General Description

The AGM13T15D 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

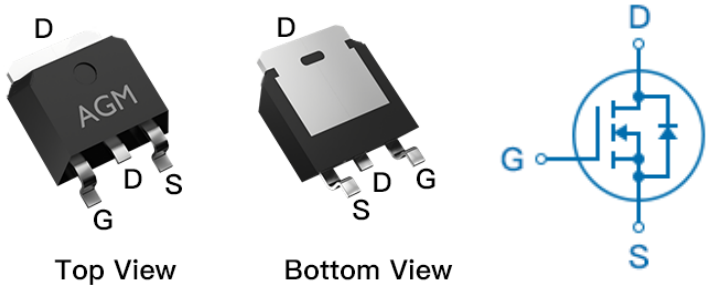
Application

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

Product Summary

BVDSS	RDSON	ID
135V	15.5mΩ	58A

TO-252 Pin Configuration



Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM13T15D	AGM13T15D	TO-252	330mm	16mm	2500

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

Symbol	Parameter	Value	Unit
VDS	Drain-Source Voltage (VGS=0V)	135	V
VGS	Gate-Source Voltage (VDS=0V)	±20	V
ID	Drain Current-Continuous(Tc=25℃) **(Note 1)**	58	A
	Drain Current-Continuous(Tc=100℃)	39	A
IDM (pluse)	Drain Current-Pulsed **(Note 2)**	232	A
PD	Maximum Power Dissipation(Tc=25℃)	120	w
	Maximum Power Dissipation(Tc=100℃)	60	w
EAS	Avalanche energy **(Note 3)**	21	mJ
TJ,TSTG	Operating Junction and Storage Temperature Range	-55 To 175	℃

Table 2. Thermal Characteristic

Symbol	Parameter	Typ	Max	Unit
RθJA	Thermal Resistance Junction-ambient (Steady State)[1]	---	62.5	℃/W
RθJC	Thermal Resistance Junction-Case[1]	---	1.25	℃/W

Table 3. 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	135	147	--	V
IDSS	Zero Gate Voltage Drain Current	VDS=135V,VGS=0V	--	--	1	μA
IGSS	Gate-Body Leakage Current	VGS=±20V,VDS=0V	--	--	±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS,ID=250μA	2	2.8	4	V
gFS	Forward Transconductance	VDS=5V,ID=5A	--	17	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=10V, ID=10A	--	15.5	21	mΩ
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=40V,VGS=0V, F=1MHZ	--	1255	--	pF
Coss	Output Capacitance		--	510	--	pF
Crss	Reverse Transfer Capacitance		--	21	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	2.8	--	Ω
Switching Times						
td(on)	Turn-on Delay Time	VGS=10V,VDS=75V, RGEN=3Ω，RL=7.5Ω	--	10	--	nS
tr	Turn-on Rise Time		--	6.5	--	nS
td(off)	Turn-Off Delay Time		--	16	--	nS
tf	Turn-Off Fall Time		--	7.0	--	nS
Qg	Total Gate Charge	VGS=10V, VDS=75V, ID=20A	--	33	--	nC
Qgs	Gate-Source Charge		--	7.2	--	nC
Qgd	Gate-Drain Charge		--	7.2	--	nC
Source-Drain Diode Characteristics						
ISD	Source-Drain Current(Body Diode)		--	--	58	A
VSD	Forward on Voltage	VGS=0V,IS=20A	--	--	1.2	V
trr	Reverse Recovery Time	IF=20A , dI/dt=100A/μs , TJ=25℃	--	30	--	ns
Qrr	Reverse Recovery Charge		--	135	--	nc

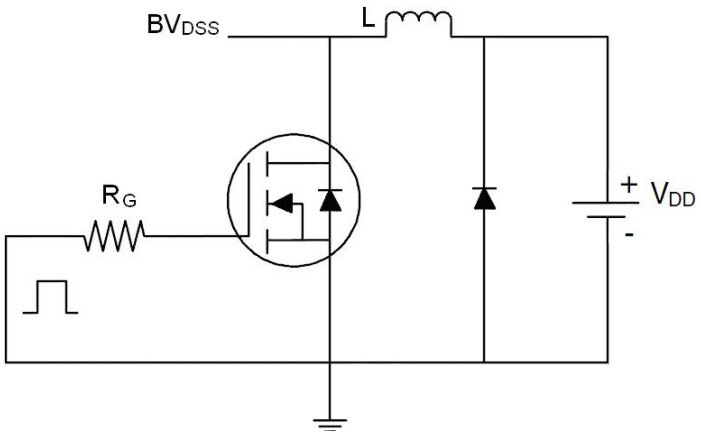
Notes 1.The maximum current rating is package limited.

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

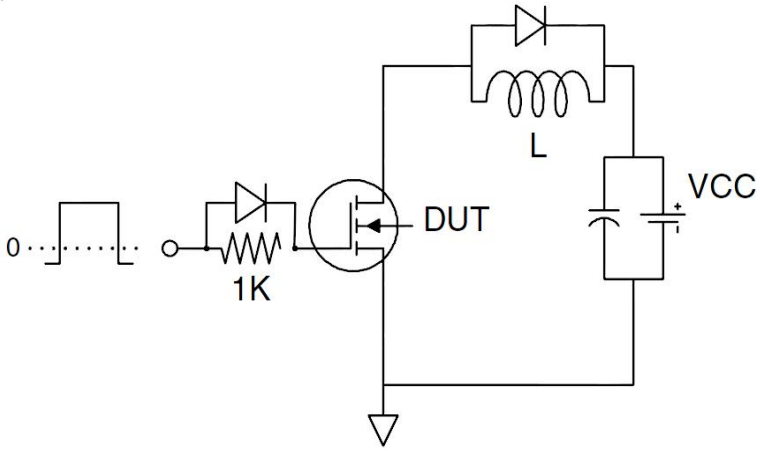
Notes 3.EAS condition: TJ=25℃,VDD=50V,Vgs=10V,ID=20.5A, L=0.1mH,RG=25ohm

Test Circuit

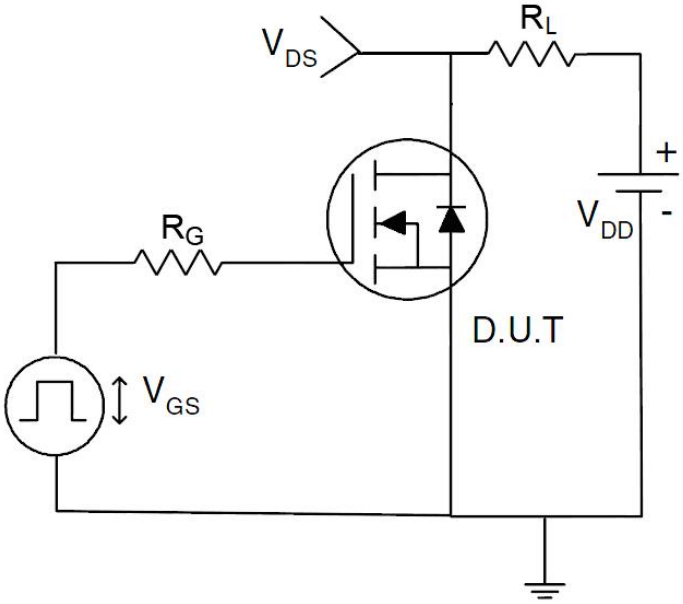
1) E_{AS} test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics

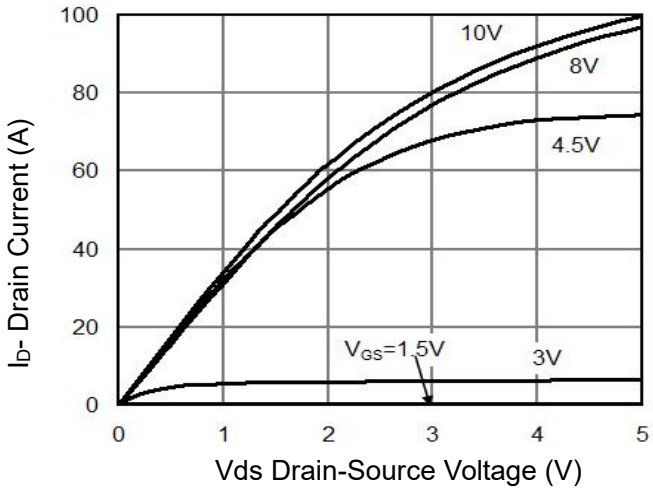


Figure 1 Output Characteristics

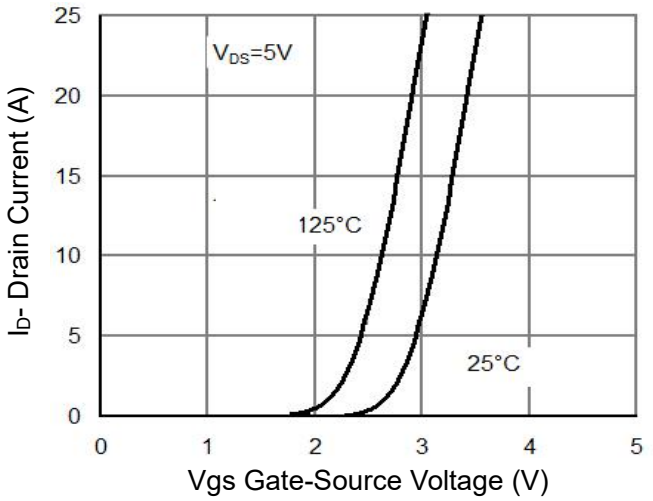


Figure 2 Transfer Characteristics

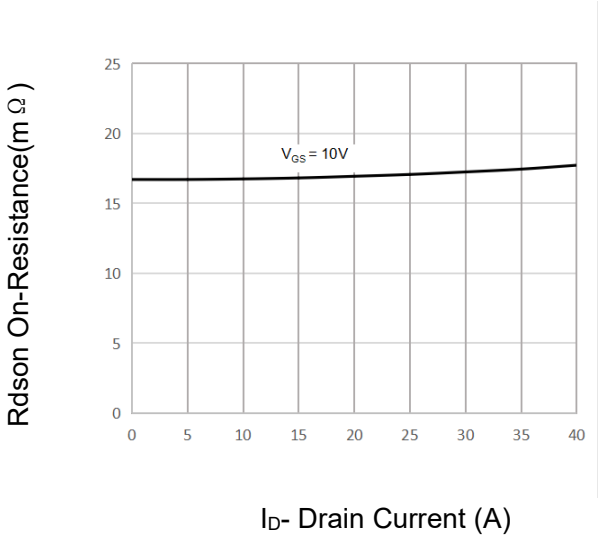


Figure 3 Rdson- Drain Current

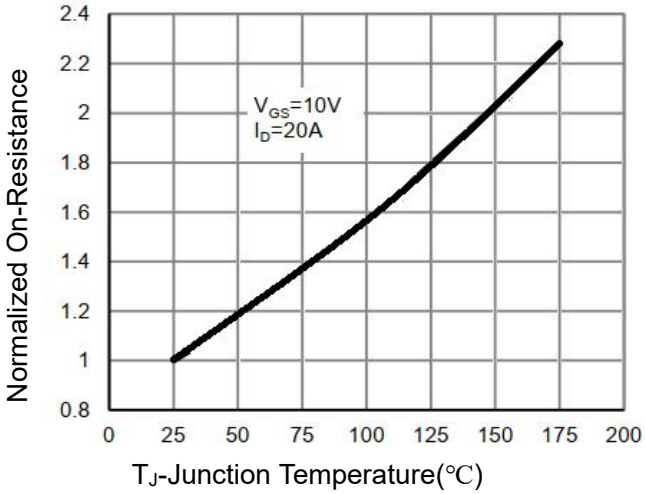


Figure 4 Rdson-Junction Temperature

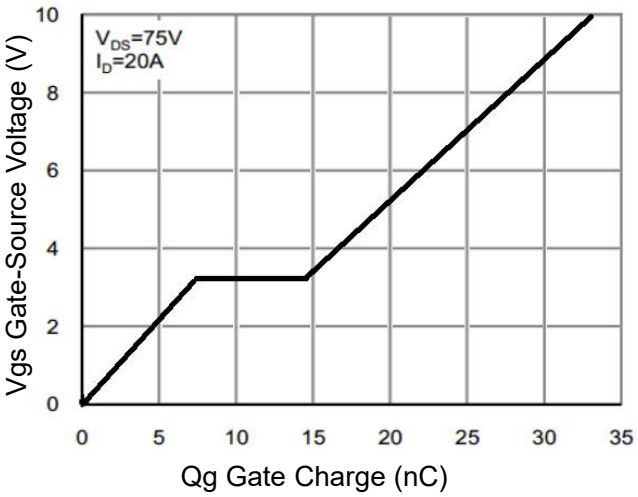


Figure 5 Gate Charge

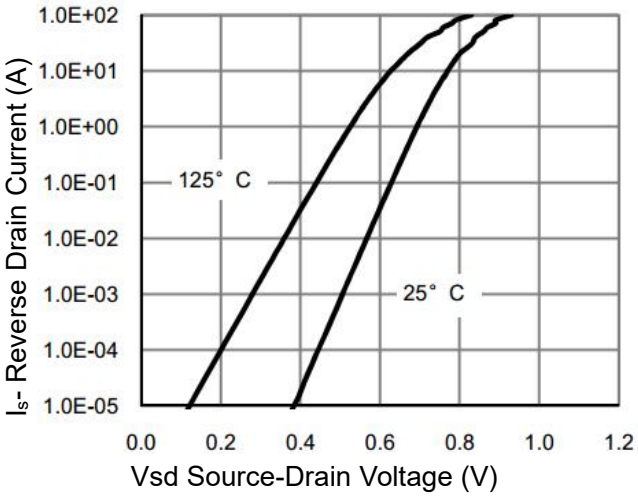


Figure 6 Source- Drain Diode Forward

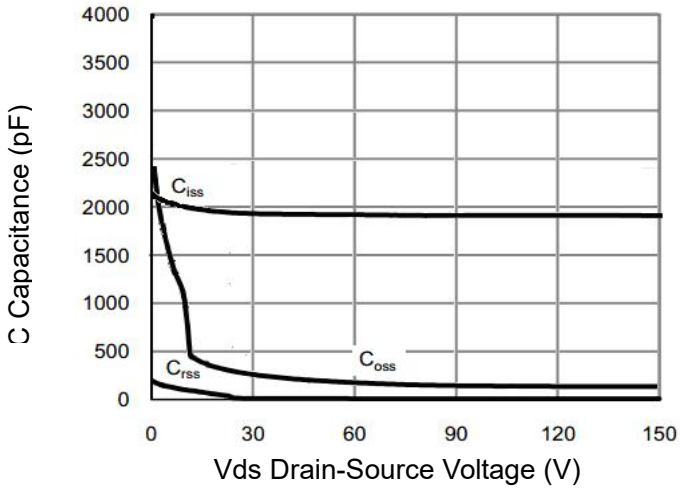


Figure 7 Capacitance vs Vds

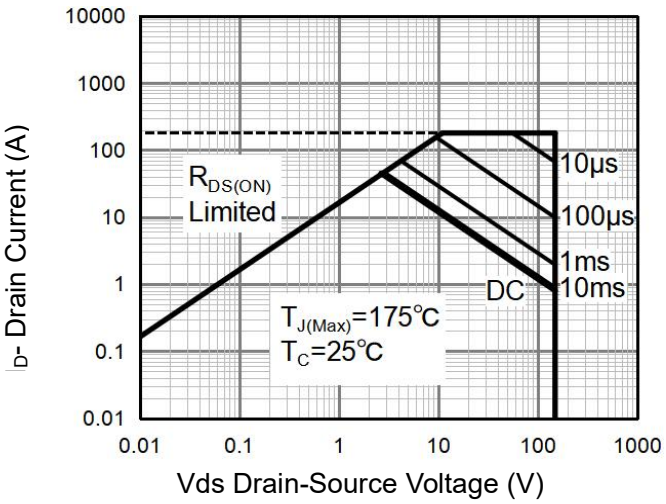
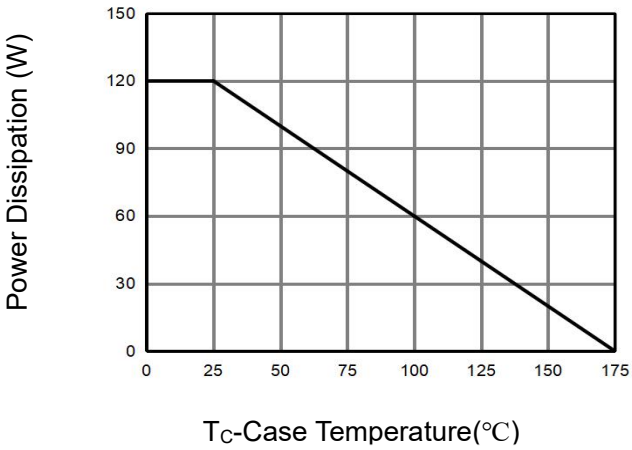


Figure 8 Safe Operation Area (Note3)



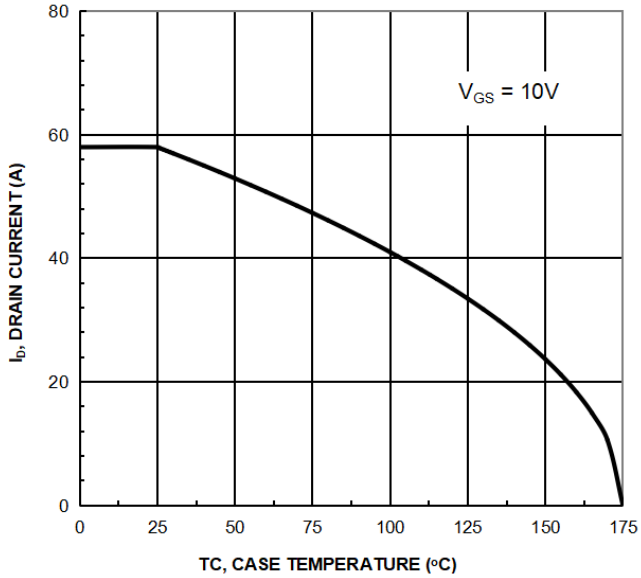


Figure 10 Current De-rating

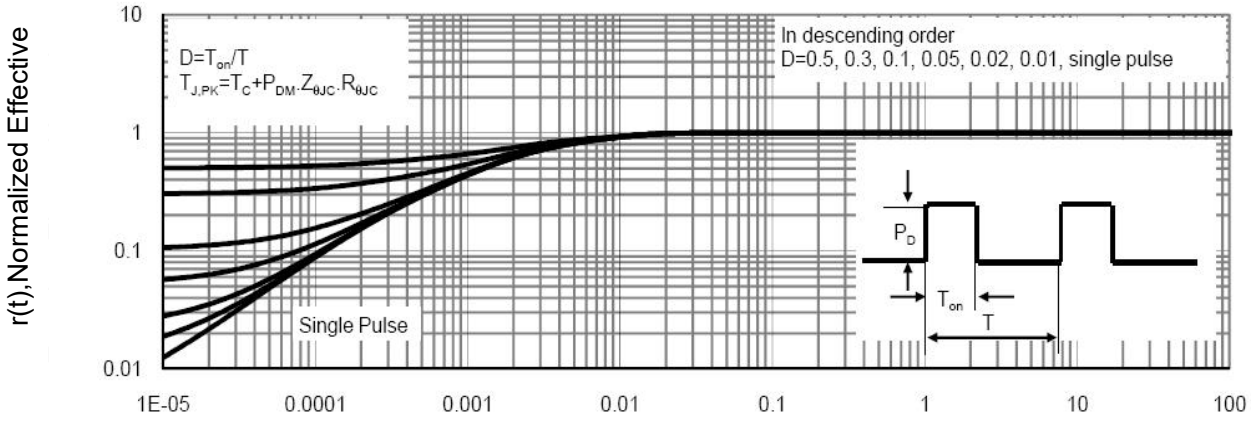
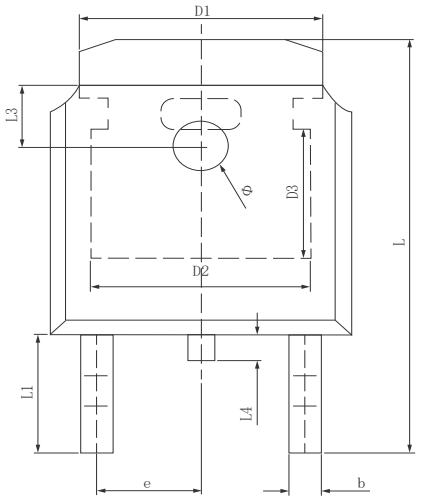
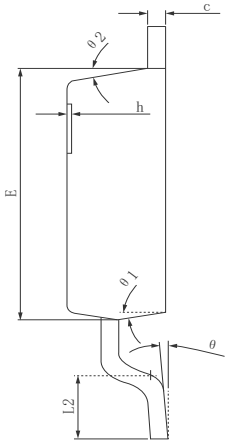


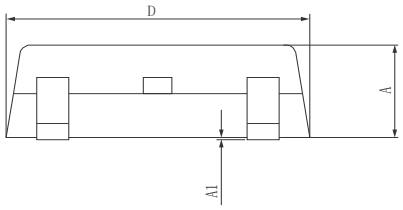
Figure 11 Normalized Maximum Transient Thermal Impedance

●Dimensions（TO-252）

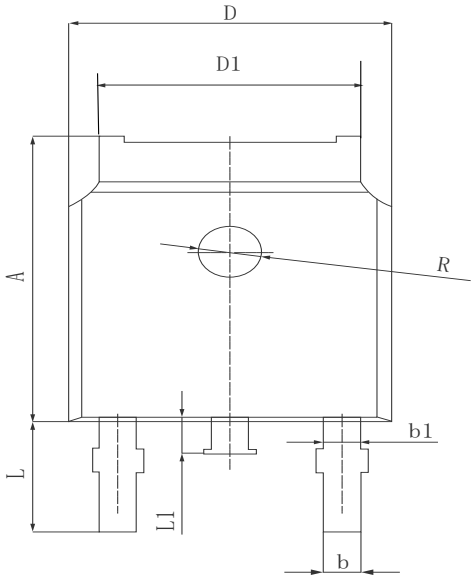


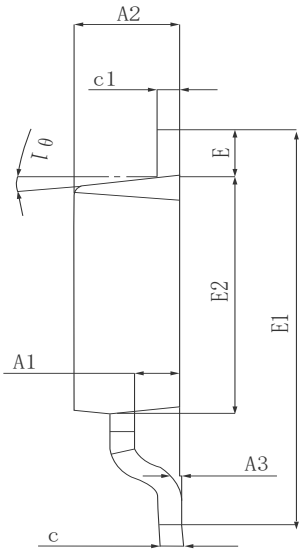


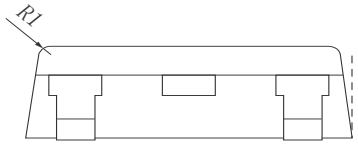
SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	2.200	2.300	2.400
A1	0.000		0.127
b	0.640	0.690	0.740
c(电镀后)	0.460	0.520	0.580
D	6.500	6.600	6.700
D1	5.334 REF		
D2	4.826 REF		
D3	3.166 REF		
E	6.000	6.100	6.200
e	2.286 TYP		
h	0.000	0.100	0.200
L	9.900	10.100	10.300
L1	2.888 REF		
L2	1.400	1.550	1.700
L3	1.600 REF		
L4	0.600	0.800	1.000
Φ	1.100	1.200	1.300
θ	0°		8°
θ1	9° TYP		
θ2	9° TYP		

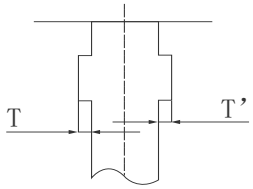


SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	7.050	7.100	7.150
A1	0.960	1.010	1.060
A2	2.250	2.300	2.350
A3	0.000	0.050	0.100
b	0.760REF.		
b1	1.000REF.		
c	0.508REF.		
c1	0.508REF.		
D	6.550	6.600	6.650
D1	5.220	5.320	5.420
E	0.950	1.000	1.050
E1	9.700	9.900	10.100
E2	6.050	6.100	6.150
e	2.286BSC		
e1	4.572REF.		
L	2.650	2.800	2.950
L1	0.700	0.800	0.900
θ1	7° REF.		
R	1.300REF.		
R1	0.250REF.		



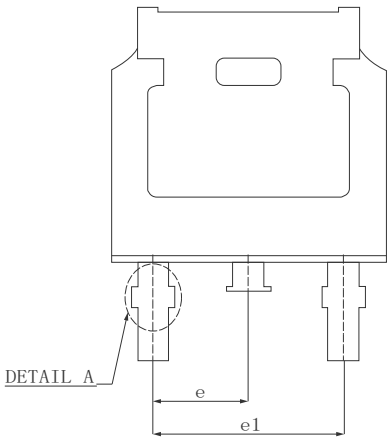




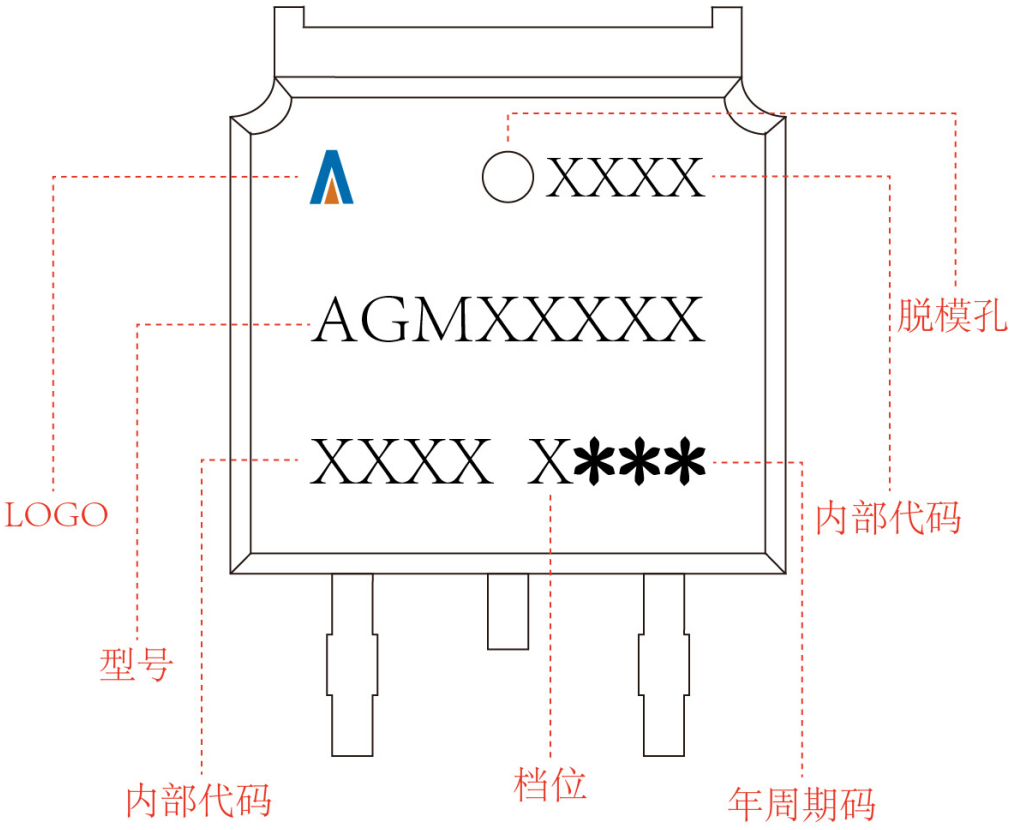


0<=T, T' <=0.12

DETALL A



TO-252
Marking Instructions:



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This document is the second version issued on April 20th, 2024. This document replaces all previously provided information.