

### General Description

The AGM4005LLM1 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

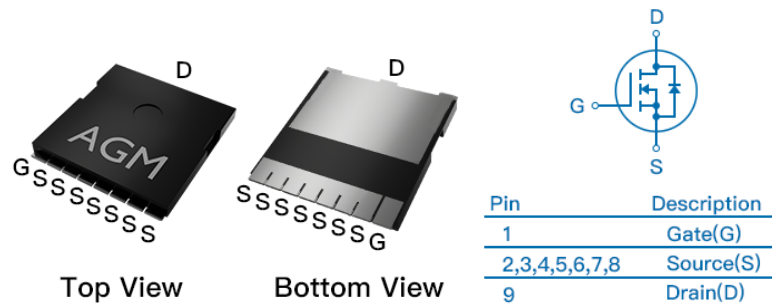
### Application

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

### Product Summary

BVDSS	RDSON	ID
40V	0.92mΩ	330A

### TOLL Pin Configuration



### Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM4005LL	AGM4005LLM1	TOLL	330mm	25mm	2000

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

Symbol	Parameter	Value	Unit
VDS	Drain-Source Voltage (VGS=0V)	40	V
VGS	Gate-Source Voltage (VDS=0V)	±20	V
ID	Drain Current-Continuous(Tc=25°C) (Note 1)	330	A
	Drain Current-Continuous(Tc=100°C)	231	A
IDM (pluse)	Drain Current-Pulsed (Note 2)	1280	A
PD	Maximum Power Dissipation(Tc=25°C)	365	w
	Maximum Power Dissipation(Tc=100°C)	183	w
EAS	Avalanche energy (Note 3)	930	mJ
TJ,TSTG	Operating Junction and Storage Temperature Range	-55 To 175	°C

Table 2. Thermal Characteristic

Symbol	Parameter	Typ	Max	Unit
RθJA	Thermal Resistance Junction-ambient (Steady State) <sup>1</sup>	---	43	°C/W
RθJC	Thermal Resistance Junction-Case <sup>1</sup>	---	0.41	°C/W

**Table 3. Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>On/Off States</b>						
BVDSS	Drain-Source Breakdown Voltage	VGS=0V ID=250μA	40	--	--	V
IDSS	Zero Gate Voltage Drain Current	VDS=40V,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	1.8	2.2	V
gFS	Forward Transconductance	VDS=5V,ID=20A	--	49	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=10V, ID=40A	--	0.92	1.25	mΩ
		VGS=4.5V, ID=20A	--	1.35	1.8	mΩ
<b>Dynamic Characteristics</b>						
Ciss	Input Capacitance	VDS=20V,VGS=0V, F=1MHZ	--	6200	--	pF
Coss	Output Capacitance		--	1596	--	pF
Crss	Reverse Transfer Capacitance		--	630	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHZ	--	3.3	--	Ω
<b>Switching Times</b>						
td(on)	Turn-on Delay Time	VGS=10V,VDS=20V ID=40A, RGEN=3Ω	--	11	--	nS
tr	Turn-on Rise Time		--	75	--	nS
td(off)	Turn-Off Delay Time		--	139	--	nS
tf	Turn-Off Fall Time		--	78	--	nS
Qg	Total Gate Charge	VGS=10V, VDS=20V, ID=40A	--	65	--	nC
Qgs	Gate-Source Charge		--	26	--	nC
Qgd	Gate-Drain Charge		--	23	--	nC
<b>Source-Drain Diode Characteristics</b>						
ISD	Source-Drain Current(Body Diode)		--	--	330	A
VSD	Forward on Voltage	VGS=0V,IS=20A	--	--	1.2	V
trr	Reverse Recovery Time	IF=20A , dI/dt=100A/μs , TJ=25°C	--	49	--	ns
Qrr	Reverse Recovery Charge		--	39	--	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<sub>J</sub>=25°C,VDD=25V,Vgs=10V,ID=61A,L=0.5mH,RG=25ohm

Typical Characteristics

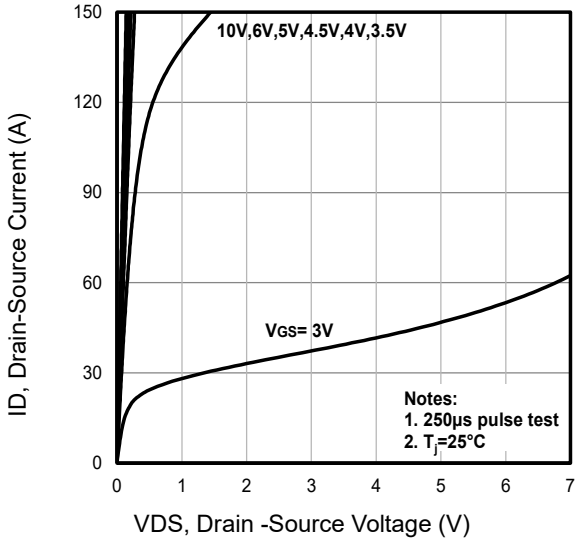


Fig1. Typical Output Characteristics

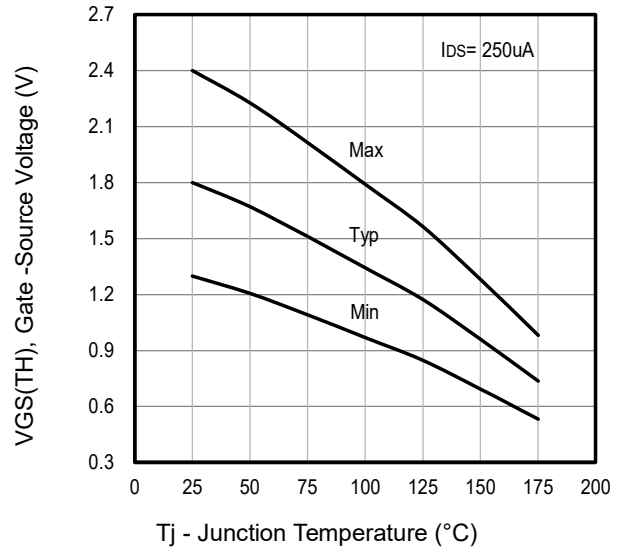


Fig2. VGS(TH) Gate-Source Voltage Vs. Tj

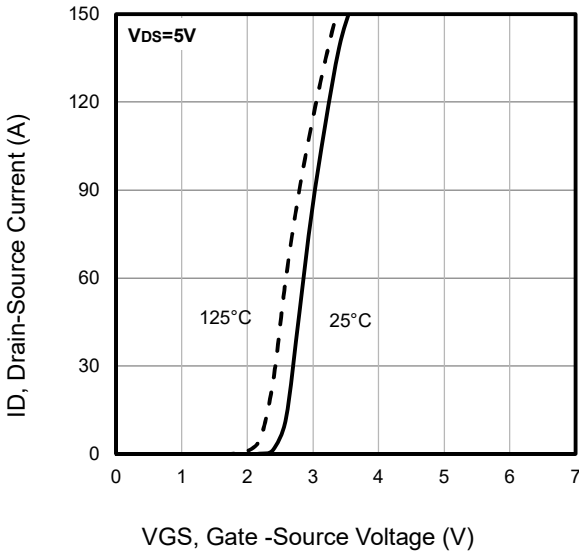


Fig3. Typical Transfer Characteristics

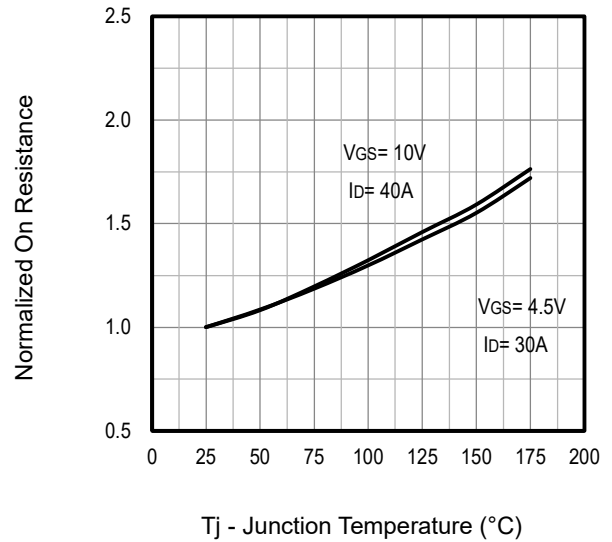


Fig4. Typical Normalized On-Resistance Vs. Tj

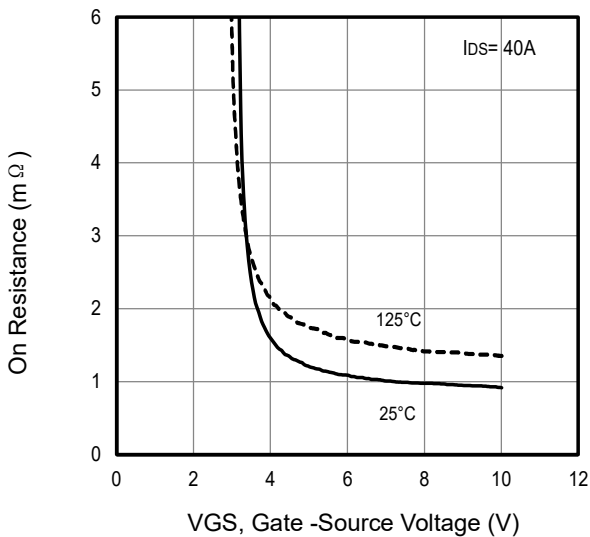


Fig5. Typical On Resistance Vs Gate-Source Voltage

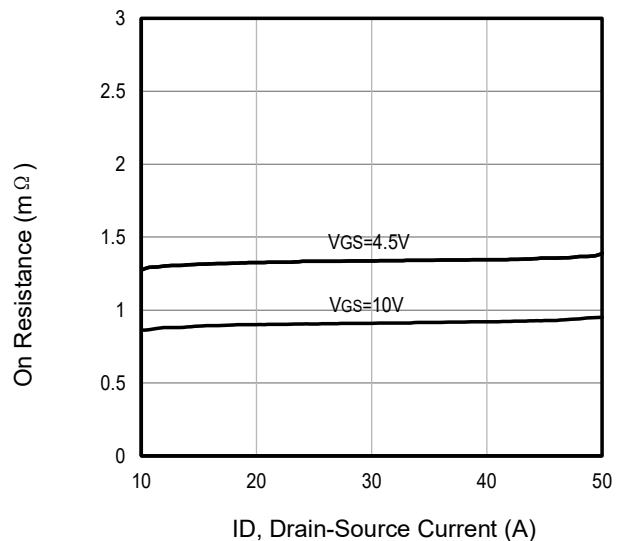


Fig6. Typical On Resistance Vs Drain Current

Typical Characteristics

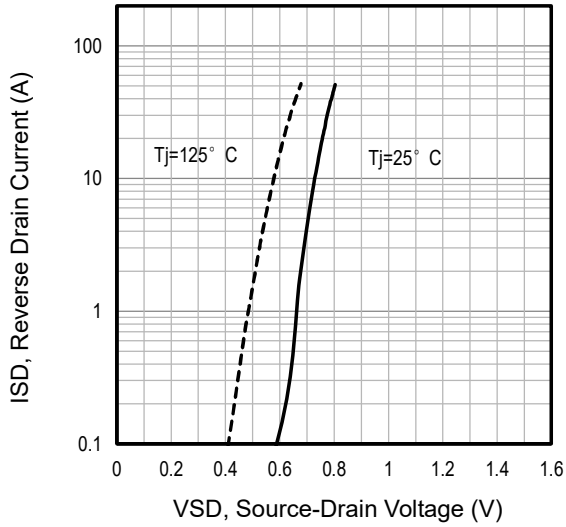


Fig7. Typical Source-Drain Diode Forward Voltage

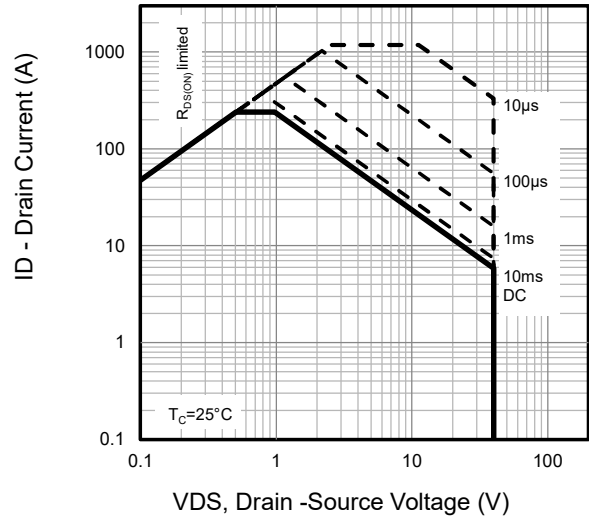


Fig8. Maximum Safe Operating Area

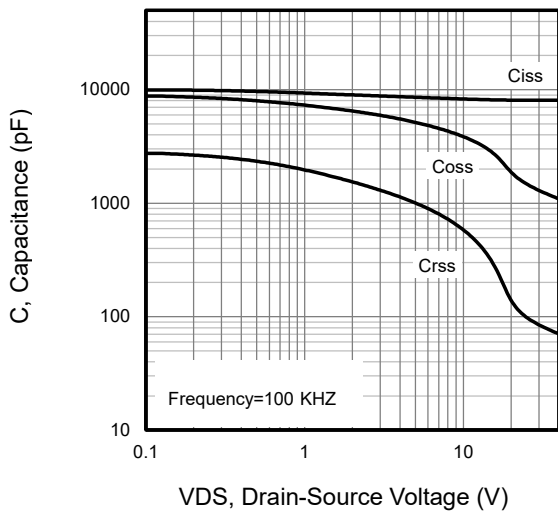


Fig9. Typical Capacitance Vs. Drain-Source Voltage

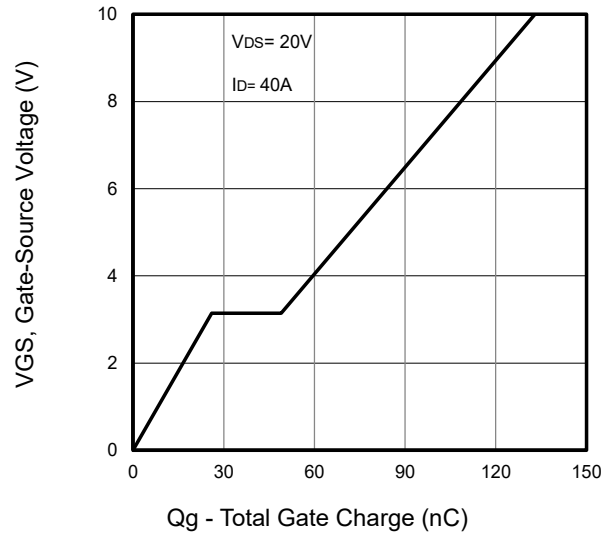


Fig10. Typical Gate Charge Vs. Gate-Source Voltage

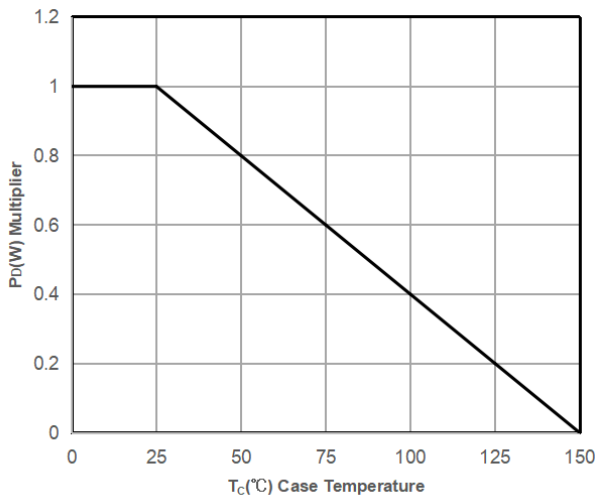


Fig11. Power Dissipation Vs. Case Temperature

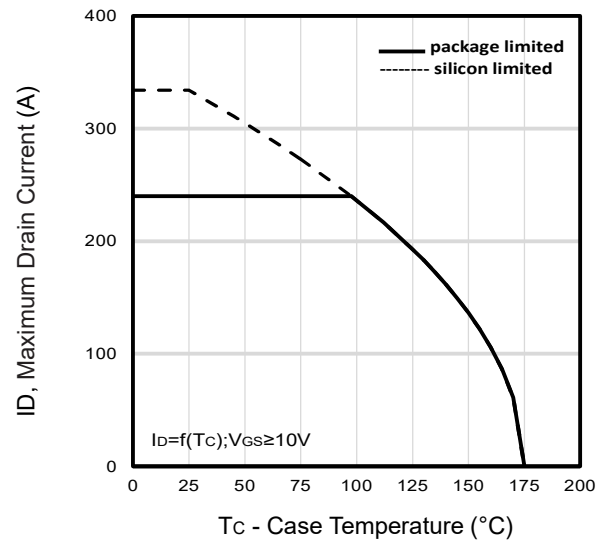


Fig12. Maximum Drain Current Vs. Case Temperature

Typical Characteristics

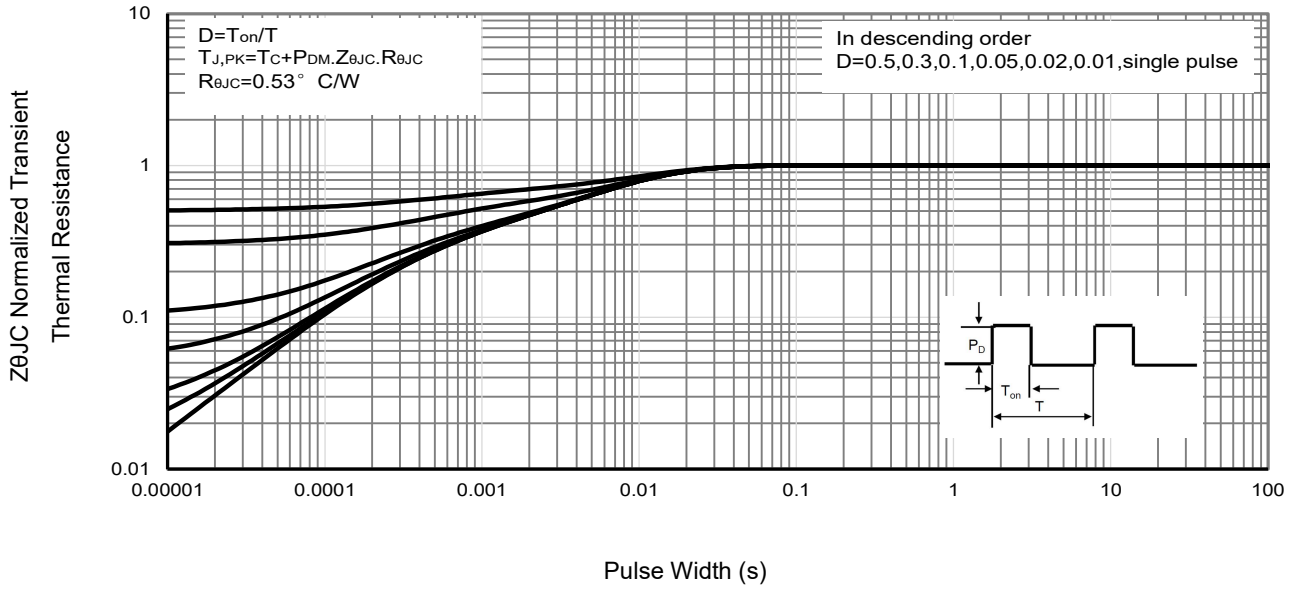


Fig13 . Normalized Maximum Transient Thermal Impedance

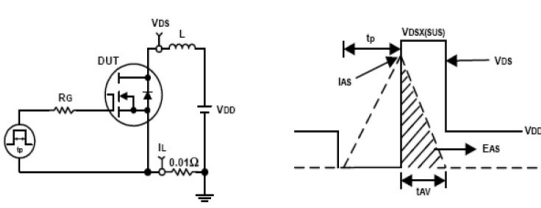


Fig14. Unclamped Inductive Test Circuit and waveforms

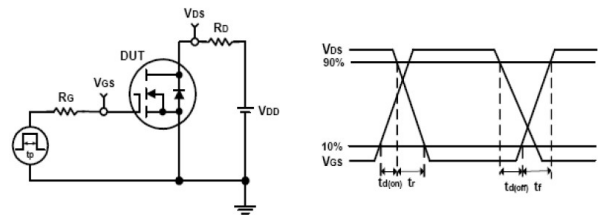
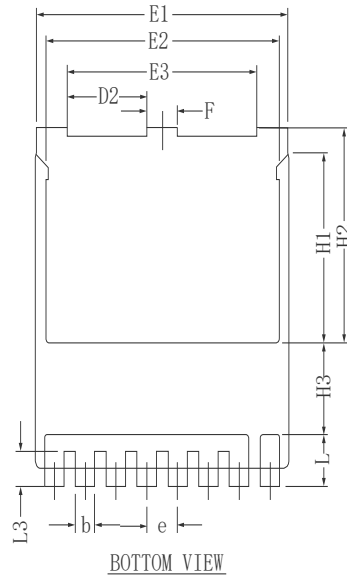
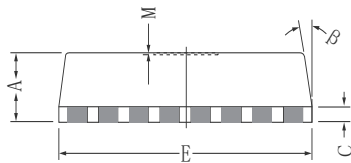
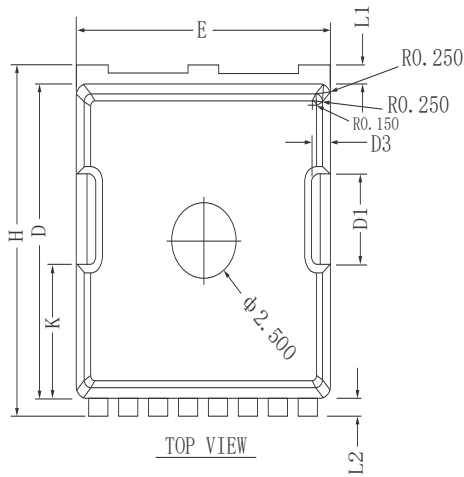
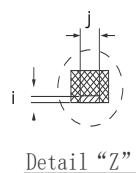
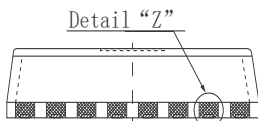
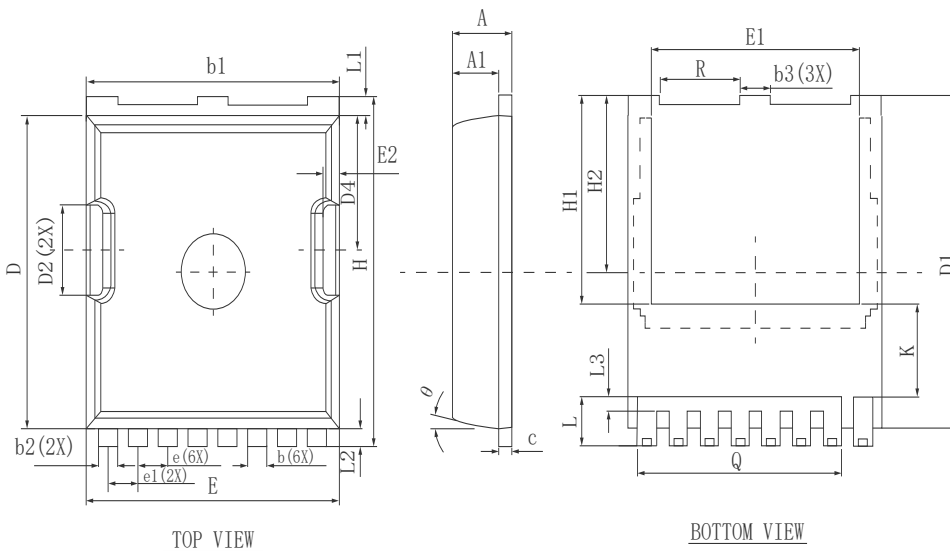


Fig15. Switching Time Test Circuit and waveforms

**•Dimensions (TOLL)**


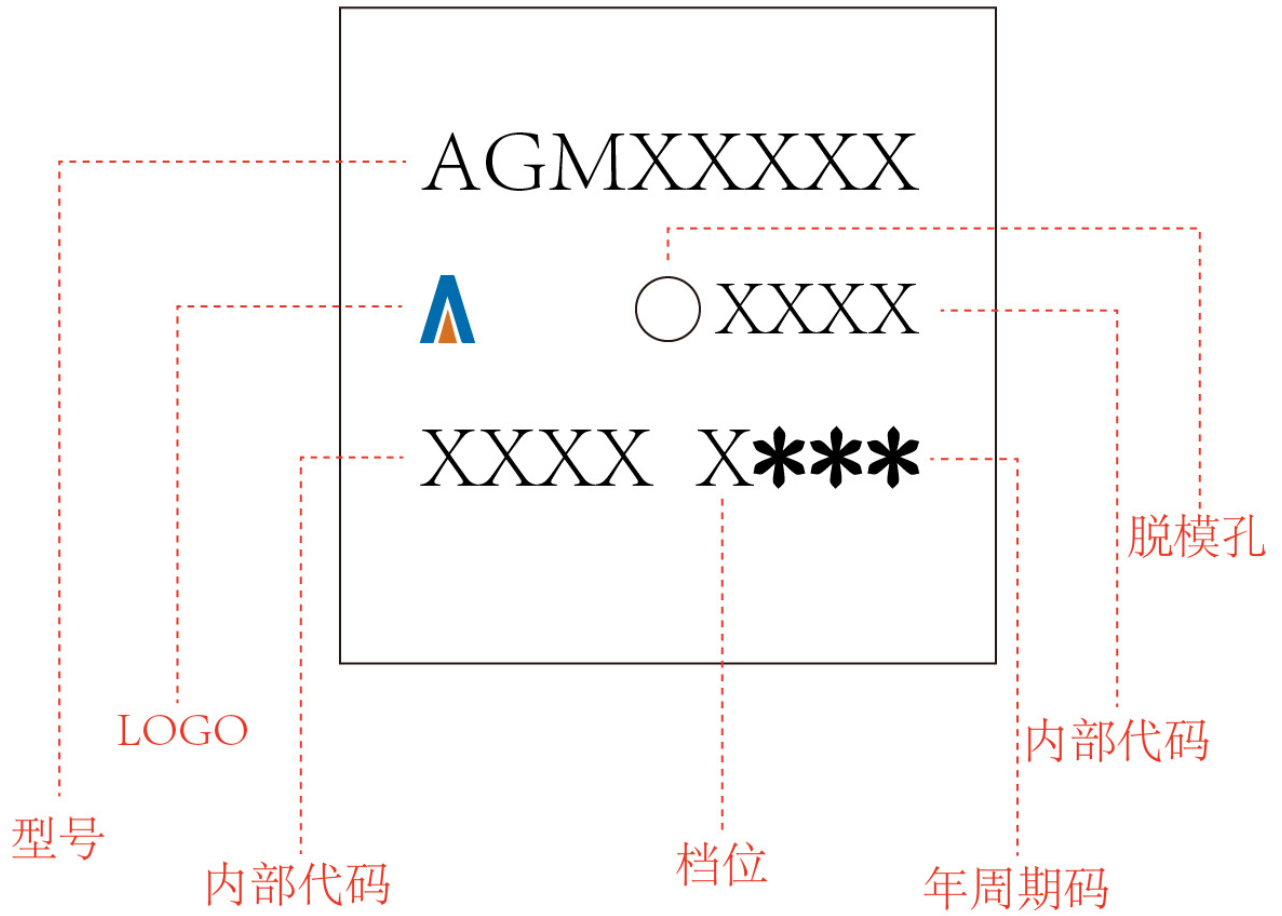
Symbols	Millimeters		
	MIN.	NOM.	MAX.
A	2.20	2.30	2.40
b	0.65	0.75	0.85
C	0.508 REF		
D	10.25	10.40	10.55
D1	2.85	3.00	3.15
D2	2.95	3.10	3.25
D3	0.75 REF		
E	9.75	9.90	10.05
E1	9.65	9.80	9.95
E2	8.95	9.10	9.25
E3	7.25	7.40	7.55
e	1.20 BSC		
F	1.05	1.20	1.35
H	11.55	11.70	11.85
H1	6.03	6.18	6.33
H2	6.85	7.00	7.15
H3	3.00 BSC		
L	1.55	1.70	1.85
L1	0.55	0.70	0.85
L2	0.45	0.60	0.75
L3	1.00	1.15	1.30
M	0.08 REF		
$\beta$	8°	10°	12°
K	4.25	4.40	4.55



SYMBOL	MILLIMETER		
	MIN.	NOM.	MAX.
A	2.200	2.300	2.400
A1	1.700	1.800	1.900
b	0.600	0.700	0.800
b1	9.700	9.800	9.900
b2	0.650	0.750	0.850
b3	1.100	1.200	1.300
c	0.400	0.500	0.600
D	10.300	10.400	10.500
D1	11.000	11.100	11.200
D2	3.200	3.300	3.400
D4	4.470	4.570	4.670
E	9.800	9.900	10.000
E1	8.000	8.100	8.200
E2	0.500	0.600	0.700
e	1.200 BSC		
e1	1.225 BSC		
H	11.600	11.700	11.800
H1	6.950 BSC		
H2	5.900 BSC		
i	0.100 REF.		
j	0.350 REF.		
K	3.100 REF.		
L	1.550	1.650	1.750
L1	0.600	0.700	0.800
L2	0.500	0.600	0.700
L3	0.400	0.500	0.600
Q	7.950 REF.		
R	3.000	3.100	3.200
$\theta$	10° REF.		

TOLL

Marking Instructions:




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