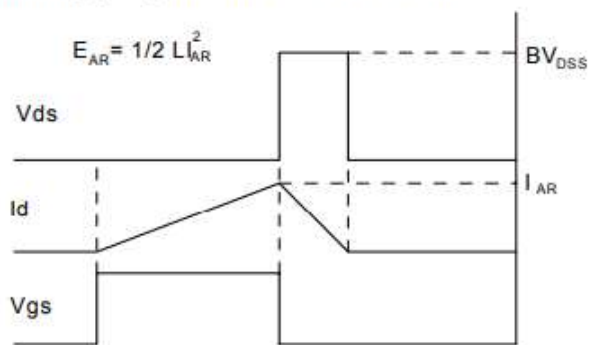
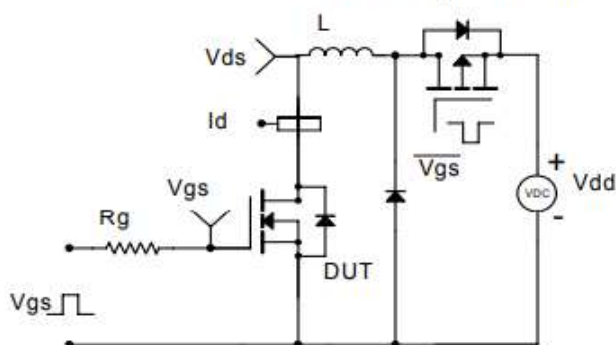
Gate Charge Test Circuit & Waveform



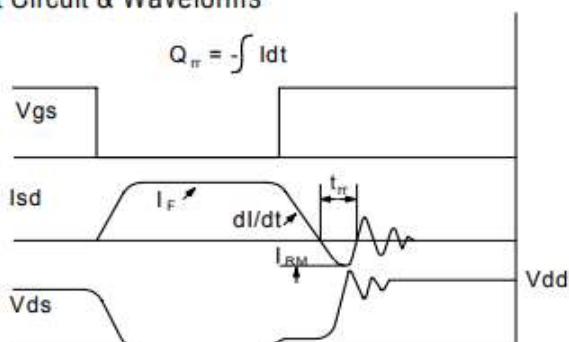
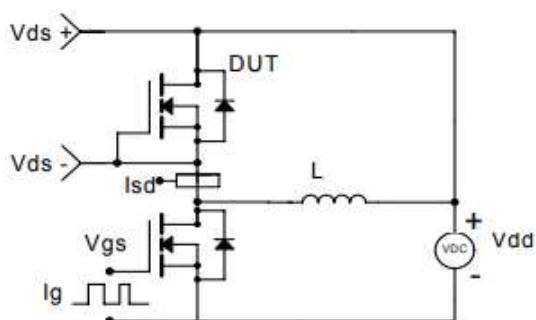
Resistive Switching Test Circuit & Waveforms



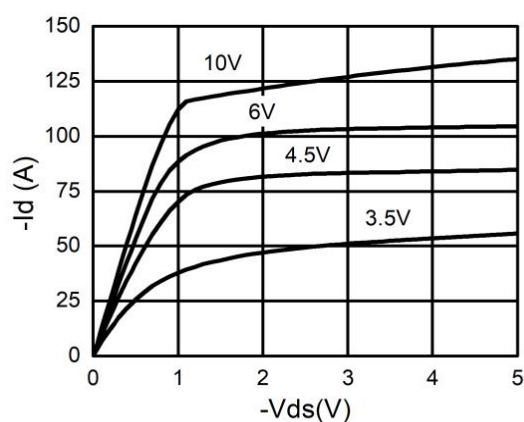
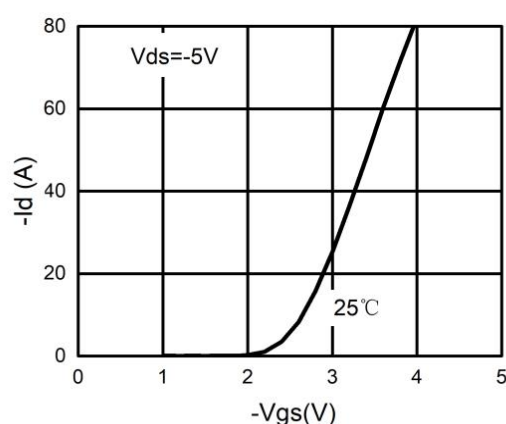
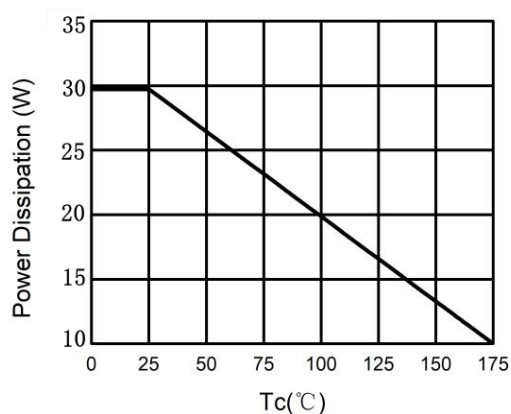
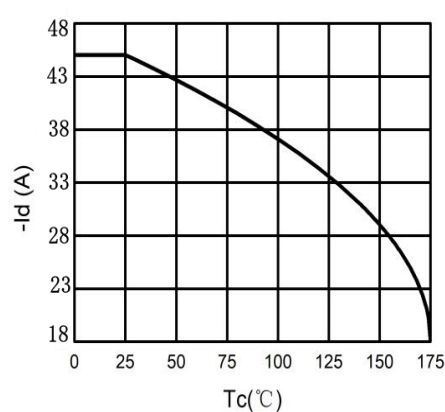
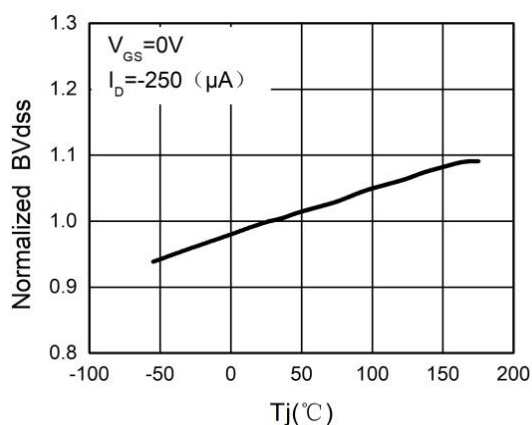
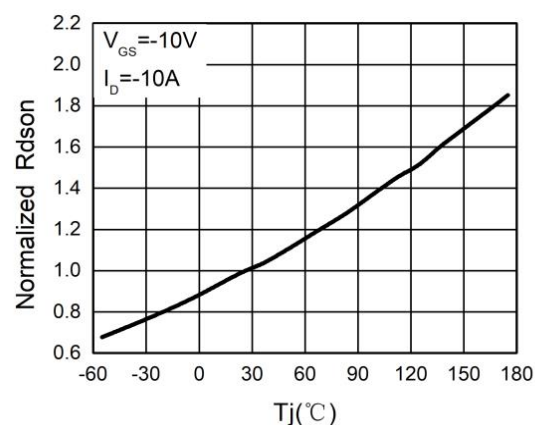
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



P-Channel Typical Electrical And Thermal Characteristics (Curves)

Figure 1. Output Characteristics

Figure 2. Transfer Characteristics

Figure 3. Power Dissipation

Figure 4. Drain Current

Figure 5. BV_{DSS} vs Junction Temperature

Figure 6. $R_{DS(ON)}$ vs Junction Temperature


Typical Electrical And Thermal Characteristics (Curves)

Figure 7. Gate Charge Waveforms

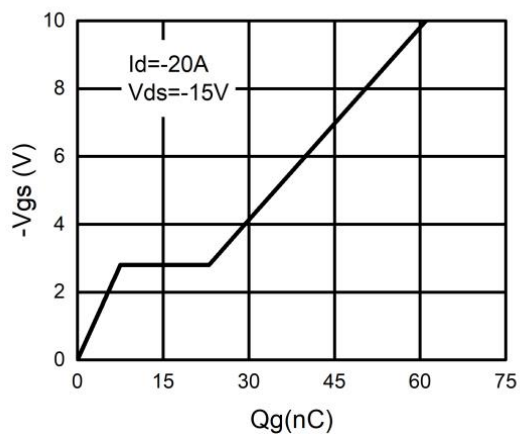


Figure 8. Capacitance

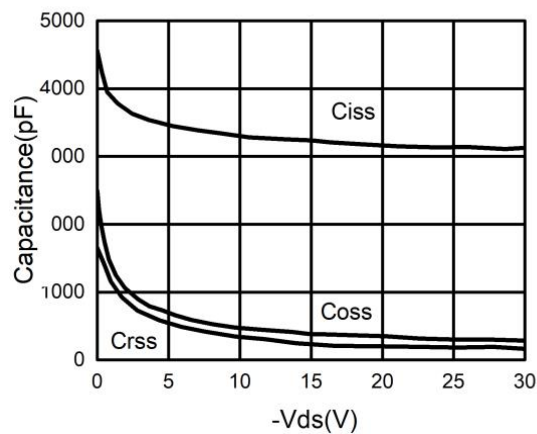


Figure 9. Body-Diode Characteristics

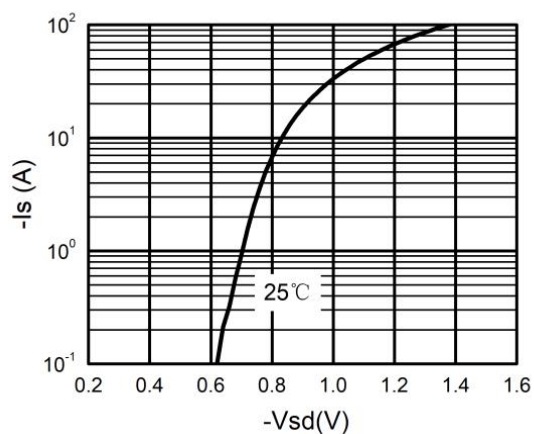
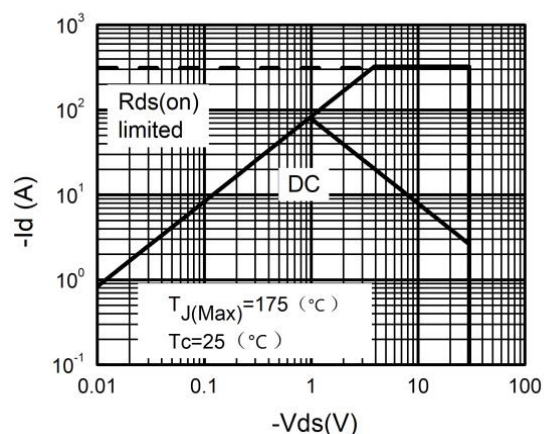
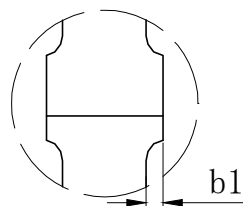
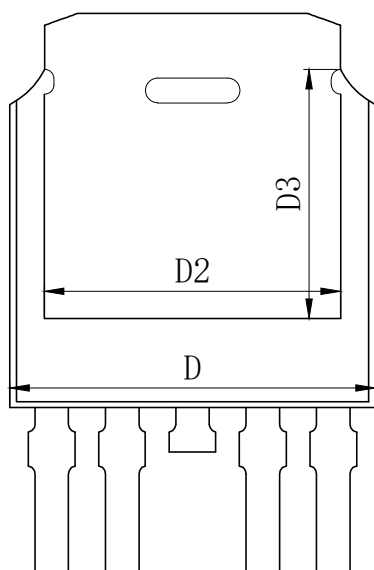
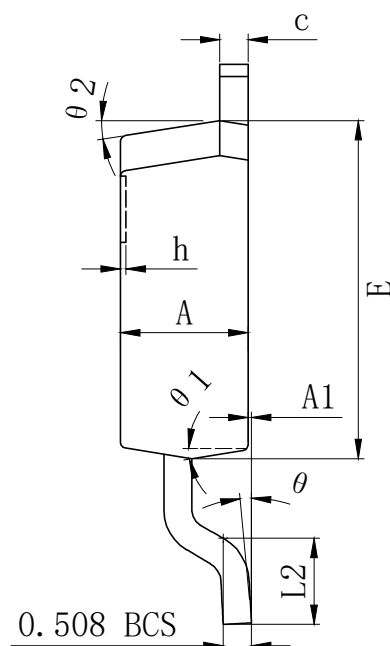
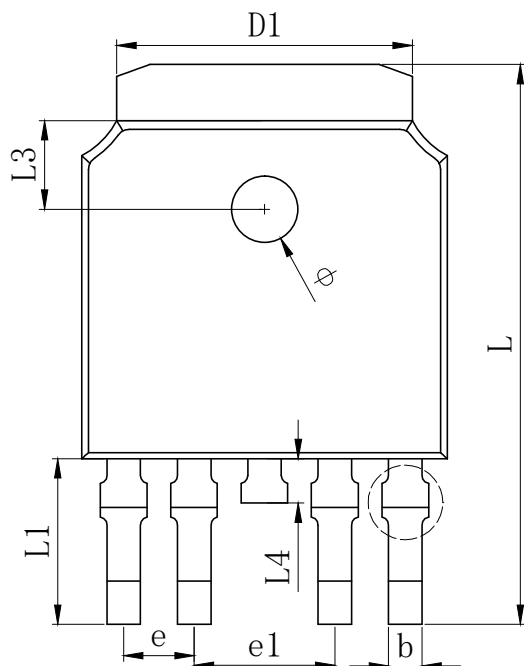


Figure 10. Maximum Safe Operating Area



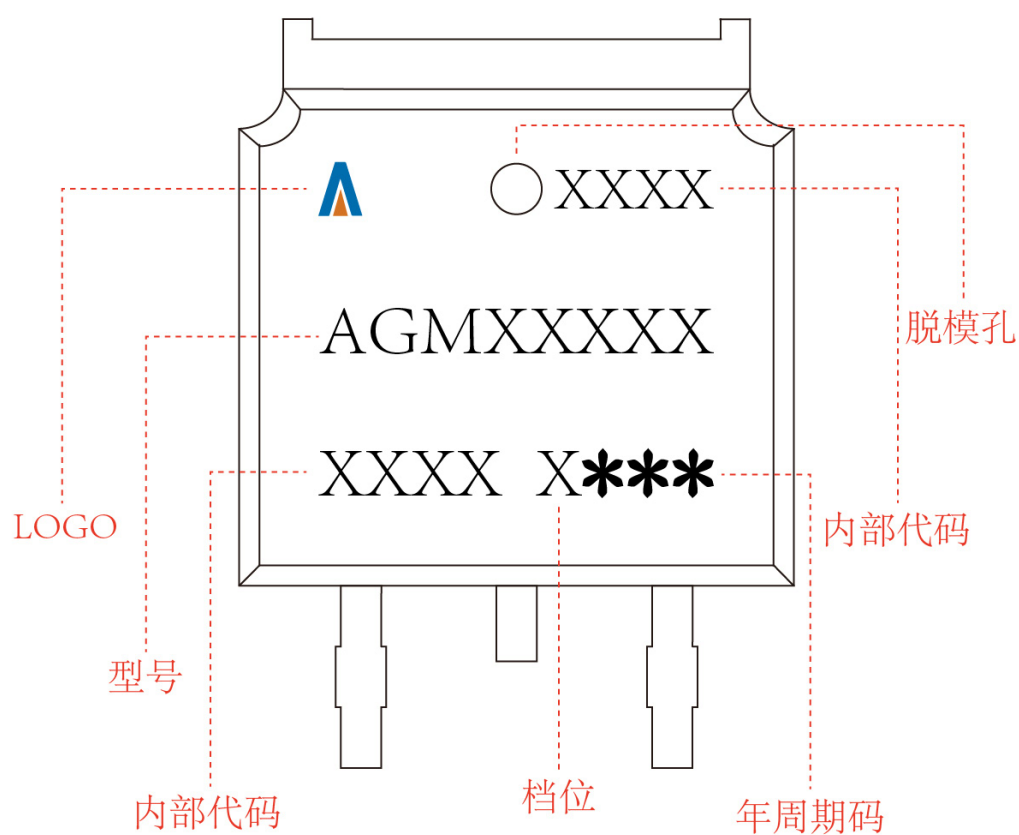
TO-252-4L Package Outline Data



SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	2.200	2.300	2.400
A1	0.000		0.127
b	0.550	0.600	0.650
b1	0.000		0.120
c (电镀后)	0.460	0.520	0.580
D	6.500	6.600	6.700
D1	5.334 REF		
D2	5.346 REF		
D3	4.490 REF		
E	6.000	6.100	6.200
e	1.270 TYP		
e1	2.540 TYP		
h	0.000	0.100	0.200
L	9.900	10.100	10.300
L1	2.988 REF		
L2	1.400	1.550	1.700
L3	1.600 REF		
L4	0.700	0.800	0.900
Φ	1.100	1.200	1.300
θ	0°		8°
θ1	9° TYP		
θ2	9° TYP		

TO-252-4L

Marking Instructions:



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